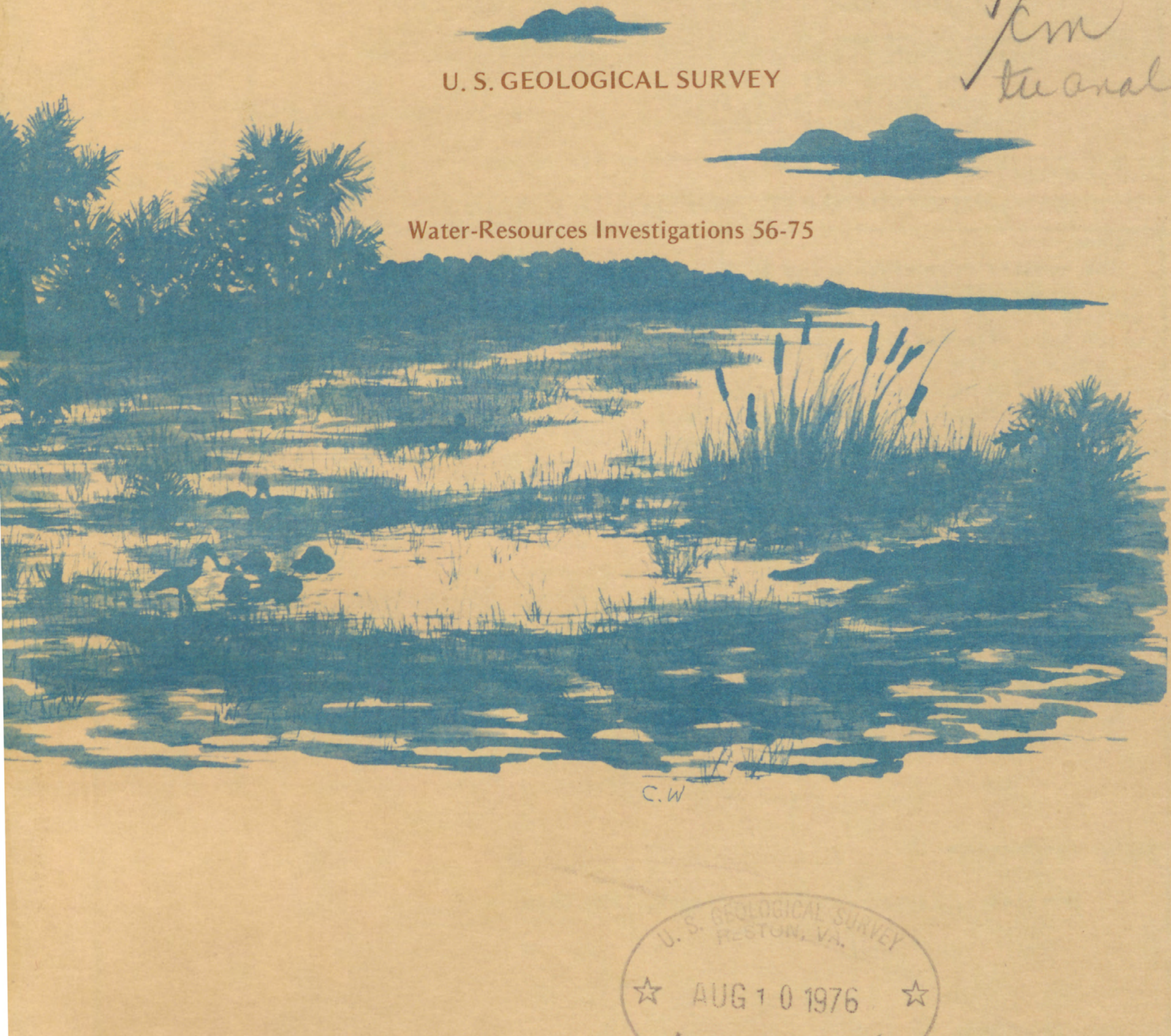
CHEMICAL AND BIOLOGICAL QUALITY OF WATER IN PART OF THE EVERGLADES, SOUTHEASTERN FLORIDA

U. S. GEOLOGICAL SURVEY

Water-Resources Investigations 56-75



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The quality of surface water in the agricultural area between Lake Okeechobee and the water conservation areas is markedly different from that of other surface water in southeastern Florida. Man has engaged in cultural activities, both agricultural and urban, which have affected the water quality in the northern and eastern segments of the area of investigation.

The quality of the water improves, however, as it flows to the south and east because there is minimal input from man's activities and many of the constituents are assimilated by plants, sorbed on organic material and clay in the bottom sediments, and entrapped within the sediments. Because of these processes, the water entering Everglades National Park is of better quality than that entering the conservation areas in the north.

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CHEMICAL AND BIOLOGICAL QUALITY OF WATER

IN A PART OF THE EVERGLADES,

SOUTHEASTERN FLORIDA

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ABSTRACT

A comprehensive monitoring network was established in a part of the Everglades to evaluate the quality of water being delivered to Everglades National Park. Physical, chemical, and biological parameters were determined in surface water, bottom sediment, and bulk precipitation (rainfall and dry fallout).

The geology of the area, bottom sediment, bulk precipitation, natural, urban, and agricultural runoff, and the characteristics of the hydrologic system in the Everglades influence the type and concentration of each chemical constituent and how it affects the water quality.

The quality of surface water in the agricultural area between Lake Okeechobee and the water conservation areas is markedly different from that of other surface water in southeastern Florida. In general, the water in this area is higher in concentrations of most chemical constituents. Man has engaged in cultural activities, both agricultural and urban, which have affected the water quality in the northern and eastern segments of the area of investigation.

The quality of the water improves, however, as it flows to the south and east because there is minimal input from man's activities and many of the constituents are assimilated by plants, sorbed on organic material and clay in the bottom sediments, and entrapped within the sediments. Dilution by rainfall and concentration by evapotranspiration are also important factors that influence the quality of surface water in the area of investigation.

The area of investigation in the Everglades is a sink for macronutrients, trace metals, and chlorinated-hydrocarbon insecticides. These constituents do not move through the system freely. They become tied up in various complexes and for that reason, the water being delivered to Everglades National Park is of better quality than the water entering the northern edge of the water conservation areas. The various physical and biological processes and chemical reactions combine to improve the water quality as the water flows southward.

The data presented in this report may be used as a baseline for determination of future changes in water quality at the several places in the Everglades where recurrent sampling of rainfall, surface water, and bottom sediments was undertaken during the course of the investigation.

INTRODUCTION

The area of investigation is located within the Everglades (Davis, 1943) and (fig. 1) extends from Lake Okeechobee southward into the extreme northwest part of Everglades National Park. The area has little relief: altitudes range from 18 ft (5.5 m) at Lake Okeechobee to sea level in the estuaries to the southwest. Most of the land within the water conservation areas of the FCD (Central and Southern Florida Flood Control District) and the National Park is characterized by emergent aquatic vegetation predominantly sawgrass (Cladium jamacencis) and cattail (Typha sp.). At the places in the southern half of the Everglades where the altitude is slightly higher, willow and bay heads (Craighead, 1971) have developed. The land north of the conservation areas is used mainly for sugar cane production, cattle ranching and truck farming.

Before south Florida was settled, the Everglades was a large fresh-water swamp 100 mi (160 km) long and 40 mi (64 km) wide. During the wet season (June through November) water moved as sheet flow over the Everglades, but during the dry season (December through May) as water levels declined, overland flow ceased and water became ponded in the deeper sloughs and alligator holes.

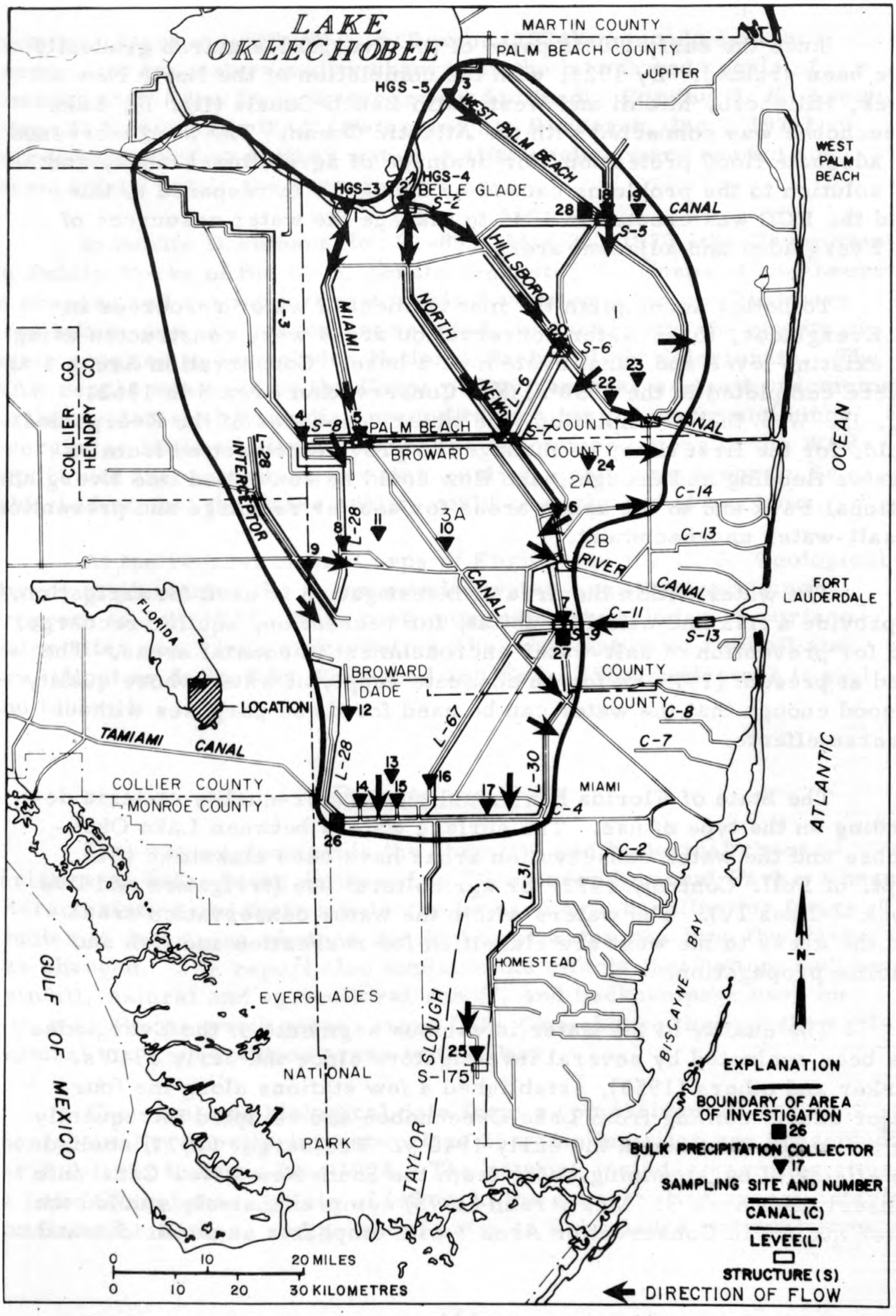


Figure 1. --Location of sampling sites, flow patterns, and delineation of the area of investigation.

Since the early 1900's parts of the Everglades marsh gradually have been drained. By 1921, with the completion of the North New River, Hillsboro, Miami and West Palm Beach Canals (fig. 1), Lake Okeechobee was connected with the Atlantic Ocean. The need increased for adequate flood protection, for drainage of agricultural lands, and for solution to the problems caused by drought. In response to this need the FCD was created in 1949 to manage the water resources of the Everglades and adjacent areas.

To better accomplish the management of water resources in the Everglades, three water conservation areas were constructed using the existing levee and canal system as a base. Conservation Areas 1 and 2 were completed in the 1950's, and Conservation Area 3 in 1962 (fig. 1). With their completion, the water resources of the Everglades could, for the first time, be managed to provide protection from excessive flooding and drought, and flow could be controlled into Everglades National Park and to the urban areas for aquifer recharge and prevention of salt-water encroachment.

The water within the area of investigation is used for irrigation, to provide a fish and wildlife habitat, for recreation, aquifer recharge, and for prevention of salt-water encroachment in coastal areas. The need at present (1975) is for an adequate supply of water whose quality is good enough that the water can be used for these purposes without adverse effects.

The State of Florida has established water-quality criteria depending on the type of use. The surface waters between Lake Okeechobee and the water conservation areas have been classified (Fla. Dept. of Poll. Control, 1972) for agricultural use (irrigation and live stock - Class IV). The waters within the water conservation areas and the areas to the west are classified for recreation and fish and wildlife propagation.

The quality of the water in various segments of the Everglades has been evaluated by several investigators since the early 1940's. Parker and others (1955), established a few stations along the four major canals coming from Lake Okeechobee and sampled infrequently for a few constituents in the early 1940's. Freiberger (1973) studied the effects of backpumping water from the South New River Canal into Conservation Area 3. McPherson (1973) comprehensively studied the water quality in Conservation Area 3 with emphasis on pesticides and their biological magnification. Gleason (1974) comprehensively documented the water-quality changes in the marsh and canals of Conservation Area 2A as water levels declined. For the U. S. Army Corps of Engineers, WAR (Water and Air Research, Inc., 1971) determined whether further water-quality studies were needed adjacent to and within the conservation areas.

In Senate Document No. 91-895, May 26, 1970, the Committee on Public Works of the U. S. Senate requested the Corps of Engineers to prepare and submit a report within 1 year on measures that have been taken, and any agreement reached, to assure that the quality of water supplied to Everglades National Park will not deteriorate. The WAR report was used by the Corps of Engineers as a base to recommend further water-quality studies needed to monitor the water entering Everglades National Park. One of the recommendations in the WAR report was that a permanent water-quality-monitoring program be established so that the water quality could be evaluated at any time.

At the request of the Corps of Engineers, the U. S. Geological Survey implemented the recommended water-quality-monitoring program in July 1972. This continuing network includes 25 surface-water sites and 3 bulk precipitation (the combination of rainfall and dry fallout as defined by Whitehead and Feth, 1964) collectors (fig. 1 and table 1).

Purpose and Scope

This report documents the chemical and biological characteristics of water being delivered to Everglades National Park. These characteristics and their levels can be used as a baseline for future studies to determine whether the quality of water reaching the Park has changed. The report also explains the effects that bottom sediment, rainfall, natural and agricultural runoff, and backpumpage have on water quality as water moves from Lake Okeechobee through the agricultural and conservation areas to the Park.

Chemical and biological data from a comprehensive environmental-quality-monitoring network of 25 sampling sites are presented for July 1972 through June 1974. The network includes sampling sites at Lake Okeechobee, points of inflow to the conservation areas, interior canals and marshes, and points of entry to Everglades National Park.

Table 1.--Site names and numbers.

Site		Surface water Name	Downstream order number or latitude-longitude
1	HGS-3	Miami Canal below HGS-3 and S-3 at Lake Harbor	02286400
2	HGS-4	North New River Canal below HGS-4 Nr. South Bay, Fla.	02283500
3	HGS-5	West Palm Beach Canal below HGS-5 at Canal Point	02278002
4	L-3 Canal	L-3 Canal 7 miles west of S-8 Nr Andytown, Fla.	261945080530000
5	S-8	Miami Canal at S-8 Nr Lake Harbor, Fla.	02286700
6	S-11C	North New River Canal below S-11C Nr Fort Lauderdale	02284501
7	S-9	South New River Canal at S-9 Nr Davie, Fla.	02285400
8	S-140	L-28 Borrow Canal below S-140 Nr Andytown, Fla.	261240080494001
9	L-28 Interceptor	L-28 Interceptor Canal 0.5 mi. below SR 84	260945080533000
10	Miami Canal @ SR 84	Miami Canal at Alligator Alley	260850080381000
11	Corps of Eng Station 3-2	Corps of Engineer Gage 3-2 Nr Andytown	261057080442600
12	L-28 Canal	L-28 East Canal near Pinecrest	255600080484500
13	Everglades Station 3-28	Everglades No. 3-28 Nr Pennsuco, Fla.	02289043
14	S-12	Tamiami Canal above S-12A Miami, Fla.	254542080493000

Table 1. --Site names and numbers (continued)

	Site	Surface water Name	Downstream order number or latitude-longitude
15	S-12C	Tamiami Canal Outlets Levee 67A to 40-Mile Bend	02289040
16	L-67 Canal	L-67A Canal 0.5 mile north of Tamiami Canal	254620080395000
17	Bridge 53	Tamiami Canal Outlets L-30 to L-67A Nr Miami	02289060
18	S-5	West Palm Beach Canal above S-5A Nr Loxahatchee, Fla.	264100080210000
19	1 Mile East of S-5	West Palm Beach Canal 1 mile East of S-5AE	264100080210000
20	S-6	Hillsboro Canal at S-6 Nr Shawano, Fla.	02281200
21	S-7	North New River Canal above S-7	262000080320500
22	S-1	Hillsboro Canal above S-10C	262400080230000
23	Everglades Sta. 1-15	Everglades No. 1-15 Delray Beach, Fla.	02281295
24	Everglades Sta. 2-17	Everglades No. 2-17 Nr Andytown, Fla.	02284642
25	S-175	L-31W Canal above S-175 Nr Florida City, Fla.	252400080341500

Table 1. --Site names and numbers (continued)

	Site	Bulk Precipitation Name	Downstream order number or latitude-longitude
26	S-12A	Rainfall at 40-Mile Bend Nr Pinecrest, Fla.	254542080493001
27	S-9	Rainfall at Pump Station 9 Nr Davie, Fla.	260340080263001
28	S-5	Rainfall at Pump Station 5 Nr Loxahatchee, Fla.	264105080221501

A pilot project determining the chemical characteristics of precipitation was included in the scope of this study. No previous studies of bulk precipitation in South Florida had been undertaken up to this time.

Data Collection

Surface-water, bulk precipitation, and bottom-material samples are collected and analyzed according to the schedule shown in table 2. Surface-water is sampled 1 foot (0.3 m) below the surface. Sediment is sampled with a 6x6-inch (150 x 150 mm) Ekman dredge or directly with the sample container.

A refrigerated precipitation collector (fig. 2) was designed especially for use in this study (Earle, 1973). It provided continuous collection of rainfall and dry fallout, termed "bulk precipitation", as defined by Whitehead and Feth (1964). Refrigeration is needed in South Florida to prevent biological activity in the bulk precipitation collected and to minimize evaporation of the sample. In studying the chemical composition of rainfall around Lake Okeechobee, Joyner (1971), used non-continuous collectors to collect the rainfall samples. Rainfall is also being collected in Central Florida on a non-continuous basis for chemical analysis. (A. Lamonds, Geological Survey, oral commun., 1974.)

GENERAL HYDROLOGY

Surface-water inflow to the conservation areas is both controlled and noncontrolled (fig. 1). Six pumping stations (S-5, S-6, S-7, S-8, S-9, and S-140) control water flow into the conservation areas by gravity discharge, through gate structures, and by back-pumping of canal water. Surface water that flows into Conservation Area 3 by way of the L-3 Canal and the 7.1-mile gap in Levee 28 is uncontrolled. The L-3 Canal (site 4, fig. 1) drains agricultural land north and west of Conservation Area 3A. The gap in Levee 28 (sites 9, 12, fig. 1) drains subarea A (fig. 1) of the Big Cypress watershed (Klein and others, 1970).

Table 2.--Parameters measured and frequency of sampling at sampling sites. (M, monthly; Q, quarterly; S, semi-annually.

	Frequency
SURFACE WATER	
[1]Field measurements	M
[2]Nutrients (unfiltered sample)	M
TOC (total organic carbon)	M
BULK PRECIPITATION:	
Nutrients (unfiltered sample)	M
TOC	M
Specific conductance	M
SURFACE WATER:	
[3]Trace metals (unfiltered sample)	Q
Biochemical oxygen demand (BOD)	Q
Alkalinity	Q
Suspended solids	Q
Phytoplankton	Q
BULK PRECIPITATION:	
Trace metals (unfiltered sample)	Q
[2]Major inorganic ions	Q
Insecticides	Q

Table 2.--Parameters measured and frequency of sampling at sampling sites (continued).

Parameter	Frequency
SURFACE WATER:	
Trace metals (filtered sample)	S
Major inorganic ions	S
BOTTOM SEDIMENT:	
[5] Nutrients and trace metals	S
Chlorinated-hydrocarbon insecticides	S

1 Field measurements: dissolved oxygen, temperature, pH, specific conductance.

2 Nutrients - nitrate, nitrite, ammonia, organic nitrogen, orthophosphate, total phosphorus, turbidity.

3 Trace metals: arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, strontium, zinc.

4 Major inorganic ions: calcium, magnesium, sodium, potassium, sulfate, chloride, fluoride, hardness, dissolved solids, color.

5 Sediments: total and organic nitrogen, total phosphorus, total and organic carbon, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, zinc, and organic content.

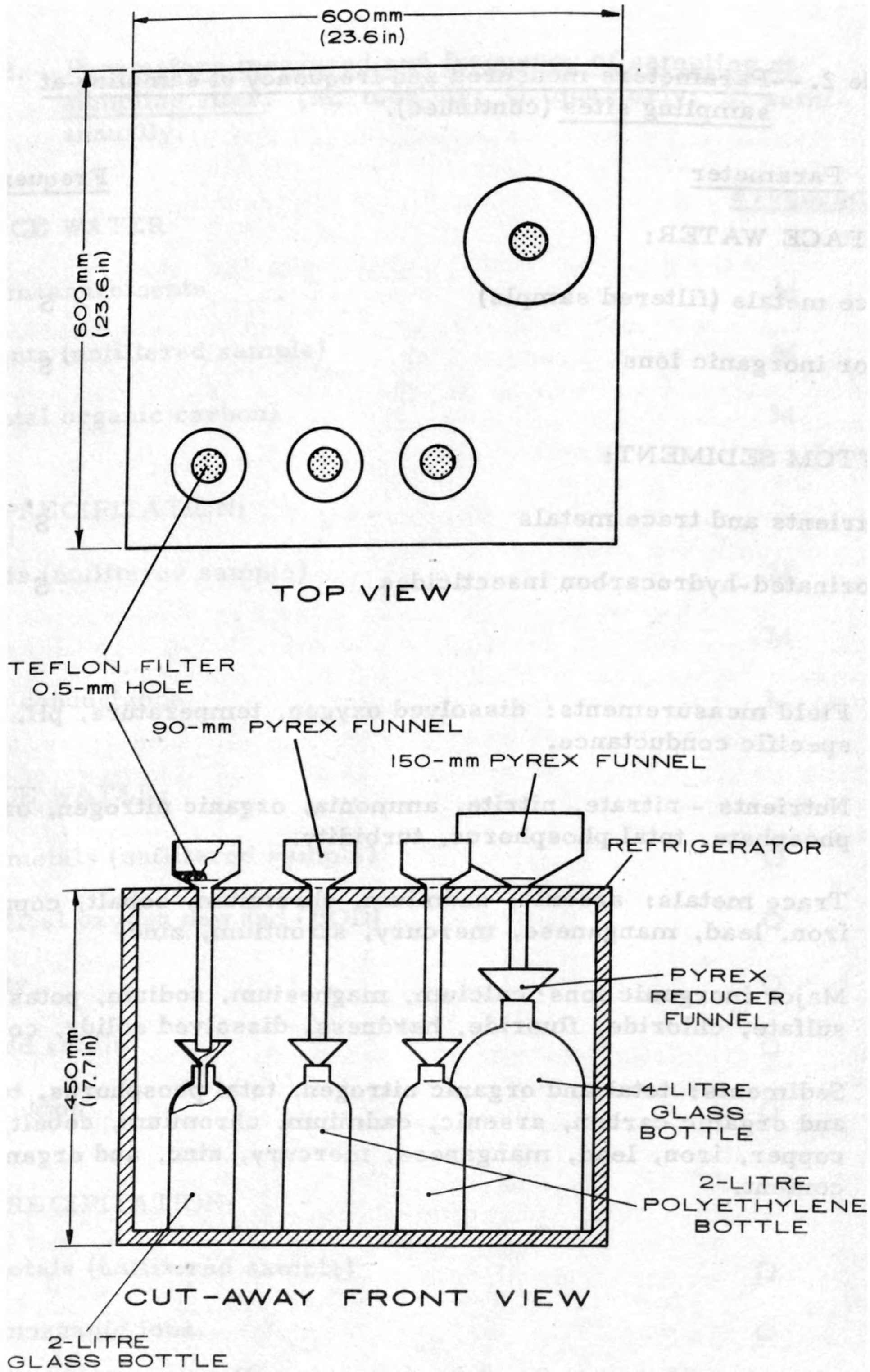


Figure 2. --Plan and front section of refrigerated bulk precipitation collector.

Control of flow into the area of investigation from Lake Okeechobee is regulated by hurricane gates 3, 4, and 5 (sites 1, 2 and 3 in fig. 1). Water is backpumped into Lake Okeechobee at S-3 on the Miami canal (site 1 in fig. 1) and S-2 on the North New River-Hillsboro canal (site 2 in fig. 1). The flow from these three Lake Okeechobee outlets is regulated to prevent flooding in the surrounding areas, to provide irrigation water, and to store water in Lake Okeechobee.

Water is lost from the three conservation areas by surface-water outflow, seepage, and evapotranspiration. Surface water is released by controlled discharge into two areas: 1) the urban area east of the conservation areas through S-31, S-34, S-38, and S-39 structures, and 2) Everglades National Park through the S-12 structures. Additional surface-water flow to the upper Shark River Slough is uncontrolled across the Tamiami Trail between Levee 30 and Levee 67 (fig. 1).

Flow into the western edge of Taylor Slough is controlled by a movable crest spillway at S-175 (site 25 in fig. 1) on the L-31W canal. Water levels are maintained upstream of S-175 to help prevent salt-water encroachment into Taylor Slough during the dry season.

Rainfall over the area of investigation averaged 41.79 inches (1,061 mm) from July 1972 to June 1973 and 47.71 inches (1,212 mm) from July 1973 to June 1974. Both of these yearly averages were significantly below the long-term average of 53.24 inches (1,352 mm) (U. S. Dept. of Commerce, 1964). Rainfall varied seasonally (fig. 3).

Most of the water within the area of investigation is derived from rainfall on the area. The remainder of the water comes from Lake Okeechobee. During the wetter months water will flow either over the marshes, as sheet flow, or in canals, culverts and spillways. During the drier months water becomes ponded in the marshes and flow ceases in the canals unless water is backpumped into the conservation areas.

CHEMICAL CHARACTERISTICS

Surface Water

The 25 surface-water sites are divided into seven groups. These groups were determined by location of the sites within the area of

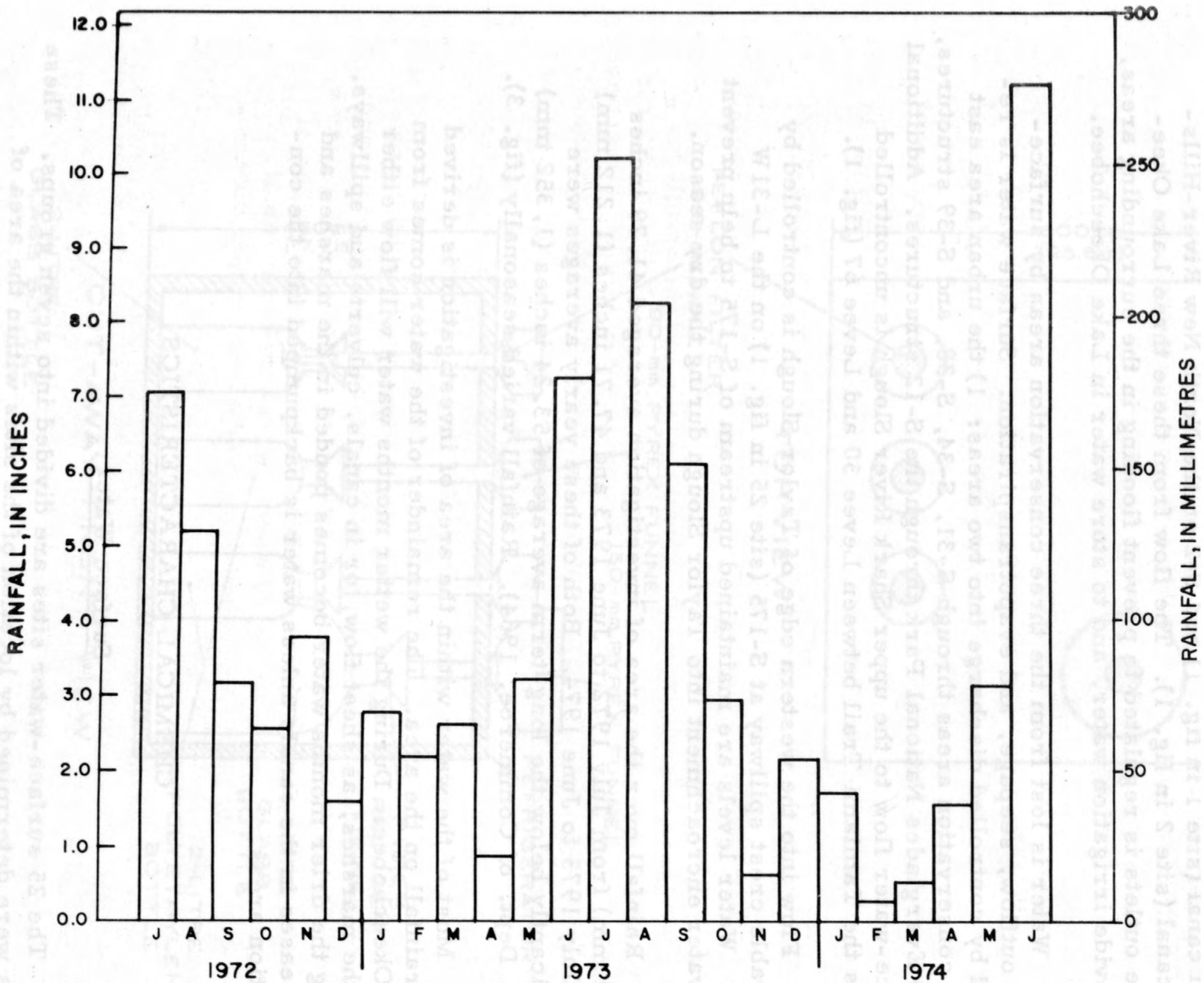


Figure 3.--Average monthly rainfall at 5 stations within and adjacent to the Everglades, July 1972 - June 1974.

investigation, use of the land adjacent to the sampling sites, and whether the sampling site is a marsh or canal, and on similarity in chemical character.

The groups of surface-water sites are as follows:

Lake sites (1, 2, and 3 of fig. 1)	(Group 1)
Northern canal sites (5, 7, and 18-21 of fig. 1)	(Group 2)
Western canal sites (4, 8, 9, and 12 of fig. 1)	(Group 3)
Internal canal sites (6, 10 and 22 of fig. 1)	(Group 4)
Marsh sites (11, 13, 23, 24 of fig. 1)	(Group 5)
Southern canal sites (14-17 of fig. 1)	(Group 6)
Taylor Slough (site 25 of fig. 1)	(Group 7)

The chemical quality of the surface water in the Everglades basin depends on many factors of which some are: 1) contact with the underlying limestone, 2) addition of rainfall and dry fallout, 3) contact with the peat and muck soils, 4) interactions with the bottom material, and 5) man-caused changes.

Macronutrients

Compounds required by organisms in any great amount are termed "macronutrients". Carbon compounds, nitrogen species and both inorganic and organic phosphorus are considered macronutrients. They are essential for the growth, maintenance and regeneration of most aquatic organisms. If the concentrations of the macronutrients are too high, some organisms may die or the water may become unsuitable for some uses.

The area of investigation is almost completely covered with highly organic peat and muck soils. Levees, canals, and rock outcrops are the only places where organic material does not cover the land surface. Because the organic content of the soils in this area is high, concentrations of macronutrients also are high. Biological processes break down the organic material and release the nitrogen, phosphorus and carbon compounds into the water.

The natural system is in a state of dynamic equilibrium and the usual way it is thrown out of balance is by cultivation of the soils and by the addition of sewage and fertilizers. This equilibrium is reflected in the ratios of the concentrations of each constituent. Increase in nitrate and orthophosphate may indicate fertilizers entering in runoff. Increases in organic carbon, nitrogen, and phosphorus may indicate domestic or feedlot waste entering the water.

The concentrations of nitrogen and phosphorus species were determined from samples of bulk precipitation, of surface water in canals and marshes, and of bottom material in both canal and marshes. In the tables contained in this report, macronutrients are reported in elemental form.

Nitrogen

Nitrogen occurs naturally in water in many forms, either as organic or inorganic compounds. The most common inorganic species are nitrate (NO_3) and nitrite (NO_2) both of which are in an oxidized state, and the ammonium ion (NH_4) which is in a reduced state. Organic nitrogen, derived from living and dead plants and animals, is usually in the form of amino acids and proteins. Total nitrogen concentration is the sum of all the nitrogen-compound concentrations, both organic and inorganic.

In an idealized aquatic ecosystem (fig. 4) nitrogen compounds are in dynamic equilibrium and the form in which they occur depends on factors such as oxygen level (redox potential), biochemical reactions, and assimilation by plants. Stratification as shown in figure 4 is not usually present in shallow marsh and canal systems, particularly if the rate of flow is high. Nitrogen compounds can reach a dynamic equilibrium when no excessive inputs or reactions are driving the system to an imbalance. Agricultural runoff, fertilizer application, and organic material from urban areas would constitute such input.

The composition of the nitrogen compounds in the area of investigation gives an indication of the nature of the drainage area. Of the total nitrogen present, organic nitrogen is the most prevalent form

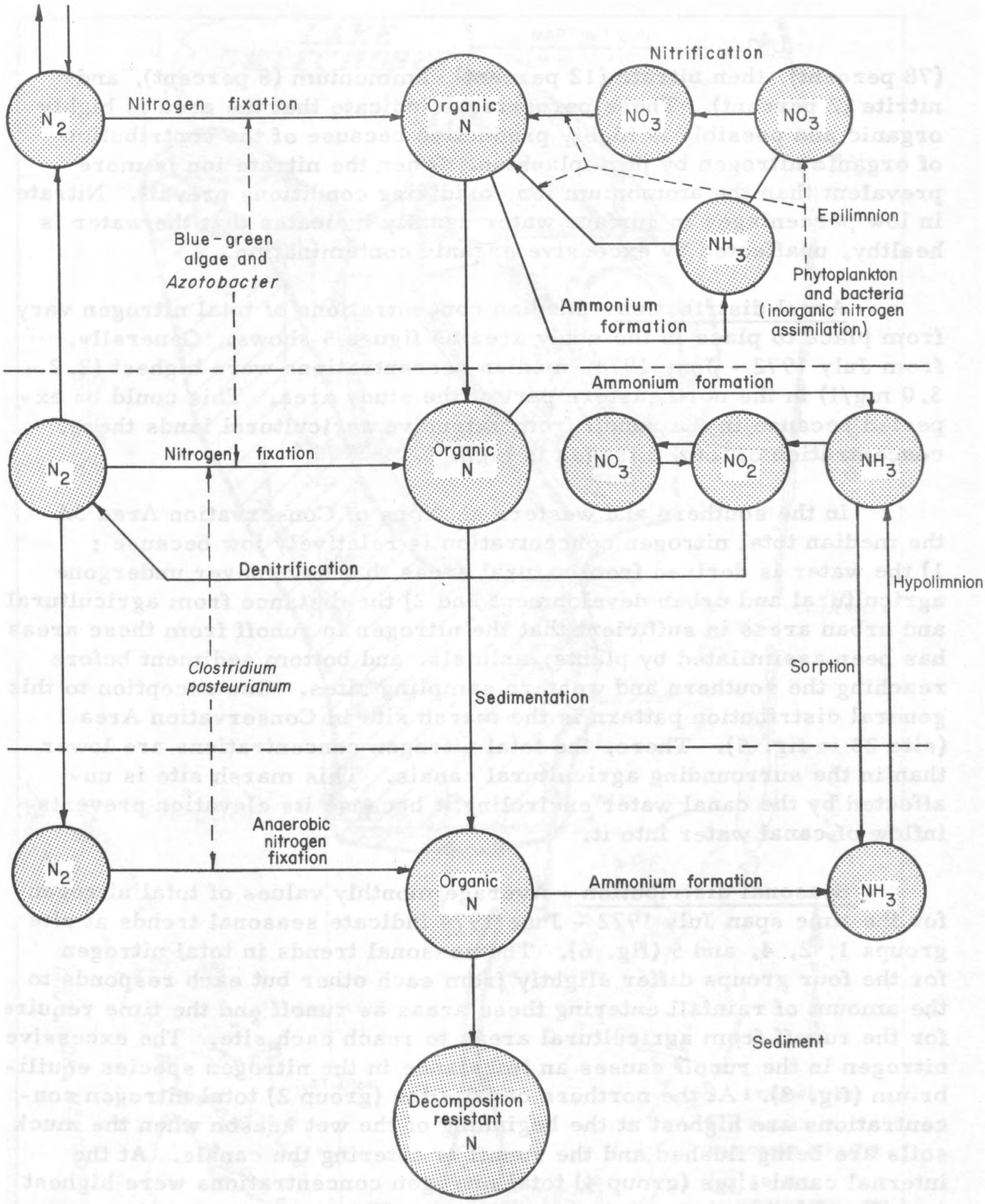


Figure 4.--Schematic diagram of nitrogen cycle reactions in an idealized aquatic ecosystem. (Adapted from Allen and Kramer.)

(78 percent), then nitrate (12 percent), ammonium (8 percent), and nitrite (2 percent). These percentages indicate that the area is highly organic and possibly is highly productive because of the contribution of organic nitrogen by phytoplankton. When the nitrate ion is more prevalent than the ammonium ion, oxidizing conditions prevail. Nitrate in low percentages in surface water usually indicates that the water is healthy, unaffected by excessive organic contamination.

Areal distribution - Median concentrations of total nitrogen vary from place to place in the study area as figure 5 shows. Generally, from July 1972 - June 1974, median concentrations were highest (2.2 - 3.0 mg/l) in the northeastern part of the study area. This could be expected because in the runoff from extensive agricultural lands there, concentration of total nitrogen is high.

