TECHNICAL MEMORANDUM

June 1994

SURFACE WATER QUALITY MONITORING NETWORK

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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DRE 317

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INTRODUCTION

The South Florida Water Management District (District) has the responsibility to manage water and related resources for the benefit of the public and in keeping with the needs of the region. The key elements of its mission are:

1. Protection and Enhancement of the Environment,
2. Water Supply,
3. Flood Protection and
4. Water Quality Protection.

The District uses a varied approach to protect water quality that ranges from monitoring, testing and researching those water quality parameters related to the District's operation and projects to operating, maintaining and enhancing water quality through; District's operations, land management, and regulation. To meet the demands of these functions, the District collects and maintains an extensive database of surface water quality through monitoring programs managed by the Water Quality Monitoring Division (WQMD) of the Department of Water Resources Evaluation (WRE).

Three goals for Environmental Services programs administered by WRE are:
1. To provide water quality data and evaluations from a network of sampling stations to support water resource management decision-making;
2. To optimize the efficiency of data collection monitoring networks, and ensure data accuracy through rigorous quality control;
3. To develop and maintain a water quality database to provide efficient data access.

To address these goals, 26 major water quality monitoring programs are currently managed by WQMD. These programs encompass a wide variety of south Florida ecosystems, land uses and hydrologic systems. Monitoring points include lakes, rivers, canals, wetlands, dairies, the intracoastal waterway, estuaries, rainfall, and water control structures. Due to the dynamics of surface water flow in south Florida, the data from one monitoring program often augments data from another. Often data collected from routine monitoring programs are used to supplement more specific water quality studies.

The report presents the objectives and purpose of each program, the location of the monitoring sites, the types of parameters tested, the period of record, the frequencies of sampling, and basic statistics of some parameters collected in the last three years. Other sources of information on these monitoring programs are listed at the end of each chapter under 'District Publications'.

PURPOSE AND SCOPE

There are 26 major water quality monitoring programs that incorporate 984 sampling stations. Depending on the specific program and/or parameter, the sampling frequencies range from weekly to biannually. In addition some sampling is done only during storm events. The parameters analyzed include basic inorganics (nutrients, cations, anions and metals) organics (e.g. pesticides and the degradation products, base neutral/acid extractable, and purgeable compounds), and physical parameters (temperature, dissolved oxygen, pH, and specific conductance).

The District follows strict QA/QC (Quality Assurance / Quality Control) procedures approved

by the Florida Department of Environmental Protection (FDEP) for both the field and laboratory work. Any contractual laboratory has to have an FDEP approved laboratory QA Plan, and be certified by the department of Health and Rehabilitative Services.

The programs presented in this document directly support the following legislative acts, permits, agreements, and technical advisory committee recommendations:

1. Surface Water Improvement and Management (SWIM) Act of 1987.

2. Florida Department of Environmental Regulation's Lake Okeechobee Operating Permit #50-0679349.

3. Memorandum of Agreement (MOA) between the Everglades National Park (TENP), the District, and the United States Army Corps of Engineers(COE).

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.

The areal extent of the surface water quality monitoring programs maintained by the District are in Figure 1. The parameters analyzed are listed in Tables 1, 2, and 3. The twenty six individual monitoring programs are grouped together under 21 main networks, 19 of which are geographic areas, and the other two; The Pesticide and Atmospheric Deposition monitoring programs are District wide. These networks are:

1. Upper Kissimmee Chain of Lakes and Tributaries
   a. Upper Kissimmee River Chain of Lakes
   b. Tributaries of the Upper Kissimmee

2. Kissimmee River
   a. Kissimmee River
   b. Tributaries of the Kissimmee River

3. Arbuckle Creek

4. Lake Istokpoga

5. Lower Kissimmee River Basin

6. Dairy Synoptic Monitoring

7. Taylor Creek/ Nubbin Slough

8. Indian River Lagoon

9. St.Lucie Estuary

10. Upper and Lower East Coast

11. Works of the District Compliance Monitoring

12. Lake Okeechobee
    a. Inflows and Outflows
    b. Limnetic and Littoral Zones

13. Caloosahatchee River

14. Everglades Agricultural Area

15. Holey Land
    a. Permitted Inflows and Outflows
    b. Interior Monitoring

16. Water Conservation Areas Inflows and Outflows

17. Biscayne Bay Monitoring

18. Everglades National Park
    a. Inflows and Outflows
    b. Interior Monitoring

19. Routine Pesticide Monitoring Network

20. Precipitation Monitoring Network

21. Manatee Bay/Long Sound

This report is an update to Technical Publication 88-3 and provides basic information to researchers, consultants, and other persons regarding the availability of routine water quality data in the District's database. Because of the dynamic nature of monitoring programs, updates of this document will be done periodically. The location of the 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 or area.

REPORT FORMAT

The report describes the purpose and scope of the surface water quality monitoring programs in geographic sequence from north to south.

The monitoring programs are shown in Figure 1. This is followed by tables that list the parameters analyzed.

The subsequent sections provide details on each monitoring program. Following the discussion on each sampling program, is a figure of sampling stations. Tables list the station identification number, latitude and longitude, a description of the site location (including location from a District structure), the period of record, types of parameters analyzed, and sample collection method. Other tables contain basic statistics on data for each monitoring location.

The data provide important sources of information for preparation of management plans required by the SWIM Act of 1987. District publications resulting from these intensive monitoring programs are at the end of each section. The reader should refer to these publications for interpretations and evaluations of the water quality data.

The appendix contains a list of the abbreviations and their descriptions.

DATA AVAILABILITY

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

Director
Water Resources Evaluation 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 or area of concern.
3. Period of record desired.
4. Parameters or parameter groups desired.
5. A Brief explanation of how the data will be used (for documentation purposes).

The District may assess a charge for providing data to the public in keeping with the Public Records Act (Section 119.085FS) and the Electronic Record Keeping Rule (1B-26.033FAC)

ACKNOWLEDGEMENTS

I would like to acknowledge all the people that helped in the process of completing this document.

1. Larry Grosser, Joe Albers, Rick Alleman, and Richard Pfeuffer for writing of their individual sections;

2. Dera Muszick, Mark Brady, Joan Stockum, Beheen Trimble, and personnel from the Okeechobee Field Office for creating the maps;

3. Jeff Saura for word processing and editing

4. District field staff who collected the samples for the monitoring programs documented in this report;

5. District laboratory staff who analyze the water samples collected from all the different monitoring programs.

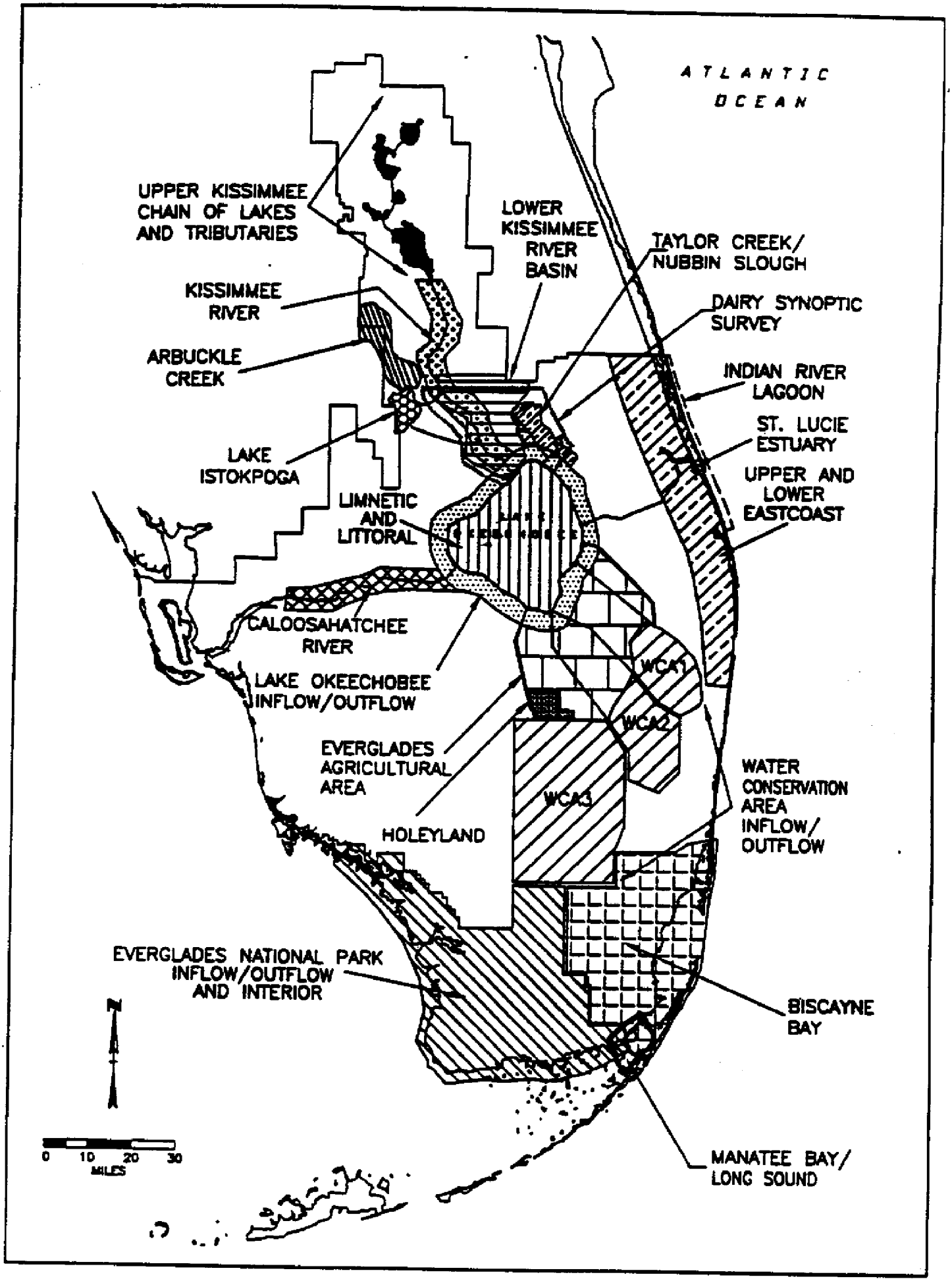

FIGURE 1. Water Quality Monitoring Programs

TABLE 1. LIST OF PARAMETERS AND UNITS BY MAJOR GROUPINGS	
PHYSICAL/CHEMICAL	**UNITS**
Temperature	C
Dissolved Oxygen	mg/l
Specific Conductance	umhos/cm
pH	pH units
Turbidity	NTU
Color	Color units
Total Suspended Solids	mg/l
Total Dissolved Suspended Solids	mg/l
Secchi	-
Salinity	-
Photosynthetically Active Radiation(PAR)	umol s-1 m-2 per microamp
NUTRIENTS	**UNITS**
Nitrite	mg/l
Nitrate	mg/l
Ammonia	mg/l
Inorganic Nitrogen	mg/l
Organic Nitrogen	mg/l
Total Nitrogen	mg/l
Ortho Phosphorus	mg/l
Total Phosphorus	mg/l
MAJOR IONS	**UNITS**
Alkalinity	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
TRACE METALS	**UNITS**
Total Mercury	ug/l
Total Cadmium	ug/l
Total Copper	ug/l
Total Zinc	ug/l
Total Arsenic	ug/l
Total Lead	ug/l
OTHER	**UNITS**
Chlorophyll	mg/m^3

- = No Units

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

2,4-D	ethion
2,4,5-T	ethoprop
2,4,5-TP	ethylene thiourea*
acephate*	fenamiphos
alachlor	fonophos
aldicarb	gamma BHC (lindane)
aldrin	glyphosate*
alpha BHC	heptachlor
alpha endosulfan	heptachlor epoxide
ametryn	linuron
atrazine	malathion
azinphos methyl (guthion)	metalaxyl*
benomyl	methamidaphos
beta endosulfan	methomyl
beta BHC	methoxychlor
bromacil	metolachlor
butylate*	metribuzin
carbaryl	mevinphos
carbofuran	monocrotophos
carbophenothion (trithion)	naled
chlordane	oxamyl
chloropyrifos	paraquat
chloropyrifos methyl	parathion ethyl
chlorothalonil	parathion methyl
delta BHC	phorate
diazinon	p,p'-DDD
dicofol (kelthane)	p,p'-DDE
dieldrin	p,p'-DDT
dimethoate*	prometryn
diquat	simazine
diuron	toxaphene
endosulfan sulfate	trifluralin
endrin aldehyde	zinc phosphide*
endrin	

* = Analyzed Only in Surface Water

** = Units are ug/l for water samples and ug/kg for sediment samples

TABLE 3. PRIORITY POLLUTANTS ANALYZED IN WATER AND SEDIMENT*

Base Neutral and Acid Extractable Compounds

acenaphthene	hexachlorobenzene
acenaphthylene	hexachlorobutadiene
anthracene	hexachloroethane
benzo(a)anthracene	indeno(1,2,3-cd)pyrene
benzo(b)fluoranthene	isophorone
benzo(k)fluoranthene	naphthalene
benzo(a)pyrene	nitrobenzene
benzo(g,h,i)perylene	n-nitrosodi-n-propylamine
bis(2-chloroethyl)ether	phenanthrene
bis(2-chloroethoxy)methane	pyrene
bis(2-ethylhexyl)phthalate	1,2,4-trichlorobenzene
bis(2-chloroisopropyl)ether	4-chloro-3-methylphenol
4-bromophenyl-phenyl-ether	2-chlorophenol
2-chloronaphthalene	2,4-dichlorophenol
4-chlorophenyl-phenyl ether	2,4-dimethylphenol
chrysene	2,4-dinitrophenol
dibenz(a,h)anthracene	2-methyl-4,6-dinitrophenol
di-n-butylphthalate	2-nitrophenol
1,3-dichlorobenzene	4-nitrophenol
1,2-dichlorobenzene	pentachlorophenol
1,4-dichlorobenzene	phenol
3,3'-dichlorobenzidine	2,4,6-trichlorophenol
diethyl phthalate	benzidine
dimethyl phthalate	hexachlorocyclopentadiene
2,4-dinitrotoluene	n-nitrosodimethylamine
2,6-dinitrotoluene	n-nitrosodiphenylamine
di-n-octylphthalate	1,2-diphenylhydrazine
fluoranthene	2,3,7,8-TCDD
fluorene	

Organochlorine Pesticides and PCB's

aldrin	PCB-1221
beta BHC	PCB-1232
delta BHC	PCB-1242
chlordane	PCB-1248
p,p'-DDD	PCB-1254
p,p'-DDE	PCB-1260
p,p'-DDT	toxaphene
dieldrin	endrin
endosulfan sulfate	alpha BHC
endrin aldehyde	gamma BHC
heptachlor	endosulfan I
heptachlor epoxide	endosulfan II
PCB-1016	

* = Units are ug/l for water samples and ug/kg for sediment samples

TABLE 3(Continued). PRIORITY POLLUTANTS ANALYZED IN WATER AND SEDIMENT*

Purgeables

acrolein	1,1-dichloroethene
acrylonitrile	trans-1,2-dichloroethylene
benzene	1,2-dichloropropane
bromodichloromethane	cis-1,3-dichloropropene
bromoform	trans-1,3-dichloropropene
bromomethane	ethyl benzene
carbon tetrachloride	methylene chloride
chlorobenzene	1,1,2,2-tetrachloroethane
chloroethane	tetrachloroethylene
2-chloroethylvinyl ether	toluene
chloroform	1,1,1-trichloroethane
chloromethane	1,1,2-trichloroethane
dibromochloromethane	trichloroethene
1,2-dichlorobenzene	trichlorofluoromethane
1,3-dichlorobenzene	vinyl chloride
1,4-dichlorobenzene	cis-1,2-dichloroethylene
1,1-dichloroethane	o-chlorotoluene
1,2-dichloroethane	

Metals

mercury
antimony
beryllium
chromium
copper
nickel
zinc
aluminum
iron
arsenic
cadmium
lead
selenium
silver
thallium
Total Organic Carbon **
Particle Size **
CaCO3 analysis **

* = Units are ug/l for water samples and ug/kg for sediment samples
** = Analyzed for only in sediment samples.

SECTION 1

UPPER KISSIMMEE RIVER CHAIN OF LAKES AND TRIBUTARIES
PROJECT CODES: UKCL and TUK

Purpose and Scope

The Upper Kissimmee Chain of Lakes and Tributaries water quality monitoring program includes five major lakes and three tributaries in the Kissimmee Chain: East Lake Tohopekaliga, Lake Tohopekaliga, Lake Cypress, Lake Hatchineha, Lake Kissimmee, Boggy Creek, Reedy Creek, and Shingle Creek. The water quality monitoring program provides a water quality and nutrient loading data base for:

1. Applying eutrophication models to develop and refine nutrient loading targets for the five major lakes in the chain;

2. Determining the 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. Assessing the in-lake effects of basin management plan implementations and lake draw downs; and

4. Investigating 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, and in 1991 the number of stations was increased to 16.

Sampling Locations and Descriptions

The locations of the 16 sites monitored under these programs are shown in Figure 2. Table 4 lists all station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 5 and 6 contain statistics for each monitoring location.

District Publications

Fan, A. and S. Lin. (1984). Water Budget for Upper Kissimmee Chain of Lakes. SFWMD. Tech. Memo. July 1984.

Jones, B. L., P.S. Millar, T. H. Miller, D. R. Swift, A.C. Federico, (1983). Preliminary Water Quality and Trophic State Assessment of the Upper Kissimmee Chain of Lakes, Florida, 1981-1982. SFWMD. Tech. Memo. June 1983.

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

SFWMD/East Central Florida Regional Planning Council (1988). Boggy Creek Water Quality Management Study. Final Report. January 1988. West Palm Beach Fla.

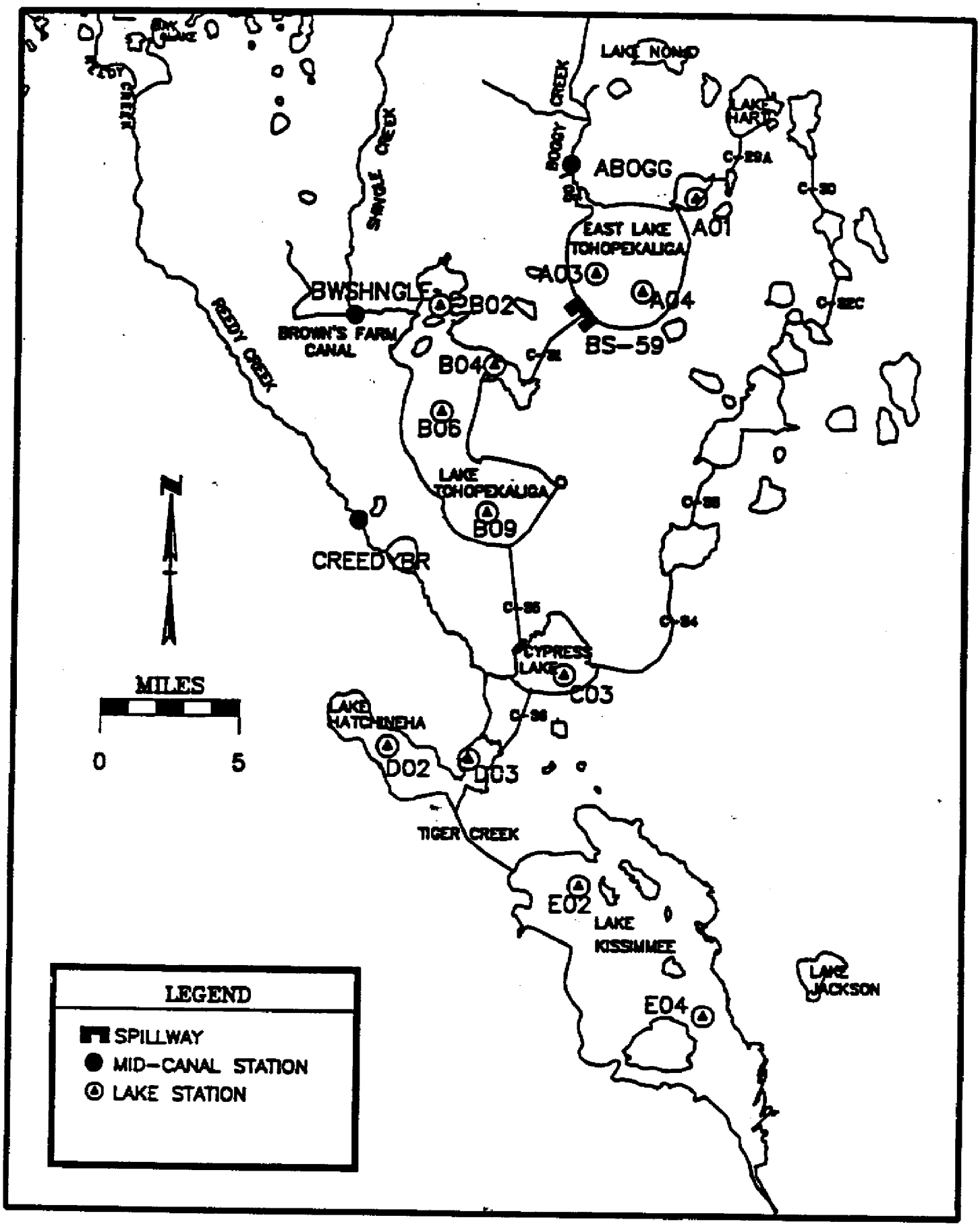

FIGURE 2. Location of Sampling Stations for the Upper Kissimmee Chain of Lakes and Tributaries Water Quality Monitoring Program

TABLE 4. Summary of Sampling Station Locations and Frequency of Collection for Upper Kissimmee River Chain of Lakes and Tributaries Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	US/DS	G/A
E02	275601	811806	At channel marker No.9 at the north end of Lake Kissimmee.	1981 - P	M	M	QTR	-	G
E04	275301	811312	At channel marker No.7 on the east side of Lake Kissimmee.	1981 - P	M	M	QTR	-	G
D02	280056	812441	In the middle of Lake Hatchineha.	1981 - P	M	M	QTR	-	G
D03	280023	812153	Southeast portion of Lake Hatchineha at channel marker No. 13.	1981 - P	M	M	QTR	-	G
C03	280325	811850	Near the south end of Lake Cypress.	1981 - P	M	M	QTR	-	G
B02	281531	812321	North end of Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
B04	281348	812128	Near the east side of Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
B06	281123	812245	Taken from the middle of Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
B09	280844	812128	Near the south end of Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
BS-59	281558	811835	S-59 which is an outflow structure located at the south end of East Lake Tohopekaliga.	81-84/90-P	M	M	QTR	US	G
A01	281945	811437	Middle of Felis Cove near the north east side of Lake Tohopekaliga.	81-84/90-P	M	M	QTR	-	G
A03	281676	811770	1.0 mile out from the north west side of Lake Tohopekaliga.	81-84/90-P	M	M	QTR	-	G
A04	281927	811422	1.0 mile out from the boat ramp in St.Cloud, in East Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
ABOGG	282051	811911	Taken in Ramada Campground at Boggy Creek off State Road 5 upstream of the discharge point to East Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G
BWSHNGLE	281600	812617	Taken from the bridge over Shingle Creek at State Road 531 upstream of the discharge point to Lake Tohopekaliga.	1981 - P	M	M	QTR	-	G

TABLE 4 (Continued). Summary of Sampling Station Locations and Frequency of Collection for Upper Kissimmee River Chain of Lakes and Tributaries Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	US/DS	G/A
CREEDYBR	280859	812628	Taken from the bridge over Reedy Creek at State Road 531 upstream of the discharge point to Lakes Hatchineha and Cypress.	1985 - P	M	M	QTR	-	G

TABLE 5. Statistics for Select Parameters for the Upper Kissimmee River Chain of Lakes and Tributaries Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
E02	0.026	0.071	0.296	<0.002	0.008	0.067	0.71	1.52	4.83	<0.004	0.024	0.264
E04	0.020	0.049	0.138	<0.002	0.007	0.073	0.50	1.44	2.68	<0.004	0.020	0.154
D02	0.015	0.058	0.160	<0.002	0.013	0.082	0.50	1.50	6.63	<0.004	0.052	0.352
D03	0.029	0.093	0.266	<0.002	0.018	0.108	0.60	1.76	6.62	<0.004	0.039	0.419
C03	0.030	0.112	0.328	<0.002	0.013	0.080	0.51	1.79	9.03	<0.004	0.037	0.424
B02	0.054	0.218	0.703	0.004	0.126	0.604	0.60	1.57	4.76	<0.004	0.060	0.348
B04	0.007	0.091	0.423	<0.002	0.022	0.214	0.10	1.26	6.33	<0.004	0.019	0.210
B06	0.019	0.149	0.782	<0.002	0.039	0.541	0.68	1.77	4.10	<0.004	0.014	0.107
B09	0.022	0.162	0.840	<0.002	0.028	0.198	0.51	2.13	10.50	<0.004	0.009	0.130
BS-59	0.008	0.038	0.141	<0.003	0.007	0.056	0.10	0.98	2.70	<0.004	0.015	0.058
A01	0.011	0.027	0.046	<0.002	0.004	0.008	0.40	1.13	1.90	<0.004	0.046	0.140
A03	0.008	0.022	0.044	<0.002	0.004	0.007	0.10	0.75	2.22	<0.004	0.008	0.050
A04	0.005	0.024	0.055	<0.002	0.005	0.021	0.26	0.94	13.31	<0.004	0.013	0.186
ABOGG	0.036	0.093	0.262	0.018	0.061	0.220	0.38	0.86	3.89	<0.004	0.031	0.198
BWSHNGLE	0.064	0.212	0.603	0.010	0.163	0.550	0.54	1.28	3.13	<0.004	0.171	1.317
CREEDYBR	0.013	0.097	1.120	<0.004	0.040	0.771	0.53	2.28	6.89	<0.004	0.041	0.232

TABLE 6. 1989 - 1991 Statistics for Select Parameters for the Upper Kissimmee River Chain of Lakes and Tributaries Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
E02	0.026	0.043	0.067	<0.004	0.004	0.009	0.71	1.23	1.61	<0.004	0.015	0.129
E04	0.020	0.036	0.052	<0.004	0.005	0.014	0.79	1.23	1.65	<0.004	0.008	0.034
D02	0.015	0.050	0.160	<0.004	0.012	0.082	0.56	1.26	2.51	<0.004	0.028	0.303
D03	0.029	0.052	0.104	<0.004	0.006	0.032	0.84	1.36	1.89	<0.004	0.032	0.419
C03	0.030	0.067	0.155	<0.004	0.005	0.015	0.51	1.37	2.28	<0.004	0.009	0.053
B02	0.061	0.108	0.183	<0.004	0.030	0.087	0.63	1.34	2.77	<0.004	0.023	0.093
B04	0.007	0.050	0.144	<0.004	0.006	0.021	<0.50	1.01	2.14	<0.004	0.008	0.042
B06	0.019	0.075	0.150	<0.004	0.005	0.016	0.78	1.41	2.57	<0.004	0.006	0.016
B09	0.022	0.076	0.162	<0.004	0.005	0.013	0.51	1.56	5.90	<0.004	0.010	0.081
BS-59	0.008	0.018	0.026	<0.004	0.005	0.007	0.51	0.71	1.06	<0.004	0.006	0.012
A01	0.016	0.027	0.041	<0.004	0.005	0.008	0.51	0.98	1.72	0.006	0.041	0.100
A03	0.016	0.024	0.032	<0.004	0.004	0.007	<0.50	0.71	1.07	<0.004	0.007	0.016
A04	<0.005	0.022	0.036	<0.004	0.005	0.010	<0.50	1.10	13.31	<0.004	0.013	0.096
ABOGG	0.036	0.073	0.169	0.023	0.049	0.084	0.51	0.65	1.01	0.011	0.033	0.191
BWSHNGLE	0.064	0.151	0.286	0.044	0.116	0 264	0.54	0.95	1.55	0.014	0.062	0.394
CREEDYBR	0.019	0.055	0.218	<0.004	0.018	0.083	0.53	1.98	4.99	<0.004	0.038	0.232

SECTION 2

KISSIMMEE RIVER
PROJECT CODES: V and KREA

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. The water quality monitoring program established in 1972 provides a water quality and nutrient loading data base for:

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.

6. Assessing tributary and basin loading and concentration inputs to Lake Okeechobee which include the following:

   a) Providing levels of Total Phosphorus at the inflows to Lake Okeechobee to compare with the 0.18 mg/l total phosphorus SWIM standard for the basin loading calculations.

   b) Providing data that will delineate the relative importance of tributary loading within the basin, to the basin, and to the whole basin output.

   c) Providing data that will help evaluate the efficacy of the Kissimmee River Restoration Project.

7. Developing basin and spatial scale models used to predict changes in loads to Lake Okeechobee as a function of land use. This includes:

   a) Providing data for determining statistical or mechanistic relationships between rainfall, land use (or land type), and nutrient runoff into streams.

   b) Providing data to help identify the reason for high episodic phosphorus events.

Sampling Locations and Descriptions

The location of the 18 sites monitored under these programs are shown on Figure 3. One sample is collected at each of the six structures on the Kissimmee River, and 12 samples are collected in the major tributaries located in pools A and B of the Kissimmee River. Table 7 lists all station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 8 and 9 contain statistics for each monitoring location.

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Storch, W. (1975). Lake Okeechobee Kissimmee River Basin Water Quality Information (combined with Lake Okeechobee Proposals for Management Actions). SFWMD, Report, March 1975.

