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**SURFACE WATER QUALITY MONITORING NETWORK  
SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

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## EXECUTIVE SUMMARY

This report describes the South Florida Water Management District's (SFWMD or District)'s eleven active surface water quality monitoring programs (Figure I-1). The objectives and purpose of each program, the location of the sampling sites, the parametric coverage, the period of record, and the frequency of sampling are presented. These programs directly support the following legislative acts, permits, agreements, and technical advisory committee recommendations:

1. Surface Water Improvement and Management Act of 1987.
2. Department of Environmental Regulation's Lake Okeechobee Operating Permit #50-0679349.
3. Memorandum of Agreement (MOA) between the Everglades National Park, the District, and the United States Army Corps of Engineers.
4. MOA between the District and the Miccosukee Tribe.
5. Lake Okeechobee Technical Advisory Committee.
6. MOA between the District, the United States Department of Agriculture, and the Environmental Protection Agency.

Revisions to this report will be distributed periodically to provide an updated, contemporary description of monitoring activities.

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## INTRODUCTION

This report describes the eleven active surface water quality monitoring programs of the South Florida Water Management District's (SFWMD or District)'s eleven active surface water quality monitoring programs. (Figure I-1). The objectives and purpose of each program, the location of the sampling sites, the parametric coverage, the period of record, and the frequency of sampling are presented. These programs directly support the following legislative acts, permits, agreements, and technical advisory committee recommendations:

1. Surface Water Improvement and Management (SWIM) Act of 1987.
2. Department of Environmental Regulation's Lake Okeechobee Operating Permit #50-0679349.
3. Memorandum of Agreement (MOA) between the Everglades National Park (ENP), the District, and the United States Army Corps of Engineers.
4. MOA between the District and the Miccosukee Tribe.
5. Lake Okeechobee Technical Advisory Committee.
6. MOA between the District, the United States Department of Agriculture, and the Environmental Protection Agency.

Revisions to this report will be distributed periodically to provide an updated description of monitoring activities.

## PURPOSE AND SCOPE

This report is structured to facilitate the information retrieval by researchers, consultants, and other persons interested in reviewing or further evaluating the data. The location of over 160 water quality stations are mapped, and the available data are summarized in table format. This allows data users to choose appropriate identification numbers and request any or all of the water quality data available for a given period. This report will be periodically updated as sampling locations change. Supplemental packages will also document historical water quality monitoring stations which are not currently sampled.

To obtain a computerized listing of surface water quality, a written request should be sent to the following address:

Director  
Water Quality Division  
Resource Planning Department  
South Florida Water Management District  
P. O. Box 24680  
West Palm Beach, FL 33416-4680

Requests should include the following information:

1. Requestor's name, address, and phone number.
2. Station identification numbers.
3. Period of record desired.
4. Parameters or parameter groups desired.
5. Intended purpose for using data.

Basic summary statistics are available upon request.

The water quality monitoring programs described in this report include the following:

1. Lake Okeechobee Inflows and Outflows;
2. Water Conservation Areas Inflows and Outflows;
3. Upper and Lower East Coast;
4. Caloosahatchee River;
5. Kissimmee River;
6. ENP;
7. Lake Okeechobee Limnetic and Littoral Zones;
8. Upper Kissimmee Chain of Lakes and Tributaries;
9. Lower Kissimmee Valley;
10. Taylor Creek/ Nubbin Slough; and
11. Routine Pesticide Monitoring Network.

These eleven programs encompass a wide variety of south Florida ecosystems including lakes, rivers, canals, wetlands, and water control structures. Due to the dynamics of surface water flow in south Florida, the data from one monitoring program often augment data from another. Often data collected from routine monitoring programs are used to supplement more specific water quality studies.

## REPORT FORMAT

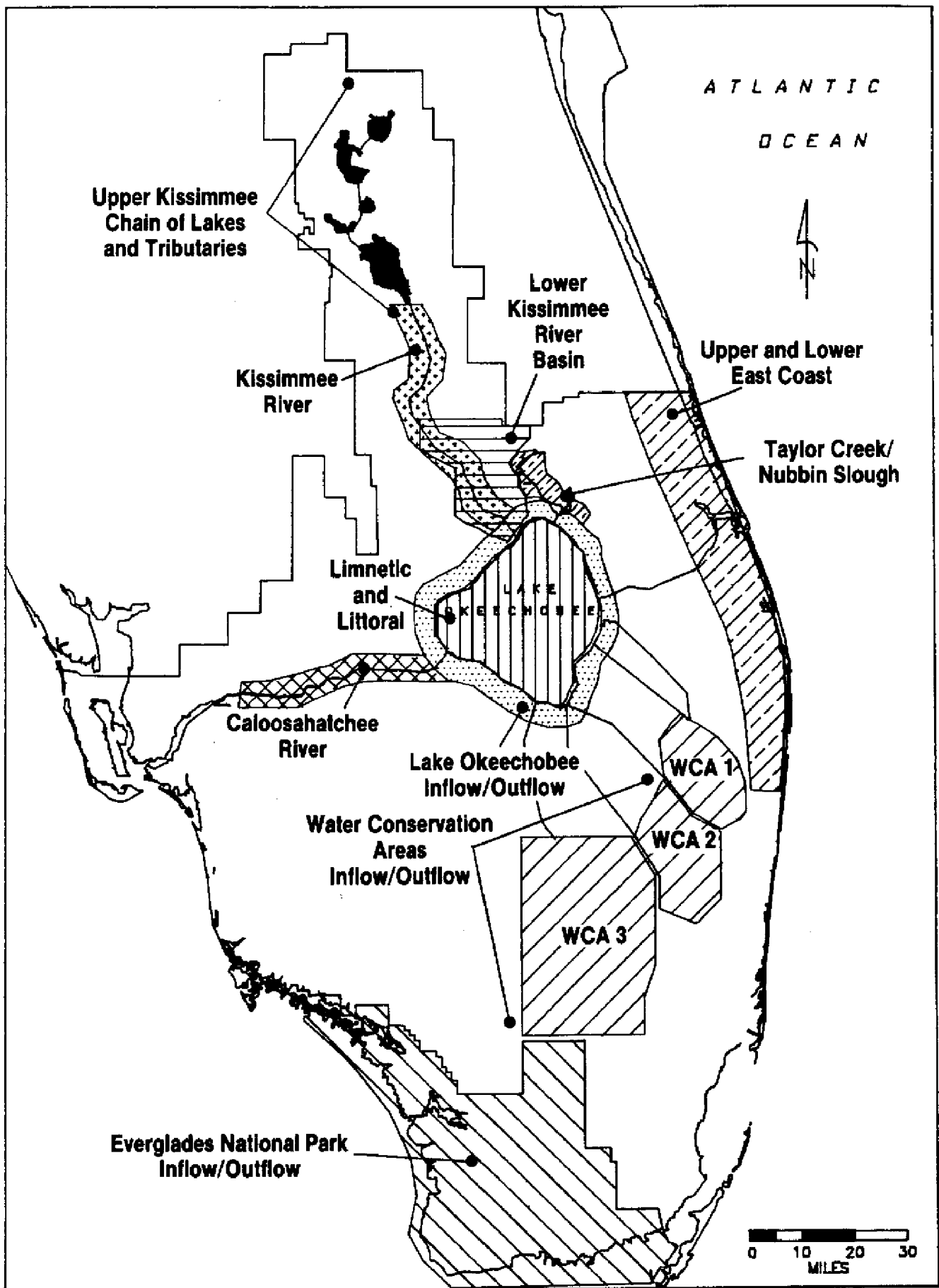
This report describes the purpose and scope of the individual monitoring programs. Each sampling site is identified and the location is described indicating the point of sample collection. A brief discussion is then given on the parameters analyzed and sampling frequency.

Following the discussion on each sampling program, a figure is presented with the generalized location shown in red. A more detailed figure follows with each sampling station indicated in red. A table is provided which lists the station identification number, the latitude and longitude, the period of record, type of parameters analyzed, and whether the sample is collected upstream or downstream.

Parameters in the data base are divided into five major chemical and physical groupings. Table I-1 lists four of the major groupings and the individual parameters within each group along with appropriate units. The fifth group is a list of pesticides (Table I-2) used in the Routine Pesticide Monitoring Network. The frequency of analysis for all five major groups is listed for each monitoring station in the appropriate section of this report.

The data provides an important source of input to preparation of management plans required by the SWIM Act in 1987. District publications which have resulted from these intensive monitoring programs are noted in each section. The reader should refer to these publications for interpretation of various chemical parameters evaluated in each report.





**Figure I-1. WATER QUALITY MONITORING PROGRAMS**



**TABLE 1. LIST OF PARAMETERS AND UNITS BY MAJOR GROUPINGS**

<u>Physical / Chemical</u>	<u>Units</u>
Temperature	°C
Dissolved Oxygen	mg/L
Sp. Conductivity	µmhos/cm
pH	-
Turbidity	NTU
Color	-
Total Suspended Solids	mg/L
<u>Nutrients</u>	<u>Units</u>
Nitrite	mg N/L
Nitrate	mg N/L
Ammonia	mg N/L
Inorganic Nitrogen	mg N/L
Organic Nitrogen	mg N/L
Total Nitrogen	mg N/L
Ortho Phosphorus	mg P/L
Total Phosphorus	mg P/L
<u>Major Ions</u>	<u>Units</u>
Alkalinity	CACO <sub>3</sub> mg/L
Chloride	mg/L
Total Iron	mg/L
Silica	mg/L
Sulfate	mg/L
Sodium	mg/L
Potassium	mg/L
Calcium	mg/L
Magnesium	mg/L
<u>Trace Metals</u>	<u>Units</u>
Total Mercury	microg/L
Total Cadmium	microg/L
Total Copper	microg/L
Total Zinc	microg/L
Total Arsenic	microg/L
Total Lead	microg/L

**TABLE 2. PESTICIDES ANALYZED IN SURFACE WATER AND SEDIMENT SAMPLES**

2,4-D	Kelthane/ Dicofol
Dichloroprop	BHC, Gamma/ Lindane
2,4,5-T	Malathion
2,4,5-TP/ Silvex	Methamidophos
Alachlor	Methomyl
Aldicarb	Methoxychlor
Aldrin	Methyl Bromide
Ametryne	Methyl Parathion
Benomyl	Metribuzin
BHC, Alpha	Mebinphos
BHC, Beta	Azodrin/ Monocrotophos
BHC, Delta	Oxamyl
Bromacil	Paraquat
Carbaryl/ Sevin	Parathion
Carbofuran	PCB 1016
Chlordane	PCB 1221
Chloropicrin	PCB 1232
Chloropyrifos	PCB 1242
Chlorothalonil	PCB 1248
Diazinon	PCB 1254
Dieldrin	PCB 1260
Endosulfan, Alpha	Perthane
Endosulfan, Beta	Phorate
Endosulfan Sulfate	DDD, PP
Endrin	DDE, PP
Endrin Aldehyde	DDT, PP
Ethion	Prometryne
Fonofos/ Dyfonate	Simazine
Ethoprop	Toxaphene
Glyphosate	Trifluralin
Guthion	Trithion/ Carbophenthion
Heptachlor Expoxide	Zinc Phosphide
Heptachlor	

## SECTION 1 LAKE OKEECHOBEE INFLOWS AND OUTFLOWS

### Purpose and Scope

The Lake Okeechobee Inflows and Outflows water quality monitoring program encompasses the entire perimeter of Lake Okeechobee (Figure 1-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Complying with monitoring requirements of the Lake Okeechobee Operating Permit #50-0679349 issued by the Department of Environmental Regulation (DER);
2. Determining effectiveness of the implementation of basin management plans in reducing nutrient loadings to the lake as specified in the Surface Water Improvement and Management Act of 1987;
3. Implementing the Lake Okeechobee Technical Advisory Committee's recommendation for a comprehensive monitoring and research plan as described in DER's "Lake Okeechobee Monitoring and Research Plan";
4. Determining long and short term trends necessary to identify potential problem areas in terms of water quality degradation and nutrient loadings; and
5. Applying eutrophication models in order to verify and refine the nutrient load targets for the lake and rank its trophic status.

Water quality data are also used to establish nutrient budgets for Lake Okeechobee. Nutrient loadings are calculated from nutrient concentrations and flow data from the various inflow/outflow stations. To account for input due to rainfall, two automatic wet/dry bulk precipitation collectors are used to provide samples for analyses to quantify nutrient concentrations.

Historical data collected between 1973 and 1979 provide a baseline water quality data base prior to implementation of water quality management plans for comparison against recent sampling data. These data can indicate trends in the changes in water quality and allow for better management of the system for environmental enhancement or prevention of degradation. Values that deviate significantly from

established criteria may signal a situation requiring immediate attention.

### Sampling Locations and Descriptions

There are 29 water quality monitoring stations that are sampled under the Lake Okeechobee Inflows and Outflows program. The location of the stations are shown in Figure 1-2. Table 1-1 lists in a clockwise order the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. The following are descriptions of each site:

S-2: a South Florida Water Management District (SFWMD or District) controlled water pumping station located on the south side of Lake Okeechobee near Belle Glade. It is at the confluence of the Hillsboro and North New River Canals, and pumps into Lake Okeechobee. The water samples are collected from the upstream side of the pump station by a flow proportional automatic water sampler.

CULV4A: a small pumping station on US-27, 2 1/2 miles west of Belle Glade that pumps water from the South Shore Drainage District into Lake Okeechobee. The water samples are collected from the upstream side of the pump station.

HGS-5, HGS-4, HGS-3: are hurricane gate structures operated by the United States Army Corps of Engineers (COE). HGS-5 is on the east side of Lake Okeechobee near Canal Point. HGS-4 is on the south side of Lake Okeechobee next to pump station S-2. HGS-3 is on the south side of Lake Okeechobee next to pump station S-3. Water is released out of Lake Okeechobee through these structures. Water samples are collected from the downstream side of these structures.

S-3: a District controlled water pumping station located on the south side of Lake Okeechobee between Belle Glade and Clewiston. Water is pumped from the Miami Canal into Lake Okeechobee. The water samples are collected on the upstream side of the pump station by a flow proportional automatic water sampler.

S-236: a small pumping station on US-27 between S-3 and Clewiston that pumps water from the South Florida Conservancy District into Lake Okeechobee.

The water samples are collected from the upstream side of the pump station.

**INDUSCAN:** water samples from this station are collected from the bridge over the Industrial Canal in Clewiston on County Road 832.

**S-169:** a gate type structure near the boat ramp and the S-310 boat locks in Clewiston. This structure lets water flow toward S-4 into C-20. The water samples are collected from the upstream side of this structure.

**S-4:** a District controlled water pumping station on C-20 near Clewiston that pumps water into Lake Okeechobee. The water samples are collected on the upstream side of the pump station by a flow proportional automatic water sampler.

**S-77:** a large gate type structure operated by the COE. It is located at the head of the Caloosahatchee River where water from Lake Okeechobee is discharged down the river. The water samples are collected from the upstream, or lake side, of this structure.

**FECSR78:** water samples from this station are collected from the bridge on State Road 78 where it crosses Fisheating Creek. The water flows toward Lake Okeechobee at this point.

**S-131:** a District controlled water pumping station located on the west side of Lake Okeechobee, north of Fisheating Creek. Water is pumped into the lake through this structure, and the water samples are collected from the upstream side of this structure.

**S-71:** a gate type structure located near the west side of Lake Okeechobee in Harney Pond Canal (C-41) about 1 1/2 miles north of State Road 78. The water samples are collected from the upstream side of this structure.

**S-129:** a District controlled water pumping station located on the Rim Canal on the northwest side of Lake Okeechobee. This structure is between C-41 and Indian Prairie Canal (C-40). Water is pumped through this structure. Water samples are collected from the upstream side of this structure.

**S-72:** a gate type structure located near the northwest side of Lake Okeechobee, in C-40 about two miles northwest of State Road 78. Water samples are collected from the upstream side of this structure.

**S-127:** a District controlled water pumping station located on the Rim Canal on the northwest side of Lake Okeechobee. This station is located between C-40 and the Kissimmee River (C-38). Water is

pumped through this structure into Lake Okeechobee. Water samples are collected from the upstream side of this structure.

**S-65E:** a large gate and lock structure on the Kissimmee River, 8 1/2 miles northwest of Lake Okeechobee. This is the southernmost structure on the Kissimmee River, and it discharges water into Lake Okeechobee. Water samples are collected from the upstream side of this structure.

**S-84:** a gate type structure where C-41A intersects the Kissimmee River. Water flows into the Kissimmee River through this structure. Water samples are collected from the upstream side of this structure.

**S-154:** a small gate type structure located on the north side of the Kissimmee River about half way between Lake Okeechobee and S-65E. This structure allows water to flow from the L-62 canal into C-38. Water samples are collected from the upstream side of this structure.

**S-133:** a District controlled water pumping station on the north side of Lake Okeechobee near Taylor Creek. Water is pumped into Lake Okeechobee through this structure. Water samples are collected from the upstream side of this structure.

**S-191:** a large gate type structure on the north side of Lake Okeechobee at Nubbin Slough. Water is released into Lake Okeechobee through this structure. Water samples are collected from the upstream side of this structure.

**S-135:** a District controlled water pumping station and lock located on the northeast side of Lake Okeechobee. Water is pumped through the structure into Lake Okeechobee. Water samples are collected from the upstream side of this structure.

**S-308C:** a COE structure on the St. Lucie Canal (C-44) at Lake Okeechobee. Water flows out of the lake through this structure down C-44. Water samples are collected from the upstream, or lake side, of this structure.

**CULV10A, CULV10, CULV12A, CULV12:** are pump stations on the southeast side of Lake Okeechobee near Pahokee that pump water from East Beach Water Control District, Closter Farms, and East Shore Water Control District, respectively, into the lake. Water samples are collected from the upstream side of each structure.

## **Parameters and Sampling Frequencies**

Pump stations S-2, S-3, and S-4, are equipped with flow proportional automatic water samplers. These devices collect water samples in proportion to the rate of pumpage. Water samples from these three stations may be collected as often as once a week depending on the amount of pumping that occurs.

Physical parameters and nutrients are sampled routinely every two weeks at the remaining 26 stations. Four times a year major cations are added to the list of routine parameters, and twice a year total trace metals are analyzed. Additionally, pesticides are analyzed in water and sediment samples four times per year at 22 sampling locations throughout the District (see Section 11).

## **District Publications**

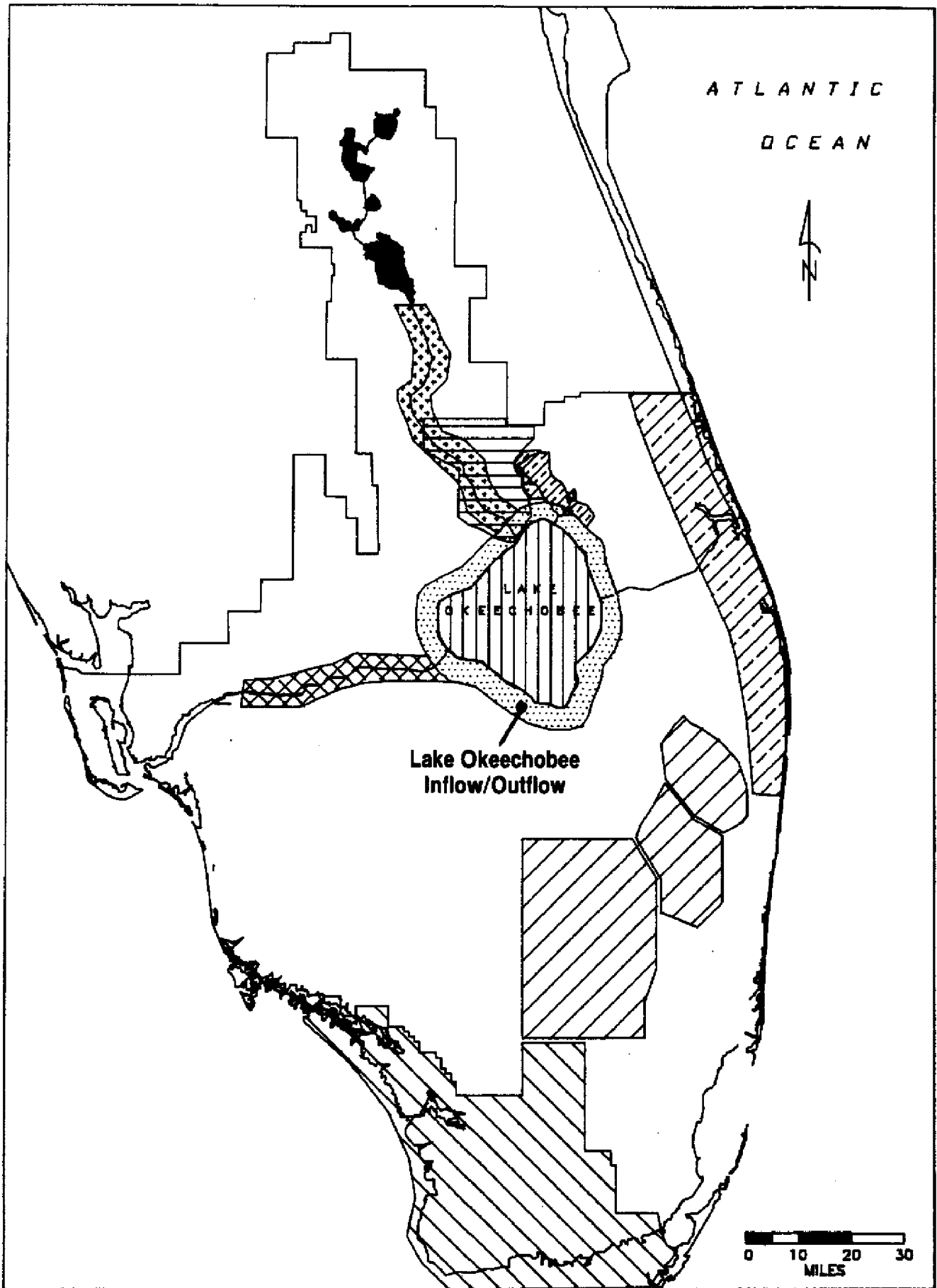
Davis, F., and Marshall, M., 1975. Chemical and Biological Investigations of Lake Okeechobee. January 1973 - June 1974 Interim Report. SFWMD, Tech. Pub. No. 75-1.

Dickson, K. G., Federico, A., and Lutz, J., 1978. Water Quality in the Everglades Agricultural Area and its Impact on Lake Okeechobee. SFWMD, Tech. Pub. No. 78-3.

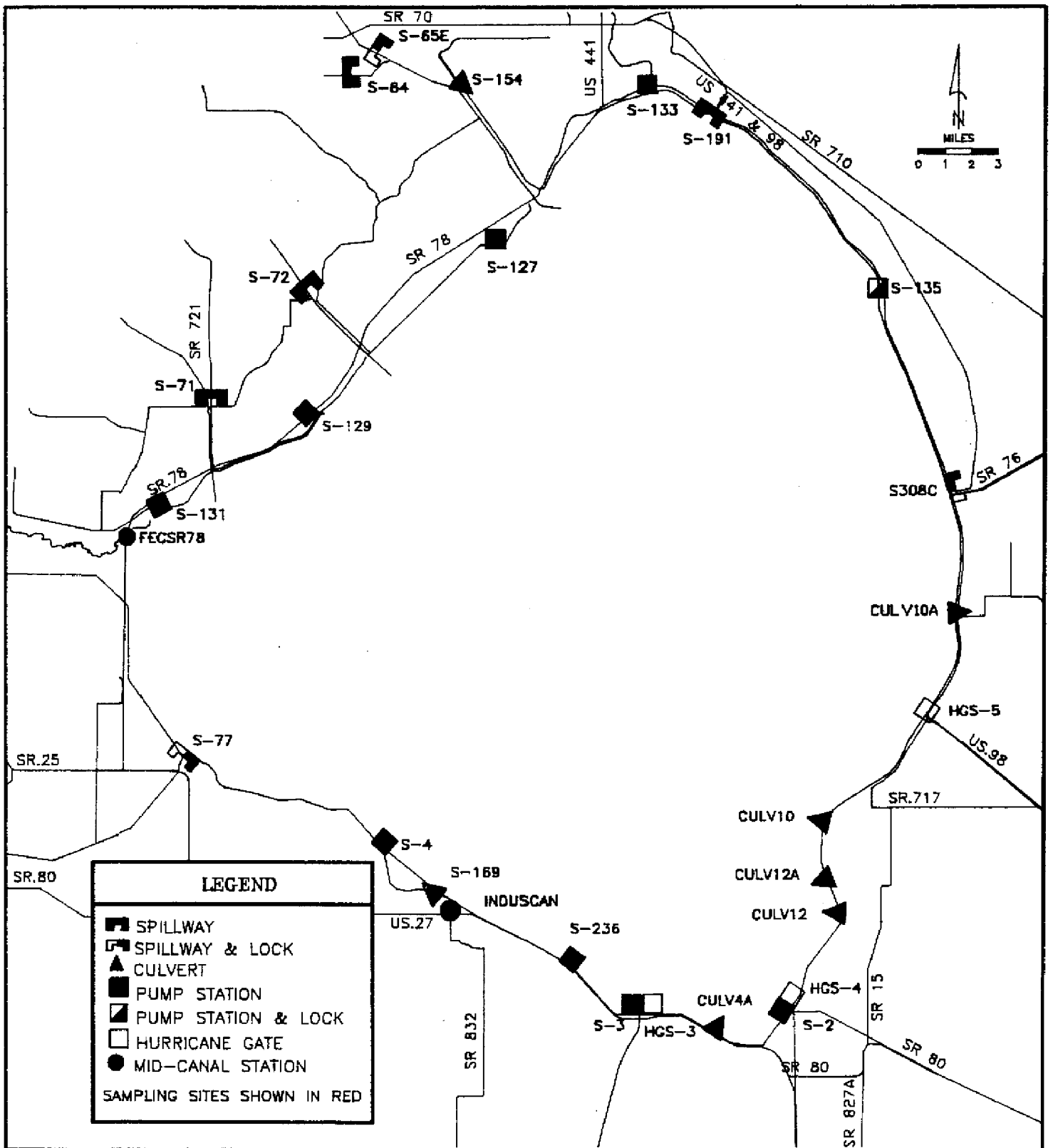
Federico, A., Dickson, K., Kratzer, C., and Davis, F., 1981. Lake Okeechobee Water Quality Studies and Eutrophication Assessment. SFWMD, Tech. Pub. No. 81-2.