In the southern and western sections of Conservation Area 3A the median total nitrogen concentration is relatively low because : 1) the water is derived from natural areas that have never undergone agricultural and urban development and 2) the distance from agricultural and urban areas is sufficient that the nitrogen in runoff from these areas has been assimilated by plants, animals, and bottom sediment before reaching the southern and western sampling sites. One exception to this general distribution pattern is the marsh site in Conservation Area 1 (site 23 in fig. 5). There, the total nitrogen concentrations are lower than in the surrounding agricultural canals. This marsh site is unaffected by the canal water encircling it because its elevation prevents inflow of canal water into it.

Seasonal distribution - Average monthly values of total nitrogen for the time span July 1972 - June 1974 indicate seasonal trends at site groups 1, 2, 4, and 5 (fig. 6). The seasonal trends in total nitrogen for the four groups differ slightly from each other but each responds to the amount of rainfall entering these areas as runoff and the time required for the runoff from agricultural areas to reach each site. The excessive nitrogen in the runoff causes an imbalance in the nitrogen species equilibrium (fig. 3). At the northern canal sites (group 2) total nitrogen concentrations are highest at the beginning of the wet season when the muck soils are being flushed and the runoff is entering the canals. At the internal canal sites (group 4) total nitrogen concentrations were highest 1 to 2 months after the wet season began. This is due to the time required for the water to flow from the agricultural areas through the conservation areas. At the marsh sites (group 5) total nitrogen concentrations

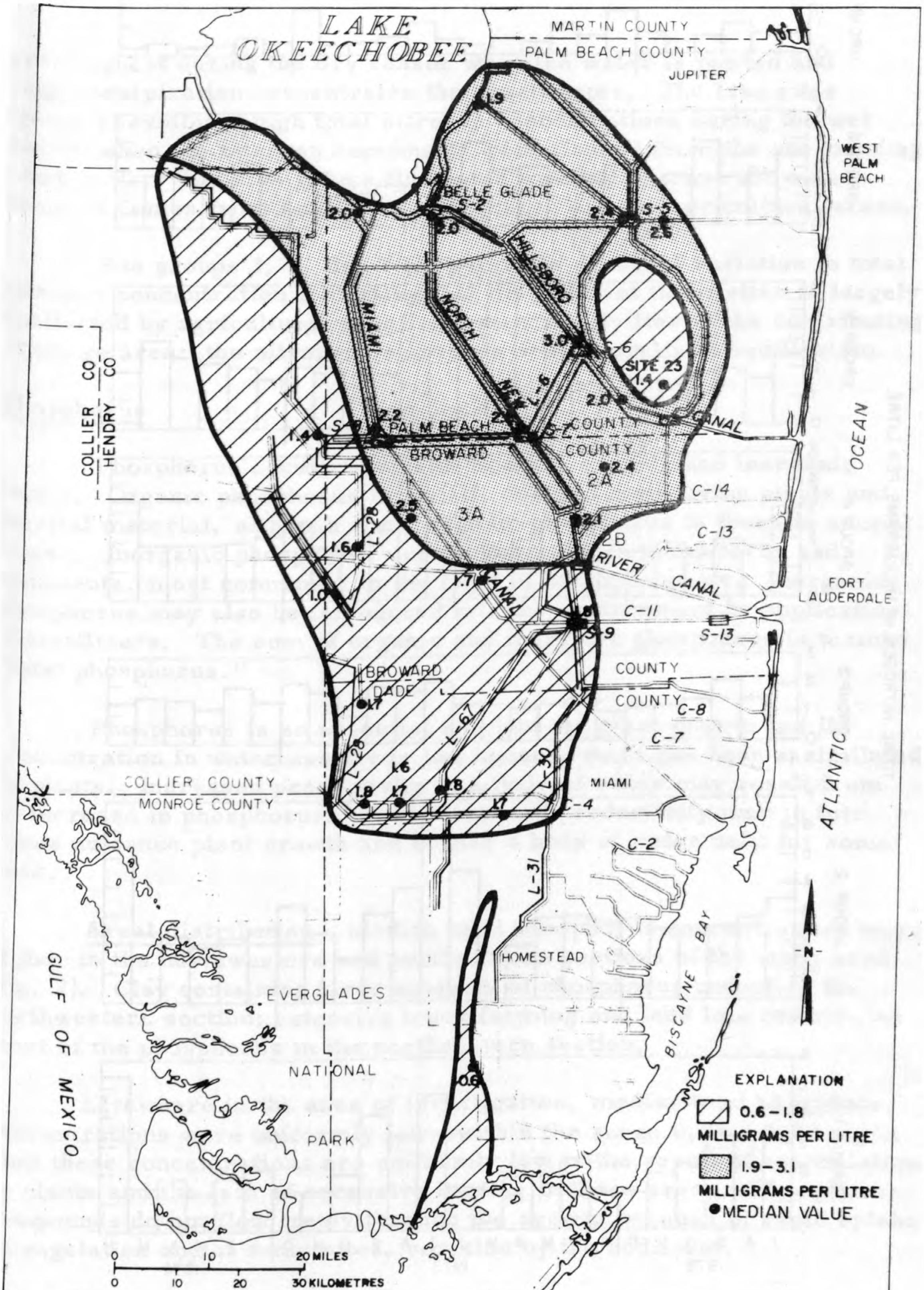


Figure 5. --Median total nitrogen concentrations, July 1972 - June 1974.

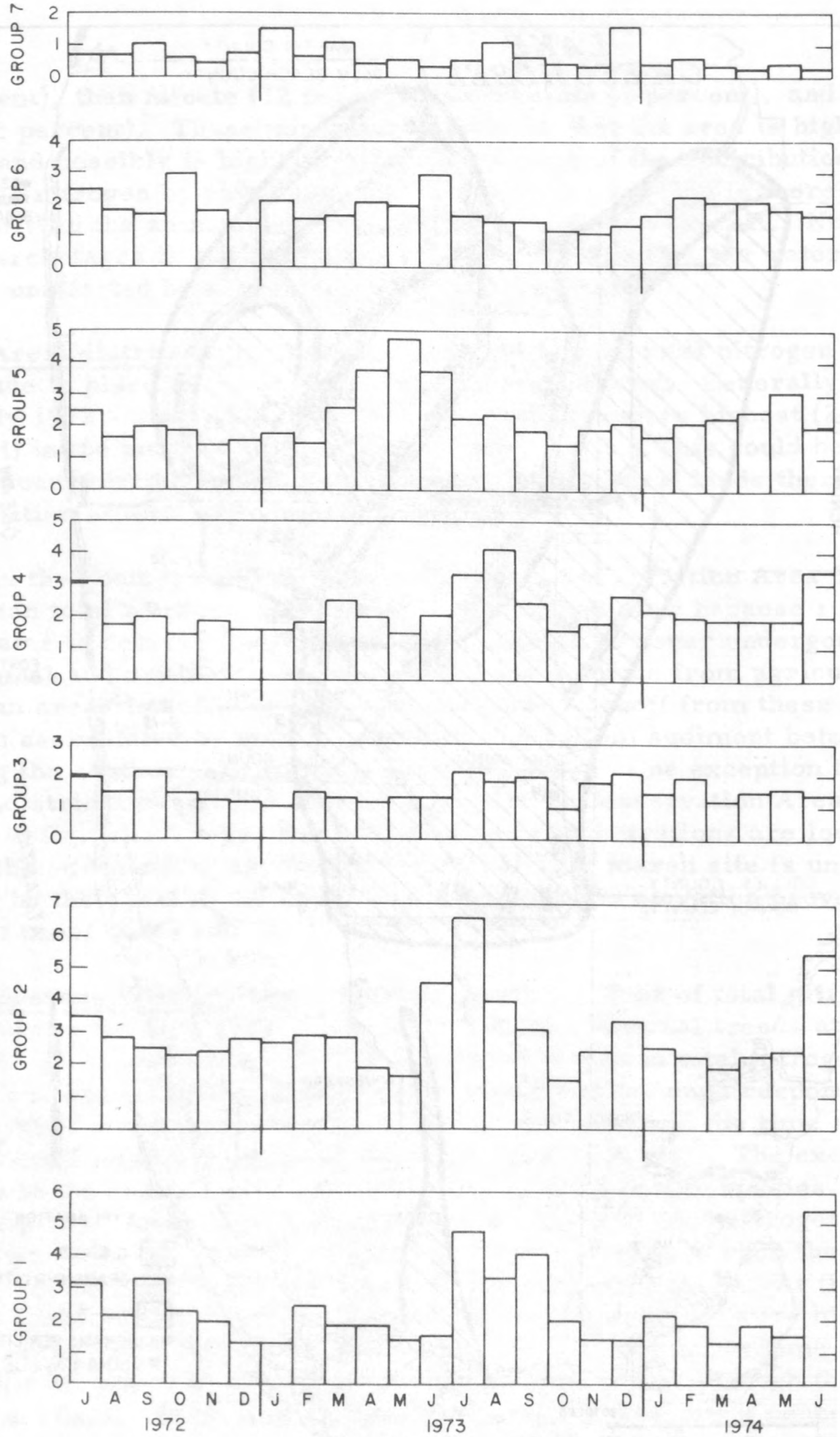


Figure 6.--Average monthly total nitrogen concentration for each sampling-site group.

were highest during the dry season when the water is ponded and evapotranspiration concentrates the constituents. The lake sites (group 1) exhibited high total nitrogen concentrations during the wet season when the nitrogen compounds were flushed from the surrounding muck soils. The high values fluctuated monthly because the water sampled comes from both Lake Okeechobee and the agricultural areas.

Site groups 3, 6, and 7 showed little seasonal variation in total nitrogen concentration indicating that the water at these sites is largely unaffected by agricultural runoff and man's activities in the contributing drainage area: the nitrogen compounds are generally in equilibrium.

Phosphorus

Phosphorus occurs naturally in many organic and inorganic forms. Organic phosphorus is usually derived from living plants and detrital material, although some organic phosphorus is found in animal tissue. Inorganic phosphorus occurs naturally in many rocks and sediments, most commonly in the form of orthophosphate. Inorganic phosphorus may also be introduced into the environment by application of fertilizers. The sum of organic and inorganic phosphorus is termed "total phosphorus."

Phosphorus is an essential nutrient for plant growth and its concentration in water usually is low because most has been assimilated by plants. Increased productivity in a body of water may result from an increase in phosphorus. This increased productivity may in turn cause nuisance plant growth and render a body of water unfit for some uses.

Areal distribution - Median total phosphorus concentrations were higher in the northwestern and northeastern sections of the study area (fig. 7). Clay containing large amounts of phosphorus underlies the northwestern section; extensive truck farming and feed lots contributed most of the phosphorus in the northeastern section.

Elsewhere in the area of investigation, median total phosphate concentrations were uniformly low--within the range 0.01 - 0.02 mg/l. That these concentrations are uniformly low is the result of assimilation by plants and the lack of excessive loading in these areas. Phosphorus compounds do not flow freely through the system because of rapid uptake by vegetation and at some sites, sorption by the sediment.

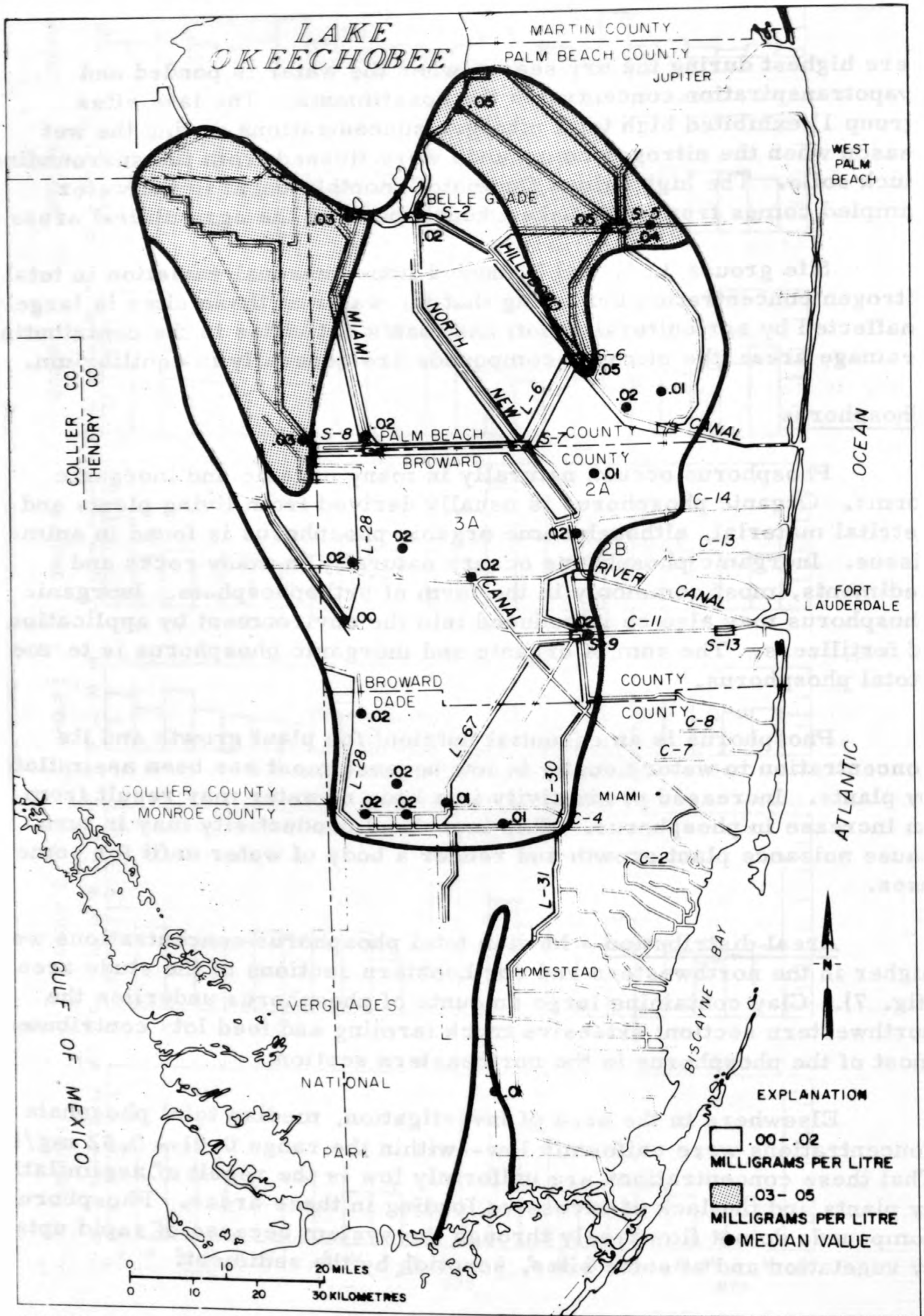


Figure 7.--Median total phosphorus concentrations, July 1972 - June 1974.

Seasonal distribution - Average monthly total phosphorus concentrations indicate a slight seasonal variation at sites in groups 1 through 4 (fig. 8). The total phosphorus concentrations increased during the wet season, thereby following the general pattern of total nitrogen (fig. 6), although the trend is not well defined. The presence of phosphorus in runoff from agricultural land due to fertilizer application near sites in groups 1, 2 and 4 probably masked seasonal trends.

Total phosphorus concentrations varied nominally in groups 5, 6, and 7. This indicates that the areas are not affected by excessive phosphorus loading and that the plant communities are able to maintain the phosphorus compounds at low levels by assimilation.

Major Inorganic Ions

The Everglades waters are mineralized primarily because of their contact with highly soluble calcium carbonate rock, which underlies most of the area, and with the organic soils. The ground water immediately to the south of Lake Okeechobee is also mineralized due to contact with connate sea water from ancient marine sediments. During periods of backpumping, ground water is drawn into the canals south of Lake Okeechobee, thus increasing the mineralization of the surface water. The waters throughout the area of investigation are classified as a calcium carbonate type on the basis of the dominant cation (positive charged ion) and anion (negative charged ion) present. In the northeastern section sodium and chloride are found in sufficient concentration to be co-dominant with calcium carbonate; hence, the waters are classified as a mixed type.

All the major inorganic ions determined (table 3) were dissolved species. Most ions stay in solution in aqueous media under natural conditions. One notable exception to this is calcium carbonate. Under a pH greater than 8.3 the compound will precipitate out of solution. This process was noted several times during the wet season at the marsh sites and in the L-28 Interceptor Canal (site 9 of fig. 1).

The concentrations of major cation and anion species varied both seasonally and between groups (fig. 9). Most dissolved species increased in concentration during the dry season. This increase is most pronounced in the marsh sites (group 5) where evapotranspiration concentrates the ions in the ponded water and in the southern canal sites

Table 3.--Average concentrations of major inorganic ions and color for wet and dry seasons. (in milligrams per litre except where noted)

	Season	Color (PCS) 1/	Ca	Mg	Na	K	HCO_3	SO_4	Cl	DS	H
Group 1 Lake sites	D*	27	47	19	63	4.9	165	67	96	385	170
	W**	55	57	20	75	5.8	200	66	110	450	210
Group 2 Northern canal sites	D	58	67	21	87	4.8	250	54	120	490	265
	W	77	76	20	83	4.0	285	38	120	490	250
Group 3 Western canal sites	D	44	28	5.2	31	1.9	165	6.9	44	270	140
	W	71	54	4.9	19	1.5	180	4.0	27	210	150
Group 4 Interior canal sites	D	68	67	24	100	5.2	270	46	145	540	240
	W	85	63	20	85	4.4	250	34	130	480	230
Group 5 Marsh sites	D	85	41	20	130	7.0	218	4.5	200	520	180
	W	72	43	10	48	2.3	166	12	67	270	120
Group 6 Southern canal sites	D	49	74	12	52	3.0	270	1.8	80	370	230
	W	56	57	5.8	27	1.7	190	3.1	44	240	155
Group 7 Taylor Slough	D	3	68	3.8	16	0.8	215	10	24	230	180
	W	10	70	3.2	9.6	0.4	210	2.0	14	205	170

* Dry season samplings - April 1973 and 1974.

** Wet season samplings - October 1972 and 1973.

1/ Platinum - cobalt standard

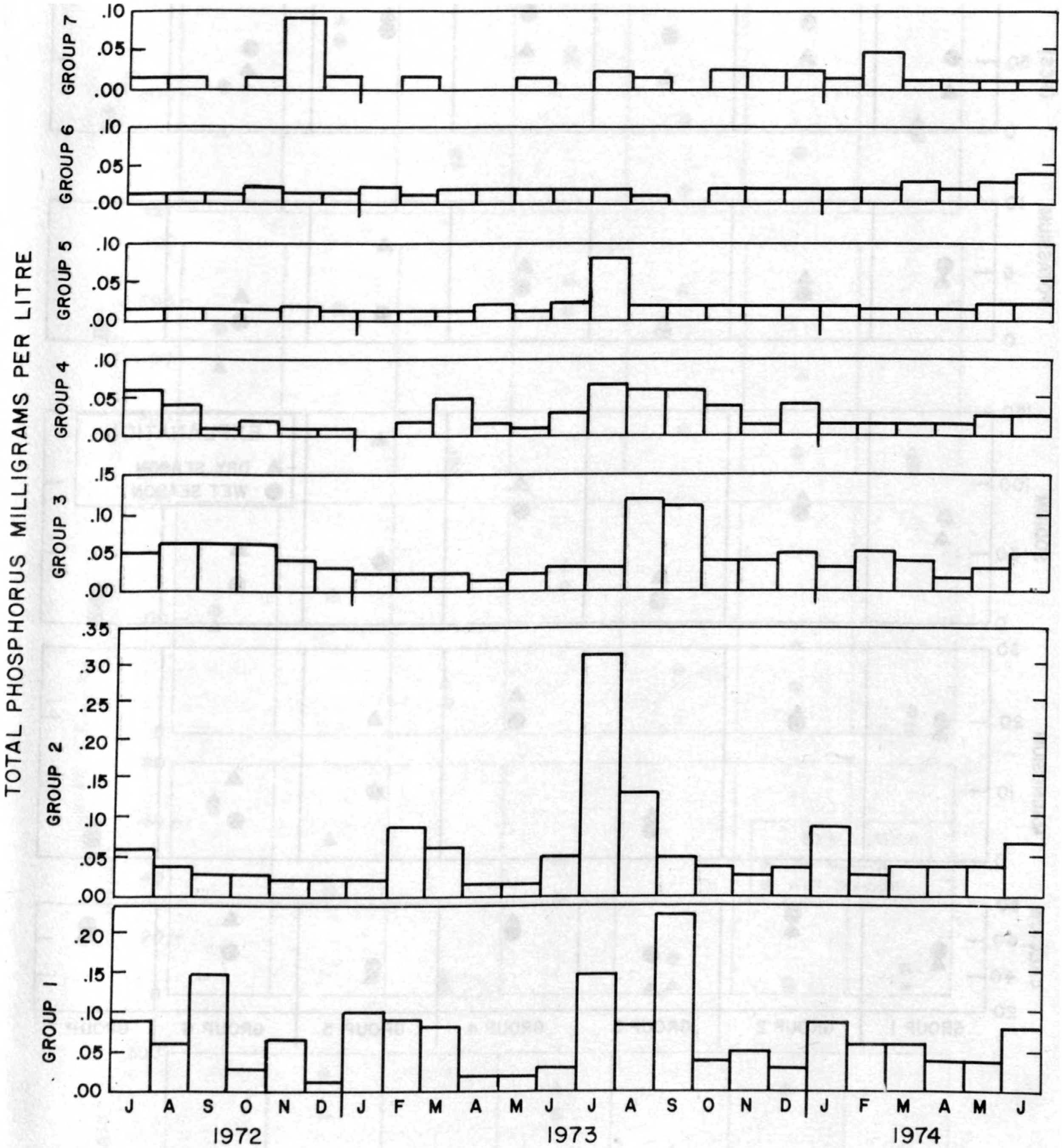


Figure 8. --Average monthly total phosphorus concentration for each sampling-site group.

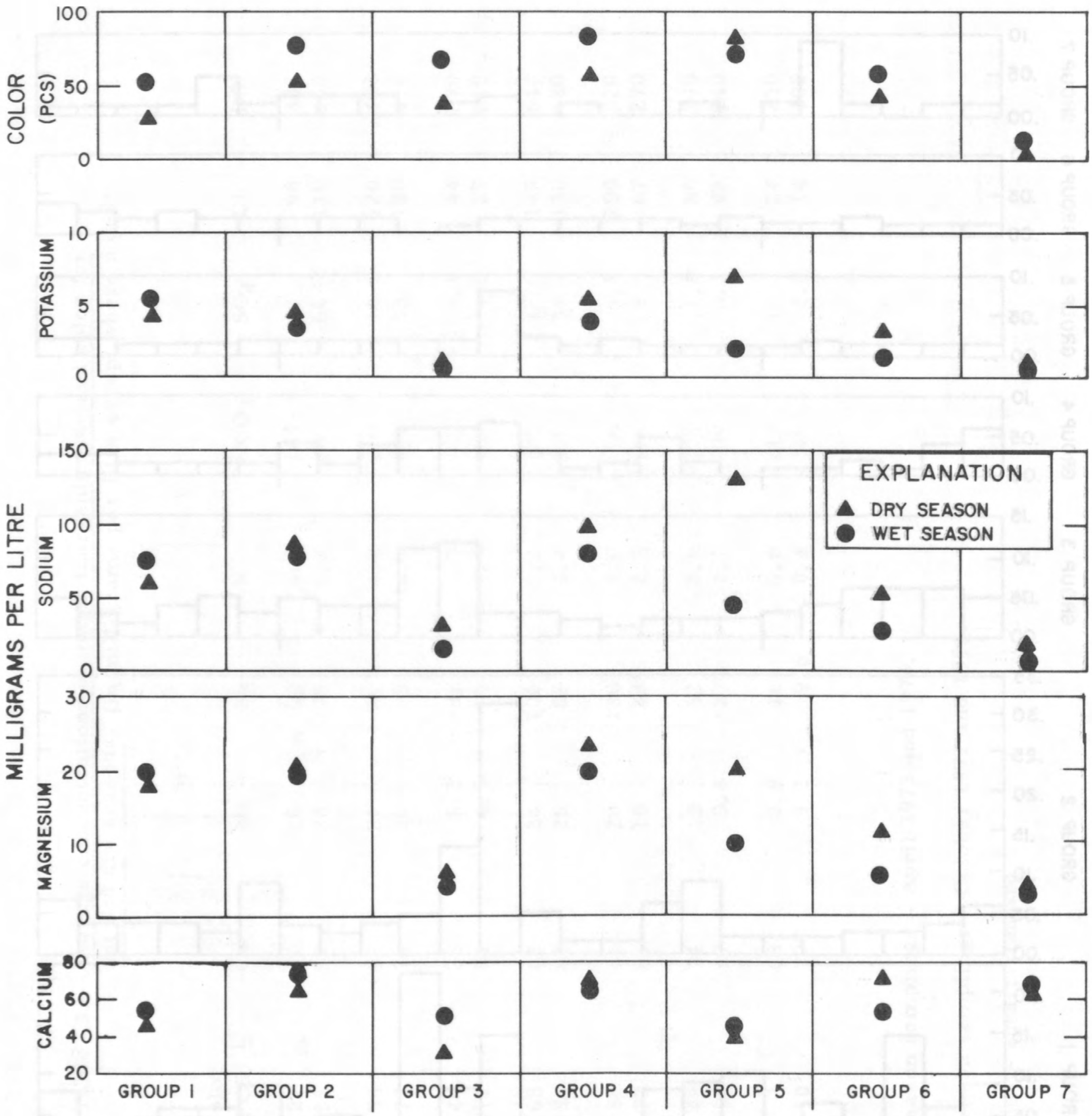
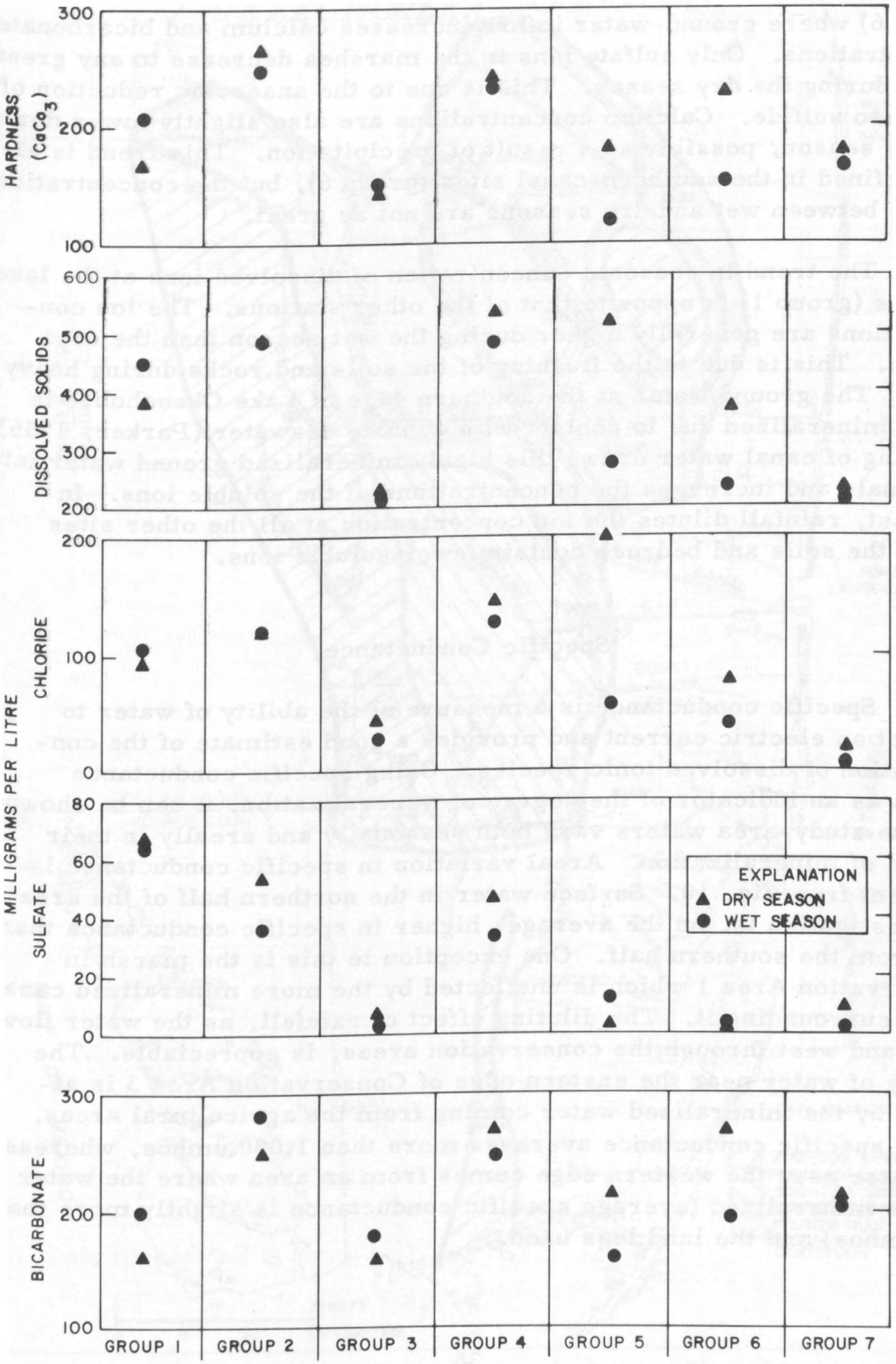


Figure 9. --Average wet season and dry season concentrations of inorganic ions and color for all sampling-site groups.


MILLIGRAMS PER LITRE
HARDNESS (CaCO3)
DISSOLVED SOLIDS
CHLORIDE
SULFATE
BICARBONATE
300
200
100
600
500
400
300
200
200
100
0
80
60
40
20
0
300
200
100
GROUP 1
GROUP 2
GROUP 3
GROUP 4
GROUP 5
GROUP 6
GROUP 7
EXPLANATION
DRY SEASON
WET SEASON

(group 6) where ground-water inflow increases calcium and bicarbonate concentrations. Only sulfate ions in the marshes decrease to any great extent during the dry season. This is due to the anaerobic reduction of sulfate to sulfide. Calcium concentrations are also slightly lower during the dry season, possibly as a result of precipitation. This trend is also well defined in the southern-canal sites (group 6), but the concentration ranges between wet and dry seasons are not as great.

The trend in seasonal concentration of dissolved ions at the lake stations (group 1) is opposite that of the other stations. The ion concentrations are generally higher during the wet season than the dry season. This is due to the flushing of the soils and rocks during heavy rains. The ground water at the southern edge of Lake Okeechobee is highly mineralized due to contact with connate seawater (Parker, 1955). Pumping of canal water draws this highly mineralized ground water into the canals and increases the concentrations of the soluble ions. In contrast, rainfall dilutes the ion concentration at all the other sites where the soils and bedrock contain fewer soluble ions.

Specific Conductance

Specific conductance is a measure of the ability of water to conduct an electric current and provides a good estimate of the concentration of dissolved ionic species. Using specific conductance values as an indicator of the degree of mineralization, it can be shown that the study-area waters vary both seasonally and areally in their degree of mineralization. Areal variation in specific conductance is apparent from fig. 10. Surface water in the northern half of the area of investigation is, on the average, higher in specific conductance than that from the southern half. One exception to this is the marsh in Conservation Area 1 which is unaffected by the more mineralized canal water surrounding it. The diluting effect of rainfall, as the water flows south and west through the conservation areas, is appreciable. The quality of water near the eastern edge of Conservation Area 3 is affected by the mineralized water coming from the agricultural areas, where specific conductance averages more than 1,000 umhos, whereas the water near the western edge comes from an area where the water is less mineralized (average specific conductance is slightly more than 400 umhos) and the land less used.

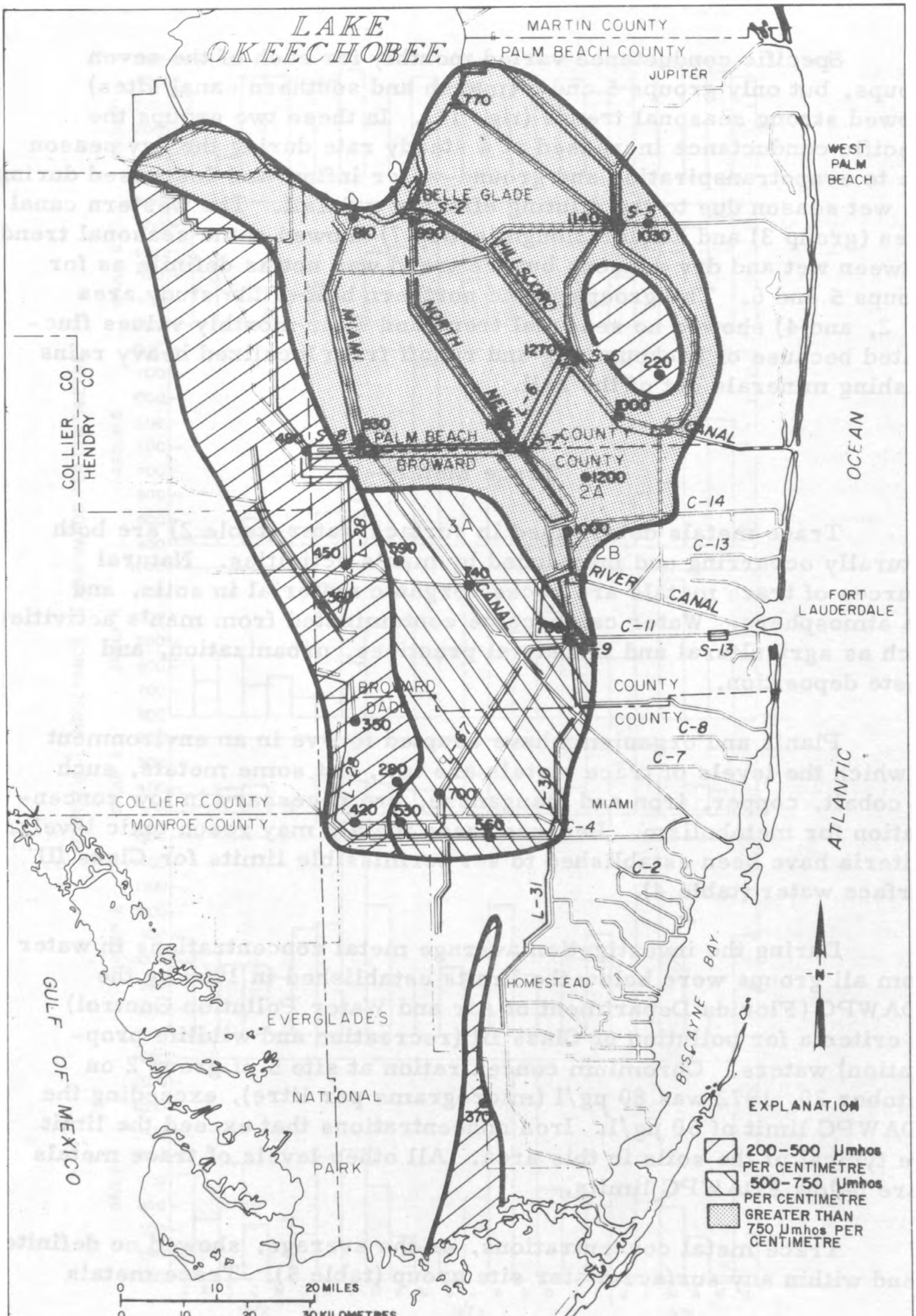


Figure 10.--Average specific conductance, July 1972 - June 1974.

Specific conductance varied monthly for each of the seven groups, but only groups 5 and 6 (marsh and southern canal sites) showed strong seasonal trends (fig. 11). In these two groups the specific conductance increased at a steady rate during the dry season due to evapotranspiration and ground-water inflow and decreased during the wet season due to the diluting effect of rainfall. The western canal sites (group 3) and Taylor Slough (group 7) showed some seasonal trend between wet and dry seasons but the trend was not as definite as for groups 5 and 6. The groups in the northern half of the study area (1, 2, and 4) showed no seasonal trend and their monthly values fluctuated because of backpumping and runoff from localized heavy rains flushing minerals out of the soil.

Trace Metals

Trace metals determined in surface water (table 2) are both naturally occurring and introduced by man's activities. Natural sources of trace metals are rocks, organic material in soils, and the atmosphere. Water can become contaminated from man's activities such as agricultural and industrial practices, urbanization, and waste deposition.

Plants and organisms have adapted to live in an environment in which the levels of trace metals are low, but some metals, such as cobalt, copper, iron and manganese, are necessary in low concentration for metabolism. Because trace metals may reach toxic levels, criteria have been established to set permissible limits for Class III surface water (table 4).

During the investigation average metal concentrations in water from all groups were below the limits established in 1969 by the FDAWPC (Florida Department of Air and Water Pollution Control) as criteria for pollution of Class III (recreation and wildlife propagation) waters. Chromium concentration at site 5 of group 2 on October 20, 1972 was 80 μg/l (micrograms per litre), exceeding the FDAWPC limit of 50 μg/l. Iron concentrations that exceed the limit are typical of the soils in this area. All other levels of trace metals were below FDAWPC limits.