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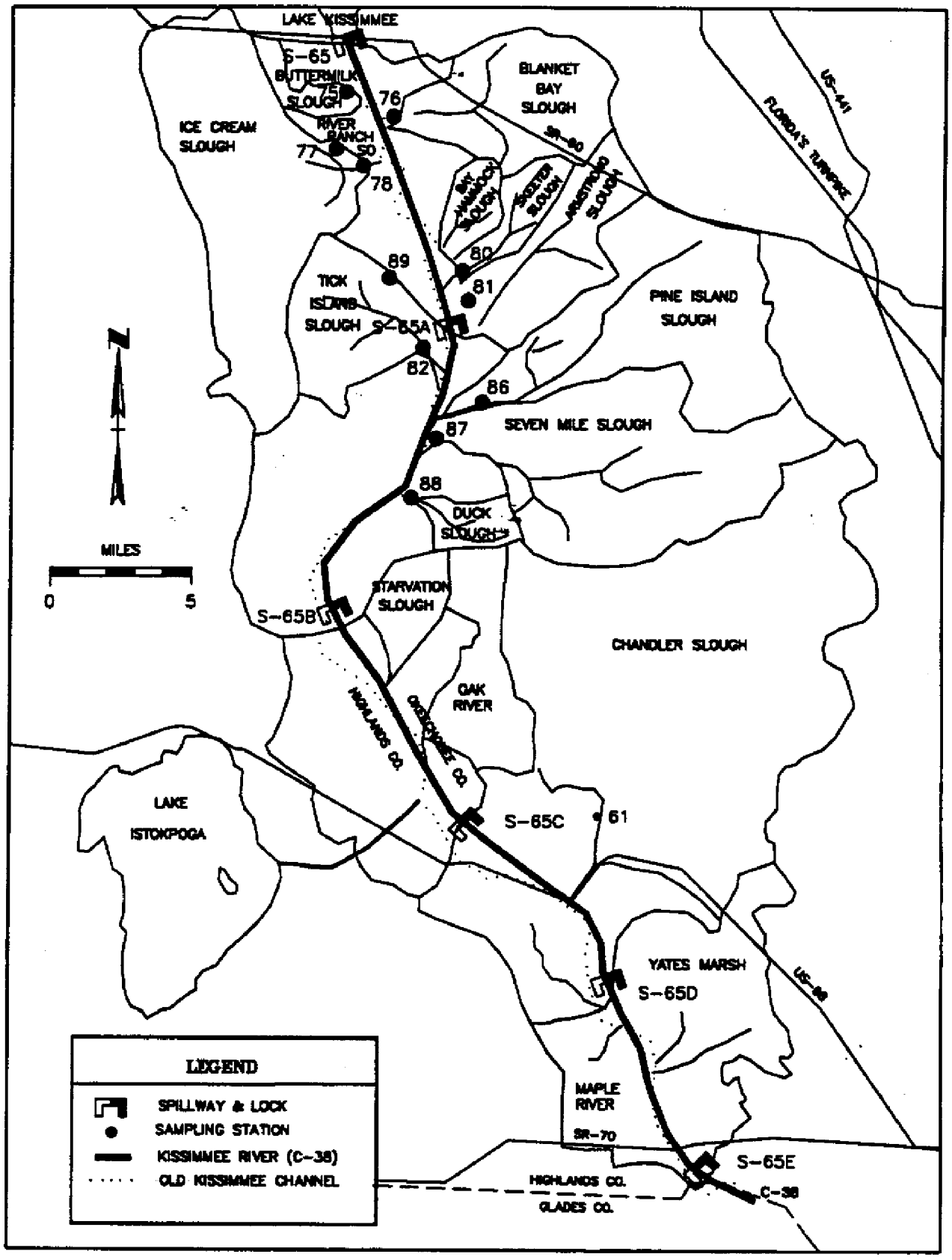

FIGURE 3. Location of Sampling Stations for the Kissimmee River Water Quality Monitoring Program

TABLE 7. Summary of Sampling Station Locations and Frequency of Collection for the Kissimmee River Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	Por	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S65	274820	811201	A large gate and boat lock structure located on the Kissimmee River (C-38) by State Road 60 at the south end of Lake Kissimmee. The water flows in a southerly direction through this structure.	1972 - P	BW	BW	BA	BA	US	G
S65A	273944	810803	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.	1972 - P	BW	BW	BA	BA	US	G
S65B	273003	811144	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.	1972 - P	BW	BW	BA	BA	US	G
S65C	272401	810657	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.	1972 - P	BW	BW	BA	BA	US	G
S65D	271845	810120	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.	1972 - P	BW	BW	BA	BA	US	G
S65E	271335	805742	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.	1972 - P	BW	BW	BA	BA	US	G

TABLE 7 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Kissimmee River Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	Por	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
KREA 61	272121	810149	Chandler Slough located just north of the railroad bridge in Pool D.	1985 - p	BW	BW	-	-	-	G
KREA 75	274650	811122	Buttermilk Slough located just north of the River Ranch Resort in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 76	274559	811019	Blanket Bay Slough in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 77	274443	811039	River Ranch South just north of Ice Cream Slough (KREA 78) in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 78	274434	811023	Ice Cream Slough located in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 80	274107	810835	Skeeter Slough located approximately 1/2 mile north of S-65A in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 81	273958	810804	Armstrong Slough located just north of S-65A in Pool A.	1986 - P	BW	BW	-	-	-	G
KREA 82	273856	810826	Located in Pool B at Tick Island Slough just north of S-65B.	1986 - P	BW	BW	-	-	-	G
KREA 86	273629	810842	Located in Pool B, at Pine Island Slough upstream. Sample site is north of the third weir structure.	1986 - P	BW	BW	-	-	-	G

TABLE 7 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Kissimmee River Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	Por	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
KREA 87	273552	810834	Downstream area of Pine Island Slough located in Pool B.	1986 - P	BW	BW	-	-	-	G
KREA 88	273453	811036	Located in Pool B at Dark Hammock Slough. Sample tributary is located just south of the second weir structure.	1986 - P	BW	BW	-	-	-	G
KREA 89	274330	810945	At the gated structure in Rattlesnake Slough located in Pool A.	1987 - P	BW	BW	-	-	-	G

TABLE 8. Statistics for Select Parameters for the Kissimmee River Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S65	0.004	0.044	0.262	<0.001	0.008	0.178	0.10	1.36	3.54	<0.003	0.032	0.926
S65A	0.010	0.052	0.237	<0.001	0.015	0.109	0.13	1.37	3.81	<0.004	0.061	0.937
S65B	0.010	0.052	0.278	<0.002	0.014	0.150	0.16	1.39	4.00	<0.004	0.073	2.311
S65C	<0.002	0.055	1.418	<0.001	0.017	0.125	0.22	1.37	3.77	<0.004	0.088	1.500
S65D	0.020	0.080	0.374	<0.002	0.040	0.235	0.33	1.40	4.30	<0.004	0.092	1.526
S65E	0.025	0.102	0.500	<0.002	0.058	0.373	0.35	1.41	5.61	<0.004	0.107	1.369
KREA 61	0.090	0.268	0.747	0.042	0.216	0.688	<0.50	1.35	3.15	<0.004	0.016	0.478
KREA 75	0.013	0.052	0.152	<0.004	0.010	0.034	0.93	1.53	2.59	<0.004	0.039	1.185
KREA 76	0.021	0.324	1.167	<0.004	0.245	1.097	0.75	1.75	13.04	<0.004	0.027	0.654
KREA 77	0.021	0.060	0.248	<0.004	0.016	0.108	<0.50	1.19	2.00	<0.004	0.012	0.134
KREA 78	0.018	0.044	0.076	<0.004	0.013	0.105	0.51	1.05	1.96	<0.004	0.016	0.079
KREA 80	<0.004	0.061	0.282	<0.004	0.018	0.129	<0.50	1.26	3.19	<0.004	0.018	0.126
KREA 81	<0.004	0.075	0.322	<0.004	0.035	0.263	<0.50	1.20	2.55	<0.004	0.029	0.514
KREA 82	0.013	0.053	0.120	<0.004	0.019	0.577	0.62	1.45	3.34	<0.004	0.037	0.376
KREA 86	0.011	0.053	1.013	<0.004	0.012	0.345	0.53	1.43	3.49	<0.004	0.032	0.557
KREA 87	0.017	0.047	0.113	<0.004	0.008	0.040	0.74	1.65	5.07	<0.004	0.019	0.161
KREA 88	0.024	0.055	0.211	<0.004	0.018	0.161	0.51	1.30	3.67	<0.004	0.059	1.672
KREA 89	0.006	0.050	0.154	<0.004	0.013	0.057	0.69	1.29	2.43	<0.004	0.015	0.411

TABLE 9. 1989 - 1991 Statistics for Select Parameters for the Kissimmee River Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S65	0.017	0.053	0.262	<0.004	0.013	0.178	<0.50	1.13	3.54	<0.004	0.039	0.926
S65A	0.022	0.069	0.237	<0.004	0.028	0.108	0.51	1.18	2.34	<0.004	0.063	0.937
S65B	0.027	0.061	0.278	<0.004	0.019	0.150	0.63	1.21	2.90	<0.004	0.062	0.809
S65C	0.026	0.069	1.418	<0.004	0.019	0.099	0.51	1.16	2.30	<0.004	0.095	1.500
S65D	0.033	0.084	0.266	<0.004	0.045	0.235	<0.51	1.16	2.23	<0.004	0.099	1.526
S65E	0.033	0.107	0.409	<0.004	0.066	0.373	<0.50	1.23	2.69	<0.004	0.105	1.369
KREA 61	0.110	0.287	0.549	0.076	0.230	0.497	<0.50	1.23	2.40	<0.004	0.009	0.018
KREA 75	0.013	0.054	0.152	<0.004	0.010	0.034	0.97	1.55	2.59	<0.004	0.051	1.185
KREA 76	0.043	0.395	1.167	<0.004	0.308	1.097	0.75	1.60	4.11	<0.004	0.032	0.654
KREA 77	0.021	0.064	0.248	<0.004	0.020	0.108	<0.50	1.05	2.00	<0.004	0.015	0.134
KREA 78	0.018	0.046	0.076	<0.004	0.017	0.105	0.51	0.90	1.77	<0.004	0.016	0.079
KREA 80	<0.004	0.059	0.156	<0.004	0.017	0.067	<0.50	1.07	2.13	<0.004	0.011	0.068
KREA 81	<0.004	0.077	0.322	<0.004	0.039	0.263	<0.50	1.04	1.82	<0.004	0.029	0.514
KREA 82	0.016	0.056	0.116	<0.004	0.025	0.577	0.63	1.37	2.36	<0.004	0.023	0.110
KREA 86	0.011	0.061	1.013	<0.004	0.015	0.345	0.53	1.31	2.36	<0.004	0.040	0.557
KREA 87	0.018	0.044	0.090	<0.004	<0.008	0.040	0.74	1.47	2.45	<0.004	0.021	0.161
KREA 88	0.025	0.059	0.211	<0.004	0.022	0.161	0.51	1.13	1.92	<0.004	0.035	0.222
KREA 89	0.006	0.053	0.154	<0.004	0.014	0.057	0.69	1.21	2.32	<0.004	0.018	0.411

SECTION 3

ARBUCKLE CREEK
PROJECT CODE: ARCK

Purpose and Scope

The Arbuckle Creek basin water quality monitoring program encompasses an area characterized by beef, intensive dairy cattle, and citrus operations. The basin is located in Highlands and Polk Counties. Water quality monitoring stations have been sampled since 1988.

The objectives of this program are:

1. Monitoring water quality in support of the FDEP's Dairy Rule by providing nutrient concentrations at the dairy outflows and providing information to evaluate the effectiveness of dairy BMP's.

2. Assessing tributary, basin loading, and concentration inputs to Lake Okeechobee. The data will delineate the relative importance of tributary loading within the basin, and to the whole basin output.

3. Developing basin and spatial scale models to predict changes in loads to Lake Okeechobee as a function of land use including the following:

   a) Providing data for determining statistical or mechanistic relationships between rainfall, land use (or land type), and nutrient runoff into streams.

   b) Providing data to help identify the cause of high episodic phosphorus events.

Data generated from this program also support the Lake Istokpoga water quality monitoring program and is 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 Locations and Descriptions

The locations of the 7 sites monitored under this program are shown in Figure 4. Table 10 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 11 and 12 contain statistics for each monitoring location.

District Publications

None.

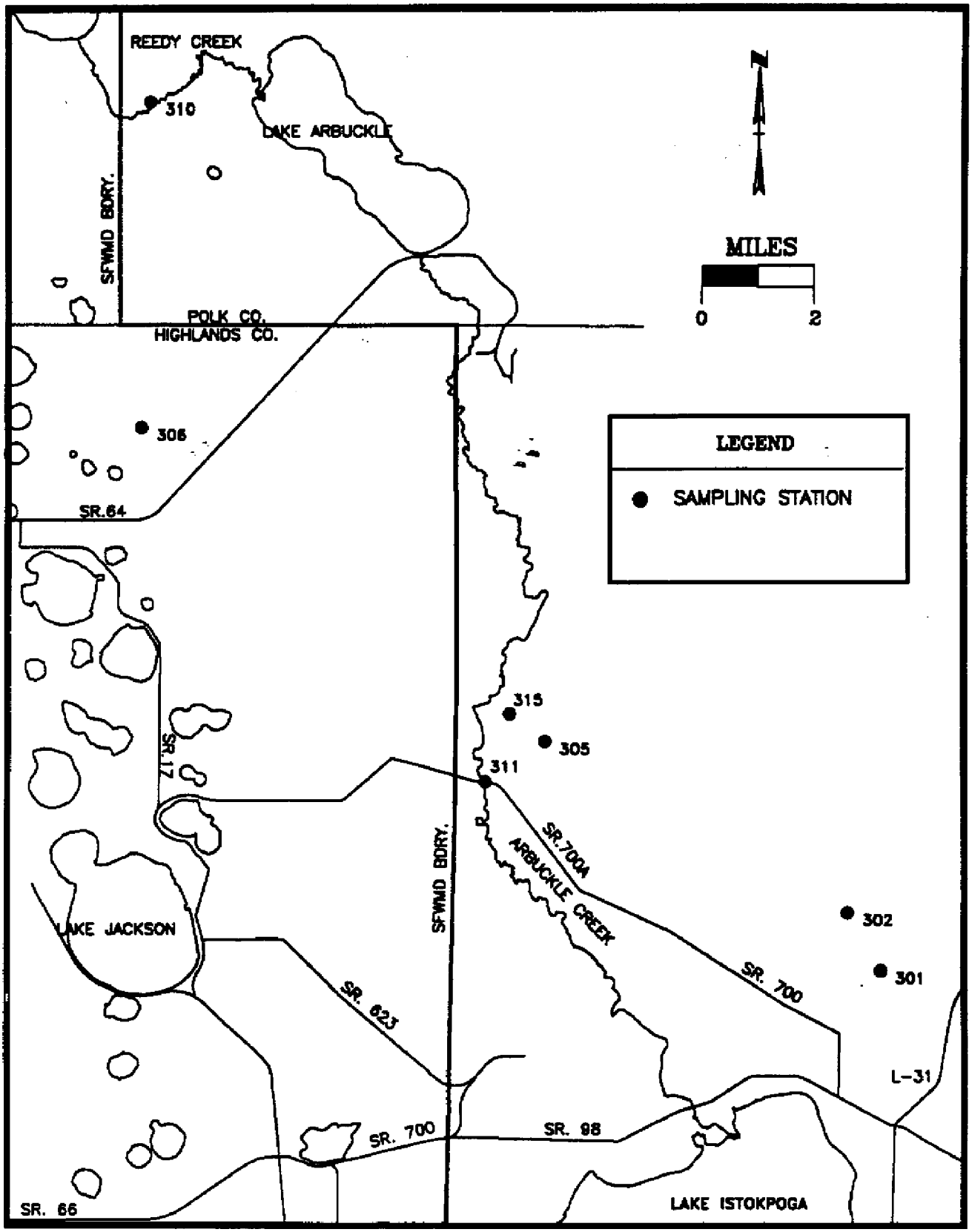

FIGURE 4. Location of Sampling Stations for the Arbickle Creek Water Quality Monitoring Program

TABLE 10. Summary of Sampling Locations and Frequency of Collection for the Arbuckle Creek Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
ARCK 301	272840	811440	Bishop Dairy outfall culvert at Bishop Dairy Road.	1988-P	BW	BW	G
ARCK 302	272934	811514	Bishop Dairy outfall culvert at Scrubpens Road.	1988-P	BW	BW	G
ARCK 305	273175	812030	Triple G Dairy east outfall on Sandford Harts Ranch.	1988-P	BW	BW	G
ARCK 306	273670	812693	Dressel Dairy outfall on Old Bombing Range Road.	1988-P	BW	BW	G
ARCK 310	274175	812685	C&C Dairy outfall where it enters Reedy Creek.	1988-P	BW	BW	G
ARCK 311	273137	812132	State Road 700A bridge (Arbuckle Creek Road) over Arbuckle Creek.	1989-P	BW	BW	G
ARCK 315	273241	812107	Triple G Dairy spray field outfall where it enters Arbuckle Creek.	1992-P	BW	BW	G

TABLE 11. Statistics for Select Parameters for the Arbuckle Creek Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
ARCK 301	<0.004	3.471	9.305	<0.004	3.452	8.737	0.53	3.43	10.35	0.010	0.840	9.663
ARCK 302	0.058	0.282	3.135	0.010	0.189	2.440	0.99	1.63	3.86	<0.004	0.009	0.021
ARCK 305	0.849	5.562	11.360	0.765	5.286	12.000	0.94	6.26	16.99	<0.004	0.017	0.175
ARCK 306	0.184	0.859	2.925	0.105	0.687	2.091	1.32	5.01	16.69	<0.004	1.758	7.695
ARCK 310	6.390	8.434	9.940	6.020	7.467	9.625	4.46	9.98	16.67	0.025	0.393	1.026
ARCK 311	0.025	0.084	0.358	<0.004	0.084	0.259	0.51	1.06	2.06	<0.004	0.111	0.521
ARCK 315*												

* = Station added in 1992

TABLE 12. 1989 - 1991 Statistics for Select Parameters for the Arbuckle Creek Monitoring Program

SFWMD

Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
ARCK 301	<0.004	3.471	9.305	<0.004	3.452	8.737	0.53	3.43	10.35	0.010	0.840	9.663
ARCK 302	0.058	0.282	3.135	0.010	0.189	2.440	0.99	1.63	3.86	<0.004	0.009	0.021
ARCK 305	0.849	5.562	11.360	0.765	5.286	12.000	0.94	6.26	16.99	<0.004	0.017	0.175
ARCK 306	0.184	0.868	2.925	0.105	0.687	2.091	1.32	5.01	16.69	<0.004	1.758	7.695
ARCK 310	6.390	8.434	9.940	6.020	7.467	9.625	4.46	9.98	16.67	0.025	0.393	1.026
ARCK 311	0.025	0.085	0.358	<0.004	0.051	0.259	0.51	1.06	2.06	<0.004	0.111	0.521
ARCK 315*												

* = Station added in 1992.

SECTION 4

LAKE ISTOKPOGA MONITORING PROGRAM
PROJECT CODE: ISTO

Purpose and Scope

The Lake Istokpoga water quality monitoring program encompasses the major inflow and outflow points to the lake as well as in-lake monitoring. The water quality monitoring program provides a water quality and nutrient loading data base for:

1. Consolidating information from all previous publications to establish historical trends;

2. Determining long and short term trends to identify potential problem areas of water quality degradation and nutrient loadings;

3. Producing a nutrient budget for the lake;

4. Note changes in water quality after herbicide treatments to the lake (Pre-treatment 1988, Post-treatment 1989 to present); and

5. Establishing acceptable nutrient loading limits using eutrophication models.

Water quality monitoring began in February 1988. Nutrient loadings are calculated by combining nutrient concentrations with flow data obtained at the major inflow and outflow points to the lake. These data can indicate trends 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

The locations of the 12 sites monitored under this program are shown on Figure 5. Table 13 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the samples are collected upstream or downstream, and type of sample collection. Tables 14 and 15 contain statistics for each monitoring location.

District Publications

Milleson,J.F. (1978). Limnological Investigations of Seven Lakes in the Istokpoga Drainage Basin. SFWMD, Tech. pub. No. 78-1.

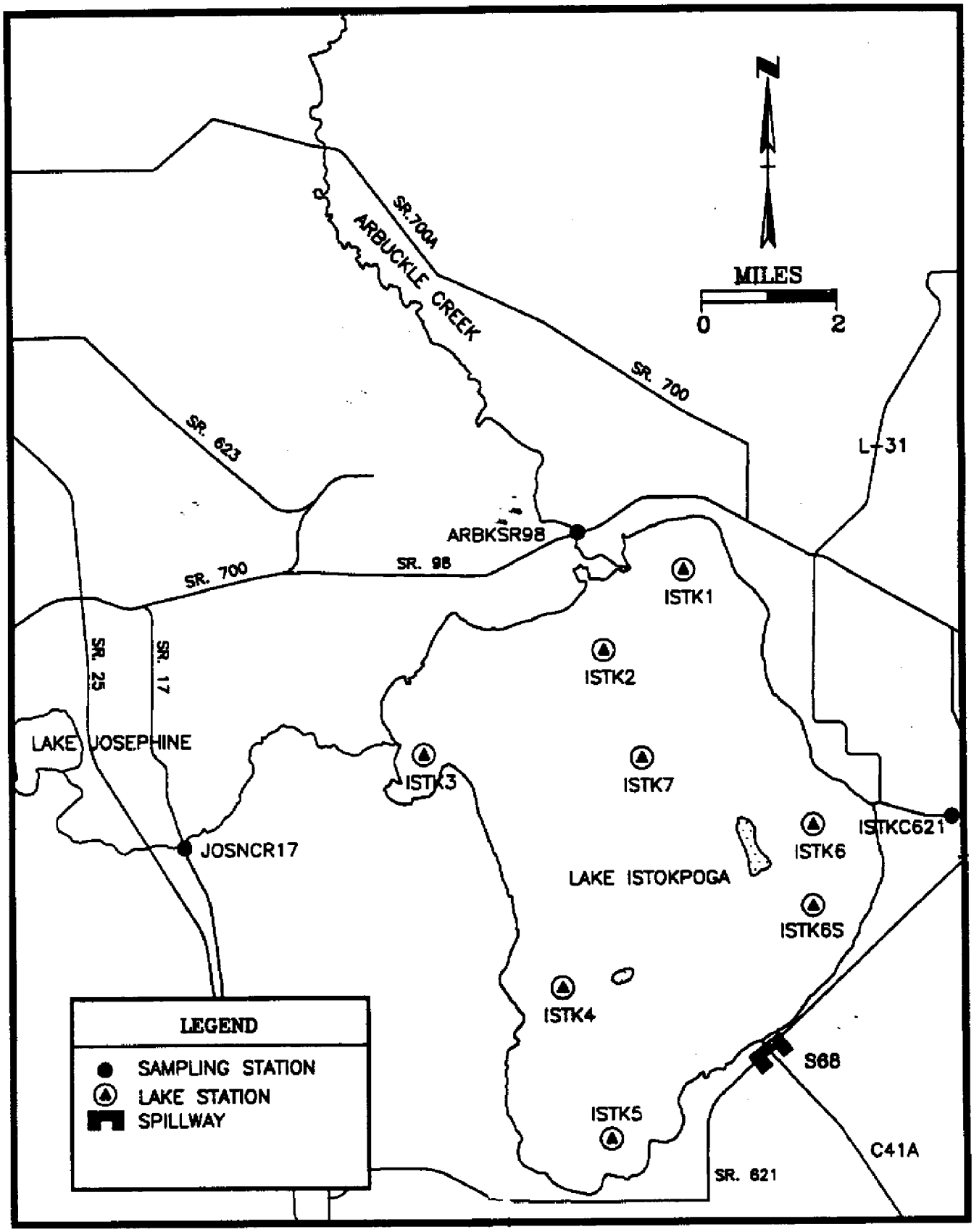

FIGURE 5. Location of Sampling Stations for the Lake Istokpoga Water Quality Monitoring Program

TABLE 13. Summary of Sampling Station Locations and Frequency of Collection for the Lake Istokpoga Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophyll	US/DS	G/A
ISTK1	272603	811620	In Lake Istokpoga due east of the entrance to Arbuckle Creek, and half way to the eastern shore.	1988-P	BM	BM	TA	BM	-	G
ISTK2	272500	811730	In Lake Istokpoga north of Little Grassy Island half way to the edge of cattails.	1988-P	BM	BM	TA	BM	-	G
ISTK3	272338	812007	In Lake Istokpoga 0.25 miles due east from the entrance to Josephine Creek.	1988-P	BM	BM	TA	BM	-	G
ISTK4	272034	811807	In Lake Istokpoga half way between Bumblebee Island and the western shore.	1988-P	BM	BM	TA	BM	-	G
ISTK5	271835	811725	In Lake Istokpoga 0.5 miles out from the southern end of the lake.	1988-P	BM	BM	TA	BM	-	G
ISTK6	272242	811428	In Lake Istokpoga half way between Istokpoga Canal and Big Island.	1988-P	BM	BM	TA	BM	-	G
ISTK6S	272142	811428	In Lake Istokpoga one mile due south of ISTK6. Half way between Big Island and the eastern shore.	1990-P	BM	BM	TA	BM	-	G
ISTK7	272335	811657	In the middle of Lake Istokpoga half way between Big Island and Little Grassy Island.	1988-P	BM	BM	TA	BM	-	G
S68	271944	811508	Taken at the outflow structure from Lake Istokpoga (S-68). Located on the southeast side of the lake on County Road 621 and the C-41A canal.	1988-P	BM	BM	TA	-	US	G

TABLE 13 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Lake Istokpoga Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophyll	US/DS	G/A
JOSNCR17	272225	812336	Taken from the bridge over Josephine Creek at County Road 17.	1988-P	BM	BM	TA	-	-	G
ISTKC621	272248	811224	Taken at the bridge on the Istokpoga Canal and County Road 621.	1988-P	BM	BM	TA	-	-	G
ARBKSR98	272633	811752	Taken from the bridge over Arbuckle Creek at State Road 98.	1988-P	BM	BM	TA	-	-	G

TABLE 14. Statistics for Select Parameters for the Lake Istokpoga Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
ISTK1	0.009	0.079	0.189	<0.004	0.037	0.158	<0.50	1.10	4.82	<0.004	0.056	0.294
ISTK2	0.029	0.061	0.153	<0.004	0.023	0.340	0.51	1.03	5.05	<0.004	0.041	0.136
ISTK3	0.024	0.042	0.122	<0.004	0.008	0.039	<0.50	1.05	5.24	<0.004	0.117	0.449
ISTK4	0.017	0.040	0.064	<0.004	0.005	0.028	<0.50	1.04	5.28	<0.004	0.007	0.030
ISTK5	0.019	0.041	0.106	<0.004	0.006	0.050	<0.50	1.01	5.69	<0.004	0.009	0.105
ISTK6	0.010	0.044	0.211	<0.004	0.010	0.114	<0.50	1.00	6.09	<0.004	0.013	0.086
ISTK6S	0.010	0.033	0.068	<0.004	0.005	0.012	0.51	0.91	1.35	<0.004	0.006	0.027
ISTK7	0.025	0.051	0.118	<0.004	0.014	0.059	<0.50	1.01	6.18	<0.004	0.027	0.123
S68	0.012	0.032	0.057	<0.004	0.006	0.052	<0.50	1.00	6.12	<0.004	0.007	0.022
JOSNCR17	0.034	0.049	0.085	<0.004	0.017	0.032	0.66	1.22	6.26	0.063	0.420	1.140
ISTKC621	0.022	0.087	0.469	<0.004	0.035	0.324	0.51	1.14	2.82	<0.004	0.014	0.074
ARBKSR98	0.032	0.098	0.410	0.013	0.063	0.365	<0.50	1.03	1.83	0.005	0.134	0.516

TABLE 15. 1989 - 1991 Statistics for Select Parameters for the Lake Istokpoga Monitoring Program

SFWMD

Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
ISTK1	0.009	0.082	0.189	<0.004	0.039	0.158	<0.50	1.14	4.82	<0.004	0.056	0.184
ISTK2	0.030	0.062	0.153	<0.004	0.019	0.090	0.51	1.05	5.05	<0.004	0.040	0.119
ISTK3	0.024	0.043	0.122	<0.004	0.007	0.029	<0.50	1.07	5.24	<0.004	0.099	0.446
ISTK4	0.021	0.042	0.064	<0.004	0.006	0.028	<0.50	1.13	5.28	<0.004	0.006	0.022
ISTK5	0.020	0.043	0.106	<0.004	0.006	0.050	0.51	1.07	5.69	<0.004	0.009	0.105
ISTK6	0.018	0.046	0.211	<0.004	0.009	0.114	0.55	1.05	6.09	<0.004	0.011	0.063
ISTK6S	0.010	0.033	0.068	<0.004	0.005	0.012	0.51	0.91	1.35	<0.004	0.006	0.027
ISTK7	0.030	0.053	0.118	<0.004	0.014	0.059	0.53	1.07	6.18	<0.004	0.028	0.123
S68	0.012	0.033	0.057	<0.004	0.005	0.012	<0.50	1.12	6.12	<0.004	0.006	0.015
JOSNCR17	0.036	0.048	0.085	<0.004	0.017	0.032	0.66	1.28	6.26	0.063	0.426	1.140
ISTKC621	0.022	0.093	0.469	<0.004	0.041	0.324	0.66	1.14	2.82	<0.004	0.041	0.050
ARCKSR98	0.032	0.108	0.410	0.013	0.072	0.365	<0.50	1.07	1.83	0.005	0.144	0.516

SECTION 5

LOWER KISSIMMEE RIVER BASIN
PROJECT CODE: KREA and LKR

Purpose and Scope

The Lower Kissimmee River Basin water quality monitoring program encompasses an area characterized by beef and intensive dairy cattle operations. Water quality monitoring stations have been established at locations throughout the Kissimmee River basin in Okeechobee and Highlands Counties.

The objectives of the program are as follows:

1. Monitoring water quality in support of the FDEP's Dairy Rule by providing nutrient concentration measurements at the dairy outflows, and information to evaluate the effectiveness of dairy BMP's and the Dairy Buy-out program.

2. Assessing tributary, basin loading, and concentration inputs to Lake Okeechobee which include the following:

   a) Providing concentration measurements from inflows to Lake Okeechobee to compare with the 0.18 mg/l total phosphorus SWIM standard, and for use in basin loading calculations.

   b) Providing data that will delineate the relative importance of tributary loading within the basin to the whole basin output.

   c) Providing concentration measurements that will help evaluate the efficacy of the Kissimmee River restoration project.

3. Developing basin and spatial scale models to predict changes in loads to Lake Okeechobee as a function of land use which includes:

   a) Providing data for determining statistical or mechanistic relationships between rainfall, land use (or land type), and nutrient runoff.

   b) Providing data to help identify the reason for high episodic phosphorus events.

Data generated by this program serve two additional purposes:

i) To provide a data base in support of SFWMD funded contractual research with the University of Florida Institute of Food and Agricultural Sciences to evaluate the physical, chemical, and biological conditions and processes that govern phosphorus uptake, release, and movement through the soils in the basin; and

ii) To fulfill the commitment by the District to provide water quality sampling and analysis support for the $1.25 million federal Rural Clean Water Program (RCWP) grant for cost sharing of BMP implementation. The RCWP is administered by the

United States Department of Agriculture and the Environmental Protection Agency.

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 (SWIM) legislation of 1987.

Sampling Location and Description

The locations of the 46 sites monitored under this program are shown in Figure 6. Table 16 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 17 and 18 contain statistics for each monitoring location.

District Publications

Federico, A. (1983). Water Quality Characteristics of the Lower Kissimmee River Basin, Florida. SFWMD, Tech. Pub. 82-3.