Jones, B., and Federico, A., 1984. Phytoplankton, Chlorophyll *a*, and Primary Production in Lake Okeechobee. SFWMD, Tech. Pub. No. 84-4.

Pfeuffer, R. J., 1985. Pesticide Residue Monitoring in Sediment and Surface Water Bodies within the South Florida Water Management District. SFWMD, Tech. Pub. No. 85-2.



**Figure 1-1. LAKE OKEECHOBEE INFLOW/OUTFLOW  
WATER QUALITY MONITORING PROGRAM**



**Figure 1-2. LOCATION OF SAMPLING STATIONS FOR THE LAKE OKEECHOBEE INFLOW/OUTFLOW MONITORING PROGRAM**



TABLE 1-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE LAKE OKEECHOBEE INFLOWS / OUTFLOWS MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	Pesticide Species	Other	US/DS
CULV4A	264056	804502	Pump Sta West of Belle Glade	1979-P	BW	BW	QTR	BA			US
CULV10	264753	804146	Pump Sta at SR441 in Pahokee	1979-P	BW	BW	QTR	BA			US
CULV10A	265501	803650	Culverts at West End of L8 at Okeechobee	1987	BW	BW	QTR	BA			DS
CULV11	265756	803644	Pump Sta 1 Mile South of C-44	1979-P	BW	BW	QTR	BA			US
CULV12	264455	804105	Pump Sta 2 Miles S of Pahokee on SR441	1979-P	BW	BW	QTR	BA			US
CULV12A	264634	804137	Pump Sta 1 1/2 Miles S of Pahokee on SR441	1979-P	BW	BW	QTR	BA	QTR	QTR	US
FECRSR78	265744	810715	Fisheating Creek and SR78	1973-P	BW	BW	QTR	BA			DS
HGS3	264155	804825	Hurricane Gate Adjacent to S3	1982-P	BW	BW	QTR	BA			DS
HGS4	264200	804300	Hurricane Gate Adjacent to S2	1983-P	BW	BW	QTR	BA			DS
HGS5	265145	803755	Hurricane Gate near Card Point	1973-P	BW	BW	QTR	BA			DS
Induscan	264514	805508	Industrial Canal in Clewiston at SR832	1982-P	BW	BW	QTR	BA			US
S2	264200	804300	Pump Sta S2 at South End of Lake Okee	1973-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR	US
S3	264155	804825	Pump Sta S3 at South End of Lake Okee	1973-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR	US
S4	264722	805743	Pump Sta S4 at South End of Lake Okee	1976-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR	US
S65E	271335	805742	S65E on the Kissimmee River	1973-P	BW	BW	QTR	BA			US
S71	270201	811811	S71 on Harney Pond Canal (C41)	1973-P	BW	BW	QTR	BA			US
S72	270532	810023	S72 on Indian Prairie Canal (C40)	1973-P	BW	BW	QTR	BA			US
S77	265023	810618	Caloosahatchee River and Lake Okee	1973-P	BW	BW	QTR	BA			US
S84	271250	805584	On C41A Canal	1973-P	BW	BW	QTR	BA			US
S127	270719	805346	Pump Sta S127 NW Side of Lake Okee	1973-P	BW	BW	QTR	BA			US
S129	270147	810006	Pump Sta S129 NW Side of Lake Okee	1973-P	BW	BW	QTR	BA			US
S131	265843	810526	Pump Sta S131 W Side of Lake Okee	1973-P	BW	BW	QTR	BA			US
S133	271228	804802	Pump Sta S133 N Side of Lake at Taylor Cr	1973-P	BW	BW	QTR	BA			US
S135	270510	803941	Pump Sta S135 NE Side of Lake Okee	1973-P	BW	BW	QTR	BA			US
S154	271241	805506	Gate Structure on L62 at C38	1978-P	BW	BW	QTR	BA			US
S169	264545	815730	Gate Structure Near S310 in Clewiston	1985-P	BW	BW	QTR	BA			US
S191	271135	804535	Bridge at SR441 and Nubbin Slough	1973-P	BW	BW	QTR	BA	QTR	QTR	US
S236	264340	805111	Pump Sta South Side of Lake Okee	1979-P	BW	BW	QTR	BA			US
S308C	265904	803717	Lake Okee and the St Lucie Canal	1973-P	BW	BW	QTR	BA			US

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/ Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
A	=	Automatic Sampler	DD	=	During Discharge	P	=	Present

## SECTION 2 WATER CONSERVATION AREAS INFLOWS AND OUTFLOWS

### Purpose and Scope

The Water Conservation Area (WCA) Inflows and Outflows water quality monitoring program encompasses an area of over 1,300 square miles of Everglades marsh (Figure 2-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Complying with monitoring requirements of the Everglades National Park (ENP) Memorandum of Agreement (MOA) between the National Park Service, the South Florida Water Management District (SFWMD or District), and the United States Army Corps of Engineers;
2. Complying with the MOA between the Miccosukee Tribe of Florida and the District;
3. Implementing the Lake Okeechobee Technical Advisory Committee's (LOTAC)'s recommendation for a comprehensive monitoring and research plan as described in the the Department of Environmental Regulation's "Lake Okeechobee Monitoring and Research Plan";
4. Determining long and short term trends necessary to identify the downstream impacts of LOTAC's Surface Water Improvement and Management (SWIM) implementation plan for the Everglades Agricultural Area (EAA); and
5. Determining effectiveness of the implementation of basin management plans in reducing nutrient loadings to the WCA.

Water quality data are also used to establish nutrient budgets for the WCA. Monitoring of nutrients and other water quality parameters is important in the quantification of the effect of inflows on the ecology of the marsh. With the implementation of the SWIM Act, the data collected will be instrumental in evaluating downstream impacts of the Interim Action Plan and other possible management alternatives for the EAA.

Data have been collected since 1978 and continues today. These data can indicate trends in the changes in water quality and allow for better management of the system to monitor for environmental enhancement or degradation. Values that deviate

significantly from established criteria may signal a concern requiring immediate attention.

### Sampling Locations and Descriptions

There are 35 water quality monitoring stations that are sampled under the WCA Inflows and Outflows program. The location of the stations are shown in Figure 2-2. Table 2-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. The following are descriptions of each site:

S-5A: a District controlled water pumping station located at the northern most end of WCA1 near State Road 80. The water samples are collected on the upstream side of the pump station by a flow proportional automatic water sampler only when the pump station is in operation. S-5A pumps water from the EAA, L-8, and the C-51 basin into WCA1.

S-5AE: a small gate type structure located at the intersection of the C-51 and L-8 canal near S-5AS and State Road 80. Water flows eastward out of the L-8 canal down C-51. Water samples are collected from the upstream side of this structure.

S-5AS: a gate type structure located at the north end of WCA1 near S-5A and State Road 80. Water flows out of WCA1 into the L-8 canal. The water samples are collected from the upstream side of this structure.

S-6, S-7, S-8: these are all District controlled water pumping stations. The water samples are collected by flow proportional automatic water samplers only when the pump stations are pumping. S-6 is located about 16 miles southwest of S-5A on the Hillsboro Canal at the intersection of Hillsboro Canal (L-15), L-6, and L-7. Water is pumped in a southerly direction through this pump station down the Hillsboro Canal. S-7 is located approximately 11 miles southwest of S-6 at the intersection of North New River Canal (L-18), L-5, and L-6, along US-26. Water is pumped in a southerly direction down the North New River Canal. S-8 is located about 15 miles west of S-7 at the intersection of Miami Canal (L-23), L-4, and L-5. Water is pumped in a southerly direction down the Miami Canal.

S-9: a District controlled water pumping station located along US-27 on the South New River Canal (C-11). Water is pumped from C-11 into WCA3. The water samples are collected from the upstream side of this structure.

S-10A, S-10C, S-10D, S-10E: these are all gate type structures located along L-39 between WCA1 and WCA2A on the Hillsboro Canal. They are one, three, and six miles west of S-39 on L-39, respectively. Water flows from WCA1 and WCA2A through these structures. The water samples are collected from the upstream side of each of these structures.

S-11A, S-11B, S-11C: these are gate type structures located along US-27 beginning approximately two miles north of State Road 84, and are spaced approximately two miles apart. Water flows from WCA2A into WCA3A through these structures. Water samples are collected from the upstream side of these structures.

S-12A, S-12B, S-12C, S-12D: these are all gate type structures located along US-41 at the south end of WCA3A. They are 1/4, 2, 6, and 9 miles west of S-333, respectively. Water flows southward from WCA3A through these structures into the ENP. The water samples are collected from the upstream side of these structures.

S-31: a series of culvert structures located on the east side of WCA3A on the Miami Canal near US-27. Water flows southeast through this structure down the Miami Canal. Water samples are collected from the upstream side of this structure.

S-34: a small gate type structure located on the North New River Canal along US-27 about 1/4 a mile north of State Road 84. Water flows in an easterly direction down the North New River Canal. The water samples are collected from the upstream side of this structure.

S-38: a small gate type structure located on the east side of WCA2A at the intersection of L-36 seven miles west of State Road 7, on C-14. The water samples are collected from the upstream side of this structure.

S-39: a small gate type structure located at the south end of WCA1 at the intersection of L-36 eight miles west of State Road 7, on the Hillsboro Canal. This is an outflow point from WCA1 where water flows eastward, down the Hillsboro Canal. The water samples are collected from the upstream side of this structure.

S-140: a District controlled water pumping station located at the west side of WCA3A on the L-28 canal

near State Road 84. Water is pumped eastward through this structure down C-60. The water samples are collected from the upstream side of this structure.

S-144, S-145, S-146: these are all single culvert structures located along L-35B which divides WCA2A from WCA2B. They are five, seven, and nine miles east of US-27, respectively. Water flows from WCA2A through these structures into WCA2B. The water samples are collected from the upstream side of each of these structures.

S-150: a series of culvert structures located west of S-7 across US-27. Water flows southward through this structure into WCA3A. The water samples are collected from the upstream side of this structure.

S-151: a series of culvert structures located in WCA3A at the intersection of L-67A and the Miami Canal. Water flows in a southeasterly direction through this structure, down the Miami Canal. The water samples are collected from the upstream side of this structure.

S-190: a gate type structure located on the L-28 Interceptor Canal about 2 1/2 miles south of State Road 833 along the north feeder canal that leads into the L-28 Interceptor Canal, which is located within the Big Cypress Seminole Indian Reservation. The water samples are collected from the upstream side of this structure.

S-333: a gate type structure located at the southeast corner of WCA3A, 1/4 of a mile east of S-12D along US-41. The water flows eastward from WCA3A down the L-29 canal. Water samples are collected from the upstream side of this structure.

L-3: a canal station located at the intersection of the L-4 and L-28 canals, approximately three miles west of pump station S-8. The water flows southward down the L-28 canal.

L30WBR: this water sample is collected from the Oil Well Bridge, which is located 6 1/2 miles west of pump station S-8 at the intersection of the L-3 and L-4 levees near the northwest corner of WCA3A.

L003: this sample is collected from the Deer Fence canal bridge on L-2, which is the second wooden bridge north along L-3. Water flows in a southerly direction at this point.

L-28I: this water sample is collected from the bridge of State Road 84 at the L-28 Interceptor Canal, about four miles west of pump station S-140. The water flow is toward the south at this point.

**G-123:** a District controlled water pumping station located on the North New River Canal along US-27 about 1/4 of a mile north of State Road 84. Water is pumped toward the north through this structure and then is released into WCA3A through S-142. The water samples are collected from the upstream side of this structure.

### **Parameters and Sampling Frequencies**

Pump stations S-5A, S-6, S-7, and S-8 are sampled with a flow proportional automatic water sampler. Water is sampled in proportion to the rate of pumping. Water samples from these four stations may be collected as often as once a week, depending on the amount of pumping that occurs. Of the remaining 31 stations, 17 are sampled biweekly and 14 once a month.

Physical parameters and nutrients are sampled biweekly at these stations. Four times a year major cations are added to the list of routine parameters, and twice a year total trace metals are also analyzed. Additionally, pesticides are analyzed for in water and sediment samples four times per year at 22 sampling locations throughout the District (see Section 11).

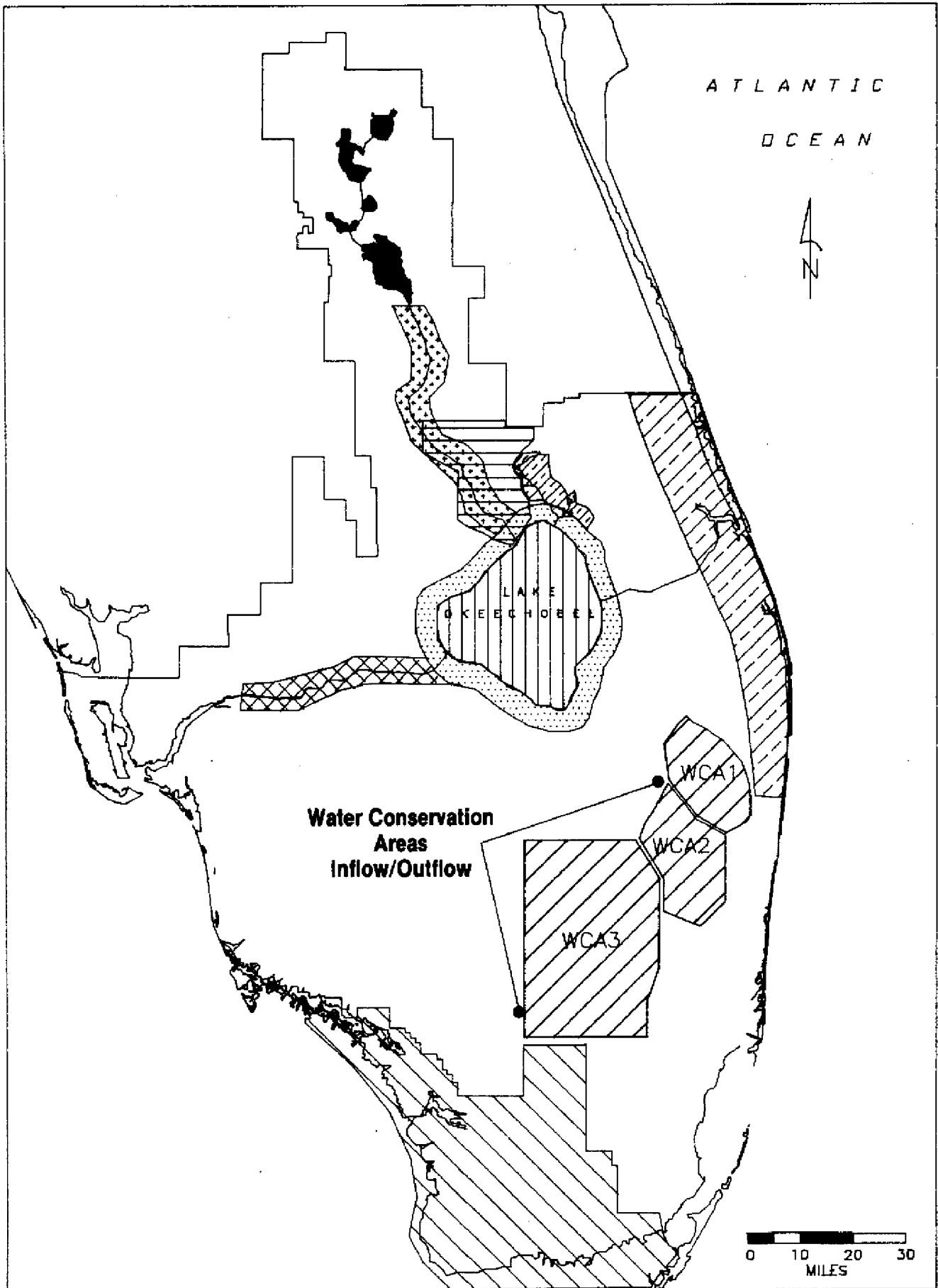
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**Figure 2-1. WATER CONSERVATION AREAS INFLOW/OUTFLOW  
WATER QUALITY MONITORING PROGRAM**

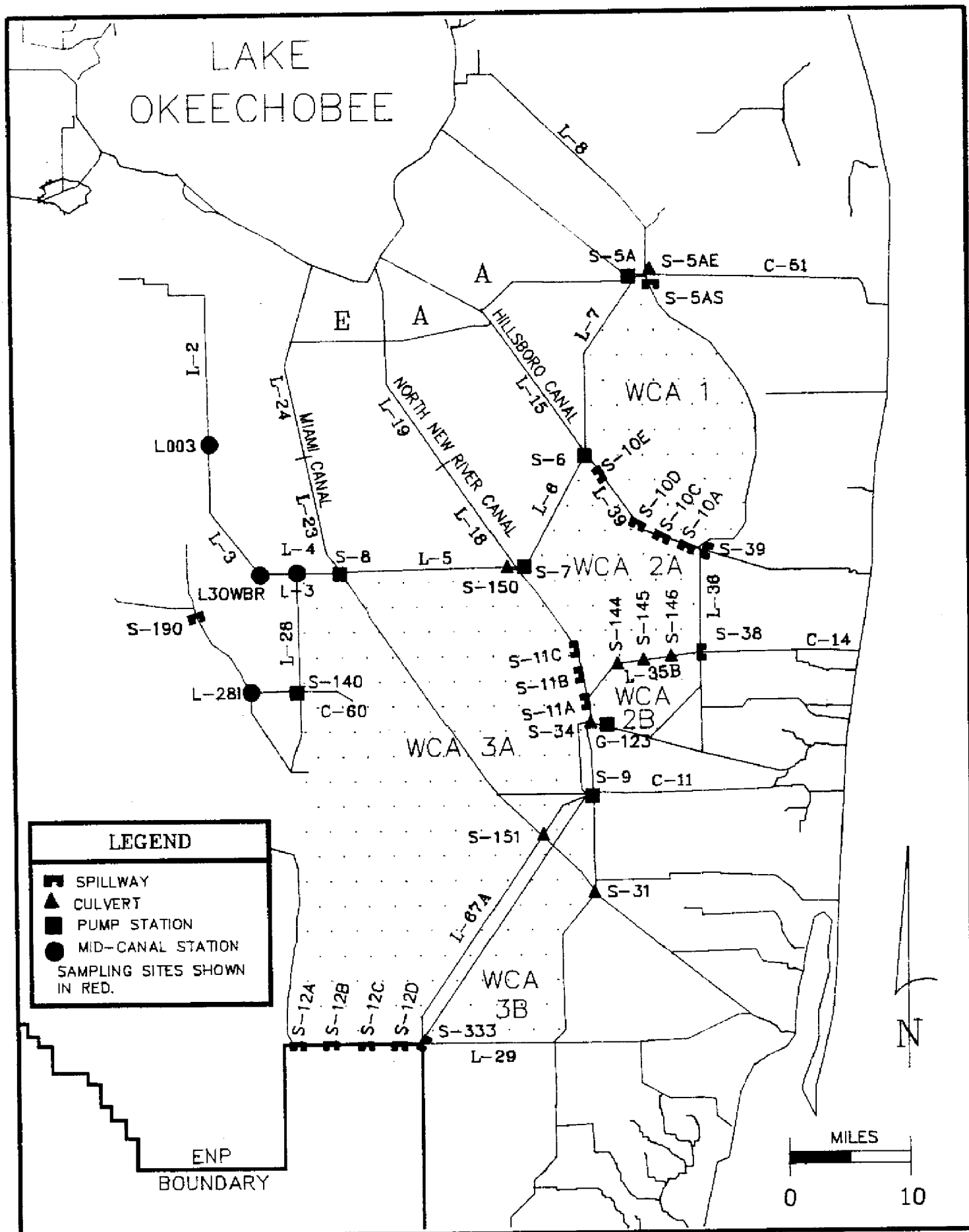


Figure 2-2. LOCATION OF SAMPLING STATIONS FOR THE WATER CONSERVATION AREAS INFLOW/OUTFLOW WATER QUALITY MONITORING PROGRAM

TABLE 2-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE WATER CONSERVATION AREA INFLOWS/ OUTFLOWS WATER QUALITY MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	Physical		Major		Trace		Pesticide
				POR	Parameters	Nutrients	Ions	Metals	Species	
L3	261952	804956	4.0 Miles West of S8 on L4 at L28	1978-P	BW	BW	QTR	BA		
L30WBR	261950	805253	6.5 Miles West of S8 Where L3 and L4 Meet	1987	BW	BW	QTR	BA	QTR	QTR
L003	262600	805650	From the Deer Fence Canal Bridge on L3	1984-P	M	BW	QTR	BA		
L28I	260954	804943	From Bridge on SR84 4.0 Miles West of S140	1978-P	BW	BW	QTR	BA		
G123	260859	802634	Pump Station 1/4 Mile North of SR84 on US27	1982-P	DD	DD	DD	DD	DD	DD
S5A	264101	802205	Pump Sta at the North End of WCA1	1978-P	BW/A	BW/A	QTR/A	BA/A		US
S5AE	264104	802150	Gate Structure at L8 and C51	1982-P	BW	BW	QTR	BA		US
S5AS	264101	802151	Gate Structure at L8 and WCA1	1979-P	BW	BW	QTR	BA		US
S6	262822	802650	Pump Sta at L15, L6, & L7 Intersect	1978-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR
S7	262007	803213	Pump Sta at L5, L6, and L18 Intersect	1978-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR
S8	261953	804628	Pump Sta at L4, L5, and L23 Intersect	1978-P	BW/A	BW/A	QTR/A	BA/A	QTR	QTR
S9	260340	802638	Pump Sta on S New River Canal at WCA3A	1978-P	BW	BW	QTR	BA	QTR	QTR
S10A	262133	801846	1.0 Mile West of S39 on L39	1978-P	BW	BW	QTR	BA		US
S10C	262216	802110	3.0 Miles West of S39 on L39	1978-P	BW	BW	QTR	BA		US
S10D	262317	802256	6.0 Miles West of S39 on L39	1978-P	BW	BW	QTR	BA		US
S10E	262733	802614	1/2 Mile South of S6 on L39	1985-P	BW	BW	QTR	BA		US
S11A	261036	802656	On US27 - 2.0 Miles North of SR84	1978-P	BW	BW	QTR	BA		US
S11B	261208	802716	On US27 - 4.0 Miles North of SR84	1978-P	BW	BW	QTR	BA		US
S11C	261345	802737	On US 27 - 6.0 Miles North of SR84	1978-P	BW	BW	QTR	BA		US
S12A	254541	804917	On US41 - 3.0 Miles West of S12B	1978-P	BW	BW	QTR	BA		US
S12B	254541	804611	On US41 - 3.0 Miles West of S12C	1978-P	BW	BW	QTR	BA	QTR	US
S12C	254542	804338	On US41 - 2.5 Miles West of S12D	1978-P	BW	BW	QTR	BA		US
S12D	254542	804055	On US41 - 1/4 Mile West of S333	1978-P	BW	BW	QTR	BA	QTR	US
S31	255633	802624	On Miami Canal Near US27	1987	BW	BW	QTR	BA	QTR	US
S34	260858	802634	On US27 - 1/4 Mile North of SR84	1978-P	BW	BW	QTR	BA		US
S38	261344	801756	7.0 Miles West of SR7 on the C14 Canal	1978-P	BW	BW	QTR	BA		US
S39	262119	801752	8.0 Miles West of SR7 on the Hillsboro Canal	1978-P	BW	BW	QTR	BA		US
S140	261017	804940	Pump Station on SR84 27 Miles West of US27	1978-P	BW	BW	QTR	BA		US
S144	261304	802353	5.0 Miles East of US27 on L35B	1978-P	BW	BW	QTR	BA		US
S145	261317	802158	7.0 Miles East of US27 on L35B	1978-P	BW	BW	QTR	BA		US
S146	261330	802001	7.0 Miles East of US27 on L35B	1978-P	BW	BW	QTR	BA		US
S150	262004	803223	West of S7 Across US27	1978-P	BW	BW	QTR	BA		US
S151	260040	803037	Intersection of L67A and Miami Canal	1978-P	BW	BW	QTR	BA	QTR	US
S190	261701	805805	On L28I 2.5 Miles South of SR833	1987	BW	BW	QTR	BA	QTR	US
S333	254542	804027	On US41 at L67A Mile E of S120 & Miami Canal	1978-P	BW	BW	QTR	BA		US

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
 W = Weekly  
 BW = Bi-weekly (Twice/ Month)  
 A = Automatic Sampler  
 M = Monthly  
 QTR = Quarterly  
 BA = Bi-annually (Twice/Year)  
 DD = During Discharge  
 US = Upstream  
 DS = Downstream  
 Other = PCB's  
 Present

## SECTION 3 UPPER AND LOWER EAST COAST

### Purpose and Scope

The Upper and Lower East Coast water quality monitoring program was initiated in 1979 and includes the coastal portions of St. Lucie, Martin, and Palm Beach Counties (Figure 3-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Determining loadings to the Indian River Lagoon;
2. Determining long and short term trends;
3. Assessing potential downstream impacts on the Indian River Lagoon associated with the possible Lake Okeechobee Technical Advisory Committee (LOTAC)/ Surface Water Improvement and Management plan implementation of the Taylor Creek/ Nubbin Slough diversion; and
4. Implementing LOTAC's recommendation for a comprehensive monitoring and research plan as described in the Department of Environmental Regulation's "Lake Okeechobee Monitoring and Research Plan."