Trace metal concentrations, on the average, showed no definite trend within any surface-water site group (table 5). Trace metals

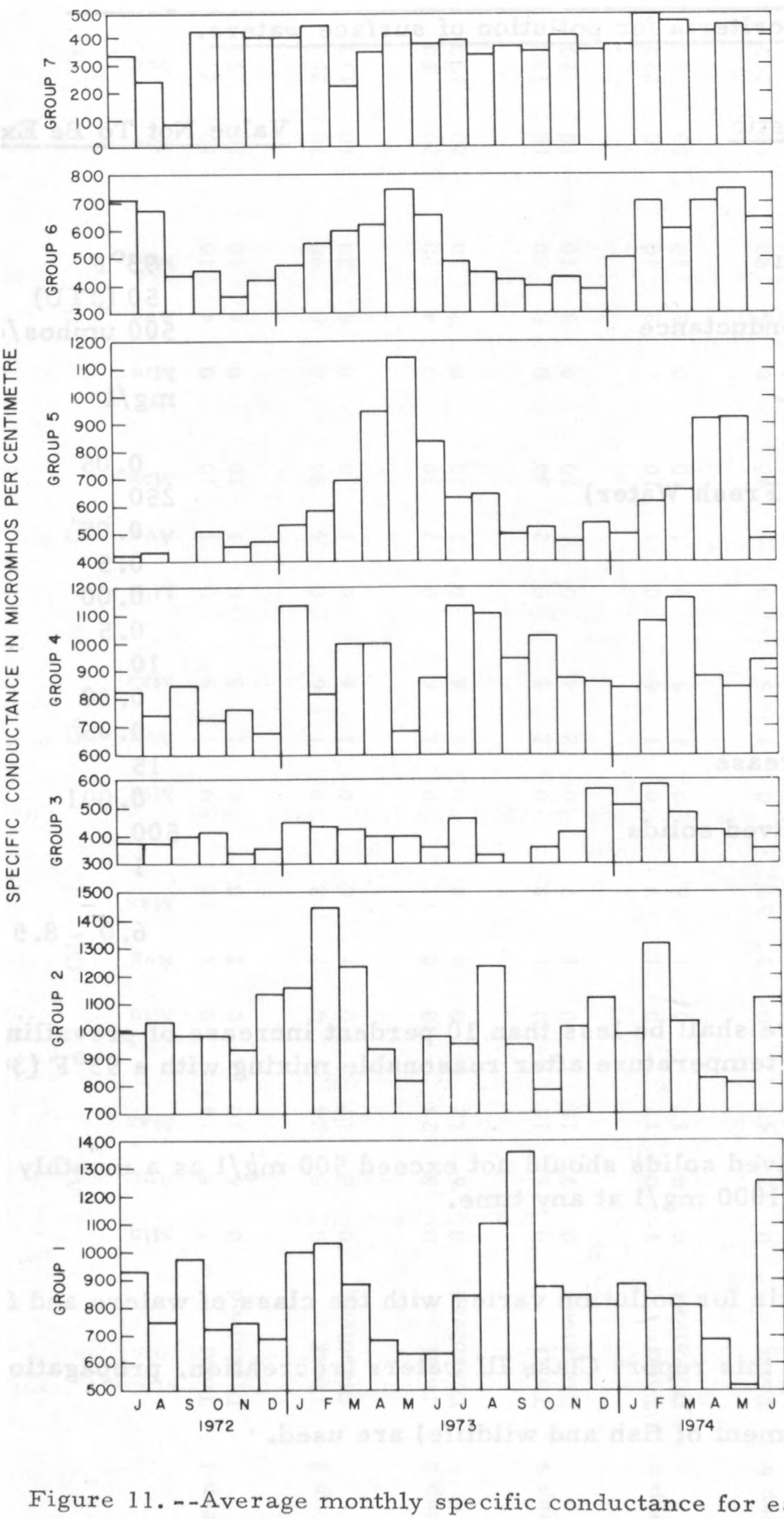


Figure 11. --Average monthly specific conductance for each sampling-site group.

Table 4.--Florida Department of Pollution Control general criteria for pollution of surface waters.

Characteristic	Value Not To Be Exceeded
PHYSICAL	
1/ Temperature	93°F
Turbidity	50 (JTU)
Specific Conductance	500 umhos/cm
CHEMICAL	mg/l
Arsenic	0.05
Chlorides (Fresh Water)	250
Chromium	0.05
Copper	0.5
Cyanide	0.00
Detergents	0.5
Fluorides	10
Iron	0.30
Lead	0.05
Oils and Grease	15
Phenol	0.001
2/ Total dissolved solids	500
Zinc	1
pH	6.0 - 8.5 units

1/ Temperature shall be less than 10 perdent increase of prevailing background temperature after reasonable mixing with a 93°F (34°C) maximum.

2/ Total dissolved solids should not exceed 500 mg/l as a monthly average or 1000 mg/l at any time.

Criteria for pollution varies with the class of waters and for purposes in this report Class III waters (recreation, propagation and management of fish and wildlife) are used.

Table 5.--Average, maximum and minimum concentrations of trace metals in surface water. (micrograms per litre)

		As			Cd			Co			Cr			Cu			Fe		
		Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
Group 1	Total	1	8	14	0	1	11	0	1	5	0	1	10	0	4	10	10	290	2800
	Dissolved	0	6	10	0	2	8	0	1	3	0	1	10	0	4	10	10	50	180
Group 2	Total	0	9	24	0	1	12	0	1	6	0	5	80	0	6	90	30	260	2000
	Dissolved	0	6	17	0	1	8	0	1	4	0	1	10	0	5	20	10	110	450
Group 3	Total	0	8	23	0	0	11	0	1	6	0	2	30	0	4	20	20	50	1100
	Dissolved	0	6	12	0	0	8	0	1	4	0	1	10	0	2	10	20	150	500
Group 4	Total	0	8	15	0	1	8	0	2	5	0	2	30	0	6	80	10	120	400
	Dissolved	0	7	15	0	1	7	0	2	4	0	1	10	0	3	10	10	80	310
Group 5	Total	1	10	17	0	1	9	0	1	6	0	1	10	0	2	10	10	220	1400
	Dissolved	0	10	17	0	1	8	0	1	5	0	1	10	0	2	10	10	80	180
Group 6	Total	0	12	40	0	2	10	0	1	5	0	3	30	0	6	130	50	250	950
	Dissolved	0	6	14	0	2	7	0	1	4	0	3	10	0	5	10	20	10	310
Group 7	Total	0	10	40	0	2	11	0	1	5	0	1	10	0	9	50	60	160	300
	Dissolved	0	1	3	0	1	4	0	1	4	0	1	10	0	4	10	10	40	100

Table 5.--Average, maximum and minimum concentrations of trace metals in surface water. (continued) (micrograms per litre)

		Pb			Mn			Zn			Hg			Sr		
		Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
Group 1	Total	0	6	23	0	17	100	0	47	280	0.0	0.2	1.1			
	Dissolved	0	1	3	0	5	20	0	17	60				920	1500	2300
Group 2	Total	0	6	25	0	14	70	0	40	380	0.0	0.2	1.2			
	Dissolved	0	5	20	0	7	20	0	18	50				420	1200	3200
Group 3	Total	0	5	27	0	10	40	0	28	310	0.0	0.2	1.2			
	Dissolved	0	4	25	0	4	20	0	6	20				120	340	930
Group 4	Total	0	4	25	0	15	33	0	34	90	0.0	0.1	1.0			
	Dissolved	0	4	20	0	11	33	0	19	90				590	1000	2800
Group 5	Total	0	5	22	0	36	300	0	28	150	0.0	0.1	0.8			
	Dissolved	0	5	22	0	26	280	0	46	40				30	780	2500
Group 6	Total	0	6	25	0	14	30	0	34	250	0.0	0.1	1.0			
	Dissolved	0	3	25	0	9	25	0	20	40				90	740	1400
Group 7	Total	0	8	30	0	11	25	5	48	130	0.0	0.1	0.6			
	Dissolved	0	3	8	0	9	25	4	18	40				400	520	640

reaching surface waters by leaching processes, runoff, and through the atmosphere are mostly sorbed on the sediments and assimilated by vegetation, thus, preventing high concentrations in the water.

Phytoplankton

The phytoplankton community is a vital part of the ecology in any body of water. Organisms in the phytoplankton community are the basis of the food chain by being the principal primary producers. They are the food source for the primary consumers such as shrimp, amphipods and small fish which in turn provide food for the higher consumers such as larger fish, reptiles, birds, and mammals. The phytoplankton community can alter the dissolved oxygen content of the water. The phytosynthetic activity of large phytoplankton populations can supersaturate the water with oxygen during daylight; at night, respiration bythe vegetation can depress oxygen levels.

A healthy body of water contains a large enough phytoplankton population to provide an adequate food supply for the primary consumer organisms yet not large enough to inhibit the intended use of the water. Periodically rapid increases in a phytoplankton population (plankton blooms) do occur depleting oxygen and causing fish distress or death. The body of water also may become esthetically unpleasant because of the color or odor caused by the large phytoplankton population. Low phytoplankton populations may indicate that a body of water is low in productivity (oligotrophic) and less desirable for fish and wildlife propagation.

Phytoplankton numbers varied seasonally, but with no particular trend (table 6). The physical and chemical characteristics of the water appeared to dictate the size of the populations rather than the time of year the population was sampled. At each sampling site numbers of phytoplankton cells varied because of the variability in the physical and chemical factors needed for growth and regeneration of phytoplankton genera.

Variation in phytoplankton counts among groups is evident. The three lake sites (group 1) had a median cell count of 12,000 cells/ml, the highest of all seven groups (table 7). Taylor Slough (group 7) had a median cell count of 360 cells/ml, the lowest. A variety of factors, both physical and chemical, are responsible for determining why phytoplankton communities develop well in some areas and poorly in others.

Table 6.--Median values and ranges of phytoplankton counts at all sites for each sampling period.

(counts in cells per millilitre)

Date	Median	Range
August 1972	520	0 - 15,000
October 1972	270	28 - 2,100
January 1973	3,400	400 - 1,700,000
April 1973	420	0 - 12,000
July 1973	7,000	1,200 - 62,000
October 1973	4,700	340 - 360,000
January 1974	3,000	35 - 120,000
April 1974	6,900	360 - 280,000

Table 7.--Median values and ranges of phytoplankton counts for each sampling-site group.

(counts in cells per millilitre)

Group	Median	Range
1	12,000	28 - 360,000
2	2,300	0 - 120,000
3	3,000	0 - 280,000
4	1,800	84 - 44,000
5	1,900	14 - 700,000
6	1,200	53 - 1,700,000
7	360	45 - 2,100

A discussion of phytoplankton community development is beyond the scope of this study.

Phytoplankton numbers varied greatly (0 - 1,700,000 cells/millilitre) with no apparent seasonal trend (table 8). When many cells were present dissolved oxygen levels were above the saturation point but because no diel oxygen measurements were taken, it could not be determined if dissolved oxygen levels were depressed at night due to respiration.

In samples collected at all sites during six of the eight sampling periods, the dominant phytoplankton division was Cyanophyta (blue-green algae) (fig. 12). Cyanophytes and chrysophytes (includes diatoms) were the co-dominant groups during the August 1972 sampling period. Chlorophytes (green algae) were the dominant division during the April 1973 sampling. Phytoplankton divisions varied seasonally, but with no trend. In July and October 1973 the blue-green algae were dominant over four of the five divisions. The Division Euglenophyta (flagellates) represents the lowest percentage for all samplings.

In each of the seven surface-water groups, cyanophytes (blue-green algae) were dominant (fig. 13). For all samples, the percentage occurrence of the Division Euglenophyta (flagellates) was least.

The phytoplankton genera most frequently found in each division are:

Cyanophyta - *Oscillatoria*, *Anabaena*, *Anacystis*, *Lyngbya*, *Microcystis*

Chlorophyta - *Carteria*, *Chlamydomonas*, *Scenedesmus*

Chrysophyta - *Ochromonas*, *Fragillaria*

Euglenophyta - *Euglena*, *Trachelomonas*, *Phacus*

Pyrrophyta - *Glenodinium*, *Peridinium*

Table 8.--Phytoplankton counts at 25 sites in the Everglades basin.
(cells per millilitre)

Site No.	1972 August	1972 October	1973 January	1973 April	1973 July	1973 October	1974 January	1974 April
1	5700	620	21,000	420	2,200	175,000	41,000	4,700
2	6900	1500	200,000	12,000	12,000	360,000	17,000	13,000
3	760	2400	5,500	28	23,000	12,000	55,000	17,000
4	1800	1200	900	290	37,000	3,800	9,300	6,900
5	9400	28	1,600	700	21,000	32,000	120,000	1,100
6	170	180	4,200	1,800	1,200	1,700	830	9,200
7	28	49	-	0	16,000	3,200	370	4,700
8	21	670	2,000	150	11,000	8,700	1,300	530
9	0	98	3,000	250	9,200	66,000	6,200	36,000
10	610	180	18,000	84	3,000	7,000	2,100	2,400
11	520	1000	1,000	DRY	23,000	13,000	6,000	DRY
12	510	740	6,000	1,900	5,500	4,700	5,200	280,000
13	240	340	700,000	DRY	2,600	1,000	3,000	DRY
14	53	150	1,500,000	2,700	1,700	1,000	2,900	12,000
15	120	270	1,700,000	850	3,700	340	420	1,200
16	98	270	400,000	730	5,400	4,700	1,200	6,500
17	53	140	2,000	460	62,000	750	580	9,000
18	1500	560	500	110	4,200	370	4,300	13,000
19	2300	2100	1,600	150	4,900	5,900	-	11,000
20	15000	220	3,300	290	11,000	5,800	2,300	17,000
21	1200	580	3,400	28	3,100	8,100	35	2,800
22	930	-	2,900	1,000	13,000	44,000	3,100	2,600
23	690	350	14,000	14	47,000	1,900	6,500	1,200
24	130	180	5,300	2,400	7,000	1,300	4,800	51,000
25	90	120	400	600	2,100	1,700	45	360

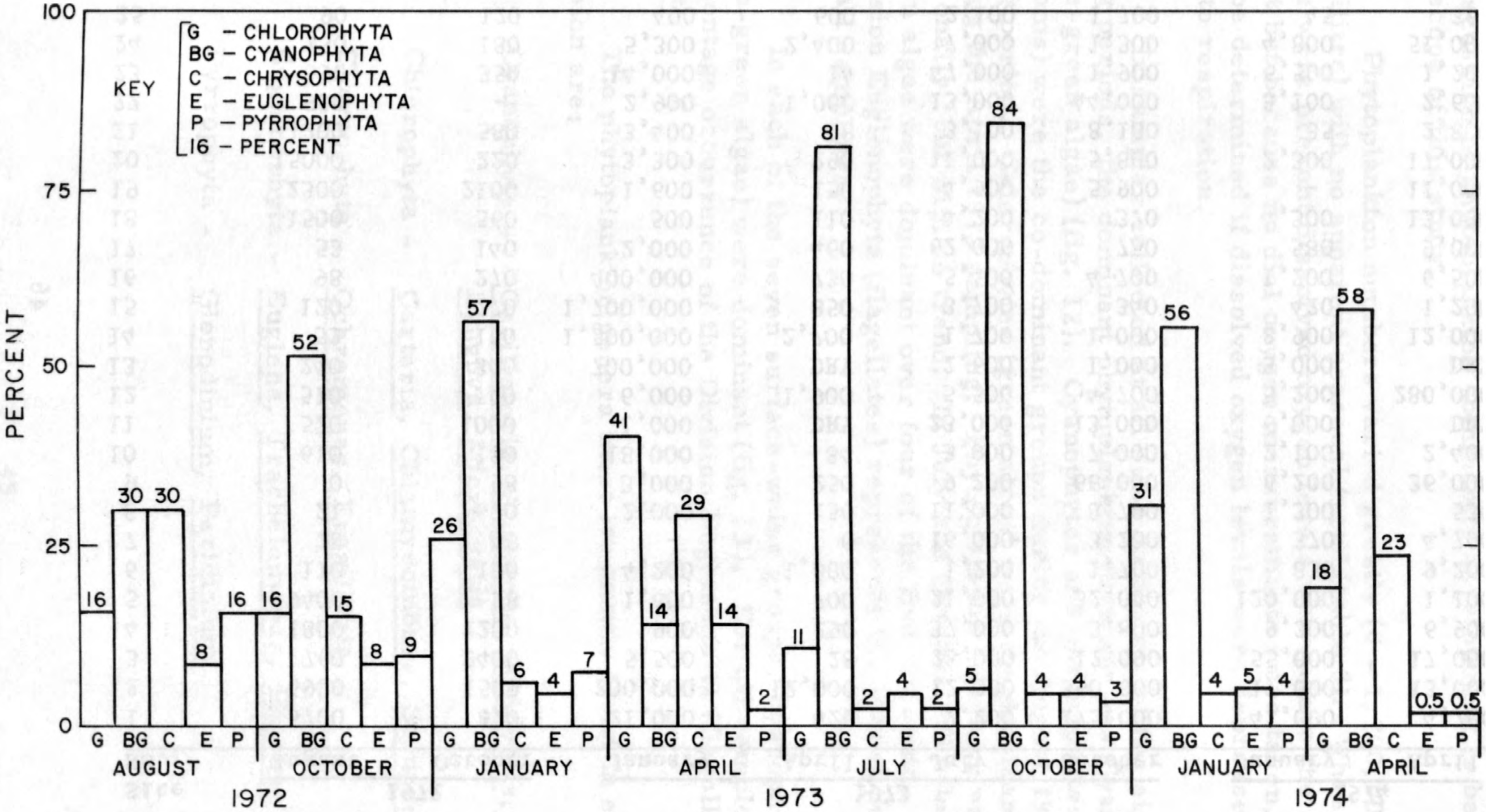


Figure 12.--Dominance of phytoplankton divisions in surface-water samples collected from August 1972 to April 1974.

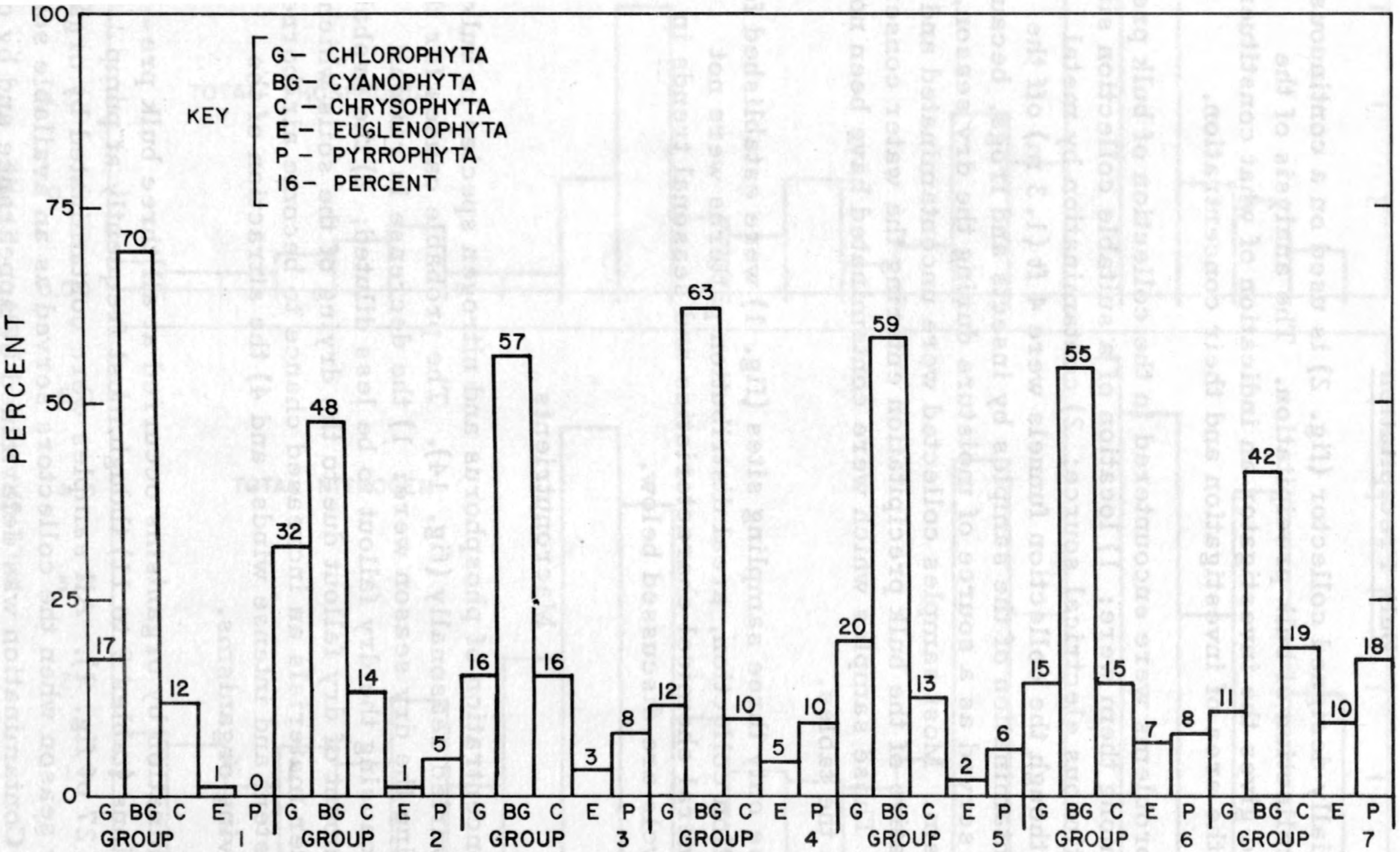


Figure 13.--Dominance of phytoplankton divisions for each surface-water site group.

Bulk Precipitation

A specially designed collector (fig. 2) is used on a continuous basis for the collection of bulk precipitation. The analysis of the water collected gives the investigator an indication of what constituents are falling on the area of investigation and their concentration.

Many problems were encountered in the collection of bulk precipitation. Among them were: 1) location of a suitable collection site that had a continuous electrical source; 2) contamination by metal objects, even though the collection funnels were 4 ft (1.3 m) off the ground; 3) contamination of the samples by insects and frogs, because the collectors served as a source of moisture during the dry season, and 4) vandalism. Most samples collected were uncontaminated and are representative of the bulk precipitation entering the water conservation areas. Those samples which were contaminated have been noted in the text and the tables.

Because only three sampling sites (fig. 1) were established for bulk precipitation collection, areal distribution patterns were not analyzed. General chemical characteristics and seasonal trends in constituent levels are discussed below.

Macronutrients

The concentration of phosphorus and nitrogen species in bulk precipitation varied seasonally (fig. 14). The probable causes for the increases during the dry season were: 1) the decrease in rainfall (fig. 3), thus causing the dry fallout to be less diluted; 2) the probable increase in amount of dry fallout due to the drying of the soils which gives the lighter materials an increased chance to become air-borne; 3) more persistent and intense winds, and 4) the attraction of the collector to living organisms.

Contamination by organisms occurred at all three bulk precipitation stations (tables 9 to 11) though most frequently at pump station 9 (site 27 of fig. 1). All samples were contaminated by organisms during the dry season when the collectors served as an available source of moisture. Contamination was determined by appearance and by odor.

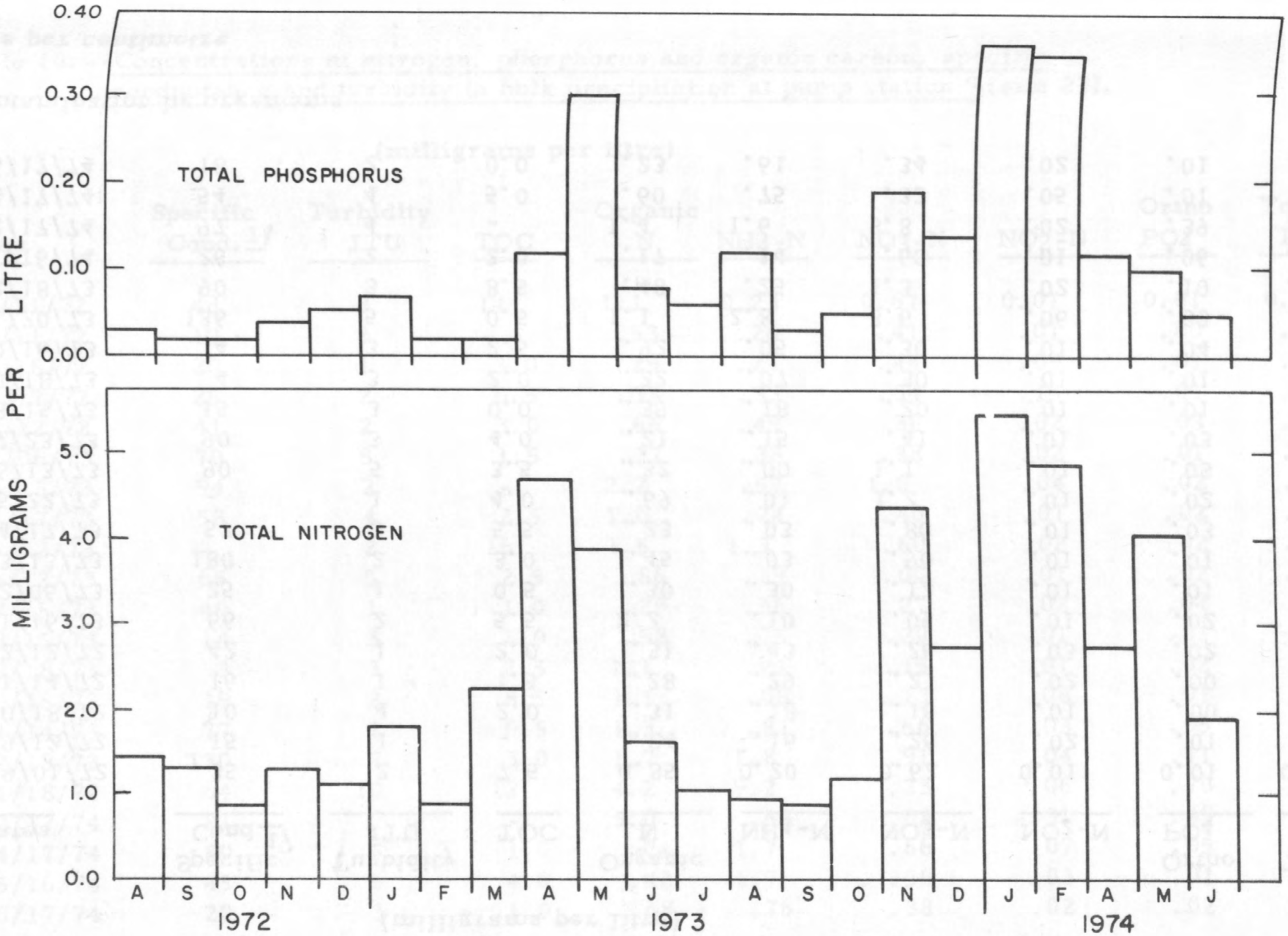


Figure 14.--Average total nitrogen and total phosphorus concentration in bulk precipitation, by month, August 1972 - June 1974.

Table 9.--Concentrations of nitrogen, phosphorus and organic carbon, specific conductance and turbidity in bulk precipitation at 40-mile bend (site 26).

(milligrams per litre)

Composite dates	Specific Cond.1/	Turbidity JTU	TOC	Organic N	NH_4-N	NO_3-N	NO_2-N	Ortho PO_4	Total P
08/17/72 - 09/01/72	35	2	7.5	0.85	0.20	0.62	0.01	0.01	0.02
09/01/72 - 09/12/72	15	1	-	.24	.16	.26	.02	.01	.02
09/12/72 - 10/18/72	10	4	2.0	.31	.18	.16	.01	.00	.00
10/18/72 - 11/14/72	16	1	1.5	.28	.29	.23	.02	.00	.01
11/14/72 - 12/12/72	42	1	2.0	.31	.43	.26	.03	.02	.04
12/12/72 - 01/16/73	66	2	5.5	2.2	.10	.05	.01	.02	.05
01/16/73 - 02/06/73	25	1	0.5	.30	.30	.12	.01	.01	.01
02/06/73 - 03/13/73	180	2	3.0	.45	.03	.90	.01	.01	.01
03/13/73 - 04/17/73	57	3	5.5	.23	.03	.80	.01	.03	.04
04/17/73 - 05/22/73	-	1	4.0	.69	.01	1.2	.01	.02	.05
05/22/73 - 06/13/73	90	5	3.5	.32	.00	1.1	.01	.03	.03
06/13/73 - 07/23/73	90	3	4.0	.21	.15	.41	.01	.03	.07
07/23/73 - 08/15/73	15	3	0.0	.39	.18	.20	.01	.01	.01
08/15/73 - 09/18/73	4	3	2.0	.22	.07	.30	.01	.01	.04
09/18/73 - 10/16/73	14	3	2.5	.92	.05	.30	.01	.04	.05
*10/16/73 - 11/20/73	136	5	0.5	1.1	2.8	3.6	.06	.33	.37
*11/20/73 - 12/18/73	90	3	8.5	.48	.25	1.3	.02	.10	.10
12/18/73 - 01/16/74	26	2	2.0	.17	.14	.60	.01	.06	.07
*01/16/74 - 02/17/74	97	4	-	1.4	1.6	3.8	.02	.39	.43
02/17/74 - 04/17/74	54	4	5.0	.60	.75	.32	.05	.01	.03
04/17/74 - 06/17/74	18	2	0.0	.23	.61	.34	.02	.01	.03

* denotes contamination by organisms

1/ micromhos per centimetre

Table 10.--Concentrations of nitrogen, phosphorus and organic carbon, specific conductance and turbidity in bulk precipitation at pump station 9 (site 27).

(milligrams per litre)

Composite dates	Specific Cond. 1/	Turbidity JTU	TOC	Organic N	NH_4-N	NO_3-N	NO_2-N	Ortho PO_4	Total P
08/17/72 - 08/31/72	48	3	14	1.1	0.23	0.67	0.01	0.01	0.04
08/31/72 - 09/11/72	10	3	-	.53	.26	.41	.01	.00	.02
09/11/72 - 10/18/72	20	1	3.0	.29	.21	.45	.09	.01	.02
10/18/72 - 11/17/72	25	2	0.5	.33	.33	.34	.15	.01	.02
11/17/72 - 12/12/72	41	2	3.0	.66	.49	.38	.02	.03	.07
12/12/72 - 02/06/73	70	5	1.5	.37	.38	.38	.02	.01	.01
02/06/73 - 03/13/73	94	2	-	2.2	.57	1.0	.04	.02	.03
*03/13/73 - 04/17/73	58	4	2.5	1.0	.24	.40	.01	.02	.04
*04/17/73 - 05/22/73	-	2	16	1.5	1.3	.60	.02	.02	.05
05/22/73 - 06/13/73	65	5	2.5	.86	.39	.00	.01	.02	.02
06/13/73 - 07/15/73	40	1	1.0	.29	.56	.27	.02	.04	.06
07/15/73 - 08/15/73	14	3	1.0	.58	.15	.20	.01	.01	.02
08/15/73 - 09/18/73	3	3	2.5	1.1	.21	.15	.01	.02	.02
09/18/73 - 10/16/73	19	2	8.5	1.1	.08	.13	.08	.01	.02
10/16/73 - 11/14/73	77	1	0.5	1.3	.81	.56	.03	.05	.06
*11/14/73 - 12/18/73	130	7	3.0	1.7	1.8	.91	.04	.11	.15
*12/18/73 - 01/18/74	64	10	12	4.2	9.2	.23	.06	.70	.94
*01/18/74 - 02/17/74	81	9	-	3.0	.53	.03	.31	.49	
*02/17/74 - 04/17/74	80	5	1.0	.74	1.7	.66	.07	.05	.10
*04/17/74 - 05/16/74	45	6	4.0	.42	1.7	.56	.03	.01	.02
05/16/74 - 06/17/74	20	3	1.0	.48	.76	.38	.02	.02	.04

* denotes contamination by organisms

1/ micromhos per centimetre

Table 11.--Concentrations of nitrogen, phosphorus, and organic carbon, specific conductance and turbidity in bulk precipitation in pump station 5 (site 28).

(milligrams per litre)

Composite dates	Specific Cond.1/	Turbidity JTU	TOC	Organic N	NH_4-N	NO_3-N	NO_2-N	Ortho PO_4	Total P
08/16/72 - 08/31/72	55	3	-	0.36	0.08	0.18	0.01	0.01	0.03
08/31/72 - 09/11/72	20	3	2.0	1.0	.31	.58	.01	.02	.03
09/11/72 - 10/16/72	23	3	2.0	.40	.08	.27	.01	.01	.03
10/16/72 - 11/13/72	28	2	5.5	.84	.41	.41	.02	.10	.10
11/13/72 - 12/11/72	60	1	4.5	.43	.23	.11	.02	.02	.04
12/11/72 - 01/08/73	110	1	5.0	.61	.34	.13	.04	.08	.08
01/08/73 - 02/05/73	110	2	2.0	.33	.17	.10	.01	.02	.02
02/05/73 - 03/12/73	44	3	4.0	.59	.49	.40	.03	.02	.02
*03/12/73 - 04/16/73	90	5	6.0	3.1	1.9	.20	.01	.28	.28
*04/16/73 - 05/21/73	85	6	11	1.3	4.1	.50	.09	.06	.80
*05/21/73 - 06/15/73	48	7	3.0	.65	1.3	-	-	.18	.19
06/15/73 - 07/14/73	31	1	1.5	.48	.44	.23	.01	.04	.04
07/14/73 - 08/13/73	11	1	1.5	.71	.21	.20	.01	.02	.32
08/13/73 - 09/16/73	5	6	1.0	.44	.08	.07	.01	.04	.04
09/16/73 - 10/30/73	12	1	2.0	.42	.16	.21	.02	.09	.09
10/30/73 - 11/20/73	81	3	1.5	1.1	.92	.52	.04	.13	.14
11/20/73 - 12/17/73	79	4	5.0	.71	.03	1.0	.01	.16	.18
12/17/73 - 01/16/74	63	4	1.5	.55	.11	.83	.01	.07	.08
01/16/74 - 02/20/74	74	4	8.0	.63	.00	.86	.00	.11	.14
02/20/74 - 04/17/74	-	7	-	-	.07	3.2	.01	.17	.22
*04/17/74 - 05/17/74	104	5	4.0	2.3	2.4	.52	.11	.08	.18
05/17/74 - 06/07/74	96	5	3.0	1.1	1.1	.74	.01	.05	.07

* denotes contamination by organisms

1/ micromhos per centimetre

Fires burned frequently around site 26 (fig. 1) during both dry seasons. The fires affected the macronutrient concentrations during this collection period. The material burned was chiefly sawgrass, cattail, and dried peat soil.

The average total nitrogen concentration for all sites was 40 percent organic nitrogen, 30 percent ammonia, 29 percent nitrate and 1 percent nitrite. This compared with the surface-water percentages of 78 for organic nitrogen, 8 for ammonia, 12 for nitrate and 2 for nitrite. Orthophosphate was 57 percent of the total phosphorus in bulk precipitation as compared with 66 percent in surface water. Organic carbon in bulk precipitation averaged 3.7 mg/l as compared with surface-water average concentrations of 31 mg/l.

Bulk precipitation appears to be a major contributor of the inorganic macronutrients (ammonia, nitrate, nitrite and orthophosphate) to the surface waters of the area of investigation (see Waller, 1975). Organic carbon and organic nitrogen entering surface water as bulk precipitation contribute less to the concentrations of these two constituents than contribution from the runoff.

Major Inorganic Ions

A seasonal trend in the concentrations of major inorganic ions could not be detected from the data collected at the three bulk precipitation sampling sites (tables 12 to 14). The reason for this is that sampling was done only quarterly. A large, localized rainstorm could dilute a particular sample and bias the data. These storms occurred frequently enough to be detected in the monthly specific conductance determinations (tables 9 to 11).

Table 15 shows the variability in concentration of selected chemical constituents. For most constituents the concentrations varied over a wide range for all three sites, but the averages varied only slightly between the sites.

Comparison of bulk precipitation data collected over the coastal and inland parts of northeastern United States (Pearson and Fisher, 1971) and North Carolina and Virginia (Gambell and Fisher, 1966) with that collected over south Florida reveals that the bulk precipitation in south Florida generally contains higher concentrations of the common ions (fig. 15). Although sulfate concentration in south Florida bulk

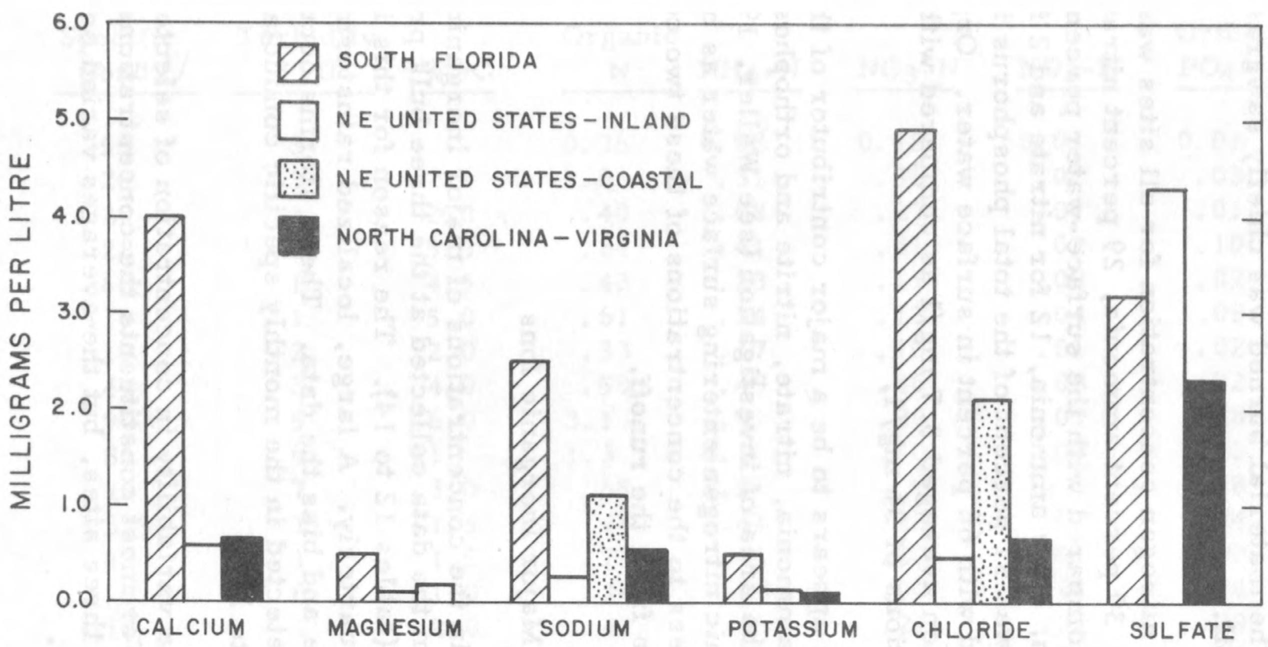


Figure 15. --Average concentrations of selected inorganic ions inbulk precipication for the Northeastern United States, North Carolina - Virginia area, and south Florida.