Goldstein, A. (1980). Upland Detention/Retention Demonstration Project 3rd Annual report to the Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek Nubbin Slough Basin. SFWMD, Tech. Memo. Sept.1980.

Goldstein, A. (1982). Upland Detention/Retention Demonstration Project fourth Annual Report to the Kissimmee River Coordinating Council. SFWMD, Tech. Memo. Dec.1982.

Goldstein, A. (1983). Engineering, Hydro and Water Quality Analysis of Detention/Retention Sites, Fourth Annual Report from SFWMD to the Coordinating Council on the Restoration of the Kissimmee River and Taylor Creek/Nubbin Slough Basin Detention/Retention Demo Project. SFWMD, Report Dec. 1983.

Goldstein, A. (1986). Upland Detention/Retention Demonstration Final Report. Impacts of Agricultural Land Use on Water Quality and Utilization of Wetlands for Detention/Retention in the Kissimmee River Basin. SFWMD, Tech. Pub. 86-2.

Lake Okeechobee SWIM Plan, (1989), Planning Department, SFWMD.

Miami, Civil Engineering Dept. (1973). Kissimmee River Basin Water Quality University of Miami Model Study. Report July 1973.

Resource Planning Department Staff, (1974). Report on Progress of Hydrologic, Water Quality and Land Use Studies in the Kissimmee River Watershed and Lake Okeechobee. SFWMD, Report April 1974.

Storch, W. (1975). Lake Okeechobee Kissimmee Basin Water Quality Information (combined with Lake Okeechobee Proposals for Management Actions). SFWMD, Report March 1975.

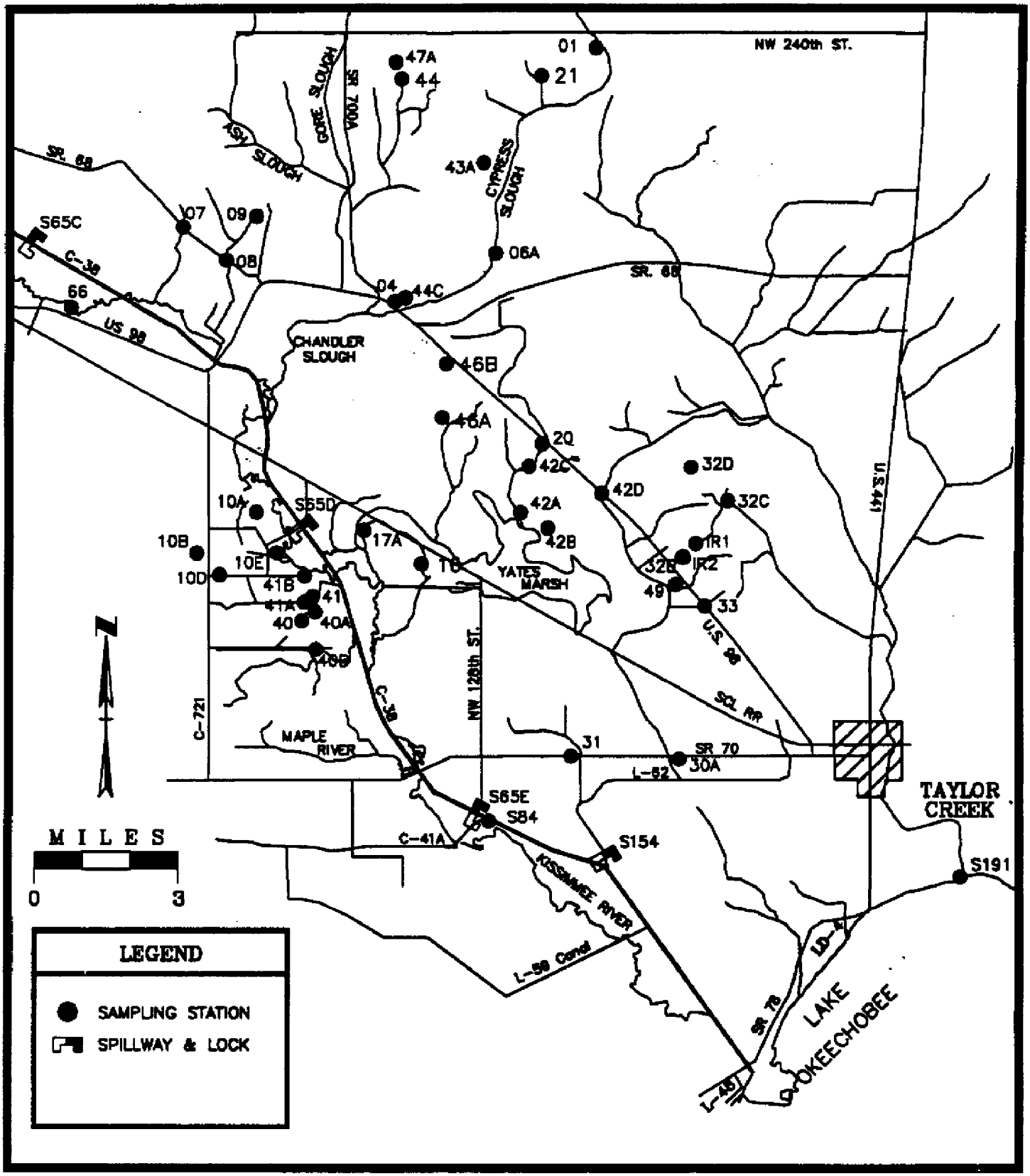

FIGURE 6. Location of Sampling Stations for the Lower Kissimmee River Basin Water Quality monitoring Program

TABLE 16. 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 Parameters	Nutrients	US/DS	G/A
KREA 01	272736	805523	On N.W. 240th Street (Eagle Island Road). The samples are collected from the north side of the bridge at Fish Slough.	1992 - P	BW	BW	-	G
KREA 04	272258	805928	From Chandler Slough bridge on State Road 98 near Fort Bassinger.	1992 - P	BW	BW	-	G
KREA 06A	272350	805725	Off N.W. 144th Avenue (Lamb Island Road) on the Watford Beef Ranch at Cypress Slough.	1992 - P	BW	BW	-	G
KREA 07	272420	810347	Go 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).	1986 - P	BW	BW	-	G
KREA 08	272344	810254	Go 1.2 miles on NW 160th Drive just east of Larson Dairy at the culverts draining under NW 160th Drive (Ash Slough).	1986 - P	BW	BW	-	G
KREA 09	272432	810217	Off of NW 203rd Avenue (Old Peavine Trail). The sample is collected on the north side of the culvert at Ash Slough.	1986 - P	BW	BW	-	G
KREA 10A	271820	810217	At the corner of Underhill Road and S-65d access road. Site collects runoff from Butler Dairy #1.	1986 - 1992	BW	BW	-	G
KREA 10B	271807	810320	Butler Dairy's spray field off C-721 at culvert under the spray field road which drains the spray field storm water retention pond runoff.	1988 - P	BW	BW	-	G
KREA 10D	271756	810302	At a set of three culverts on Boat Ramp Road just off County Road 721 which collects the outfall from Butler Dairy #1 outer outfall.	1991 - P	BW	BW	-	G

TABLE 16 (Continued). 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 Parameters	Nutrients	US/DS	G/A
KREA 10E	271820	810152	Culvert at the end of Silver Creek Lane off Boat Ramp Road, and collects outer pasture outfall from Butler Dairy #1.	1991 - P	BW	BW	-	G
KREA 16	271808	805855	Go 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.	1986 - P	BW	BW	-	G
KREA 17A	271845	810005	On the access road to the Baptist Children's Home (Yates Marsh).	1987 - P	BW	BW	-	G
KREA 20	272020	805628	State Road 98 approximately 1/2 mile west of Flying "G" Dairy. Sample is collected on the south side of the bridge (Sandfly Gully).	1987 - P	BW	BW	-	G
KREA 21	272705	805630	W.S. Rucks dairy outfall flume at Cypress Slough.	1987 - P	BW	BW	-	G
KREA 30A	271432	805341	Culverts draining Popash Slough into the L-62 canal off C-70A. The automatic sampler collects daily composites.	1989 - P	W	W	US	G/A
KREA 31	271435	805553	On State Road 70 west of Popash Slough in the tributary leading into the L-62 canal.	1987 - 1991	BW	BW	-	G
KREA 32B	271815	805335	Off State Road 98 at last entrance gate to Dry Lake Dairy #1. Sample is collected from culvert under dirt road which is the runoff from Dry Lake Dairy #1.	1988 - P	BW	BW	-	G
KREA 32C	271917	805241	Off State Road 98 on the east property line of Dry Lake Dairy and collects outer pasture runoff from Dry Lake Dairy #2 as it flows into Wolf Creek.	1991 - P	BW	BW	-	G

TABLE 16 (Continued). 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 Parameters	Nutrients	US/DS	G/A
KREA 32D	271954	805326	Off State Road 98 on the north property line of Dry Lake Dairy collects oncoming water from Rofra Dairy.	1991 - P	BW	BW	-	G
KREA 33	271722	805309	On State Road 98. Sample is collected just south of the entrance to Dry Lake Dairy #2.	1986 - P	BW	BW	-	G
KREA 40	271705	810121	North of Larson Dairy Road. Sampled at the flume that catches the outfall for Larson Dairy #2. The automatic sampler collects daily composites.	1987 - P	W	W	DS	G/A
KREA 40A	271715	810105	North of Larson Dairy Road sample is collected at a ditch downstream of, and perpendicular to the flume outfall ditch, and also catches outfall from Larson Dairy #2.	1991 - P	BW	BW	-	G
KREA 40B	271633	810104	At the end of Larson Dairy Road at the entrance to Clemons property. The site collects runoff from Larson Dairy #2 outer pasture.	1991 - P	BW	BW	-	G
KREA 41	271732	810108	Off Boat Ramp Road. Sample catches the outfall for Butler Dairy #2.	1987 - P	BW	BW	-	G
KREA 41A	271726	810119	On Butler Dairy #2 just south of KREA 41. Ditch parallels the boundary between Butler Dairy #2 and Larson Dairy #2.	1987 - P	BW	BW	-	G
KREA 41B	271755	810118	East of Butler Dairy #2 on the culvert at the corner of Boat Ramp Road and Sheridan Palms Lane and collects runoff from barn #2.	1991 - P	BW	BW	-	G

TABLE 16 (Continued). 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 Parameters	Nutrients	US/DS	G/A
KREA 42A	271904	805654	East of KREA 42 on Flying "G" Dairy at culvert which drains the first spray field.	1990 - P	BW	BW	-	G
KREA 42B	271847	805621	South of KREA 42 on Flying "G" Dairy at culvert which drains the spray field.	1990 - P	BW	BW	-	G
KREA 42C	271955	805644	Off State Road 98 on Flying "G" Dairy. Sample is collected at culvert running under dirt road and catches runoff from the first spray field.	1990 - P	BW	BW	-	G
KREA 42D	271925	805515	On State Road 98 at the east property line of Flying "G" Dairy, and collects from the dairy.	1991 - P	BW	BW	-	G
KREA 43A	272530	815740	Southeast corner of C & M Dairy off northwest 240th street (Eagle Island Road).	1987 - P	BW	BW	-	G
KREA 44	272302	805920	Off of Lamb Island Road. This sample is collected at the culvert that drains Lamb Island Dairy into Cypress Slough.	1987 - P	BW	BW	-	G
KREA 44C	272302	805915	South of Lamb Island Road, site collects runoff from Lamb Island Dairy (Ferrell) Spray field.	1991 - P	BW	BW	-	G
KREA 46A	272050	805830	On C. Williamson Dairy off State Road 98. Sample is collected at culvert through which drains runoff from the dairy's stormwater retention pond.	1989 - P	BW	BW	-	G

TABLE 16 (Continued). 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 Parameters	Nutrients	US/DS	G/A
KREA 46B	272150	805825	On State Road 98 just north of C. Williamson Dairy. Sample is taken at culvert which collects outfall from the dairy.	1990 - P	BW	BW	-	G
KREA 47A	272720	805927	South of Eagle Island Dairy off northwest 240th street (Eagle Island Road). Sample is taken at culvert which collects outfall from the dairy's storm water retention pond.	1990 - P	BW	BW	-	G
KREA 49	271745	805345	Dry Lake Dairies #1 and 2 outfall located on State Road 98 approximately 200 yards north of the entrance to Dry Lake #2.	1987 - P	BW	BW	-	G
KREA 66	272252	810604	Off State Road 98 at Four-E's Campground.	1986 - P	BW	BW	-	G
KREA IR1	271790	805320	East of State Road 98 at Dry Lake Dairy #2. Sample is collected 0.3 miles north of the Dry Lake #2 barn in the east spray field. The automatic sampler collects daily composites.	1988 - P	W	W	DS	G/A
KREA IR2	271815	805337	East of State Road 98 at Dry Lake Dairy #2. Sample is collected 0.7 miles northwest of Dry Lake #2 barn in the west spray field. The automatic sampler collects daily composites.	1988 - P	W	W	DS	G/A
S65C	272401	810657	A large gate and boat lock structure located on the Kissimmee River nine miles south of S-65BB. The automatic sampler collects daily composites.	1987 - P	W	W	US	A
S65D	271845	810120	A large gate and boat lock structure located on the Kissimmee River nine miles south of S-65C. The automatic sampler collects daily composites.	1987 - P	W	W	US	A

TABLE 16 (Continued). 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 Parameters	Nutrients	US/DS	G/A
S65E	271335	805742	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 automatic sampler collects daily composites.	1987 - P	W	W	US	A
S154	271241	805506	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 automatic sampler collects daily composites.	1987 - P	W	W	US	A/G
S191	271135	804535	A large gate type structure on the north side of Lake Okeechobee at Nubbin Slough. Water is released into Lake Okeechobee through this structure. The automatic sampler collects daily composites.	1987 - P	W	W	US	G/A
S84	271250	805584	A gate type structure where C-41A intersects the Kissimmee River. Water flows into the Kissimmee River through this structure. The automatic sampler collects daily composites.	1988 - P	W	W	US	G

TABLE 17. Statistics for Select Parameters for the Lower Kissimmee River Valley Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
KREA 01	0.031	0.186	2.650	0.008	0.103	0.639	0.51	1.61	13.97	<0.004	0.025	0.253
KREA 04	0.056	0.222	1.023	0.025	0.163	0.965	<0.50	1.54	3.54	<0.004	0.029	0.627
KREA 06A	0.043	0.288	2.881	0.033	0.221	1.125	0.51	2.23	94.62	<0.004	0.047	1.368
KREA 07	0.150	1.220	5.480	0.080	0.910	4.150	0.57	2.77	15.06	<0.004	0.053	2.431
KREA 08	0.435	1.743	13.520	0.178	1.273	5.095	0.51	3.56	16.07	<0.004	0.362	7.349
KREA 09	0.128	0.542	1.840	0.053	0.346	1.175	0.56	2.27	10.97	<0.004	0.028	0.267
KREA 10A	3.305	10.801	28.420	1.838	6.763	10.920	1.42	8.36	13.55	0.019	0.399	1.423
KREA 10B	0.073	0.465	2.845	<0.004	0.182	1.090	1.13	3.46	9.24	<0.004	0.055	1.595
KREA 10D**	0.118	0.425	0.730	-	-	-	-	-	-		-	-
KREA 10E**	0.197	1.984	3.150	-	-	-	-	-	-		-	-
KREA 16	0.079	1.730	21.380	0.087	0.966	3.955	0.86	2.67	11.69	<0.004	0.037	0.394
KREA 17A	0.026	0.219	3.690	<0.004	0.097	0.613	0.51	1.96	8.68	<0.004	0.023	0.248
KREA 20	0.680	3.740	9.180	0.605	3.297	8.030	<0.50	3.25	11.67	<0.004	0.027	0.253
KREA 21	<0.004	0.602	6.920	0.010	0.547	3.220	0.50	1.46	6.57	<0.004	0.032	1.251
KREA 30A	0.392	1.440	3.945	0.189	1.361	3.750	0.58	2.01	4.36	<0.004	0.036	0.115
KREA 31	0.057	1.170	8.485	<0.004	0.552	3.352	0.96	3.59	21.40	<0.004	0.040	1.317
KREA 32B	0.949	3.673	15.440	0.685	3.009	13.830	1.67	5.15	23.87	<0.004	0.217	11.446
KREA 32C	1.804	2.673	3.755	3.135	3.135	3.135	3.32	3.32	3.32	0.011	0.011	0.011
KREA 32D**	1.405	3.098	4.790	-	-	-	-	-	-	-	-	-
KREA 33	0.374	2.803	34.540	0.074	1.222	2.915	1.82	5.22	13.86	0.009	0.283	5.028
KREA 40	0.028	1.835	15.740	0.007	1.252	11.470	0.88	4.22	50.06	<0.004	0.340	4.343
KREA 40A	0.035	2.533	21.360	<0.004	0.712	4.910	0.79	3.79	20.37	<0.004	0.194	3.029
KREA 40B	6.860	10.050	13.240	6.025	6.025	6.025	3.67	3.67	3.67	0.011	0.011	0.011
KREA 41	2.431	19.062	87.240	0.555	5.058	9.560	3.13	17.52	31.91	0.017	0.073	0.130
KREA 41A	0.060	0.926	4.875	0.032	0.747	2.475	0.69	2.55	9.88	<0.004	0.089	0.903

TABLE 17 (Continued). Statistics for Select Parameters for the Lower Kissimmee River Valley Monitoring Program for Period of Record

SFWMD

Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
KREA 41B*	12.420	12.420	12.420	-	-	-	-	-	-	-	-	-
KREA 42A	1.544	2.614	4.195	1.141	2.282	3.730	2.20	3.77	7.47	0.011	0.045	0.360
KREA 42B	0.932	2.339	4.730	0.835	1.968	3.285	1.99	5.59	23.00	0.009	0.086	0.557
KREA 42C	1.207	6.702	19.780	1.030	3.039	7.940	2.27	3.98	8.42	0.008	0.041	0.246
KREA 42D*	0.930	0.930	0.930	-	-	-	-	-	-	-	-	-
KREA 43A	0.095	1.515	8.920	0.012	1.316	8.070	<0.50	1.89	6.35	<0.004	0.096	1.313
KREA 44	0.512	14.912	40.475	2.324	9.274	22.956	2.84	9.35	22.42	0.016	0.167	1.129
KREA 44C	0.059	0.135	0.211	0.185	0.185	0.185	1.95	1.95	1.95	0.015	0.015	0.015
KREA 46A	<0.004	1.284	6.430	0.115	1.338	6.215	1.56	2.26	4.01	<0.004	0.011	0.023
KREA 46B	0.036	2.551	6.850	<0.004	2.251	5.865	0.97	3.37	7.21	0.009	0.014	0.022
KREA 47A	0.125	0.470	4.425	0.025	0.258	0.491	0.51	1.57	2.20	<0.004	0.018	0.063
KREA 49	0.772	7.441	34.820	1.375	5.681	10.690	1.38	6.41	23.89	0.005	0.115	2.512
KREA 66	0.017	0.066	0.302	<0.004	0.025	0.139	0.51	1.26	4.71	<0.004	0.022	0.242
KREA IR1	0.126	1.811	5.870	0.046	1.658	5.170	1.30	3.44	9.07	<0.004	0.039	0.463
KREA IR2	0.453	2.818	9.110	0.345	2.346	5.365	1.20	4.35	24.12	<0.004	0.092	1.238
S65C	0.020	0.057	0.420	<0.004	0.019	0.130	0.51	1.15	2.51	<0.004	0.056	0.282
S65D	0.026	0.088	0.502	<0.004	0.045	0.359	0.51	1.19	5.51	<0.004	0.063	0.230
S65E	0.011	0.109	0.441	<0.004	0.067	0.397	<0.50	1.22	5.76	<0.004	0.083	0.298
S154	0.045	0.760	2.720	0.018	0.617	2.306	0.55	1.69	3.41	<0.004	0.038	0.161
S191	0.174	0.594	9.650	0.083	0.472	1.026	<0.50	1.78	17.93	<0.004	0.285	0.871
S84	<0.004	0.047	0.451	<0.004	0.018	0.369	0.58	1.18	2.46	<0.004	0.161	0.432

* New station as of October 1991 with only one sample collected through December 31, 1991.

** Total Phosphorus only at this station.

TABLE 18. 1989 - 1991 Statistics for Select Parameters for the Lower Kissimmee River Valley Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
KREA 01	0.033	0.214	2.650	0.008	0.129	0.639	0.51	1.41	2.55	<0.004	0.025	0.153
KREA 04	0.148	0.148	0.148	0.103	0.103	0.103	1.37	1.37	1.37	0.012	0.012	0.012
KREA 06A	0.043	0.244	0.719	0.033	0.186	0.508	0.51	1.79	40.61	<0.004	0.052	1.368
KREA 07	0.250	1.182	5.480	0.214	1.013	3.421	1.49	2.70	8.760	<0.004	0.114	2.431
KREA 08	0.435	1.551	13.520	0.178	1.009	1.770	0.67	3.61	11.650	<0.004	0.858	7.349
KREA 09	0.128	0.539	1.383	0.082	0.358	0.815	1.14	2.04	3.460	<0.004	0.021	0.267
KREA 10A	3.305	12.158	28.420	5.015	8.446	10.920	5.72	9.43	13.430	0.019	0.086	0.227
KREA 10B	0.073	0.490	2.845	<0.004	0.200	1.090	1.13	3.57	9.24	<0.004	0.063	1.595
KREA 10D*	0.118	0.425	0.730	-	-	-	-	-	-	-	-	-
KREA 10E*	0.197	1.984	3.150	-	-	-	-	-	-	-	-	-
KREA 16	0.079	2.738	21.380	0.087	1.172	2.945	1.13	2.97	10.840	0.008	0.019	0.052
KREA 17A	0.026	0.150	0.746	<0.004	0.012	0.613	0.51	1.78	3.760	<0.004	0.022	0.193
KREA 20	0.680	3.401	9.180	0.605	3.103	8.030	<0.50	3.00	6.350	<0.004	0.019	0.197
KREA 21	0.048	0.761	6.920	0.013	0.669	3.220	0.50	1.40	5.76	<0.004	0.025	1.251
KREA 30A	0.392	1.465	3.945	0.189	1.369	3.750	0.58	2.00	4.360	<0.004	0.036	0.115
KREA 31	0.057	0.873	8.485	<0.004	0.438	2.082	0.96	2.96	21.400	<0.004	0.021	0.145
KREA 32B	0.949	3.194	13.940	0.685	2.725	13.830	1.67	4.16	22.140	<0.004	0.219	11.446
KREA 32C	1.804	2.673	3.755	3.135	3.135	3.135	3.32	3.32	3.320	0.011	0.011	0.011
KREA 32D*	1.405	3.098	4.790	-	-	-	-	-	-	-	-	-
KREA 33*	2.420	4.585	6.750	-	-	-	-	-	-	-	-	-
KREA 40	0.028	0.659	7.130	0.007	0.484	6.240	0.88	2.80	50.06	<0.004	0.358	4.343
KREA 40A	0.117	1.043	5.260	0.080	0.305	1.860	0.79	2.27	07.50	<0.004	0.225	3.029
KREA 40B	6.860	10.050	13.240	6.025	6.025	6.025	3.67	3.67	03.67	0.011	0.011	0.011
KREA 41*	2.431	18.510	87.240	-	-	-	-	-	-	-	-	-
KREA 41A	0.060	0.926	4.875	0.032	0.717	2.475	0.69	2.71	09.88	<0.004	0.120	0.903

TABLE 18 (Continued). 1989 - 1991 Statistics for Select Parameters for the Lower Kissimmee River Valley Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
KREA 41B*	12.420	12.420	12.420	-	-	-	-	-	-	-	-	-
KREA 42A	1.544	2.614	4.195	1.141	2.282	3.730	2.20	3.770	07.47	0.011	0.045	0.360
KREA 42B	0.932	2.339	4.730	0.835	1.968	3.285	1.99	5.59	23.00	0.009	0.086	0.557
KREA 42C	1.207	6.702	9.780	1.030	3.039	7.940	2.27	3.98	08.42	0.008	0.041	0.246
KREA 42D*	0.930	0.930	0.930	-	-	-	-	-	-	-	-	-
KREA 43A	0.095	0.809	2.485	0.012	0.699	2.004	0.53	1.78	06.35	<0.004	0.047	0.857
KREA 44	2.430	10.557	32.680	2.324	6.220	8.409	2.84	5.93	14.14	0.016	0.119	0.606
KREA 44C	0.059	0.135	0.211	0.185	0.185	0.185	1.95	1.95	01.95	0.015	0.015	0.015
KREA 46A	<0.004	1.284	6.430	0.115	1.338	6.215	1.56	2.26	04.01	<0.004	0.011	0.023
KREA 46B	0.036	2.551	6.850	<0.004	2.251	5.865	0.97	3.37	07.21	0.009	0.0.14	0.022
KREA 47A	0.125	0.470	4.425	0.025	0.258	0.491	0.51	1.57	02.20	<0.004	0.018	0.063
KREA 49	2.460	7.080	34.820	3.310	5.434	9.805	1.38	5.14	18.60	0.005	0.021	0.067
KREA 66	0.040	0.087	0.302	<0.004	0.045	0.139	0.51	1.26	02.31	<0.004	0.021	0.242
KREA IR1	0.330	2.144	5.870	0.234	1.952	5.170	1.30	3.18	09.07	<0.004	0.014	0.031
KREA IR2	0.453	3.024	9.110	0.345	2.482	5.365	1.52	4.27	24.12	<0.004	0.097	1.238
S65C	0.020	0.062	1.418	<0.002	0.021	0.130	0.51	1.14	02.51	<0.004	0.071	1.500
S65D	0.026	0.090	0.502	<0.003	0.050	0.359	0.51	1.15	02.67	<0.004	0.077	1.526
S65E	0.011	0.114	0.441	<0.004	0.074	0.397	<0.50	1.21	02.69	<0.004	0.093	1.369
S154	0.045	0.786	2.720	0.018	0.650	2.306	0.55	1.72	3.41	<0.004	0.038	0.153
S191	0.231	0.551	1.108	0.083	0.479	1.026	<0.50	1.63	3.49	<0.004	0.295	0.796
S84	<0.004	0.050	0.451	<0.004	0.020	0.369	0.58	1.18	02.46	<0.004	0.152	0.432

* = Total Phosphorus only at this Station

SECTION 6

DAIRY SYNOPTIC SURVEY

Purpose and Scope

The Dairy Synoptic Survey monitoring program is performed on dairies in the Taylor Creek/Nubbin Slough, Lower Kissimmee River, and Arbuckle Creek Basins. The basins are located in Okeechobee, Highlands and Polk Counties. The dairy farms receiving the highest priority are those having total phosphorus concentrations greater than 1.2 mg/l on an annual "rolling" or moving average basis.

The objectives of this program are:

1. Identifying sources of phosphorus contributing to the high phosphorus concentrations observed through routine monitoring of the dairy outflows.

2. Providing the land owner and FDEP with information enabling them to identify best management practices which may reduce the total phosphorus concentrations to the 1.2 mg/l goal.

Sampling Locations and Descriptions

The locations of the 11 sites monitored under this program are shown on Figure 7. Eleven synoptic surveys have been performed. Each consists of a single sampling event throughout a farm after the antecedent moisture condition and rainfall have combined to produce runoff from which high phosphorus concentrations may be anticipated. Sampling locations on each farm are based on the need to separate sources of water so that the sources of high phosphorus concentrations may be identified. A typical survey may average 30 grab samples. Table 19 lists a latitude and longitude, a brief station description, and the month the synoptic survey was completed.

Parameters and Sampling Frequencies

The samples are collected and brought back to the field office in Okeechobee where they are screened for soluble reactive phosphorus using a spectrophotometer. Physical parameters are not measured. Sampling is a single event done during the wet season. The results of these surveys can only be found in the Synoptic Survey Reports. These reports are sent to FDEP, the dairy owner, and to the Water Quality Monitoring Division Director.

District Publications

Synoptic Survey Reports are available for each location, Water Quality Monitoring Division, SFWMD.

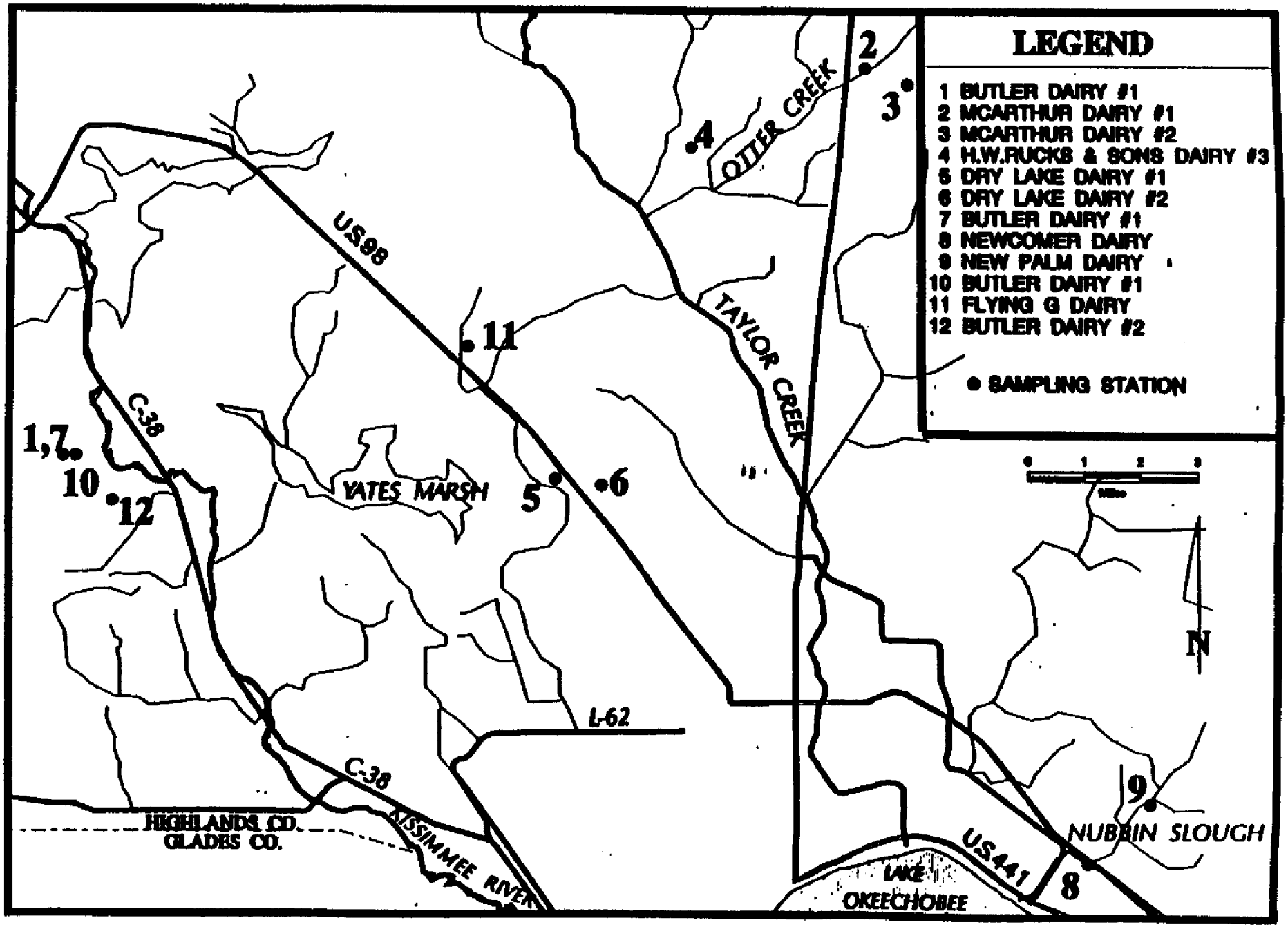

FIGURE 7. Location of Sampling Stations for the dairy Synoptic Survey

Table 19. Summary of Sampling Station Locations and Dates collected for the Dairy Synoptic Survey Monitoring Program

Sampling Stations	Lat	Long	Location	Date
1	271820	810230	Butler Dairy #1, Highlands County	July, 1990 and February, 1992
2	272415	804835	McArthur Dairy #1, Okeechobee County	October, 1991
3	272400	804751	McArthur Dairy #2, Okeechobee County	October, 1991
4	272302	805137	H.W. Rucks & Son Dairy #3, Okeechobee County	October, 1991
5	271800	805400	Dry Lake Dairy #1, Okeechobee County	October, 1991
6	271754	805312	Dry Lake Dairy #2, Okeechobee County	October, 1991
7	271211	804448	Newcomer Dairy, Okeechobee County	July, 1992
8	271306	804345	New Palm Dairy, Okeechobee County	July, 1992
9	271820	810217	Butler Dairy #1, Highlands County	September, 1992
10	272000	805530	Flying G Dairy, Okeechobee County	October, 1992
11	271739	800139	Butler Dairy #2, Highlands County	March, 1993

SECTION 7

TAYLOR CREEK NUBBIN SLOUGH
PROJECT CODE: TCNS

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 and parts of Martin County.