Water quality data from the Upper and Lower East Coast are also used to:

1. Identify seasonal and discharge related water quality trends;
2. Calculate material loads, basin-wide areal export rates, and flow-weighted concentrations; and
3. Compare the effect of varying sampling frequencies and collection methodologies on the calculation of material loads (Federico, 1983).

Data have been collected from 1979 to present.

### Sampling Locations and Descriptions

Seventeen water quality monitoring stations are sampled under the Upper and Lower East Coast monitoring program. The location of the stations are shown on Figure 3-2. Table 3-1 lists the latitude and longitude, the period of record, the frequency of collection of major chemical species, and whether the

sample is collected upstream, downstream, or during discharge. The following are descriptions of each site:

C25S99: S-99 is a gate type structure located on C-25 near Ft. Pierce. The water flow at this point is toward the east, and the water samples are collected from the upstream side of this structure.

C25S50: S-50 is a large weir structure located on C-25 near Ft. Pierce. This structure is downstream of S-99 and is a coastal structure. Water flows eastward over this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

C24S49: S-49 is a gate type coastal structure located on C-24 in Port St. Lucie. This structure is about 1/2 mile west of the turnpike. The water flows toward the east through this structure and into the St. Lucie River. The water samples are collected from the upstream side of this structure.

C23S97: S-97 is a gate type structure located on C-23 about 1/2 mile west of the turnpike. Water flows eastward through this structure, and the water samples are collected from the upstream side of this structure.

C23S48: S-48 is a large weir coastal structure located downstream of S-97 on C-23. The water flows eastward over this structure and into the St. Lucie River. The water samples are collected from the upstream side of this structure.

C44S80: S-80 is a large gate and boat lock coastal structure located on the St. Lucie Canal and operated by the United States Army Corps of Engineers. The water flows northeast through this structure into the St. Lucie River. The water samples are collected from the upstream side of this structure.

C18S46: S-46 is a gate type coastal structure located on C-18 about one mile east of the Florida Turnpike. The water flows northeast into the Loxahatchee River. The water samples are collected from the upstream side of this structure.

C181.9: a sample is collected from the bridge going over C-18 about 1.9 miles southwest of the Florida Turnpike. The water flows to the northeast at this point toward S-46.

C18G92: G-92 is a small culvert type structure located on C-18 about 1/4 of a mile southwest of C-181.9. The



water flows toward the west through this structure out of C-18. The water samples are collected from the upstream side of this structure.

C18SR710: a small weir structure located on C-18 near State Road 710. Water flows eastward over this structure, and the water samples are collected from the upstream side of this structure.

C17S44: S-44 is a gate type coastal structure located on C-17. The water flows eastward through this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

C17SR702: a small weir structure located on C-17. The water flows northward toward S-44 over this structure, and the water samples are collected from the 45th Street bridge.

C51S155: S-155 is a gate type coastal structure located on C-51 (West Palm Beach Canal). Water flows eastward through this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

C16S41: S-41 is a gate type coastal structure located on C-16. Water flows eastward through this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

C16SR809: this sample is collected from the bridge on State Road 809 at C-16. The water flows eastward at this point towards S-41.

C15S40: S-40 is a gate type coastal structure located on C-15. Water flows eastward through this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

C15SR809: this sample is collected from the bridge on State Road 809 at C-15. The water flows eastward at this point toward S-40.

### **Parameters and Sampling Frequencies**

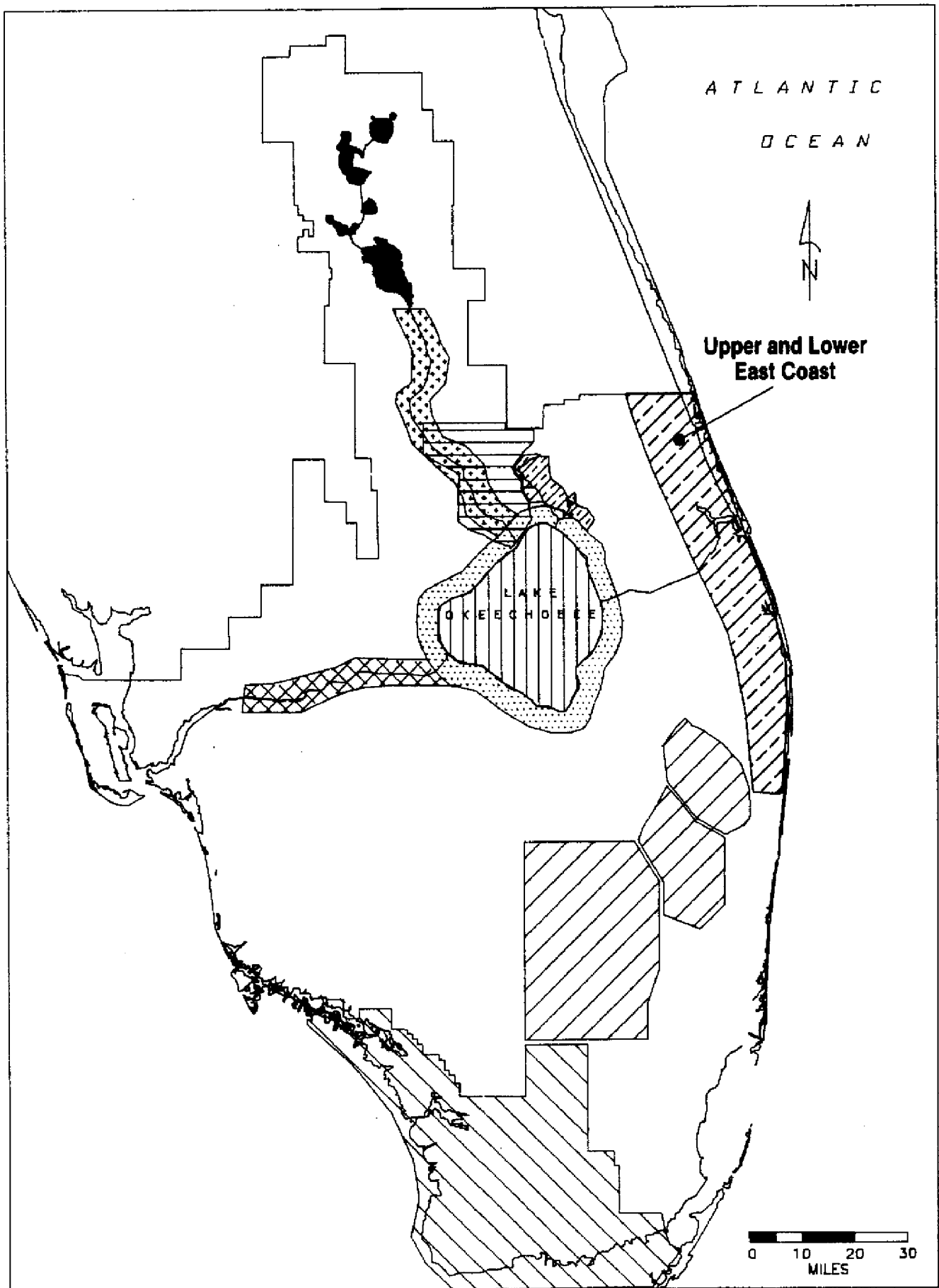
The nine coastal water quality monitoring stations are sampled once a month. The remaining eight stations are sampled only if there was any discharge at any time during a one week period prior to the scheduled sampling date.

Physical parameters and nutrients are sampled routinely once a month at these stations. Four times a year major cations are added to the list of routine parameters, and twice a year total trace metals are also analyzed.

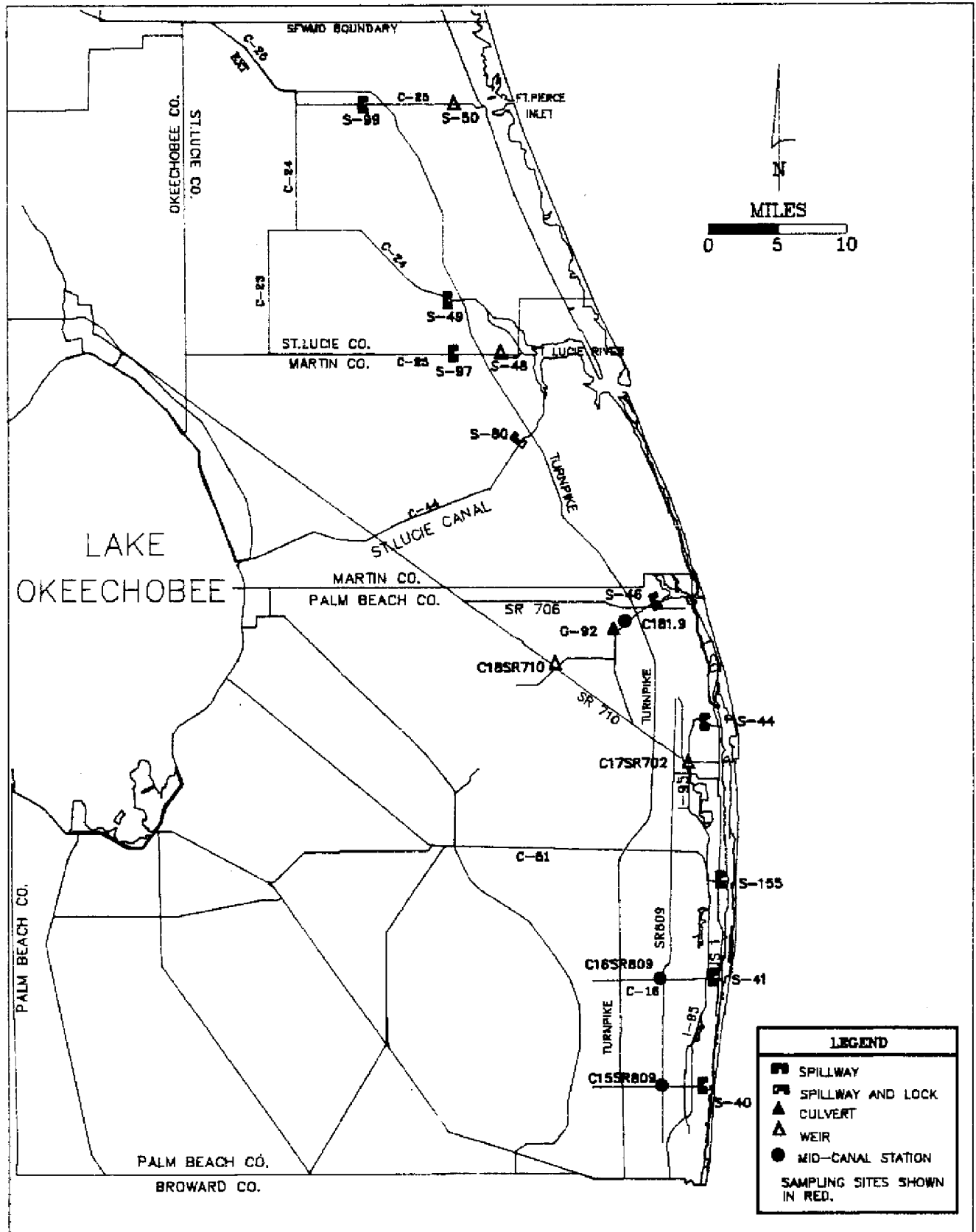
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Federico, A., 1983. Upper East Coast - Water Quality Studies. SFWMD, Tech. Pub. No. 83-1.



**Figure 3-1. UPPER AND LOWER EAST COAST  
WATER QUALITY MONITORING PROGRAM**



**Figure 3-2. LOCATION OF THE SAMPLING STATIONS FOR THE UPPER AND LOWER EAST COAST WATER QUALITY MONITORING STATIONS**

TABLE 3-1. SUMMARY OF SAMPLING STATIONS AND FREQUENCY OF COLLECTION FOR THE  
UPPER AND LOWER EAST COAST MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical		Major		Pesticide	Other	US/DS
					Parameters	Nutrients	Ions	Trace Metals			
C15S40	262527	800428	At S40 on C15	1979-P	M	M	QTR	BA			US
C16S41	263236	800330	At S41 on C16	1979-P	M	M	QTR	BA			US
C17S44	264909	800459	At S44 on C17	1979-P	M	M	QTR	BA			US
C181.9	265515	800953	Bridge on C18 1.9 Miles SW of Turnpike	1979-P	M	M	QTR	BA			US
C18G92	265434	801033	At G92 on C18	1979-P	M	M	QTR	BA			US
C18S46	265610	800833	At S46 on C18	1979-P	M	M	QTR	BA			US
C44S80	270639	801706	At St. Lucie Lock and Dam on C44	1979-P	M	M	QTR	BA			US
C23S48	271209	801805	At S48 on C23	1979-P	M	M	QTR	BA			US
C23S97	271218	802027	At S97 on C23	1979-P	M	M	QTR	BA			US
C24S49	271549	802131	At S49 on C24	1979-P	M	M	QTR	BA			US
C25S50	272818	802012	At S50 on C25	1979-P	M	M	QTR	BA			US
C25S99	272820	802848	At S99 on C25	1979-P	M	M	QTR	BA			US
C17SR702	264535	800515	From Bridge at SR702 and C17	1979-P	M	M	QTR	BA			US
C18SR710	265220	801451	At SR710 and C18	1979-P	M	M	QTR	BA			US
S15SR809	262533	800720	From Bridge at SR809 and C15	1979-P	M	M	QTR	BA			US
S16SR809	263226	800727	From Bridge at SR809 and C16	1979-P	M	M	QTR	BA			US
S51S155	263846	800325	At S155 on C51	1979-P	M	M	QTR	BA			US

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
W = Weekly  
BW = Bi-weekly (Twice/ Month)  
M = Monthly  
QTR = Quarterly  
BA = Bi-annually (Twice/Year)  
DD = During Discharge  
US = Upstream  
DS = Downstream  
Other = PCB's  
P = Present

## SECTION 4 CALOOSAHATCHEE RIVER

### Purpose and Scope

The Caloosahatchee River water quality monitoring program was established in 1979 and extends from Lake Okeechobee to the outfall coastal structure upstream of the Caloosahatchee Estuary (Figure 4-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Determining loadings to the Caloosahatchee River estuary;
2. Assessing potential downstream impacts on the Caloosahatchee River estuary associated with the possible Lake Okeechobee Technical Advisory Committee (LOTAC) / Surface Water Improvement and Management plan implementation of the S-4 basin diversion;
3. Implementing LOTAC's recommendation for a comprehensive monitoring and research plan as described in the Department of Regulation's "Lake Okeechobee Monitoring and Research Plan"; and
4. Determining long and short term trends necessary to identify potential problem areas in terms of water quality degradation and nutrient loadings.

Water quality data from the Caloosahatchee River are also used to determine the effect of Lake Okeechobee discharges and tributary impacts on the Caloosahatchee River.

### Sampling Locations and Descriptions

There are four water quality monitoring locations that are sampled under the Caloosahatchee River program. The location of these stations are shown on Figure 4-2. Table 4-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. The following are descriptions of each site:

CR-00.2T: a small culvert type structure also known as S-235 located near Moorehaven on the southwest side of Lake Okeechobee on LD-1 near S-77. Water flows westward through this structure into the Caloosahatchee River. The water samples are collected from the upstream side.

CR-04.8T: a small gate type structure known as S-47D located on C-19 south of US-27 and west of Moorehaven. The water flows southward through this structure and into the Caloosahatchee River. The water samples are collected from the upstream side of this structure.

S-78: a large gate and boat lock structure (Ortona Lock and Dam) located on the Caloosahatchee River operated by the United States Army Corps of Engineers (COE). Water flows toward the west through this structure. Water samples are collected from the upstream side of this structure.

S-79: a large gate and boat lock and coastal structure (W. P. Franklin Lock and Dam) located on the Caloosahatchee River operated by the COE. Water flows toward the west through this structure and is mixed with salt water on the downstream side of this structure. The water samples are collected from the upstream side of this structure.

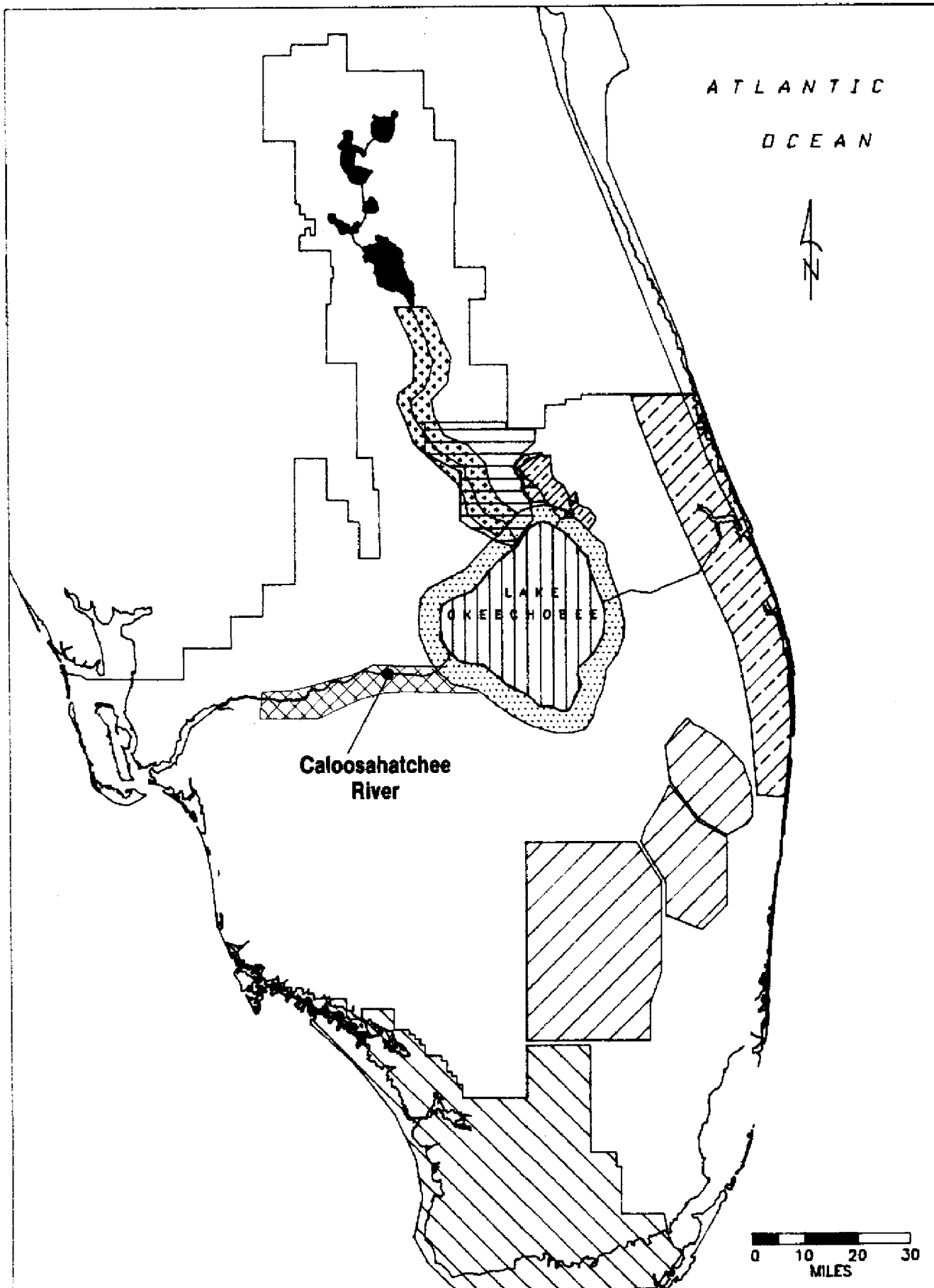
### Parameters and Sampling Frequencies

The four water quality monitoring locations that are sampled under this project are collected once every two months.

Physical parameters and nutrients are sampled routinely every trip. Four times a year major cations are added, and twice a year total trace metals are also analyzed.

### District Publications

Miller, T. H., Federico, A., and Milleson, J., 1982. A Survey of Water Quality Characteristics and Chlorophyll *a* Concentrations in the Caloosahatchee River System, Florida. July 1982. SFWMD, Tech. Pub. No. 82-4.