Table 12.--Concentrations of major inorganic ions and color in bulk precipitation at 40-mile bend (site 26).

(milligrams per litre)

Composite dates	Color (PCS)1/	Ca	Mg	Na	K	HCO_3	SO_4	Cl	Fl	DS Sum	Hardness ($CaCO_3$)
08/16/72 - 10/16/72	-	3.0	0.2	1.3	0.2	9.0	0.8	1.5	0.0	13	8
10/16/72 - 01/08/73	-	-	-	-	-	38	2.1	12	0.1	80	-
01/08/73 - 04/16/73	0	8.9	1.3	5.9	1.0	32	4.0	6.0	0.2	45	28
04/16/73 - 07/14/73	5	4.1	0.3	1.7	0.4	6.0	8.4	1.0	0.1	20	11
07/14/73 - 10/30/73	3	2.4	0.7	1.0	0.7	4.0	1.5	2.5	0.0	11	4
10/30/73 - 07/16/74	3	3.3	0.0	0.3	0.3	7.0	2.9	1.4	0.1	12	5

1/ Platinum-cobalt standard.

Table 13. --Concentrations of major inorganic ions and color in bulk precipitation at pump station 9 (site 27).

(milligrams per litre)

Composite dates	Color (PCS)1/	Ca	Mg	Na	K	HCO_3	SO_4	Cl	Fl	DS Sum	Hardness ($CaCO_3$)
08/17/72 - 10/18/72	-	1.7	0.2	1.3	0.2	1.0	2.4	2.0	0.0	11	5
10/18/72 - 01/09/73	-	-	-	-	-	5.0	3.2	13	0.1	39	-
01/09/73 - 04/17/73	0	4.0	0.7	4.5	0.4	8.0	4.0	7.0	0.1	27	13
04/17/73 - 07/15/73	5	2.6	0.2	0.8	0.3	5.0	2.0	1.0	0.1	11	7
07/15/73 - 10/16/73	5	1.0	0.4	1.0	0.4	8.0	1.4	2.5	0.0	20	7
10/16/73 - 01/18/74	7	3.2	0.8	7.1	1.5	0.0	5.3	11	0.1	29	0
01/18/74 - 07/17/74	2	3.6	0.3	2.3	0.2	8.0	2.4	3.0	0.0	16	6

1/ Platinum-cobalt standard

Table 14.--Concentrations of major inorganic ions and color in bulk precipitation at pump station 5 (site 28).

(milligrams per litre)

Composite dates	Color (PCS)[1/]	Ca	Mg	Na	K	HCO_3	SO_4	Cl	Fl	DS Sum	Hardness ($CaCO_3$)
08/17/72 - 10/18/72	-	1.6	0.2	1.4	0.4	2.0	3.2	3.0	0.0	11	5
10/18/72 - 01/16/73	-	-	-	-	-	7.0	2.4	7.0	0.1	32	-
01/16/73 - 04/17/73	-	3.7	0.7	4.3	0.4	7.0	5.6	6.5	0.2	29	12
04/17/73 - 07/23/73	2	5.8	1.4	6.1	0.5	13	7.6	8.5	0.2	39	20
07/23/73 - 10/16/73	2	1.0	0.6	0.9	0.4	3.0	0.9	2.6	0.0	8	2
10/16/73 - 04/17/74	1	3.4	0.4	2.7	0.3	4.0	3.0	4.9	0.1	17	3
04/17/74 - 07/17/74	4	4.9	0.0	0.8	0.9	5.0	2.0	1.6	0.0	13	4

1/ Platinum-cobalt standard

Table 15. --Range and average concentration of selected inorganic ions in bulk precipitation. (milligrams per litre)

Site	Ca		Mg		Na		K		Cl		SO_4		Dissolved Solids	
	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.
26 40-Mile Bend	2.4-8.0	4.3	0.0-1.3	0.5	0.3-5.9	2.0	0.2-1.0	0.5	1.0-12	4.1	0.8-8.4	3.3	11-80	30
27 Pump Station 9	1.7-10	4.2	0.2-0.8	0.5	0.8-7.1	2.8	0.2-1.5	0.5	1.0-13	5.6	1.4-5.3	2.9	11-39	22
28 Pump Station 5	1.0-5.8	3.4	0.0-1.4	0.6	0.8-6.1	2.7	0.3-0.9	0.5	1.6-8.5	4.9	0.9-7.6	3.5	8-39	21

precipitation is less than that from the inland part of northeastern United States, it is higher than that in the bulk precipitation from North Carolina and Virginia.

Levels of magnesium, sodium and chloride may be high because the sampling sites are near the ocean. The higher concentrations of calcium are attributed to the calcareous nature of south Florida soils. These also contain some clay and sand which could supply both potassium and magnesium. The finer materials containing calcium and potassium are blown into the atmosphere by the wind and are deposited as dry fallout.

That sulfate is present in bulk precipitation in appreciable quantity is difficult to explain. There are no large industrialized areas near the collection sites that could contribute a significant amount of sulfur dioxide or sulfides from fossil fuel consumption. One explanation is the extensive biological reduction of sulfates in the vast swampy areas and shallow coastal mangrove areas. Release of large volumes of hydrogen sulfide from reduction of sulfate could account for the higher sulfate concentrations in bulk precipitation. Another source is the extensive burning of sugar cane fields during the dry season. The plant material contains sulfur in organic form. During burning much of this sulfur is released in the form of sulfur oxides.

Trace Metals

Most of the trace metals in bulk precipitation are thought to be derived from finely divided rocks and soils that are windblown and redeposited as dry fallout. The mercury and arsenic compounds probably are from pesticides used in the agricultural areas; the most probable source of lead is automotive emissions. Except for the high cadmium and zinc levels, iron was the trace metal found in the highest concentration in surface water and sediment in south Florida and is available for redeposition as dry fallout.

Concentrations of trace metals (tables 16 to 18) in the bulk precipitation show no seasonal variation or trend in areal distribution. Contamination is evident from the zinc concentrations at all sampling sites. This is apparently due to the closeness of galvanized metals to

Table 16.--Concentrations of trace metals in bulk precipitation at 40-mile bend (site 26).

Composite Dates	As	Cd	Cr	Co	Cu	Fe	Pb	Mn	Zn	Hg	Sr
08/16/72 - 10/16/72	0	0	10	0	3.2	17	13	1	40	0.2	120
10/16/72 - 01/08/73	0	2	0	1	0.0	0	10	0	1300	0.0	-
01/08/73 - 04/16/73	2	6	0	1	6.0	2	10	3	156	-	100
04/16/73 - 07/14/73	-	28	10	0	0	0	11	0	50	0.1	0
07/14/73 - 10/30/73	-	25	0	0	4	150	15	0	70	0.0	0
10/30/73 - 07/16/74	2	62	0	2	6	0	7	10	180	0.0	50

Table 17.--Concentrations of trace metals in bulk precipitation at pump station 9 (site 27).

Composite Dates	As	Cd	Cr	Co	Cu	Fe	Pb	Mn	Zn	Hg	Sr
08/17/72 - 10/18/72	0	4	10	0	9.4	120	40	1	100	0.1	120
10/18/72 - 01/09/73	0	43	0	0	0	60	12	10	70	0.0	-
01/09/73 - 04/17/73	2	-	0	1	6	30	8	5	38	0.2	20
04/17/73 - 07/15/73	5	100	0	0	0	40	22	0	80	0.2	10
07/15/73 - 10/16/73	7	34	0	3	4	400	14	0	110	0.0	0

Table 18.--Concentrations of trace metals in bulk precipitation at pump station 5 (site 28).

Composite Dates	As	Cd	Cr	Co	Cu	Fe	Pb	Mn	Zn	Hg	Sr
08/17/72 - 10/18/72	0	0	10	0	6.1	26	12	2.0	180	0.1	120
10/18/72 - 01/16/73	0	1	0	0	0	0	4	10	80	0.0	-
01/16/73 - 04/17/73	0	0	0	1	4	0	6	1	21	0.2	20
04/17/73 - 07/23/73	6	2	0	0	0	30	13	0	80	0.9	10
07/23/73 - 10/16/73	7	1	0	3	0	100	20	0	90	0.2	0
10/16/73 - 04/17/74	2	1	0	8	10	0	2	0	60	0.0	30
04/17/74 - 07/17/74	0	8	0	8	6	40	29	0	180	0.1	30

the collection funnels. Apparently cadmium contamination at sites 26 and 27 (tables 16 and 17) was also due to metal objects near the collection funnels.

Insecticides

Insecticides were detected at all of the sites and in 71 percent of all samples collected. Their presence reflected the localized use of insecticides around the sampling sites. Surrounding two of the sites (27 and 28 of fig. 1) are fields on which cultivated crops are grown. Although insecticides are applied only seasonally, no seasonal trends in concentration in bulk fallout seem to exist. Apparently the fallout may not be traveling toward the collector or the insecticides may be chemically degrading.

Concentrations of insecticides ranged between 0.01 µg/l to 0.9 µg/l, about the same range as in rainfall samples collected in nearby areas (U. S. Dept. of the Interior, 1971). Parathion and chlordane were the insecticides detected most frequently. Diazinon and dieldrin were detected more than once, but during different sampling periods. Methyl parathion and DDE were detected only once. At site 28, insecticides were detected during every sampling period; this could be expected because of the agricultural lands surrounding this site and the frequent use of insecticides on the lands. Insecticide detections in bulk precipitation at the northern edge of Everglades National Park (site 26 of fig. 1) had the lowest average concentration, 0.01 µg/l, and the fewest detections; three.

Bottom Sediments

The bottom material in the canals is an accumulation of organic debris and fine limestone particles which have settled during periods of little or no flow. The organic content generally is high because of the peat and muck soils that cover the surrounding areas. The deposition rate of the sediment contributing to the bottom material depends on velocity of flow in the canal, the duration of the flow, the amount of organic material entering the canal as runoff, and the age of the canal.

The bottom sediments in canals remain fairly stationary because of the small amount of flow most of the year. Only in the canals downstream from pumping stations or control structures where velocities increase, do the deep sections of the canal become scoured of the fine organic detritus.

At all sites in group 5 except number 11, bottom material consists of peat derived primarily from sawgrass (Cladium jamacensis) and other aquatic plants. At these sites, the organic content of the bottom materials (table 19) is higher than at the other sampling stations. The deposition of the peat has occurred slowly and its deposition rate is dependent on the existence of anaerobic conditions and water cover. The sampling surface is composed of decaying vegetation and in most cases, a periphyton mat.

Peat lands develop only where the lands are inundated seasonally. Where the lands are covered by water only infrequently, the needed anaerobic environment is lacking and the peat will oxidize and break down into smaller molecular components.

Drainage of the muck soils south of Lake Okeechobee for agricultural use has caused the soils to oxidize. Because of this, subsidence of the soil has occurred and many of the oxidation products, mainly carbon and nitrogen compounds, are flushed into the canals during the wetter months.

The organic material in both the canal bottoms and the marshes ties up macronutrients, trace metals, and chlorinated insecticides. The forms in which these compounds are held within this organic bottom material depend on whether they were entrapped or assimilated into the sediments by chelation or occlusion, or whether they were adsorbed during sedimentation of the organic material. Recycling of compounds and elements from the sediments into the overlying water is influenced by many factors, among which are: changes in flow, pH, and DO levels, microbial and invertebrate metabolism, and chemical exchange. Recycling generally occurs at a slower rate than the accumulation of the compounds in the sediment. Thus, the periodic sampling of bottom material for chemical analysis provides information on the rate of deposition of the bottom sediments, the rate at which macronutrients, trace metals, and insecticides are building up in them and the quality of the water entering the canal.

Macronutrients

Average concentrations of carbon, nitrogen, and phosphorus compounds in the bottom materials varied widely (table 19). Ranges in average concentration for these macronutrients were 29 to 420 g/kg (grams per kilogram) for total carbon, 1.2 to 46 g/kg for Kjeldahl nitrogen (organic nitrogen plus ammonia), and 0.008 to 1.4 g/kg total phosphorus. Differences in the areas drained by each canal and the age of the canal appear to have the greatest influence on the concentrations of these major nutrients in the bottom material. For example, low concentrations (1.2 and 2.4 g/kg) of Kjeldahl nitrogen are found at site 9 and 25 which are in canals that have been constructed in the last ten years and drain areas with very little peat covering the rock. Canals that were constructed more than 50 years ago (sites 2 and 3) and drain areas with muck soil have much higher average concentrations of Kjeldahl nitrogen (11 and 9.1 g/kg) than these recently constructed canals. Nitrogen and phosphorus compounds were dominated by their organic forms, whereas the carbon compounds varied in dominance between inorganic and organic forms.

Runoff into the canals carries surrounding soils and plant detritus which settle and, in some cases, mix with the sediment in the canal. The greater the age of the canal, the more the sediment reflects the materials making up the surface deposits of the surrounding drainage area. There is little urban runoff into the canals so the most of the runoff is derived from natural areas, although the runoff between Lake Okeechobee and the conservation areas is greatly influenced by agricultural practices. Organic contamination from sewage effluent and feedlot runoff also will raise the concentrations of the macronutrients in bottom sediment.

The organic content of the bottom material in the canals and marshes of the Everglades is derived mainly from plant detritus (including peat and muck) and decaying vegetation. The marsh areas with bottom material composed of peat have the highest organic content. The bottom material is the lowest in organic content (table 19) in the canals that have been recently constructed (sites 8-10 and 25), are subject to high discharge velocities (sites 5 and 7), or are in a sandy area (sites 7 and 19). An attempt to characterize the sediments in both canals and marshes was made using an organic sediment index (OSI, Ballinger and McKee, 1971). This attempt at characterization proved unsuccessful because of the highly-organic nature of the bottom materials. Values calculated were 1 to 2 orders of magnitude greater than those found for fresh sewage sludge.

Table 19.--Average concentrations of macronutrients and percent organic material in bottom sediments. (milligrams per kilogram)

Site	Total C	Organic C	KJD[1/] N	Total P	Percentage Organic Material	COD
1	126,000	54,000	9,400	95	13.7	104,000
2	181,000	98,000	11,000	91	27.4	510,000
3	129,000	88,500	9,100	87	22.7	430,000
4	74,000	49,000	8,300	1450	13.7	365,000
5	31,000	8,300	1,900	490	2.5	27,800
6	139,000	94,000	5,500	180	28.3	250,000
7	29,000	6,500	4,400	640	3.1	35,300
8	82,000	18,500	3,000	340	5.8	91,500
9	87,000	17,000	1,200	19	6.3	35,500
10	100,000	31,000	4,400	300	6.9	127,000
11	139,000	96,000	9,400	27	21.0	200,000
12	133,000	82,000	15,000	110	22.3	350,000
13	367,000	366,000	46,000	250	62.4	2,660,000
14	157,000	92,000	15,000	90	16.6	258,000
15	112,000	98,000	9,800	41	23.6	278,000
16	103,000	67,000	6,600	7.5	16.0	215,000
17	264,000	226,000	20,000	53	49.8	900,000
18	79,000	50,000	3,700	125	15.9	255,000
19	42,000	24,000	5,800	68	7.7	190,000
20	281,000	257,000	14,000	83	49.1	520,000
21	153,000	90,000	10,000	87	23.6	345,000
22	206,000	163,000	17,000	400	43.1	570,000
23	420,000	420,000	38,000	167	86.6	1,800,000
24	310,000	282,000	23,000	235	67.9	615,000
25	128,000	42,000	2,400	14	4.7	50,000

1/ Kjeldahl nitrogen (organic nitrogen plus ammonia)

Most of the Kjeldahl nitrogen is tied up in the organic fraction of the sediment and is unavailable for use by primary producers. Recycling of this source of nitrogen to inorganic nitrogen in the overlying water is facilitated by microbial action and detritus feeders (fig. 16) (Allen and Kramer, 1972). However, most of the nitrogen is lost from the water and incorporated into the sediments because recycling rate is slower than deposition rate.

The organic-carbon concentrations in bottom sediments indicate the organic nature of the soil in the surrounding area and also reflect the age of the canal. Organic-carbon concentrations correlate well ($r = 0.81$) with the percentage of organic content of the bottom sediments at each site. The average percentage of organic-carbon content as compared with the average total-carbon content ranged from 20 percent to 100 percent for all sites. Most of the inorganic carbon is derived from the limestone (carbonate-rock) formations that underlie most of the study area. Canal construction caused the finer limestone material to be redeposited in the bottom sediment.

The phosphorus compounds in the bottom sediment are derived from three principal sources: Inorganic material from clays and limestones, intercellular phosphorus from plant detritus, and sorption of inorganic phosphorus into iron compounds in the sediment. Most of the phosphorus is in the organic form and tied up in plant detritus. Locally high concentrations may be found in some clays such as at site 4. Whether any of the inorganic phosphorus that is tied up with the bottom sediment will be released to the overlying water depends on specific local conditions. For example, under aerobic conditions, phosphorus is taken up by the sediment and if the proper iron and manganese compounds are present, is retained indefinitely. However, under anaerobic conditions the phosphorus is released by diffusion from the bottom sediments and is recycled. Because of the sedimentation process and the prevalence of aerobic conditions at the water-sediment interface during most of the year, inorganic phosphorus is released from the sediments only infrequently.

The COD (chemical oxygen demand) of bottom sediment is a measure of the maximum amount of oxygen the sediment is capable of consuming in the processes of oxidation of all but the most inert detrital materials. Generally the COD of the bottom material in the Everglades is high. Within the area of investigation, the sites with the highest organic content have the highest COD (table 19). This is

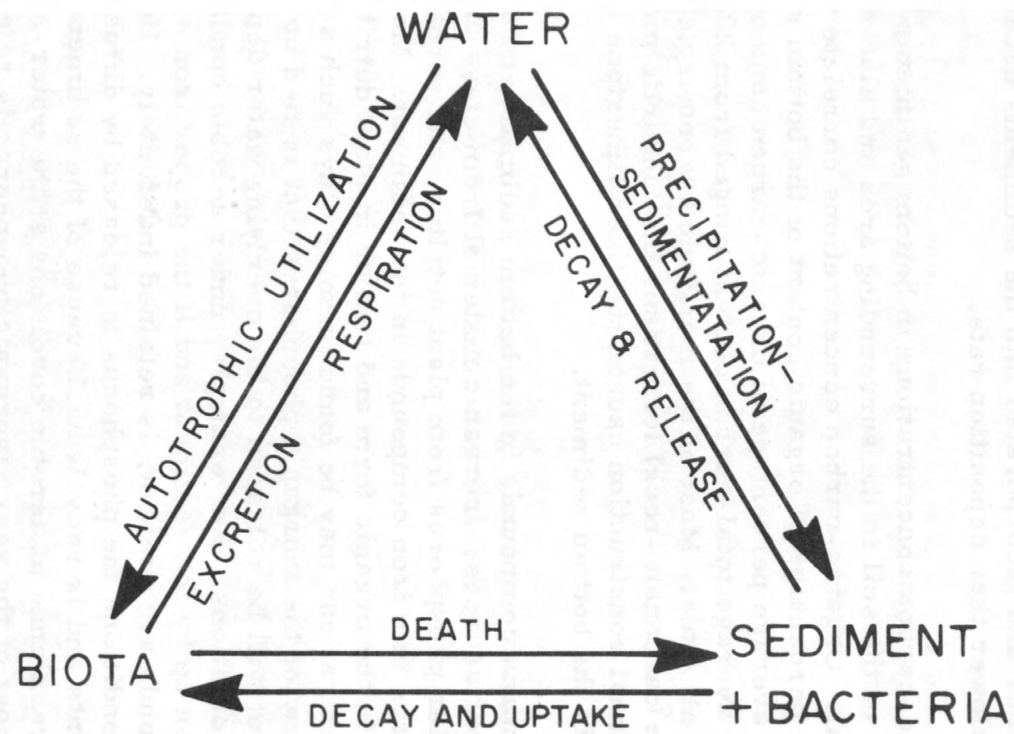


Figure 16.--Schematic diagram of processes influencing the cycling of chemical nutrient species.

not surprising, especially since most of the organic material analyzed developed under anaerobic conditions and is able to consume oxygen readily and in great amounts, given the proper conditions. Indications of the reducing environment are Eh readings of -50 to -300 mv (millivolts) in the marsh peats (H. Feltz, Geological Survey, oral commun., 1974). The bottom sediments and peat remain in a reduced state except at the water-sediment interface and, unlike materials such as sewage sludge and freshly decaying vegetation, the stabilized sediments exert little oxygen demand on the overlying water.

Trace Metals

Trace metals were analyzed in samples of bottom material collected during four sampling periods. Concentrations of copper, lead, iron, and manganese in the canal sites are different from the concentrations in the marsh sites on the average. The concentration in both environments are as follows:

	Micrograms per gram	
	Canal	Marsh
Copper	17	7.2
Lead	66	37
Iron	6,700	4,100
Manganese	82	100

Manganese is slightly higher in the marsh sites than in the canal sites. The remaining trace-metal concentrations, other than those listed here, are highly variable in their areal distribution.

Four major sources of trace metals in the study area are: 1) limestone and clay, 2) agricultural chemicals, predominantly arsenic, mercury, copper, lead, and zinc compounds, 3) motor vehicle exhaust, and 4) trash dumped into waterways and surrounding areas.

The fate of trace metals in bottom sediment varies depending on the chemical reactive capability of each metal. They can be assimilated by plants, trapped within the sediment or adsorbed on organic material in the sediment as shown in figure 17. The trace-metal levels determined in sediments and plants were significantly higher than those found in water. The sediments and plants within the Everglades constitute a "sink" for trace metals. When the concentration of trace metals in sediment is greater than in the overlying water, sorption or entrapment by bottom sediment or assimilation by vegetation is assumed.

Chlorinated-hydrocarbon Insecticides and PCB's

Insecticides are used extensively in the agricultural areas between Lake Okeechobee and the water conservation areas. These insecticides are persistent and breakdown slowly in the environment. They are bound in the organic fraction of the sediments by: 1) ionic attraction, 2) covalent bonding, 3) adsorption, and 4) entrapment. Under natural conditions, a combination of all four of these processes bind the insecticide residue to the sediment (T. Steinheimer, Geol. Survey, oral commun., 1975). The possibility of these compounds reentering the water column is relatively small since they are virtually insoluble in water and, for the most part, chemically bound to the sediment. They also can be assimilated into living plant cells and thus be incorporated within the cells. Physical and chemical binding into the sediments and residual accumulation in detrital plant cells in the sediment makes the bottom material a "sink" for chlorinated hydrocarbon insecticides.

Chlorinated-hydrocarbon insecticides were found in all but two samples (site 11 and site 4, October 1973). The most common insecticide group, the DDT family (DDT, DDE, and DDD) was detected in 96 percent of all samples. Dieldrin was the next most prevalent insecticide (60 percent) followed by chlordane (21 percent), endrin (3 percent) and toxaphene (2 percent). Aldrin and lindane were detected only once.

Distribution of chlorinated-hydrocarbon insecticides in bottom sediment showed a definite areal trend. The lake sites (group 1), northern canal sites (group 2) and internal canal sites (group 4) had the greatest average concentration of the DDT family (table 20). Concentrations decreased as the distance increased from the agricultural

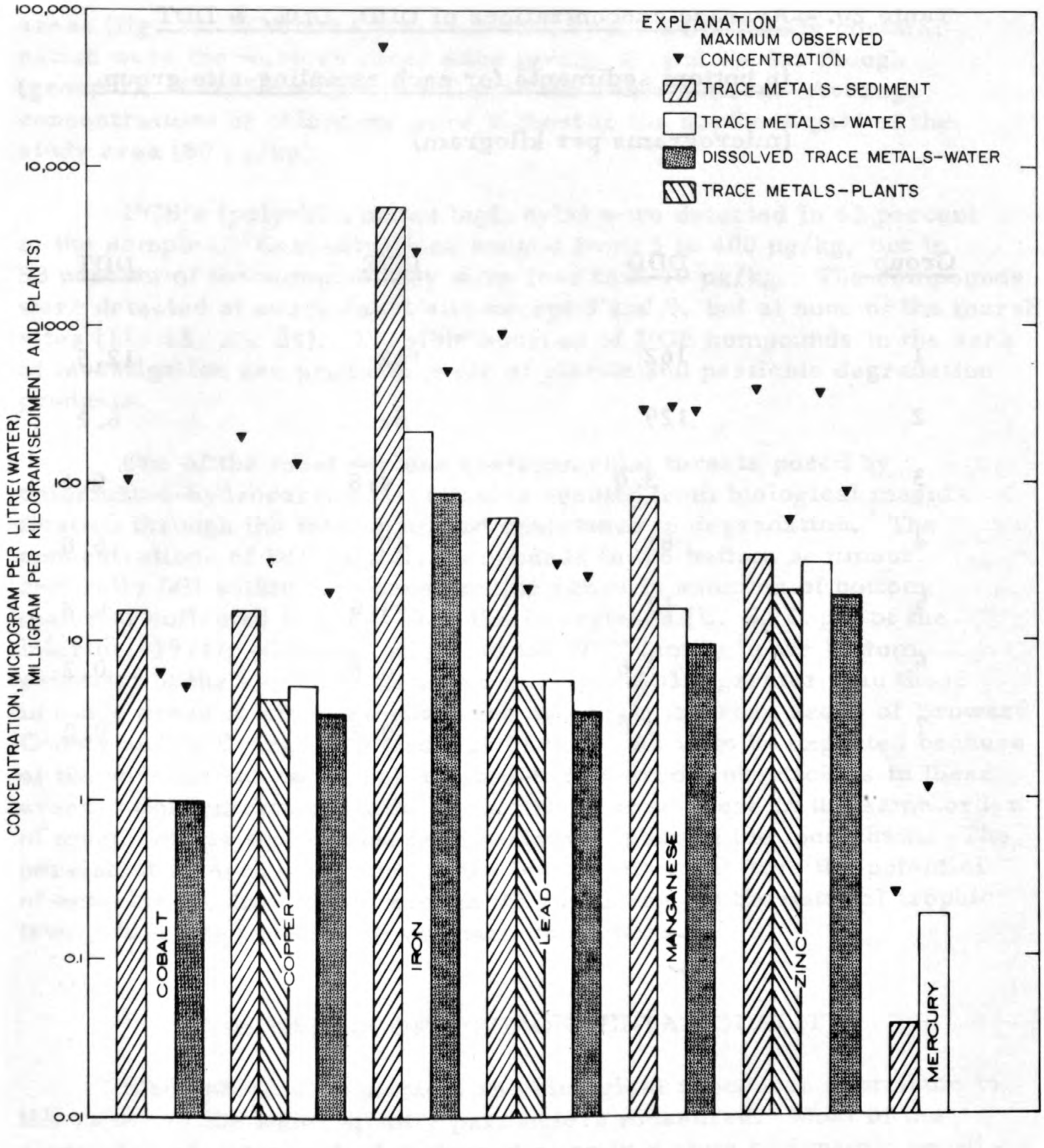


Figure 17.--Average and maximum concentrations of selected trace metals in water, sediment and plants.

Table 20. --Average concentrations of DDD, DDE, & DDT in bottom sediments for each sampling-site group.

(micrograms per kilogram)

Group	DDD	DDE	DDT
1	162	162	12.5
2	129	62	6.2
3	3.0	4.8	0.1
4	81	48	6.8
5	13	4.0	0.2
6	3.6	6.8	0.2
7	0.0	0.2	0.0

areas (fig. 1). The area least affected by the DDT-family contamination were the western canal sites (group 3) and Taylor Slough (group 7). Chlordane levels followed the same pattern. Average concentrations of chlordane were highest in the northern part of the study area (80 µg/kg).

PCB's (polychlorinated biphenyls) were detected in 43 percent of the samples. Concentrations ranged from 5 to 400 µg/kg, but in 53 percent of the samples they were less than 10 µg/kg. The compounds were detected at every canal site except 3 and 9, but at none of the marsh sites (11, 13, 23, 24). Possible sources of PCB compounds in the area of investigation are products made of plastic and pesticide degradation products.

One of the most serious environmental threats posed by chlorinated-hydrocarbon insecticides results from biological magnification through the food chain and resistance to degradation. The concentrations of DDT-family compounds in the bottom sediment generally fall within the concentration range in samples of bottom material collected in 1968-70 in the Everglades (U. S. Dept. of the Interior, 1971). Concentrations of the DDT family in the bottom sediment of the agricultural areas were generally greater than those in other areas of south Florida such as canals in urban areas of Broward County and in Everglades National Park. This is to be expected because of the widespread use of chlorinated-hydrocarbon insecticides in these areas. Concentrations in the agricultural areas were in the same order of magnitude as those found in organisms higher in the food chain. The persistent insecticides found in the bottom material have the potential of entering the food chain through the organisms in the detrital trophic level which are ingested by primary consumers.

EVALUATION OF ENVIRONMENTAL QUALITY

Many physical, chemical and biological processes contribute to the values of the water-quality parameters measured. Most of the elements and compounds determined were in a state of dynamic equilibrium, changing continually in form and (or) in chemical property. In general the chemical processes that do occur in the Everglades are accelerated by the subtropical climate. Because of this subtropical environment, there is more energy driving the various reactions within the system. It should be noted that point samples, not depth-integrated samples, were collected. The values given indicate approximate concentrations that could be expected and lead to some understanding of the processes involved that control the chemical reactions.

The parameters measured may be either conservative or nonconservative in their chemical reactions. Conservative elements and compounds are biologically nonreactive and move through a system freely being affected only by dilution and evapotranspiration. Nonconservative chemical species react, to a certain degree, with the biological community. Assimilation by plants and animals of a certain compound within the Everglades will cause the system to become a sink for that compound. Adsorption on organic material and clays and physical entrapment can also cause the system to become a sink for chemical constituents of water. The Everglades could, in turn, become a possible source of these chemicals if the proper metabolic processes, reactions and physical conditions are present for their release.

The chemical levels reflect both temporal and spatial differences in concentration. The surface waters within the Everglades differ areally and certain parameters vary seasonally, in level. From the data reported, two conclusions are drawn: 1) base levels of each constituent can be anticipated and 2) the effect of constituent transport from one area of the Everglades to another can be determined.

There are three basic sources of elements and compounds in the Everglades waters. One is lithologic, the second is atmospheric (bulk precipitation), and the third is anthropogenic (man's activities). Most of the minerals and trace metals in surface water are derived from the lithologic source. The canals that cut into the limestone made these minerals more accessible to the system. Except for nitrogen and phosphorus, little is known about the atmospheric contribution of chemical species to the Everglades. The inorganic macronutrients are probably the main contribution, followed by the major inorganic ions and insecticides. Cultural activities, both agricultural and urban, contribute macronutrients, trace metals, and insecticides to the system in excess of natural runoff levels. The processes of cycling these chemical constituents through the system are facilitated by biological activity and water movement.

The macronutrients in the Everglades are dominated by organic forms. The organic species move through the system freely unless they settle out or are broken down by organism metabolism. The inorganic nitrogen and phosphorus species remain at a steady-state level because of plant assimilation unless the system is receiving increases in macronutrient loads from runoff.

The marsh ecosystem maintains the inorganic nitrogen and phosphorus levels at a steady state. The macronutrient levels in canals, however, can fluctuate between a system driven by excessive loading derived from fertilizers and runoff, and one in steady-state equilibrium. In the agricultural areas one can expect seasonal peaks in the macronutrient levels, but the canals to the south and west do not have extreme seasonal peaks.

Bulk precipitation is probably the major contributor of nitrogen and phosphorus to the Everglades (Waller, 1975). These compounds are mostly in the inorganic form. Because most of the area is open marsh, these compounds probably reach a stabilized level rapidly due to plant assimilation. More information is needed about the loading of nitrogen and phosphorus input from bulk precipitation.

The inorganic ions in the Everglades are chiefly calcium, sodium, carbonate, and chloride. All are lithologic in origin except those contributed by dry fallout and sea aerosols. All except bicarbonate ion are conservative in their reactions and move through the system freely. Bicarbonate is precipitated as calcium carbonate with change in pH. The greatest dissolved-ion loading in surface water comes from the northern half of the study area. As the water flows southward and eastward it is affected only by rainfall (dilution) and evapotranspiration (concentration). In years when rainfall is below average, the concentrations of inorganic ions would be greater due to evapotranspiration and ground water inflow than in years of above average rainfall. Ions carried in bulk precipitation, plus sea aerosols, probably have a greater effect on the mineralization of remote marsh areas than on the mineralization of water in canals.

Where trace metals occur naturally in the Everglades, their concentrations are well below established limits. The trace metals most likely to be in high concentrations are arsenic, mercury, copper lead and zinc, because these play an important part in agricultural and industrial activity. Concentrations of all the trace metals in sediments and plants are 1 to 2 orders of magnitude higher than those in water, indicating that the processes of sorption, assimilation, and entrapment are tying up these elements. Most trace metals are kept at a fairly stable level in surface water because of these processes with little areal difference between sites. The water conservation areas may be becoming sinks for trace metals and monitoring their levels would detect when they could become toxic to the biological community.

The use of insecticides in the Everglades is concentrated in the area between Lake Okeechobee and the water conservation areas. Most of the insecticides are used for agricultural purposes. Concentrations of insecticides in the Everglades are highest in the northern (upstream) areas. A potential threat to the integrity of the environment exists because of the persistence and magnification of insecticides through the food chain. Insecticides, when in great enough concentration, affect the metabolism of many organisms and reduce their fecundity. In all the areas studied chlorinated-hydrocarbon insecticide residues were found. The concentrations present, however, are greatly reduced as the distance from the agricultural areas increases. These insecticides are carried through the system by flow, bulk precipitation and through the food chain by both plants and animals.

Within the area of investigation, the waters entering Everglades National Park (group 6 - sites 14-17, group 7, site 25 and site 26 - bulk precipitation at 40-mile bend) are affected by man's activities to a lesser extent than those waters entering the conservation areas. The macronutrients maintain a stable, steady-state level and fluctuate little seasonally. The inorganic ion concentrations in group 6 are at low levels when compared with other sampling-site groups except for the canals draining the Big Cypress Swamp (group 3). The concentration of dissolved solids is not as great as the concentration in the waters north of the conservation areas. This indicates that the water is greatly diluted by rainfall before it reaches entry points to the Park.

The levels of trace metals in water entering the Park show few extremes and are stabilized generally at slightly lower concentrations than the levels in water in the agricultural areas. Insecticide levels in both sediment and bulk precipitation are very low as compared with the levels found in the agricultural areas. This reflects the lack of insecticide use around the northern boundary of the Park, the assimilation by plants, and the binding to the sediments of the insecticides as they move downstream from the agricultural areas.

LONG-TERM TRENDS

There are two major ways of determining long-term trends in water quality. One is from existing water-quality data which provide immediate comparisons between previous and current levels of each parameter. The other is from chemical analyses of plants and bottom sediment inasmuch as the plants and sediments have the ability to absorb, adsorb, and entrap different chemical constituents from the water.

The most reliable water-quality data in the past were collected by Parker and others (1955). Comparing their data with similar data collected recently, it appears that the ionic balance and concentrations of common ionic constituents in water from a specific locality have changed little in the major canals since the 1940's. However, new canals, because they move water rapidly from place to place, have distributed water high in dissolved solids from around Lake Okeechobee southward. For example, flow down the L-67A canal has caused an increase in the concentration of inorganic ions, primarily sodium and chloride, at the northeastern entry points to Everglades National Park. At one of these points, the concentrations of these two constituents were 12 mg/l and 20 mg/l in 1961. In 1974 they were as much as 59 mg/l and 89 mg/l, respectively.

Sediment analyses indicate that the Everglades has been functioning as a sink for macronutrients, trace metals and chlorinated-hydrocarbon insecticides. A potential threat to the integrity of the Everglades ecosystem is posed by the accumulation of trace metals and persistent pesticides. The process that can enable these potentially-toxic substances to cause possible harm to the ecosystem is biological magnification and persistence through the food chain. The insecticides may break down in the sediments, but the time required for this has not been determined.

The water reaching Everglades National Park shows minimal effects from the generally higher concentrations of trace metals and insecticides observed in the northern part of the system. The only noticeable long-term effect is that of increasing the concentration of dissolved solids due to channelization of water from the northern agricultural areas.

The waters of the Everglades vary both seasonally and areally in terms of physical, chemical, and biological parameters. Levels of certain parameters, mainly the macronutrients, trace metals, and insecticides, have changed drastically over the last few years.

CONCLUSIONS

1. Many physical and biological processes, and chemical reactions influence the water quality within the Everglades. The major factors that influence the concentrations of each constituent in surface water, are assimilation by plants and animals, adsorption on organic material and clays, entrapment by the sediment, dilution by rainfall, and concentration by evapotranspiration.

2. The geology of the area, bulk precipitation, natural, urban, and agricultural runoff, interaction with the bottom sediment, and the hydrologic characteristics of the area are factors that influence the concentrations of each constituent in the Everglades.

3. Nitrogen and phosphorus concentrations in surface water vary both seasonally and areally. Median concentrations were highest in the northern agricultural areas. On the average, concentrations were highest in the canals during the beginning of the wet season and in the marshes at the end of the dry season.

4. The dominant inorganic ions in the area were calcium and bicarbonate. In the northern agricultural areas sodium and chloride were codominant ions with calcium and bicarbonate. Specific conductance and dissolved-solids concentrations varied both seasonally and areally. Both were highest in the northern areas, and decreased from north to south as the water flowing southward was diluted by rainfall. In canals and marshes, levels of specific conductance and dissolved solids were generally highest during the drier months when evapotranspiration concentrated the waters.

5. Trace-metal concentrations were generally below the limits established by the Florida Department of Pollution Control as criteria for recreational (Class III) and agricultural use (Class IV). Iron concentrations in surface water exceeded these limits the greatest number of times when compared with the other trace metals determined. Trace metal concentrations in surface water varied neither seasonally or areally.