A water quality monitoring network has been sampled by SFWMD since 1979. This program was initiated as a means of identifying trends and quantifying changes in water quality due to changes in land use and/or implementation of BMPs on beef cattle ranches and dairy farms in the basin. This program is jointly funded by the state/federal Taylor Creek Headwaters/Rural Clean Waters Program. The program is part of the District's Lake Okeechobee Operating Permit, granted by the Florida Department of Environmental Protection.

It was recommended by the Kissimmee River Resource Planning Management (380), and the Lake Okeechobee Technical Advisory Committee to; identify trouble spots, inform individual landowners of the impacts of implementing BMPs to improve water quality, and to provide the state and federal agencies responsible for administering cost-share programs, a method of measuring the cost-effectiveness. The District intensified the monitoring effort in fiscal year 87/88, by approximately doubling the number of sampling sites. In fiscal year 91/92, the network design was again modified to provide more intensive and comprehensive monitoring.

The objectives of this program are:

1. Monitoring water quality in support of the FDEP's Dairy Rule, by providing chemistry data for the dairy outflows, and evaluating the effectiveness of dairy BMP's and the Dairy Buy-out program.

2. Assessing tributary, basin loading, and concentration inputs to Lake Okeechobee, including:

   a) Providing levels of total phosphorus at the inflows to Lake Okeechobee to compare with the 0.18 mg/l total phosphorus SWIM standard for the basin loading calculations.

   b) Providing data that will delineate the relative importance of tributary loading

within the basin, to the whole basin output.

3. Developing basin and spatial scale models to predict changes in loads to Lake Okeechobee as a function of land use. This includes:

   a) Providing data for determining statistical or mechanistic relationships between rainfall, land use (or land type), and nutrient runoff into streams.

   b) Providing data to help identify the reason for high episodic phosphorus events.

This program fulfills the District's obligations to the Taylor Creek Headwaters and the Rural Clean Waters programs, also the 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 SWIM legislation of 1987.

Sampling Location and Description

The locations of the 45 sites monitored under the Taylor Creek/ Nubbin Slough program are shown on Figure 8. Table 20 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 21 and 22 contain statistics for each monitoring location.

District Publications

Federico, A. (1977). Investigations of the Relationships between Land Use, Rainfall, and Runoff Quality in the Taylor Creek Watershed. SFWMD, Tech. Pub. 77-03.

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

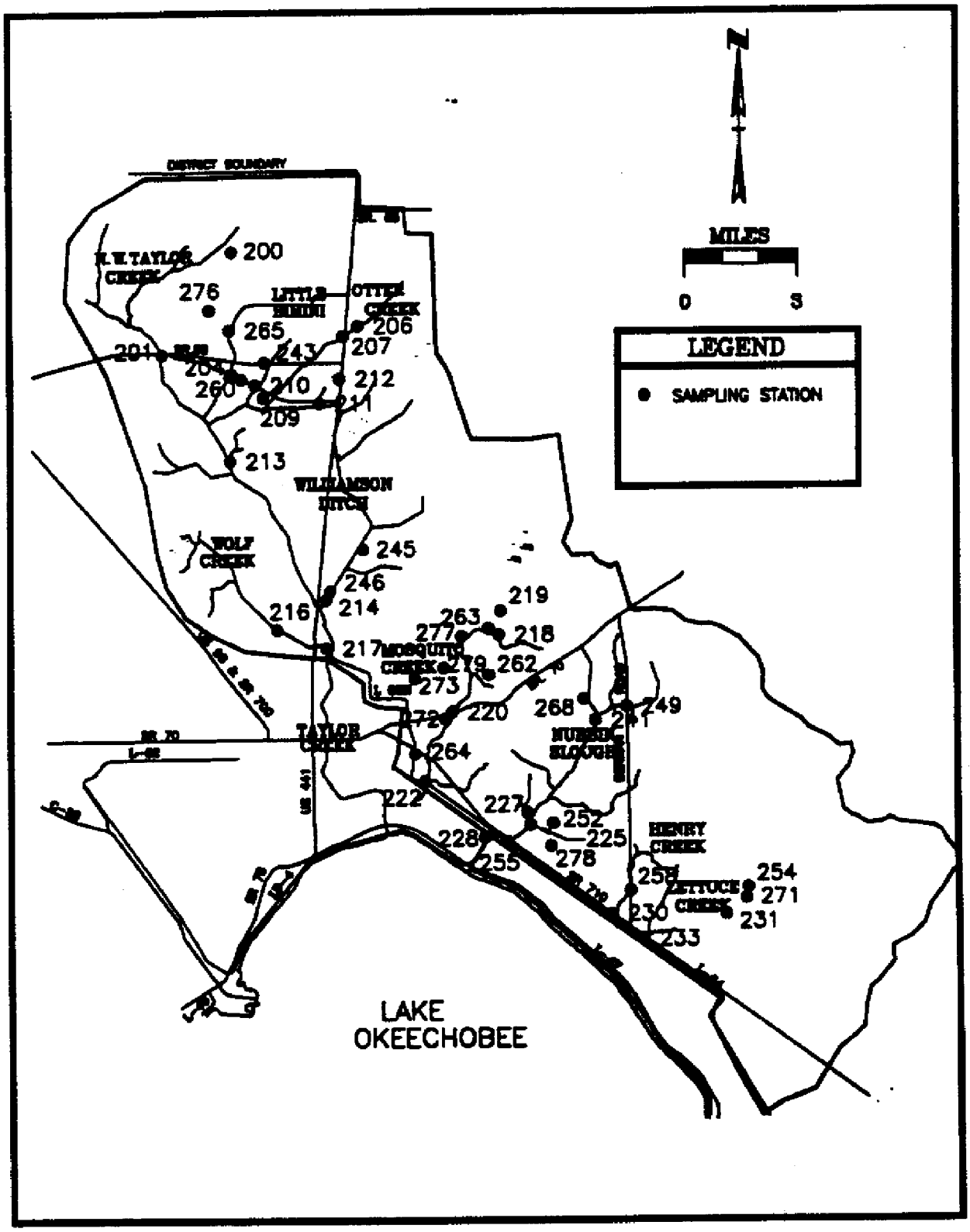

FIGURE 8. Location of Sampling Stations for the Taylor Creek/Nubbin slough Water Quality Monitoring Program

TABLE 20. Summary of Sampling Station Locations and Frequency of Collection for the Taylor Creek Nubbin Slough Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
TCNS 200	272600	805151	On Calf Barn Road below the McArthur Heifer operation. Samples are collected from the bridge over N.W. Taylor Creek.	1979 - P	BW	BW	G
TCNS 201	272337	805340	On HWY 68. The samples are collected from the bridge over N.W. Taylor Creek at the U.S.G.S. stage station.	1979 - P	BW	BW	G
TCNS 204	272309	805151	On N.W. 144th Drive (Potter Road). The samples are collected from the bridge over Little Bimini.	1979 - P	BW	BW	G
TCNS 206	272415	804835	East of State Road 441 approximately 0.5 miles behind a FP&L substation at Remilu Ranch, and collects runoff from McArthur Dairy Barns #1 and #2. Sample is collected above weir on Otter Creek.	1989 - P	BW	BW	G
TCNS 207	272403	804858	100 yards west of State Road 441 at S-13B bridge over Otter Creek on Wilson Rucks property.	1979 - P	W	W	G/A
TCNS 209	272240	805046	West of State Road 441 on Potter Road. The samples are collected at two large culverts on Potter Road at Otter Creek.	1979 - P	W	W	G/A
TCNS 210	272300	805000	West of State Road 441 on Potter Road. The samples are collected at a tributary that runs across H & T Rucks Barn #3 at Potter Road.	1985 - P	BW	BW	G
TCNS 211	272228	804935	West of State Road 441 on Potter Road. The samples are collected at East Otter Creek and Potter Road at two large roadside culverts.	1979 - P	BW	BW	G
TCNS 212	272302	804904	At East Otter Creek, just off State Road 441 above Remilu Ranch.	1988 - P	BW	BW	G

TABLE 20 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Taylor Creek Nubbin Slough Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
TCNS 213	272108	805154	West of State Road 441 on State Road 68 at Flying "G" Ranch. The samples are collected approximately 3.5 miles south into Flying "G" Ranch directly below the confluence of Otter Creek, Little Bimini, and NW Taylor Creek.	1979 - P	W	W	G/A
TCNS 214	271804	804920	East of State Road 441 at Williamson Ditch at the Florida School for Boys. The samples are collected directly downstream of the treatment plant at the Boys School.	1979 - P	W	W	G/A
TCNS 216	271710	805043	Off HWY 98 east at the outflow of Sloane Ray Dairy (Old SEZ) into Wolf Creek.	1979 - P	W	W	G
TCNS 217	271644	804926	East of State Road 441, off Cemetary Road. Sample is collected from the weir on Wolf Creek.	1988 - P	W	W	G/A
TCNS 218	271701	804459	Off State Road 70 on N.E. 80th Avenue at a county ditch above Larson Dairy #8.	1988 - P	BW	BW	G
TCNS 219	271734	804456	North of State Road 70 on N.E. 80th Avenue at Hales Farms runoff above Larson Dairies #5, 6, 7, and 8.	1988 - P	BW	BW	G
TCNS 220	271512	804613	On State Road 70 at Mosquito Creek. The samples are collected at the Mosquito Creek bridge.	1979 - P	BW	BW	G
TCNS 222	271413	804053	On State Road 710 and Mosquito Creek. The samples are collected at the Mosquito Creek bridge.	1979 - P	W	W	G/A
TCNS 225	271235	804412	Off State Road 710 and collects runoff from New Palm Dairy at culvert above Newcommer Dairy.	1988 - P	BW	BW	G

TABLE 20 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Taylor Creek Nubbin Slough Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
TCNS 227	271245	804410	At Red Top Dairy off State Road 710. The samples are collected at a surface water ditch approximately 1/2 mile north of ARS 14A that drains several hay pastures into Nubbin Slough.	1987 - P	BW	BW	G
TCNS 228	271213	804445	On State Road 710 and Nubbin Slough. The samples are collected at the Nubbin Slough bridge.	1979 - P	W	W	G/A
TCNS 230	271029	804207	On State Road 710 at Henry Creek. The samples are collected at the Henry Creek bridge.	1979 - P	W	W	G/A
TCNS 231	271028	803910	Off Martin Grade Road and collects runoff from Underhill Dairy.	1988 - P	BW	BW	G
TCNS 233	270956	804114	On State Road 710 at Lettuce Creek. The samples are collected at the Lettuce Creek bridge.	1979 - P	W	W	G/A
TCNS 241	271500	804230	Off Berman Road and collects runoff from Davie Dairy Barn #1 and #2 below the spray field.	1988 - P	BW	BW	G
TCNS 243	272325	805101	Off State Road 68 and is the upstream site of Otter Creek, above H.T. Rucks & Sons Dairy #3.	1988 - P	BW	BW	G
TCNS 245	271902	804829	East of State Road 441 North, at Williamson Cattle Company. The sample is collected from a concrete bridge on the Williamson main ditch.	1979 - P	BW	BW	G
TCNS 246	271804	804920	Off State Road 441 North, at Williamson Cattle Company. The sample is collected at a four culvert discharge structure in the Williamson east lateral ditch 0.25 miles east of TCNS 245.	1979 - P	BW	BW	G

TABLE 20 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Taylor Creek Nubbin Slough Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
TCNS 249	271520	804142	On Berman Road approximately three miles south of State Road 70. The samples are collected at a culvert where Nubbin Slough crosses Berman Road.	1979 - P	BW	BW	G
TCNS 252	271237	804337	Off State Road 710 on New Palm Dairy. Sample is taken at tributary culvert above New Palm Dairy.	1988 - P	BW	BW	G
TCNS 254	271105	803835	Off Martin Grade in Martin County, and is the oncoming tributary north of the Underhill Dairy barn.	1991 - P	BW	BW	G
TCNS 255	271211	804448	Off State Road 710 and collects runoff from the cooling ponds of Newcommer Dairy going into Nubbin Slough.	1989 - P	BW	BW	G
TCNS 258	271102	804138	Off State Road 710 and collects runoff from Enrico Dairy as it flows into Henry Creek.	1989 - P	BW	BW	G
TCNS 260	272302	805137	West of State Road 441 on Potter Road and collects the east runoff from H.T. Rucks and Sons Dairy #3.	1990 - P	BW	BW	G
TCNS 262	271605	804515	North of State Road 70 and collects runoff from Larson Dairy #7 at a culvert just south of Woody's Lane.	1990 - P	BW	BW	G
TCNS 263	271710	804515	North of State Road 70 and collects runoff from Larson Dairy #8 at a culvert just north of Woody's Lane.	1990 - P	BW	BW	G
TCNS 264	271415	804710	Off State Road 710 and collects runoff from Murphy White Dairy at the first culvert before the FP&L substation.	1990 - 1991	BW	BW	G

TABLE 20 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Taylor Creek Nubbin Slough Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	G/A
TCNS 265	272410	805155	Off State Road 68 at the culvert on Rucks Dairy Road that collects the outfall H.T. Rucks and Sons Dairy #1.	1991 - P	BW	BW	G
TCNS 268	271530	804248	On Davie Dairy on the southeast property line and collects oncoming water to the Dairy from the Lou Cox property.	1991 - P	BW	BW	G
TCNS 271	271050	803838	Off Martin Grade Road along the Underhill Dairy access road and collects oncoming water to the dairy.	1991 - P	BW	BW	G
TCNS 272	271505	804625	The culvert north of Larson Dairy Barn #5 and collects oncoming water to Barn #5.	1992 - P	BW	BW	G
TCNS 273	271615	804625	At the outfall point at Larson Dairy Barn #5, at Mosquito Creek culvert on Woody's Lane.	1991 - P	BW	BW	G
TCNS 276	272438	805226	Off Calf Barn Road on the McArthur Dairy property and collects runoff from McArthur Dairy Barns #4 & #5.	1991 - P	BW	BW	G
TCNS 277	271655	804557	North of Larson Dairy Barn #8 and collects runoff from the barn.	1992 - P	BW	BW	G
TCNS 278	271205	804340	Off State Road 710 and collects runoff from the New Palm Dairy spray field.	1991 - P	BW	BW	G
TCNS 279	271600	804710	Off State Road 70E on N.E. 42nd Avenue. The samples are collected from a ditch downstream of the convergence of the ditch draining the Larson #5 east spray field and the ditch draining the Larson #5 west spray field.	1992 - P	BW	BW	G

TABLE 21. Statistics for Select Parameters for the Taylor Creek/Nubbin Slough Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
TCNS 200	0.125	1.368	8.760	0.062	0.593	2.772	0.61	2.25	6.74	<0.004	0.117	2.279
TCNS 201	0.234	0.508	1.735	0.156	0.408	1.358	0.50	1.37	3.49	<0.004	0.058	0.234
TCNS 204	0.319	1.106	5.565	0.097	0.932	3.635	0.93	3.33	8.86	<0.004	1.310	3.725
TCNS 206	0.115	2.092	6.115	0.078	1.295	4.160	1.57	4.87	26.77	<0.004	0.136	0.958
TCNS 207	0.115	1.497	7.475	0.054	1.268	6.146	0.50	3.21	22.04	<0.004	0.350	12.567
TCNS 209	0.173	1.439	6.540	0.024	1.208	4.654	0.26	3.65	76.46	<0.004	0.585	75.000
TCNS 210	0.032	3.140	18.290	0.031	2.082	8.469	<0.50	5.55	54.67	<0.004	0.500	17.763
TCNS 211	0.025	0.361	1.965	<0.004	0.176	1.911	0.10	1.75	12.61	<0.004	0.040	1.922
TCNS 212	0.024	0.296	2.235	<0.004	0.194	2.111	0.81	2.36	15.02	<0.004	0.019	0.147
TCNS 213	0.118	0.619	1.519	0.079	0.515	1.519	0.53	1.62	8.32	<0.004	0.282	2.580
TCNS 214	0.021	0.326	6.064	0.005	0.204	1.452	0.23	1.58	10.84	<0.004	0.079	1.243
TCNS 216	0.212	2.280	19.460	0.155	1.536	6.790	0.86	5.58	22.22	<0.004	0.379	10.161
TCNS 217	0.067	0.684	3.045	0.010	0.518	2.394	<0.50	1.92	9.28	<0.004	0.236	2.137
TCNS 218	0.019	0.375	2.450	<0.001	0.147	0.952	0.69	2.29	9.11	<0.004	0.023	0.299
TCNS 219	0.012	0.336	3.345	<0.004	0.171	1.183	0.51	2.33	93.05	<0.004	0.906	91.200
TCNS 220	0.151	1.464	14.358	<0.004	1.301	11.047	0.50	4.82	35.38	<0.004	0.540	7.100
TCNS 222	0.079	1.444	8.605	0.010	1.295	6.610	0.68	4.03	27.31	<0.004	1.202	9.750
TCNS 225	0.042	1.193	6.585	0.034	1.360	3.310	0.52	5.02	15.85	<0.004	0.087	0.370
TCNS 227	0.037	0.845	19.100	0.008	0.229	1.811	0.51	2.88	39.02	<0.004	0.178	1.875
TCNS 228	0.091	1.778	14.650	0.018	1.286	10.060	0.86	6.20	57.26	<0.004	0.359	2.952
TCNS 230	0.143	1.779	16.258	<0.004	1.250	5.660	0.76	4.48	33.95	<0.004	0.222	2.331
TCNS 231	0.145	1.321	13.940	0.054	1.102	13.054	0.77	3.59	45.48	<0.004	0.033	0.811
TCNS 233	0.030	0.425	13.460	<0.004	0.246	1.216	0.34	1.86	8.06	<0.004	0.095	0.961
TCNS 241	0.169	1.653	6.015	0.011	1.216	3.263	0.92	4.25	24.43	0.006	0.987	6.537
TCNS 243	0.045	0.364	1.640	<0.004	0.250	1.188	0.59	3.77	93.13	<0.004	2.036	91.600

TABLE 21 (Continued). Statistics for Select Parameters for the Taylor Creek/Nubbin Slough Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
TCNS 245	0.053	0.171	0.444	0.023	0.113	0.277	<0.50	1.15	4.16	<0.004	0.030	0.931
TCNS 246	0.015	0.238	2.147	<0.004	0.170	0.778	<0.50	1.34	17.68	<0.004	0.051	0.684
TCNS 249	0.051	0.490	4.245	0.027	0.346	1.971	0.46	2.50	25.42	<0.004	0.020	0.500
TCNS 252	0.156	0.872	5.200	0.079	0.561	2.076	0.52	2.75	13.07	<0.004	0.039	0.149
TCNS 254	0.131	0.653	1.985	0.085	0.530	1.838	0.85	4.39	51.79	<0.004	1.121	22.170
TCNS 255	0.589	3.541	22.620	0.236	2.243	4.100	0.52	4.34	17.03	0.008	0.080	0.464
TCNS 258	0.185	4.690	11.480	0.080	4.890	11.065	1.93	7.91	19.20	<0.004	0.113	1.490
TCNS 260	0.247	3.648	8.665	0.226	1.255	3.000	0.99	2.46	4.49	0.007	0.030	0.113
TCNS 262	0.352	2.204	4.280	0.287	1.997	3.710	1.93	16.62	81.33	0.008	0.038	0.312
TCNS 263	0.209	0.610	7.240	0.168	0.410	3.350	0.61	1.87	7.09	0.015	0.133	0.553
TCNS 264	8.520	11.145	17.080	7.560	10.882	17.125	4.74	5.60	6.19	0.013	0.022	0.029
TCNS 265***	0.199	0.270	0.337	-	-	-	-	-	-	-	-	-
TCNS 268***	0.138	0.310	0.703	-	-	-	-	-	-	-	-	-
TCNS 271***	0.068	0.192	0.526	-	-	-	-	-	-	-	-	-
TCNS 272***	0.298	0.298	0.298	-	-	-	-	-	-	-	-	-
TCNS 273***	0.372	0.507	0.747	-	-	-	-	-	-	-	-	-
TCNS 276***	0.303	0.597	0.853	-	-	-	-	-	-	-	-	-
TCNS 277**	0.106	0.795	1.485	1.475	1.475	1.475	-	-	-	0.016	0.016	0.016
TCNS 278***	0.061	0.312	1.177	-	-	-	-	-	-	-	-	-
TCNS 279*	0.321	0.321	0.321	0.275	0.275	0.275	1.12	1.12	1.12	0.008	0.008	0.008

* = New station only one sample collected.

** = New station only one sample collected for OPO4, TPO4 and NOX.

*** = TPO4 only parameter sampled for at this site.

TABLE 22. 1989 - 1991 Statistics for Select Parameters for the Taylor Creek/Nubbin Slough Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
TCNS 200	0.214	1.596	8.760	0.073	0.616	2.772	0.71	2.40	6.74	<0.004	0.190	2.279
TCNS 201	0.235	0.520	1.735	0.156	0.420	1.358	0.50	1.41	3.49	<0.004	0.053	0.234
TCNS 204	0.319	1.118	5.565	0.097	0.932	3.635	1.08	3.29	8.86	0.044	1.199	3.725
TCNS 207	0.115	1.146	5.715	0.054	0.894	4.535	0.52	2.70	22.04	<0.004	0.248	12.567
TCNS 209	0.196	0.876	6.540	0.148	0.666	2.135	0.51	2.31	76.46	<0.004	0.785	75.00
TCNS 210	0.032	2.968	6.560	0.185	1.433	7.612	1.00	2.95	12.43	0.005	0.073	0.905
TCNS 211	0.065	0.371	1.884	0.026	0.243	1.386	0.51	1.36	04.28	<0.004	0.020	0.249
TCNS 212	0.046	0.290	2.235	<0.004	0.184	2.111	0.81	2.37	15.02	<0.004	0.018	0.147
TCNS 213	0.118	0.627	1.519	0.092	0.519	1.496	0.53	1.57	07.72	<0.004	0.260	2.580
TCNS 214	0.054	0.253	2.083	0.037	0.183	1.452	<0.50	1.12	04.78	<0.004	0.065	1.243
TCNS 216	0.212	2.272	19.460	0.155	1.585	6.790	0.86	5.31	22.22	<0.004	0.384	10.161
TCNS 217	0.099	0.719	3.045	0.060	0.537	2.394	0.51	1.99	09.28	<0.004	0.251	2.137
TCNS 218	0.019	0.410	2.450	<0.004	0.153	0.952	1.07	2.57	09.11	<0.004	0.023	0.299
TCNS 219	0.012	0.337	3.345	<0.004	0.166	0.707	0.51	2.54	93.05	<0.004	1.082	91.200
TCNS 220	0.233	0.680	3.040	0.186	0.597	2.285	0.59	2.64	05.74	<0.004	0.462	1.590
TCNS 222	0.272	0.691	1.611	0.158	0.610	1.619	0.79	2.11	03.71	<0.004	0.647	1.712
TCNS 225	0.073	1.142	6.585	0.034	1.311	3.310	0.52	4.92	15.85	<0.004	0.077	0.281
TCNS 227	0.049	0.790	19.100	0.008	0.201	1.768	0.51	2.15	09.90	<0.004	0.047	0.434
TCNS 228	0.270	0.870	2.615	0.158	0.646	1.426	1.43	2.95	18.20	0.014	0.536	2.307
TCNS 230	0.256	0.749	1.638	0.158	0.658	1.611	0.99	2.03	4.60	<0.004	0.120	0.473
TCNS 231	0.145	1.193	3.435	0.054	0.929	2.100	0.77	2.99	9.95	<0.004	0.033	0.811
TCNS 233	0.092	0.471	7.235	0.201	0.298	1.199	0.75	1.90	8.06	<0.004	0.115	0.961
TCNS 241	0.169	1.660	6.015	0.011	1.226	3.263	0.92	4.23	24.43	0.006	0.996	6.537
TCNS 243	0.045	0.283	1.204	<0.004	0.195	1.188	0.59	3.97	93.13	<0.004	2.388	91.600
TCNS 245	0.053	0.167	0.444	0.023	0.109	0.277	<0.50	1.18	4.16	<0.004	0.029	0.931

TABLE 22 (Continued). 1989 - 1991 Statistics for Select Parameters for the Taylor Creek/Nubbin Slough Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
TCNS 249	0.051	0.520	2.026	0.027	0.443	1.853	<0.50	1.28	03.72	<0.004	0.013	0.064
TCNS 252	0.156	0.762	4.565	0.079	0.552	2.076	0.52	2.40	12.49	<0.004	0.037	0.149
TCNS 255	0.589	3.541	22.620	0.236	2.243	4.100	0.52	4.34	17.03	0.008	0.080	0.464
TCNS 258	0.185	4.690	11.480	0.080	4.865	11.065	1.93	7.91	19.20	<0.004	0.113	0.490
TCNS 260	0.247	3.648	8.665	0.226	1.255	3.000	0.99	2.46	04.49	0.007	0.030	0.113
TCNS 262	0.352	2.210	4.280	0.287	1.997	3.710	1.93	16.62	81.33	0.008	0.038	0.312
TCNS 263	0.209	0.612	7.240	0.168	0.400	3.350	0.61	1.87	7.09	0.015	0.133	0.553
TCNS 264	8.520	11.145	17.080	7.560	10.882	17.125	4.74	5.60	6.19	0.013	0.022	0.029
TCNS 265**	0.199	0.270	0.337	-	-	-	-	-	-	-	-	-
TCNS 268**	0.138	0.310	0.703	-	-	-	-	-	-	-	-	-
TCNS 271**	0.068	0.192	0.526	-	-	-	-	-	-	-	-	-
TCNS 272*	-	-	-	-	-	-	-	-	-	-	-	-
TCNS 273**	0.409	0.523	0.747	-	-	-	-	-	-	-	-	-
TCNS 276**	0.303	0.597	0.853	-	-	-	-	-	-	-	-	-
TCNS 277	1.485	1.485	1.485	1.475	1.475	1.475	2.63	2.63	2.63	0.016	0.016	0.016
TCNS 278**	0.078	0.354	1.177	-	-	-	-	-	-	-	-	-

* = New station to be added in 1992.

** = Total Phosphorus only

SECTION 8
INDIAN RIVER LAGOON
PROJECT CODE: IRL

Purpose and Scope

The Indian River Lagoon water quality monitoring program is a lagoon wide monitoring program that involves 5 agencies: South Florida Water Management District (SFWMD), St.Johns River Water Management District (SJRWMD), Volusia County, Brevard County, and Indian River County took over the FDEP's responsibilities. The SFWMD encompasses a 40 mile stretch of the lagoon from Jupiter Inlet to the northern boundary of St. Lucie County. The water quality monitoring program was established to provide a water quality data base for:

1. Documenting known problem areas within the lagoon system, especially those that are located near urban areas and point source discharges;

2. Locating and reviewing existing stations monitored by state, regional and local environmental groups;

3. Locating and establishing monitoring stations in the lagoon and it's tributaries not currently being monitored;

4. Determining parameters that will best evaluate the water quality of the lagoon;

5. Establishing water quality assurance requirements for the field and laboratory; and

6. Documenting long term trends within the lagoon, especially in areas where good biological or water quality conditions currently exist.

This is a SWIM program that began in October 1988. The collection and analysis of the samples were contracted out during the first two years of the study. In October 1990 the collection and analysis of the samples within the SFWMD boundaries was taken over by the SFWMD.

The data collected can indicate any changes in water quality, and allow for better management of the Indian River Lagoon for environmental enhancement, and prevention of any further degradation.

Sampling Locations and Descriptions

The locations of the 40 sites monitored under this program are shown in Figure 9. Table 23 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 24 and 25 contain statistics for each monitoring location.

District Publications

Indian River Lagoon SWIM Plan (1987), Planning Department, SFWMD.