**Figure 4-1. CALOOSAHATCHEE RIVER  
WATER QUALITY MONITORING PROGRAM**

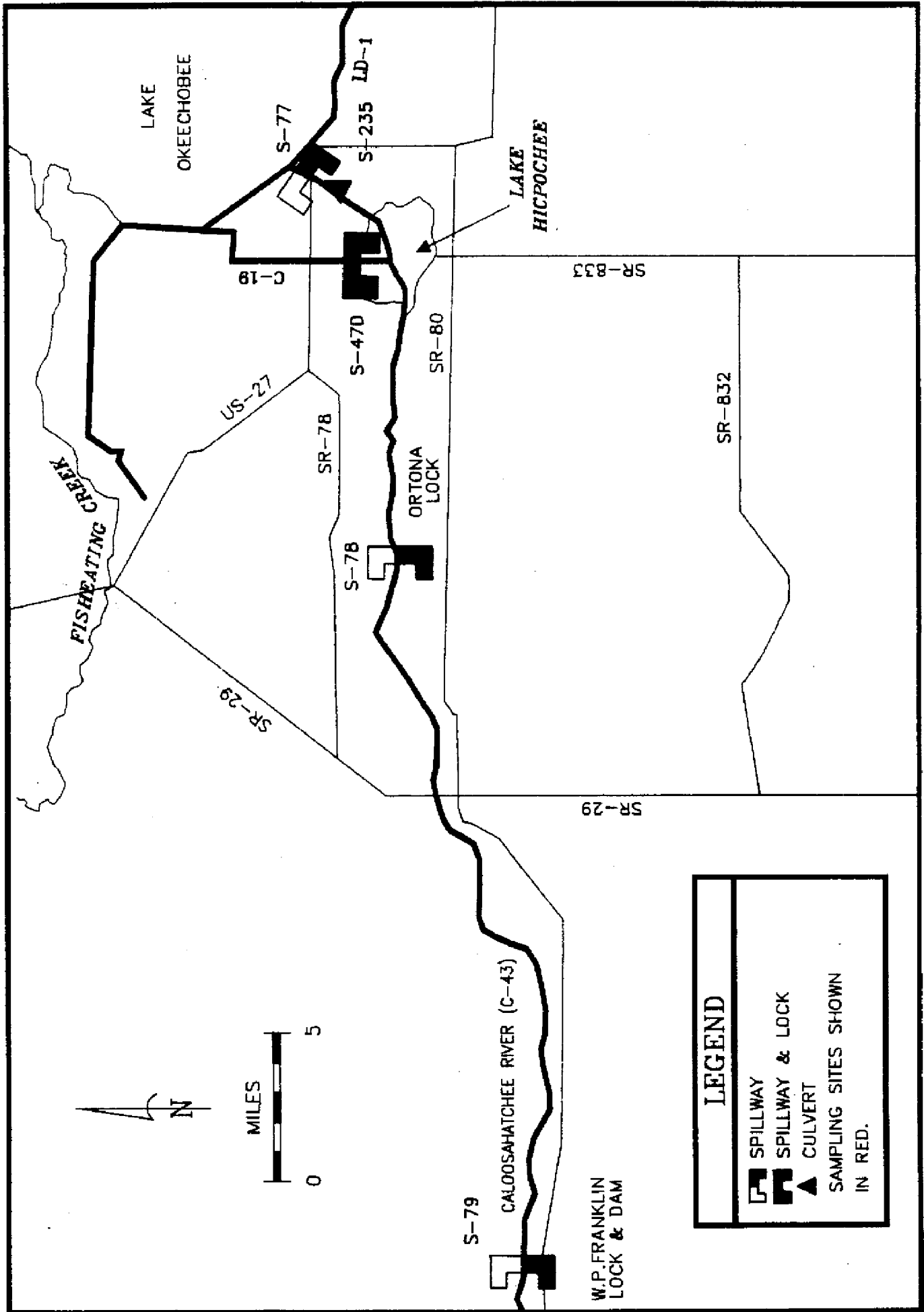


Figure 4-2. LOCATION OF SAMPLING STATIONS FOR THE CALOOSAHA TCHEE RIVER WATER QUALITY MONITORING PROGRAM

**TABLE 4-1. SUMMARY OF SAMPLING STATIONS AND FREQUENCY OF COLLECTION FOR THE  
CALOOSAHAATCHEE RIVER MONITORING PROGRAM**

<u>SFWMD STA ID</u>	<u>LAT</u>	<u>LONG</u>	<u>Location</u>	<u>POR</u>	<u>Physical Parameters</u>	<u>Nutrients</u>	<u>Major Ions</u>	<u>Trace Metals</u>	<u>Pesticide Species</u>	<u>Other US/DS</u>
CR-00.2T	265021	810509	At S-235 on LD-1 Near S-77	1979-P	BM	BM	QTR	BA		US
CR-04.8T	264834	810823	On C-19 at S-47D	1979-P	BM	BM	QTR	BA		US
S78	264722	811811	On the Caloosa River at Ortona Locks	1979-P	BM	BM	QTR	BA		US
S79	264314	814107	Caloosa River at Franklin Lock and Dam	1979-P	BM	BM	QTR	BA		US

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
 W = Weekly  
 BW = Bi-weekly (Twice/ Month)  
 M = Monthly  
 QTR = Quarterly  
 BA = Bi-annually (Twice/Year)  
 DD = During Discharge  
 US = Upstream  
 DS = Downstream  
 Other = PCB's  
 P = Present



**SECTION 5**  
**KISSIMMEE RIVER (C-38)**

**Purpose and Scope**

The Kissimmee River (C-38) water quality monitoring program extends along the river from the source at the southern end of Lake Kissimmee to the outfall at Lake Okeechobee (Figure 5-1). The water quality monitoring program was established in 1972 to provide a water quality and nutrient loading data base for the purposes of:

1. Determining loadings to Lake Okeechobee from the Kissimmee River;
2. Determining the effectiveness of the lower Kissimmee River Best Management Practices in improving water quality along the river;
3. Implementing Lake Okeechobee Technical Advisory Committee's (LOTAC)'s recommendation for a comprehensive monitoring and research plan as described in the Department of Environmental Regulation's "Lake Okeechobee Monitoring and Research Plan";
4. Determining long and short term trends associated with the Kissimmee River restoration project; and
5. Determining long and short term trends necessary to identify potential problem areas in terms of water quality degradation.

**Sampling Locations and Descriptions**

There are 27 water quality monitoring locations sampled under the Kissimmee River project. One sample is collected at each of the six structures, and 21 samples are collected in the major tributaries located in pools A, B, C, D, and E. The location of the stations are shown on Figure 5-2. Table 5-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. The following are descriptions of each site:

S-65: a large gate and boat lock structure located on the Kissimmee River (C-38) State Road 60 at the south end of Lake Kissimmee. The water flows in a southerly direction through this structure and the water samples are collected from the upstream side.

S-65A: a large gate and boat lock structure located on the Kissimmee River 10.5 miles south of S-65. The water flows southward through this structure, and the water samples are collected from the upstream side.

S-65B: a large gate and boat lock structure located on the Kissimmee River 12 miles south of S-65A. The water flows southward through this structure, and the water samples are collected from the upstream side.

S-65C: a large gate and boat lock structure located on the Kissimmee River nine miles south of S-65B. The water flows southward through this structure, and the water samples are collected from the upstream side.

S-65D: a large gate and boat lock structure located on the Kissimmee River nine miles south of S-65C. The water flows southward through this structure, and the water samples are collected from the upstream side.

S-65E: this is the largest of the six gate and boat lock structures on the Kissimmee River located 7 1/2 miles south of S-65D, and 8 miles north of Lake Okeechobee. The water flows southward through this structure into Lake Okeechobee. The water samples are collected from the upstream side.

KREA 51: this sample is collected on the Maple River, north of the Kissimmee River trailer park. There will be a small tributary on the east side. The sample is collected in Pool E.

KREA 54: this sample is collected at Doughtry Cutoff south of the Clemon Ranch. The sample is collected in Pool E.

KREA 55: this sample is collected 1/4 mile south of Butler Dairy boat ramp in Pool E.

KREA 57: west of Butler Dairy boat ramp in Pool E.

KREA 61: northern most section of the Chandler Slough tributary.

KREA 64: sample is collected approximately 3/4 mile east of Four-E's Fish Camp in Pool D.

KREA 75: Buttermilk Slough located just north of the River Ranch Resort in Pool A.

KREA 76: Blanket Bay Slough in Pool A. Site receives beef pasture runoff from El Maximo Ranch (Latt Maxy).

KREA 77: River Ranch South just north of Ice Cream Slough (KREA 76) in Pool A.

KREA 78: Ice Cream Slough located in Pool A.

KREA 79: Bay Hammock Slough located in Pool A.

KREA 80: Skeeter Slough located approximately 1/2 mile north of S-65A in Pool A.

KREA 81: Armstrong Slough located just north of S-65A in Pool A.

KREA 82: located in Pool B at Tick Island Slough just north of S-65B.

KREA 83: Starvation Slough located in Pool C. Sample site is just north of Oak Creek (KREA 843).

KREA 84: Oak Creek upstream and is located just south of Starvation Slough in Pool C.

KREA 85: Oak Creek downstream in Pool C.

KREA 86: located in Pool B, at Pine Island Slough upstream. Sample site is north of the third weir structure.

KREA 87: Pine Island Slough downstream located in Pool B.

KREA 88: located in Pool B at Dark Hammock Slough. Sample tributary is located just south of the second weir structure.

KREA 89: Rattlesnake Slough located in Pool A.

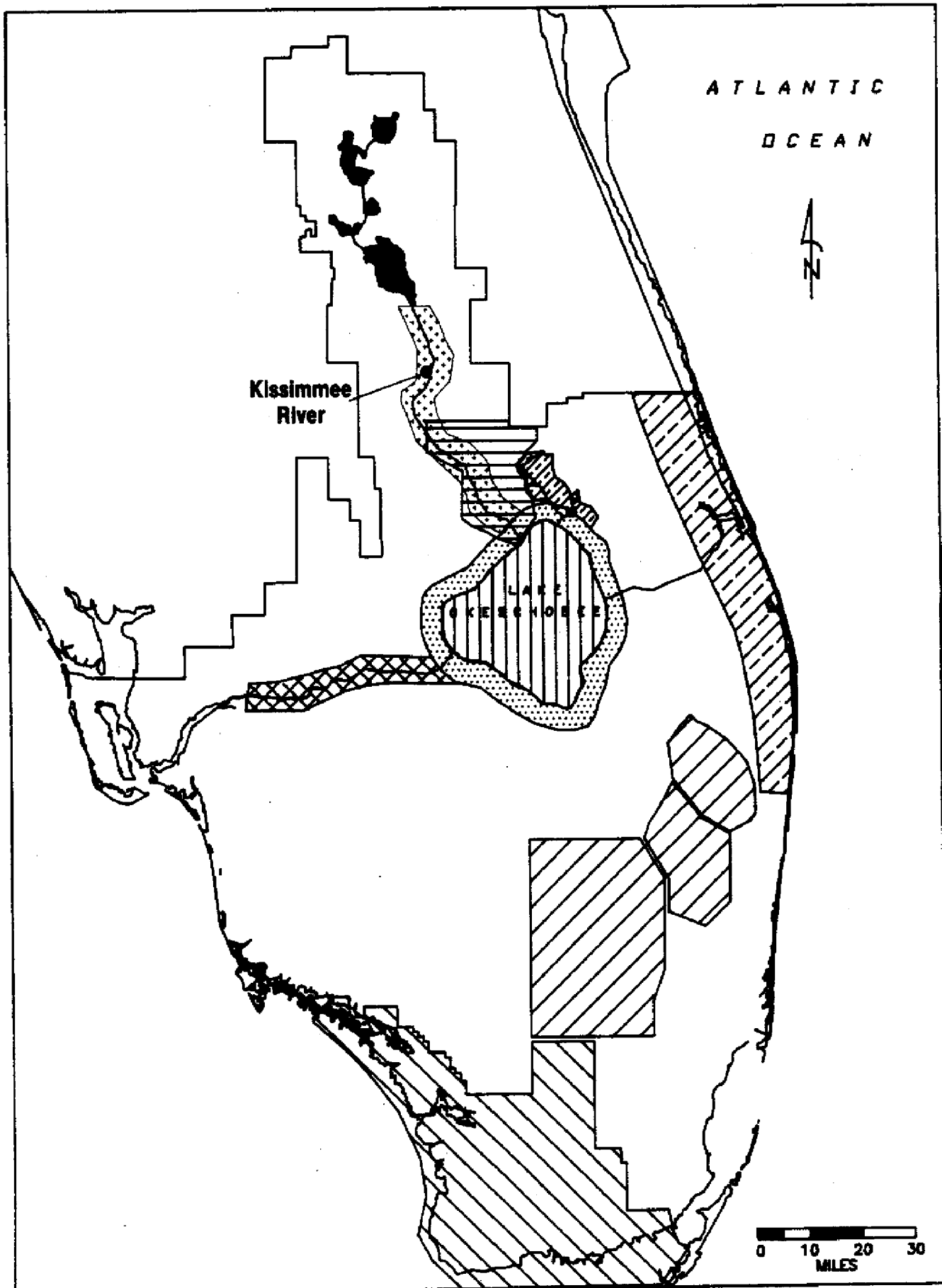
## **Parameters and Sampling Frequencies**

Physical parameters and nutrients are sampled once a month for the six structure locations, and twice a year for major cations and total trace metals. The tributary stations are sampled biweekly for physical parameters and nutrients.

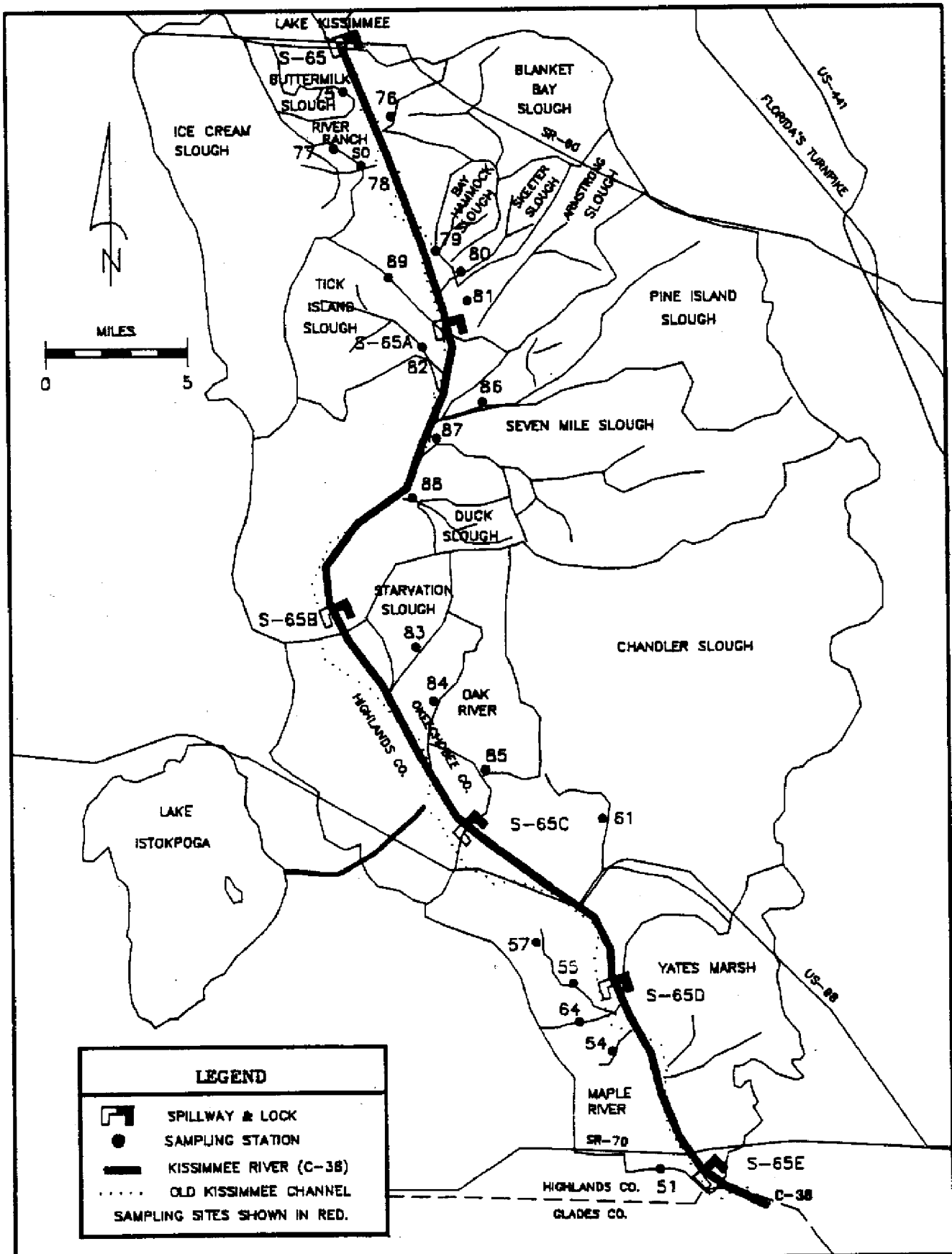
## **District Publications**

Milleson, J., 1976. Environmental Responses to Marshland Reflooding in the Kissimmee River Basin. SFWMD, Tech. Pub. No. 76-3.

Federico, A., 1982. Water Quality Characteristics of the Lower Kissimmee River Basin, Florida. SFWMD, Tech. Pub. No. 82-3.



**Figure 5-1. KISSIMMEE RIVER  
WATER QUALITY MONITORING PROGRAM**



**Figure 5-2. LOCATION OF SAMPLING STATIONS FOR THE KISSIMMEE RIVER WATER QUALITY MONITORING PROGRAM**

TABLE 5-1. SUMMARY OF SAMPLING LOCATIONS AND FREQUENCY OF COLLECTION FOR THE  
KISSIMMEE RIVER MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical Parameters		Major Trace Pesticide		Other US/DS
					Nutrients	Ions	Metals	Species	
S65	274820	811201	Lower End Lake Kissimmee at C38 and SR60	1972-P	M	M	QTR	BA	US
S65A	273944	810803	At S65A on Kissimmee River 10.5 Miles S of S65	1972-P	M	M	QTR	BA	US
S65B	273003	811144	At S65B on Kissimmee River 12 Miles S of S65A	1972-P	M	M	QTR	BA	US
S65C	272401	810657	At S65C on Kissimmee River 9 Miles S of S65B	1972-P	M	M	QTR	BA	US
S65D	271845	810120	At S65D on Kissimmee River 9 Miles S of S65C	1972-P	M	M	QTR	BA	US
S65E	271335	805742	At S65E on Kissimmee River 7.5 Miles S of S65D	1972-P	M	M	QTR	BA	US
KREA61	272121	810149	Pool D Chandler Slough Upstream	1985-P	BW	BW			
KREA64	272306	810524	Pool D Larson West Runoff	1985-P	BW	BW			
KREA51	271422	805915	Pool E Maple River US	1985-P	BW	BW			
KREA54	271740	810022	Pool E Dougherty Cutoff	1985-P	BW	BW			
KREA55	271803	810038	Larson and Butler Dairy Runoff	1985-P	BW	BW			
KREA57	271837	810142	Pool E Butler Dairy Runoff	1985-P	BW	BW			
KREA75	274640	811107	Pool A - Buttermilk Slough	1973-79; 1986-P	BW	BW			
KREA76	274602	811015	Pool A - Blanket Bay Slough	1973-79; 1986-P	BW	BW			
KREA77	274435	811148	Pool A - River Ranch Resort	1973-79; 1986-P	BW	BW			
KREA78	274445	811145	Pool A - Ice Cream Slough	1973-79; 1986-P	BW	BW			
KREA79	274203	810825	Pool A - Bay Hammock Slough	1973-79; 1986-P	BW	BW			
KREA80	274146	810827	Pool A - Skeeet Slough	1973-79; 1986-P	BW	BW			
KREA81	273940	810755	Pool A - Armstrong Slough	1973-79; 1986-P	BW	BW			
KREA82	273850	810817	Pool B - Tick Island Slough	1973-79; 1986-P	BW	BW			
KREA83	272731	810945	Pool C - Starvation Slough	1973-79; 1986-P	BW	BW			
KREA84	272729	810943	Pool C - Oak Creek US	1973-79; 1986-P	BW	BW			
KREA85	272553	810822	Pool C - Oak Creek DS	1973-79; 1986-P	BW	BW			
KREA86	273640	810827	Pool B - Pine Island Slough US North of Third Weir Structure	1986-P	BW	BW			
KREA87	273550	810820	Pool B - Pine Island Slough DS	1986-P	BW	BW			
KREA88	273332	811015	Pool B - Dark Hammock Slough South of Second Weir Structure	1986-P	BW	BW			
KREA89	274330	810945	Pool A - Rattlesnake Slough	1987-P	BW	BW			

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
W = Weekly  
BW = Bi-weekly (Twice/ Month)  
M = Monthly  
QTR = Quarterly  
BA = Bi-annually (Twice/Year)  
DD = During Discharge  
US = Upstream  
DS = Downstream  
Other = PCB's  
P = Present

## SECTION 6 EVERGLADES NATIONAL PARK

### Purpose and Scope

The Everglades National Park (ENP) water quality monitoring program was established to address the quality of water entering the ENP from agricultural sources to the north, and both agricultural and urban sources to the east. In January 1979, the South Florida Water Management District (SFWMD or District), the National Park Service and the United States Army Corps of Engineers (COE) entered into a joint Memorandum of Agreement (MOA) with the intent to establish non-degradation standards for water quality parameters for waters delivered to the ENP through water control structures along L-67A, L-31W and C-111.

Additional watershed monitoring stations were added to the agreement and are sampled under the Water Conservation Area (WCA) Inflows and Outflows sampling program (Section 2). The area considered to be monitored under the ENP program is the ENP boundary (Figure 6-1).

The water quality monitoring program also provides for the determination of long and short term trends necessary to identify the downstream impacts of the Lake Okeechobee Technical Advisory Committee (LOTAC) / Surface Water Improvement and Management plan implementation for the Everglades Agricultural Area and for implementation of LOTAC's recommendation for a comprehensive monitoring and research plan as described in the Department of Environmental Regulation's "Lake Okeechobee Monitoring and Research Plan."

Water quality data from the ENP program are used in conjunction with the standards that were established for inflow water quality to the ENP. These standards are based on historical (1970-1978) average annual concentrations. At least annually, the District, ENP, and the COE meet to discuss any violations of the standards. As stated in the MOA, "Should water quality criteria not be met and a clear and present danger to water quality been determined by the parties, appropriate actions or such legal processes as may be necessary to restore or protect the quality of water entering the ENP shall be taken by the COE, National Park Service, and District." Data routinely collected by the District are forwarded to the ENP and the COE.

### Sampling Locations and Descriptions

The seven inflow watershed water quality locations that are sampled within the vicinity of the ENP are shown on Figure 6-2. Ten additional stations are collected under the WCA program, these are; S-12D, S-12B, S-333, L003, L-28I, S-140, S-11C, S-7, S-8, and S-9. The location of these ten stations can be found on Figure 2-2, and are described in Section 2. Table 6-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. The following are descriptions of the seven water quality monitoring locations sampled under the ENP program.

S-18C: a gate type structure located on C-111E south of US-27. The water flows southward through this structure. The water samples are collected from the upstream side of this structure.

S-176: a gate type structure located at the head of the C-111 near C-113 north west of Homestead. Water flows southward through this structure, and water samples are collected from the upstream side.

S-177: a gate type structure located on C-111 and US-27 west of Homestead. The water flows southward through this structure, and the water samples are collected from the upstream side.

S-178: a gate type structure located at the head of C-111E and US-27 west of Homestead. The water flows southward through this structure, and water samples are collected from the upstream side.

S-332: a District controlled water pumping station located on the east boundary of the ENP on the L-31W levee at Taylor Slough west of Homestead. The water is pumped into the ENP through this structure, and water samples are collected from the upstream side.

TAMBR105: this sample is taken from bridge No. 105 on US-41 (Tamiami Trail) located 12 miles west of S-12A. Water flows southward under this bridge.

US41-25: this sample is taken from bridge No. 25 on US-41 (Tamiami Trail) located two miles west of S-12A. Water flows southward through this small culvert that runs under US-41.