6. Phytoplankton numbers and species varied considerably, both seasonally and areally. The dominant phytoplankton division was Cyanophyta (blue-green algae) for each grouping of stations and for all but one of the sampling periods.

7. Concentrations of nitrogen and phosphorus compounds in bulk precipitation (rainfall and dry fallout) varied seasonally. Increases in concentration occurred during the dry season due to (1) probable increase in dry fallout; (2) less rainfall; (3) more persistent and intense winds, and (4) contamination by organisms. Bulk precipitation was, on the average, higher in inorganic nitrogen and lower in inorganic phosphorus than average surface-water concentrations.

8. The bulk precipitation in south Florida is much more mineralized than that falling on the Northeastern United States or the North Carolina-Virginia area. The codominant inorganic cations are calcium and sodium and the dominant anion is chloride.

9. Concentrations of macronutrients and trace metals are at much higher levels in bottom sediment than in surface water. In the marshes, average macronutrient levels were higher and average trace-metal levels were lower than in most of the canals.

10. Chlorinated-hydrocarbon-insecticide concentrations in bottom sediment varied areally. Average concentrations were highest in the northern agricultural areas. Levels decreased as the distance from agricultural areas increased.

11. The bottom sediment and plants in the Everglades are acting as a sink for macronutrients, trace metals, and chlorinated-hydrocarbon insecticides. These constituents are temporarily immobilized in the plants and sediments.

12. The water reaching Everglades National Park is of better quality than that entering the northern edge of the conservation areas because of the beneficial effects of certain physical, chemical, and biological processes, which alter or remove constituents in the water as it flows southward.

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BASIC DATA A

Site Descriptions

Site 1. Miami Canal below HGS-3 is located 1,200 feet (366 m) downstream from hurricane gate structure 3 and pump station 3 at Lake Okeechobee. Samples are collected from end of walkway extending 40 feet (12 m) into the canal. The canal is 15 feet (5 m) deep and 250 feet (76 m) wide. Canal bottom is a fine texture organic material derived from the surrounding muck soils.

Flow is regulated by the hurricane gate and pump station and is reported as the sum of flow and pumpage. Usual flow is to the south, but in periods of heavy rainfall reverse flows have been observed. Canal water levels are regulated to provide drainage or irrigation for surrounding agricultural areas.

Site 2. North New River Canal below HGS-4 is located 1,600 feet (490 m) downstream from hurricane gate structure 4 and pump station 2 at Lake Okeechobee. Samples are collected from end of walkway extending 40 feet (12 m) into the canal. The canal is 18 feet (5.5 m) deep and 200 feet (61 m) wide. Canal bottom is a fine texture organic material derived from the surrounding muck soils.

Flow is regulated by the hurricane gate and pump station and is reported as the difference in discharge between North New River Canal at S-2 and HGS-4 and Hillsboro Canal below HGS-4. Usual water flow is to the south, but in periods of heavy rainfall reverse flows have been observed. Canal water levels are regulated to provide drainage or irrigation for surrounding agricultural areas.

Site 3. West Palm Beach Canal below HGS-5 is located 1,500 feet (460 m) downstream from hurricane gate structure 5 at Lake Okeechobee. Samples are collected from an old lock chamber extending 50 feet (15 m) into the canal. The canal is 20 feet (6 m) deep and 200 feet (61 m) wide. Canal bottom is a fine texture organic material derived from the surrounding muck soils.

Flow is regulated by the hurricane gate structure 5 and pumping at structure 5-A, 20 miles (32.2 km) downstream. Canal water levels are also affected by local pumping and drainage in surrounding agricultural areas.

Site 4. L-3 Canal is located 7 miles (11.3 km) west of pump station 8. Samples are collected from the center of the canal. The canal is 7 feet (2.5 m) deep and 120 feet (37 m) wide. Canal bottom consists of detritus from decaying aquatic vegetation and the surrounding muck soils and is underlain by clay.

Flow is unregulated and enters Conservation Area 3 six miles (9.6 km) to the southeast. In December 1973, L-4 canal was connected via a culvert to L-3 canal. Water can flow in either direction through this culvert depending on water levels in both canals.

Site 5. Miami Canal at S-8 is located 500 feet (152 m) downstream from pump station 8. Samples are collected 10 feet (3 m) from west side of the canal. The canal is 20 feet (6.1 m) deep and 200 feet (61 m) wide. Canal bottom is tightly-packed, sandy-gray marl and peat.

Flow is regulated by pumping and a movable crest spillway at pump station 8. Canal water levels are regulated to provide drainage or irrigation for agricultural lands upstream.

Site 6. North New River Canal above S-11C is located 200 feet (6.1 m) upstream of gate structure 11C. Samples are collected from the north wingwall of structure 80 feet (24 m) north of the canal. The canal is 20 feet (6.1 m) deep and 200 feet (61 m) wide. Canal bottom consists of detritus from decaying aquatic vegetation of Conservation Area 2 and from peat.

Flow is regulated by the gate structure 11C and structures 11B and 11B downstream. Flow is generally to the west when S-11C is open. Flow to the south is dependent on water levels at S11-B and S11-A. Canal water levels are maintained for storage in Conservation Area 3 and eventual flow to Everglades National Park.

Site 7. South New River Canal at S-9 is located about 200 feet (61 m) east of pump station 9. Samples are collected from end of walkway 20 feet (6.1 m) into the canal. The canal is 15 feet (5 m) deep and 150 feet (46 m) wide. Canal bottom is mostly sand with little organic material present.

Flow is regulated by the pump station and is usually backpumped into Conservation Area 3. Flow is to the west from South New River Canal and from a north-south canal entering South New River Canal 600 feet (180 m) east of the pump station. When large quantities of water are backpumped, canal water levels decline as much as 4 feet and ground-water recharges the canal east of the pump station. Water is backpumped to supply Conservation Area 3 and drain the C-11 basin east of the pump station.

Site 8. L-28 Borrow Canal below S-140 is located about 50 feet (15 m) west of pump station 140. Samples are collected from south wingwall of concrete structure. The canal is 20 feet (6.1 m) deep and 100 feet (30 m) wide. Canal bottom is a fine limestone clay with very little organic material present.

Flow to the south in L-28 canal is unregulated. Flow to the east into Conservation Area 3 is regulated by backpumping at pump station 140.

Site 9. L-28 Interceptor Canal is located 50 feet (15 m) downstream of State Road 84. Samples are collected from the center of the canal. The canal is 20 feet (6.1 m) deep and 200 feet (61 m) wide. Canal bottom is a tightly-packed, inorganic sand with some clay.

Flow is unregulated and drains the northern boundary of the Big Cypress Swamp. The canal terminates on the western edge of Conservation Area 3.

Site 10. Miami Canal at State Road 84 is located 50 feet (15 m) downstream of State Road 84. Samples are collected from west wingwall of bridge over the canal. The canal is 15 feet (3 m) deep and 80 feet (24 m) wide. Canal bottom is decaying vegetation, marl and rock.

Flow is unregulated, but can be effected by pumping at S-8, 16 miles (25.7 km) upstream or S-9, 14 miles (22.5 km) downstream.

Site 11. Corps of Engineers Gage 3-2 is located between S-140 and Miami Canal 3 miles (4.8 km) north of State Road 84. Samples are collected from a ponded area within an open slough near Corps of Engineers Gage 3-2.

Flow is unregulated and during the wet season water flows as sheet flow across the entire area. During the dry season water becomes ponded. The area was completely dry in 6 of the 24 months of the study. Bottom material is muck and decaying vegetation.

Site 12. L-28 Canal is located at the south end of L-28 Canal on the east side of Levee 28. Samples are collected from end of walkway extending 40 feet (12 m) into the canal. The canal is 13 feet (4 m) deep and 150 feet (46 m) wide. Canal bottom is a fine texture organic material derived from peat.

Flow is unregulated and discharges into the southwestern part of Conservation Area 3. The canal drains subarea A of the Big Cypress Swamp. The canal has very little flow in the deeper sections. During the wet season water flows over the banks to the east and south.

Site 13. Everglades Station 3-28 is located in the south-central part of Conservation Area 3. Samples are collected from an open slough area at Corps of Engineers gage.

Flow is unregulated and during the wet season water flows as sheet flow across the entire area. During the dry season water becomes ponded. The area was completely dry in 6 of the 24 months of the study. Bottom material is peat.

Site 14. Tamiami Canal above S-12A is located 100 feet (30 m) upstream of control structure 12A. Samples are collected from walkway extending 20 feet (6.1 m) into the canal. The canal is 12 feet (3.7 m) deep and 150 feet (46 m) wide. Canal bottom is a fine texture organic material derived from peat.

Flow is regulated by operation of control structure 12A. Discharge is regulated to provide flow into Everglades National Park.

Site 15. Tamiami Canal Outlets, Levee 67A to 40-mile Bend is located 200 feet (61 m) upstream of control structure 12C. Samples are collected from walkway extending 20 feet (6.1 m) into the canal. The canal is 12 feet (3.7 m) deep and 150 feet (46 m) wide. Canal bottom is a fine texture organic material derived from peat.

Flow is regulated by operation of control structure 12C. Discharge is regulated to provide flow into Everglades National Park.

Site 12. L-67A Canal is located 0.5 mile (0.8 km) north of U. S. Highway 41 at control structure 12E. Samples are collected 10 feet (3 m) from east bank of the canal. The canal is 20 feet (6.1 m) deep and 200 feet (61 m) wide. Canal bottom is peat and decaying vegetation.

Flow is regulated by operation of the S-12 control structures. Discharge is regulated to provide flow into Everglades National Park.

Site 17. Tamiami Canal Outlets, L-30 to L-67A, are located at Bridge 53 on U. S. Highway 41. Samples are collected from the center of the canal. The canal is 10 feet (3 m) deep and 120 feet (37 m) wide. Canal bottom consists of detritus from peat and from decaying Australian pine trees that border the canal.

Flow is unregulated and consists entirely of seepage through Levee 29 from Conservation Area 3B.

Site 18. West Palm Beach Canal above S-5A is located 500 feet (152 m) upstream of pump station 5A. Samples are collected from end of walkway extending 40 feet (12 m) into the canal. The canal is 30 feet (9.1 m) deep and 150 feet (46 m) wide. Canal bottom is a fine texture organic material derived from the surrounding muck soils.

Flow is regulated by pumpage at S-5A and to a lesser extent by operation of control structure 5AE. Regulation above the site is at Cross Canal, 1.5 miles (2.4 km), upstream, and at hurricane gate structure 5 at Lake Okeechobee, 20 miles (32 km) upstream. Discharge is the difference between pumpage at S-5A and gate discharge at S-5AW. Canal water levels are regulated to provide drainage or irrigation for surrounding agricultural areas. Water is also back-pumped to maintain water levels in Conservation Area 1.

Site 19. West Palm Beach Canal east of S-5AE is located 1 mile (km) east of control structure 5AE. Samples are collected 3 feet (1 m) from north bank of the canal. The canal is 7 feet (2.5 m) deep and 100 feet (30 m) wide. Canal bottom is a fine-grain, organic detritus from muck soils and from decaying aquatic vegetation, and sand.

Flow is regulated by S-5AE for irrigation and drainage. Flow is diverted above station through S-5AE, S-5AS, and by pumping at S-5A. Flow is also affected by adjacent agricultural drainage ditches and reverse flow has been observed. A north-south drainage ditch and culvert was installed perpendicular to the canal at this station in June 1973. Flow from this culvert was generally into West Palm Beach Canal. Flow is computed from discharge relationship betwee discharge, head, and gate openings at S-5AE.

Site 20. Hillsboro Canal at S-6 is located 50 feet (15.2 m) upstream of pump station 6. Samples are collected from east wingwall of structure 15 feet into the canal. The canal is 20 feet (6.1 m) deep and 150 feet (46 m) wide. Canal bottom is muck and decaying vegetation from the surrounding agricultural areas.

Flow is regulated by operation of pump station 6. Canal water levels are regulated to provide drainage or irrigation for surrounding agricultural areas and for maintaining storage in Conservation Area 1.

Site 21. North New River Canal above S-7 is located 400 feet (122 m) upstream of pump station 7. Samples are collected 10 feet (3 m) from west bank of the canal. The canal is 18 feet (5.5 m) deep and 250 feet (76 m) wide. Canal bottom is mostly fine grain detritus from the surrounding muck soils, with some decaying aquatic vegetation.

Flow is regulated by pumping station 7. Canal water levels are regulated to provide drainage or irrigation for adjacent agricultural areas. Flow is reported as the discharge from pumping station 7.

Site 22. Hillsboro Canal above S-10C is located 50 feet (15 m) northeast of gate structure 10C, 4 miles (6.4 km) northwest of structure 39 along Levee 39. Samples are collected from the center of the canal. The canal is 20 feet (6 m) deep and 250 feet (76 m) wide. Canal bottom is fine grain detritus from the muck soils and decaying aquatic vegetation from the adjacent marsh of Conservation Area 1.

Flow is regulated by operation of structures S-10C and S-39 and pumping at pump station S-6, about 12 miles (19.3 km) upstream. Flow is generally to the south and channelized as gate structure S-10C is rarely opened. Canal water levels are regulated for water management purposes in Conservation Areas 1a and 2.

Site 23. Everglades Station 1-15 is located in the south-central part of Conservation Area 1. Samples are collected from an open slough area at Corps of Engineers gage.

Flow is unregulated and during the wet season water flows as sheet flow across the entire area. During the dry season water becomes ponded. Bottom material is peat.

Site 24. Everglades Station 2017 is located in the north-central part of Conservation Area 2A. Samples are collected from an open slough area at Corps of Engineers gage.

Flow is unregulated and during the wet season water flows as sheet flow across the entire area. During the dry season water becomes ponded. Bottom material is peat.

Site 25. Levee 31W Canal above S-175 is located 2 miles (3.2 km) north of U. S. 27. Samples are collected from north side of control 10 feet (3 m) into the canal. The canal is 10 feet (3 m) deep and 100 feet (30 m) wide. Canal bottom is calcium-carbonate rock and marl with some decaying aquatic vegetation.

Flow is regulated by a movable crest spillway (S-175) and would be southward if the structure is ever opened. The canal is designed to remove excess water from the eastern edge of Taylor Slough and shuttle it into the lower part of the Slough.

Site 26. Rainfall at 40-mile Bend. Bulk precipitation collector is located at the U. S. Weather Service recording station within the National Park Service Tamiami Ranger Station. Collection funnels are approximately 4 feet (1.2 m) above land surface. There are no obstructions or sources of contamination in the vicinity. Rainfall averages approximately 57 in. (1448 mm) with a prevailing wind from the east-southeast.

Site 27. Rainfall at pump station 9. Bulk precipitation collector is located on the roof of the pumping structure (for the prevention of vandalism). Collection funnels are 3 feet (0.9 m) above the roof. The only obstruction and possible source of contamination are guy wires crossing overhead. Rainfall averages approximately 62 in. (1575 mm) with a prevailing wind from the east-southeast.

Site 28. Rainfall at pump station 5. Bulk precipitation collector is located at the S-5A weather station. Collection funnels are 4 feet (1.2 m) above land surface. There are no obstructions to rainfall but there is a possibility of contamination from splash off a nearby galvanized fence. Rainfall averages approximately 64 in (1626 mm) with a prevailing wind from the southeast.

BASIC DATA B

Monthly nutrient, total organic carbon, and field measurements in surface water.

All values in milligrams per litre except where noted.

Nitrogen reported as N

Phosphorus reported as P

Specific conductance reported as micromhos per centimetre.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/19	1230	29.0	5.1	790	8.20	10	4	40	188	154	0.11	2.3	0.02	0.02	0.03	0.04	2.4
72/08/15	1200	31.0	6.3	755	8.35	8.0	4	34	164	134	.05	1.9	.00	.01	.02	.03	2.0
72/09/13	1020	29.0	5.2	820	7.80	10	4	27	360	295	.19	2.1	.05	.07	.02	.02	2.4
72/10/19	0930	26.5	7.1	720	7.60	3.8	5	14	152	125	.06	3.1	.00	.00	.00	.02	3.2
72/11/15	1200	24.5	4.4	780	7.60	6.6	30	39	200	164	.20	1.7	.43	.01	.12	.15	2.3
72/12/13	1110	23.0	6.4	710	8.10	4.0	2		184	151	.04	1.4	.00	.00	.00	.01	1.4
73/01/12	1200	17.0	7.2	920	7.70			31	200	164							
73/02/07	1230	20.5	7.5	1030	7.80	10	5	24	208	171	.29	1.5	.04	.01	.00	.02	1.8
73/03/14	1210	27.0	5.1	500	7.70	5.2	4	22	200	164	.28	1.6	.04	.16	.02	.02	2.1
73/04/18	1045	23.0	8.1	665	7.70	4.8	3	17	196	161	.05	2.4	.00	.00	.00	.02	2.4
73/05/23	1100	27.5	7.2	630	8.40	4.2	7	21	132	108	.06	1.8	.00	.01	.00	.02	1.9
73/06/14	1250	30.5	7.2	600	8.70	7.0		24	104	85	.01	1.5	.06	.01	.02	.03	1.6
73/07/23	1340	28.5	1.8	895	8.10	8.7	15	51	156	128	.50	3.6	.48	.01	.12	.14	4.6
73/08/16	1200	31.0	6.4	1040		19	10	28			.13	2.8	1.1	.06	.05	.12	4.1
73/09/18	1350	31.0	4.3	1220		28	4	32			.64	3.1	.04	.06	.04	.10	3.8
73/10/17	1400	28.0	6.5	1070	8.40	23	7	36	293	255	.56	1.4	.02	.04	.00	.03	2.0
73/11/20	0930	23.5	6.8	830			10	17			.10	1.2	.02	.01	.02	.04	1.3
73/12/19	1100	16.0	8.2	880			10	17			.19	1.1	.14	.01	.02	.03	1.4
74/01/15	0930	21.0	6.7	720			4	24			.19	1.4	.07	.01	.02	.02	1.7
74/02/13	1035	16.0	8.5	860			5	22			.06	1.5	.00	.01	.02	.03	1.6
74/03/14	1300	23.5	7.7	830			8	26			.04	1.2	.00	.00	.01	.03	1.2
74/04/18	1400	27.5	7.9	690	8.70		4	21	154	133	.03	1.4	.02	.00	.00	.02	1.4
74/05/15	1110	26.0	8.1	710			10	20			.04	1.3	.02	.01	.01	.02	1.4
74/06/17	1050	28.0	2.7	870			13	25			.41	2.2	2.3	.12	.03	.04	5.0

Site 1. --Miami Canal below HGS-3 and S-3.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/19	1200	29.5	1.4	1420	7.70	24	10	80	376	308	0.88	3.9	0.32	0.14	0.17	0.19	4.5
72/08/15	1130	30.0	6.1	920	8.05	11	5	40	196	161	.29	2.4	.32	.07	.09	.11	3.1
72/09/13	0945	29.0	3.3	1480	7.70	24	2	54	240	197	.83	4.4	.05	.20	.32	.38	5.5
72/10/19	1030	26.0	6.8	750	8.00	4.9	7	15	136	112	.04	2.2	.00	.00	.01	.02	2.2
72/11/15	1130	24.5	2.8	835	7.40	7.9	25	31	192	157	.27	1.6	.09	.01	.01	.02	2.0
72/12/13	1010	22.5	7.0	680	8.00	3.4	5		176	144	.08	1.5	.00	.00	.00	.01	1.6
73/01/12	1100	17.5	3.3	1150	7.50	16	10	38	280	230	.63	.52	.40	.08	.14	.16	1.6
73/02/07	1210	21.5	4.2	1280	7.55	17	6	65	272	223	.64	2.4	.55	.12	.16	.22	3.7
73/03/14	1130	26.5	4.8	1480	7.60	18	4	69	264	216	.34		1.4	.16	.14	.17	
73/04/18	1010	22.0	7.6	660	7.80	4.9	7	14	188	154	.05	1.3	.00	.00	.00	.01	1.4
73/05/23	1000	29.5	6.3	640	8.15	6.0	10	21	200	164	.07	1.2	.01	.01	.01	.02	1.3
73/06/14	1145	29.0	5.9	840	7.40	15			204	167	.19	1.7	1.2	.10	.02	.04	1.9
73/07/23	1300	28.0	1.3	720	7.95	11	15	45	248	203	.38	2.7	4.4	.12	.25	.26	7.6
73/08/16	1035	29.5	4.2	1440		24	10				.73	2.4	.30	.08	.05	.07	3.5
73/09/18	1330	30.0	1.2	1860		31	8	52			1.0	2.9	.24	.20	.24	.32	4.3
73/10/17	1245	28.5	5.9	800	8.30	12	9	36	281	221	.11	1.9	.01	.01	.01	.03	2.0
73/11/20	1320	24.0	6.1	870			10	18			.10	1.5	.06	.01	.02	.04	1.7
73/12/19	1040	15.0	8.9	790			10	15			.05	1.2	.12	.01	.02	.03	1.4
74/01/15	0850	20.0	2.7	1300			3	80			.47	2.1	.29	.07	.08	.12	2.9
74/02/13	1130	16.5	8.7	850			6	20			.07	1.8	.07	.01	.01	.04	2.0
74/03/14	1140	23.5	8.0	840			10	29			.05	1.4	.00	.00	.01	.04	1.4
74/04/18	1300	26.5	7.1	700	8.60		10	20	153	134	.03	1.5	.08	.00	.02	.02	1.6
74/05/15	1135	26.0	7.0	345			18	22			.21	1.4	.08	.01	.02	.03	1.7
74/06/17	1110	28.0	1.7	1140			6	70			.40	2.5	3.3	.20	.08	.09	6.4

Site 2. --North New River Canal below HGS-4 and S-2.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO4 ortho	P total	N total
72/07/19	1100	28.5	5.7	620	7.80	1.3	6	34	160	131	0.14	1.4	0.11	0.01	0.04	0.04	1.7
72/08/15	1000	29.5	3.9	620	7.95	4.4	5	21	152	125	.21	1.2	.03	.01	.04	.05	1.4
72/09/13	0900	28.0	4.0	650	8.10	6.2	4	6.0	80	66	.16	1.6	.14	.04	.03	.05	2.0
72/10/19	1130	25.5	6.5	680	8.20	5.8	9	12	128	105	.08	1.3	.06	.01	.02	.06	1.4
72/11/15	1100	24.0	4.9	650	7.80	7.6	9	26	160	131	.12	1.3	.17	.01	.03	.04	1.6
72/12/13	0930	21.5	7.9	645	8.20	7.4	8		176	144	.04	1.1	.12	.00	.01	.02	1.3
73/01/12	1015	16.5	7.3	920	7.80	7.7	3	24	160	131	.10	1.0	.19	.01	.02	.04	1.3
73/02/07	1050	19.5	7.8	800	7.80	7.0	20	22	148	121	.08	1.8	.25	.01	.04	.04	2.1
73/03/14	1020	24.5	4.6	700	7.85	8.5	10	19	168	138	.12	1.2	.20	.01	.03	.04	1.5
73/04/18	0915	21.5	7.9	705	7.85	6.7	15	13	172	141	.05	1.8	.20	.00	.01	.02	2.0
73/05/23	0930	29.0	6.0	640	8.10	5.4	15	19	176	144	.04	1.1	.00	.01	.01	.02	1.2
73/06/14	1100	28.5	6.0	480	7.90	5.0	10		148	121	.05	1.1	.00	.01	.01	.02	1.2
73/07/23	1215	30.0	4.6	890	7.80	8.6	10	24	188	154	.38	2.1	.07	.05	.06	.06	2.6
73/08/16	0945	29.0	4.4	820		3.5	10	15			.27	1.9	.00	.01	.03	.06	2.2
73/09/18	1245	29.5	1.9	1020		19	9	32			.70	2.6	.67	.10	.10	.27	4.1
73/10/17	1045	26.0	4.1	770	8.40	10	5	24	197	172	.29	.79	.97	.03	.04	.06	2.1
73/11/20	1300	23.0	6.5	860			8	14			.05	1.2	.23	.01	.04	.07	1.5
73/12/19	1000	15.0	8.8	750			25	17			.02	1.6	.26	.01	.02	.03	1.9
74/01/15	1300	22.0	3.7	660			20	27			.42	1.4	.34	.02	.08	.14	2.2
74/02/13	1400	17.5	8.5	810			32	23			.06	1.8	.24	.02		.12	2.1
74/03/14	1430	23.5	7.2	770			20	30			.07	1.4	.15	.01	.03	.11	1.6
74/04/18	1100	25.5	6.9	690	8.20		16	26	174	143	.04	2.1	.18	.01	.03	.07	2.3
74/05/15	1210	26.0	6.8	480			22	21			.05	1.6	.12	.01	.04	.07	1.8
74/06/17	1130	28.0	2.4	1780			7	76			.36	2.7	1.8	.40	.08	.10	5.3

Site 3. --West Palm Beach Canal below HGS-5.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/19	1430	27.0	1.6	380	7.45	8.6	2	39	160	131	0.09	1.9	0.00	0.01	0.13	0.15	2.0
72/08/15	1445	30.0	8.9	465	8.20	10	4	28	240	197	.07	2.2	.00	.01	.15	.20	2.3
72/09/13	1340	29.5	3.7	450	8.60	9.7	3				.25	2.2	.00	.02	.16	.21	2.5
72/10/20	1315	26.5	5.0	450	7.70	7.0	2	15	144	118	.10	1.5	.03	.01	.14	.14	1.6
72/11/15	1400	26.5	2.8	420	7.50	7.0	2		152	125	.06	1.1	.07	.01	.12	.13	1.2
72/12/13	1300	22.5	8.4	405	7.60	5.0	3	35	184	151	.03	1.0	.00	.01	.06	.07	1.0
73/01/12	1340	17.5	7.1	480	7.50	5.5	2	30	188	154	.05	.84	.00	.01	.02	.03	.90
73/02/07	1410	20.0	4.1	545	7.60	5.1	2	25	200	164	.05	1.3	.00	.01	.02	.03	1.4
73/03/14	1325	25.5	5.7	510	7.80	1.9	3	20	220	180	.05	1.0	.00	.01	.02	.02	1.1
73/04/19	1100	22.0	4.7	470	7.60	2.9	2	16	180	148	.05	1.1	.00	.00	.01	.02	1.2
73/05/23	1235	27.5	6.1	400	7.50	2.0	5	27	148	121	.02	1.1	.00	.00	.02	.03	1.1
73/06/14	1240	28.0	8.3	320	7.80	7.0		25	188	154	.01	1.3	.00	.01	.03	.05	1.3
73/07/23	1520	30.5	4.2	690	8.00	11	5	19	204	167	.21	2.2	.00	.01	.02	.07	2.4
73/08/16	1420	31.0	.8	310		11	9	18			.30	2.2	.00	.01	.24	.43	2.5
73/09/18	1540	30.0	2.4	305		6.7	6	18			.23	1.8	.00	.02	.11	.17	2.0
73/10/18	1230	27.0	2.3	320	8.10	5.6	6	26	140	115	.10	.98	.02	.02	.04	.06	1.1
73/11/21	1300	24.0	5.2	410			3	19			.06	1.4	.00	.01	.03	.05	1.5
73/12/19	1245	16.0	7.6	930			5	20			.03	1.7	.25	.01	.01	.82	2.0
74/01/21	1415	23.5	8.2	810			9	30			.07	1.9	.35	.03	.02	.03	2.4
74/02/14	1400	20.5	8.1	885			9	31			.05	2.6	.14	.01	.02	.03	2.8
74/03/15	1300	23.0	6.8	550			4	29			.04	1.0	.00	.00	.01	.03	1.0
74/04/19	1400	27.0	9.0	400	8.40		6	27	137	114	.02	1.3	.02	.00	.01	.03	1.3
74/05/16	1115	26.0	7.7	370			5	20			.03	1.4	.01	.01	.02	.03	1.4
74/06/18	1200	31.0	10.2	360			2	26			.01	.93	.00	.01	.01	.03	.95

Site 4.--L-3 Canal.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/19	1350	28.5	4.7	920	7.80	7.8	2	55	324	266	0.08	2.4	0.13	0.05	0.02	0.02	2.7
72/08/15	1400	30.5	7.2	960	8.00	8.2	3	50	324	266	.14	2.1	.00	.01	.02	.03	2.2
72/09/13	1140	29.5	6.3	755	7.75	8.3	2	57	280	230	.17	2.8	.46	.08	.02	.04	3.5
72/10/20	1130	26.5	5.1	1140	7.45	8.5	1	24	320	262	.04	1.9	.24	.02	.01	.02	2.2
72/11/15	1305	25.0	3.3	980	7.80	8.5	3	36	276	226	.05	1.8	.39	.03	.01	.01	2.3
72/12/13	1210	21.5	7.7	1000	7.80	6.4	2		300	246	.10	1.4	.11	.01	.00	.01	1.6
73/01/12	1315	18.0	7.1	1060	8.10	8.2	5	46	308	253	.05	3.2	.24	.02	.02	.02	3.5
73/02/07	1320	21.5	8.6	1160	8.05	7.6	3	59	300	246	.07	1.7	.14	.02	.01	.02	1.9
73/03/14	1305	26.5	5.9	1160	8.10	7.7	6	58	264	216	.65	1.8	.00	.01	.02	.02	2.5
73/04/19	1010	24.0	6.2	1220	7.70	9.0	2	22	308	253	.11	1.9	.10	.03	.01	.02	2.1
73/05/23	1200	27.5	6.1	670	7.90	4.6	10	23	132	108	.04	1.4	.00	.01	.01	.02	1.4
73/06/14	1415	29.5	6.3	620	7.40	7.0		25	220	180	.03	1.3	.01	.00	.01	.02	1.3
73/07/23	1450	30.5	4.1	1080	7.85	9.0	9	50	296	243	.07	2.4	2.6	.05	.02	.02	5.1
73/08/16	1400	31.0	4.7	1090		12	10	39			.17	2.6	2.7	.08	.04	.05	5.6
73/09/18	1450	30.5	4.4	785		8.5	5	34			.15	1.8	.51	.02	.03	.03	2.5
73/10/18	1200	26.0	4.7	480	8.20	7.0	10	28	204	167	.16	1.2	.04	.03	.04	.06	1.4
73/11/14	1230	24.0	2.4	970			4	20			.01	2.3	.25	.46	.05	.06	3.0
73/12/19	1300	18.0	7.4	1060			5	17			.08	1.6	.18	.01	.01	.02	1.9
74/01/21	1400	25.5	16.3	900			6	33			.17	2.7	.20	.13	.04	.09	3.2
74/02/14	1330	21.5	6.9	1140			8	30			.22	2.2	.12	.05	.02	.04	2.6
74/03/15	1210	22.5	6.8	970			5	28			.09	1.5	.05	.01	.01	.04	1.6
74/04/19	1200	27.5	6.8	700	8.40		6	19	153	132	.05	1.8	.10	.00	.01	.03	2.0
74/05/16	1050	26.5	6.3	600			7	22			.07	1.7	.08	.01	.01	.03	1.9
74/06/18	1140	29.0	4.4	930			4	51			.08	2.2	7.8	.19	.01	.03	10

Site 5.--Miami Canal at S-8.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1210	29.5	2.4	920	7.65	13	2	64	312	259	0.05	3.9	0.01	0.02	0.01	0.02	4.0
72/08/14	0900	29.5	3.0	970	7.65	17	1	34	220	180	.03	1.2	.00	.01	.01	.03	1.2
72/09/12	0950	27.5	4.2	1050	7.85	16	1	52	288	236	.04	1.7	.00	.01	.00	.00	1.8
72/10/18	1115	26.5	5.2	830	7.60	13	1	17	208	171	.02	1.4	.00	.00	.00	.02	1.4
72/11/14	1115	23.0	2.8	670	7.65	17	1	33	196	161	.05	1.8	.00	.00	.00	.01	1.8
72/12/12	1015	23.0	6.8	830	8.10	16	1		248	203	.03	1.3	.00	.00	.00	.02	1.3
73/01/11	1030	18.5	3.7	920	7.70	14	2	40	248	203	.03	1.5	.00	.00	.00	.00	1.5
73/02/06	1040	20.5	4.4	1080	7.70	12	2	30	240	197	.06	1.9	.03	.01	.00	.01	2.0
73/03/13	1040	26.5	5.4	1060	7.75	10	2	59	224	184	1.6	2.3	.00	.01	.09	.12	3.9
73/04/17	1020	23.5	4.4	1100	7.90	14	2	46	264	216	.65	1.8	.03	.04	.02	.05	2.5
73/05/22	1100	27.0	8.3	820	8.40	4.8	10	24	132	108	.12	1.6	.05	.02	.02	.02	1.8
73/06/13	1030	28.0	8.3	1050	7.50	15		63	404	331	.08	2.3	.35	.03	.04	.06	2.8
73/07/16	0945	28.0	6.7	1180	7.95	13	8	45	256	210	.13	1.6	.31	.03	.00	.00	2.1
73/08/15	1015	28.0	.9	1010		15	1	33			.14	1.9	.17	.02	.03	.04	2.2
73/09/18	0945	29.5	1.9	840		21	4	38			.04	2.2	.00	.01	.01	.03	2.2
73/10/16	1120	27.0	4.2	1140	8.60	19	4	55	338	306	.00	1.1	.02	.02	.01	.02	1.1
73/11/14	1000	24.0	5.7	1140			2	29			.03	2.2	.02	.01	.02	.02	2.2
73/12/18	1000	15.5	7.3	910			4	37			.03	2.7	.06	.01	.02	.02	2.8
74/01/17	1420	22.0	2.5	1080			5	65			.03	2.3	.00	.01	.01	.02	2.3
74/02/13	0930	16.0	4.7	1060			6	82			.07	2.2	.00	.01	.01	.02	2.3
74/03/14	1100	23.5	5.8	1410			5	54			.06	2.0	.00	.00	.01	.02	2.1
74/04/17	1000	25.5	7.3	820	7.70		4	29	204	167	.06	1.7	.22	.01	.01	.02	2.0
74/05/15	1020	26.0	5.9	940			8	19			.09	1.5	.16	.01	.03	.03	1.8
74/06/17	1015	27.0	2.3	1140			4	58			.08	1.8	1.0	.08	.03	.05	3.0

Site 6.--North New River Canal at S-11C.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1030	25.5	1.8	670	7.35	9.6	4	29	200	164	0.23	1.7	0.01	0.01	0.01	0.01	2.0
72/08/17	1325	29.5	2.4	620	6.75	10	3	36	224	184	.23	1.4	.02	.01	.00	.01	1.7
72/09/11	0900	25.0	1.5	455	7.40	9.7	4	20	224	184	.24	1.4	.01	.01	.00	.01	1.7
72/10/18	0945	23.5	1.3	750	6.95	9.7	4	11	272	223	.28	1.5	.00	.00	.00	.04	1.8
72/11/14	1045	22.5	2.4	605	7.10	9.5	3	28	276	226	.29	1.3	.03	.00	.00	.01	1.6
72/12/12	0940	24.0	.4	720	7.80	11	1	20	336	276	.53	.92	.00	.00	.00	.02	1.4
73/01/18	1000	22.0	.5	760	7.35	10	2	23	288	236	.41	1.3	.00	.01	.00	.00	1.7
73/02/06	0945	24.5	.5	840	7.50	11	4	19	248	203	.46	1.5	.00	.00	.00	.01	2.0
73/03/13	0945	25.0	.6	800	7.70	11	2	43	260	213	.51	1.1	.00	.00	.02	.02	1.6
73/04/17	0830	23.5	.3	800	7.30	12	1	22	256	210	.54	1.5	.00	.00	.01	.01	2.0
73/05/22	1000	26.0	1.2	850	7.35	11	5	17	344	282	.48	1.9	.00	.01	.00	.00	2.4
73/06/13	0930	27.5	3.4	690	7.75	10	5	47	344	282	.15	1.2	.00	.01	.01	.01	1.4
73/07/16	0730	26.0	2.2	640	7.40	10	8	22	180	148	.30	1.3	.20	.02	.02	.02	1.8
73/08/15	0820	26.5	1.2	680		10	10	13			.28	1.5	.20	.03	.02	.05	2.0
73/09/24	1900	27.0	1.9	690				15			.31	1.0	.41	.03	.02	.03	1.8
73/10/16	1015	24.5	1.9	690	8.40	10	4	29	271	229	.32	.78	.02	.02	.01	.02	1.1
73/11/14	0900	25.0	.8	840			2	18			.53	1.4	.00	.01	.01	.02	1.9
73/12/18	0900	22.5	1.2	840			4	20			.56	2.5	.06	.01	.01	.02	3.1
74/01/17	1620	24.5	.6	700			8	61			.53	1.1	.05	.02	.02	.04	1.7
74/02/13	0845	22.5	.7	900			4	69			.61	1.6	.00	.01	.01	.02	2.2
74/03/14	1000	24.0	.7	940			2	31			.62	1.2	.00	.00	.01	.02	1.8
74/04/17	1000	25.0	2.3	860	7.60		4	46	330	271	.44	1.6	.04	.00	.00	.02	2.1
74/05/15	0950	26.0	3.8	910			5	20			.34	1.4	.03	.01	.01	.02	1.8
74/06/17	1000	25.0	1.4	780			7	37			.36	1.2	.39	.05	.01	.03	2.0