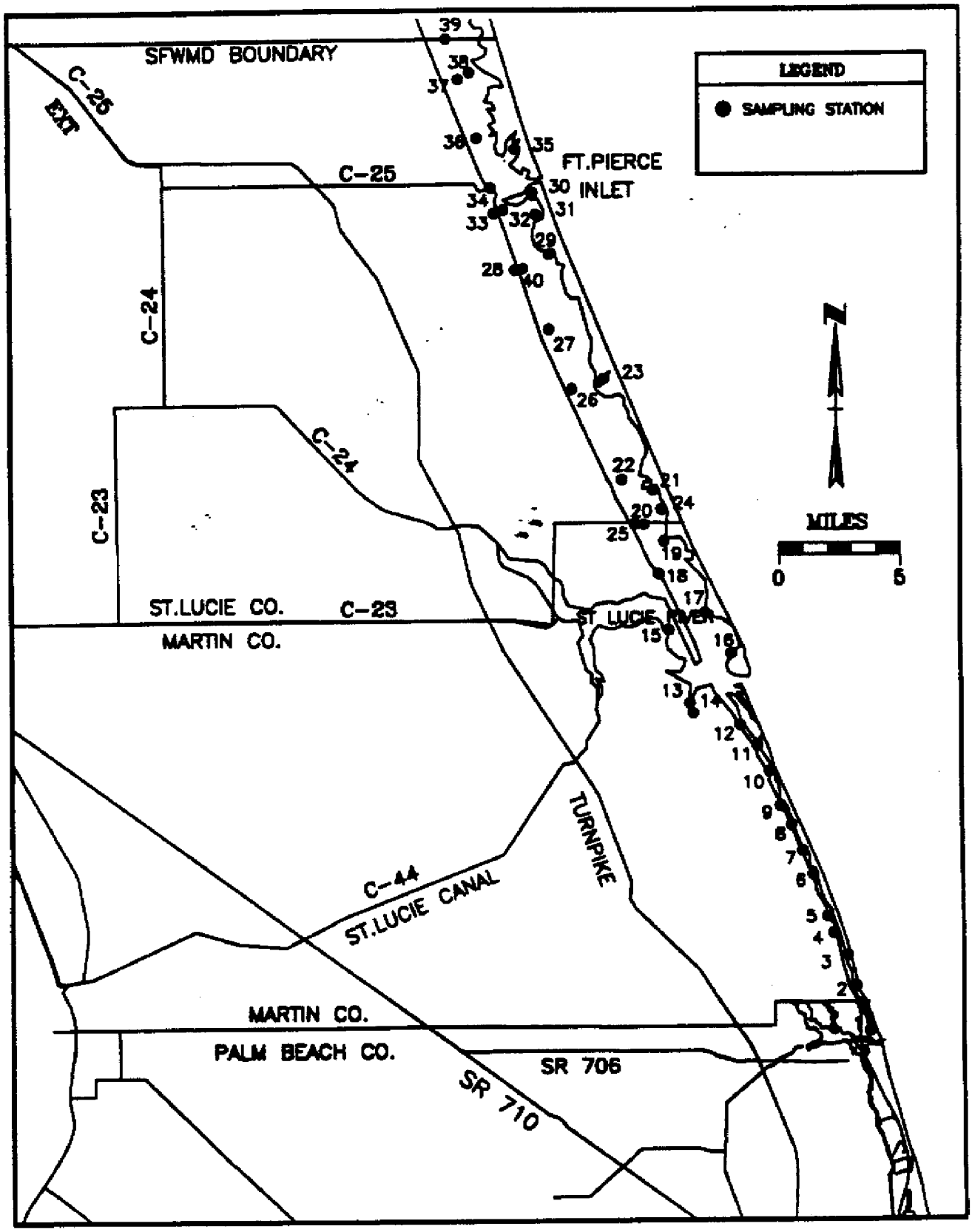

FIGURE 9. Location of Sampling Stations for the Indian River Lagoon Water Quality Monitoring program

TABLE 23. Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL01	265726	800448	Indian River Lagoon in Martin County about 0.6 miles north of the Jupiter Inlet in the Intracoastal Waterway(ICWW) at channel marker #60.	1988 - P	QTR	QTR	QTR	QTR	G
IRL02	265843	800509	Indian River Lagoon in Martin County north of the Jupiter Inlet near Maxon Marina in the ICWW at channel marker #52.	1988 - P	QTR	QTR	QTR	QTR	G
IRL03	265939	800531	Indian River Lagoon in Martin County in the ICWW at channel marker #48.	1988 - P	QTR	QTR	QTR	QTR	G
IRL04	265957	800535	Indian River Lagoon in Martin County taken half way between channel Markers #42 and #44 in the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G
IRL05	270118	800611	Indian River Lagoon in Martin County taken at channel marker #41 in the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G
IRL06	270301	800648	Indian River Lagoon in Martin County taken approximately 50 yards out from the Jupiter Island Club docks.	1988 - P	QTR	QTR	QTR	QTR	G
IRL07	270350	800720	Indian River Lagoon in Martin County taken approximately 50 yards south of the State Road 707 bridge on the west side of the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL08	270448	800748	Indian River Lagoon in Martin County taken at the mouth of the cove on the west side if the jupiter narrows (ICWW) just south of channel marker #28.	1988 - P	QTR	QTR	QTR	QTR	G
IRL09	270540	800815	Indian River Lagoon in Martin County taken in the Jupiter Narrows at channel marker #24 adjacent to a series of seven canals.	1988 - P	QTR	QTR	QTR	QTR	G
IRL10	270645	800838	Indian River Lagoon in Martin County taken in the Pecks Lake portion of the ICWW at channel marker #19.	1988 - P	QTR	QTR	QTR	QTR	G
IRL11	270736	800903	Indian River Lagoon in Martin County taken at the north end of the Pecks Lake portion of the ICWW at channel marker #16.	1988 - P	QTR	QTR	QTR	QTR	G
IRL12	270850	800952	Indian River Lagoon in Martin County taken at channel marker #3, about 0.5 miles south of the St. Lucie Inlet in the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G
IRL13	270913	801150	Manatee Pocket in Martin County in the middle of the cove leading to Crooked Creek.	1988 - P	QTR	QTR	QTR	QTR	G
IRL14	270851	801140	Manatee Pocket in Martin County in front of the marina at the end of Manatee Pocket.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL15	271156	801228	In the middle of the St. Lucie River in Martin County under the A1A bridge.	1988 - P	QTR	QTR	QTR	QTR	G
IRL16	271057	801000	In Sailfish Point Marina in Martin County located just north of the St. Lucie Inlet. The sample is taken in the canal about 50 yards west of docks.	1988 - P	QTR	QTR	QTR	QTR	G
IRL17	271233	801106	Indian River Lagoon in Martin County by the Indian River Plantation Marina taken by marker #4. This is located just south of the A1A bridge, which is the first bridge north of the St. Lucie Inlet, on the east side of the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G
IRL18	271357	801302	Indian River Lagoon in Martin County at entrance Marker #10 to the Baily Boat Company Marina just north of the A1A bridge on the west side of the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G
IRL19	271510	801239	Indian River Lagoon in Martin County at entrance marker #12 to the boat docks just south of HWY 707A on the east side of the ICWW. Second bridge north of the St. Lucie Inlet.	1988 - P	QTR	QTR	QTR	QTR	G
IRL20	271605	801230	Indian River Lagoon in St. Lucie County in the middle of the Waveland Trailer Park canal on the east side of the ICWW just north of HWY 707A.	1988 - P	QTR	QTR	QTR	QTR	G
IRL21	271707	801305	Indian River Lagoon in St. Lucie County by the boat docks on the east side of Nettles Island Trailer Park, north of HWY 707A on the east side of the ICWW.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL22	271804	801431	Indian River Lagoon in St. Lucie County at channel marker #212 in the middle of the ICWW, north of Nettles Island.	1988 - P	QTR	QTR	QTR	QTR	G
IRL23	272057	801504	Indian River Lagoon in St. Lucie County in Big Mud Creek 50 yards out from Hutchinson Island Power Plant.	1988 - P	QTR	QTR	QTR	QTR	G
IRL24	271542	801346	Indian River Lagoon in Martin County taken approximately 0.5 miles north of HWY 707A near the east side of the ICWW in 2.0 meters of water. About 300 yards straight out from a house with a black roof.	1988 - P	QTR	QTR	QTR	QTR	G
IRL25	271540	801350	Indian River Lagoon in Martin County taken approximately 0.5 miles north of HWY 707A. This is a transect station to IRL24. This sample is collected about 100 yards west of IRL24 in 1.0 meters of water.	1988 - P	QTR	QTR	QTR	QTR	G
IRL26	272047	801634	Indian River Lagoon in St. Lucie County near the west side of the ICWW opposite the Hutchinson Island Power Plant, about 200 yards south of the power lines in 2.0 meters of water.	1988 - P	QTR	QTR	QTR	QTR	G
IRL27	272257	801710	Indian River Lagoon in St. Lucie County near channel marker #198 in 2.0 meters of water taken from the west side of the channel.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL28	272458	801828	Indian River Lagoon in St. Lucie County between channel markers #192 and #193 near the west side of the ICWW taken in 1.0 meter of water, straight out from the Virginia Avenue Canal discharge culverts in FT. Pierce. This station is west of Hutchinson Island and is a transect station with IRL40.	1988 - P	QTR	QTR	QTR	QTR	G
IRL29	272531	801712	Indian River Lagoon in St. Lucie County off the south end of Hutchinson Island. The sample is collected in the middle of Bear Point Cove.	1988 - P	QTR	QTR	QTR	QTR	G
IRL30	272751	801746	Indian River Lagoon in St. Lucie County, just south of FT. Pierce Inlet in Faber Cove on the east side of the ICWW. The sample is taken at the NO WAKE sign in the marina basin.	1988 - P	QTR	QTR	QTR	QTR	G
IRL31	272658	801727	Indian River Lagoon in St. Lucie County just south of FT. Pierce Inlet out from the Jaycees Park in Jennings Cove.	1988 - P	QTR	QTR	QTR	QTR	G
IRL32	272719	801858	Indian River Lagoon in St. Lucie County just south of the FT. Pierce Inlet at the City of FT. Pierce waste water treatment plant. The sample is collected at the outfall point to the Indian River Lagoon.	1988 - P	QTR	QTR	QTR	QTR	G
IRL33	272705	801923	Indian River Lagoon in St. Lucie County just south of the FT. Pierce Inlet on the west side of the ICWW at the entrance to Morris Creek in the middle of the marina by the power plant.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL34	272800	801940	Indian River Lagoon in St. Lucie County just north of the FT. Pierce Inlet, on the east side of the ICWW between the two marinas at the entrance to Taylor Creek. Also known as the C-25 canal.	1988 - P	QTR	QTR	QTR	QTR	G
IRL35	272915	801825	Indian River Lagoon in St. Lucie County just north of the FT. Pierce Cut, in front of the second of three canals on the east side of the cut.	1988 - P	QTR	QTR	QTR	QTR	G
IRL36	272923	801951	Indian River Lagoon in St. Lucie County just north of the FT. Pierce Inlet in the ICWW at channel marker #176.	1988 - P	QTR	QTR	QTR	QTR	G
IRL37	273203	802049	Indian River Lagoon in St. Lucie County north of the FT. Pierce Inlet, half way down the canal leading to the Harbor Branch Oceanographic Institute, were the concrete seawalls start.	1988 - P	QTR	QTR	QTR	QTR	G
IRL38	273222	802026	Indian River Lagoon in St. Lucie County north of the FT. Pierce Inlet between the two Spoil piles on the east side of the ICWW just north of the Harbor Branch canal.	1988 - P	QTR	QTR	QTR	QTR	G
IRL39	273313	802055	Indian River Lagoon in St. Lucie County north of the Harbor Branch canal, west of channel marker #169 in line with the spoil piles.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 23 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	G/A
IRL40	272455	801834	Indian River Lagoon in St. Lucie County just south of the FT. Pierce Inlet, out from the Virginia Avenue Canal Discharge culverts, collected in 2.0 meters of water. This is a transect station with IRL28.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 24. Statistics for Select Parameters for the Indian River Lagoon Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
IRL01	0.011	0.020	0.035	<0.004	0.007	0.011	0.52	0.57	0.72	<0.004	0.014	0.031
IRL02	0.007	0.020	0.039	<0.004	0.008	0.018	0.51	0.60	0.87	<0.004	0.018	0.051
IRL03	0.009	0.025	0.049	<0.004	0.010	0.028	<0.50	0.98	2.32	0.005	0.018	0.063
IRL04	0.014	0.028	0.053	<0.004	0.011	0.030	<0.50	0.62	0.88	<0.004	0.021	0.061
IRL05	0.011	0.030	0.052	<0.004	0.012	0.035	0.51	0.65	1.00	<0.004	0.023	0.062
IRL06	0.015	0.042	0.074	<0.004	0.023	0.051	0.51	0.65	0.84	<0.004	0.029	0.051
IRL07	0.025	0.056	0.091	<0.004	0.033	0.067	<0.50	0.70	0.95	<0.004	0.032	0.067
IRL08	0.022	0.059	0.115	0.006	0.040	0.087	0.56	0.79	1.03	<0.004	0.032	0.075
IRL09	0.028	0.067	0.124	0.008	0.041	0.093	<0.50	0.79	1.11	<0.004	0.035	0.083
IRL10	0.026	0.070	0.143	<0.004	0.050	0.103	<0.50	0.76	1.00	<0.004	0.037	0.103
IRL11	0.031	0.082	0.165	0.007	0.052	0.122	<0.50	0.78	1.13	<0.004	0.045	0.124
IRL12	0.027	0.068	0.144	0.018	0.042	0.094	<0.50	0.77	1.61	<0.004	0.029	0.063
IRL13	0.067	0.105	0.200	0.018	0.052	0.135	0.64	1.03	1.73	<0.004	0.038	0.123
IRL14	0.044	0.103	0.167	0.027	0.050	0.090	0.54	0.10	1.89	0.020	0.038	0.055
IRL15	0.049	0.139	0.226	0.037	0.098	0.160	<0.50	1.09	2.50	0.005	0.075	0.145
IRL16	0.022	0.045	0.073	0.009	0.027	0.051	0.52	0.70	1.24	<0.004	0.012	0.024
IRL17	0.033	0.056	0.085	0.019	0.036	0.052	0.51	0.68	0.13	<0.004	0.020	0.050
IRL18	0.030	0.071	0.185	0.017	0.024	0.040	0.51	0.90	0.16	<0.004	0.026	0.068
IRL19	0.045	0.055	0.074	0.021	0.031	0.060	<0.50	0.75	1.34	<0.004	0.018	0.051
IRL20	0.045	0.060	0.080	0.019	0.031	0.071	0.51	0.75	1.15	<0.004	0.026	0.071
IRL21	0.043	0.065	0.113	<0.004	0.026	0.019	0.51	0.73	1.09	<0.004	0.007	0.019
IRL22	0.040	0.049	0.064	0.019	0.025	0.034	0.51	0.63	1.06	<0.004	0.014	0.044
IRL23	0.026	0.067	0.118	<0.004	0.039	0.038	<0.50	0.76	1.20	<0.004	0.017	0.038
IRL24	0.044	0.059	0.086	0.017	0.025	0.032	<0.50	0.67	1.16	<0.004	0.006	0.017
IRL25	0.041	0.053	0.079	0.011	0.022	0.029	<0.50	1.28	3.85	<0.004	0.005	0.006

TABLE 24 (Continued). Statistics for Select Parameters for the Indian River Lagoon Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
IRL26	0.036	0.046	0.061	0.013	0.024	0.038	0.51	0.67	1.23	<0.004	0.015	0.055
IRL27	0.032	0.053	0.074	0.010	0.024	0.050	0.51	0.81	1.39	<0.004	0.019	0.072
IRL28	0.034	0.053	0.078	0.006	0.015	0.031	0.51	0.70	0.82	<0.004	0.016	0.061
IRL30	0.025	0.038	0.048	<0.004	0.013	0.027	<0.50	0.77	1.19	<0.004	0.006	0.012
IRL31	0.028	0.035	0.041	0.006	0.012	0.020	<0.50	0.65	0.89	<0.004	0.005	0.006
IRL32	0.034	0.056	0.078	<0.004	0.027	0.045	<0.50	1.09	2.11	<0.004	0.022	0.039
IRL33	0.043	0.058	0.074	0.014	0.025	0.038	<0.50	0.71	1.03	<0.004	0.011	0.017
IRL34	0.041	0.096	0.179	0.024	0.061	0.139	0.59	1.00	0.50	<0.004	0.073	0.071
IRL35	0.043	0.059	0.081	0.009	0.021	0.031	<0.50	0.70	0.95	<0.004	0.007	0.018
IRL36	0.038	0.081	0.144	0.009	0.036	0.068	0.51	0.78	1.43	<0.004	0.024	0.070
IRL37	0.058	0.090	0.135	0.025	0.046	0.073	0.51	0.81	1.48	<0.004	0.021	0.039
IRL38	0.056	0.094	0.143	0.015	0.042	0.061	0.52	0.80	1.50	<0.004	0.028	0.092
IRL39	0.058	0.096	0.170	0.019	0.049	0.071	<0.50	0.78	1.69	<0.004	0.035	0.110
IRL40	0.035	0.046	0.052	0.011	0.018	0.030	0.51	0.67	1.05	<0.004	0.015	0.053

TABLE 25. 1989 - 1991 Statistics for Select Parameters for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
IRL01	0.011	0.020	0.035	<0.004	0.007	0.011	0.52	0.57	0.72	<0.004	0.014	0.031
IRL02	0.007	0.020	0.039	<0.004	0.008	0.018	0.51	0.60	0.87	<0.004	0.018	0.051
IRL03	0.009	0.025	0.049	<0.004	0.010	0.028	<0.50	0.98	2.32	0.005	0.018	0.063
IRL04	0.014	0.028	0.053	<0.004	0.011	0.030	<0.50	0.62	0.88	<0.004	0.021	0.061
IRL05	0.011	0.030	0.052	<0.004	0.012	0.035	0.51	0.65	1.00	<0.004	0.023	0.062
IRL06	0.015	0.042	0.074	<0.004	0.023	0.051	0.51	0.65	0.84	<0.004	0.029	0.051
IRL07	0.025	0.056	0.091	<0.004	0.033	0.067	<0.50	0.70	0.95	<0.004	0.032	0.067
IRL08	0.022	0.059	0.115	0.006	0.040	0.087	0.56	0.79	1.03	<0.004	0.032	0.075
IRL09	0.028	0.067	0.124	0.008	0.041	0.093	<0.50	0.79	1.11	<0.004	0.035	0.083
IRL10	0.026	0.070	0.143	<0.004	0.050	0.103	<0.50	0.76	1.00	<0.004	0.037	0.103
IRL11	0.031	0.082	0.165	0.007	0.052	0.122	<0.50	0.78	1.13	<0.004	0.045	0.124
IRL12	0.027	0.068	0.144	0.018	0.042	0.094	<0.50	0.77	1.61	<0.004	0.029	0.063
IRL13	0.067	0.105	0.200	0.018	0.052	0.135	0.64	1.03	1.73	<0.004	0.038	0.123
IRL14	0.044	0.103	0.167	0.027	0.050	0.090	0.54	0.099	1.89	0.020	0.038	0.055
IRL15	0.049	0.139	0.226	0.037	0.098	0.160	<0.50	1.09	2.50	0.005	0.075	0.145
IRL16	0.022	0.045	0.073	0.009	0.027	0.051	0.52	0.70	1.24	<0.004	0.012	0.024
IRL17	0.033	0.056	0.085	0.019	0.036	0.052	0.51	0.68	0.129	<0.004	0.020	0.050
IRL18	0.030	0.071	0.185	0.017	0.024	0.040	0.51	0.90	0.160	<0.004	0.026	0.068
IRL19	0.045	0.055	0.074	0.021	0.031	0.060	<0.50	0.75	1.340	<0.004	0.018	0.051
IRL20	0.045	0.060	0.080	0.019	0.031	0.071	0.51	0.75	1.150	<0.004	0.026	0.071
IRL21	0.043	0.065	0.113	<0.004	0.026	0.019	0.51	0.73	1.09	<0.004	0.007	0.019
IRL22	0.040	0.049	0.064	0.019	0.025	0.034	0.51	0.63	1.06	<0.004	0.014	0.044
IRL23	0.026	0.067	0.118	<0.004	0.039	0.038	<0.50	0.76	1.20	<0.004	0.017	0.038
IRL24	0.044	0.059	0.086	0.017	0.025	0.032	<0.50	0.67	1.16	<0.004	0.006	0.017
IRL25	0.041	0.053	0.079	0.011	0.022	0.029	<0.50	1.28	3.85	<0.004	0.005	0.006

TABLE 25 (Continued). 1989 - 1991 Statistics for Select Parameters for the Indian River Lagoon Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
IRL26	0.036	0.046	0.061	0.013	0.024	0.038	0.51	0.67	1.23	<0.004	0.015	0.055
IRL27	0.032	0.053	0.074	0.010	0.024	0.050	0.51	0.81	1.39	<0.004	0.019	0.072
IRL28	0.034	0.053	0.078	0.006	0.015	0.031	0.51	0.70	0.82	<0.004	0.016	0.061
IRL29	0.034	0.045	0.069	<0.004	0.011	0.026	0.51	0.68	0.94	<0.004	0.009	0.028
IRL30	0.025	0.038	0.048	<0.004	0.013	0.027	<0.50	0.77	1.19	<0.004	0.006	0.012
IRL31	0.028	0.035	0.041	0.006	0.012	0.020	<0.50	0.65	0.89	<0.004	0.005	0.006
IRL32	0.034	0.056	0.078	<0.004	0.027	0.045	<0.50	1.09	2.11	<0.004	0.022	0.039
IRL33	0.043	0.058	0.074	0.014	0.025	0.038	<0.50	0.71	1.03	<0.004	0.011	0.017
IRL34	0.041	0.096	0.179	0.024	0.061	0.139	0.59	1.00	0.50	<0.004	0.073	0.071
IRL35	0.043	0.059	0.081	0.009	0.021	0.031	<0.50	0.70	0.95	<0.004	0.007	0.018
IRL36	0.038	0.081	0.144	0.009	0.036	0.068	0.51	0.78	1.43	<0.004	0.024	0.070
IRL37	0.058	0.090	0.135	0.025	0.046	0.073	0.51	0.81	1.48	<0.004	0.021	0.039
IRL38	0.056	0.094	0.143	0.015	0.042	0.061	0.52	0.80	1.50	<0.004	0.028	0.092
IRL39	0.058	0.096	0.170	0.019	0.049	0.071	<0.50	0.78	1.69	<0.004	0.035	0.110
IRL40	0.035	0.046	0.052	0.011	0.018	0.030	0.51	0.67	1.05	<0.004	0.015	0.053

SECTION 9

ST. LUCIE ESTUARY
PROJECT CODE: SE

Purpose and Scope

The St. Lucie Estuary is a major coastal resource of east central Florida. It supports a variety of commercial and recreational activities, and provides an important habitat for many aquatic organisms. This estuary is located at the east end of the Okeechobee Waterway which crosses south central Florida. It also acts as a navigational channel and outlet for discharges of excess fresh water from Lake Okeechobee and the St. Lucie canal basin.

The St. Lucie Estuary surface water monitoring program is part of a Surface Water Improvement and Management (SWIM) program that began in 1989. The areas of interest are the St. Lucie inlet and both the north and south forks of the St. Lucie River.

The water quality monitoring program provides a water quality data base for:

1. Documenting problem areas within the St. Lucie Estuary system, and especially those that may be related to point source discharges;

2. Locating and reviewing any existing stations and data that might exist and comparing the data;

3. Locating and establishing monitoring stations in the estuary not currently being monitored;

4. Determining parameters that will best evaluate the water quality of the estuary; and

5. Documenting long term trends within the estuary, especially in areas where good biological or water quality data currently exists.

The SE project began in October 1989. The collection and analysis of the samples were contracted to a private firm during the first year of the study. In October 1990 the collection and analysis of the samples was taken over by the SFWMD.

The data can indicate changes in water quality and allow for better management of the estuary for environmental enhancement and prevention of any further degradation.

Sampling Locations and Descriptions

The locations of the 11 sites monitored under this program are shown on Figure 10. Table 26 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 27 and 28 contain statistics for each monitoring location.

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Haunert, D. and R. Startzman, (1985). Short Term Effects of a Freshwater Discharge on the Biota of St. Lucie Estuary, Florida. SFWMD, Tech. Pub. 85-01.

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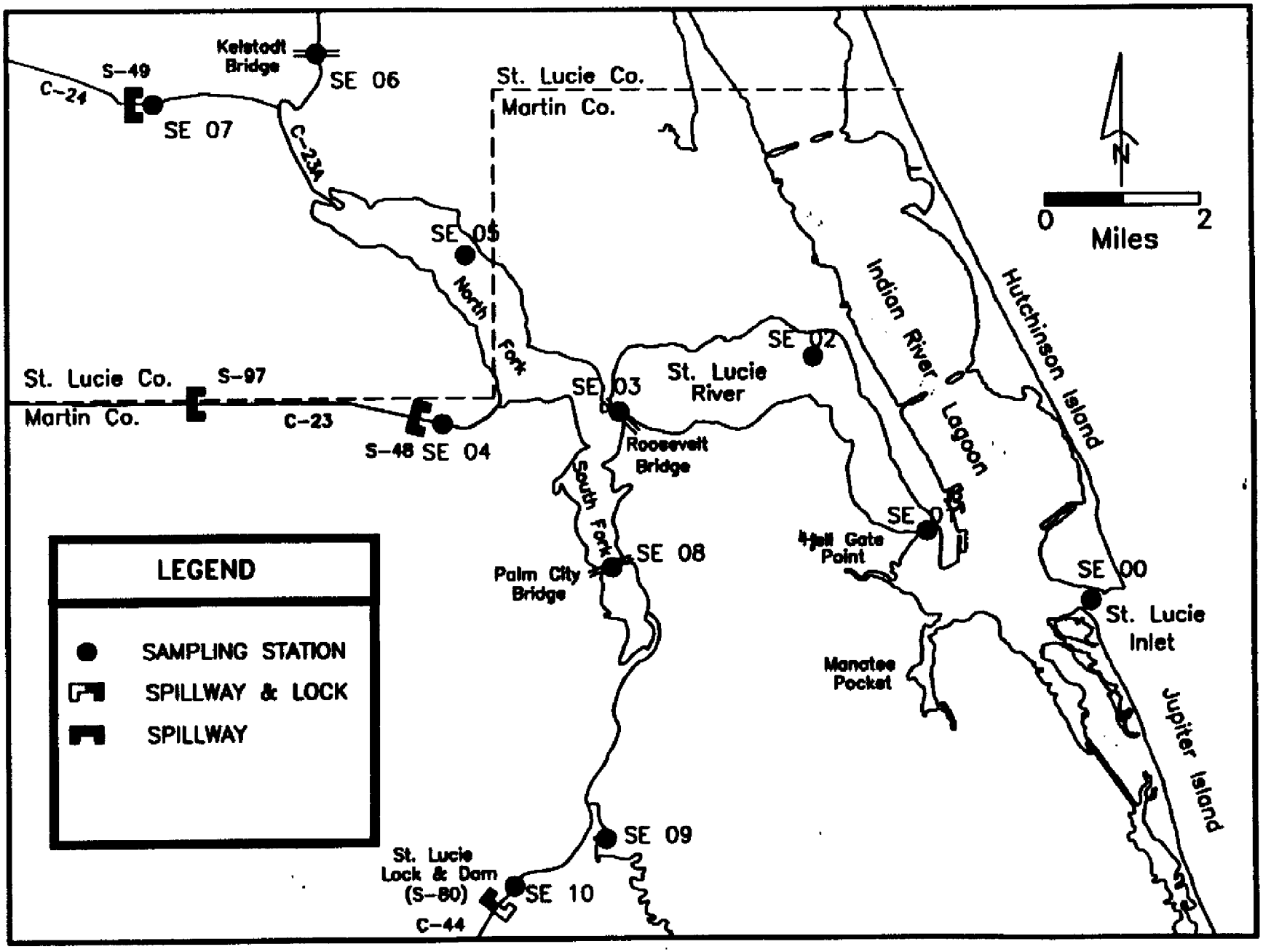

FIGURE 10. Location of Sampling Stations for the St.Lucie Estuary Water Quality Monitoring Program

TABLE 26. Summary of Sampling Station Locations and Frequency of Collection for the St. Lucie Estuary Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	US/DS	G/A
SE 00	270646	800933	Collected from the middle of the St. Lucie inlet about half way between the Indian River lagoon and the ocean.	1990 - P	BW	BW	BW	BW	-	G
SE 01	271048	801139	Out from Hell Gate Point near the mouth of the river, and collected from the middle of the river.	1990 - P	BW	BW	BW	BW	-	G
SE 02	271248	801254	At channel marker 21 out from Hoggs Cove north of the A1A bridge.	1990 - P	BW	BW	BW	BW	-	G
SE 03	271210	801533	Taken near the west side of the Roosevelt Bridge which is US1, and about 50 yards south of the channel.	1990 - P	BW	BW	BW	BW	-	G
SE 04	271205	801753	Taken below S48 in the C-23 canal, which is also called Bessy Creek.	1990 - P	BW	BW	BW	BW	DS	G
SE 05	271271	801735	Taken in the middle of the river between Britt Creek on the east and Pendarvis Point on the west sides of the river. It is also near gauging station #4A.	1990 - P	BW	BW	BW	BW	-	G
SE 06	271617	801920	Taken from the south side of Kellstadt Bridge, which is up the north fork of thr river. It is about 1 mile north of where the C-24 canal enters the river.	1990 - P	BW	BW	BW	BW	-	G
SE 07	271540	802128	Taken below S-49 on the C-24 canal.	1990 - P	BW	BW	BW	BW	DS	G
SE 08	271026	801536	Taken from the south side of the Palm City bridge about 50 yards east of the main channel. The Palm City bridge crosses the south fork of the St. Lucie river.	1990 - P	BW	BW	BW	BW	-	G

TABLE 26 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the St. Lucie Estuary Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	PAR	Chlorophyll	US/DS	G/A
SE 09	270724	801546	Taken from that portion of the south fork that branches off of the main channel leading to the St. Lucie Lock and Dam (S80). The south fork branches off the main channel about 2 miles east of S80.	1990 - P	BW	BW	BW	BW	-	G
SE 10	270646	801704	Taken below the St. Lucie Lock and Dam (S80).	1990 - P	BW	BW	BW	BW	DS	G

TABLE 27. Statistics for Select Parameters for the St. Lucie Estuary Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
SE 00	0.026	0.066	0.250	0.013	0.043	0.205	<0.50	0.73	1.61	<0.004	0.031	0.176
SE 01	0.051	0.121	0.380	0.029	0.089	0.306	0.51	0.88	2.34	<0.004	0.064	0.236
SE 02	0.057	0.138	0.410	0.037	0.103	0.308	0.51	0.94	2.66	<0.004	0.073	0.246
SE 03	0.098	0.177	0.457	0.063	0.132	0.372	0.53	1.06	2.72	<0.004	0.083	0.247
SE 04	0.097	0.214	0.401	0.063	0.154	0.281	0.60	1.29	2.84	<0.004	0.100	0.322
SE 05	0.120	0.196	0.417	0.072	0.148	0.342	0.52	1.13	2.34	<0.004	0.077	0.322
SE 06	0.152	0.230	0.400	0.098	0.165	0.301	0.71	1.22	1.92	0.006	0.151	0.527
SE 07	0.128	0.241	0.679	0.063	0.171	0.558	0.55	1.21	1.79	<0.004	0.080	0.209
SE 08	0.113	0.184	0.413	0.065	0.125	0.295	0.52	1.19	2.03	0.006	0.093	0.350
SE 09	0.103	0.177	0.440	0.065	0.125	0.350	0.66	1.22	1.70	0.005	0.118	0.304
SE 10	0.098	1.280	0.468	0.063	0.140	0.370	0.83	1.28	1.99	0.051	0.202	0.486

TABLE 28. 1989 - 1991 Statistics for Select Parameters for the St. Lucie Estuary Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
SE 00	0.026	0.066	0.250	0.013	0.043	0.205	<0.50	0.73	1.61	<0.004	0.031	0.176
SE 01	0.051	0.121	0.380	0.029	0.089	0.306	0.51	0.88	2.34	<0.004	0.064	0.236
SE 02	0.057	0.138	0.410	0.037	0.103	0.308	0.51	0.94	2.66	<0.004	0.073	0.246
SE 03	0.098	0.177	0.457	0.063	0.132	0.372	0.53	1.06	2.72	<0.004	0.083	0.247
SE 04	0.097	0.214	0.401	0.063	0.154	0.281	0.60	1.29	2.84	<0.004	0.100	0.322
SE 05	0.120	0.196	0.417	0.072	0.148	0.342	0.52	1.13	2.34	<0.004	0.077	0.322
SE 06	0.152	0.230	0.400	0.098	0.165	0.301	0.71	1.22	1.92	0.006	0.151	0.527
SE 07	0.128	0.241	0.679	0.063	0.171	0.558	0.55	1.21	1.79	<0.004	0.080	0.209
SE 08	0.113	0.184	0.413	0.065	0.125	0.295	0.52	1.19	2.03	0.006	0.093	0.350
SE 09	0.103	0.177	0.440	0.065	0.125	0.350	0.66	1.22	1.70	0.005	0.118	0.304
SE 10	0.098	1.28	0.468	0.063	0.140	0.370	0.83	1.28	1.99	0.051	0.202	0.486

SECTION 10

UPPER AND LOWER EAST COAST
PROJECT CODE: WQM

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. The water quality monitoring program provides a water quality and nutrient loading data base for:

1. Determining loadings to the Indian River Lagoon, St.Lucie Estuary, Loxahatchee River, and Lake Worth Lagoon;

2. Determining long and short term trends;

3. Identifying seasonal and discharge related water quality trends;

4. Calculating material loads, basin-wide areal export rates, and flow-weighted concentrations; and

5. Implementing LOTAC's recommendation for a comprehensive monitoring and research plan as described in the Department of Environmental Protection "Lake Okeechobee Monitoring and Research Plan."