## **Parameters and Sampling Frequencies**

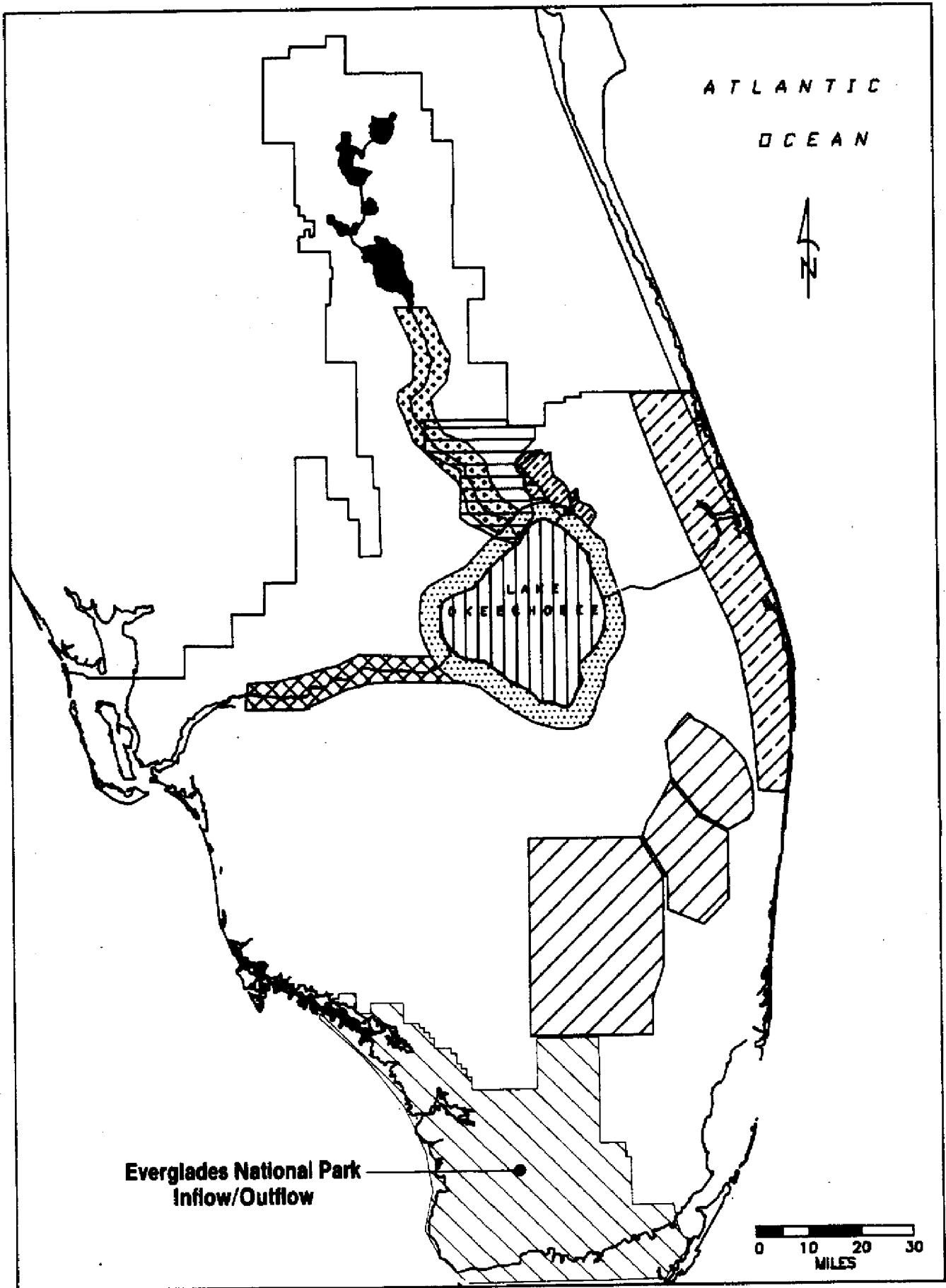
Water samples at the seven stations are collected on a biweekly basis during discharge conditions and monthly during no flow conditions.

Physical parameters, nutrients, and major cations are analyzed on each sample. Once a month total trace metals are added to the list of routine parameters. Additionally, all seven stations are analyzed for pesticides in water and sediment samples four times per year (see Section 11). Four times a year recorders are also set out at S-332, S-18C, and at S-12D for a three to four day period to measure diel dissolved oxygen, pH, temperature, and specific conductance.

## **District Publications**

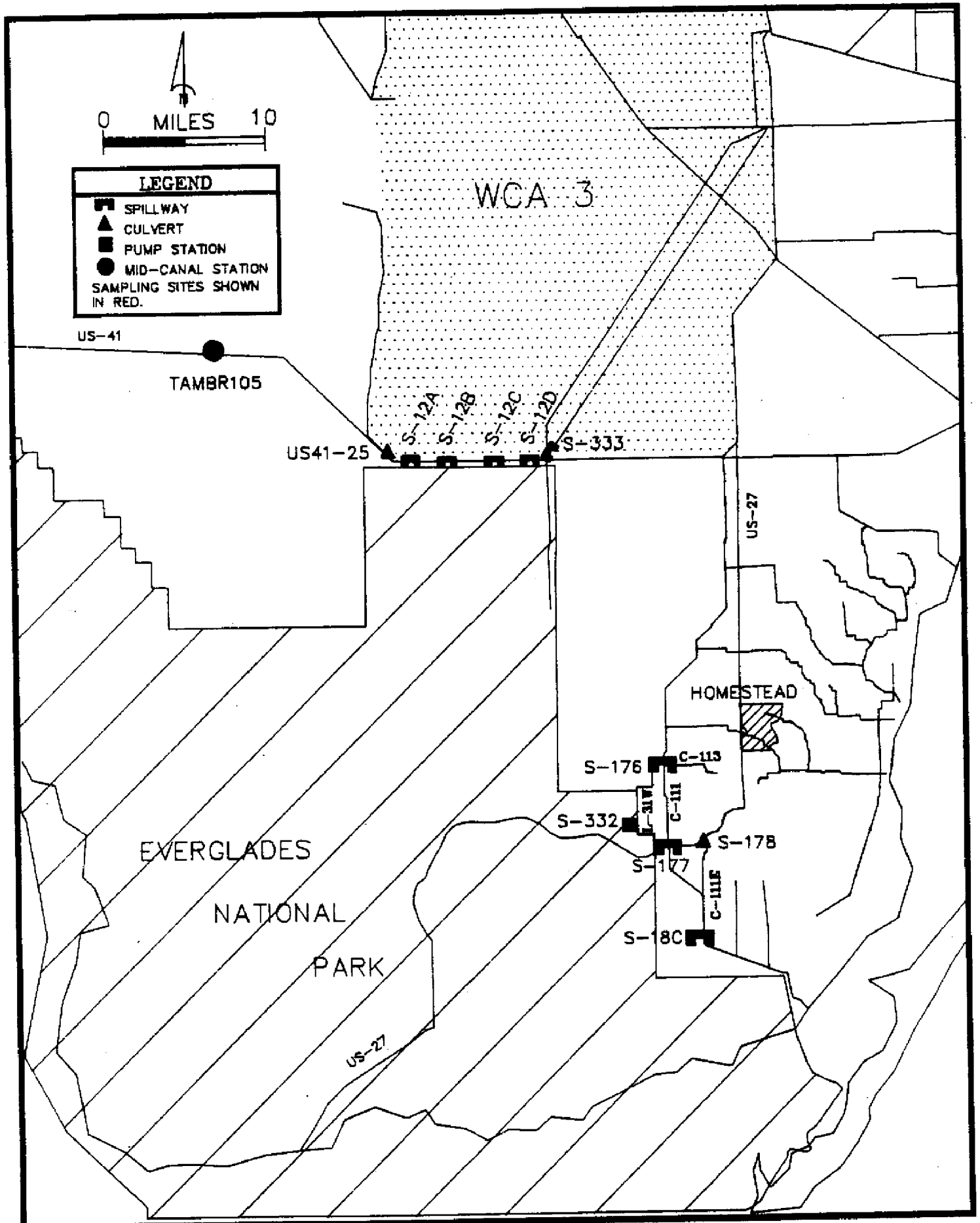
Pfeuffer, R. J., 1985. Pesticide Residue Monitoring in Sediment and Surface Water Bodies within the South Florida Water Management District. SFWMD, Tech. Pub. No. 85-2.

MacVicar, T. K., 1985. A Wet Season Field Test of Experimental Water Deliveries to Northeast Shark River Slough. SFWMD, Tech. Pub. No. 85-3.



**Figure 6-1. EVERGLADES NATIONAL PARK INFLOW/OUTFLOW  
WATER QUALITY MONITORING PROGRAM**





**Figure 6-2. LOCATION OF SAMPLING STATIONS FOR THE EVERGLADES NATIONAL PARK WATER QUALITY MONITORING PROGRAM**

**TABLE 6-1. SUMMARY OF SAMPLING LOCATIONS AND FREQUENCY OF COLLECTION FOR THE  
EVERGLADES NATIONAL PARK MONITORING PROGRAM**

<u>SFWMD</u> <u>STA ID</u>	<u>LAT</u>	<u>LONG</u>	<u>Location</u>	<u>POR</u>	<u>Physical</u>		<u>Major Trace</u>		<u>Pesticide</u>		
					<u>Parameters</u>	<u>Nutrients</u>	<u>Ions</u>	<u>Metals</u>	<u>Species</u>	<u>Other</u>	<u>US/DS</u>
S18C	251950	803203	Structure on C111 5.2 Miles South of US27	1983-P	BW	BW	BW	M	QTR	QTR	US
S176	252865	803345	Structure at Head of C113 on C111	1983-P	BW	BW	BW	BA	QTR	QTR	US
S177	252407	803329	Floodgate at C111 and US27	1983-P	BW	BW	BW	BA	QTR	QTR	US
S178	252427	803127	Floodgate at C111E and US27	1983-P	BW	BW	BW	BA	QTR	QTR	US
S332	252524	803524	Pump Station at L31W and Taylor Slough	1983-P	BW	BW	BW	M	QTR	QTR	US
TAMBR105	255049	805705	Bridge #105 on US41 12 Miles West of S12A	1985-P	BW	BW	BW	M	QTR	QTR	US
US41-25	254621	805023	Bridge #25 on US41 2 Miles West of S12A	1984-P	BW	BW	BW	M	QTR	QTR	US

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/ Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
			DD	=	During Discharge	P	=	Present

## SECTION 7 LAKE OKEECHOBEE LIMNETIC AND LITTORAL ZONES

### Purpose and Scope

The Lake Okeechobee Limnetic and Littoral Zones water quality monitoring program lies wholly within the confines of the Lake Okeechobee levee (Figure 7-1). The water quality monitoring program was established to provide a water quality data base for the purposes of:

1. Complying with monitoring requirements of the Lake Okeechobee Operating Permit #50-0679349 issued by the Department of Environmental Regulation (DER);
2. Determining effectiveness of the implementation of basin management plans in reducing nutrient concentrations in the lake;
3. Implementing Lake Okeechobee Technical Advisory Committee's recommendation for a comprehensive monitoring and research plan as described in DER's "Lake Okeechobee Monitoring and Research Plan";
4. Determining long and short term trends necessary to track the eutrophication of the lake;
5. Applying eutrophication models in order to verify and refine the nutrient load reduction targets for the lake.

Water quality data from Lake Okeechobee are used to support Lake Okeechobee management reports as required by the Surface Water Improvement Management (SWIM) bill. Evaluation of the data is then used for:

1. Assessing the impact of operating permit management implementations;
2. Verifying eutrophication models;
3. Examining differences in water quality between the limnetic and littoral zones;
4. Monitoring possible algal blooms near or within shoreline vegetation;
5. Providing water quality data in support of periphyton and sediment studies; and

6. Examining the areal extent of the influence of the tributaries on the water quality of Lake Okeechobee.

### Sampling Locations and Descriptions

There are 43 water quality monitoring stations that are sampled under this program. The locations of these stations are shown on Figure 7-2. Table 7-1 lists the station code reference for each site numbered in Figure 7-1. Table 7-2 lists the latitude and longitude, a brief station description, the period of record, and the frequency of collection of major chemical species. The following are descriptions of each site:

L001: north end of Lake Okeechobee 4 1/2 miles south of Taylor Creek Locks (S-193).

L002: Coast Guard tower on the north end of Lake Okeechobee about 7 1/2 miles south of Taylor Creek Locks (S-193).

L003: east side of Lake Okeechobee, west of Florida Power and Light Indiantown power plant smoke stakes.

L004: east side of Lake Okeechobee four miles due south of L-003, west of the Port Mayaca bridge.

L005: Coast Guard tower on the west side of Lake Okeechobee, east of Fisheating Creek.

L006: Coast Guard tower at the south end of Lake Okeechobee.

L007: south end of Lake Okeechobee 3 1/4 miles due south of L-006.

L008: middle of Lake Okeechobee 4 1/2 miles due east of L-005.

S1910.0: lake side of S-191 (Nubbin Slough) at the north side of Lake Okeechobee.

S191N0.5: 1/2 mile west of S1910.0 on the north side of Lake Okeechobee.

S191N1.5: 1 1/2 miles west of station S1910.0 on the north side of Lake Okeechobee.

LZ2: Okeechobee public water supply intake in Lake Okeechobee on the north side of the lake.

**S1910.5:** 1/2 mile southwest of S-1910.0 on the north side of Lake Okeechobee.

**S1911.5:** 1 1/2 miles southwest of station S191.0 on the north side of Lake Okeechobee

**KISSR0.0:** mouth of the Kissimmee River near the north side of Lake Okeechobee.

**KISSR1.2:** 1.2 miles east of station KISSR0.0 near the north side of Lake Okeechobee.

**S191E0.5:** 1/2 mile south of station S1910.0 on the north side of Lake Okeechobee.

**S191E1.5:** 1 1/2 miles south of station S1910.0 on the north side of Lake Okeechobee.

**CPTIN:** about three miles southeast of S-191 in the marsh on the northeast side of Lake Okeechobee.

**CPTMID:** 100 yards west of station CPTIN in the marsh on the northeast side of Lake Okeechobee.

**CPTOUT:** 100 yards west of station CPTMID in the lake on the northeast side of Lake Okeechobee.

**KBARIN:** at the north end of Kings Bar in the marsh near the northwest side of Lake Okeechobee.

**KBARMID:** 100 yards north of station KBARIN in the marsh near the northwest side of Lake Okeechobee.

**KBAROUT:** 100 yards north of station KBARMID in the lake near the northwest side of Lake Okeechobee.

**3RDPTIN:** west of Kings Bar at Third Point in the marsh at the northwest side of Lake Okeechobee.

**3RDPTMID:** 100 yards southeast of station 3RDPTIN in the marsh at the northwest side of Lake Okeechobee.

**3RDPTOUT:** 100 yards southeast of station 3RDPTMID in the lake at the northwest side of Lake Okeechobee.

**STAKEIN:** 1/2 mile west of Indian Prairie Canal (C-40) in the marsh on the northwest side of Lake Okeechobee.

**STAKEMID:** 100 yards southeast of station STAKEIN in the marsh on the northwest side of Lake Okeechobee.

**STAKEOUT:** 100 yards southeast of station STAKEMID in the lake on the northwest side of Lake Okeechobee.

**TREEIN:** on the east side of Observation Shoal in the marsh near the west side of Lake Okeechobee.

**TREEMID:** 100 yards northeast of station TREEIN in the marsh near the west side of Lake Okeechobee.

**TREEOUT:** 100 yards northeast of station TREEMID in the lake near the west side of Lake Okeechobee.

**PALMIN:** on the east side of Observation Island in the marsh near the west side of Lake Okeechobee.

**PALMMID:** 100 yards east of station PALMIN in the marsh near the west side of Lake Okeechobee.

**PALMOUT:** 100 yards east of station PALMMID in the lake near the west side of Lake Okeechobee.

**LZ30:** water supply intake for Clewiston in Lake Okeechobee near the southwest side of the lake.

**RITAWEST:** west side of Ritta Island near the south end of Lake Okeechobee.

**RITAEAST:** east side of Ritta Island at the northern most channel marker near the south end of Lake Okeechobee.

**KRAMIN:** southeast side of Creamer Island in the marsh near the south end of Lake Okeechobee.

**KRAMMID:** 100 yards west of station KRAMIN from the southeast side of Creamer Island in the marsh near the south end of Lake Okeechobee.

**LZ25:** 100 yards west of station KRAMID from the southeast side of Creamer Island in the lake near the south end of Lake Okeechobee.

**PELMID:** middle of Pelican Bay, which is east of Creamer Island, near the south end of Lake Okeechobee.

### **Parameters and Sampling Frequencies**

The 43 water quality monitoring stations that are collected under this program are sampled every two weeks from May to October and monthly from November to April.

Physical parameters, nutrients, and chlorophyll are measured at all of these stations. Four times a year major cations are added to the list of parameters.

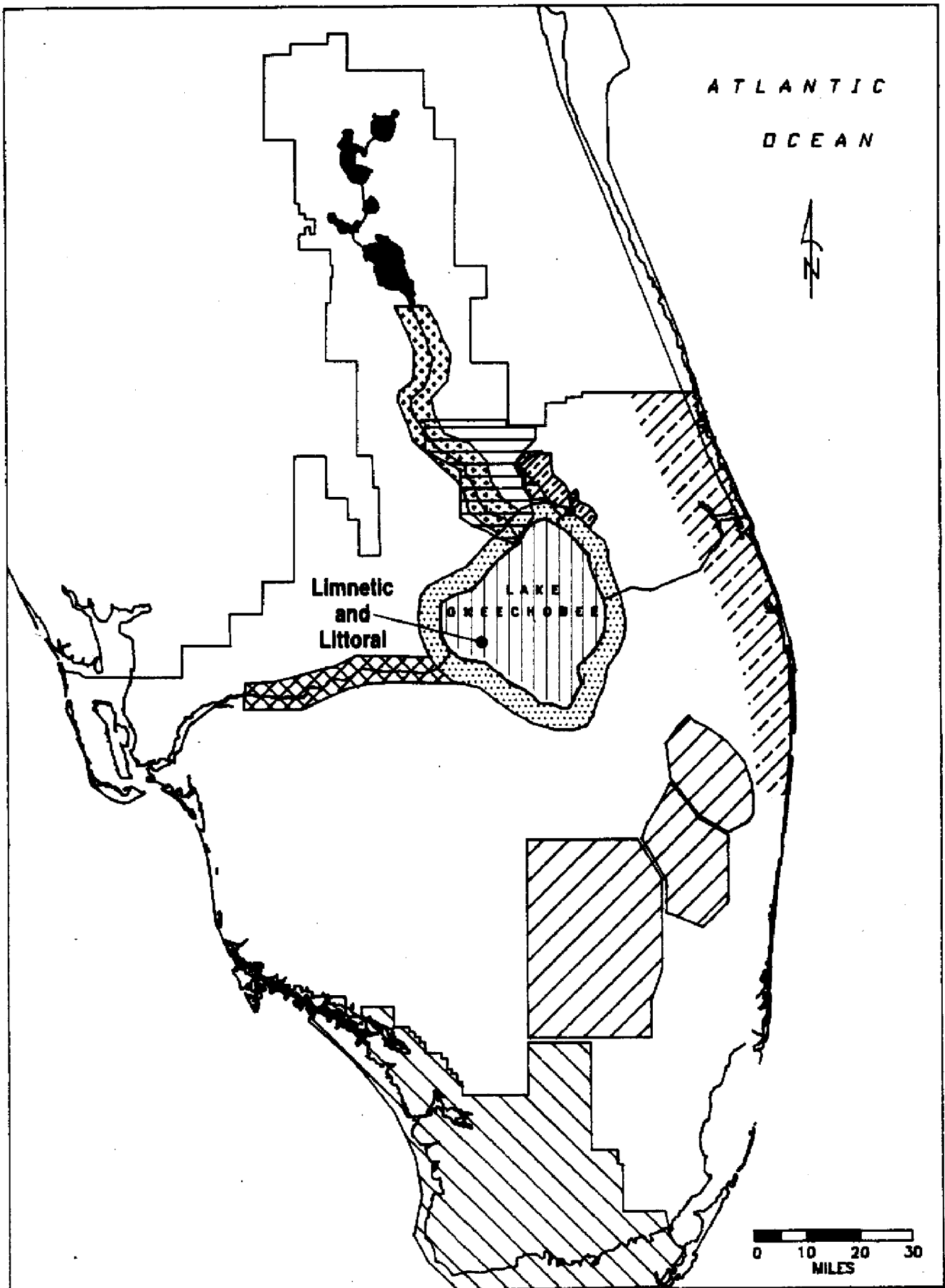
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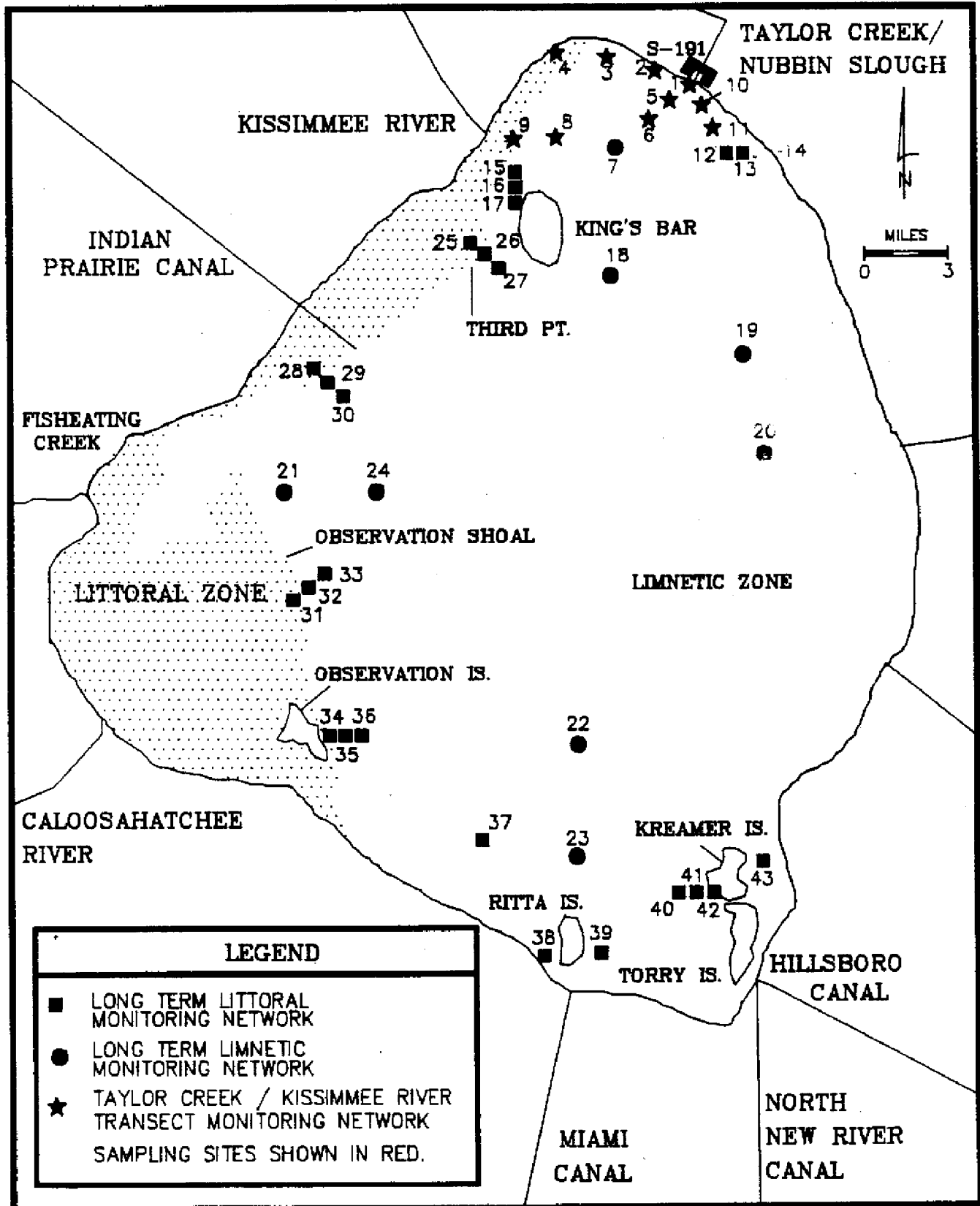
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Federico, A., Dickson, K., Kratzer, C., and Davis, F., 1981. Lake Okeechobee Water Quality Studies and Eutrophication Assessment. SFWMD, Tech. Pub. No. 81-2.