Site 7. --South New River Canal at S-9.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/19	1520	28.5	3.6	330	7.70	6.3	2	23	140	116	0.10	2.2	0.05	0.01	0.02	0.02	2.2
72/08/15	1550	30.0	3.0	270	8.00	4.4	2	10	60	49	.05	.89	.04	.01	.01	.02	.99
72/09/13	1405	28.0	2.7	315	7.40	6.6	2	18	160	131	.11	1.9	.00	.01	.02	.02	2.0
72/10/20	1430	26.0	5.1	460	7.70	6.3	3	15	192	157	.01	1.6	.01	.00	.01	.02	1.6
72/11/15	1445	26.0	4.9	320	7.90	6.0	1	18	152	125	.05	1.3	.15	.01	.01	.02	1.5
72/12/13	1325	21.5	7.8	445	7.95	6.6	1		216	177	.04	1.6	.17	.00	.00	.01	1.8
73/01/12	1425	17.0	8.1	520	7.75	6.5	3	32	200	164	.03	.89	.24	.01	.00	.02	1.2
73/02/07	1445	23.5	9.5	580	7.80	6.1	2	19	200	164	.04	1.7	.41	.01	.00	.01	2.2
73/03/14	1400	24.0	6.2	580	7.90	5.9	4	22	208	171	.04	1.3	.10	.01	.01	.01	1.4
73/04/19	1140	22.0	8.7	540	7.80	6.4	2	12	220	180	.07	1.1	.10	.00	.00	.00	1.3
73/05/23	1300	28.5	7.5	580	7.95	6.8	4	17	212	174	.07	1.4	.06	.01	.00	.01	1.5
73/06/14	1315	27.0	7.0	530	7.70	9.0	8	20	204	167	.03	1.9	.00	.00	.01	.02	1.9
73/07/23	1625	29.5	3.8	420	7.90	9.9	6	35	144	188	.37	3.6	.00	.01	.01	.01	4.0
73/08/16	1510	31.0	2.6	400		8.8	7	13			.18	1.6	.00	.02	.01	.03	1.8
73/09/18	1620	30.5	4.7	350		8.5	6	16			.09	2.0	.02	.01	.05	.08	2.1
73/10/18	1340	27.0	3.6	430	8.50	7.1	2	23	205	180	.12	.76	.12	.02	.02	.02	1.0
73/11/14	1500	23.5	6.0	490			7	17			.01	1.8	.32	.07	.02	.05	2.2
73/12/19	1315	18.0	6.6	470			6	19			.04	1.9	.31	.01	.04	.13	2.3
74/01/21	1300	23.0	6.8	440			4	23			.01	.95	.23	.01	.01	.02	1.2
74/02/14	1340	20.5	7.2	550			9	28			.08	1.3	.18	.01	.01	.04	1.6
74/03/15	1450	23.0	8.8	590			3	22			.06	.93	.10	.01	.00	.02	1.1
74/04/19	1500	26.5	7.9	510	8.00		3	28	184	151	.04	1.6	.09	.00	.00	.02	1.7
74/05/16	1150	25.5	7.3	410			5	17			.07	1.3	.32	.04	.02	.02	1.7
74/06/18	1240	29.0	5.3	340			6	32			.15	1.2	.26	.02	.01	.06	1.6

Site 8.--L-28 Borrow Canal at S-140.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO4 ortho	P total	N total
72/07/21	1105	28.5	7.6	480	7.80	9.0	8	17	200	164	0.04	1.6	0.00	0.00	0.00	0.01	1.6
72/08/23	1000	27.0	3.6	520	7.95	8.5	6	18	168	138	.03	1.2	.00	.01	.00	.01	1.2
72/09/14	0900	26.0	6.8	520	7.25	7.7	2	13	192	157	.03	1.0	.00	.00	.01	.01	1.0
72/10/25	1000	24.0	8.1	340	8.20	7.5	1	18	116	95	.00	.83	.00	.00	.01	.02	.83
72/11/16	0940	24.0	11.8	300	8.10	8.1	1	9.0	124	102	.03	.62	.00	.00	.00	.01	.65
72/12/14	0910	23.5	9.6	235	7.60	7.0	1		88	72	.02	.56	.00	.00	.00	.01	.58
73/01/19	1040	22.0	12.4	220	9.65	5.2	1	10			.02	.60	.00	.00	.00	.00	.60
73/02/08	0915	18.0		235	8.20	4.7	2	10	128	105	.03	1.0	.00	.00	.00	.01	1.0
73/03/15	1030	25.5	8.9	240	7.95	3.5	2	8.0	144	118	.03	.71	.00	.00	.00	.00	.74
73/04/20	1125	23.5	13.2	250	8.05	4.6	1	8.0	144	118	.02	1.1	.00	.00	.00	.00	1.1
73/05/24	1105	30.0	12.5	250	7.95	4.0	5	12	200	164	.01	.94	.00	.00	.00	.00	.95
73/06/16	0930	28.5	5.0	250	7.85	6.0	6	14	80	66	.03	.66	.00	.00	.00	.02	.69
73/07/17	1015	30.0	7.5	510	8.30	7.0	2	17	176	144	.01	.92	.00	.00	.00	.02	.93
73/08/14	1110	32.0	4.8	425		9.0	5	10			.07	1.0	.00	.01	.01	.01	1.1
73/09/20	1030	28.5	.6	330		7.5	10	16			.05	2.4	.00	.00	.14	.20	2.5
73/10/31	1000	24.0	1.8	430	8.40	5.4	5	19	215	190	.08	.79	.00	.00	.04	.06	.87
73/11/20	0900	20.5	.7	400			3	14			.11	1.9	.00	.01	.03	.04	2.0
73/12/21	1320	15.5	3.0	470			3	14			.09	.82	.00	.01	.00	.02	.92
74/01/21	1215	24.5	6.5	420			4	19			.01	.85	.00	.01	.02	.03	.87
74/02/20	1440	21.0	8.5	500			5	22			.00	1.4	.00	.00	.01	.07	1.4
74/03/11	1020	23.0	9.8	375			6	20			.00	1.2	.00	.00	.01	.05	1.2
74/04/16	1020	25.0	9.4	360	7.60		8	22	150	123	.01	1.3	.00	.00	.01	.02	1.3
74/05/16	1205	26.5	8.1				6	13			.06	1.3	.00	.01	.01	.02	1.4
74/06/07	1120	30.0	3.4	270			6	15			.01	1.3	.00	.00	.02	.05	1.3

Site 9. --L-28 Interceptor at SR 84.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turb-idity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Orga-nic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1130	28.5	1.9	450	7.50	6.0	2	31	184	151	0.07	1.7	0.05	0.01	0.01	0.02	1.8
72/08/17	1140	29.5	3.3	495	7.70	6.5	2	31	176	144	.07	1.9	.00	.01	.00	.02	2.0
72/09/13	1440	28.5	3.5	385	7.45	6.0	3	25	184	151	.07	1.7	.06	.01	.01	.02	1.8
72/10/20	1510	25.5	3.9	470	7.55	4.9	2	18	200	164	.04	1.0	.11	.01	.00	.02	1.2
72/11/15	1500	27.0	4.8	530	7.50	6.3	2	26	224	184	.05	1.2	.11	.01	.01	.01	1.4
72/12/13	1345	23.0	6.2	530	7.55	5.8	5	5.0	266	218	.04	1.8	.05	.00	.00	.01	1.9
73/01/12	1515	17.0	8.0	1080	7.80	6.9	5	41	292	239	.06	1.4	.12	.01	.00	.01	1.6
73/02/07	1500	23.5		750	7.60	6.0	10	39	256	210	.17	2.0	.00	.01	.01	.04	2.2
73/03/14	1430	25.0	6.4	840	7.60	6.8	4	28	240	197	.04	1.5	.10	.01	.00	.00	1.6
73/04/19	1215	24.0	8.4	900	7.60	7.3	10	23	272	223	.04	1.2	.20	.00	.00	.00	1.4
73/05/23	1345	29.0	6.8	700	8.10	5.0	10	24	132	108	.04	1.4	.08	.01	.01	.01	1.5
73/06/14	1400	29.0	6.6	630	7.55	7.0	8	23	196	161	.03	1.4	.09	.01	.00	.01	1.5
73/07/17	1105	29.0	3.8	980	7.90	9.8	5	55	200	164	.15	2.7	1.9	.06	.02	.03	4.8
73/08/16	1600	30.5	5.6	930		8.9	7	18			.13	2.4	2.8	.04	.02	.02	5.4
73/09/18	1055	29.5	3.2	950		8.8	2	38			.17	2.5	.96	.03	.02	.10	3.7
73/10/18	1430	25.0	4.8	670	8.50	6.0	5	36	268	228	.10	1.5	.19	.02	.02	.04	1.8
73/11/14	1745	25.5	5.3	640			4	16			.15	1.4	.13	.03	.01	.02	1.7
73/12/19	1330	18.5	8.0	710			5	25			.07	1.6	.21	.01	.01	.02	1.9
74/01/21	1430	24.0	5.2	660			9	52			.05	2.1	.13	.01	.01	.02	2.3
74/02/14	1330	22.5	9.8	1000			8	58			.08	1.8	.04	.01	.01	.02	1.9
74/03/15	1530	23.5	8.6	1080			9	27			.03	2.0	.06	.01	.00	.02	2.1
74/04/19	1600	27.5	6.6	700	8.00		8	26	159	130	.07	1.5	.11	.01	.01	.02	1.7
74/05/16	1230	26.5	6.0	675			5				.13	1.4	.17	.04	.02	.03	1.7
74/06/18	1300	29.0	5.0	900			4	55			.08	1.9	3.3	.12	.01	.03	5.4

Site 10.--Miami Canal at SR 84.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/21	1130	29.5	5.2	390	7.40	6.2	4	38	156	128	0.08	2.4	0.00	0.00	0.00	0.01	2.5
72/08/23	0900	25.0	3.2	280	7.55	2.8	2	26	160	131	.05	1.9	.00	.01	.00	.01	2.0
72/09/14	0845	26.0	2.3	390	7.40	3.8	4	23	176	144	.04	2.4	.00	.08	.00	.01	2.5
72/10/25	0900	22.0	6.1	710	8.15	.5	3	28	216	177	.00	2.6	.00	.00	.01	.02	2.6
72/11/16	0915	19.0	5.5	615	8.10	1.4	4	41	240	197	.03	2.1	.00	.00	.02	.02	2.1
72/12/14	0845	22.0	4.5	635	7.75	.6	2	8.0	240	197	.04	2.2	.00	.00	.01	.02	2.2
73/01/19	1015	19.5	7.6	710	8.05	.1	4	48	320	262	.03	1.8	.00	.00	.00	.02	1.8
73/02/08	0850	16.5		680	8.00	.1	2	45	308	253	.05	1.6	.00	.01	.00	.02	1.7
73/03/15	0830	23.5	4.9	810	8.00			67	320	262	.25	2.9	.00	.01	.02	.02	3.2
73/04/19	DRY																
73/05/24	1045	31.0	3.5	990	7.15	1.0	5	42	80	66	2.0	2.8	2.5	.15	.00	.00	7.4
73/06/16	0950	27.0	4.9	900	7.40	1.5	3	64	312	259	.20	2.2	.70	.15	.02	.02	3.2
73/07/17	1040	29.5	6.1	640	7.65	1.0	10	34	152	125	.04	2.6	.07	.04	.02	.02	2.8
73/08/14	1045	31.5	4.0	560		2.2	15	18			.02	1.6	.13	1.0	.02	.05	2.8
73/09/20	1045	29.5	5.4	315		6.0	9	21			.03	2.5	.00	.00	.01	.03	2.5
73/10/31	1015	27.0	4.6	440	8.30	.8		24	221	181	.01	1.7	.11	.01	.01	.03	1.8
73/11/20	0915	23.5	4.6	420			7	24			.18	2.4	.02	.01	.02	.04	2.6
73/12/21	1300	18.0	7.7	600			5	44			.23	1.9	.14	.02	.02	.04	2.3
74/01/21	1455	26.0	10.8	540			9	55			.01	1.9	.00	.01	.02	.04	1.9
74/02/20	DRY																
74/03/11	DRY																
74/04/17	DRY																
74/05/16	DRY																
74/06/17	DRY																

Site 11. --Corps of Engineers gage 3-2.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/21	1020	29.0	3.2	330	7.50	5.6	3	40	156	128	0.14	1.8	0.02	0.00	0.00	0.02	2.0
72/08/23	1130	27.5	4.2	280	7.80	4.0	2		120	98	.09	1.8	.03	.01	.00	.01	1.9
72/09/14	0940	28.5	2.7	320	7.10	2.7	2	20	160	131	.09	2.5	.27	.01	.01	.01	2.9
72/10/25	1100	24.0	3.1	380	7.55	1.4	2	14	136	112	.04	1.6	.12	.00	.01	.02	1.8
72/11/16	1010	24.0	3.3	320	7.45	1.5	1	24	128	105	.11	1.1	.05	.01	.01	.01	1.3
72/12/14	0935	23.5	7.5	330	8.00	.6	1	6.0	160	131	.04	1.3	.00	.00	.00	.02	1.3
73/01/16	0945	17.0	6.6	575	7.80	.8	2	25	196	161	.13	1.2	.12	.01	.00	.01	1.5
73/02/08	0945	19.5		380	7.65	.8	2	25	188	154	.08	1.2	.07	.01	.00	.02	1.4
73/03/15	1100	26.5	9.6	400	7.70	1.0	2	18	172	141	.13	2.3	.00	.01	.05	.06	2.4
73/04/20	1145	25.5	12.4	365	7.80	3.7	3	14	148	121	.04	1.4	.00	.00	.01	.02	1.4
73/05/14	1220	28.5	9.7	350	8.40	.0	6	28	168	138	.07	1.6	.00	.01	.01	.02	1.7
73/06/16	0850	29.0	6.8	320	7.70	1.5	10	22	168	138	.06	1.4	.00	.01	.01	.02	1.5
73/07/17	0945	29.0	2.8	225	7.85	6.4	4	20	188	154	.09	1.5	.00	.01	.01	.02	1.6
73/08/14	1130	32.5	3.7	205		3.3	8	10			.01	1.6	.00	.01	.00	.01	1.6
73/09/10	1000	30.5	4.0	215		4.5	7				.04	1.6	.00	.00	.00	.00	1.6
73/10/31	0930	25.0	3.7	310	8.30	4.5	3	16	167	137	.05	1.1	.02	.00	.00	.02	1.2
73/11/20	0840	23.0	2.8	330			8	17			.17	1.5	.04	.01	.01	.02	1.7
73/12/21	1340	17.0	6.8	400			8	48			.40	3.0	.11	.01	.02	.02	3.5
74/01/21	1145	22.5	3.7	360			8	40			.14	1.4	.10	.01	.02	.03	1.6
74/02/20	1500	24.0	13.2	415			3	26			.01	2.2	.00	.00	.01	.05	2.2
74/03/11	0950	23.0	6.3	390			7	23			.06	1.8	.00	.00	.01	.04	1.9
74/04/16	1045	26.0	9.1	400	7.30		7	30	195	160	.05	2.0	.03	.01	.02	.03	2.1
74/05/17	1200	28.0	6.1	420			4	20			.20	1.6	.08	.02	.02	.05	1.9
74/06/07	1200	29.0	6.8	475			8	18			.32	1.5	.14	.02	.02	.06	2.0

Site 12.--L-28 East Canal.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/21	0945	26.5	5.2	90	7.20	4.0	4	26	92	75	0.10	2.1	0.00	0.00	0.00	0.01	2.2
72/08/23	12[illegible]	[illegible]9.5	4.6	270	8.10	6.7	4	20	76	62	.02	1.4	.00	.00	.01	.01	1.4
72/09/14	1115	29.0	5.4	210	7.20	8.0	2	13	96	79	.02	1.3	.00	.01	.00	.01	1.3
72/10/25	1300	24.5	4.4	250	7.35	7.8	3	11	88	72	.01	1.5	.00	.00	.00	.01	1.5
72/11/16	1110	21.5	5.1	220	7.10	5.7	1	14	112	92	.04	1.0	.00	.00	.00	.02	1.0
72/12/14	1030	22.5	2.7	255	7.00	4.6	1	14	112	92	.04	1.7	.00	.00	.00	.00	1.7
73/01/16	1300	15.0	6.5	340	7.50	3.5	2	23	152	125	.03	1.1	.00	.00	.00	.02	1.1
73/02/08	1015	19.0		300	7.55	3.0	1	28	148	121	.05	1.2	.00	.00	.00	.01	1.3
73/03/15	1145	28.0	5.3	420	7.65	3.7	4	32	140	116	.05	2.0	.00	.01	.01	.02	2.1
73/04/21	DRY																
73/05/24	DRY																
73/06/16	DRY																
73/07/17	0845	27.0	3.1	325	8.00	9.5	2	38	124	102	.14	2.9	.00	.01	.01	.23	3.0
73/08/14	1250	34.0	5.5	240		6.0	10	15			.00	1.6	.00	.01	.00	.01	1.6
73/09/20	0950	30.0	3.6	200		6.5	4	16			.03	1.5	.00	.00	.00	.01	1.5
73/10/31	0905	27.0	3.9	230	8.10	6.2	4	19	110	90	.00	1.3	.01	.00	.00	.02	1.3
73/11/20	0950	23.0	5.4	235			3	19			.03	2.5	.00	.01	.02	.02	2.5
73/12/21	1510	18.0	9.2	310			10	40			.22	2.0	.04	.01	.01	.02	2.3
74/01/21	1100	22.0	3.7	320			6	36			.30	1.5	.00	.01	.01	.02	1.8
74/02/20	1520	27.5	9.0	435			4	38			.24	2.7	.00	.01	.01	.01	2.9
74/03/11	0940	22.0	3.7	460			7	36			.08	2.4	.00	.00	.01	.02	2.5
74/04/16	DRY																
74/05/17	DRY																
74/06/17	DRY																

Site 13.--Everglades No. 3-28.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/17	1335	30.0	4.2	770	7.60	13	2	35	240	197	0.05	2.5	0.01	0.01	0.00	0.01	2.6
72/08/16	1630	31.5	5.3	730	8.15	9.6	2	27	200	164	.08	1.7	.00	.01	.00	.01	1.8
72/09/11	1400	23.5	5.3	210	7.40	3.0	3	14	112	92	.04	1.5	.00	.00	.00	.01	1.5
72/10/16	1030	26.0	6.9	255	8.00	3.9	8	13	80	66	.02	1.5	.00	.00	.01	.02	1.5
72/11/13	1100	26.0	5.4	285	7.55	3.6	1	22	120	98	.09	2.3	.00	.00	.01	.01	2.4
72/12/11	0845	20.5	1.8	270	7.35	1.1	1	3.0	160	131	.15	1.2	.00	.00	.00	.01	1.4
73/01/08	0940	23.5	2.4	345	7.50	.7	4	23	156	128	.43	2.0	.00	.01	.02	.04	2.4
73/02/05	0820	18.5	2.8	390	7.65	.8	2	26	160	131	.23	1.2	.06	.01	.00	.02	1.5
73/03/13	1040	27.0	6.2	400	7.80	1.2	3	22	160	131	.29	2.0	.10	.03	.03	.04	2.4
73/04/16	1100	24.5	5.6	440	7.65	3.0	3	14	212	174	.28	2.1	.20	.08	.02	.03	2.7
73/05/21	1120	25.5	5.6	640	8.30	2.6	10	28	224	184	.14	2.0	.10	.01	.02	.03	2.2
73/06/15	1330	29.5	9.5	670	7.70	1.5	10	32	176	144	.05	1.7	.07	.01	.01	.02	1.8
73/07/15	1050	30.0	6.3	290	7.35	7.6	9	13	132	108	.06	1.2	.00	.00	.01	.02	1.3
73/08/13	0900	28.5	3.8	320		8.5	10				.00	1.2	.00	.01	.00	.01	1.2
73/09/16	0800	29.5	3.8	255		6.4	1	11			.03	1.4	.00	.00	.00	.00	1.4
73/10/30	1000	25.5	6.9	210	8.20	5.7	9	11	105	85	.01	.80	.00	.00	.00	.02	.81
73/11/20	1320	24.0	6.0	230			2	12			.05	1.5	.00	.01	.01	.02	1.6
73/12/17	1100	18.5	5.2	315			3	12			.07	1.2	.04	.01	.01	.03	1.3
74/01/16	1045	22.5	5.1	250			4	22			.12	1.1	.03	.01	.02	.03	1.3
74/02/20	1150	23.5	8.7	385			3	26			.06	2.2	.04	.01	.01	.03	2.3
74/03/11	1000	25.0	6.9	385			5	29			.16	2.1	.19	.01	.01	.04	2.5
74/04/15	0900	25.5	5.8	525	7.50		11	34	229	188	.10	2.1	.23	.01	.01	.03	2.4
74/05/17	1200	28.0	6.9	800			9	28			.07	2.1	.22	.02	.02	.04	2.4
74/06/07	1005	29.0		675			5	24			.01	1.8	.02	.01	.01	.05	1.8

Site 14.--Tamiami Canal above S-12A.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/17	1310	29.5	3.4	750	7.50	12	2	31	240	197	0.05	1.8	0.01	0.01	0.00	0.01	1.9
72/08/16	1525	29.5	3.5	740	7.75	11	1	40	232	190	.07	1.8	.01	.01	.00	.00	1.9
72/09/11	1500	25.5	3.4	550	7.60	10	2	24	200	164	.04	1.5	.07	.02	.00	.01	1.6
72/10/16	1400	25.5	3.8	400	7.50	6.6	1	15	112	92	.02	1.3	.00	.00	.00	.02	1.3
72/11/13	1130	25.0	2.9	230	7.05	5.7	1	25	112	92	.05	1.3	.00	.00	.00	.01	1.4
72/12/11	0830	21.5	2.7	255	7.30	2.6	1		152	125	.10	1.2	.00	.00	.00	.01	1.3
73/01/08	1050	23.0	3.4	330	7.50	1.5	3	24	144	118	.24	1.5	.00	.01	.01	.03	1.8
73/02/05	0840	18.0	3.7	400	7.60	1.8	2	25	148	121	.16	1.7	.04	.01	.00	.01	1.9
73/03/13	1120	25.5	4.5	560	7.65	3.3	2	22	188	154	.26	1.5	.10	.02	.01	.01	1.9
73/04/16	1220	24.0		680	7.80	6.6	2	15	280	230	.30	1.8	.20	.03	.01	.02	2.3
73/05/21	1140	25.5	6.1	900	8.25	8.0	5	23	260	213	.15	1.7	.40	.02	.02	.02	2.3
73/06/15	1430	32.0	9.0	720	7.65	4.8		21	192	157	.02	1.3	.00	.01	.01	.02	1.3
73/07/15	1110	30.0	5.8	280	7.40	8.5	3	12	128	105	.07	1.4	.07	.01	.02	.02	1.6
73/08/13	0950	28.5	2.8	300		7.5	7				.00	1.3	.00	.01	.00	.01	1.3
73/09/16	0900	30.5	3.1	280		9.2	2	16			.02	1.3	.00	.00	.00	.00	1.3
73/10/30	1120	24.5	3.8	320	8.30	10	3	22	157	129	.03	1.1	.01	.00	.00	.01	1.1
73/11/20	1350	24.0	6.0	500			1	16			.04	.73	.01	.01	.01	.02	.79
73/12/17	1215	18.5	5.3	350			5	18			.09	1.6	.04	.01	.01	.02	1.7
74/01/16	1140	22.0	4.8	580			3	34			.14	1.6	.04	.01	.01	.02	1.8
74/02/20	1215	23.0	6.1	720			7	30			.11	2.1	.03	.00	.01	.02	2.2
74/03/11	1030	23.5	4.3	660			4	37			.29	1.8	.14	.02	.02	.05	2.2
74/04/15	1030	25.5	4.8	790	7.70		9	41	258	212	.24	1.9	.41	.06	.02	.03	2.6
74/05/17	1230	27.5	7.8	740			8	20			.02	1.5	.03	.01	.01	.04	1.6
74/06/07	1015	29.0		680			6	23			.07	1.5	.17	.01	.01	.03	1.8

Site 15.--Tamiami Canal Outlets Levee 67A to 40-Mile Bend.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/17	1505	30.5	4.7	740	7.70	12	2	31	240	197	0.05	2.2	0.01	0.01	0.00	0.01	2.[illegible]
72/08/16	1505	31.5	6.1	710	7.80	11	1	25	232	190	.07	1.7	.01	.01	.00	.01	1.8
72/09/11	1530	27.5	3.6	560	7.40	9.3	2	17	212	174	.05	1.8	.15	.02	.00	.01	2.0
72/10/16	1500	26.0	5.8	640	7.50	8.7	5	19	144	118	.03	1.4	.04	.01	.00	.02	1.5
72/11/13	1155	24.5	2.9	505	7.40	9.3	1	32	208	171	.09	1.5	.05	.01	.00	.02	1.6
72/12/11	0750	21.0	3.8	625	7.85	9.0	2		232	190	.04	1.2	.04	.00	.00	.01	1.3
73/01/16	1010	16.5	6.7	690	7.55			32	276	226							
73/02/05	0900	18.5	6.5	840	7.60	9.0	2	39	260	213	.06	1.7	.09	.01	.00	.01	1.9
73/03/13	1140	24.5	5.3	820	7.50	7.4	2	29	248	203	.09	1.3	.05	.01	.00	.01	1.4
73/04/16	1300	25.0		700	8.10	6.4	5	14	312	259	.20	1.7	.20	.02	.00	.01	2.1
73/05/21	1200	26.0	5.9	820	8.20	8.0	9	22	328	269	.14	1.3	.30	.02	.01	.01	1.8
73/06/15	1440	31.0	10.2	670	7.80	6.2		28	176	144	.02	1.5	.00	.00	.01	.02	1.5
73/07/15	1130	30.5	7.2	810	7.85	9.3	5	30	272	223	.04	1.8	.70	.04	.00	.00	2.6
73/08/13	1040	29.0	4.9	660		9.4	9	15			.00	1.6	.50	.02	.00	.01	2.1
73/09/16	0920	29.5	2.7	730		14	1	18			.04	2.0	.05	.01	.00	.00	2.1
73/10/30	1145	25.0	6.8	590	8.50	12	2	28	227	198	.03	1.3	.04	.00	.00	.01	1.4
73/11/20	1340	24.0	6.3	440			3	18			.05	1.2	.00	.01	.01	.02	1.3
73/12/17	1300	17.0	6.6	360			4	17			.05	1.0	.02	.01	.01	.01	1.1
74/01/16	1200	22.5	4.4	710			5	66			.14	1.7	.06	.01	.01	.01	1.9
74/02/20	1230	22.5	7.9	1060			6	70			.03	1.8	.02	.00	.01	.02	1.8
74/03/11	1100	24.5	7.3	820			7	36			.09	2.0	.05	.01	.01	.02	2.2
74/04/15	1130	25.5	7.9	860	8.00		6	45	287	235	.10	1.5	.29	.06	.01	.02	2.0
74/05/17	1300	28.0	7.8	740			8	21			.05	1.7	.07	.01	.01	.03	1.8
74/06/07	1035	29.0		740			8	17			.08	1.4	.19	.01	.01	.03	1.7

Site 16. --L-67A Canal.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/17	1240	27.0	3.1	590	7.30	5.3	9	24	280	230	0.98	1.6	0.00	0.00	0.00	0.01	2.6
72/08/16	1410	30.0	3.7	545	7.75	5.2	6	16	256	210	.68	.97	.00	.01	.00	.01	1.7
72/09/11	1600	25.5	3.6	425	7.10	5.8	7	43	236	194	.72	1.1	.00	.01	.00	.00	1.8
72/10/17	0930	25.0	1.8	550	7.40	5.5	6	13	240	197	.68	.87	.00	.00	.00	.02	1.6
72/11/13	1220	24.5	1.6	485	7.15	5.7	5	26	240	197	.72	1.2	.00	.00	.00	.01	1.9
72/12/11	0945	18.5	1.6	540	7.40	5.4	4		300	246	.79	.86	.00	.00	.00	.01	1.6
73/01/08	1110	23.0	2.7	540	7.40	5.4	10	23	148	121	.68	1.4	.00	.01	.00	.00	2.1
73/02/05	0920	18.0	3.2	620	7.40	5.1	5	22	144	118	.73	.82	.00	.01	.0	.01	1.6
73/03/13	1200	25.5	4.7	600	7.30	4.0	5	16	160	131	.53	1.1	.05	.01	.00	.01	1.7
73/04/16	1350	23.0		610	7.80	4.9	6	9.0	340	279	.28	1.1	.04	.00	.00	.01	1.4
73/05/21	1225	25.5	4.6	660	8.00	5.0	7	14	360	295	.51	1.0	.06	.01	.01	.01	1.6
73/06/15	1500	29.0	3.8	620	7.45	6.2		45	200	164	.50	.95	.01	.01	.00	.01	1.5
73/07/15	1155	30.0	6.0	570	7.85	3.5	30	19	296	243	.19	.86	.10	.02	.02	.02	1.2
73/08/13	1050	27.5	2.2	570		6.5	30	8.0			.71	1.0	.00	.00	.00	.01	1.7
73/09/16	1000	28.5	2.7	400		8.7	3	13			.38	1.3	.00	.00	.00	.00	1.7
73/10/30	1400	25.0	1.9	480	8.30	7.0	7	17	259	212	.84	.83	.00	.00	.00	.02	1.7
73/11/20	1400	24.5	5.2	540			5	13			.75	.52	.00	.01	.01	.02	1.3
73/12/17	1330	17.5	7.2	540			9	22			.90	.78	.02	.01	.02	.02	1.7
74/01/16	1230	22.5	3.5	475			9	46			.83	1.3	.01	.01	.01	.02	2.2
74/02/20	1250	23.0	7.2	650			3	26			.62	1.3	.03	.01	.01	.02	2.0
74/03/11	1130	23.5	5.9	560			9	21			.42	1.0	.16	.02	.01	.02	1.6
74/04/15	1230	25.5	7.5	640	8.00		6	36	333	273	.05	1.3	.09	.01	.01	.02	1.4
74/05/17	1400	28.0	4.5	680			8	19			.39	1.3	.09	.02	.01	.02	1.8
74/06/07	1100	29.0		440			8	20			.30	1.3	.17	.01	.01	.03	1.8

Site 17. --Tamiami Canal Outlets L-30 to L-67A.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1530	29.0	2.5	1550	7.50	21	20	84	352	289	1.1	3.6	1.4	0.16	0.14	0.16	6.3
72/08/14	1335	31.5	2.9	950	7.95	11	5	36	304	249	.17	2.2	.48	.07	.07	.10	2.9
72/09/12	1230	27.5	3.0	880	7.60	13	1	28	200	164	.11	2.3	.23	.03	.02	.02	2.7
72/10/18	1420	25.5	8.2	750	7.85	6.8	4	15	132	108	.10	1.6	.30	.03	.01	.02	2.0
72/11/14	1250	24.5	2.8	810	7.50	12	4	32	204	167	1.2	1.3	.48	.10	.01	.02	3.1
72/12/12	1225	22.5	5.8	1040	7.80	14	3		272	223	.65	1.4	5.0	.11	.02	.02	7.2
73/01/16	0800	15.0	4.9	1280	8.00	14	4	34	244	200	.41	1.4	.40	.07	.04	.06	2.3
73/02/06	1155	22.5	3.3	1900	7.85	29	3	79	216	177	.38	2.6	.84	.11	.05	.07	3.9
73/03/13	1220	27.0	5.0	1240	7.90	11	3	31	220	180	.16	1.6	.60	.03	.07	.08	2.4
73/04/17	1350	23.0	7.9	740	7.85	8.8	10	10	312	259	.13	1.2	.30	.01	.02	.04	1.6
73/05/22	1345	31.0	8.0	780	8.20	6.2	9	15	184	151	.11	1.3	.20	.02	.01	.02	1.6
73/06/13	1230	31.0	2.3	1400	7.40	30		84	448	367	1.3	3.3	10	.01	.12	.12	15
73/07/23	1045	29.5	1.2	970	7.60	22	35	78	164	134	1.2	6.3	9.1	4.0	.60	.66	21
73/08/15	1300	29.0	4.1	2400		6.3	2	8.0			.07	1.9	.20	.01	.01	.04	2.2
73/09/18	1120	29.5	4.2	880		15	10	21			.15	1.8	.20	.29	.02	.06	2.4
73/10/10	1640	26.5	5.6	330	8.20	5.2	2	15	120	98	.04	.44	.98	.02	.02	.02	1.5
73/11/20	1100	24.5	5.4	1080			5	17			.01	1.1	.36	.20	.02	.03	1.7
73/12/18	1140	16.5	5.3	1150			7	41			.56	3.7	1.5	.19	.06	.07	6.0
74/01/16	1220	22.0	1.8	1480			9	87			.83	2.2	.48	.08	.06	.08	3.6
74/02/14	1030	19.0	5.5	1360			8	38			.24	1.1	.57	.09	.02	.04	2.0
74/03/14	1500	22.5	6.9	855			8	28			.07	2.0	.23	.01	.03	.04	2.3
74/04/17	1400	26.5	7.4	820	7.80		8	27	212	174	.20	1.7	.38	.03	.02	.03	2.3
74/05/15	1330	27.0	4.4	840			3	20			.19	1.4	.53	.05	.03	.05	2.2
74/06/17	1200	28.0	2.7	1780			5	54			.74	3.1	2.7	.26	.12	.12	6.8

Site 18. --West Palm Beach Canal above S-5A.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1545	32.0	6.2	510	7.70	5.8	7	37	176	144	0.07	1.9	0.16	0.03	0.04	0.04	2.2
72/08/14	1445	32.0	5.9	840	8.40	7.3	3	27	168	138	.10	1.6	.16	.08	.02	.04	1.9
72/09/12	1300	27.5	5.4	940	7.55	9.2	1	26	200	164	.22	2.2	.18	.02	.04	.05	2.6
72/10/19	1230	25.5	4.5	980	7.70	8.4	15	13	160	131	.34	2.0	.29	.06	.01	.05	2.7
72/11/14	1320	25.0	4.9	1260	7.60	13	4	27	264	216	.89	1.4	.35	.11	.02	.04	2.8
72/12/12	1300	22.5	7.9	1510		16	1				.17	1.8	.51	.09	.01	.02	2.6
73/01/11	1300	20.0	6.4	1220	7.40	16	4	45	240	197	.27	2.0	1.3	.15	.01	.02	3.7
73/02/06	1250	23.0	7.1	1850	7.30	14	40	72	196	161	.20	2.8	.80	.07	.02	.06	3.9
73/03/13	1245	27.0	5.8	1260	7.65	11	3	27	260	213	.12	1.4	.60	.04	.02	.04	2.2
73/04/17	1400	23.5	8.3	780	7.70	8.5	10	12	256	210	.06	1.2	.30	.01	.02	.04	1.6
73/05/22	1410	31.0	7.6	840	7.90	6.0	6	18	200	164	.08	1.4	.20	.01	.01	.02	1.7
73/06/13	1330	28.0	7.1	1140	7.75	10			208	171	.26	2.3	.00	.21	.01	.02	2.8
73/07/23	1010	28.5	2.6	1060	7.55	8.5	10	45	192	157	.54	3.3	.19	.16	.72	.73	4.2
73/08/15	1420	29.5	3.3	550		7.2	9	18			.41	2.1	.30	.03	.40	.47	2.8
73/09/18	1205	29.5	4.0	650		5.5	6	27			.20	1.9	4.0	.04	.03	.07	6.1
73/10/16	1500	27.0	4.2	580	7.90	5.8	4	23	156	128	.17	1.0	.08	.03	.04	.06	1.3
73/11/20	1120	24.5	5.7	1360			3	20			.01	1.8	.06	.02	.00	.03	1.9
73/12/18	1200	17.5	8.1	1250			5	38			.25	1.9	1.3	.14	.05	.06	3.6
74/01/16	1230	22.0	2.9	550			7	43			.30	1.6	.36	.04	.19	.23	2.3
74/02/14	0900	18.5	5.8	1500			6	48			.23	1.4	.62	.07	.02	.03	2.3
74/03/14	1610	24.0	8.5	880			8	29			.06	1.4	.23	.01	.02	.04	1.7
74/04/17	1500	26.5	10.4	810	7.70		7	29	203	167	.11	1.4	.31	.03	.02	.04	1.8
74/05/15	1340	26.5	5.1	820			4	24			.19	1.8	1.1	.08	.04	.05	3.2
74/06/17	1220	28.0	4.1	1630			6	67			.40	3.1	1.9	.20	.02	.08	5.6

Site 19.--West Palm Beach Canal 1 mile east of S-5A(E).