Sampling Locations and Descriptions

The locations of the 16 sites monitored under this program are shown on Figure 11. Table 29 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 30 and 31 contain statistics for each monitoring location.

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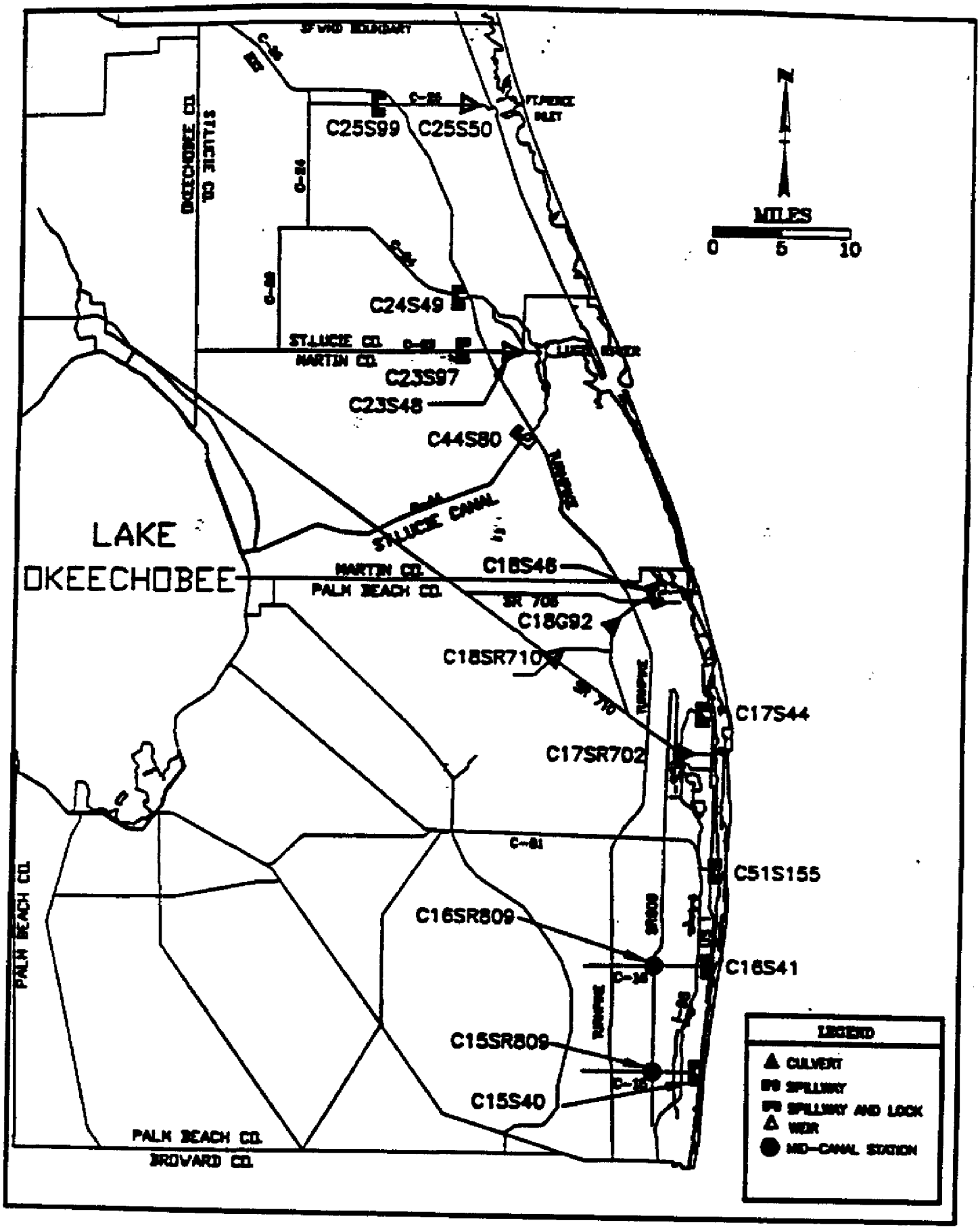

FIGURE 11. Location of the Sampling Stations for the Upper and Lower East Coast Water Quality Monitoring Program

TABLE 29. Summary of Sampling Station Locations and Frequency of Collection for the Upper and Lower East Coast Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
C15S40	262527	800428	S-40 is a spillway coastal structure on the C-15 canal. Water flows eastward through this structure and is mixed with salt water on the downstream side of this structure.	1979 - P	M	M	QTR	BA	US	G
C15SR809	262533	800720	From the bridge on State Road 809 at C-15. The water can flow east or west, depending on stage levels.	1979 - P	MF	MF	QTR	BA	-	G
C16S41	263236	800330	S-41 is a spillway coastal structure on the C-16 canal. Water flows eastward through this structure and is mixed with salt water on the downstream side of this structure.	1979 - P	M	M	QTR	BA	US	G
C16SR809	263226	800727	From the bridge on State Road 809 at C-16. The water can flow east or west, depending on stage levels.	1979 - P	MF	MF	QTR	BA	-	G
C51S155	263846	800325	S-155 is a spillway coastal structure 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.	1979 - P	M	M	QTR	BA	US	G
C17S44	264909	800459	S-44 is a spillway coastal structure on the C-17 canal. The water flows eastward through this structure and is mixed with salt water on the downstream side of this structure.	1979 - P	M	M	QTR	BA	US	G

TABLE 29 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Upper and Lower East Coast Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
C17SR702	264535	800515	A small weir structure located on C-17. The water flows northward toward S-44 into C-17 over this structure, and the water samples are collected from the 45th Street bridge upstream of weir.	1979 - P	MF	MF	QTR	BA	US	G
C18G92	265434	801033	G-92 is a small culvert type structure located on the C-18 canal. Water flows toward the north through this structure out of C-18.	1982 - P	MF	MF	QTR	BA	US	G
C18S46	265610	800833	S-46 is a spillway coastal structure on the C-18 canal about one mile east of the Florida Turnpike. The water flows northeast into the southwest fork of the Loxahatchee River.	1979 - P	M	M	QTR	BA	US	G
C18SR710	265220	801451	A small weir structure located on C-18 at State Road 710. Water flows eastward over this structure.	1979 - P	MF	MF	QTR	BA	US	G
C44S80	270639	801706	S-80 is a large spillway 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.	1979 - P	M	M	QTR	BA	US	G
C23S48	271209	801805	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.	1979 - P	M	M	QTR	BA	US	G

TABLE 29 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Upper and Lower East Coast Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
C23S97	271218	802027	S-97 is a spillway on the C-23 canal about 1/2 mile west of the turnpike. Water flows east through this structure.	1979 - P	MF	MF	QTR	BA	US	G
C24S49	271549	802131	S-49 is a spillway coastal structure located on the C-24 canal 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.	1979 - P	M	M	QTR	BA	US	G
C25S50	272818	802012	S-50 is a large coastal weir structure located on the C-25 canal 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.	1979 - P	M	M	QTR	BA	US	G
C25S99	272820	802848	S-99 is a spillway on the C-25 canal near Ft. Pierce. The water flow at this point is toward the east.	1979 - P	MF	MF	QTR	BA	US	G

TABLE 30. Statistics for Select Parameters for the Upper and Lower East Coast Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
C15S40	0.034	0.211	0.771	0.004	0.156	0.613	0.21	1.48	5.44	<0.004	0.263	2.739
C15SR809	0.031	0.292	1.324	<0.002	0.203	1.190	0.27	1.93	6.27	<0.004	0.342	3.592
C16S41	0.030	0.197	0.810	<0.002	0.138	0.564	0.43	1.47	4.74	<0.004	0.226	2.055
C16SR809	0.069	0.365	1.145	0.017	0.267	0.998	0.55	1.75	3.37	<0.004	0.243	1.434
C51S155	0.029	0.119	0.384	0.004	0.065	0.199	0.54	1.59	3.69	<0.004	0.253	1.385
C17S44	0.021	0.076	0.284	<0.002	0.022	0.213	0.50	1.49	6.62	<0.004	0.194	1.980
C17SR702	0.015	0.086	0.505	<0.002	0.018	0.228	0.41	1.64	4.87	<0.004	0.172	1.055
C18G92	0.010	0.028	0.071	<0.004	0.006	0.023	0.26	1.06	2.15	<0.004	0.042	0.191
C18S46	0.008	0.040	0.246	<0.002	0.015	0.097	0.37	1.13	2.98	<0.004	0.050	1.053
C18SR710	0.006	0.036	0.289	<0.002	0.009	0.083	0.31	1.33	4.22	<0.004	0.048	1.365
C44S80	0.049	0.127	0.351	0.005	0.078	0.286	0.50	1.56	6.16	<0.004	0.204	0.822
C23S48	0.033	0.174	0.501	0.006	0.121	0.355	0.31	1.41	4.04	<0.004	0.151	1.288
C23S97	0.025	0.180	0.386	0.004	0.118	0.360	0.55	0.74	4.99	<0.004	0.187	1.083
C24S49	0.062	0.271	0.774	0.004	0.196	0.647	0.36	1.66	4.57	<0.004	0.147	1.636
C25S50	0.004	0.100	1.046	<0.002	0.061	0.313	0.48	1.28	2.66	<0.004	0.136	1.071
C25S99	0.009	0.135	0.890	<0.002	0.086	0.710	0.51	1.52	3.06	<0.004	0.135	1.293

TABLE 31. 1989 - 1991 Statistics for Select Parameters for the Upper and Lower East Coast Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
C15S40	0.034	0.137	0.336	<0.004	0.090	0.297	<0.50	1.04	1.59	<0.004	0.099	0.712
C15SR809	0.092	0.228	0.429	0.046	0.148	0.330	0.96	1.28	1.60	0.024	0.113	0.222
C16S41	0.030	0.107	0.343	<0.004	0.057	0.301	<0.50	1.03	1.91	<0.004	0.089	0.779
C16SR809	0.184	0.359	0.562	0.128	0.285	0.506	0.59	1.43	2.52	0.074	0.381	1.434
C51S155	0.029	0.077	0.143	<0.004	0.025	0.079	0.54	1.08	1.54	<0.004	0.118	0.639
C17S44	0.032	0.069	0.170	<0.004	0.017	0.102	0.51	1.14	2.78	<0.004	0.175	1.980
C17SR702	0.015	0.099	0.394	<0.004	0.038	0.228	0.71	1.32	2.07	0.021	0.211	1.055
C18G92	0.014	0.027	0.037	<0.004	0.007	0.023	0.55	0.80	1.40	<0.004	0.047	0.105
C18S46	0.015	0.036	0.097	<0.004	0.014	0.046	0.52	0.87	1.48	<0.004	0.048	0.369
C18SR710	0.007	0.042	0.289	<0.004	0.008	0.019	0.59	1.16	4.22	<0.004	0.081	1.365
C44S80	0.059	0.123	0.257	0.024	0.078	0.224	0.52	1.09	3.55	<0.004	0.195	0.723
C23S48	0.063	0.207	0.501	0.016	0.147	0.355	<0.50	1.07	2.17	<0.004	0.110	1.117
C23S97	0.153	0.273	0.386	0.047	0.185	0.360	0.63	1.39	2.28	0.005	0.124	0.244
C24S49	0.063	0.256	0.653	<0.004	0.191	0.555	<0.50	1.21	2.45	<0.004	0.151	1.636
C25S50	0.024	0.106	0.295	<0.004	0.072	0.248	<0.50	1.03	1.67	<0.004	0.194	1.071
C25S99	0.052	0.174	0.374	0.028	0.106	0.207	0.64	1.46	2.45	0.070	0.318	1.293

SECTION 11

WORKS OF THE DISTRICT PERMIT COMPLIANCE
PROJECT CODE: WOD

Purpose and Scope

The Works of the District Permit Compliance water quality monitoring program encompasses the Lake Okeechobee Drainage Basin. The water quality monitoring program was established by the Works of the District (WOD) Rule, Chapter 40E-61, F.A.C., for the purpose of:

1. Documenting permittee compliance with off site discharge total phosphorus concentration limitations established by the Lake Okeechobee SWIM Plan.

2. Each permitted parcel is evaluated for compliance with Rule 40E-61 Phosphorus concentration limitations.

Sampling Location and Descriptions

There are currently 303 water quality monitoring stations which are sampled under the WOD Compliance program, however, this number will change continuously as the number of active permits change. The stations are located in Okeechobee, Highlands, Martin, and Glades counties. Tables and maps showing locations, station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, type of sample collection, and statistics will be provided in a later update of this document.

Sample site locations are determined by the District's Regulation Department upon permit issuance.

A private laboratory is contracted to perform all analytical work.

Parameters and Sampling Frequencies

Water samples are collected biweekly at all active monitoring locations. Total phosphorus is the only parameter analyzed. Monitoring is performed for a minimum of 12 months. If the site is within compliance of the permit conditions after 12 months, the monitoring is discontinued. If the site exceeds permit conditions, monitoring is continued indefinitely.

SECTION 12

LAKE OKEECHOBEE MONITORING PROGRAMS
PROJECT CODE: X = INFLOWS/OUTFLOWS
PROJECT CODE: Y = LIMNETIC AND LITTORAL ZONES

Purpose and Scope

The Lake Okeechobee Inflows and Outflows water quality monitoring program encompasses the entire perimeter of Lake Okeechobee. The Lake Okeechobee Limnetic and Littoral Zones water quality monitoring program lies wholly within the confines of the Lake Okeechobee levee. The water quality monitoring programs were established to provide a water quality and nutrient loading data base for:

1. Complying with monitoring requirements of the Lake Okeechobee Operating Permit #50-0679349 issued by the Florida Department of Environmental Regulation (FDEP);

2. Determining effectiveness of the implementation of basin management plans in reducing nutrient loadings into 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 FDEP'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, nutrient loadings, and tracking eutrophication of the lake; 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 from Lake Okeechobee are also used to support Lake Okeechobee management reports as required by the Surface Water Improvement Management (SWIM) Act. Evaluation of the data is then used for:

1. Assessing the impact of operating permit management implementations;

2. Verifying water quality models;

3. Examining differences in water quality between the limnetic and littoral zones;

4. Monitoring possible algal blooms in the limnetic and littoral zones; and

5. Providing water quality data in support of nutrient dynamics studies.

6. Monitor for changes in water quality following basin management strategies

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. Two automatic wet/dry precipitation collectors are used to collect samples for nutrient analyses.

Historical data collected between 1973 and 1979 provide baseline water quality data prior to implementation of water quality management plans. Comparison with recent sampling data can indicate 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

The location of the 35 sites monitored under project "X" and the 56 for project "Y" are shown in Figures 12 and 13. Tables 32 and 33 list all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 34 through 37 contain statistics for each monitoring location.

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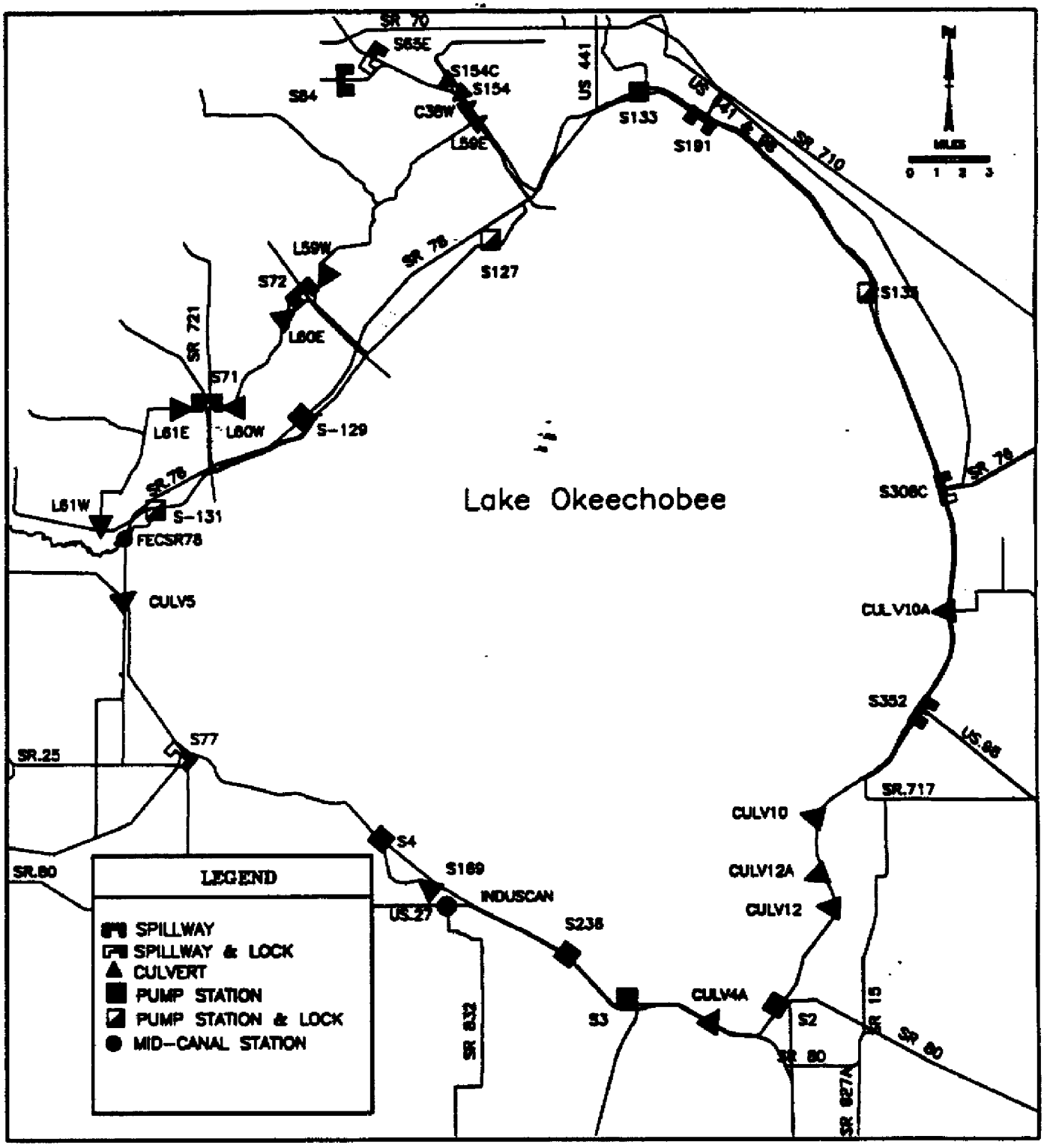

FIGURE 12. Location of Sampling Stations for the Lake Okeechobee Inflow/Outflow Water Quality monitoring Program

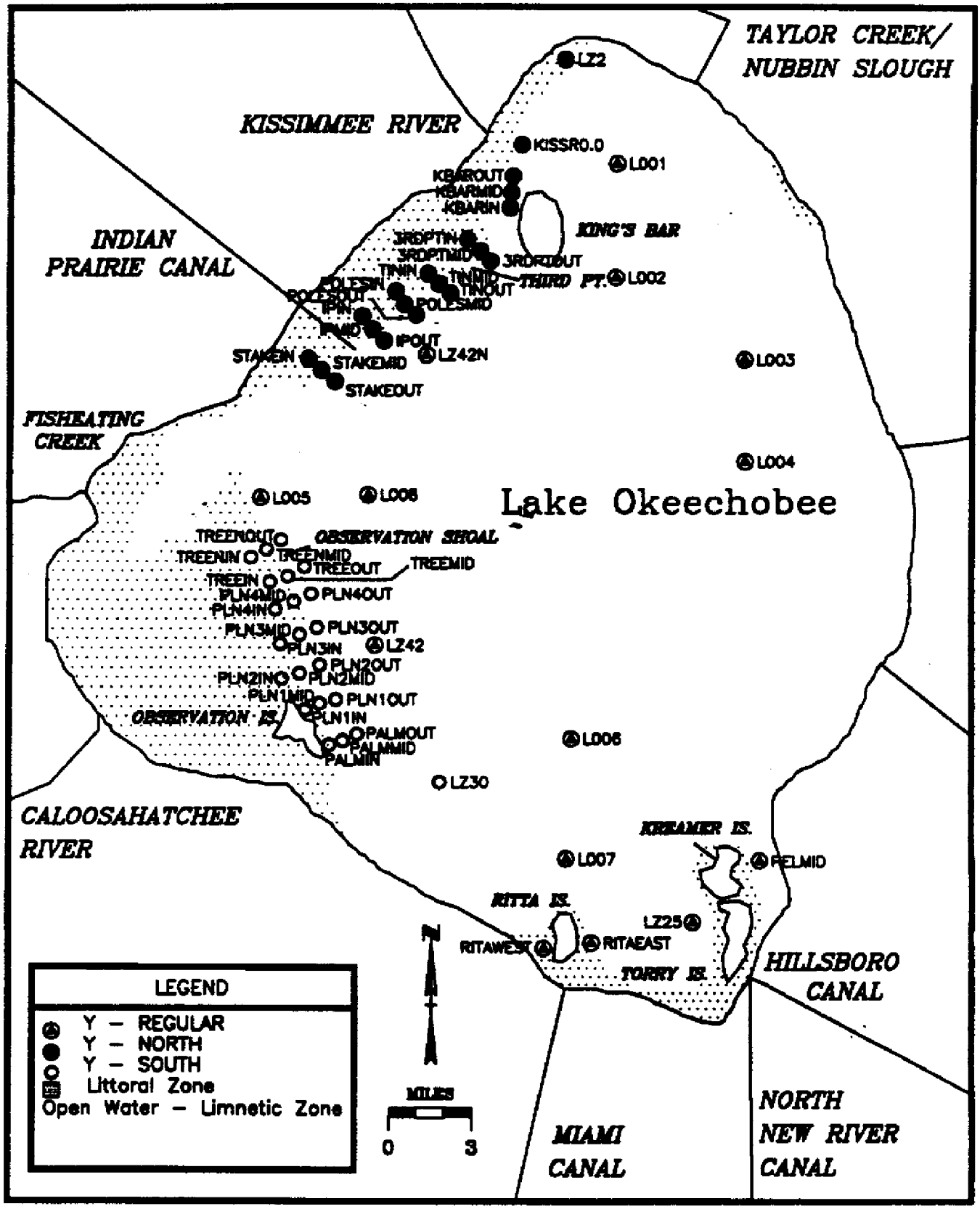

FIGURE 13. Location of Sampling Stations for the Lake Okeechobee limnetic and Littoral Zone Water Quality monitoring program

TABLE 32. Summary of Sampling Station Locations and Frequency of Collection for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S2	264200	804300	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.	1973 - P	BWF/M	W/BWF/M	QTR	QTR	US	G/A
S3	264155	804825	A District controlled water pumping station located on the south side of Lake Okeechobee at Lake Harbor. Water is pumped from the Miami Canal into Lake Okeechobee.	1973 - P	BWF/M	W/BWF/M	QTR	QTR	US	G/A
S4	264722	805743	A District controlled water pumping station on C-20 near Clewiston that pumps water into Lake Okeechobee.	1976 - P	BWF/M	W/BWF/M	QTR	QTR	US	G/A
INDUSCAN	264514	805508	Water samples from this station are collected from the bridge over the Industrial Canal in Clewiston on County Road 832.	1982 - P	BWF/M	BWF/M	QTR	QTR	-	G
S77	265023	810518	A large spillway 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.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
FECSR78	265744	810715	Water samples from this station are collected from the bridge on State Road 78 where it crosses Fisheating Creek. Water can flow towards Lake Okeechobee or water can flow west in this canal at this point depending on water stages.	1973 - P	BWF/M	BWF/M	QTR	QTR	-	G

TABLE 32 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S71	270201	811811	A spillway type structure and pump station located near the west side of Lake Okeechobee on Harney Pond Canal (C-41) about 1.5 miles north of State Road 78.	1973 - P	BW	BW	QTR	QTR	US	G
S72	270532	810023	A gate type structure located near the northwest side of Lake Okeechobee, in C-40 about two miles northwest of State Road 78.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S65E	271335	805742	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.	1973 - P	BW	BW	QTR	QTR	US	G
S84	271250	805830	A gate type structure where C-41A intersects the Kissimmee River. Water flows into the Kissimmee River through this structure.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S191	271135	804535	A large gate type structure on the north side of Lake Okeechobee at Nubbin Slough. Water flows into the lake through this structure. Water samples are collected from the north side of this structure.	1973 - P	BW	BW	QTR	QTR	US	G
S308C	265904	803717	A COE structure on the St. Lucie Canal (C-44) at Lake Okeechobee. Water can flow in or out of the lake through this structure. Water samples are collected from the lake side of this structure.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G

TABLE 32 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S352	265145	803755	S352(HGS5) is a hurricane gate structure operated by the United States Army Corps of Engineers (COE). HGS-5 is on the east side of Lake Okeechobee near Canal Point. Water is released out of Lake Okeechobee through this structure, however, water can flow into the lake when lake levels are low. In 1989 the HGS5 structure was replaced and renamed S352.	1973 - P	BWF/M	BWF/M	QTR	QTR	DS	G
CULV4A	264056	804502	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.	1979 - P	BWF/M	BWF/M	QTR	QTR	US	G
CULV10	264753	804146	CULV10, CULV10A, CULV12, CULV12A are pump stations on the southeast side of Lake Okeechobee that pump water from East Beach Water Control District, Closter Farms, East Shore Drainage District, and East Shore Water Control District, respectively, into the lake. They can all let water gravity flow out of the Lake.	1979 - P	BWF/M	BWF/M	QTR	QTR	US	G
CULV10A	265501	803650		1987 - P	BWF/M	BWF/M	QTR	QTR	US	G
CULV12	264455	804105		1979 - P	BWF/M	BWF/M	QTR	QTR	US	G
CULV12A	264634	804137		1979 - P	BWF/M	BWF/M	QTR	QTR	US	G
S127	270719	805346	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 can also be allowed to gravity flow back through these pumps to let water out of the lake.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S129	270147	810006	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 can also be allowed to gravity flow back through these pumps to let water out of the lake.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G

TABLE 32 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S131	265843	810526	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. Water can also gravity flow back through these pumps to let water out of the lake.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S133	271228	804802	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 can also be allowed to gravity flow back through these pumps to let water out of the lake.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S135	270510	803941	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 can also be allowed to gravity flow back through these pumps to let water out of the lake.	1973 - P	BWF/M	BWF/M	QTR	QTR	US	G
S154	271241	805506	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.	1978 - P	BW	BW	QTR	QTR	US	G
S169	264545	815730	A spillway gate structure near the boat ramp and the S-310 boat locks in Clewiston. This structure lets water flow east or west depending on water stage.	1985 - P	BWF/M	BWF/M	QTR	QTR	US	G
S236	264340	805111	A small pumping station on US-27 between S-3 and Clewiston that pumps water from the South Florida Conservancy District into Lake Okeechobee.	1979 - P	BWF/M	BWF/M	QTR	QTR	US	G

TABLE 32 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
CULV5	265533	810722	A culvert and flap gate located on the west side of Lake Okeechobee near State Road 78, south of Fisheating Creek. The water samples are collected from the bridge on State Road 78.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L61W	265806	810811	A culvert located at the west end of the L-61 canal where it meets the L-50 canal.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L61E	270158	810518	A culvert located at the east end of the L-61 canal immediately down stream of S-71 on Harney Pond canal.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L60W	270157	810310	A culvert located at the west end of the L-60 canal immediately down stream of S-71 on the Harney Pond canal.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L60E	270504	810128	A culvert located at the east end of the L-60 canal immediately down stream of S-72 on the Indian Prairie canal.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L59W	270625	805958	A culvert located at the west end of the L-59 canal immediately down stream of S-72 on the Indian Prairie canal.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
L59E	271130	805412	A gated structure located at the east end of the L-59 canal at C-38.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
C38W	271159	805436	A gated structure located on the west side of C-38, three miles south of S-65E.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G
S154C	271237	805507	A gated structure located on the east side of C-38 next to S-154.	1987,1989-P	BWF/M	BWF/M	QTR	QTR	US	G