**Figure 7-1. LAKE OKEECHOBEE LIMNETIC AND LITTORAL ZONE  
WATER QUALITY MONITORING PROGRAM**



**Figure 7-2. LOCATION OF SAMPLING STATIONS FOR THE LAKE OKEECHOBEE LIMNETIC AND LITTORAL ZONE WATER QUALITY MONITORING PROGRAM**

**TABLE 7-1. LAKE OKEECHOBEE LIMNETIC AND LITTORAL ZONES  
LIST OF STATIONS**

<u>Station Number</u>	<u>Station Code</u>	<u>Station Number</u>	<u>Station Code</u>
1	S1910.0	23	L007
2	S191NO.5	24	L008
3	S191N1.5	25	3RDPTIN
4	LZ2	26	3RDPTMID
5	S1910.5	27	3RDPTOUT
6	S1911.5	28	STAKEIN
7	L001	29	STAKEMID
8	KISSR1.2	30	STAKEOUT
9	KISSR0.0	31	TREEIN
10	S191E0.5	32	TREEMID
11	S191E1.5	33	TREEOUT
12	CPTOUT	34	PALMIN
13	CPTMID	35	PALMMID
14	CPTIN	36	PALMOUT
15	KBAROUT	37	LZ30
16	KBARMID	38	RITAWEST
17	KBARIN	39	RITAEAST
18	L002	40	LZ25
19	L003	41	KRAMMID
20	L004	42	KRAMIN
21	L005	43	PELMID
22	L006		



TABLE 7-2. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE LAKE  
 OKEECHOBEE LIMNETIC AND LITTORAL ZONE MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical		Major Ions	Trace Metals	Pesticide Species	Other US/DS
					Parameters	Nutrients				
L001	270828	804754	See Latitude and Longitude	1972-P	BW	BW	QTR			
L002	270506	804717	See Latitude and Longitude	1972-P	BW	BW	QTR			
L003	270308	804233	See Latitude and Longitude	1972-P	BW	BW	QTR			
L004	265905	804233	See Latitude and Longitude	1972-P	BW	BW	QTR			
L005	265730	805840	See Latitude and Longitude	1972-P	BW	BW	QTR			
L006	264922	804719	See Latitude and Longitude	1972-P	BW	BW	QTR			
L007	264635	804719	See Latitude and Longitude	1972-P	BW	BW	QTR			
L008	265730	805418	See Latitude and Longitude	1972-P	BW	BW	QTR			
S1910.0	271128	804550	See Latitude and Longitude	1986	BW	BW	QTR			
S191NO.5	271129	804620	See Latitude and Longitude	1986	BW	BW	QTR			
S191N1.5	271132	804738	See Latitude and Longitude	1986	BW	BW	QTR			
LZ2	271140	804954	See Latitude and Longitude	1978-P	BW	BW	QTR			
S1910.5	271105	804606	See Latitude and Longitude	1986	BW	BW	QTR			
S1911.5	271020	804637	See Latitude and Longitude	1986	BW	BW	QTR			
KISSRO.0	270823	805047	See Latitude and Longitude	1986	BW	BW	QTR			
KISSRI.2	270825	804942	See Latitude and Longitude	1986	BW	BW	QTR			
S191EO.5	271108	804530	See Latitude and Longitude	1986	BW	BW	QTR			
S101E1/5	270800	804450	See Latitude and Longitude	1986	BW	BW	QTR			
CPTIN	270846	804238	See Latitude and Longitude	1986	BW	BW	QTR			
CPTMID	270844	804243	See Latitude and Longitude	1986	BW	BW	QTR			
CPTOUT	270820	804239	See Latitude and Longitude	1986	BW	BW	QTR			
KBARIN	270748	805052	See Latitude and Longitude	1986	BW	BW	QTR			
KBARMID	270802	805103	See Latitude and Longitude	1986	BW	BW	QTR			
KBAROUT	270821	805059	See Latitude and Longitude	1986	BW	BW	QTR			
3RDPTIN	270450	805256	See Latitude and Longitude	1986	BW	BW	QTR			
3RPOTMID	270448	805246	See Latitude and Longitude	1986	BW	BW	QTR			
3RDPTOUT	270449	805238	See Latitude and Longitude	1986	BW	BW	QTR			
STAKEIN	270202	805916	See Latitude and Longitude	1986	BW	BW	QTR			
STAKEMID	270158	805706	See Latitude and Longitude	1986	BW	BW	QTR			

POR =	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W =	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW =	Bi-weekly (Twice/Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
		DD	=	During Discharge	P	=	Present

TABLE 7-2. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE LAKE  
 OKEECHOBEE LIMNETIC AND LITTORAL ZONE MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical		Major Ions	Trace Metals	Pesticide Species	Other US/DS
					Parameters	Nutrients				
STAKEOUT	270150	805659	See Latitude and Longitude	1986	BW	BW	QTR			
TREEIN	265517	805916	See Latitude and Longitude	1986	BW	BW	QTR			
TREEMID	265520	805910	See Latitude and Longitude	1986	BW	BW	QTR			
TREEOUT	265525	805901	See Latitude and Longitude	1986	BW	BW	QTR			
PALMIN	265031	805734	See Latitude and Longitude	1986	BW	BW	QTR			
PALMMID	265032	805728	See Latitude and Longitude	1986	BW	BW	QTR			
PALMOUT	265036	805717	See Latitude and Longitude	1986	BW	BW	QTR			
LZ30	264822	805150	See Latitude and Longitude	1978-P	BW	BW	QTR			
RITAWEST	264410	804941	See Latitude and Longitude	1986	BW	BW	QTR			
RITAEAST	264327	804737	See Latitude and Longitude	1986	BW	BW	QTR			
KRAMIN	264450	804452	See Latitude and Longitude	1986	BW	BW	QTR			
KRAMMID	264450	804456	See Latitude and Longitude	1986	BW	BW	QTR			
LZ25	264452	804522	See Latitude and Longitude	1978-P	BW	BW	QTR			
PELMID	264629	804257	See Latitude and Longitude	1986	BW	BW	QTR			

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
 W = Weekly  
 BW = Bi-weekly (Twice/ Month)  
 M = Monthly  
 QTR = Quarterly  
 BA = Bi-annually (Twice/Year)  
 DD = During Discharge  
 US = Upstream  
 DS = Downstream  
 Other = PCB's  
 P = Present

## SECTION 8 UPPER KISSIMMEE CHAIN OF LAKES AND ITS TRIBUTARIES

### Purpose and Scope

The Upper Kissimmee Chain of Lakes and Tributary water quality monitoring program includes five major lakes in the Kissimmee Chain: East Lake Tohopekaliga, Lake Tohopekaliga, Lake Cypress, Lake Hatchineha, and Lake Kissimmee (Figure 8-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Applying eutrophication models in order to establish and refine nutrient loading targets for the five major lakes in the chain for the purpose of establishing management plans for the lakes;
2. Determining long and short term trends necessary to identify the effectiveness of basin management plan implementation and potential problem areas in terms of water quality degradation and nutrient loadings;
3. Assess the in-lake effects of basin management plan implementations and lake drawdowns; and
4. Investigate the relationship between the lakes in the chain and the impact on downstream water bodies.

In June 1985, this program's intensive 40 water quality station monitoring program was reduced to 13 key locations for long term monitoring.

### Sampling Locations and Descriptions

There are currently 13 water quality monitoring locations being sampled under this program. The location of these stations are shown in Figure 8-2. Table 8-1 lists the latitude and longitude, a brief station description, the period of record, and the frequency of collection of major chemical species. The following are descriptions of each site:

E02: this sample is collected by channel marker No. 9 at the north end of Lake Kissimmee.

E04: this sample is collected by channel marker No. 7 on the east side of Lake Kissimmee.

D02: this sample is collected in the middle of Lake Hatchineha.

D03: this sample is collected at the southeast portion of Lake Hatchineha at channel marker No. 13.

C03: this sample is collected near the south end of Lake Cypress.

B02: this sample is collected at the north end of Lake Tohopekaliga.

B04: this sample is collected near the east side of Lake Tohopekaliga.

B06: this sample is collected from the middle of Lake Tohopekaliga.

B09: this sample is collected near the south end of Lake Tohopekaliga.

A04: this sample is collected from the middle of East Lake Tohopekaliga.

ABOGG: this sample is collected from the bridge over Boggy Creek at State Road 5 upstream of the discharge point to East Lake Tohopekaliga.

BWSHNGLE: this sample is collected from the bridge over Shingle Creek at State Road 531 upstream of the discharge point to Lake Tohopekaliga.

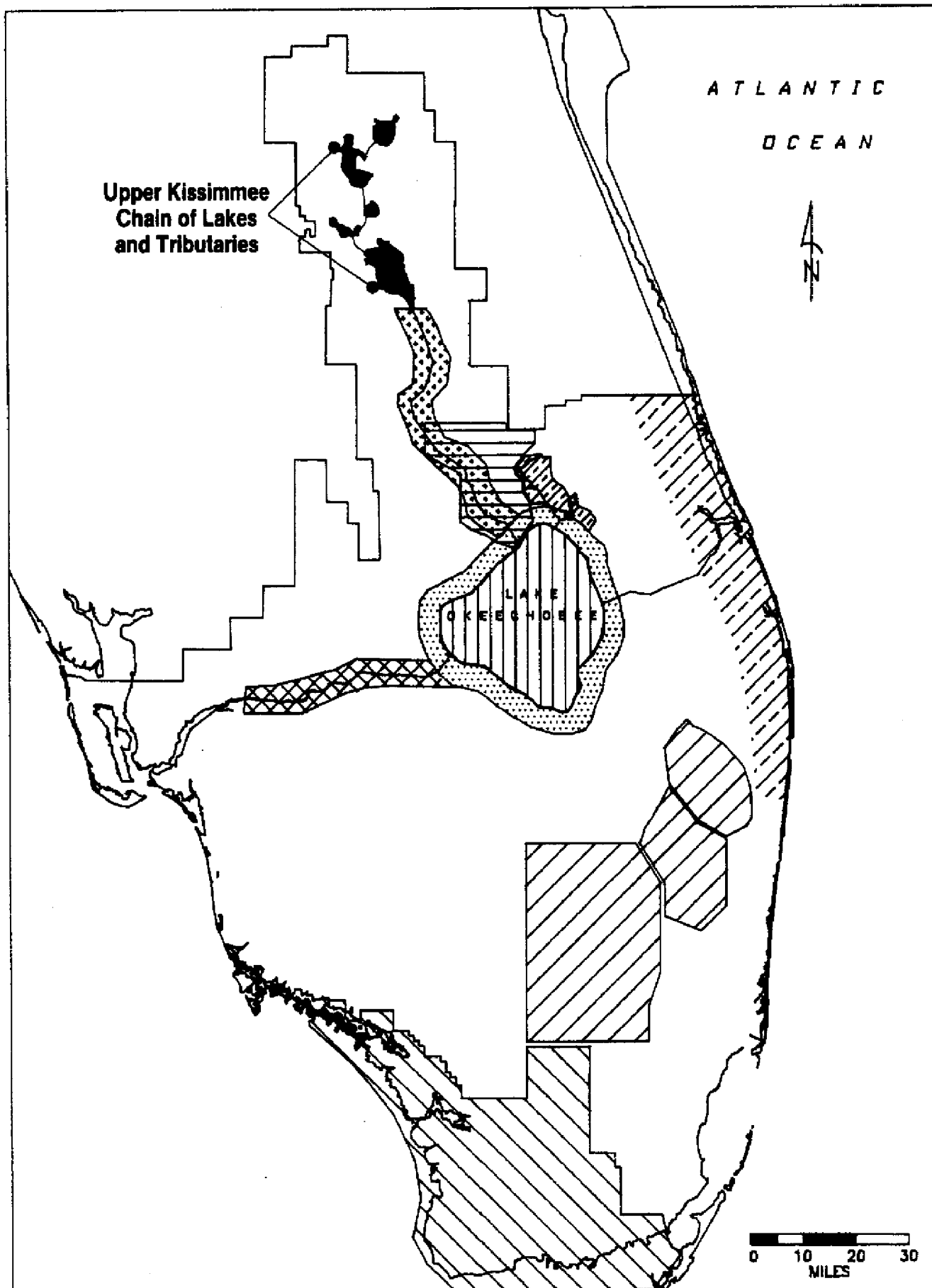
CREEDYBR: this sample is collected from the bridge over Reedy Creek at State Road 531 upstream of the discharge point to Lakes Hatchineha and Cypress.

### Parameters and Sampling Frequencies

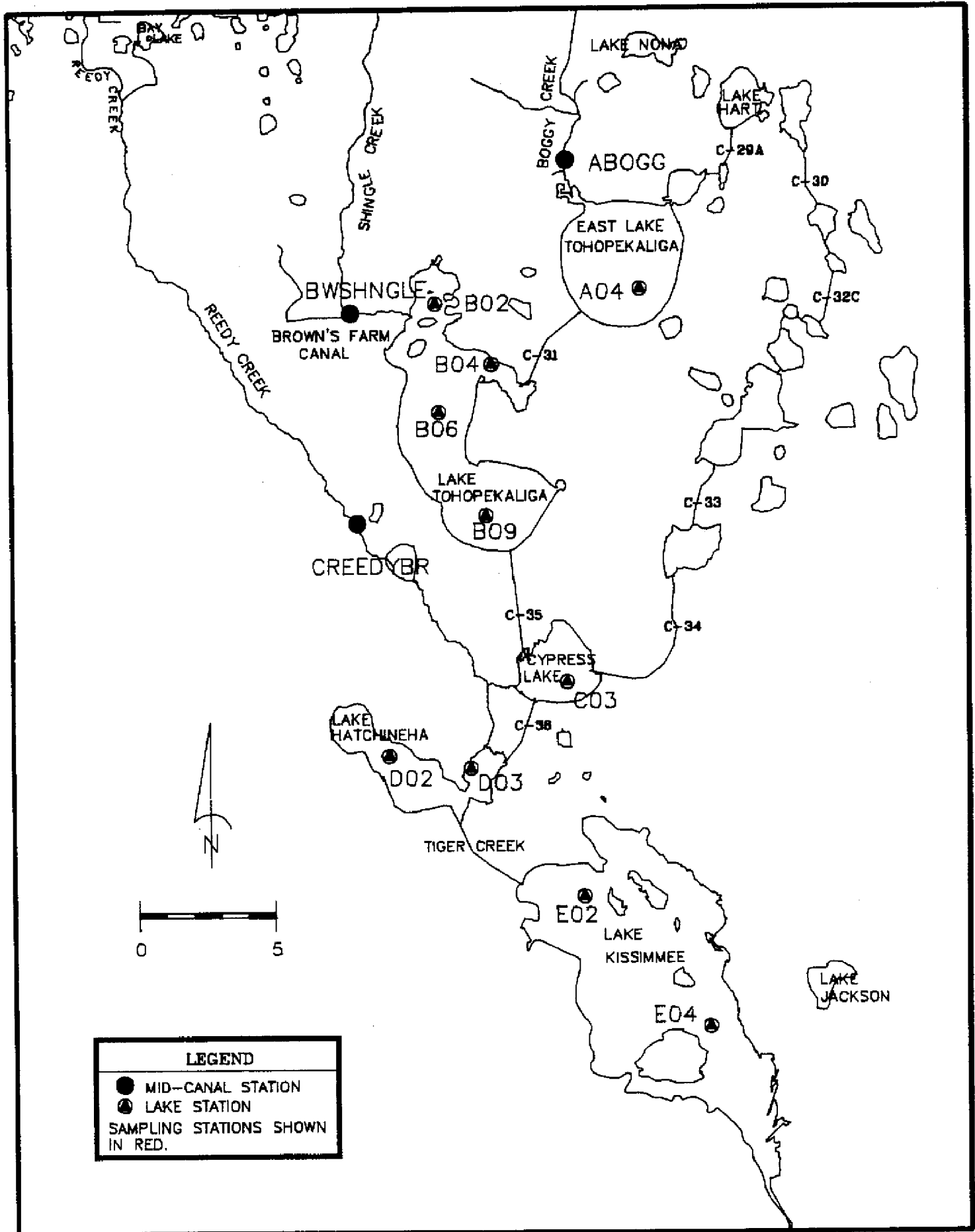
The 13 water quality monitoring stations that are collected under this project are sampled once a month for physical parameters, nutrients, and chlorophyll *a*. Four times a year major cations are added to the list of routine parameters.

### District Publications

Milleson, J., 1975. Progress Report Upper Kissimmee River Chain of Lakes Water Quality and Benthic Invertebrate Sampling. SFWMD, Tech. Pub. No. 75-2.



**Figure 8-1. UPPER KISSIMMEE CHAIN OF LAKES AND TRIBUTARIES  
WATER QUALITY MONITORING PROGRAM**



**Figure 8-2. LOCATION OF SAMPLING STATIONS FOR THE UPPER KISSIMMEE CHAIN OF LAKES AND TRIBUTARIES WATER QUALITY MONITORING PROGRAM**

TABLE 8-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE UPPER KISSIMMEE CHAIN OF LAKES AND TRIBUTARY MONITORING PROGRAM

SFWMID STA ID	LAT	LONG	Location	POR	Physical		Major		Trace	Pesticide	Other	US/DS
					Parameters	Nutrients	Ions	Metals				
A04	281927	811422	Lat and Long Station Middle of East Lake Toho	1981-P	M	M	QTR					
B02	281531	812321	North End of Lake Toho	1981-P	M	M	QTR					
B04	281348	812128	Northeast Side of Lake Toho	1981-P	M	M	QTR					
B06	281123	812245	Middle of Lake Toho	1981-P	M	M	QTR					
B09	280844	812128	Lat and Long Station at South End of Lake Toho	1981-P	M	M	QTR					
C03	280325	811850	South End of Lake Cypress	1981-P	M	M	QTR					
D02	280056	812441	Middle of Lake Hatchineha	1981-P	M	M	QTR					
D03	280023	812153	Southeast Lake Hatchineha at Marker #13	1981-P	M	M	QTR					
E02	275601	811806	North End of Lake Kissimmee at Marker #9	1981-P	M	M	QTR					
E04	275301	811312	East Side of Lake Kissimmee at Marker #7	1981-P	M	M	QTR					
AB0GG	282051	811911	From Bridge at Boggy Creek at SR5	1981-P	M	M	QTR					
BWSHNGLE	281600	812617	From Bridge at Shingle Creek at SR531	1981-P	M	M	QTR					
CREEDYBR	280859	812628	From Bridge at Reedy Creek at SR531	1985-P	M	M	QTR					

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/ Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
			DD	=	During Discharge	P	=	Present

## SECTION 9 LOWER KISSIMMEE VALLEY

### Purpose and Scope

The lower Kissimmee Valley water quality monitoring program encompasses an area characterized by beef and intensive dairy cattle operations throughout the lower Kissimmee River basin (Figure 9-1). Water quality monitoring stations have been established at locations throughout the Kissimmee River basin.

The objectives of the program are four-fold. They are:

1. To determine the effectiveness of Best Management Practices (BMPs) being implemented on the dairies for improving water quality in the Kissimmee River (C-38) and its tributary streams;
2. To identify the causes of high episodic phosphorus events;
3. Evaluate the effectiveness of individual Soil Conservation Service's (SCS)'s BMP design plans for improving water quality in runoff from individual farms; and
4. Determine the nutrient concentration from non-dairy land use activities. This program was initiated in response to the Kissimmee River Resource Planning and Management (380) Committee and Lake Okeechobee Technical Advisory Committee (LOTAC) mandates to implement and maintain a high resolution water quality monitoring program in this basin as a tool for identifying trouble spots, informing individual landowners of the impacts of their efforts in implementing BMP plans to improve water quality, and to provide state agencies responsible for administering cost-share programs a method of measuring the cost-effectiveness of the legislatively provided funds.

Data generated by this program serve two additional purposes. The first is to provide a data base in support of South Florida Water Management District (SFWMD or District) funded contractual research with the University of Florida Institute of Food and Agricultural Sciences in a study to evaluate the physical, chemical, and biological conditions and processes that govern phosphorus uptake, release, and movement through the soils in the basin. The second

additional purpose is the fulfillment of the commitment by the District to provide the water quality monitoring data gathering support for the newly funded \$1.25 million federal Rural Clean Waters Project grant for cost sharing of BMP implementation in the lower Kissimmee River basin. Such monitoring is required by the United States Department of Agriculture and the Environmental Protection Agency to become and remain eligible for the funds.

Data gathered under this program are also integral in development of the Lake Okeechobee Water Quality Management Plan as required by the state's Surface Water Improvement and Management legislation of 1987.

### Sampling Location and Description

There are 60 water quality monitoring stations that are sampled under the Kissimmee Valley program. The location of the stations are shown in Figure 9-2. Table 9-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge.

Thirty of the stations will be equipped with automatic water samplers in the lower Kissimmee River valley. These samplers will monitor direct runoff from dairy and non-dairy operations, major tributary drainage, and water quality at structures S-65C, S-65D, S-65E, and S-154. Future updates of this report will document the location and data availability of these water quality monitoring stations.

KREA 01: located on NW 240th Street (Eagle Island Road). The sample is collected from the north side of the bridge at Fish Slough.

KREA 03: located on County Road 700-A south of Chandler Road. The sample is collected from the northwest side of the southernmost bridge (Gore/ Ash Slough).

KREA 04: located on State Road 98 just north of State Road 68 at the northernmost bridge (Chandler Slough).

**KREA 04A:** located off State Road 98 on the Bass Ranch. Sample is collected upstream of KREA 04 (Chandler Slough).

**KREA 06:** located on NW 144th Avenue (Lambs Island Road), the sample is collected from the east side of a steel bridge approximately .4 mile up Lambs Island Road from State Road 68 (Cypress Slough).

**KREA 06A:** located off Lamb Island Road on Watford Ranch. Sample is collected upstream of KREA 06 (Cypress Slough).

**KREA 07:** located 1.9 miles on NW 160th Drive (Micco Bluff Road) just west of Larson Dairy at the culverts draining under NW 160th Drive (Ash Slough).

**KREA 08:** located 1.2 miles on NW 160th Drive just east of Larson Dairy at the culverts draining under NW 160th Drive (Ash Slough).

**KREA 09:** located off of NW 203rd Avenue (Old Peavine Trail). The sample is collected on the north side of the culvert at Ash Slough.

**KREA 10:** located .5 mile on Underhill Road from C-721, and is collected from a culvert that drains a shallow ditch.

**KREA 14:** located at the end of Larson Dairy Road. Sample is collected at the culvert on the upstream side of Clemon's property.

**KREA 16:** located approximately 1.6 miles on NW 56th Street southwest of Rucks Dairy. The sample is collected from a culvert on the south side of the road.

**KREA 17:** located on Platts Bluff Road. The sample is collected from the west side of the culvert (Yates Marsh).

**KREA 17A:** sample site is located on the access road to the Baptist Children's Home downstream of KREA 17 (Yates Marsh).

**KREA 18:** located .8 mile north of KREA 17 on Platts Bluff Road. This site is also a culvert which runs perpendicular to the Seaboard Coastal Line railroad bridge at Yates Marsh.

**KREA 19:** located off of State Road 70 west of the Kissimmee River at Queen Bee Farms.

**KREA 20:** located on State Road 98 approximately 1/2 mile west of Flying "G" Dairy. Sample is collected on the south side of the bridge (Yates Marsh).

**KREA 21:** located west of KREA 01 (Fish Slough) sample is collected on the south side of Dad Island Road.

**KREA 22:** located at the corner of Eagle Island Road and 700-A. Sample is collected from south side of the culvert on Eagle Island Road (Gore Island).

**KREA 23:** west on Eagle Island Road from KREA 22. Sample is collected on the south side by the fence (Ash Slough).

**KREA 25:** located on State Road 98 approximately 1/2 mile east of Flying "G" Dairy. Sample is collected on the south side of the bridge (Turkey Slough).

**KREA 26:** located off of 700-A on 216th Avenue. Sample is collected on the southwest side of Continental Ranch.

**KREA 27:** located off of 700-A on 220th Avenue. Sample is collected from the south side of the culvert (West Chandler Slough).

**KREA 28:** located on railroad tracks; sample is collected from railroad bridge. Sample site is approximately 1/2 mile from the end of Mitchell Road, which is located off of State Road 98 (Popash Slough).

**KREA 29:** located off State Road 70. Sample is collected between Eagle Bay Drive and Okeechobee Animal Hospital.

**KREA 30:** located on State Road 70. Sample is collected at Popash Slough.

**KREA 31:** located on State Road 70 west of KREA 30. Sample is collected from tributary which feeds into L-62.

**KREA 32:** located off State Road 98 at Dry Lake Dairy #1.

**KREA 32A:** located on State Road 98 and Dry Lake Dairy #1, south of KREA 32.

**KREA 33:** located on State Road 98. Sample is collected west of Dry Lake Dairy #2.

**KREA 34:** located along State Road 78 and Ferrell Dairy.



KREA 34A: located off Ferrell Dairy Road, west of KREA 34.

KREA 35: located on L-59 at C-38. Sample is collected on the southwest side of the Kissimmee River.

KREA 36: this station is located west off State Road 441 on Wolfe Road. Samples are collected at Wolfe Brothers Dairy.

KREA 37: located on Myrtle Island Ranch at southeast corner of R. Rucks Dairy. Sample is collected downstream of culvert at R. Ruck Dairy.

KREA 38: site is located south of the C-41A canal and west of KREA 37. Sample catches the outfall for Brighton Dairy #1.

KREA 38A: located south of C-41A. Sample catches the inflow to Brighton Dairy #1.

KREA 39: located on Smith Okeechobee Farm along south edge of White Dairy north of sample site KREA 19. Sample is collected upstream of culvert.

KREA 40: located north of Larson Dairy Road. This sample catches the outfall for Larson Dairy #2.

KREA 41: located off Boat Ramp Road. Sample catches the outfall for Butler Dairy #2.

KREA 41A: located on Butler Dairy just south of KREA 41.

KREA 42: located on the Flying "G" Ranch off State Road 98. This sample catches the outfall for Flying "G" Dairy.

KREA 43: located south of Eagle Island Road. This sample catches the runoff from C & M Dairy.

KREA 43A: located at the southeast corner of C & M Dairy.

KREA 44: located off of Lamb Island Road. This sample catches the outfall for that dairy.

KREA 46: this station is located west off State Road 98 at Williamson Dairy. Samples are collected 500 yards west of the dairy outflow.