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1445	29.0	1.7	1400	7.60	21	3	95	416	341	0.83	3.5	0.12	0.09	0.00	0.09	4.5
72/08/14	1240	31.0	1.9	1440	7.85	19	5	73	284	233	.39	4.0	.13	.16	.06	.06	4.7
72/09/12	1140	27.0	2.3	1480	7.60	22	2		376	308	.48	2.3	.25	.08	.03	.04	3.1
72/10/18	1310	26.5	4.5	1260	7.50	16	3	45	360	295	.23	1.9	.17	.05	.00	.01	2.4
72/11/14	1200	24.0	2.4	970	7.35	16	1	61	288	236	.69	2.0	.08	.11	.01	.02	2.9
72/12/12	1145	23.5	5.5	1430	7.95	18	3		392	321	.21	1.9	.15	.02	.01	.01	2.3
73/01/11	1210	20.0		1460	7.60	20	3	46	376	308	.40	1.9	.32	.03	.01	.01	2.6
73/02/06	1130	23.0	3.7	1460	7.65	18	4	67	300	246	.24	2.0	.66	.18	.19	.24	3.1
73/03/13	1135	26.5	4.0	1440	7.65	18	5	78	312	259	.55	2.2	1.4	.11	.10	.10	4.3
73/04/17	1145	23.5	6.2	1240	7.80	12	3	20	388	318	.08	1.6	.20	.02	.00	.01	1.9
73/05/22	1255	28.0	5.6	860	8.05	5.0	4	20	208	171	.16	1.5	.04	.04	.02	.04	1.7
73/06/13	1145	30.0	6.3	1120	8.05	18	9	65	328	269	.17	2.0	2.2	.32	.05	.06	4.7
73/07/16	1020	29.0	6.1	775	8.05	22	5	73	240	197	1.1	3.2	1.8	.13	.46	.50	6.2
73/08/15	1115	28.5	2.5	1380		24	7	43			1.1	3.0	4.0	.08	.10	.13	8.2
73/09/18	1040	29.5	3.2	1550		23	8	51			.37	2.3	.08	.23	.05	.06	3.0
73/10/16	1255	26.5	3.4	1420	8.40	19	5	59	367	319	.32	1.7	.09	.06	.01	.02	2.2
73/11/20	1045	23.5	4.1	940			2	18			.91	2.6	.13	.03	.02	.03	3.7
73/12/18	1100	16.5	3.4	1360			5	33			.59	2.6	.53	.11	.02	.02	3.8
74/01/17	1040	21.5	3.0	1090			5	78			.45	1.9	.26	.04	.07	.08	2.6
74/02/14	1200	19.0	4.0	1800			4	58			.25	2.2	.85	.07	.02	.02	3.4
74/03/15	1000	22.5	3.2	1430			8	39			.28	1.8	.14	.01	.01	.05	2.2
74/04/17	1300	26.0	14.8	910	7.10		9	48	219	180	.03	3.7	.00	.01	.05	.11	3.7
74/05/16	0945	26.0	3.8	880			5	25			.28	1.6	.24	.05	.03	.04	2.2
74/06/18	1045	29.0	6.5	1330			6	72			.42	2.5	1.4	.18	.03	.10	4.5

Site 20. --Hillsboro Canal at S-6.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/18	1240	27.5	2.4	920	7.35	11	2	76	376	308	0.16	2.4	0.13	0.03	0.01	0.01	2.7
72/08/14	1000	30.5	1.8	1380	7.55	17	4	68	432	354	.21	2.8	.09	.04	.01	.03	3.1
72/09/12	1020	26.5	1.6	1420	7.70	19	2	69	400	328	.28	1.5	.05	.04	.02	.02	1.9
72/10/18	1145	26.5	6.2	1080	7.50	10	4	23	260	213	.09	1.9	.46	.04	.00	.02	2.5
72/11/14	1130	23.5	3.7	980	7.40	13	2	30	292	239	.29	1.5	.09	.01	.00	.01	1.9
72/12/12	1035	22.0	8.0	1190	8.00	13	2		420	344	.11	1.6	.16	.06	.01	.02	1.9
73/01/17	1100	19.5	5.9	1200	7.75	16	1	32	384	135	.18	1.9	.18	.03	.00	.00	2.3
73/02/06	1100	22.5	6.8	1480	7.70	14	5	54	324	266	.06	2.1	.27	.02	.07	.12	2.4
73/03/13	1100	26.5	4.5	1500	7.75	17	4	67	308	253	.17	2.2	2.0	.21	.15	.16	4.6
73/04/17	1050	23.0	6.9	865	7.90	8.0	5	13	420	344	.11	1.3	.20	.01	.01	.02	1.6
73/05/22	1130	27.0	6.8	940	7.70	9.0	6	14	260	213	.09	1.4	.10	.01	.00	.01	1.6
73/06/13	1055	29.5	2.5	980	7.55	17	9	70	408	335	.36	2.1	.00	.15	.07	.08	2.6
73/07/16	0930	27.0	5.6	1240	7.95	15	3	45	224	184	.18	1.8	.00	.04	.01	.02	2.0
73/08/15	1040	27.0	2.1	1300		19	2	36			.44	2.3	.50	.05	.04	.06	3.3
73/09/18	1010	28.0	.7	1140		20	5	36			.42	2.5	.00	.02	.01	.03	2.9
73/10/16	1200	27.0	4.9	1160	8.20	15	4	44	421	345	.32	1.7	.12	.04	.02	.03	2.2
73/11/14	1000	24.0	6.2	940													
73/12/18	1025	16.0	6.7	1060			4	16			.11	1.4	.24	.02	.02	.03	1.8
74/01/17	1345	23.0	2.3	1200			5	75			.08	1.9	.09	.01	.01	.04	2.1
74/02/13	0950	19.0	6.3	1510			3	43			.15	1.2	.22	.02	.01	.02	1.6
74/03/15	1100	22.5	5.8	1120			7	31			.13	1.7	.08	.01	.00	.02	1.9
74/04/17	1100	25.5	6.6	840	7.90		4	38	226	185	.05	1.7	.30	.02	.01	.02	2.1
74/05/16	1020	26.5	5.7	830			5	18			.14	1.3	1.4	.02	.02	.02	2.9
74/06/18	1105	27.5	3.8	1270			3	60			.19	1.9	1.9	.18	.05	.07	4.2

Site 21.--North New River Canal above S-7.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO4 ortho	P total	N total
72/07/18	1425	29.0	2.9	1100	7.90	18	2	85	352	289	0.14	3.1	0.24	0.08	0.11	0.13	3.6
72/08/14	1145	30.0	3.2	750	7.85	14	2	32	172	141	.06	1.9	.00	.01	.02	.06	2.0
72/09/14	1245	29.0	3.3	1120	7.70	19	1		272	223	.03	2.2	.15	.02	.01	.02	2.4
72/10/25	1500	24.5	5.6	850	8.20	12	1	23	160	131	.02	1.9	.01	.00	.00	.01	1.9
72/11/16	1245	22.5	4.0	1080	7.80	17	2	32	244	200	.31	1.8	.24	.10	.01	.01	2.4
72/12/14	1150	23.5	5.8	670	7.90	9.9	1	24	152	125	.03	1.5	.00	.00	.00	.01	1.5
73/01/17	1415	16.5	9.7	1420	7.95	16	2	45	380	312	.03	1.8	.28	.02	.00	.00	2.1
73/02/08	1140	20.0		640	8.00	9.3	3	39	360	295	.04	1.6	.00	.01	.02	.02	1.6
73/03/15	0900	25.5	5.7	1090	8.10	8.6	3	37	368	302	.08	2.3	.00	.01	.02	.02	2.4
73/04/20	0915	23.5	7.8	990	8.00	9.4	4	35	360	295	.06	1.9	.05	.01	.00	.02	2.0
73/05/24	0945	27.5	6.8	550	8.20	4.0	9	32	280	230	.06	1.5	.02	.01	.01	.01	1.6
73/06/16	1040	31.0	6.2	970	7.50	7.5	7	53	252	207	.05	1.9	.10	.01	.02	.02	2.1
73/07/17	1150	28.5	7.2	1240	8.10	19	5	66	228	187	.05	1.9	.90	.00	.16	.18	2.9
73/08/14	0950	29.5	1.0	1390		22	5	48			.83	3.7	.30	.18	.07	.11	5.0
73/09/20	1145	30.0	2.9	1070		19	2	40			.00	1.9	.00	.01	.02	.04	1.9
73/10/31	1400	24.5	8.0	1280	8.50	23	2	43	300	258	.11	2.1	.07	.01	.04	.06	2.3
73/11/20	1200	24.0	4.7	860			2	12			.04	1.7	.06	.01	.02	.03	1.8
73/12/21	1145	17.0	11.9	1000			10	37			.20	3.2	.04	.01	.02	.09	3.4
74/01/16	1700	22.0	5.2	805			6	52			.13	1.7	.02	.01	.02	.03	1.9
74/02/20	1015	20.2	8.5	1180			3	42			.03	1.9	.00	.00	.02	.02	1.9
74/03/11	1115	25.0	6.7	1020			3	40			.05	1.5	.00	.00	.01	.02	1.6
74/04/16	0920	25.5	7.5	1120	8.20		7	53	273	224	.01	2.1	.02	.00	.01	.01	2.1
74/05/17	0950	27.0	7.5	920			3	32			.06	2.0	.01	.01	.01	.02	2.1
74/06/07	0930	29.5	4.2	820			4	29			.04	1.9	.03	.01	.01	.02	2.0

Site 22.--Hillsboro Canal above S-10C.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO4 ortho	P total	N total
72/07/21	1320	29.5	5.8	140	6.80	3.8	3	30	28	23	0.06	1.9	0.00	0.00	0.00	0.01	2.0
72/08/23	1415	29.5	3.4	140	6.90	3.1	4	16	32	26	.04	1.3	.00	.01	.01	.02	1.4
72/09/14	1220	29.5	2.7	140	6.70	3.8	2	14	48	39	.04	1.7	.00	.01	.01	.01	1.8
72/10/25	1445	25.5	5.4	150	6.80	2.3	1	10	40	33	.01	1.1	.41	.00	.00	.01	1.5
72/11/16	1230	23.0	6.8	140	6.60	2.6	1	9.0	20	16	.05	1.2	.00	.00	.01	.01	1.2
72/12/14	1140	23.0	5.4	135	6.70	.6	1	12	28	23	.02	.93	.00	.00	.00	.00	.96
73/01/17	1400	18.0	10.4	170	6.85	.8	2	22	52	43	.04	2.4	.00	.00	.00	.00	2.4
73/02/08	1130	19.5		210	6.80	1.6	3	24	64	52	.04	1.0	.00	.01	.00	.01	1.0
73/03/15	0930	24.0	3.6	210	6.85	.4	2	25	80	66	.19	2.3	.00	.01	.00	.01	2.5
73/04/20	0850	21.5	2.9	330	7.00	3.0	2	22	80	66	.04	1.3	.00	.00	.00	.00	1.3
73/05/24	0930	29.0	1.3	350	7.00	13	7	42	108	89	.05	1.9	.00	.00	.00	.01	2.0
73/06/16	1050	30.5	4.5	320	6.75	15	5	40	80	66	.03	1.2	.00	.01	.01	.01	1.2
73/07/17	1215	30.5	8.3	510	6.90	6.6	2	27	84	69	.00	1.4	.00	.01	.01	.02	1.4
73/08/14	0940	30.5	2.1	600		14	1	17			.03	1.8	.00	.00	.00	.00	1.8
73/09/20	1150	30.0	2.2	200		3.7	6	16			.00	1.3	.00	.01	.01	.02	1.3
73/10/31	1130	25.0	8.2	200	7.60	3.4	1	16	49	40	.02	.56	.00	.01	.02	.02	.59
73/11/20	1030	24.0	7.1	130			2	12			.03	1.1	.00	.00	.01	.02	1.1
73/12/21	1135	17.0	9.8	150			1	18			.05	1.3	.00	.01	.01	.02	1.4
74/01/16	1445	23.0	8.5	95			5	18			.09	1.0	.00	.01	.02	.02	1.1
74/02/20	1020	20.0	6.9	180			3	27			.02	1.4	.00	.00	.01	.01	1.4
74/03/11	1120	23.0	5.8	185			3	28			.05	1.7	.00	.00	.01	.01	1.8
74/04/16	0940	24.0	5.1	170	7.00		7	24	41	34	.03	1.4	.00	.00	.00	.00	1.4
74/05/17	1000	26.5	2.4	175			6	27			.06	1.3	.00	.01	.01	.02	1.4
74/06/07	0940	27.5	7.8	230			7	26			.19	1.4	.00	.01	.01	.02	1.6

Site 23.--Everglades No. 1-15.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/21	1230	28.5	4.9	1010	7.70	21	3	62	272	223	0.06	2.1	0.00	0.00	0.00	0.01	2.7
72/08/23	1330	29.5	3.4	1000	7.95	23	2	49	240	197	.03	1.9	.00	.01	.00	.01	1.9
72/09/14	1200	28.5	3.1	845	7.00	21	2	17	168	138	.02	2.5	.00	.01	.01	.02	2.5
72/10/25	1415	24.0	8.2	960	8.00	24	2	25	216	177	.00	2.0	.00	.04	.00	.01	2.0
72/11/16	1210	22.0	7.4	840	7.60	24	1	24	200	164	.04	1.5	.00	.00	.00	.01	1.5
72/12/14	1120	23.0	5.0	830	7.40	22	1	24	240	197	.02	1.7	.00	.00	.00	.00	1.7
73/01/17	1315	17.5	8.1	960	7.50	21	1	39	300	246	.09	1.8	.00	.01	.00	.00	1.9
73/02/08	1110	19.5		1180	7.60	16	2	61	288	236	.04	1.9	.00	.01	.00	.01	1.9
73/03/15	1000	24.0	2.9	1350	7.55	9.8	8	74	268	220	.18	2.7	.00	.01	.00	.00	2.9
73/04/20	0940	22.5	6.0	1600	8.20	24	4	173	424	348	1.2	5.2	.00	.01	.02	.03	6.4
73/05/24	1010	30.0	2.2	2100	7.60	48	10		176	144	1.4	3.5	.00	.01	.00	.02	4.9
73/06/16	1020	32.5	8.0	1300	7.35	11		81	168	138	1.2	5.8	.08	.05	.02	.02	7.1
73/07/17	1130	32.0	10.4	1070	7.70	14	4	56	144	118	.07	1.7	.00	.01	.02	.05	1.8
73/08/14	0920	30.0	2.0	1200		29	3	34			.04	3.0	.00	.01	.00	.02	3.0
73/09/20	1130	29.5	3.6	1300		28	4	52			.00	2.4	.00	.01	.01	.03	2.4
73/10/31	1400	25.5	8.1	1250	8.50	29	4		330	292	.01	2.3	.00	.01	.01	.01	2.3
73/11/20	1130	23.5	4.2	1130			1	27			.02	1.6	.00	.01	.01	.02	1.6
73/12/21	1205	16.5	9.4	1180			3	102			.03	2.5	.00	.01	.01	.01	2.5
74/01/17	1310	21.5	4.4	1020			5				.11	2.2	.00	.01	.02	.02	2.3
74/02/20	0940	18.5	4.5	1280			8	76			.05	2.0	.02	.01	.01	.01	2.1
74/03/11	1100	21.0	3.9	1340			7	79			.05	2.4	.00	.00	.01	.01	2.4
74/04/16	0900	24.5	4.5	1680	7.60		8	129	332	272	.04	4.2	.01	.00	.01	.01	4.2
74/05/17	0930	26.5	6.8	1650			1	103			.06	4.7	.00	.01	.02	.02	4.8
74/06/07	0900	27.5	5.2	730			5	29			.08	2.0	.38	.05	.01	.02	2.5

Site 24.--Everglades No. 2-17.

Date	Time	Temp. °C	DO	Spec. cond.	pH	SiO_2	Turbidity (JTU)	TOC	Alk. as HCO_3	Alk. as $CaCO_3$	NH_4	Organic N	NO_3	NO_2	PO_4 ortho	P total	N total
72/07/17	1035	27.0	5.8	340	7.65	3.8	3	8.0	184	151	0.09	0.68	0.02	0.00	0.01	0.01	.77
72/08/16	1210	27.5	5.7	235	8.00	4.1	2	5.0	200	164	.12	.70	.01	.01	.00	.01	.84
72/09/11	1120	26.0	4.5	80	7.85	3.9	3	11	163	138	.12	1.0	.02	.00	.00	.00	1.1
72/10/17	1100	25.5	5.8	420	7.90	3.9	4	3.0	192	157	.17	.50	.06	.04	.00	.01	.74
72/11/13	0845	24.5	4.7	425	7.40	4.1	1	19	200	164	.20	.30	.06	.00	.00	.09	.56
72/12/11	1100	24.5	7.3	400	8.00	3.7	1		224	184	.14	.63	.07	.00	.00	.01	.84
73/01/08	1210	23.5	7.5	400	8.10	3.8	2	12	200	164	.11	1.4	.07	.00	.00	.00	1.6
73/02/05	1100	20.5	8.4	440	8.15	4.0	2	13	208	171	.10	.53	.09	.01	.00	.01	.73
73/03/12	0815	25.0	5.6	215	8.10	3.8	10	7.0	196	161	.12	.94	.07	.01	.00	.00	1.1
73/04/16	0800	23.5	7.3	360	7.95	3.8	2	4.0	208	171	.04	.35	.07	.00	.00	.00	.46
73/05/21	0830	24.5	5.2	410	7.95	3.2	3	1.0	200	164	.01	.54	.00	.00	.01	.01	.55
73/06/19	0815	28.0	5.2	380	7.65	4.7	8	17	188	154	.03	.33	.00	.00	.00	.00	.36
73/07/31	0800	30.0	4.1	390	7.70	3.6	3	3.0	140	115	.09	.35	.05	.01	.00	.02	.50
73/08/13	1300	29.0	5.3	340		4.5	4	3.0			.12	.95	.01	.00	.00	.01	1.1
73/09/20	0850	27.5	5.2	370		4.3	5	3.0			.08	.57	.00	.00	.00	.00	.66
73/10/26	1620	27.5	6.1	350	8.00	4.4	5	8.0	193	158	.13	.15	.10	.01	.02	.02	.39
73/11/20	1200	24.5	6.2	400			2	2.0			.28	.05	.01	.01	.00	.02	.35
73/12/21	1030	22.0	6.8	360			7	23			.16	1.5	.07	.01	.00	.02	1.7
74/01/16	0900	22.5	7.2	370			4	10			.15	.32	.08	.01	.01	.01	.56
74/02/20	1000	22.5	8.4	500			11	13			.05	.54	.05	.00	.00	.05	.64
74/03/11	1400	24.0	8.3	460			6	7.0			.08	.26	.09	.00	.00	.01	.42
74/04/09	1000	24.5	8.4	420	8.00		3	7.0	214	176	.01	.40	.02	.00	.00	.01	.43
74/05/17	1000	27.0	8.0	460			3	2.0			.02	.43	.00	.01	.00	.01	.46
74/06/07	0840	29.5	7.6	425			3	1.0			.09	.27	.02	.00	.00	.01	.38

Site 25. --L-31W Canal above S-175.

BASIC DATA C

Trace metals in surface water. Type T denotes total recoverable. Type D denotes dissolved. All values in micrograms per litre.

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1200	0	1	0	0	-	20	0	1500	10	0	1.0
T	10/19	0930	0	0	0	10	10	40	3	-	10	10	0.1
D	10/19	0930	0	0	0	10	10	10	0	1700	10	10	-
T	1/12/73	1200	0	1	0	0	-	30	2	-	10	20	0.0
T	4/18	1045	0	0	0	10	5	20	2	-	10	20	0.0
D	4/18	1045	0	0	0	0	5	20	2	1200	10	20	-
T	7/23	1340	1	1	0	0	8	750	2	1600	20	20	0.8
T	10/17	1400	8	3	1	5	14	180	7	-	20	120	0.0
D	10/17	1400	8	3	0	3	8	180	3	-	20	10	-
T	1/15/74	0930	0	0	0	3	3	140	0	1000	20	40	0.0
T	4/18	1400	0	0	0	3	6	100	23	-	10	280	0.0
D	4/18	1400	0	0	0	2	5	-	0	920	0	20	-

Site 1. --Miami Canal below HGS-3 and S-3

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1130	0	0	0	0	-	30	1	2000	10	10	1.1
T	10/19	1030	0	0	0	0	10	10	3	-	10	20	0.0
D	10/19	1030	0	0	0	0	10	10	0	1600	0	20	-
T	1/12/73	1100	0	0	0	0	10	100	3	-	20	20	0.0
T	4/18	1010	0	1	0	0	4	40	1	-	0	20	-
D	4/18	1010	0	0	0	0	4	10	1	1300	0	20	-
T	7/23	1300	1	0	0	10	7	420	6	1700	20	110	0.7
T	10/17	1245	7	3	0	6	10	250	8	-	20	10	0.2
D	10/17	1245	7	3	0	6	10	50	3	-	20	10	-
T	1/15/74	0850	0	0	0	3	10	140	3	2300	20	30	0.0
T	4/18	1300	0	0	0	3	11	120	16	-	10	100	0.0
D	4/18	1300	0	0	0	2	3	10	0	-	0	60	-

Site 2.--North New River Canal below HGS-4 and S-2

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1000	0	0	0	0	-	60	3	1200	10	0	1.0
T	10/19	1130	0	1	10	10	10	120	3	-	10	20	0.1
D	10/19	1130	0	0	0	10	10	10	0	1500	0	20	-
T	1/12/73	1015	0	0	0	0	10	410	4	-	20	20	0.0
T	4/18	0915	1	1	0	10	5	230	1	-	10	20	0.1
D	4/18	0915	1	0	0	10	5	10	1	1200	0	0	-
T	7/23	1215	0	0	0	0	8	220	2	1400	20	40	0.1
T	10/17	1045	11	5	0	3	7	250	5	-	0	40	0.0
D	10/17	1045	7	3	0	3	0	180	3	-	0	5	-
T	1/15/74	1300	0	0	1	4	7	2800	8	1100	100	70	0.0
T	4/18	1100	0	1	10	5	1	410	22	-	20	70	0.0
D	4/18	1100	0	1	10	2	1	-	0	1200	0	10	-

Site 3.--West Palm Beach Canal below HGS-5

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1445	0	1	0	10	-	360	0	300	40	0	1.2
T	10/20	1315	0	1	10	0	10	1100	6	-	30	10	0.0
D	10/20	1315	-	-	-	-	-	-	-	440	-	-	-
T	1/12/73	1340	0	1	0	0	0	230	5	-	20	10	0.0
T	4/19	1100	0	0	10	-	5	160	0	-	0	10	0.0
D	4/19	1100	0	0	-	-	5	-	0	120	0	0	-
T	7/23	1520	0	0	0	0	8	330	0	360	10	20	0.2
T	10/18	1230	3	1	0	6	8	540	27	-	20	30	0.0
D	10/18	1230	3	1	0	1	3	500	25	-	17	10	-
T	1/21/74	1415	0	0	0	2	23	100	3	930	10	80	0.2
T	4/19	1400	0	1	0	2	22	210	10	-	10	9	0.0
D	4/19	1400	0	0	0	2	6	70	10	260	0	0	-

Site 4. --L-3 Canal

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1400	0	1	0	0	-	100	0	1400	20	0	0.5
T	10/20	1130	0	1	80	20	20	290	3	-	10	20	0.0
D	10/20	1130	0	0	0	20	10	40	0	1800	10	20	-
T	1/12/73	1315	0	1	0	0	10	100	2	-	10	20	-
T	4/19	1010	1	1	0	10	7	160	2	-	10	20	0.1
D	4/19	1010	1	0	0	10	7	80	2	1900	10	20	-
T	7/23	1450	1	1	0	0	10	330	0	-	20	20	0.5
T	10/18	1200	12	4	1	4	10	450	11	-	0	20	0.0
D	10/18	1200	6	3	1	0	6	450	11	-	0	20	-
T	1/21/74	1200	0	0	0	2	10	210	1	1200	10	90	0.1
T	4/19	1200	1	0	0	2	18	50	10	-	25	10	0.0
D	4/19	1200	1	0	0	1	0	50	10	1200	20	10	-

Site 5. --Miami Canal at S-8

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/14/72	0900	0	1	0	10	10	0	1	-	30	10	0.5
T	10/18	1115	0	0	30	0	10	40	6	-	10	20	0.1
D	10/18	1115	0	0	0	0	10	10	0	1800	0	20	-
T	1/11/73	1030	1	0	0	0	10	30	3	-	10	20	0.0
T	4/17	1020	7	1	10	10	7	110	2	-	30	20	0.0
D	4/17	1020	7	0	0	10	7	30	2	2400	30	20	-
T	7/16	0900	1	0	0	0	9	90	0	2000	20	50	0.1
T	10/16	1120	8	4	0	3	9	180	8	-	20	30	0.2
D	10/16	1120	7	4	0	3	8	180	8	-	20	7	-
T	1/17/74	1420	0	3	0	4	5	140	0	1900	20	90	0.1
T	4/17	1000	1	4	0	3	4	60	10	-	20	20	0.1
D	4/17	1000	0	4	0	1	4	20	10	1600	0	0	-

Site 6. --North New River Canal at S-11C

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/17/72	1325	0	0	0	90	-	670	16	890	10	60	1.1
T	10/18	0945	1	0	10	0	10	580	6	-	20	50	0.1
D	10/18	0945	1	0	10	0	10	220	0	1300	20	50	-
T	1/18/73	1000	0	0	0	0	0	530	4	-	10	20	0.0
T	4/17	0830	1	0	0	0	5	100	-	-	10	10	0.0
D	4/17	0830	0	0	0	0	5	100	0	1200	10	10	-
T	7/16	0730	0	0	0	10	6	640	2	860	10	30	0.0
T	10/16	1015	9	4	0	3	9	450	13	-	20	30	0.0
D	10/16	1015	7	4	0	0	9	350	5	-	20	10	-
T	1/17/74	1620	0	0	0	5	10	2000	5	780	10	70	0.1
T	4/17	1000	2	6	0	0	0	150	9	-	20	20	0.1
D	4/17	1000	2	3	0	0	0	150	8	1300	0	0	-

Site 7.--South New River Canal at S-9

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/15/72	1500	0	0	0	0	-	160	7	220	20	20	1.0
T	10/20	1430	0	0	10	10	20	540	4	-	10	20	0.0
D	10/20	1430	0	0	10	10	10	200	0	440	0	20	-
T	1/12/73	1425	1	1	0	0	0	450	2	-	10	20	0.0
T	4/19	1140	1	0	0	10	7	110	2	-	10	10	0.0
D	4/19	1140	0	0	0	10	7	30	2	400	0	10	-
T	7/23	1625	1	1	30	10	10	390	17	280	20	310	0.3
T	10/31	1100	0	0	1	8	11	450	8	-	20	30	0.2
D	10/31	1100	0	0	0	3	10	450	4	-	20	4	-
T	1/21/74	1300	0	3	0	2	9	140	7	190	10	60	0.2
T	4/19	1500	1	6	0	2	0	60	2	-	20	0	0.1
D	4/19	1500	0	3	0	1	0	40	0	300	0	0	-

Site 8. --L-28 Borrow Canal at S-140

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	1000	0	0	0	0	-	60	10	460	0	10	0.0
T	10/25	1000	0	0	10	0	10	90	2	-	0	10	0.0
D	10/25	1000	0	0	10	0	10	10	0	560	0	10	-
T	1/19/73	1040	0	0	0	0	10	60	2	-	0	10	0.0
T	4/20	1125	0	1	0	0	5	50	2	-	10	10	0.2
D	4/20	1125	0	0	0	0	5	10	2	160	0	0	-
T	7/17	1015	0	0	10	10	9	70	1	380	0	10	0.0
T	10/31	1000	0	3	0	6	15	250	8	-	25	0	0.3
D	10/31	1000	0	0	0	3	12	250	3	-	20	0	-
T	1/21/74	1015	0	0	0	1	1	140	0	220	10	30	0.1
T	4/16	1020	2	4	-	5	8	20	8	-	0	10	0.0
D	4/16	1020	1	4	0	0	0	20	7	210	0	0	-

Site 9.--L-28 Interceptor Canal

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/17/72	1140	0	0	0	80	-	240	8	760	20	60	0.5
T	10/20	1510	0	0	10	10	10	350	2	-	10	10	0.1
D	10/20	1510	0	0	10	0	10	110	0	600	10	10	-
T	1/12/73	1515	0	0	0	0	0	100	4	-	20	20	0.0
T	4/19	1215	1	1	0	0	6	140	2	-	10	20	0.1
D	4/19	1215	0	0	0	0	3	40	2	1200	10	20	-
T	7/17	1105	0	0	0	0	11	80	1	1700	10	50	0.1
T	10/18	1430	3	0	1	3	12	400	25	-	33	90	0.0
D	10/18	1430	2	0	0	0	12	310	20	-	33	90	-
T	1/21/74	1430	0	0	1	3	8	290	1	590	30	40	0.1
T	4/19	1600	6	4	0	2	4	110	12	-	0	20	0.1
D	4/19	1600	0	4	0	0	4	20	12	1300	0	0	-

Site 10.--Miami Canal at SR 84

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	0900	0	0	0	0	-	310	4	410	20	10	0.6
T	10/25	0900	0	0	10	10	10	80	4	-	0	10	0.1
D	10/25	0900	0	0	10	10	10	30	0	520	0	10	-
T	1/19/73	1015	0	0	0	0	10	100	2	-	10	20	0.0
T	7/17	1040	1	0	0	0	9	110	1	580	10	50	0.1
T	10/31	1015	3	1	1	2	17	250	22	-	17	7	0.0
D	10/31	1015	2	1	0	2	17	70	22	-	17	0	-
T	1/21/74	1455	0	0	0	3	3	180	0	420	10	10	0.1

Site 11.--Corps of Engineers Gage 3-2

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	1130	1	0	0	0	-	160	1	260	10	0	0.5
T	10/25	1100	0	0	0	20	10	180	3	-	10	20	0.0
D	10/25	1100	0	0	0	0	10	40	0	460	0	20	-
T	1/16/73	0945	0	0	0	0	10	80	2	-	0	20	0.0
T	4/20	1145	0	0	0	0	6	120	2	-	10	10	0.0
D	4/20	1145	0	0	0	0	6	20	1	520	0	10	-
T	7/17	0945	1	0	0	0	7	210	0	150	10	60	0.1
T	10/31	0930	11	4	0	4	5	300	10	-	0	20	0.2
D	10/31	0930	8	4	0	3	5	250	3	-	0	10	-
T	1/21/74	1145	0	0	0	4	3	140	0	160	10	30	0.1
T	4/16	1045	0	6	0	2	0	60	10	250	40	0	0.0
D	4/16	1045	0	3	0	0	0	40	5	-	0	0	-

Site 12.--L-28 East Canal

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	1235	1	0	0	0	-	150	0	260	10	10	0.5
T	10/25	1300	0	0	0	10	10	460	10	-	30	10	0.0
D	10/25	1300	0	0	0	10	10	70	0	300	10	10	-
T	1/16/73	1300	0	0	0	0	10	1400	4	-	120	10	0.0
T	7/17	0845	1	0	0	0	10	380	0	200	-	10	0.0
T	10/31	0905	9	4	0	3	15	180	8	-	20	5	0.0
D	10/31	0905	8	3	0	3	15	180	4	-	20	0	-
T	1/21/74	1100	0	0	0	0	9	380	1	100	10	80	0.0

Site 13.--Everglades No. 3-28

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/16/72	1630	0	0	0	0	-	80	0	1100	10	0	0.5
T	10/16	1030	0	0	10	0	10	180	4	-	10	20	0.1
D	10/16	1030	0	0	10	0	10	40	0	320	0	20	-
T	1/8/73	0940	0	0	0	10	10	210	3	-	20	20	0.0
T	4/16	1100	3	1	10	10	5	220	3	-	30	30	0.0
D	4/16	1100	3	0	10	10	4	70	2	880	20	30	-
T	7/15	1050	1	-	0	10	11	130	1	270	10	50	0.0
T	10/30	1000	5	4	0	7	9	250	5	-	0	10	0.0
D	10/30	1000	5	4	0	7	5	50	3	-	0	10	-
T	1/16/74	1045	0	0	0	4	8	50	0	190	10	60	0.0
T	4/15	0900	0	0	0	4	40	260	6	-	0	10	0.0
D	4/15	0900	0	0	0	4	11	70	0	590	0	10	-

Site 14. --Tamiami Canal above S-12A

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/16/72	1525	0	0	0	10	-	100	5	1200	20	10	0.5
T	10/16	1400	1	0	30	40	10	-	7	-	20	30	0.0
D	10/16	1400	1	0	0	10	10	200	2	340	20	30	-
T	1/8/73	1050	0	1	0	0	0	270	3	-	20	10	0.0
T	4/16	1220	1	1	10	10	6	120	3	-	20	20	0.0
D	4/16	1220	1	0	10	10	6	30	2	1200	20	20	-
T	7/15	1110	1	0	0	-	10	150	2	250	10	20	0.1
T	10/30	1120	9	5	0	3	9	250	14	-	20	30	0.0
D	10/30	1120	7	4	0	3	4	250	5	-	0	10	-
T	1/16/74	1140	0	3	0	6	6	180	0	740	20	100	0.0
T	4/15	1030	0	0	0	5	20	190	9	-	0	10	0.0
D	4/15	10	0	0	0	3	3	60	0	1200	0	10	-

Site 15.--Tamiami Canal Outlets Levee 67A to 40-mile bend

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/16/72	1505	2	0	0	10	-	100	8	1200	10	10	0.8
T	10/16	1505	2	0	10	10	10	90	14	-	10	20	0.1
D	10/16	1500	0	0	10	10	10	40	0	1000	10	20	-
T	1/16/73	1010	0	1	0	0	-	60	4	-	10	20	0.0
T	4/16	1300	0	1	0	0	5	70	2	-	10	20	0.0
D	4/16	1300	0	0	0	0	5	20	2	1200	0	20	-
T	7/15	1130	1	0	0	0	6	70	0	1400	10	20	0.0
T	10/30	1145	10	4	0	3	17	200	5	-	0	10	0.0
D	10/30	1145	6	4	0	3	6	100	0	90	0	10	-
T	1/16/74	1200	0	0	0	5	9	140	0	930	10	40	0.0
T	4/15	1130	1	0	0	3	15	100	1	-	10	9	0.0
D	4/15	1130	1	0	0	0	0	70	1	1400	0	9	-

Site 16.--L-67A Canal

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/16/72	1410	0	0	0	130	-	860	23	600	20	250	1.0
T	10/17	0930	0	0	10	10	10	730	7	-	20	30	0.0
D	10/17	0930	0	0	10	10	10	120	0	880	20	30	-
T	1/8/73	1110	0	0	0	0	10	170	2	-	20	20	0.0
T	4/16	1350	2	1	0	10	5	680	2	-	20	30	0.0
D	4/16	1350	2	0	0	10	5	50	2	560	10	30	-
T	7/15	1155	1	0	0	0	8	280	2	360	20	50	0.0
T	10/30	1400	3	0	1	2	13	950	25	-	17	40	0.0
D	10/30	1400	3	0	0	0	7	310	25	-	17	40	-
T	1/16/74	1230	0	0	0	3	8	50	12	350	10	80	0.1
T	4/15	1230	0	1	10	2	25	670	10	-	30	20	0.0
D	4/15	1230	0	0	10	2	14	50	9	590	25	20	-

Site 17.--Tamiami Canal Outlets L-30 to L-67A

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/14/72	1335	0	1	0	0	10	60	15	1700	10	130	0.5
T	10/18	1420	0	0	10	10	10	70	4	-	10	40	0.1
D	10/18	1420	0	0	0	10	10	10	0	1600	0	10	-
T	1/16/73	0800	0	1	-	0	10	60	3	1600	0	20	0.0
T	4/17	1350	2	1	10	0	6	170	-	-	10	40	0.0
D	4/17	1350	2	0	0	0	6	20	2	1200	10	40	-
T	7/23	1045	1	0	0	0	12	1400	4	3000	70	380	0.0
T	10/16	1340	1	4	1	8	19	350	3	-	0	20	0.1
D	10/15	1340	1	4	0	3	17	100	0	-	0	10	-
T	1/16/74	1220	0	0	0	5	16	180	1	2300	10	60	0.1
T	4/17	1400	1	3	0	2	3	90	10	1500	0	150	0.0
D	4/17	1400	0	3	0	1	0	30	9	-	0	0	-

Site 18.--West Palm Beach Canal above S-5A

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/14/72	1445	0	0	0	0	4	40	7	1300	0	0	1.8
T	10/19	1230	0	0	30	20	10	160	5	-	10	20	0.0
D	10/19	1230	0	0	0	20	10	50	0	1500	10	20	-
T	1/16/73	1300	0	1	0	0	10	230	2	-	20	20	0.0
T	4/17	1400	1	1	0	10	7	240	5	-	10	30	0.0
D	4/17	1400	1	0	0	10	7	40	3	1200	10	30	-
T	7/23	1010	1	0	20	0	16	330	7	760	30	60	0.0
T	10/16	1500	3	1	1	3	9	350	25	-	20	30	0.0
D	10/16	1500	3	1	0	0	2	250	24	-	17	30	-
T	1/16/74	1230	0	0	0	4	8	290	1	420	20	30	0.2
T	4/17	1500	2	1	0	3	1	120	10	-	20	0	0.0
D	4/17	1500	2	1	0	1	0	10	6	1400	0	0	-

Site 19.--West Palm Beach Canal 1 mile east of S-5A(E)

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/14/72	1240	0	1	0	0	10	40	1	2900	10	10	1.2
T	10/18	1310	1	0	30	10	10	50	3	-	10	10	0.0
D	10/18	1310	0	0	10	10	10	30	0	2800	0	10	-
T	1/11/73	1210	0	0	0	0	10	60	3	-	0	20	0.0
T	4/17	1145	1	1	0	10	5	-	5	-	10	50	0.0
D	4/17	1145	1	0	0	10	5	70	5	2600	0	50	-
T	7/16	1020	1	0	0	0	9	100	2	3200	20	20	0.2
T	10/16	1255	1	3	0	6	18	250	12	-	40	20	0.0
D	10/16	1255	0	3	0	0	7	180	12	-	20	20	-
T	1/17/74	1040	0	0	0	2	8	100	15	2100	10	50	0.0
T	4/17	1300	2	0	0	7	24	70	8	-	25	5	0.0
D	4/17	1300	1	0	0	1	4	40	2	1600	0	4	-

Site 20.--Hillsboro Canal at S-6

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/14/72	1000	0	1	0	0	10	40	4	2700	0	10	0.9
T	10/18	1145	0	0	30	10	10	70	6	-	10	20	0.0
D	10/18	1145	0	0	0	10	10	.30	0	2400	0	20	-
T	1/11/73	1100	0	1	0	10	0	150	2	-	0	30	0.0
T	4/17	1050	2	1	0	10	6	30	2	-	0	20	0.0
D	4/17	1050	2	0	0	10	6	30	2	1400	0	20	-
T	7/16	0930	0	0	0	10	8	100	0	1900	20	30	0.0
T	10/16	1200	8	5	1	4	-	250	8	-	20	20	0.0
D	10/16	1200	8	4	0	3	-	250	4	-	20	20	-
T	1/17/74	1345	0	0	0	4	1	180	0	2400	10	80	0.2
T	4/17	1100	0	3	0	3	1	30	10	-	20	30	0.0
D	4/17	1100	0	3	1	1	0	30	10	1600	0	0	-

Site 21. --North New River Canal above S-7

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	08/14/72	1145	0	0	0	0	10	30	4	1400	10	30	1.0
T	10/25	1500	0	0	0	0	10	30	3	-	0	0	0.1
D	10/25	1500	0	0	0	0	10	10	0	1700	0	0	-
T	01/17/73	1415	0	0	0	0	10	30	0	-	0	10	0.0
T	4/20	0915	0	1	0	10	7	-	2	-	10	30	0.0
D	4/20	0915	0	0	0	10	7	30	2	1800	10	30	-
T	7/17	1150	0	0	0	0	9	50	2	2800	10	20	0.0
T	10/31	1400	1	4	1	6	15	100	3	-	20	60	0.0
D	10/31	1400	1	4	0	6	15	100	3	-	20	30	-
T	01/16/74	1700	0	3	0	4	8	100	0	1100	10	30	0.0
T	4/16	0920	2	5	1	2	1	50	9	-	0	60	0.1
D	4/16	0920	0	3	0	0	0	50	3	2000	0	0	-

Site 22.--Hillsboro Canal above S-10C

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	1415	1	0	0	0	10	220	4	260	20	10	0.6
T	10/25	1445	0	0	0	0	10	110	4	-	10	0	0.0
D	10/25	1445	0	0	0	0	10	40	0	300	10	0	-
T	1/17/73	1400	0	0	0	0	10	270	0	-	120	10	0.1
T	4/20	0850	0	1	0	10	6	50	3	-	40	20	0.0
D	4/20	0850	0	0	0	10	6	40	2	960	30	30	-
T	7/17	1135	1	0	10	0	9	230	3	600	20	50	0.1
T	10/31	1130	8	5	0	4	11	180	13	-	20	30	0.0
D	10/31	1130	5	5	0	4	5	180	5	30	20	30	-
T	1/16/74	1445	0	0	0	4	1	180	0	100	0	30	0.1
T	4/16	0940	0	6	1	1	3	90	11	-	25	150	0.1
D	4/16	0940	0	3	1	1	3	80	6	150	25	30	-

Site 23.--Everglades No. 1-15

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/23/72	1330	1	0	0	0	10	0	3	2100	30	10	0.8
T	10/25	1415	0	0	0	10	10	50	3	-	10	10	0.1
D	10/25	1415	0	0	0	10	10	10	0	2000	10	10	-
T	1/17/73	1315	0	0	0	0	10	10	0	-	10	20	0.0
T	4/20	0940	2	1	0	10	7	-	3	-	-	40	0.0
D	4/20	0940	0	0	0	10	7	50	3	2500	250	40	-
T	7/17	1100	0	0	0	0	10	30	2	2200	20	80	0.0
T	10/31	1400	0	3	1	6	16	150	8	-	40	40	0.0
D	10/31	1400	0	3	0	3	9	100	5	-	20	10	-
T	1/17/74	1310	0	3	0	4	11	100	1	1500	20	40	0.0
T	4/16	0900	0	1	1	3	6	130	10	2300	300	50	0.0
D	4/16	0900	0	1	0	3	0	120	5	-	280	20	-

Site 24.--Everglades No. 2-17

Type	Date	Time	Cd	Co	Cr	Cu	As	Fe	Pb	Sr	Mn	Zn	Hg
T	8/16/72	1210	1	0	0	50	-	120	30	600	10	130	0.6
T	10/17	1100	1	0	10	0	10	170	5	-	10	40	0.1
D	10/17	1100	0	0	10	0	0	10	0	640	0	40	-
T	1/8/73	1210	0	0	0	0	0	130	2	-	10	20	0.0
D	4/16	0800	0	1	0	10	3	60	3	-	10	20	0.0
T	4/16	0800	0	0	0	10	3	20	0	400	10	20	-
T	7/31	0800	0	0	0	0	6	170	2	480	10	60	0.1
T	10/26	1620	11	5	0	3	5	300	10	-	0	5	0.0
D	10/26	1620	4	4	0	3	1	100	3	-	0	4	-
T	1/16/74	0900	0	0	0	4	9	210	0	420	10	100	0.0
T	4/09	1000	0	0	0	3	40	120	8	-	25	10	0.0
D	4/09	1000	0	0	0	2	0	30	8	590	25	10	-

Site 25. --Canal L-31 W above S-175

BASIC DATA D

Major inorganic ions in surface water. All values in milligrams per litre except where noted.