TABLE 33. Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
L001	270790	804730	North end of Lake Okeechobee 4 1/2 miles south of Taylor Creek Locks (S-193).	1972 - P	BW/M	BW/M	QTR	BW/M	G
L002	270450	804725	Army Corps of Engineers(COE) tower on the north end of Lake Okeechobee about 7 1/2 miles south of Taylor Creek Locks (S-193).	1972 - P	BW/M	BW/M	QTR	BW/M	G
L003	270250	804255	East side of Lake Okeechobee, west of Florida Power and Light Indian Town power plant smoke stacks.	1972 - P	BW/M	BW/M	QTR	BW/M	G
L004	265870	804255	East side of Lake Okeechobee four miles due south of L003, west of the Port Mayaca bridge.	1972 - P	BW/M	BW/M	QTR	BW/M	G
L005	265695	805783	COE tower on the west side of Lake Okeechobee, east of Fisheating Creek.	1972 - P	BW/M	BW/M	QTR	BW/M	G
L006	264908	804684	COE tower at the south end of Lake Okeechobee.	1972 - P	BW/M	BW/M	QTR	BW/M	G
L007	264620	804708	South end of Lake Okeechobee 3 1/4 miles due south of L006.	1972 - P	BW/M	BW/M	QTR	BW/M	G
L008	265695	805350	L008 is about 4 1/2 miles due east of L005.	1972 - P	BW/M	BW/M	QTR	BW/M	G
LZ2	271140	804954	City of Okeechobee potable water supply intake in Lake Okeechobee on the north side of the lake.	1978 - P	TW	TW	QTR	TW	G
KISSR0.0	270803	805037	KISSR0.0 is at the mouth of the Kissimmee River near the north side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
KBARIN	270748	805052	At the north end of Kings Bar in the marsh near the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G

TABLE 33 (Continued). Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
KBARMID	270802	805103	100 yards north of station KBARIN in the marsh near the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
KBAROUT	270821	805059	100 yards north of station KBARMID in the lake near the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
3RDPTIN	270414	805222	West of Kings Bar at Third Point in the marsh at the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
3RDPTMID	270394	805209	100 yards southeast of station 3RDPTIN in the marsh at the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
3RDPTOUT	270386	805193	100 yards southeast of station 3RDPTMID in the lake at the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
STAKEIN	270108	805652	1/2 mile southwest of Indian Prairie Canal (C-40) out from a metal pipe sticking out of the water in the marsh on the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
STAKEMID	270100	805635	100 yards southeast of station STAKEIN in the marsh on the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
STAKEOUT	270097	805612	100 yards southeast of station STAKEMID in the lake on the northwest side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
TREEIN	265430	805863	On the east side of Observation Shoal out from a lone Cypress tree in the marsh near the west side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G

TABLE 33 (Continued). Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
TREEMID	265434	805873	100 yards northeast of station TREEIN in the marsh near the west side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
TREEOUT	265440	805836	100 yards northeast of station TREEMID in the lake near the west side of Lake Okeechobee.	1986 - P	TW	TW	QTR	TW	G
TREENIN	265524	805888	1 mile northwest of TREEIN in the marsh near Observation Shoal near the west side of Lake Okeechobee.	1988-1989	TW	TW	QTR	TW	G
TREENMID	265534	805873	100 yards northeast of TREENIN in the marsh near the west side of Lake Okeechobee.	1988-1990	TW	TW	QTR	TW	G
TREENOUT	265544	805861	100 yards northeast of TREENMID in the lake near the west side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G
PALMIN	264955	805686	On the east side of Observation Island out from a lone dead palm tree in the marsh near the west side of Lake Okeechobee.	1986 - P	QTR	QTR	QTR	QTR	G
PALMMID	264955	805673	100 yards east of station PALMIN in the marsh near the west side of Lake Okeechobee.	1986 - P	QTR	QTR	QTR	QTR	G
PALMOUT	264960	805659	100 yards east of station PALMMID in the lake near the west side of Lake Okeechobee.	1986 - P	QTR	QTR	QTR	QTR	G
PLN1IN	265066	805697	1 mile north west of PALMIN in the marsh near the east side of Observation Island.	1988-1990	QTR	QTR	QTR	QTR	G
PLN1MID	265063	805688	100 yards east of station PLN1IN in the marsh near the west side of Lake Okeechobee.	1988-1990	QTR	QTR	QTR	QTR	G

TABLE 33 (Continued). Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
PLN1OUT	265062	805674	100 yards east of station PLN1MID in the lake near the west side of Lake Okeechobee.	1988 - P	QTR	QTR	QTR	QTR	G
PLN2IN	265170	805708	1 mile north west of PLN1IN in the marsh near the western side of Lake Okeechobee near Observation Island.	1988 - P	TW	TW	QTR	TW	G
PLN2MID	265167	805696	100 yards east of PLN2IN in the marsh near the western side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G
PLN2OUT	265177	805682	100 yards east of PLN2MID in the lake near the western side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G
PLN3IN	265283	805739	1 mile north of PLN2IN in the marsh near the western side of Lake Okeechobee.	1988-1990	QTR	QTR	QTR	QTR	G
PLN3MID	265275	805732	100 yards east of PLN3IN in the marsh near the western side of Lake Okeechobee.	1988-1991	QTR	QTR	QTR	QTR	G
PLN3OUT	265276	805719	100 yards east of PLN3MID in the lake near the western side of Lake Okeechobee.	1988 - P	QTR	QTR	QTR	QTR	G
PLN4IN	265373	805788	1 mile north of PLN3IN in the marsh near the western side of Lake Okeechobee.	1988-1989	QTR	QTR	QTR	QTR	G
PLN4MID	265375	805783	100 yards east of PLN4IN in the marsh near the western side of Lake Okeechobee.	1988-1990	QTR	QTR	QTR	QTR	G
PLN4OUT	265378	805778	100 yards east of PLN4MID in the lake near the western side of Lake Okeechobee.	1988 - P	QTR	QTR	QTR	QTR	G

TABLE 33 (Continued). Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
LZ30	264822	805150	Potable water supply intake for the city of Clewiston in Lake Okeechobee near the southwest side of the lake.	1978 - P	BW/M	BW/M	QTR	BW/M	G
RITAWEST	264410	804941	West side of Rita Island near the south end of Lake Okeechobee.	1986 - P	BW/M	BW/M	QTR	BW/M	G
RITAEAST	264327	804737	East side of Rita Island at the northern most channel marker near the south end of Lake Okeechobee.	1986 - P	BW/M	BW/M	QTR	BW/M	G
LZ25	264452	804522	100 yards west of Torry Island in the lake near the south end of Lake Okeechobee.	1978 - P	BW/M	BW/M	QTR	BW/M	G
PELMID	264629	804257	Middle of Pelican Bay, which is east of Kreamer Island, near the south end of Lake Okeechobee.	1986 - P	BW/M	BW/M	QTR	BW/M	G
TININ	270362	805324	In the marsh near Tin House Cove near the north west side of Lake Okeechobee.	1988-1990	QTR	QTR	QTR	QTR	G
TINMID	270356	805320	100 yards south east of TININ in the marsh near the north west side of Lake Okeechobee.	1988-1991	QTR	QTR	QTR	QTR	G
TINOUT	270353	805301	100 yards south east of TINMID in the lake near the north west side of Lake Okeechobee.	1988 - P	QTR	QTR	QTR	QTR	G
POLESIN	270292	805459	In the marsh about 2 miles north east of Indian Prairie Canal near the north west side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G
POLESMID	270287	805447	100 yards south east of POLESIN in the marsh near the north west side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G

TABLE 33 (Continued). Summary of Sampling Locations and Frequency of Collection for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Chlorophylls	G/A
POLESOUT	270281	805439	100 yards south east of POLESMID in the lake near the north west side of Lake Okeechobee.	1988 - P	TW	TW	QTR	TW	G
IPIN	270204	805499	In the marsh about 1/2 mile north east of Indian Prairie Canal near the north west side of Lake Okeechobee.	1988-1989	QTR	QTR	QTR	QTR	G
IPMID	270200	805501	100 yards south east of IPIN in the marsh near the north west side of Lake Okeechobee.	1988-1991	QTR	QTR	QTR	QTR	G
IPOUT	270185	805483	100 yards south east of IPMID in the lake near the north west side of Lake Okeechobee.	1988 - P	QTR	QTR	QTR	QTR	G
LZ42N	270256	805345	0.5 miles out from the littoral zone near the north west side of Lake Okeechobee.	1990 - P	BW/M	BW/M	QTR	BW/M	G
LZ42	265300	805500	2.5 miles out from the littoral zone near the south west side of Lake Okeechobee.	1990 - P	BW/M	BW/M	QTR	BW/M	G

TABLE 34. Statistics for Select Parameters for the Lake Okeechobee Inflow/Outflow Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S2	0.015	0.134	0.832	<0.002	0.070	0.396	0.92	4.48	18.71	<0.001	1.372	11.559
S3	0.003	0.107	1.120	<0.001	0.051	0.880	0.51	3.91	13.07	<0.001	1.711	8.987
S4	0.019	0.190	1.412	<0.002	0.123	1.247	0.51	2.74	21.27	<0.004	0.305	3.983
INDUSCAN	0.042	0.227	1.446	<0.001	0.145	1.325	0.51	3.06	7.97	<0.004	0.771	3.880
S77	0.020	0.085	0.437	<0.002	0.045	0.358	0.41	1.70	2.98	<0.001	0.093	0.340
FECSR78	0.026	0.166	1.280	<0.002	0.105	1.280	0.23	1.81	6.36	<0.001	0.047	1.859
S71	0.038	0.184	0.791	<0.002	0.124	0.756	0.35	2.19	7.40	<0.004	0.480	3.603
S72	0.018	0.168	0.917	<0.002	0.109	0.790	0.27	2.05	7.40	<0.001	0.156	1.266
S65E	0.024	0.105	0.490	<0.002	0.060	0.361	0.27	1.51	4.41	<0.004	0.091	0.911
S84	0.009	0.058	0.910	<0.002	0.024	0.381	0.18	1.42	4.90	<0.004	0.111	1.241
S191	0.010	0.806	2.108	<0.002	0.666	1.437	0.73	2.19	6.24	<0.003	0.444	4.912
S308C	0.010	0.141	0.444	<0.002	0.056	0.345	0.50	2.00	7.11	<0.003	0.213	1.719
S352	0.007	0.125	0.817	<0.002	0.056	0.508	0.42	2.55	10.05	<0.004	0.305	2.665
CULV4A	<0.002	0.076	0.212	<0.002	0.028	0.149	0.10	3.58	20.10	<0.004	0.612	14.420
CULV10	0.019	0.212	0.949	<0.002	0.111	0.668	0.59	4.62	25.89	<0.004	0.838	16.150
CULV10A	0.019	0.112	0.651	<0.004	0.045	0.402	1.03	2.57	26.60	<0.004	0.698	21.405
CULV12	0.022	0.109	0.360	<0.002	0.049	0.273	0.71	4.80	24.20	<0.004	1.412	14.732
CULV12A	0.039	0.237	0.972	<0.002	0.152	0.812	0.88	4.91	16.91	<0.004	0.401	9.877
S127	0.048	0.278	0.831	<0.004	0.187	0.712	0.80	2.30	6.92	<0.001	0.091	3.422
S129	0.033	0.131	0.768	<0.002	0.069	0.444	0.21	1.94	4.76	<0.001	0.054	1.421
S131	0.022	0.100	1.000	<0.002	0.046	0.395	0.21	1.80	4.10	<0.001	0.057	0.806
S133	0.031	0.234	0.880	<0.002	0.143	0.650	0.51	2.00	6.40	<0.003	0.135	4.046
S135	<0.002	0.086	1.105	<0.002	0.032	0.304	0.10	1.83	7.96	<0.001	0.065	1.122
S154	0.051	0.656	8.255	<0.002	0.484	1.803	0.53	2.04	11.96	<0.004	0.047	0.683
S169	0.025	0.139	0.893	<0.004	0.055	0.706	<0.50	2.18	6.43	<0.004	0.221	1.710
S236	0.025	0.081	0.294	<0.002	0.028	0.124	0.73	4.15	13.08	<0.008	0.875	8.621
CULV5	0.025	0.072	0.396	<0.004	0.014	0.136	0.74	1.83	4.00	<0.004	0.030	0.282
L61W	0.032	0.101	0.310	0.006	0.032	0.102	0.74	1.70	3.84	<0.004	0.036	0.218
L61E	0.063	0.140	0.406	0.010	0.077	0.320	0.87	1.72	4.06	<0.004	0.350	1.247
L60W	0.059	0.164	0.640	0.011	0.116	0.640	0.91	1.91	4.99	0.021	0.556	3.224
L60E	0.052	0.166	0.698	0.014	0.095	0.333	0.58	1.66	7.09	<0.007	0.110	0.534
L59W	0.052	0.208	0.837	0.013	0.141	0.708	0.51	1.61	4.07	<0.004	0.075	0.514

TABLE 34 (Continued). Statistics for Select Parameters for the Lake Okeechobee Inflow/Outflow Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
L59E	0.058	0.247	0.805	<0.004	0.087	0.326	0.83	2.66	7.71	<0.004	0.059	0.943
C38W	0.061	0.336	0.783	<0.004	0.120	0.583	0.56	2.98	8.74	<0.004	0.015	0.078
S154C	0.039	0.259	1.642	<0.004	0.185	1.403	<0.50	1.35	6.45	<0.004	0.035	0.869

TABLE 35. 1989 - 1991 Statistics for Select Parameters for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S2	0.035	0.176	0.514	<0.004	0.080	0.352	1.16	3.90	10.10	<0.004	1.129	6.353
S3	0.026	0.129	0.682	<0.004	0.037	0.549	1.30	4.15	12.33	<0.004	1.262	5.590
S4	0.042	0.102	0.224	<0.004	0.036	0.118	0.62	1.92	4.85	<0.004	0.189	1.433
INDUSCAN	0.042	0.137	0.752	<0.004	0.068	0.668	0.87	2.11	5.24	<0.004	0.382	2.525
S77	0.040	0.103	0.374	<0.004	0.037	0.255	0.61	1.64	2.81	<0.004	0.068	0.439
FECSR78	0.062	0.171	0.852	0.030	0.115	0.652	0.51	1.47	3.36	<0.004	0.068	1.859
S71	0.051	0.167	0.688	0.017	0.106	0.505	0.85	2.20	7.40	0.024	0.795	3.580
S72	0.049	0.153	0.383	0.010	0.090	0.300	0.58	1.67	5.33	0.005	0.138	0.637
S65E	0.029	0.112	0.407	<0.004	0.068	0.361	0.51	1.33	3.68	<0.004	0.085	0.911
S84	0.020	0.048	0.161	<0.004	0.014	0.091	0.54	1.23	2.20	<0.004	0.151	1.241
S191	0.289	0.545	1.085	0.031	0.477	0.997	0.73	1.64	6.24	<0.004	0.358	4.912
S308C	0.063	0.143	0.296	<0.004	0.054	0.191	0.51	1.72	3.21	<0.004	0.270	5.590
S352	0.062	0.165	0.598	<0.004	0.079	0.508	1.34	2.45	6.70	<0.004	0.385	1.524
CULV4A	0.027	0.081	0.212	<0.004	0.026	0.129	1.28	3.41	20.10	<0.004	0.993	14.420
CULV10	0.047	0.229	0.856	<0.004	0.124	0.668	0.90	3.16	09.48	0.008	0.426	4.464
CULV10A	0.024	0.101	0.651	<0.004	0.040	0.402	1.03	2.60	26.60	0.006	0.913	21.405
CULV12	0.035	0.101	0.282	<0.004	0.040	0.186	0.71	3.50	19.18	<0.004	1.278	14.732
CULV12A	0.048	0.154	0.596	<0.004	0.081	0.524	0.88	3.48	13.31	<0.004	0.532	9.877
S127	0.062	0.205	0.735	<0.004	0.106	0.421	1.18	0.210	03.19	<0.004	0.081	1.092
S129	0.034	0.108	0.294	<0.004	0.036	0.209	0.88	1.55	2.56	<0.004	0.042	0.270
S131	0.043	0.109	0.568	<0.004	0.046	0.395	0.84	1.51	2.75	<0.004	0.064	0.366
S133	0.086	0.176	0.352	<0.004	0.082	0.228	0.51	1.68	2.45	0.005	0.114	0.810
S135	0.034	0.062	0.108	<0.004	0.011	0.049	0.53	1.38	2.31	<0.004	0.062	1.122
S154	0.081	0.710	2.330	0.035	0.537	1.729	0.53	1.76	4.87	<0.004	0.056	0.683
S169	0.035	0.110	0.390	<0.004	0.045	0.327	0.66	2.01	6.43	<0.004	0.197	1.680
S236	0.039	0.099	0.273	<0.004	0.019	0.092	0.73	3.22	13.08	0.015	0.557	8.621
CULV5	0.025	0.070	0.396	<0.004	0.013	0.136	0.74	1.77	3.01	<0.004	0.029	0.282
L61W	0.032	0.111	0.310	0.006	0.032	0.102	0.74	1.68	3.84	<0.004	0.041	0.218
L61E	0.063	0.139	0.314	0.010	0.072	0.192	0.87	1.76	4.06	<0.004	0.426	1.247
L60W	0.059	0.147	0.539	0.011	0.103	0.483	1.07	1.96	4.99	0.021	0.648	3.224
L60E	0.052	0.167	0.698	0.014	0.091	0.333	0.58	1.63	7.09	<0.008	0.124	0.008
L59W	0.052	0.217	0.837	0.013	0.146	0.708	0.51	1.49	2.55	<0.004	0.083	0.514

TABLE 35 (Continued). 1989 - 1991 Statistics for Select Parameters for the Lake Okeechobee Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
L59E	0.058	0.234	0.774	<0.004	0.081	0.270	0.83	2.74	7.71	<0.004	0.062	0.943
C38W	0.061	0.372	0.783	<0.004	0.129	0.583	0.56	3.20	8.74	<0.004	0.053	1.209
S154C	0.039	0.248	1.266	<0.004	0.172	1.022	<0.50	1.26	6.45	<0.004	0.036	0.869

TABLE 36. Statistics for Select Parameters for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
L001	0.019	0.078	0.246	<0.002	0.018	0.134	0.36	1.65	5.68	<0.001	0.073	0.533
L002	0.010	0.071	0.297	<0.002	0.016	0.104	0.30	1.67	5.52	<0.001	0.090	0.554
L003	0.014	0.083	0.302	<0.002	0.021	0.077	0.36	1.70	4.36	<0.001	0.125	0.661
L004	0.012	0.089	0.266	<0.002	0.023	0.074	0.36	1.70	3.63	<0.001	0.134	0.635
L005	0.005	0.053	0.422	<0.001	0.010	0.089	0.29	1.64	4.06	<0.002	0.005	0.022
L006	0.015	0.081	0.376	<0.001	0.026	0.099	0.30	1.65	8.89	<0.001	0.172	0.837
L007	0.010	0.067	0.365	<0.002	0.022	0.088	0.10	1.68	9.24	<0.001	0.158	0.676
L008	0.016	0.084	0.245	<0.002	0.018	0.097	0.23	1.74	4.08	<0.001	0.123	0.897
LZ2	0.027	0.090	0.345	<0.002	0.021	0.136	<0.50	1.54	2.72	<0.004	0.036	0.387
KISSR0.0	0.042	0.103	0.292	<0.004	0.044	0.189	0.67	1.37	2.49	<0.004	0.054	0.424
KBARIN	0.014	0.077	0.375	<0.004	0.022	0.130	0.73	1.50	4.21	<0.004	0.017	0.186
KBARMID	0.010	0.052	0.141	<0.004	0.012	0.106	0.54	1.35	2.98	<0.004	0.017	0.205
KBAROUT	0.031	0.085	0.331	<0.004	0.025	0.162	0.66	1.41	2.83	<0.004	0.032	0.340
3RDPTIN	0.010	0.055	0.344	<0.004	0.013	0.163	0.56	1.43	4.26	<0.004	0.013	0.105
3RDPTMID	0.007	0.044	0.188	<0.004	0.008	0.049	<0.50	1.36	2.18	<0.004	0.017	0.205
3RDPTOUT	0.008	0.056	0.153	<0.004	0.010	0.076	0.94	1.42	2.43	<0.004	0.017	0.236
STAKEIN	0.008	0.033	0.178	<0.004	0.007	0.023	0.51	1.38	3.15	<0.004	0.009	0.057
STAKEMID	0.007	0.037	0.122	<0.004	0.007	0.055	0.64	1.31	2.83	<0.004	0.013	0.150
STAKEOUT	0.014	0.059	0.168	<0.004	0.009	0.067	0.67	1.49	4.17	<0.004	0.016	0.262
TREEIN	0.018	0.078	0.263	<0.004	0.021	0.180	0.80	1.69	3.70	<0.004	0.016	0.107
TREEMID	0.015	0.061	0.254	<0.004	0.009	0.067	<0.50	1.59	3.19	<0.004	0.020	0.302
TREEOUT	0.010	0.044	0.138	<0.004	0.009	0.095	<0.50	1.54	3.36	<0.004	0.018	0.249
TREENIN	0.024	0.074	0.339	<0.004	0.005	0.013	<0.50	1.73	5.71	<0.004	0.030	0.149
TREENMID	0.010	0.048	0.165	<0.004	0.005	0.011	0.78	1.49	2.95	<0.004	0.017	0.099
TREENOUT	<0.004	0.038	0.070	<0.004	0.005	0.018	0.51	1.50	2.73	<0.004	0.007	0.085
PALMIN	<0.004	0.041	0.253	<0.004	0.007	0.024	1.00	1.59	5.52	<0.004	0.013	0.101
PALMMID	0.008	0.035	0.130	<0.004	0.006	0.025	0.80	1.48	3.10	<0.004	0.012	0.141
PALMOUT	<0.004	0.039	0.138	<0.004	0.007	0.062	0.69	1.58	4.62	<0.004	0.010	0.111

TABLE 36 (Continued). Statistics for Select Parameters for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
PLN1IN	0.025	0.076	0.193	<0.004	0.020	0.130	1.01	1.58	2.68	<0.004	0.021	0.122
PLN1MID	0.013	0.047	0.087	<0.004	0.006	0.025	1.06	1.53	3.33	<0.004	0.018	0.088
PLN1OUT	0.010	0.035	0.139	<0.003	0.005	0.015	<0.50	1.49	2.44	<0.004	0.006	0.37
PLN2IN	0.006	0.068	0.339	<0.004	0.016	0.073	0.80	1.51	2.18	<0.004	0.020	0.099
PLN2MID	0.012	0.051	0.169	<0.004	0.005	0.012	0.95	1.58	3.70	<0.004	0.016	0.106
PLN2OUT	0.010	0.034	0.088	<0.004	0.005	0.012	0.63	1.44	2.85	<0.004	0.007	0.086
PLN3IN	0.027	0.100	0.355	<0.004	0.019	0.150	0.81	1.85	5.49	<0.004	0.014	0.124
PLN3MID	0.012	0.040	0.103	<0.004	0.005	0.021	<0.50	1.38	2.10	<0.004	0.007	0.031
PLN3OUT	0.008	0.033	0.084	<0.004	0.005	0.025	<0.50	1.38	2.16	<0.004	0.006	0.036
PLN4IN	0.028	0.083	0.256	<0.004	0.007	0.032	1.07	1.70	3.99	<0.004	0.021	0.107
PLN4MID	0.014	0.057	0.145	<0.004	0.005	0.027	1.16	1.68	3.94	<0.004	0.006	0.035
PLN4OUT	0.012	0.036	0.016	<0.004	0.005	0.016	<0.50	1.44	2.19	<0.004	0.006	0.048
LZ30	0.013	0.072	0.190	<0.004	0.020	0.078	0.52	1.55	4.59	<0.004	0.112	0.530
RITAWEST	<0.004	0.045	0.160	<0.004	0.007	0.036	0.98	1.64	3.07	<0.004	0.034	0.867
RITAEAST	<0.004	0.041	0.166	<0.004	0.007	0.055	0.78	1.65	3.47	<0.004	0.043	0.599
LZ25	0.013	0.062	0.333	<0.002	0.012	0.121	0.50	1.76	8.94	<0.004	0.067	0.808
PELMID	0.012	0.077	0.305	<0.004	0.022	0.093	0.55	1.58	3.23	<0.004	0.126	0.662
TININ	0.014	0.054	0.132	<0.004	0.012	0.075	0.98	1.44	2.13	<0.004	0.009	0.043
TINMID	0.006	0.035	0.091	<0.004	0.006	0.091	0.85	1.37	1.97	<0.004	0.011	0.078
TINOUT	0.012	0.032	0.107	<0.004	0.005	0.018	0.69	1.36	2.15	<0.004	0.005	0.018
POLESIN	0.016	0.080	0.316	<0.004	0.015	0.090	0.74	1.43	3.74	<0.004	0.016	0.093
POLESMID	0.011	0.043	0.107	<0.004	0.006	0.024	0.63	1.24	2.36	<0.004	0.012	0.116
POLESOUT	0.020	0.050	0.150	<0.004	0.007	0.044	0.84	1.38	2.41	<0.004	0.006	0.029
IPIN	0.014	0.063	0.153	<0.004	0.021	0.061	0.74	1.41	3.23	<0.004	0.013	0.064
IPMID	0.009	0.038	0.087	<0.004	0.005	0.019	0.95	1.29	2.03	<0.004	0.008	0.084
IPOUT	0.027	0.056	0.184	<0.004	0.006	0.029	0.75	1.41	2.03	<0.004	0.009	0.182
LZ42N	0.022	0.066	0.111	<0.004	0.013	0.042	0.52	1.29	2.02	<0.004	0.021	0.147
LZ42	0.029	0.059	0.199	<0.004	0.012	0.047	0.66	1.38	2.04	<0.004	0.045	0.256

TABLE 37. 1989 - 1991 Statistics for Select Parameters for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
L001	0.041	0.085	0.168	<0.004	0.018	0.079	0.66	1.46	5.68	<0.004	0.046	0.267
L002	0.023	0.080	0.153	<0.004	0.014	0.062	0.87	1.45	2.68	<0.004	0.057	0.503
L003	0.042	0.104	0.302	<0.004	0.022	0.071	0.55	1.52	3.34	<0.004	0.095	0.465
L004	0.038	0.110	0.266	<0.004	0.027	0.067	0.51	1.45	2.80	<0.004	0.110	0.625
L005	0.022	0.055	0.144	<0.002	0.008	0.068	0.89	1.45	2.64	<0.004	0.023	0.263
L006	0.034	0.097	0.210	<0.004	0.026	0.081	0.60	1.39	2.68	<0.004	0.121	0.636
L007	0.041	0.081	0.365	<0.004	0.019	0.065	0.56	1.39	2.61	<0.004	0.114	0.632
L008	0.032	0.095	0.245	<0.004	0.016	0.059	0.79	1.57	3.80	<0.004	0.072	0.352
KISSR0.0	0.042	0.109	0.245	<0.004	0.051	0.109	0.67	1.30	1.86	<0.004	0.066	0.424
KBARIN	0.014	0.082	0.375	<0.004	0.027	0.130	0.73	1.39	4.21	<0.004	0.010	0.057
KBARMID	0.010	0.027	0.080	<0.004	0.007	0.020	0.54	1.14	2.98	<0.004	0.009	0.054
KBAROUT	0.031	0.086	0.331	<0.004	0.025	0.148	0.66	1.37	2.83	<0.004	0.033	0.340
3RDPTIN	0.010	0.063	0.344	<0.004	0.016	0.163	0.67	1.44	4.26	<0.004	0.009	0.039
3RDPTMID	0.007	0.031	0.095	<0.004	0.006	0.025	<0.50	1.24	1.81	<0.004	0.009	0.096
3RDPTOUT	0.013	0.052	0.132	<0.004	0.009	0.062	0.94	1.35	2.43	<0.004	0.009	0.112
STAKEIN	0.009	0.037	0.178	<0.004	0.006	0.021	0.86	0.128	2.46	<0.004	0.011	0.057
STAKEMID	0.007	0.027	0.101	<0.004	0.005	0.023	0.64	1.22	2.83	<0.004	0.013	0.150
STAKEOUT	0.014	0.052	0.149	<0.004	0.006	0.029	0.67	1.42	4.17	<0.004	0.006	0.022
TREEIN	0.018	0.117	0.263	<0.004	0.026	0.180	0.80	1.77	3.70	<0.004	0.018	0.107
TREEMID	0.015*	0.053	0.254	<0.004	0.007	0.067	<0.50	1.47	3.19	<0.004	0.018	0.302
TREEOUT	0.010	0.031	0.090	<0.004	0.005	0.016	0.51	1.42	2.49	<0.004	0.007	0.063
TREENIN	0.024	0.053	0.087	<0.004	0.005	0.008	<0.50	1.51	2.55	<0.004	0.023	0.149
TREENMID	0.010	0.033	0.073	<0.004	0.005	0.011	0.78	1.39	1.90	<0.004	0.013	0.099
TREENOUT	<0.004	0.035	0.070	<0.004	0.005	0.018	0.51	1.48	2.73	<0.004	0.007	0.085
PALMIN	<0.004	0.042	0.198	<0.004	0.007	0.020	1.00	1.51	5.52	<0.004	0.015	0.045
PALMMID	0.008	0.026	0.066	<0.004	0.004	0.011	0.80	1.28	1.85	<0.004	0.009	0.056
PALMOUT	<0.004	0.027	0.067	<0.004	0.004	0.013	0.69	1.44	2.29	<0.004	0.010	0.075
PLN1IN	0.025	0.066	0.164	<0.004	0.028	0.130	1.01	1.42	1.87	<0.004	0.015	0.112
PLN1MID	0.013	0.033	0.054	<0.004	0.006	0.025	1.06	1.50	3.33	<0.004	0.010	0.088
PLN1OUT	0.010	0.030	0.139	<0.004	0.005	0.015	0.85	1.48	2.44	<0.004	0.006	0.037
PLN2IN	0.006	0.069	0.339	<0.004	0.022	0.073	0.80	1.48	2.07	<0.004	0.018	0.068

TABLE 37 (Continued). 1989 - 1991 Statistics for Select Parameters for the Lake Okeechobee Limnetic and Littoral Zone Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
PLN2MID	0.012	0.033	0.108	<0.004	0.005	0.012	0.95	1.49	3.70	<0.004	0.011	0.037
PLN2OUT	0.010	0.028	0.064	<0.004	0.005	0.012	0.63	1.39	2.28	<0.004	0.007	0.086
PLN3IN	0.027	0.100	0.319	<0.004	0.029	0.150	0.81	1.80	4.13	<0.004	0.007	0.037
PLN3MID	0.012	0.030	0.084	<0.004	0.006	0.021	<0.50	1.31	2.10	<0.004	0.006	0.031
PLN3OUT	0.008	0.028	0.062	<0.004	0.005	0.017	<0.50	1.34	2.05	<0.004	0.006	0.036
PLN4IN	0.028	0.063	0.105	<0.004	0.006	0.017	1.07	1.64	2.91	<0.004	0.017	0.107
PLN4MID	0.014	0.040	0.082	<0.004	0.005	0.018	1.16	1.74	3.94	<0.004	0.005	0.013
PLN4OUT	0.012	0.031	0.067	<0.004	0.005	0.016	<0.50	1.42	2.19	<0.004	0.007	0.048
LZ30	0.027	0.072	0.155	<0.004	0.014	0.067	0.52	1.49	4.59	<0.004	0.105	0.523
RITAWEST	<0.004	0.036	0.160	<0.004	0.005	0.036	0.98	1.53	2.80	<0.004	0.043	0.867
RITAEAST	<0.004	0.031	0.166	<0.004	0.005	0.033	0.78	1.54	3.47	<0.004	0.036	0.599
LZ25	0.017	0.060	0.184	<0.004	0.011	0.121	0.80	1.62	3.36	<0.004	0.065	0.766
PELMID	0.012	0.072	0.305	<0.004	0.018	0.093	0.55	1.53	3.23	<0.004	0.115	0.662
TININ	0.014	0.050	0.121	<0.004	0.016	0.075	1.08	1.60	2.13	<0.004	0.011	0.043
TINMID	0.006	0.026	0.075	<0.004	0.006	0.019	0.85	1.45	1.97	<0.004	0.012	0.078
TINOUT	0.012	0.028	0.067	<0.004	0.005	0.018	0.69	1.36	2.15	<0.004	0.006	0.019
POLESIN	0.016	0.051	0.126	<0.004	0.015	0.090	0.74	1.12	1.70	<0.004	0.021	0.093
POLESMID	0.011	0.031	0.063	<0.004	0.006	0.024	0.63	1.21	2.36	<0.004	0.010	0.050
POLESOUT	0.020	0.047	0.100	<0.004	0.007	0.044	0.84	1.38	2.41	<0.004	0.006	0.029
IPIN	0.014	0.051	0.101	<0.004	0.013	0.061	0.89	1.37	3.23	<0.004	0.017	0.064
IPMID	0.009	0.026	0.046	0.009	0.005	0.019	0.95	1.26	2.03	<0.004	0.007	0.025
IPOUT	0.027	0.053	0.161	<0.004	0.007	0.161	0.75	1.43	2.03	<0.004	0.009	0.182
LZ42N	0.022	0.066	0.111	<0.004	0.013	0.042	0.52	1.29	2.02	<0.004	0.021	0.147
LZ42	0.029	0.059	0.199	<0.004	0.012	0.047	0.66	1.38	2.04	<0.004	0.045	0.256
LZ2	0.035	0.089	0.345	<0.004	0.023	0.136	<0.50	1.43	2.58	<0.004	0.024	0.256

SECTION 13

CALOOSAHATCHEE RIVER
PROJECT CODE: CR

Purpose and Scope

The Caloosahatchee River water quality monitoring program was established in 1979, and extends from Lake Okeechobee west to the coastal structure that releases fresh water to the Caloosahatchee Estuary. The water quality monitoring program provides a water quality and nutrient loading data base for:

1. Determining loadings to the Caloosahatchee River estuary;

2. Assessing potential downstream impacts on the Caloosahatchee River estuary.;

3. Implementing LOTAC's recommendation for a comprehensive monitoring and research plan as described in the Department of Environmental Protection "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

The locations of the four sites monitored under this program are shown on Figure 14. Table 38 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 39 and 40 contain statistics for each monitoring location.