KREA 47: located south of Eagle Island Dairy. Sample catches the outfall from that dairy.

KREA 48: located at Eagle Bay on State Road 78 W.

KREA 49: Dry Lake Dairies #1 and 2 outfall located on State Road 98 approximately 200 yards north of Dry Lake #2 entrance.

KREA 49A: located upstream of KREA 49.

KREA 55: located at southwest corner of Micco Dairy, 2.5 miles northwest along spoil bank from east access road to S65C.

KREA 65C: a large gate and boat lock structure located on the Kissimmee River nine miles south of S-65BB. The water samples are collected with an automatic water sampler from the upstream side.

KREA 65D: a large gate and boat lock structure located on the Kissimmee River nine miles south of S-65C. The water samples are collected with an automatic water sampler from the upstream side.

KREA 65E: this is the largest of the six gate and boat lock structures on the Kissimmee River located 7 1/2 miles south of S-65D, and 8 miles north of Lake Okeechobee. The water samples are collected with an automatic water sampler from the upstream side.

KREA 66: located off State Road 98 at Four-E's Campground.

KREA 68: located on 4-K Ranch, 2.9 miles west on NW 160th Drive (Micco Bluff Road). The sample is collected upstream of flume draining pasture from the west.

KREA 154: a small gate type structure located on the north side of the Kissimmee River about half way between Lake Okeechobee and S-65E. This structure allows water to flow from the L-62 canal into C-38. The water samples are collected with an automatic water sampler from the upstream side.

KREADL11: this station is located east off State Road 98 at Dry Lake Dairy #2. Samples are collected .3 mile north of the Dry Lake #2 barn in the east spray field.

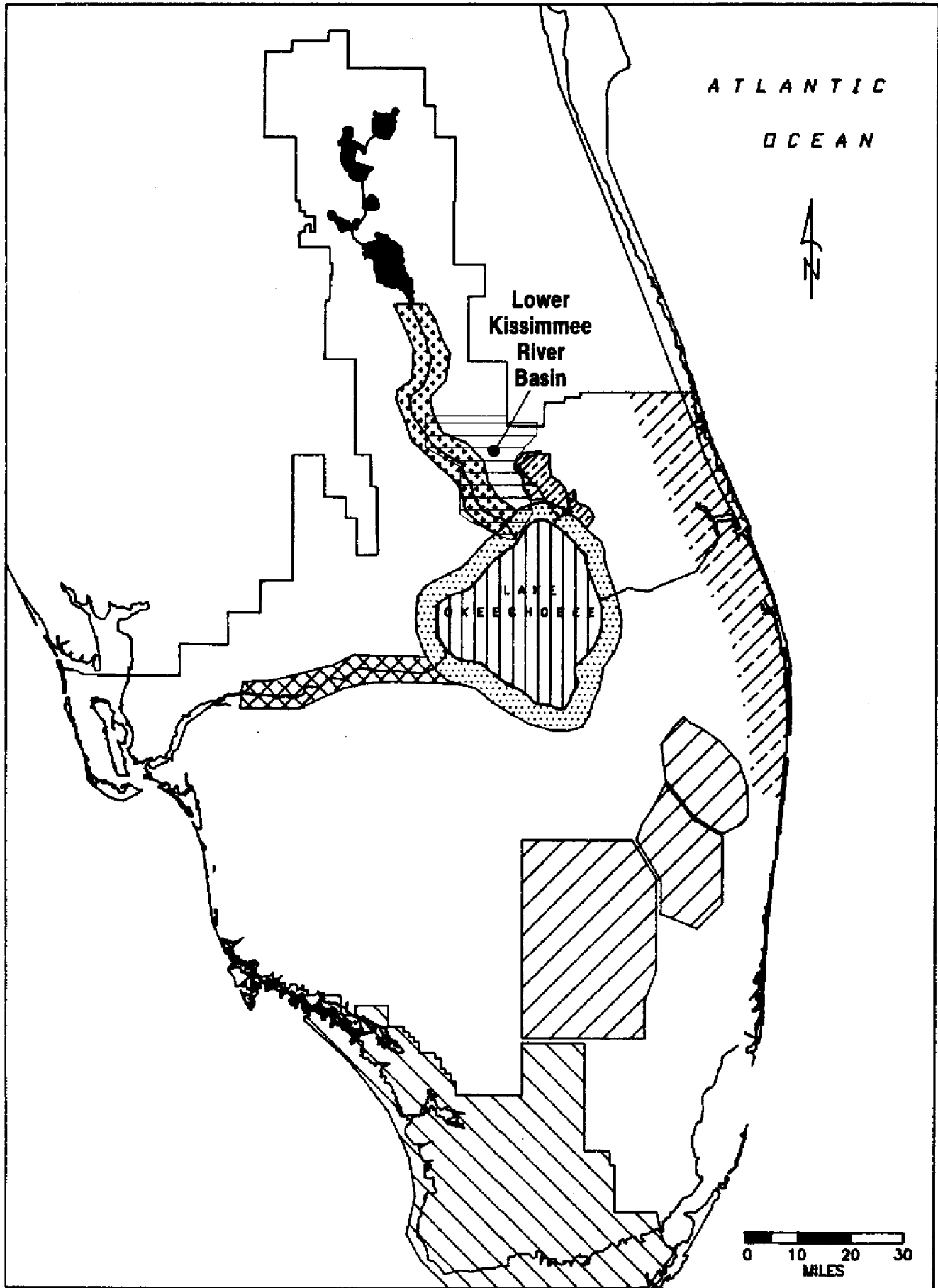
KREADL12: this station is located east off State Road 98 at Dry Lake Dairy #2. Samples are collected .7 mile northwest of Dry Lake #2 barn in the west spray field.

KREADLN1: this station is location east off State Road 98 at Dry Lake Dairy # 2. Samples are collected .5 mile north of Dry Lake #2 barn in the east spray field.

## **Parameters and Sampling Frequencies**

Structures S-65C, S-65D, S-65E, and S-154 are sampled with automatic water samplers on a regular time interval, and analyzed weekly.

Physical parameters and nutrients are sampled routinely each week at all stations.



**Figure 9-1. LOWER KISSIMMEE RIVER BASIN  
WATER QUALITY MONITORING PROGRAM**

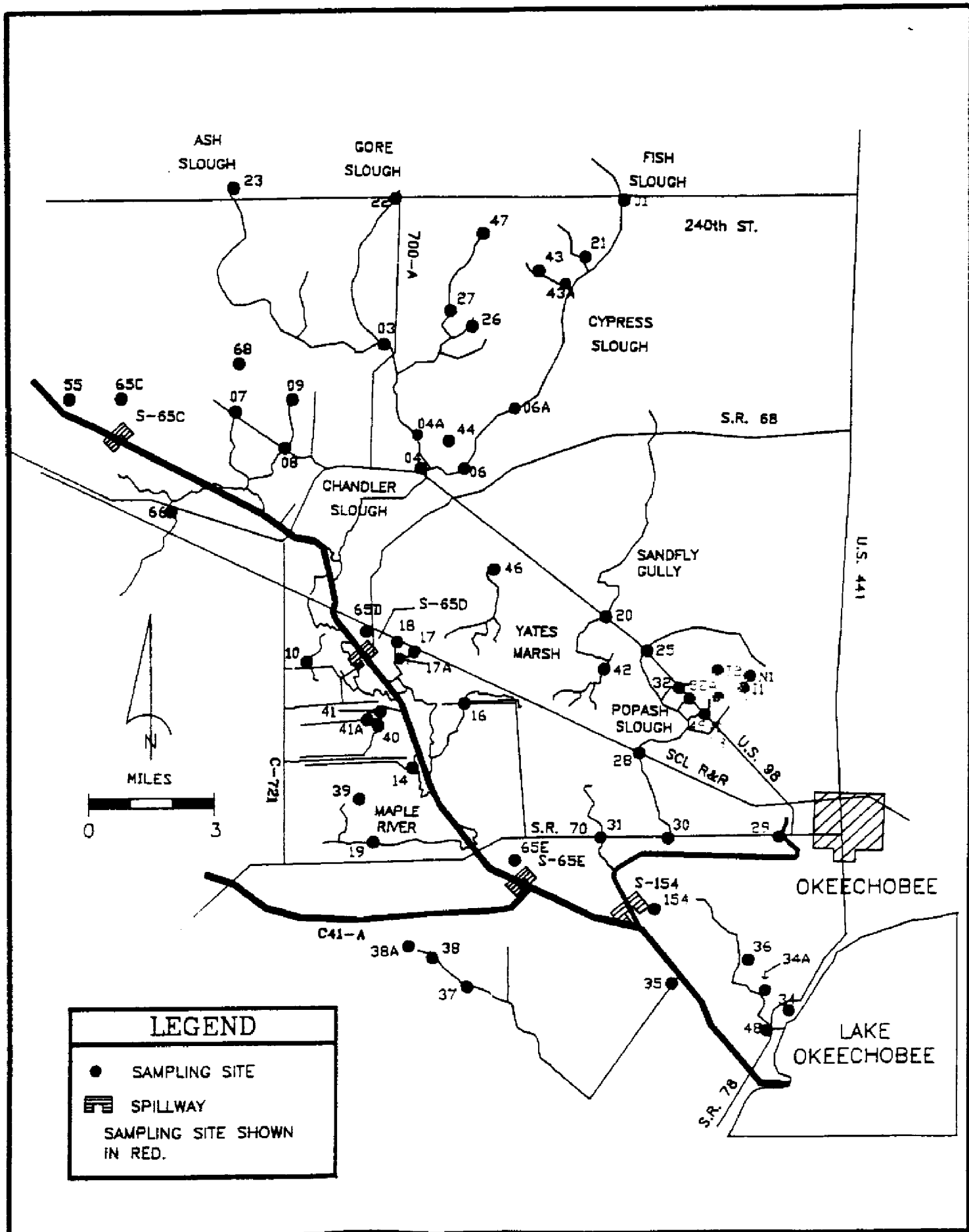


Figure 9-2. LOCATION OF SAMPLING STATIONS FOR THE LOWER KISSIMMEE RIVER BASIN WATER QUALITY MONITORING PROGRAM

TABLE 9-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE LOWER KISSIMMEE RIVER BASIN MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical		Major Ions	Trace Metals	Pesticide Species	Other US/DS
					Parameters	Nutrients				
KREA 01	272736	805523	Fish Slough at NW 240th Road	1986 - P	W	W				
KREA 03	272515	810026	Ash/ Gore Slough at C-700A Bridge	1986 - P	W	W				
KREA 04	272258	805928	Chandler Slough North at SR 98	1986 - P	W	W				
KREA 04A	272310	805938	Chandler Slough at JC Bass Stage Rec	1986 - P	W	W				
KREA 06	272249	805830	Cypress Slough at NW 144th Avenue	1986 - P	W	W				
KREA 06A	272358	805723	Cypress Slough at Watford Stage Rec	1986 - P	W	W				
KREA 07	272433	810237	Larson Dairy Trib W at NW 160th Dr	1986 - P	W	W				
KREA 08	272430	810222	Larson Dairy Trib E at NW 160th Dr	1986 - P	W	W				
KREA 09	272554	810319	Larson Dairy/Ash Slough Off Old Peavine Trib	1986 - P	W	W				
KREA 10	271919	810250	Butler Dairy Outfall Underhill Rd	1986 - P	W	W				
KREA 14	271651	810114	Pump on Clemons Ranch and Larson Dairy Rd	1986 - P	W	W				
KREA 16	271808	805855	Platts Bluff Dr Outfall NW 156th St	1986 - P	W	W				
KREA 17	271942	810035	Yates Marsh S at SCL Railroad	1986 - P	W	W				
KREA 17A	271845	810005	Yates Marsh Outfall at BAP Child HM	1987 - P	W	W				
KREA 18	271951	810035	Yates Marsh N at SCL Railroad	1986 - P	W	W				
KREA 19	271442	800110	MA Williams/ Queen Bee Rd off SR 70	1987 - P	W	W				
KREA 20	272020	805628	Sandfly Gully N of Flying "G" at SR98	1987 - P	W	W				
KREA 21	272705	805630	HF Rucks D Outfall off Eagle Island Road	1987 - P	W	W				
KREA 22	273052	810027	Gore Slough at NW 240th St and C-700A	1987 - P	W	W				
KREA 23	273052	810355	Ash Slough Viking Property at Weir	1987 - P	W	W				
KREA 25	272612	805925	Turkey Slough S of Flying "G" D SR 98	1987 - P	W	W				
KREA 26	272612	805925	Chandler Slough East at NW 216th Street	1987 - P	W	W				
KREA 27	272635	805950	Chandler Slough West at NW 220th Street	1987 - P	W	W				
KREA 28	271630	805555	Popash Slough at SCL Railroad Bridge	1987 - P	W	W				
KREA 29	271435	805135	Trib SR 70 Eagle Bay Dr and Animal Hosp	1987 - P	W	W				
KREA 30	271435	805341	At Popash Slough and SR 70	1987 - P	W	W				
KREA 31	271435	805553	Trib to L-62 W of Popash Slough SR 70	1987 - P	W	W				
KREA 32	271839	805405	.5 Mile N or Dry Lake Dairy #1 SR 98	1987 - P	W	W				
KREA 32A	271820	805355	At Dry Lake Dairy #1 at SR 98	1987 - P	W	W				
KREA33	271745	805323	.5 Mile S of Dry Lake Dairy #2 SR 98	1986 - P	W	W				

POR = Period of Record for Nutrients, Physical Parameters, and Major Ions  
W = Weekly  
BW = Bi-weekly (Twice/ Month)  
A = Automatic Sampler  
M = Monthly  
QTR = Quarterly  
BA = Bi-annually (Twice/Year)  
DD = During Discharge  
US = Upstream  
DS = Downstream  
Other = PCB's  
P = Present

TABLE 9-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE LOWER KISSIMMEE RIVER BASIN MONITORING PROGRAM

SFWMD STA ID	LAT	LONG	Location	POR	Physical		Major Ions	Trace Metals	Pesticide Species	Other US/DS
					Parameters	Nutrients				
KREA 34	271140	805047	Ferrell Dairy Outfall at SR 78	1987 - P	W	W				
KREA 34A	271153	805148	Ferrell Dairy Outfall at Ferrell Dairy Road	1987 - P	W	W				
KREA 35	271120	805410	In L-59 at C-38 SW Side of Kissimmee River	1987 - P	W	W				
KREA 36	271215	805251	One Mile S Wolfe Dairy Road on Wolfe Dairy	1988 - P	W	W				
KREA 37	271200	805705	SE Corner R. Rucks Dairy	1988 - P	W	W				
KREA 38	271215	800005	Brighton Dairy #1 Outfall	1987 - P	W	W				
KREA 38A	271212	805958	Brighton Dairy #1 Outfall Upstream	1987 - P	W	W				
KREA 39	271502	800200	0.2 Mile SW White Dairy Barn	1988 - P	W	W				
KREA 40	271731	810129	Larson Dairy #2 Outfall Larson Dairy Rd	1987 - P	W	W				
KREA 41	271715	810105	Butler Dairy #2 off Boat Ramp Road	1987 - P	W	W				
KREA 41A	271720	810207	Butler Dairy #2 Outfall S of KREA 41	1987 - P	W	W				
KREA 42	271855	805540	Outfall for Flying "G" Dairy	1987 - P	W	W				
KREA 43	272052	805925	C & M Rucks Dairy Outfall	1987 - P	W	W				
KREA 43A	272510	815745	C & M Dairy Downstream of KREA 43	1987 - P	W	W				
KREA 44	272302	805810	Outfall Lamb Island Dairy Cypress Slough	1987 - P	W	W				
KREA 46	272000	805850	One Mile S SR98 on Williamson Dairy	1988 - P	W	W				
KREA 47	272720	805929	Outfall Eagle Island Dairy	1987 - P	W	W				
KREA 48	271113	805115	Eagle Bay at SR 78	1987 - P	W	W				
KREA 49	271753	805337	Dry Lake Dairy #'s 1 and 2 Outfall	1987 - P	W	W				
KREA 49A	271809	805330	Downstream KREA 49	1987 - P	W	W				
KREA 55	272630	810825	SW Corner of Micco Dairy	1988 - P	W	W				
KREA 65C	272401	810657	River Structure 65C	1987 - P	W/A	W/A				
KREA 65D	271845	810120	River Structure 65D	1987 - P	W/A	W/A				
KREA 65E	271335	805742	River Structure 65E	1987 - P	W/A	W/A				
KREA 66	272252	810604	Four E's Fish Camp at SR 98	1986 - P	W	W				
KREA 68	272500	810230	Ash Slough Bass Property at Flume	1988 - P	W	W				
KREA 154	271241	805506	River Structure 154	1987 - P	W/A	W/A				
KREADL1	271790	805320	.3 Mile N Dry Lake 2 Barn at E Spray Field	1988 - P	W	W				
KREADL2	271815	805337	.7 Mile NW Dry Lake 2 Barn at W Spray Field	1988 - P	W	W				
KREADLN1	271850	805330	.5 Mile N of Dry Lake 2 E Spray Field	1988 - P	W	W				

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
A	=	Automatic Sampler	DD	=	During Discharge	P	=	Present

**SECTION 10**  
**TAYLOR CREEK/NUBBIN SLOUGH**

**Purpose and Scope**

The Taylor Creek/ Nubbin Slough water quality monitoring program encompasses an area characterized by beef and intensive dairy cattle operations. The basin is located primarily in southeast and central Okeechobee County (Figure 10-1).

A water quality monitoring network has been in place and sampled by the South Florida Water Management District (SFWMD or District) since 1979. This network, currently consisting of 26 stations, was initiated as a means of identifying trends and quantifying, where possible, changes in water quality that occurred due to changes in land use and/or implementation of Best Management Practices (BMPs) on beef cattle ranches and dairy farms in the basin under the jointly funded state/ federal Taylor Creek Headwaters/ Rural Clean Waters Program. The program was further institutionalized by nature of its continuance being included as a condition of the District's Lake Okeechobee Operating Permit granted by the Florida Department of Environmental Regulation.

In response to recommendations by the Kissimmee River Resource Planning and Management (380) and the Lake Okeechobee Technical Advisory Committee to provide a higher degree of resolution to the network as a tool for identifying trouble spots, informing individual landowners of the impacts of their efforts in implementing BMPs plans to improve water quality, and to provide state and federal agencies responsible for administering cost-share programs a method of measuring the cost-effectiveness of the legislatively provided funds, the District has committed to further intensify the monitoring effort in fiscal year 1987-88 by approximately doubling the number of sampling sites. The intensified version of the program is scheduled to be on-line by October, 1988.

The objectives of the program are four-fold. They are:

1. To determine the effectiveness of BMPs being implemented on the dairies for improving water quality in C-38 and its tributary streams;
2. To identify the causes of high episodic phosphorus events;

3. Evaluate the effectiveness of individual Soil Conservation Service's BMP design plans for improving water quality in runoff from individual farms; and
4. Determine the nutrient concentration from non-dairy land use activities.

This program satisfies the District's commitments under the conditions of the Taylor Creek Headwaters and the Rural Clean Waters programs and legal obligations under the Lake Okeechobee Operating Permit. In addition, this program is integral in the development of the Lake Okeechobee Water Quality Management Plan as required by the state's Surface Water Quality Management Plan under the state's Surface Water Improvement and Management legislation of 1987.

**Sampling Location and Description**

The original sampling locations that are monitored under the Taylor Creek/ Nubbin Slough program are shown in Figure 10-2. Table 10-1 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of major chemical species, and whether the sample is collected upstream, downstream, or during discharge. Approximately 28 stations equipped with automatic samplers will be used to monitor runoff from each of the dairies within the basin and water quality at nine of the major tributaries and structures.

OSEZ 01: this station is located east off State Road 98 at the outflow of SEZ dairy into Wolf Creek.

ARS 07: this station is located east off State Road 441 to Williamson Cattle Company. A grab sampler is collected at a concrete bridge on the Williamson main ditch.

ARS 08: this station is located east off State Road 441 to Williamson Cattle Company. A grab sample is collected at a four culvert discharge structure in the Williamson east lateral 1/4 mile east of station 07.

ARS 09: this station is located east off State Road 441 at Williamson Ditch at the Florida School for Boys. A grab sample is collected directly downstream of the treatment plant at the Boys School.

ARS 11: this station is located east off State Road 441 on Cemetery Road. A grab sample is collected at Taylor Creek on the Cemetery Road bridge.

ARS 12: this station is located west off State Road 441 on Hillard Road. A grab sample is collected at Taylor Creek on the D.R. Daniel's beef cattle operation.

ARS 13: this station is located on State Road 710 and Mosquito Creek. A grab sample is collected at the Mosquito Creek bridge.

ARS 14: this station is located on State Road 710 and Nubbin Slough. A grab sample is collected at the Nubbin Slough bridge.

ARS 14A: this station is located at Red Top Dairy off State Road 710. A grab sample is collected at a surface water drainage ditch running from the dairy into Nubbin Slough.

ARS 14B: this station is located at Red Top Dairy off State Road 710. A grab sample is collected at a surface water ditch approximately 1/2 mile north of ARS 14A that drains several hay pastures into Nubbin Slough.

ARS 15: this station is located on State Road 70 at Mosquito Creek. A grab sample is collected at the Mosquito Creek bridge.

ARS 17: this station is located on Berman Road approximately three miles south of State Road 70. A grab sample is collected at a culvert where Nubbin Slough crosses Berman Road.

ARS 39: this station is located on State Road 710 at Henry Creek. A grab sample is collected at the Henry Creek bridge.

ARS 40: this station is located on State Road 710 at Lettuce Creek. A grab sample is collected at the Lettuce Creek bridge.

S-191: A large gate type structure on the north side of Lake Okeechobee at Nubbin Slough. Water is released into Lake Okeechobee through this structure. Water samples are collected from the upstream side of this structure by an automatic water sampler.

TCHW 01: this station is located approximately five miles west off State Road 441 on State Road 68. A grab sample is collected at the road bridge on State Road 68 at NW Taylor Creek.

TCHW 02: this station is located west off State Road 441 on Potter Road. A grab sampler is collected at the road bridge on Potter Road at Little Bimini.

TCHW 02: This station is located 100 yards west of State Road 441 at a culvert on Wilson Rucks property on Otter Creek.

TCHW 06: this station is located west off State Road 441 on Potter Road. A grab sample is collected at two large culverts on Potter Road at Otter Creek.

TCHW 18: this station is located west off State Road 441 on State Road 68 at Flying "G" Ranch. A grab sample is collected approximately 3.5 miles south into Flying "G" Ranch directly below the confluence of Otter Creek, Little Bimini, and NW Taylor Creek.

TCHW 19: this station is located west off State Road 441 on Potter Road. A grab sample is collected at East Otter Creek and Potter Road at two large roadside culverts.

TCHW 20: this station is located east off State Road 441 on Dark Hammock Road. A grab sample is collected at a Department of Transportation's culvert on the south corner of Dark Hammock Road and State Road 441.

TCHW 23: this station is located west off State Road 441 and Big Daddy Grocery. A grab sample is collected approximately 1/2 mile west on Otter Creek at a tributary running perpendicular to the Wilson Rucks Dairy barn.

TCHW 25: this station is located east off State Road 441 1/2 mile behind McArthur Barn #1. A grab sample is collected at a tributary ditch draining into Otter Creek perpendicular to McArthur Barns #1 and 2 lagoons.

TCHW26: this station is located east off State Road 441 1/2 mile behind McArthur Barns #1 and 2. A grab sample is collected at Otter Creek upstream of station 25.

TCHS104: this station is located west off State Road 441 on Calf Barn Road. A grab sample is collected at a tributary ditch, south of Calf Barn Road, that drains into the headwaters of Little Bimini. This ditch also runs parallel and is 1/4 mile south of McArthur Barn #5.

TCNS111: this station is located west off State Road 441 on Potter Road. A grab sampler is collected at a tributary that runs across H & T Rucks Barn #3 at Potter Road.