Site	Date	Time	Color (PCS)	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	CL	NO_3	FL	DS*	Hardness ($CaCO_3$)
1	10/19/72	0930	40	48	20	64	5.8	160	1.0	69	100	0.0	0.4	390	200
2	10/19/72	1030	60	48	22	65	6.0	160	4.0	74	100	.0	.4	410	210
3	10/19/72	1130	40	52	18	54	5.2	180	.0	64	82	.3	.4	370	210
4	10/20/72	1315	80	50	5.0	30	3.2	180	.0	6.4	42	.1	.2	230	150
5	10/20/72	1130	80	110	24	92	5.0	370	.0	77	140	1.1	.6	630	380
6	10/18/72	1115	60	48	20	92	4.2	220	8.0	22	130	.0	.6	450	200
7	10/18/72	0945	-	80	14	58	2.1	320	.0	.8	86	.0	.2	410	260
8	10/20/72	1430	80	62	4.6	22	2.0	220	.0	1.6	30	.0	.2	230	170
9	10/25/72	1000	30	38	5.2	18	.5	120	.0	8.8	28	.0	.2	170	120
10	10/20/72	1510	60	62	5.4	22	1.3	200	.0	1.6	30	.5	.2	240	180
11	10/25/72	0900	90	74	9.6	48	.6	240	6.0	3.2	72	.0	.2	330	220
12	10/25/72	1100	60	52	3.2	12	.6	180	.0	1.6	18	.5	.2	180	140
13	10/25/72	1300	45	32	2.2	8.0	1.1	110	.0	1.6	14	.0	.2	110	89
14	10/16/72	1030	40	36	3.0	11	1.3	130	.0	.8	16	.0	.2	130	100
15	10/16/72	1400	50	38	4.8	32	2.7	130	.0	.8	54	.0	.2	200	110
16	10/16/72	1500	70	57	12	51	3.0	230	.0	6.4	80	.2	.3	330	190
17	10/17/72	0930	70	80	5.2	22	.7	280	.0	.8	34	.0	.2	280	220
18	10/18/72	1420	50	56	19	68	5.1	190	.0	64	92	1.3	.4	410	220
19	10/19/72	1230	60	64	20	100	5.6	230	.0	69	150	1.3	.5	530	240
20	10/18/72	1310	100	66	36	130	5.1	440	.0	42	170	.8	.7	680	320
21	10/18/72	1145	80	80	31	92	6.5	350	.0	78	130	2.0	.6	610	330
22	10/25/72	1500	90	38	20	100	4.8	180	.0	38	150	.0	.6	460	180
23	10/25/72	1445	60	9.3	2.4	16	.6	30	.0	1.6	27	1.8	.1	76	33
24	10/25/72	1415	100	52	23	100	5.4	260	.0	41	140	0.2	.6	490	230
25	10/17/72	1100	20	68	3.2	9.4	.4	230	.0	2.4	14	0.3	.2	210	180

* Calculated sum

Site	Date	Time	Color (PCS)	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	CL	NO_3	FL	DS*	Hardness ($CaCO_3$)
1	4/18/73	1045	30	48	20	66	4.8	160	0.0	72	98	0.0	0.5	400	200
2	4/18/73	1010	30	48	20	66	4.8	160	.0	73	98	.0	.5	390	200
3	4/18/73	0915	30	52	20	62	4.5	180	.0	70	93	.9	.5	400	210
4	4/19/73	1100	60	60	4.8	36	.6	210	.0	7.2	-	.0	.6	-	170
5	4/19/73	1010	100	120	28	110	5.2	430	.0	60	152	.4	.6	700	420
6	4/17/73	1020	100	96	30	120	4.6	400	.0	38	180	.1	.9	680	370
7	4/17/73	0830	60	80	12	67	2.4	320	.0	1.6	87	.0	.4	420	250
8	4/19/73	1140	55	62	7.2	43	3.1	220	.0	8.8	60	.4	.4	300	180
9	4/20/73	1145	20	14	6.0	24	.1	33	11	8.0	34	.0	.4	120	60
10	4/19/73	1215	50	98	19	72	3.4	340	.0	35	100	.9	.6	500	320
11	DRY														
12	4/20/73	1145	30	55	3.8	18	1.3	170	.0	1.6	30	.0	.5	200	150
13	DRY														
14	4/16/73	1100	30	60	5.6	23	2.9	190	.0	1.6	36	.9	.5	220	170
15	4/16/73	1220	45	68	16	68	3.6	270	.0	9.6	96	.9	.5	400	240
16	4/16/73	1300	45	75	16	68	3.3	280	.0	8.8	98	.9	.5	420	250
17	4/16/73	1350	35	100	5.6	27	0.6	320	.0	.0	44	.2	.2	340	270
18	4/17/73	1350	35	57	19	74	4.5	190	.0	69	100	1.3	.5	430	220
19	4/17/73	1400	35	58	19	76	4.6	190	.0	69	110	1.3	.5	440	220
20	4/17/73	1145	70	85	35	140	5.5	370	.0	79	180	.9	.1	720	360
21	4/17/73	1050	45	62	24	84	4.7	230	.0	70	120	.9	.6	490	250
22	4/20/73	0915	80	55	24	130	5.3	280	.0	32	170	.2	.9	570	240
23	4/20/73	0850	45	20	7.4	35	1.4	92	.0	1.6	53	.0	.3	170	82
24	4/20/73	0940	120	78	35	230	10	410	.0	4.0	310	.0	1.2	900	340
25	4/16/73	0800	5	70	3.7	14	.6	220	.0	8.8	24	.3	0.2	230	190

* Calculated sum

Site	Date	Time	Color (PCS)	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	CL	NO_3	FL	DS*	Hardness ($CaCO_3$)
1	10/17/73	1400	80	77	28	120	6.0	290	9.0	91	140	0.1	0.7	640	260
2	10/17/73	1245	60	62	22	71	6.0	220	.0	70	110	.0	.5	460	190
3	10/17/73	1045	50	56	21	76	6.0	200	6.0	47	110	4.3	1.0	430	180
4	10/18/74	1230	100	44	2.3	18	1.0	140	.0	4.4	26	.1	.3	170	115
5	10/18/73	1200	100	67	6.3	30	1.7	200	.0	14	44	.2	1.0	270	160
6	10/16/73	1120	100	86	28	100	5.1	340	17	37	150	.1	.9	610	320
7	10/16/73	1015	60	85	14	59	2.1	270	4.0	4.0	83	.1	.4	400	230
8	10/31/73	1100	100	66	6.6	23	2.0	200	7.0	2.5	31	.5	.4	250	180
9	10/31/73	1000	70	71	6.8	18	2.3	210	8.0	3.4	27	.0	.3	250	190
10	10/18/73	1430	100	65	19	39	2.5	270	5.0	33	63	.8	.4	370	230
11	10/31/73	1015	80	58	7.7	20	.8	220	.0	3.8	31	.5	.3	230	180
12	10/31/73	0930	50	54	5.6	9.2	.7	170	.0	3.2	15	.1	.3	180	140
13	10/31/73	0905	50	31	3.9	10	1.2	110	.0	.8	16	.0	.2	120	90
14	10/30/73	1006	30	34	2.3	7.8	.7	100	.0	1.4	12	.0	.2	120	80
15	10/30/73	1120	60	49	5.0	24	2.2	160	.0	3.3	38	.0	.4	210	130
16	10/30/73	1145	80	66	13	48	2.3	230	7.0	10	68	.2	.5	340	200
17	10/30/73	1400	50	92	1.1	17	.8	260	.0	1.7	28	.0	.3	280	210
18	10/16/73	1340	50	44	3.4	20	1.2	120	.0	19	30	4.3	.3	180	90
19	10/16/73	1500	100	66	7.7	44	2.8	160	.0	24	74	.4	.3	300	130
20	10/16/73	1255	100	97	28	180	6.7	370	11	44	250	.4	.9	840	320
21	10/16/73	1200	80	92	31	120	4.5	420	.0	22	170	.5	1.2	670	350
22	10/31/73	1400	100	77	29	160	8.9	300	7.0	58	220	.3	.9	730	260
23	10/31/73	1130	50	14	3.5	21	.6	49	.0	1.2	34	.0	.3	100	40
24	10/31/73	1400	100	71	30	160	8.1	330	13	47	200	.0	1.0	720	290
25	10/26/73	1620	5	72	3.3	9.7	.4	190	.0	1.7	14	.4	.2	200	160

* Calculated sum

Site	Date	Time	Color (PCS)	Ca	Mg	Na	K	HCO_3	CO_3	SO_4	CL	NO_3	FL	* DS	Hardness ($CaCO_3$)
1	4/18/74	1400	20	41	18	72	5.0	150	4.0	64	97	0.1	0.4	380	140
2	4/18/74	1300	20	44	21	60	5.0	150	5.0	66	99	.4	.4	380	140
3	4/18/74	1100	30	50	18	55	5.0	170	.0	56	89	.8	.4	370	140
4	4/19/74	1400	60	37	5.6	42	1.1	140	1.0	6.6	53	.1	.4	220	120
5	4/19/74	1200	30	44	19	70	4.6	150	4.0	60	98	.4	.4	380	130
6	4/17/74	1000	50	53	22	79	5.7	200	.0	63	120	1.0	.6	450	160
7	4/17/74	1000	90	90	17	79	3.0	330	.0	6.0	110	.2	1.0	480	270
8	4/19/74	1500	70	50	7.4	44	3.0	180	.0	14	64	.4	.7	280	160
9	4/16/74	1020	30	42	5.0	25	3.8	150	.0	7.5	34	.0	.3	200	130
10	4/19/74	1600	30	49	21	66	5.4	150	12	66	99	.5	.5	390	130
11	Dry														
12	4/16/74	1045	30	59	4.0	19	2.1	208	.0	2.3	28	.1	.3	210	160
13	Dry														
14	4/15/74	0900	40	59	8.2	38	2.8	230	.0	6.0	59	1.0	.3	290	180
15	4/15/74	1030	100	64	16	73	5.0	260	.0	15	130	1.8	.4	440	220
16	4/15/74	1130	60	70	18	94	5.0	290	.0	15	140	1.3	.4	490	240
17	4/15/74	1230	40	96	5.6	30	1.1	330	.0	2.1	47	.4	.2	350	260
18	4/17/74	1400	60	64	20	81	5.8	210	.0	63	110	1.7	.6	460	170
19	4/17/74	1500	50	54	20	81	5.7	200	.0	50	120	1.4	.5	440	170
20	4/17/74	1300	60	60	21	97	5.7	220	.0	62	140	.0	.6	500	180
21	4/17/74	1100	60	60	24	79	5.7	230	.0	63	120	1.3	.7	470	180
22	4/16/74	0920	100	52	27	150	6.9	270	.0	43	210	.1	1.1	640	220
23	4/16/74	0940	70	11	2.9	22	.7	41	.0	2.3	32	.0	.3	93	30
24	4/16/74	0900	100	55	37	260	16	330	.0	10	380	.0	1.3	930	270
25	4/09/74	1000	1	66	4.0	17	1.1	210	.0	11	23	.1	.2	230	170

* Calculated sum

BASIC DATA E

Trace metals, macronutrients,

chemical oxygen demand, and

loss on ignition in bottom sediment.

Site	As ug/g	Cd ug/g	C g/Kg	Org C g/Kg	Chr ug/g	Co ug/g	Cu ug/g	Fe ug/g	Pb ug/g	Mn ug/g	Hg ug/g	Zn ug/g	NKJD[1] mg/Kg	NO_3+NO_3 mg/Kg	P mg/Kg	Res LOI[2] mg/Kg	COD [3] mg/Kg
1	4	4	169	90	19	13	14	5,770	75	75	0.07	31	22,000	1.3	120	140,000	120,000
2	2	2	184	119	10	11	29	6,200	47	109	.14	71	9,700	.8	110	190,000	1,000,000
3	2	2	189	148	25	9	32	13,600	179	216	.11	68	7,700	.8	120	237,000	790,000
4	0	2	95	76	26	11	14	8,100	71	161	.26	61	12,000	.2	280	122,000	330,000
5	0	2	88	23	9	10	6	1,100	28	32	.06	9	6,200	.1	180	37,000	73,000
6	3	4	186	114	12	11	19	5,400	61	123	.01	40	4,900	.5	57	182,000	320,000
7	1	1	35	11	5	4	190	480	25	12	.05	22	1,100	1.1	73	18,000	42,000
8	0	2	87	2	14	12	6	2,800	41	32	.08	18	2,200	.2	140	3,200	73,000
9	0	2	83	0	12	11	3	840	37	36	.19	12	530	.1	69	-	20,000
10	0	2	87	2	6	14	6	3,500	43	86	.09	14	2,900	.5	130	3,200	78,000
11	0	2	107	71	12	6	5	2,600	26	50	.08	16	5,800	.3	37	114,000	210,000
12	0	2	151	109	320	100	12	6,800	71	92	.08	390	15,000	2.1	190	174,000	310,000
13	2	8	406	406	8	0	19	4,900	96	190	.23	50	42,000	4.0	92	650,000	2,600,000
14	3	2	141	67	17	13	9	4,200	45	140	.14	42	9,900	.1	110	107,000	190,000
15	0	1	53	-	8	9	2	550	14	38	.05	4	1,100	0	6.1	-	170,000
16*	4	1	36	4	4	6	2900	370	430	13	.03	230	98	.8	10	6,400	18,000
17	8	2	400	383	14	7	6	13,000	100	49	.08	63	13,000	1.4	190	613,000	1,100,000
18	1	1	117	89	7	6	14	2,600	24	37	.05	24	4,000	1.6	30	142,000	430,000
19	0	1	80	68	6	4	17	4,700	29	20	.05	29	16,000	.1	34	109,000	530,000
20	0	0	400	387	46	0	21	1,500	28	46	.11	31	6,000	0	36	620,000	110,000
21	1	4	186	120	10	13	22	5,400	110	110	.10	54	12,000	.2	110	192,000	450,000
22	0	2	234	191	12	9	55	7,000	84	160	.22	62	15,000	.6	100	306,000	560,000
23**	0	3	440	440	2	0	7	2,300	34	280	.12	38	25,000	-	38	704,000	2,100,000
24	0	0	330	300	51	6	12	530	4	160	.17	32	23,000	2.6	19	473,000	690,000
25	1	2	120	11	11	15	5	-	46	56	.05	16	3,500	2.4	12	17,000	34,000

* Sample contaminated
** Metal values reported as total

1' Kjeldahl nitrogen (organic plus ammonia)
2' Residue loss on ignition
3' Chemical oxygen demand

Site	As ug/g	Cd ug/g	C g/Kg	Org C g/Kg	Chr ug/g	Co ug/g	Cu ug/g	Fe ug/g	Pb ug/g	Mn ug/g	Hg ug/g	Zn ug/g	NKJDL[1] mg/Kg	NO_3+NO_3 mg/Kg	P mg/Kg	Res LOI[2] mg/Kg	COD [3] mg/Kg
1	6	5	142	73	14	10	16	5,600	870	85	0.02	42	11,000	0.9	140	261,000	140,000
2	3	4	193	130	13	10	29	1,300	51	140	.05	51	12,000	0.5	160	322,000	280,000
3	2	10	120	59	10	12	12	6,600	25	200	.00	30	10,000	0.0	20	174,000	340,000
4	5	2	137	110	31	12	11	16,000	37	140	.10	57	20,000	1.2	510	345,000	1,100,000
5	1	1	17	5.8	6	9	3	1,200	9	11	.01	9.0	900	0.3	200	27,000	12,000
6	5	2	111	81	13	10	10	4,800	30	170	.05	24	4,900	4.2	65	341,000	220,000
7	0	0	9.2	0	3	15	1	320	10	3	.01	6.0	12,000	0.9	750	7,500	6,200
8	6	4	80	35	30	10	6	10,000	210	59	.05	28	6,300	0.6	11	140,000	180,000
9	8	10	85	17	12	25	9	2,400	25	50	.00	12	1,000	0.0	1.6	79,400	32,000
10	1	4	81	11	9	31	6	3,000	190	79	.01	8.0	2,500	2.0	2.1	39,500	40,000
11	4	4	147	100	28	30	9	11,000	40	110	.05	15	11,000	1.2	59	281,000	60,000
12	6	4	121	61	23	10	9	8,100	39	140	.11	13	13,000	0.7	210	255,000	350,000
13	10	2	361	360	2	11	4	8,100	21	74	.07	26	52,000	3.3	140	914,000	6,700,000
14	9	6	136	81	36	29	14	9,000	77	140	.26	126	15,000	3.0	40	258,000	240,000
15	10	3	144	110	49	33	15	14,000	120	98	.11	131	14,000	0.6	8.5	302,000	550,000
16	5	0	126	54	23	20	18	5,300	68	200	.02	72	5,900	2.1	12	165,000	330,000
17	13	5	237	200	20	25	10	17,000	75	85	.11	68	29,000	1.9	3.8	525,000	1,400,000
18	4	4	58	15	16	25	13	6,000	69	71	.23	24	3,000	3.0	9.6	193,000	200,000
19	0	0	17	10	2	5	1	2,600	10	3	.01	3.0	1,900	0.4	45	14,900	76,000
20	3	3	265	230	10	16	62	4,800	31	100	.03	47	19,000	2.5	56	462,000	640,000
21	4	4	137	73	14	15	16	5,400	130	99	.00	33	11,000	0.6	38	271,000	330,000
22	4	2	268	230	14	17	47	56,000	45	160	.03	37	19,000	17	12	473,000	760,000
23	6	4	450	450	4	20	4	1,500	40	24	.00	32	54,000	2.3	140	931,000	3,800,000
24	2	2	272	270	2	8	5	1,300	15	39	.07	18	30,000	1.8	72	490,000	130,000
25	6	5	103	3.0	14	15	9	6,000	51	73	.03	15	1,700	1.5	1.5	45,600	

1' Kjeldahl nitrogen (organic plus ammonia)
2' Residue loss on ignition
3' Chemical oxygen demand

Site	As ug/g	Cd ug/g	C g/Kg	Org C g/Kg	Chr ug/g	Co ug/g	Cu ug/g	Fe ug/g	Pb ug/g	Mn ug/g	Hg ug/g	Zn ug/g	NKJD[1] mg/Kg	NO_3+NO_3 mg/Kg	P mg/Kg	Res LOI[2] mg/Kg	COD [3] mg/Kg
1	4	20	85	26	8	25	10	2,100	25	50	0.0	8	940	0.0	0.9	48,500	56,000
2	3	20	160	11	8	25	30	5,800	100	110	0.0	62	9,400	2.0	11	267,000	350,000
3	2	10	100	72	10	12	15	6,600	25	150	0.0	30	9,600	1.5	16	258,000	300,000
4	0	10	26	4.5	10	12	8	2,100	25	60	0.0	20	960	1.0	3700	39,300	29,000
5	0	10	8.8	4.4	10	0	5	260	0	10	0.0	15	430	3.5	750	18,800	11,000
6	0	20	150	130	2	12	11	3,200	25	80	0.0	22	3,000	19	490	388,000	180,000
7	0	10	44	15	10	50	-	1,100	100	20	0.3	50	3,000	1.0	720	13,000	66,000
8	0	20	85	37	10	25	9	2,500	25	30	0.0	15	1,500	0.0	1200	13,000	59,000
9	0	20	88	8.9	15	25	9	3,100	100	60	0.0	20	1,600	0.0	2.8	70,500	46,000
10	6	10	110	58	10	25	8	5,900	50	140	0.0	40	5,800	0.0	1000	117,000	200,000
11	7	20	130	72	18	12	10	3,100	100	80	0.0	60	8,600	200	2.0	142,000	270,000
12	1	20	120	47	22	0	8	3,900	25	60	0.0	30	13,000	0.0	14	140,000	350,000
13	12	20	320	320	2	0	9	5,700	50	130	0.0	35	37,000	4.5	570	113,000	120,000
14	0	20	160	92	18	25	30	5,700	75	80	0.0	160	16,000	1.5	19	46,700	220,000
15	5	20	120	91	25	12	18	8,100	100	80	0.0	180	12,000	0.0	8	151,000	360,000
16	0	20	130	71	12	25	19	3,200	50	90	0.0	38	5,600	0.0	1.7	115,000	250,000
17	8	10	200	150	12	25	10	13,000	50	70	0.0	100	18,000	17	3.5	470,000	600,000
18	7	20	60	38	8	12	20	3,300	25	40	0.0	28	4,800	0.0	380	155,000	230,000
19	10	20	27	18	5	0	12	2,300	0	10	0.0	30	2,100	2.0	130	109,000	76,000
20	0	20	160	130	8	0	32	3,000	25	50	0.0	80	14,000	3.0	9.3	426,000	670,000
21	0	20	140	91	12	38	18	5,700	130	80	0.0	45	6,800	0.0	117	228,000	290,000
22	4	20	130	91	8	25	24	3,100	50	130	0.0	32	20,000	190	1400	560,000	460,000
23	0	20	370	370	35	0	5	670	25	30	0.0	18	38,000	0.0	320	926,000	140,000
24	0	20	240	240	5	0	10	1,500	50	60	0.0	40	35,000	0.0	740	859,000	140,000
25	0	20	180	120	8	38	12	2,800	50	50	0.0	25	2,200	1.0	41	57,900	68,000

1' Kjeldahl nitrogen (organic plus ammonia)
2' Residue loss on ignition
3' Chemical oxygen demand

Site	As ug/g	Cd ug/g	C g/Kg	Org C g/Kg	Chr ug/g	Co ug/g	Cu ug/g	Fe ug/g	Pb ug/g	Mn ug/g	Hg ug/g	Zn ug/g	NKJD[1'] mg/Kg	NO_3+NO_3 mg/Kg	P mg/Kg	Res LOI[2'] mg/Kg	COD[3'] mg/Kg
1	4	4	109	27	21	20	21	4,100	50	67	0.01	23	3,600	0.7	120	99,900	100,000
2	3	2	186	130	12	10	32	5,900	41	110	.11	48	13,000	2.0	82	317,000	410,000
3	3	1	107	75	13	10	13	150	30	150	.03	22	9,100	1.9	190	240,000	290,000
4	1	1	38	6.2	18	9	3	3,600	29	56	.01	14	300	1.0	1,300	43,200	1,800
5	1	1	12	0	4	10	3	7,200	10	12	.00	7.0	.6	.8	840	18,700	15,000
6	3	3	109	49	11	16	11	3,800	41	150	.05	21	9,300	1.3	110	220,000	280,000
7	7	20	28	0.3	5	0	14	710	100	10	.00	38	1,700	1.5	1,000	85,500	27,000
8	1	3	74	0	32	32	6	4,700	42	34	.03	14	2,000	2.0	1.6	75,000	54,000
9	7	20	91	43	15	25	10	2,400	50	60	.00	25	1,700	.0	3.2	39,700	44,000
10	6	3	122	53	10	16	7	5,600	53	120	.00	13	6,200	1.4	80	118,000	190,000
11	3	3	170	140	18	17	5	7,400	25	75	.05	9.0	12,000	.7	11	302,000	360,000
12	5	3	140	110	57	34	9	12,000	48	96	.13	34	18,000	1.6	35	322,000	390,000
13	6	0	380	380	2	12	0	7,800	24	110	.00	21	52,000	3.8	200	817,000	1,200,000
14	10	5	190	130	27	10	37	7,700	80	110	.13	159	20,000	1.0	190	251,000	380,000
15	9	3	130	93	44	30	20	14,000	100	91	.08	110	12,000	3.0	140	255,000	33,000
16	5	3	120	75	29	20	27	7,000	89	120	.02	40	8,200	1.9	6.2	201,000	260,000
17	8	2	220	170	25	18	11	15,000	73	87	.02	64	19,000	5.5	16	382,000	490,000
18	1	3	82	56	9	11	10	3,500	21	40	.01	19	3,100	.5	79	146,000	160,000
19	1	1	44	0	7	5	5	2,500	10	14	.00	22	3,200	.3	64	74,000	65,000
20	5	3	300	280	7	10	38	3,700	30	72	.00	35	17,000	2.1	230	454,000	650,000
21	3	4	150	75	13	9	16	6,100	140	100	.11	34	11,000	.9	83	252,000	310,000
22	4	3	190	140	38	20	9	8,500	41	86	.06	28	15,000	.9	100	386,000	510,000
23	3	0	420	420	2	12	2	5,000	25	59	.00	10	33,000	10	170	904,000	1,200,000
24	5	0	400	320	7	44	4	1,900	22	130	.10	18	5,500	1.2	110	894,000	1,500,000
25	0	20	110	32	10	38	8	3,800	50	50	.00	12	2,000	.5	1.0	66,100	49,000

1' Kjeldahl nitrogen (organic plus ammonia)
2' Residue loss on ignition
3' Chemical oxygen demand

BASIC DATA F

Chlorinated insecticides and polychlorinated biphenyl concentrations in bottom sediment. All values in micrograms per kilogram.

Site	Date	Time	Aldrin	Chlor-dane	DDD	DDE	DDT	Diel-drin	Endrin	Hepta-chlor	Hepta-chlor Epoxide	Lindane	Toxa-phene	PCB
1	10/19/72	0930	0.0	0	17	20	3.7	0.1	0.0	0.0	0.0	0.0	0	0
2	10/19/72	1030	0	400	730	310	15	3.4	0	0	0	0	0	30
3	10/19/72	1130	0	0	142	79	0	.7	0	0	0	0	250	0
4	10/20/72	1315	0	8	17	4.7	0	.5	0	0	0	0	0	0
5	10/20/72	1130	0	0	0	2.0	0	0	0	0	0	0	0	400
6	10/18/72	1115	0	0	49	52	1.7	.1	0	0	0	0	0	5
7	10/18/72	0945	0	0	.8	.7	0	0	0	0	0	0	0	10
8	10/20/72	1430	0	0	.6	20	0	0	0	0	0	0	0	5
9	10/25/72	1000	0	0	0	.2	0	0	0	0	0	0	0	0
10	10/20/72	1510	0	0	23	2.6	0	.8	0	0	0	0	0	0
11	10/25/72	0900	0	0	.4	.6	0	0	0	0	0	0	0	0
12	10/25/72	1100	0	0	2.8	2.3	0	.3	0	0	0	0	0	5
13	10/25/72	1300	0	0	1.5	1.3	0	.1	0	0	0	0	0	0
14	10/16/72	1030	0	0	.7	6.5	0	0	0	0	0	0	0	5
15	10/16/72	1400	0	0	.2	.4	0	.1	0	0	0	0	0	0
16	10/16/72	1500	0	0	0	0	0	0	0	0	0	0	0	5
17	10/17/72	0930	0	0	5.1	6.8	0	0	0	0	0	0	0	5
18	10/18/72	1420	0	0	500	100	12	1.0	0	0	0	0	0	0
19	10/19/72	1230	0	40	100	30	0	.5	0	0	0	0	0	5
20	10/18/72	1310	0	0	870	740	8.1	17	0	0	0	0	250	100
21	10/18/72	1145	0	50	94	55	0	.4	0	0	0	0	0	40
22	10/25/72	1500	0	0	210	120	30	.8	0	0	0	0	0	5
23	10/25/72	1445	0	0	2.4	1.0	.1	.2	0	0	0	0	0	0
24	10/25/72	1415	0	0	17	13	0	.1	0	0	0	0	0	0
25	10/17/72	1100	0	0	0	.2	0	0	0	0	0	0	0	0

Site	Date	Time	Aldrin	Chlor-dane	DDD	DDE	DDT	Diel-drin	Endrin	Hepta-chlor	Hepta-chlor Epoxide	Lindane	Toxa-phene	PCB
1	4/25/73	1230	0.0	53	77	66		0.9	0.0	0.0	0.0	0.0	0	10
2	4/25/73	1140	0	100	240	100	8.8	1.5	0	0	0	0	0	10
3	4/25/73	1020	.2	0	60	24	4.2	1.6	.5	0	0	0	0	0
4	4/26/73	1330	0	7	20	6.7	.8	.3	0	0	0	0	0	5
5	4/26/73	1200	0	0	1.2	.2	0	0	0	0	0	0	0	40
6	4/24/73	1000	0	0	12	11	0	.1	0	0	0	0	0	5
7	4/24/73	0940	0	0	.4	.3	.6	.3	0	0	0	0	0	5
8	4/26/73	1310	0	0	.9	1.3	1.0	.1	0	0	0	0	0	5
9	4/27/73	1200	0	0	.2	.3	.0	0	0	0	0	0	0	0
10	4/26/73	1330	0	0	1.3	.5	.0	.1	0	0	0	0	0	0
11	4/27/73	1130	0	1	.5	.7	.1	.1	0	0	0	0	0	0
12	4/27/73	1300	0	0	1.2	4.8	.1	.1	0	0	0	0	0	10
13	4/27/73	1230	0	0	3.6	3.0	0	.1	0	0	0	0	0	0
14	4/23/73	1130	0	0	.7	4.6	.4	.1	0	0	0	0	0	5
15	4/23/73	1230	0	3	2.9	4.7	.3	.1	0	0	0	0	0	5
16	4/23/73	1500	0	4	2.9	1.1	0	.1	0	0	0	0	0	20
17	4/23/73	1430	0	1	2.6	5.1	0	.1	0	0	0	0	0	5
18	4/24/73	1400	0	7	13	6.4	.1	.3	0	0	0	0	0	5
19	4/24/73	1500	0	0	26	8.3	0	.2	0	0	0	0	0	0
20	4/24/73	1300	0	160	430	160	25	3.4	1.2	0	0	0	0	70
21	4/24/73	1145	0	30	58	32	7.2	.7	0	0	0	0	0	30
22	4/27/73	0900	0	150	350	130	23	.7	0	0	0	0	0	10
23	4/27/73	1000	0	0	5.1	4.6	0	.1	0	0	0	0	0	0
24	4/27/73	1100	0	2	5.9	3.2	0	.1	0	0	0	0	0	0
25	4/16/73	0800	0	0	0	0	0	.2	0	0	0	0	0	5

Site	Date	Time	Aldrin	Chlor-dane	DDD	DDE	DDT	Diel-drin	Endrin	Hepta-chlor	Hepta-chlor Epoxide	Lindane	Toxa-phene	PCB
1	10/17/73	1400	0.0	5	43	33	3.1	0.8	0.0	0.0	0.0	0.0	0	0
2	10/17/73	1245	0	40	390	320	35	1.9	0	0	0	0	0	20
3	10/17/73	1100	0	3	48	26	7.3	.8	0	0	0	0	0	0
4	10/18/73	1230	0	0	0	0	0	0	0	0	0	0	0	0
5	10/24/73	1220	0	0	1.3	1.2	0	.1	0	0	0	0	0	180
6	10/23/73	0945	0	0	9.3	11	0	.1	0	0	0	0	0	0
7	10/23/73	0800	0	0	.7	1.2	.6	.2	0	0	0	0	0	19
8	10/18/73	1340	0	0	.4	7.1	0	0	0	0	0	0	0	0
9	1/21/73	1100	0	0	.2	.3	0	0	0	0	0	0	0	0
10	10/18/73	1440	0	0	21	14	0	.5	0	0	0	0	0	0
11	1/21/74	1445	0	0	0	0	0	0	0	0	0	0	0	0
12	1/21/74	1200	0	0	1.5	16	0	0	0	0	0	0	0	20
13	1/17/74	1300	0	0	.5	3.5	0	0	0	0	0	0	0	0
14	12/17/73	1100	0	0	25	24	0	0	0	0	0	0	0	10
15	12/17/73	1215	0	1	2.5	8.6	.9	0	0	0	0	0	0	10
16	12/17/73	1300	0	0	4.2	.6	0	0	0	0	0	0	0	0
17	12/17/73	1345	0	0	5.3	18	0	0	0	0	0	0	0	0
18	10/23/73	1250	0	0	84	58	15	2.6	0	0	0	0	0	0
19	10/23/73	1340	0	0	12	21	0	.2	0	0	0	0	0	0
20	10/23/73	1145	0	0	62	51	8.1	2.2	0	0	0	0	0	20
21	10/23/73	1050	0	0	8.4	9.9	0	0	0	0	0	0	0	10
22	1/16/74	1830	0	0	140	160	25	.5	0	0	0	0	0	0
23	2/20/74	1100	0	0	8.0	10	0	0	0	0	0	0	0	0
24	1/17/74	1300	0	0	6.7	3.3	0	0	0	0	0	0	0	0
25	10/24/73	1230	0	0	.1	.5	0	.4	0	0	0	0	0	0

Site	Date	Time	Aldrin	Chlor-dane	DDD	DDE	DDT	Diel-drin	Endrin	Hepta-chlor	Hepta-chlor Epoxide	Lindane	Toxa-phene	PCB
1	4/18/74	1400	0.0	0	6.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0	0
2	4/18/74	1300	0	80	120	110	15	3.2	0	0	0	0	0	0
3	4/18/74	1100	0	0	77	38	10	4.0	1.5	0	0	0	0	0
4	4/19/74	1400	0	0	.4	0	0	0	0	0	0	0	0	0
5	4/19/74	1200	0	0	1.2	1.0	0	0	0	0	0	0	0	15
6	4/17/74	1000	0	0	43	43	0	0	0	0	0	0	0	0
7	4/17/74	0900	0	0	1.4	1.8	0.5	0	0	0	0	0	0	40
8	4/19/74	1500	0	0	.3	.3	0	0	0	0	0	0	0	0
9	4/16/74	1020	0	0	.3	.8	0	0	0	0	0	0	0	0
10	4/19/74	1600	0	0	54	29	0	.3	0	0	0	0	0	0
11	4/25/74	1500	0	0	1.5	1.3	0	0	0	0	0	0	0	0
12	4/16/74	1045	0	0	2.1	9.4	0	0	0	0	0	3.2	0	12
13	4/25/74	1600	0	0	14	34	0	0	0	0	0	0	0	0
14	4/15/74	0900	0	0	0	9.7	0	0	0	0	0	0	0	0
15	4/15/74	1030	0	0	1.4	12	1.8	0	0	0	0	0	0	0
16	4/15/74	1130	0	0	3.1	1.5	0	0	0	0	0	0	0	0
17	4/15/75	1230	0	0	1.8	4.9	0	0	0	0	0	0	0	0
18	4/17/74	1400	0	0	400	130	38	1.6	0	0	0	0	0	6
19	4/17/74	1500	0	0	22	10	0	.3	0	0	0	0	0	0
20	4/17/74	1300	0	0	340	31	31	1.2	0	0	0	0	0	25
21	4/17/74	1100	0	0	62	42	0	1.5	0	0	0	0	0	70
22	4/16/74	0920	0	0	160	150	1.9	1.0	0	0	0	0	0	0
23	4/16/74	0940	0	0	71	110	2.6	.6	0	0	0	0	0	0
24	4/16/74	0900	0	0	71	59	0	0	0	0	0	0	0	0
25	4/09/74	1000	0	0	0	.3	0	0	0	0	0	0	0	0

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