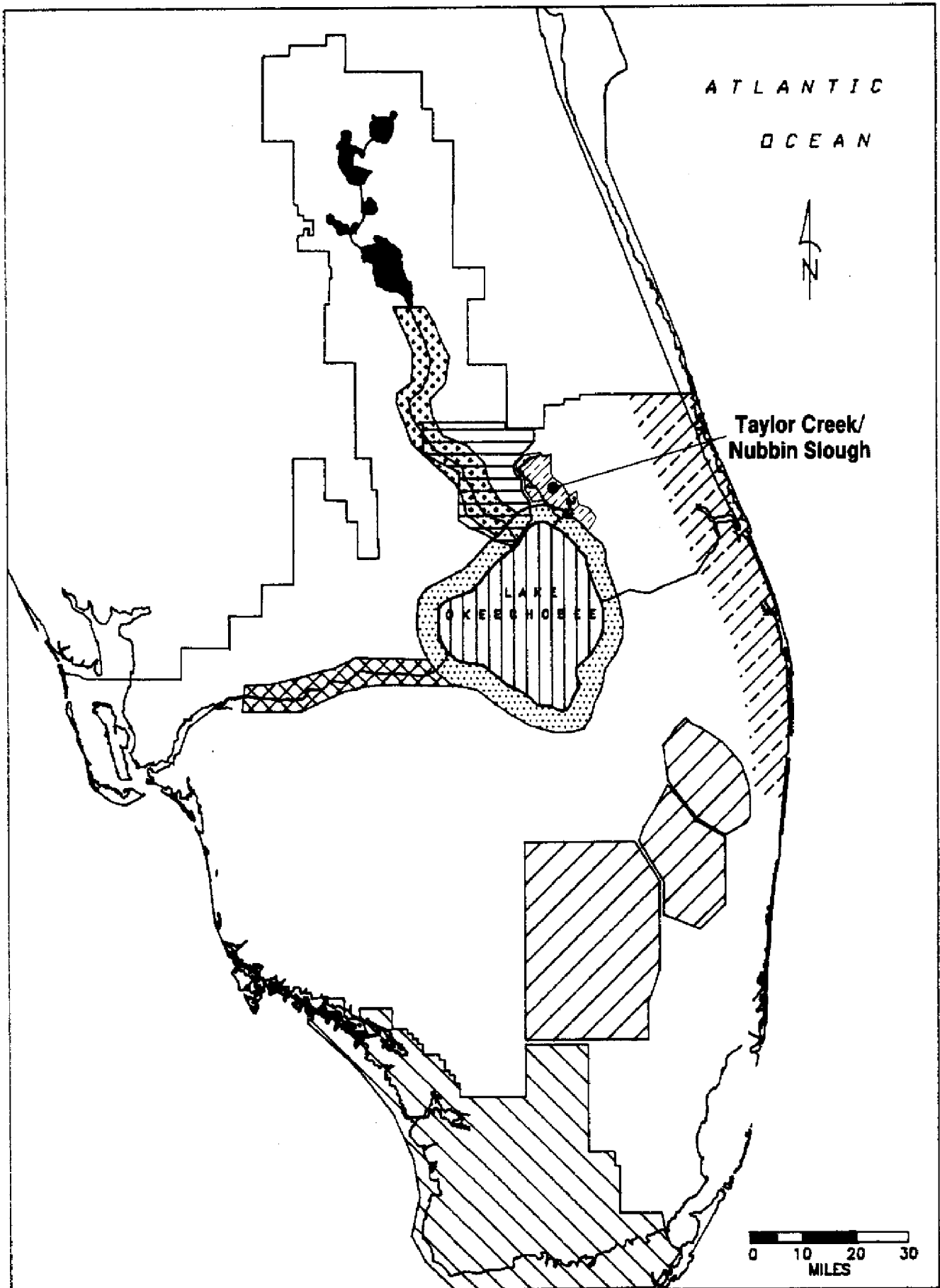
## **Parameters and Sampling Frequencies**

Structure 191 is sampled with an automatic water sampler on a regular time interval and analyzed weekly.

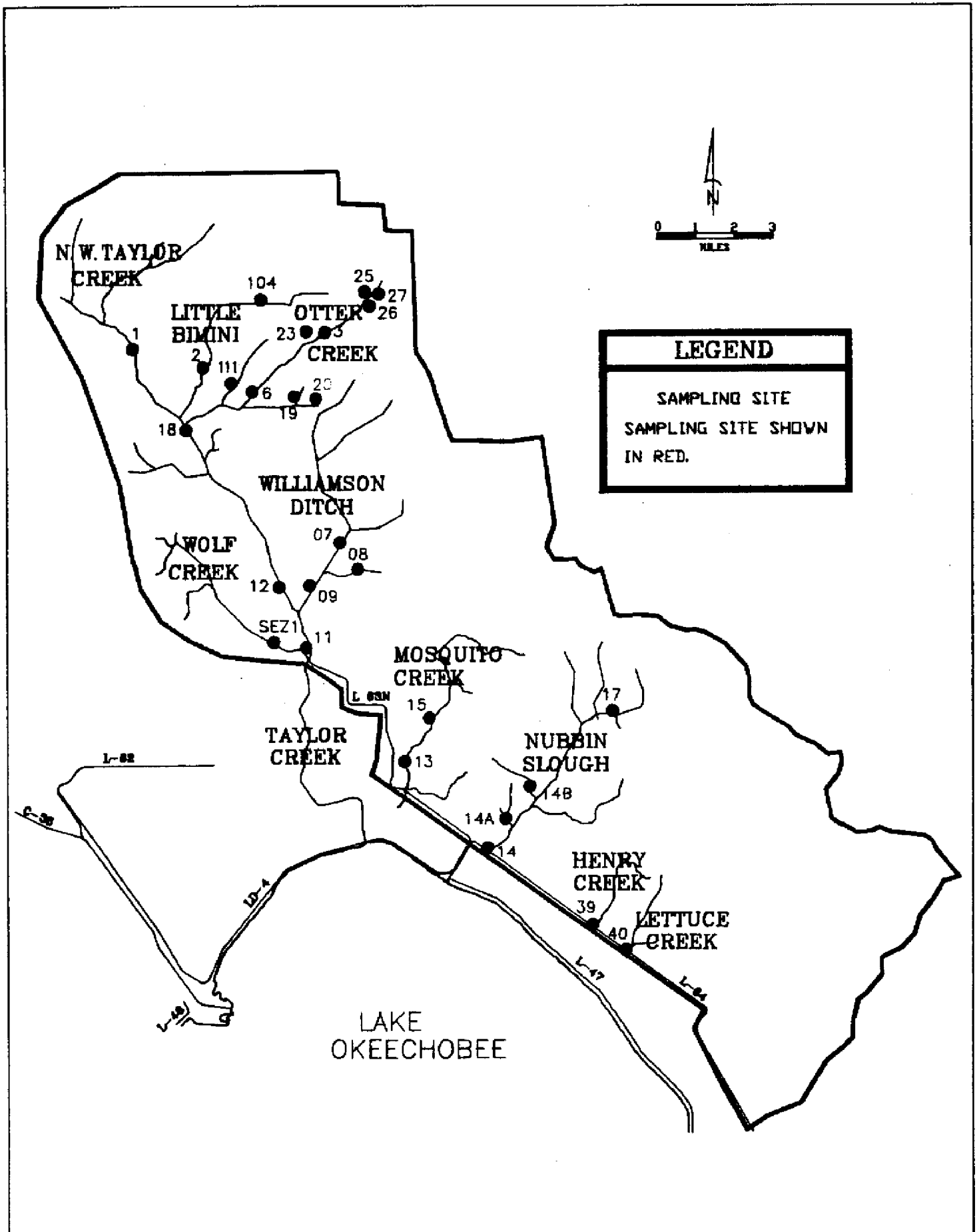
Physical parameters and nutrients are sampled routinely every two weeks at all stations.

## **District Publications**

Ritter, G. J., and Allen, H. Jr., 1982. Taylor Creek Headwaters Project Phase 1 Report; Water Quality. SFWMD, Tech. Publ 82-8.



**Figure 10-1. TAYLOR CREEK/NUBBIN SLOUGH  
WATER QUALITY MONITORING PROGRAM**



**10-2. LOCATION OF SAMPLING STATIONS FOR THE TAYLOR CREEK / NUBBIN SLOUGH WATER QUALITY MONITORING PROGRAM**

**TABLE 10-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION FOR THE  
TAYLOR CREEK NUBBIN SLOUGH MONITORING PROGRAM**

<u>SFWMD STA ID</u>	<u>LAT</u>	<u>LONG</u>	<u>Location</u>	<u>POR</u>	<u>Physical Parameters</u>	<u>Nutrients</u>	<u>Major Trace Ions</u>	<u>Metals</u>	<u>Pesticide Species</u>	<u>Other US/DS</u>
TCHW 01	272339	805344	NW Taylor Creek at SR 68 (NW 160 St)	1979 - P	BW	BW				
TCHW 02	272311	805100	Little Bimini at Potter Road (114 Dr)	1979 - P	BW	BW				
TCHW 03	272403	804858	Otter Creek at SR 441	1979 - P	BW	BW				
TCHW 06	272240	805046	Otter Creek at Potter Rd (NW 144 Drive)	1979 - P	BW	BW				
TCHW 18	272152	805222	Taylor Creek Confluence at S2	1979 - P	BW	BW				
TCHW 19	272230	804938	E Otter Creek at Potter Canal (NW 144 Drive)	1979 - P	BW	BW				
TCHW 20	272232	804902	Rimsberg Ranch Runoff at SR 441	1979 - P	BW	BW				
TCHW 23	272353	804919	Otter Creek at Wilson Rucks Dairy Outflow	1979 - P	BW	BW				
TCHW 25	272453	804750	McArthur Farms #1 Runoff at Otter Creek	1979 - P	BW	BW				
TCHW 26	272453	804750	Otter Creek Near McArthur's Barn #1	1979 - P	BW	BW				
TNCS 104	272417	805043	McArthur Runoff to Little Bimini	1983 - P	BW	BW				
TCNS 111	272300	805000	Tommy Rucks Dairy Runoff on Potter Road	1985 - P	BW	BW				
OSEZ 01	271600	805000	Outflow at East End of SEZ Dairy at Wolf Cr	1979 - P	W	W				
ARS 07	271902	804829	Williamson Ditch at Williamson Cattle Co	1979 - P	BW	BW				
ARS 08	271840	804805	Williamson E Lat Runoff to West Ditch	1979 - P	BW	BW				
ARS 09	271804	804920	Williamson Ditch at Boy School and S7	1979 - P	BW	BW				
ARS 11	271702	804920	Taylor Creek at Cemetary Road Bridge	1979 - P	BW	BW				
ARS 12	271823	805004	Taylor Creek at Well Line B and Daniel	1979 - P	BW	BW				
ARS 13	271413	804053	Mosquito Creek at SR 710	1979 - P	BW	BW				
ARS 14	271213	804445	Nubbin Slough at SR 710	1979 - P	BW	BW				
ARS 14A	271218	804434	Old Outfall Adjacent to Old Lagoon	1987 - P	BW	BW				
			Discharge at Nubbin Slough							
ARS 14B	271245	804410	Outfall from Spray Field at Nubbin Slough	1987 - P	BW	BW				
ARS 15	271512	804613	Mosquito Creek at SR 70	1979 - P	BW	BW				
ARS 17	271520	804141	Nubbin Slough at Berman Road	1979 - P	BW	BW				
ARS 39	271029	804207	Henry Creek at SR 710	1979 - P	BW	BW				
ARS 40	270956	804114	Lettuce Creek at SR 710	1979 - P	BW	BW				
S191	271135	804535	Bridge at SR441 and Nubbin Slough	1987 - P	W/A	W/A				

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/ Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
P	=	Present	DD	=	During Discharge	P	=	Present
A	=	Automatic Sampler						

## SECTION 11 ROUTINE PESTICIDE MONITORING NETWORK

### Purpose and Scope

The Routine Pesticide Monitoring Network encompasses an area from the north end of Lake Okeechobee, south to the Everglades National Park (Figure 11-1). The water quality monitoring program was established to provide a water quality and nutrient loading data base for the purposes of:

1. Complying with monitoring requirements of the Lake Okeechobee Operating Permit #50-0679349 issued by the Department of Environmental Regulation (DER);
2. Complying with the Memorandum of Agreement (MOA) between the Miccosukee Tribe of Florida and the South Florida Water Management District (SFWMD or District);
3. Complying with the MOA between the ENP, District, and United States Army Corps of Engineers;
4. Implementing the Lake Okeechobee Technical Advisory Committee's recommendation for a comprehensive monitoring and research plan as described in DER's "Lake Okeechobee Monitoring and Research Plan"; and
5. Determining long and short term trends necessary to identify potential problem areas in terms of pollution by organic contaminants (herbicides and pesticides).

Data have been collected since 1980 to the present. Initially only a few stations were collected for a narrow range of pesticides. The routine network was significantly expanded in 1984 to form the framework of current monitoring program. These data can indicate trends in the changes in water quality and allow for better management of the system. The presence of any detectable amount of pesticide may be of environmental concern and is being documented to establish baseline levels and to initiate follow up action by the appropriate state or federal agency.

### Sampling Locations and Descriptions

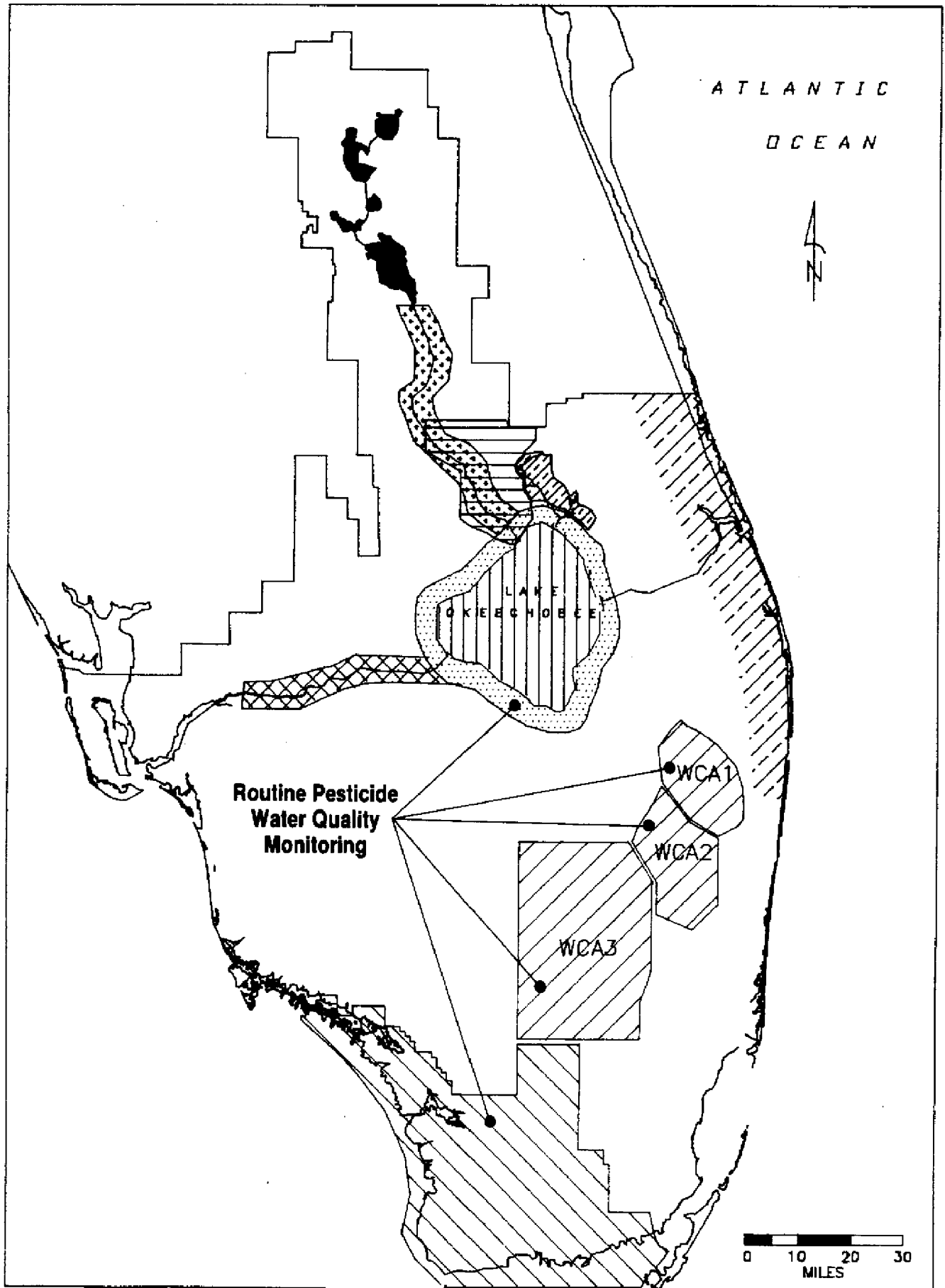
There are 22 water quality monitoring stations that are sampled under the Routine Pesticide Monitoring Network. The locations of the stations are shown in Figure 11-2. Detailed descriptions of each site are found in the section indicated in Table 11-1. Table 11-2 lists the latitude and longitude, a brief station description, the period of record, the frequency of collection of pesticides, and whether the sample is collected upstream, down-stream, or during discharge.

### Pesticide Sampling Frequency

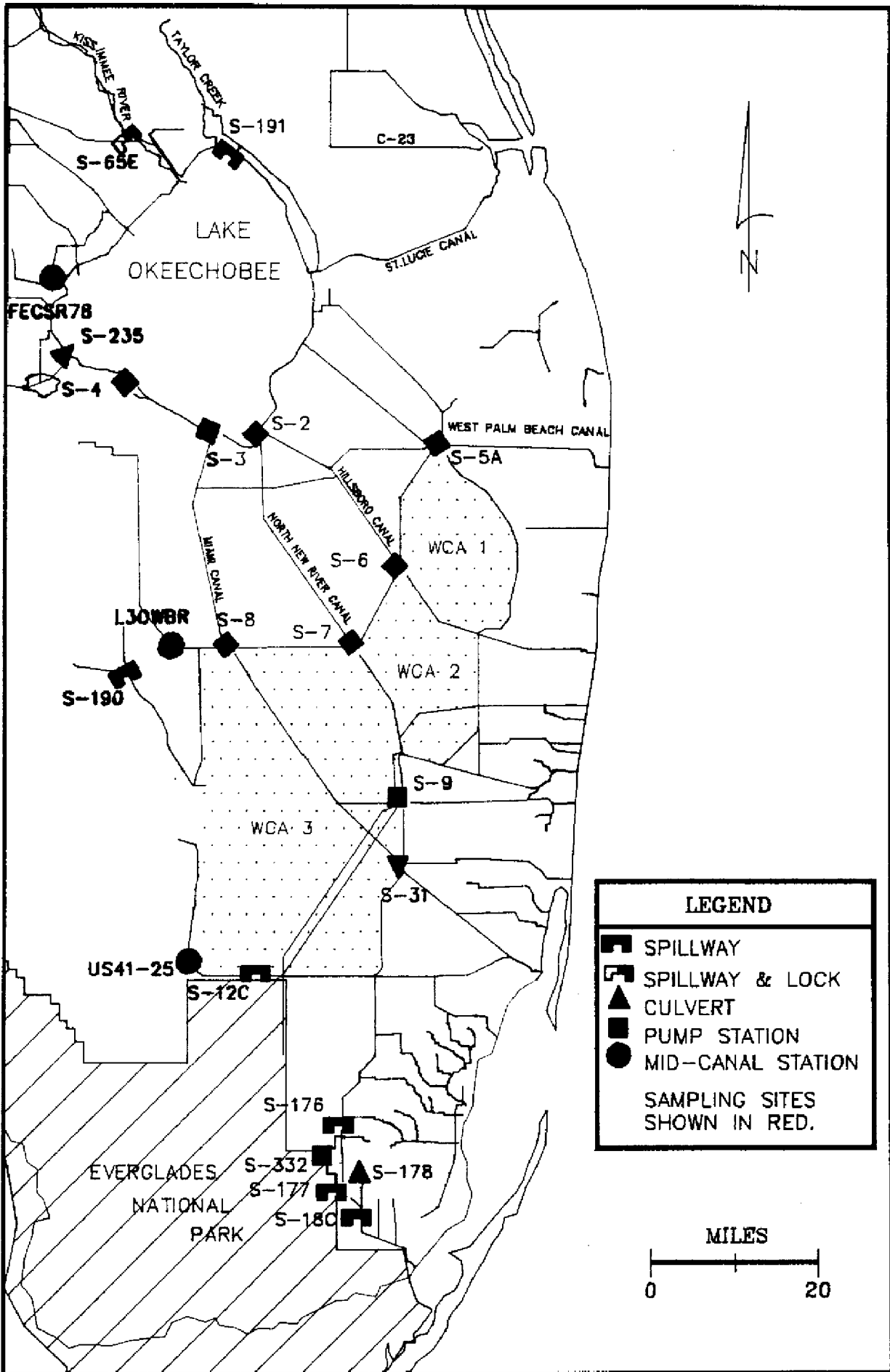
Pesticides are analyzed for in water and sediment samples four times per year at each routine station.

### District Publications

Pfeuffer, R. J., 1985. Pesticide Residue Monitoring in Sediment and Surface Water Bodies within the South Florida Water Management District. SFWMD, Tech. Pub. No. 85-2.



**Figure 11-1. ROUTINE PESTICIDE WATER QUALITY MONITORING PROGRAM**



**Figure 11-2. LOCATION OF SAMPLING STATIONS FOR THE ROUTINE PESTICIDE WATER QUALITY MONITORING PROGRAM**

**TABLE 11-1. SUMMARY OF SAMPLING STATION LOCATIONS AND FREQUENCY OF COLLECTION  
FOR THE ROUTINE PESTICIDE MONITORING PROGRAM**

<u>SFWMD</u> <u>STA ID</u>	<u>LAT</u>	<u>LONG</u>	<u>Location</u>	<u>POR</u>	<u>Physical</u>		<u>Major Trace</u>		<u>Pesticide</u>	<u>Other</u>	<u>US/DS</u>
					<u>Parameters</u>	<u>Nutrients</u>	<u>Ions</u>	<u>Metals</u>			
FECSR78	265744	810715	Fishing Creek and SR78	1987					QTR		
L30WBR	261950	805253	6.5 Miles West of S8 Where L3 and L4 Meet	1987					QTR	QTR	US
S2	264200	804300	Pump Sta S2 at South End of Lake Okee	1984-P					QTR		US
S3	264155	804825	Pump Sta S3 at South End of Lake Okee	1984-P					QTR		US
S4	264722	805743	Pump Sta S4 at South End of Lake Okee	1984-P					QTR		US
S5A	264101	802205	Pump Sta at the North End of WCA1	1987					QTR		US
S6	262822	802650	Pump Sta at L15, L6, & L7 Intersect	1984-P					QTR		US
S7	262007	803213	Pump Sta at L5, L6, & L18 Intersect	1984-P					QTR		US
S8	261953	804628	Pump Sta at L4, L5, & L23 Intersect	1984-P					QTR		US
S9	260340	802638	Pump Sta on S New River Canal at WCA3A	1987					QTR		US
S12C	254542	804338	On US41 - 2.5 Miles West of S12D	1984-P					QTR		US
S18C	251950	803203	Structure on C111, 5.2 Miles South of US27	1980-P					QTR		US
S31	255633	802624	On Miami Canal Near US27	1987					QTR		US
S65E	271335	805742	S65E on the Kissimmee River	1987					QTR		US
S176	252855	803345	Structure at Head of C113 on C111	1984-P					QTR		US
S177	252407	803329	Floodgate at C111 and US27	1984-P					QTR		US
S178	252427	803127	Floodgate at C111E and US27	1984-P					QTR		US
S190	261701	805805	On L28I 2.5 Miles South of SR833	1987					QTR		US
S191	271135	804535	Bridge at SR441 and Nubbin Slough	1987					QTR		US
S235	265021	810509	Caloosahatchee River below S77	1987					QTR		US
S332	252524	803524	Pump Sta at L31W and Taylor Slough	1980-P					QTR		US
US41-25	254621	805023	Bridge #25 on US41 2 Miles West of S12A	1984-P					QTR	QTR	US

POR	=	Period of Record for Nutrients, Physical Parameters, and Major Ions	M	=	Monthly	US	=	Upstream
W	=	Weekly	QTR	=	Quarterly	DS	=	Downstream
BW	=	Bi-weekly (Twice/ Month)	BA	=	Bi-annually (Twice/Year)	Other	=	PCB's
			DD	=	During Discharge	P	=	Present



**TABLE 11-2. STATION IDENTIFICATION AND SECTION  
WITH DETAILED DESCRIPTION**

<u>Station I.D.</u>	<u>Section</u>
S2	1
S3	1
S-4	1
S235	4
FECSR78	1
S65E	5
S191	1
S5A	2
S6	2
S7	2
S8	2
S9	2
S12C	2
S31	2
S190	2
L30WBR	2
S18C	6
S176	6
S177	6
S178	6
S332	6
US41-25	6