District Publications

Lake Okeechobee Monitoring and Research Plan, 1986, FDEP.

Miller, T. H., A. Federico, J. Milleson. (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.

Scarlatos, P. (1988). Caloosahatchee River Estuary Dynamics. SFWMD, Tech. Pub. No.88-7.

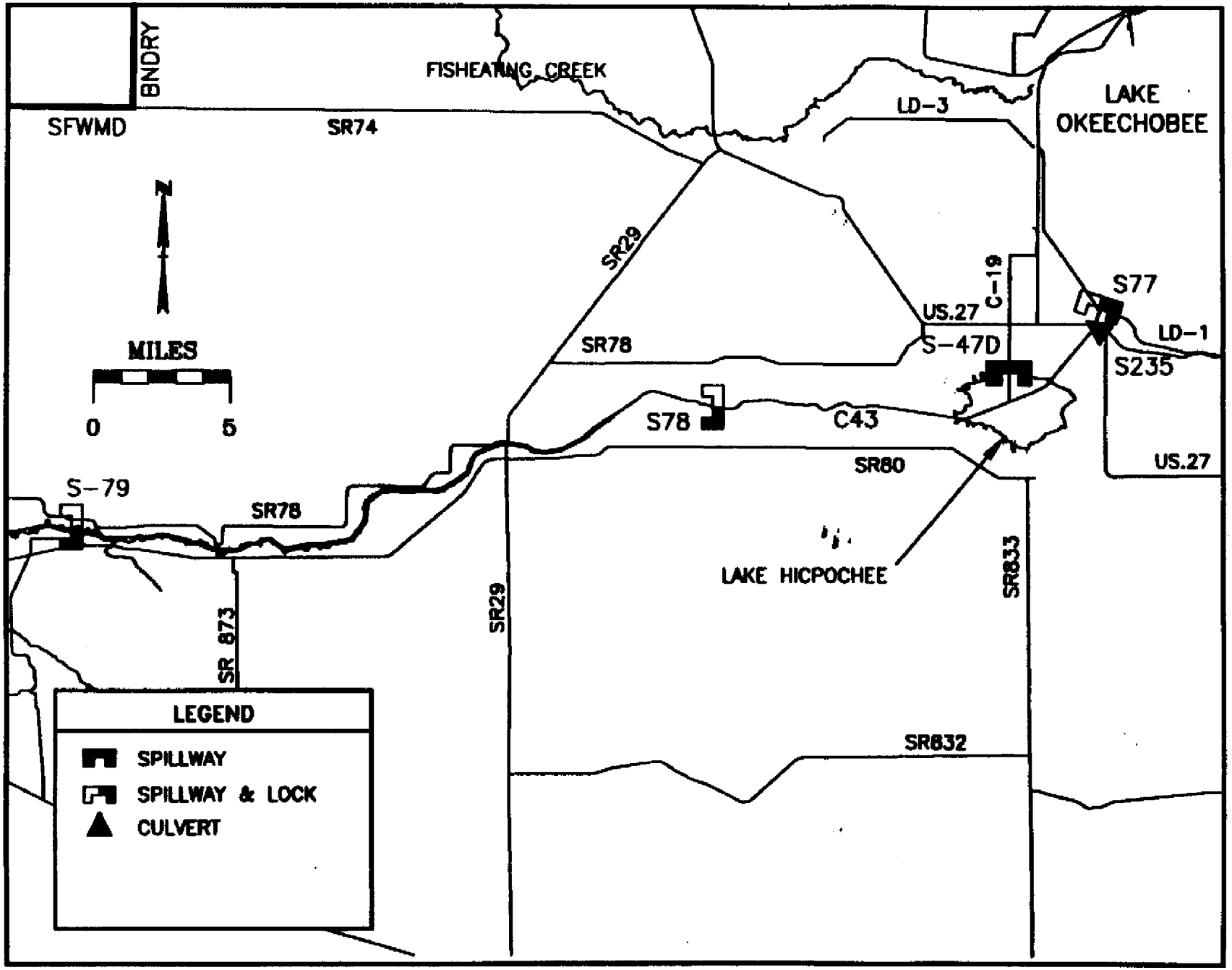

FIGURE 14. Location of Sampling Stations for the Caloosahatchee River Water Quality Monitoring Program

TABLE 38. Summary of Sampling Station Locations and Frequency of Collection for the Caloosahatchee River Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
CR-00.2T	265021	810509	A small culvert type structure (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.	1979 - P	BM	BM	QTR	BA	US	G
CR-04.8T	264834	810823	A small spillway gate structure 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.	1979 - P	BM	BM	QTR	BA	US	G
S78	264722	811811	A large spillway 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.	1981 - P	BM	BM	QTR	BA	US	G
S79	264314	814107	A large spillway 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.	1981 - P	BM	BM	QTR	BA	US	G

TABLE 39. Statistics for Select Parameters for the Caloosahatchee River Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
CR-00.2T	0.025	0.155	0.495	<0.002	0.083	0.333	1.22	2.48	6.06	<0.001	0.205	1.448
CR-04.8T	0.042	0.342	1.737	<0.002	0.237	1.540	0.84	2.69	8.80	<0.004	0.172	1.360
S78	0.063	0.153	0.339	0.007	0.097	0.312	1.00	1.92	4.17	<0.004	0.165	1.073
S79	0.066	0.152	0.365	0.028	0.102	0.238	0.58	1.82	5.18	<0.004	0.281	0.816

TABLE 40. 1989 - 1991 Statistics for Select Parameters for the Caloosahatchee River Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
CR-00.2T	0.039	0.183	0.495	<0.004	0.073	0.259	1.22	2046	6.06	<0.004	0.125	1.133
CR-04.8T	0.157	0.584	1.737	0.033	0.416	1.540	1.46	3.31	8.80	0.005	0.189	0.682
S78	0.071	0.142	0.322	0.038	0.095	0.022	1.00	1.75	4.17	<0.004	0.217	1.073
S79	0.093	0.152	0.308	0.046	0.098	0.227	0.99	1.73	4.75	<0.004	0.303	0.816

SECTION 14

EVERGLADES AGRICULTURAL AREA
PROJECT CODE: EAA

Purpose and Scope

The Everglades Agricultural Area (EAA) water quality monitoring program encompasses six major District canals. The water quality monitoring program was established to provide a Total Phosphorus concentration data base for:

1. Determining quality of water entering the SFWMD canals.

2. Pre-screening of water quality to develop the BMP Rule 40E-63.

The collection of water quality data from the six major canals in the EAA began in August of 1990, and ended in February of 1992. This program was superseded by the EAA Regulatory Program (District Rule Chapter 40E - 63) under which the permitted parties are required to collect nutrient data.

Sampling Locations and Descriptions

The locations of the 144 sites monitored under this program are shown in Figures 15-20. Table 41 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Table 42 contains statistics for each monitoring location.

Parameters and Sampling Frequencies

The water samples collected at these 144 stations are obtained on a storm event basis, and when pump stations S5A, S6, S7, and S8 are pumping.

District Publications

Cooper, R. (1989). An Atlas of the Everglades Agricultural Area Surface Water Management Basins. SFWMD, Tech. Memo. September 1989.

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

Everglades SWIM Plan (1992), Planning Department, SFWMD.

Lutz, J. (1977). Water Quality and Nutrient Loadings of the Major Inflows from the Everglades Agricultural Area to the Conservation Areas, Southeast Florida. SFWMD, Tech. Pub. No.77-6.

Mierau, R. (1974). Supplemental Water Use in the Everglades Agricultural Area. SFWMD, Tech. Pub. No.74-4.

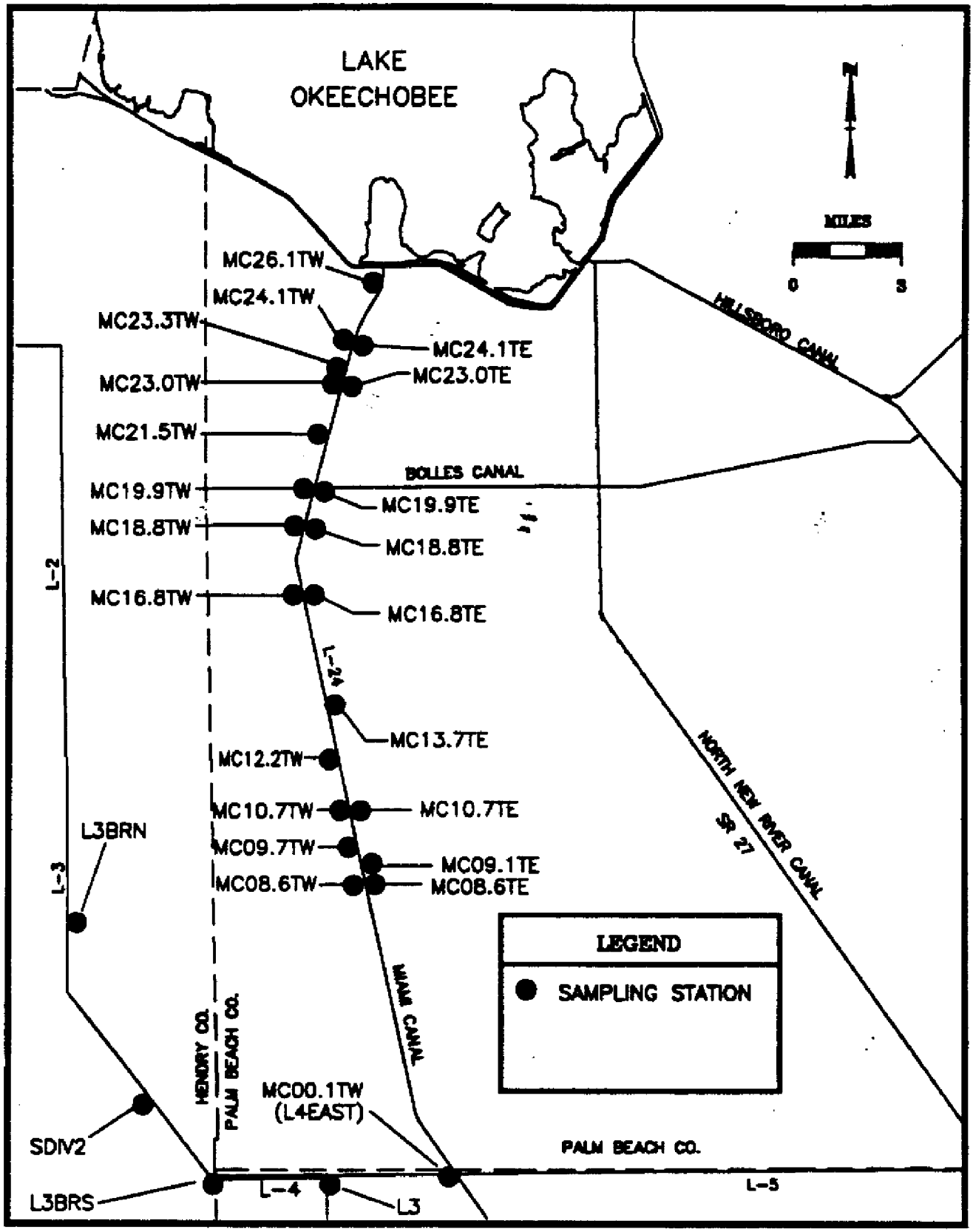

FIGURE 15. Location of Sampling Stations along the Miami Canal for the Everglades Agricultural Area Water Quality Monitoring Program

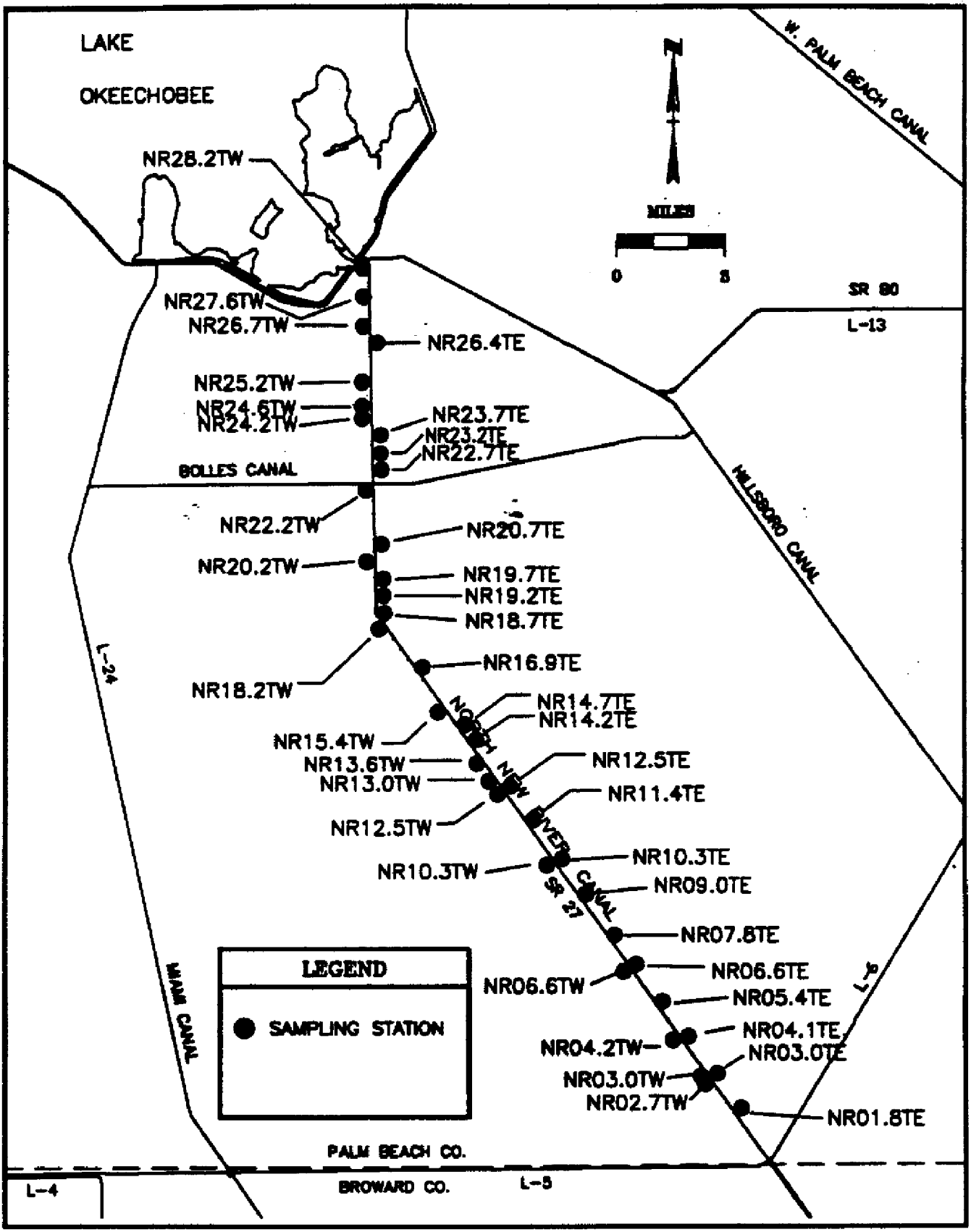

FIGURE 16. Location of Sampling Stations Along the North New River Canal for the Everglades Agricultural Area Water Quality Monitoring program

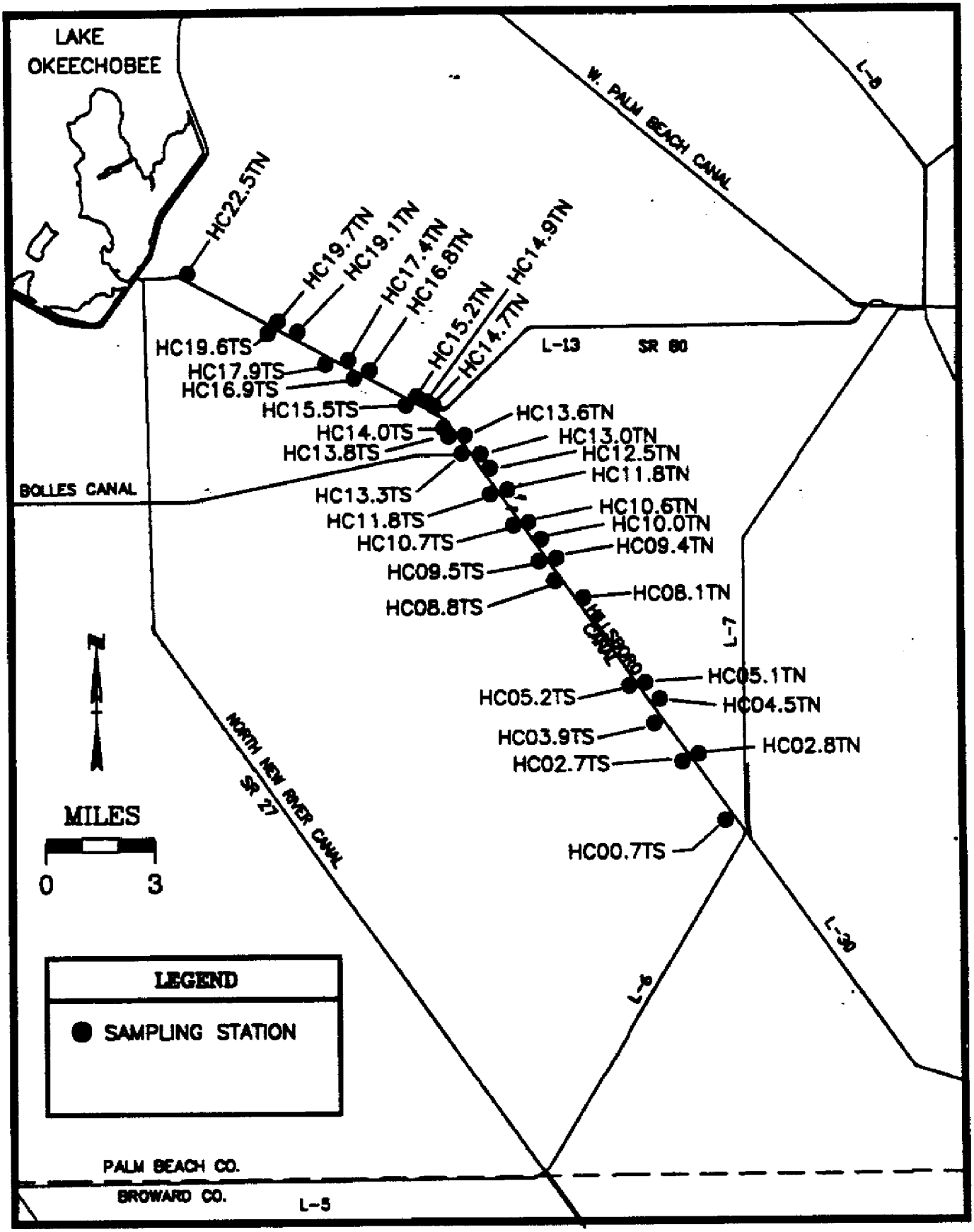

FIGURE 17. Location of Sampling Stations Along the Hillsboro Canal for the Everglades Agricultural Area Water Quality Monitoring Program

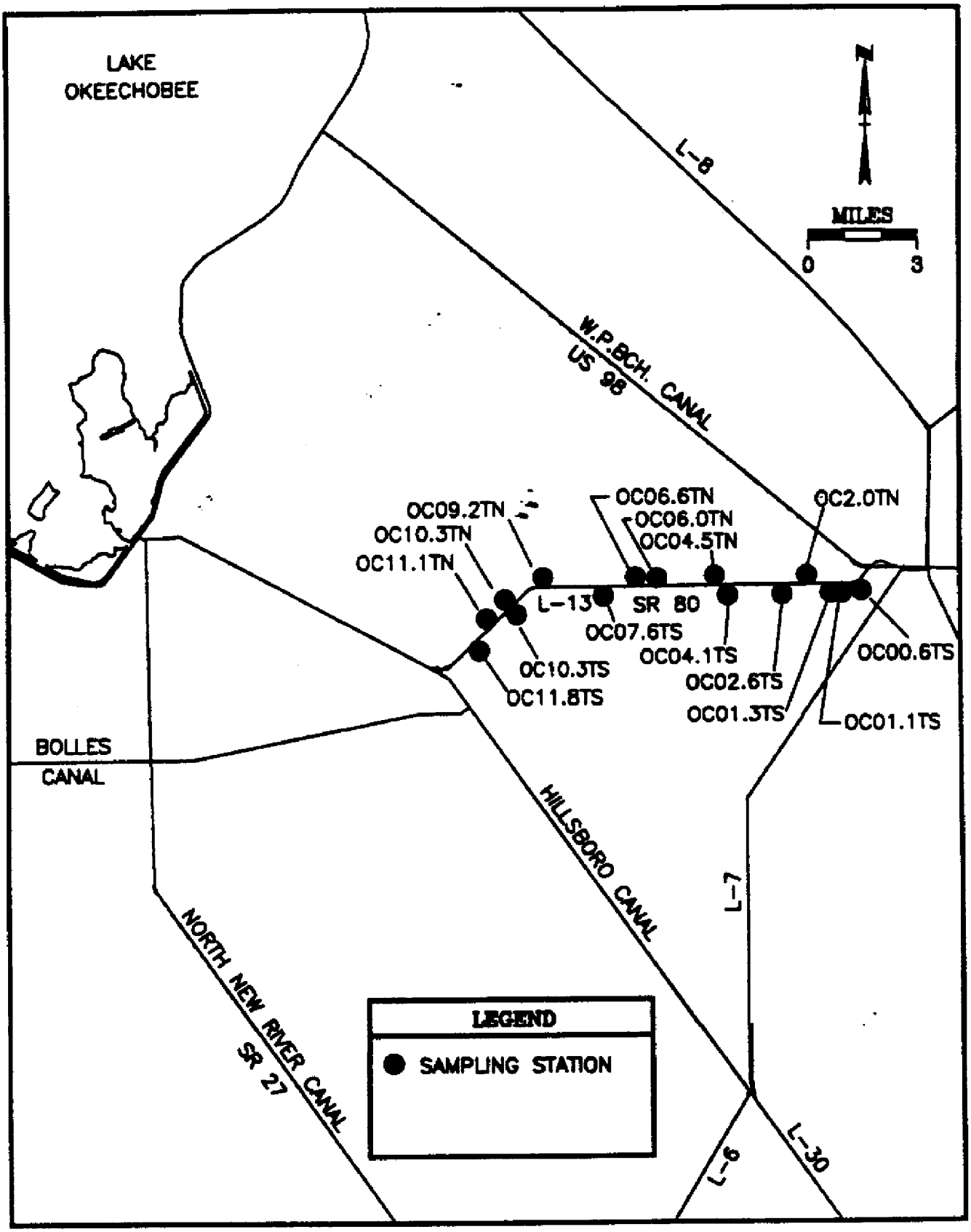

FIGURE 18. Location of Sampling Stations Along the Ocean Canal for the Everglades Agricultural Area Water Quality Monitoring program

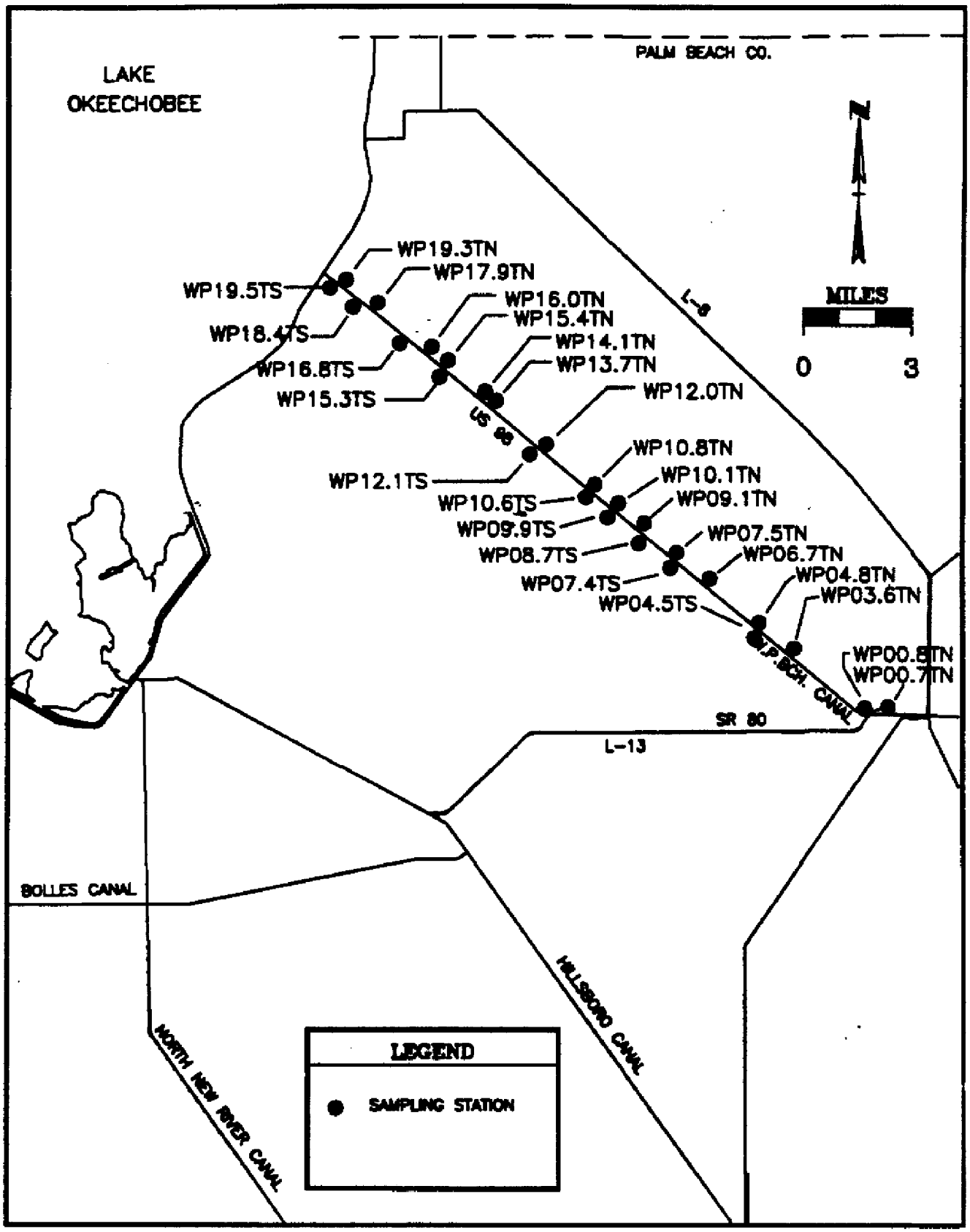

FIGURE 19. Location of Sampling Stations Along the West Palm Beach Canal for the Everglades Agricultural Area Water Quality Monitoring Program

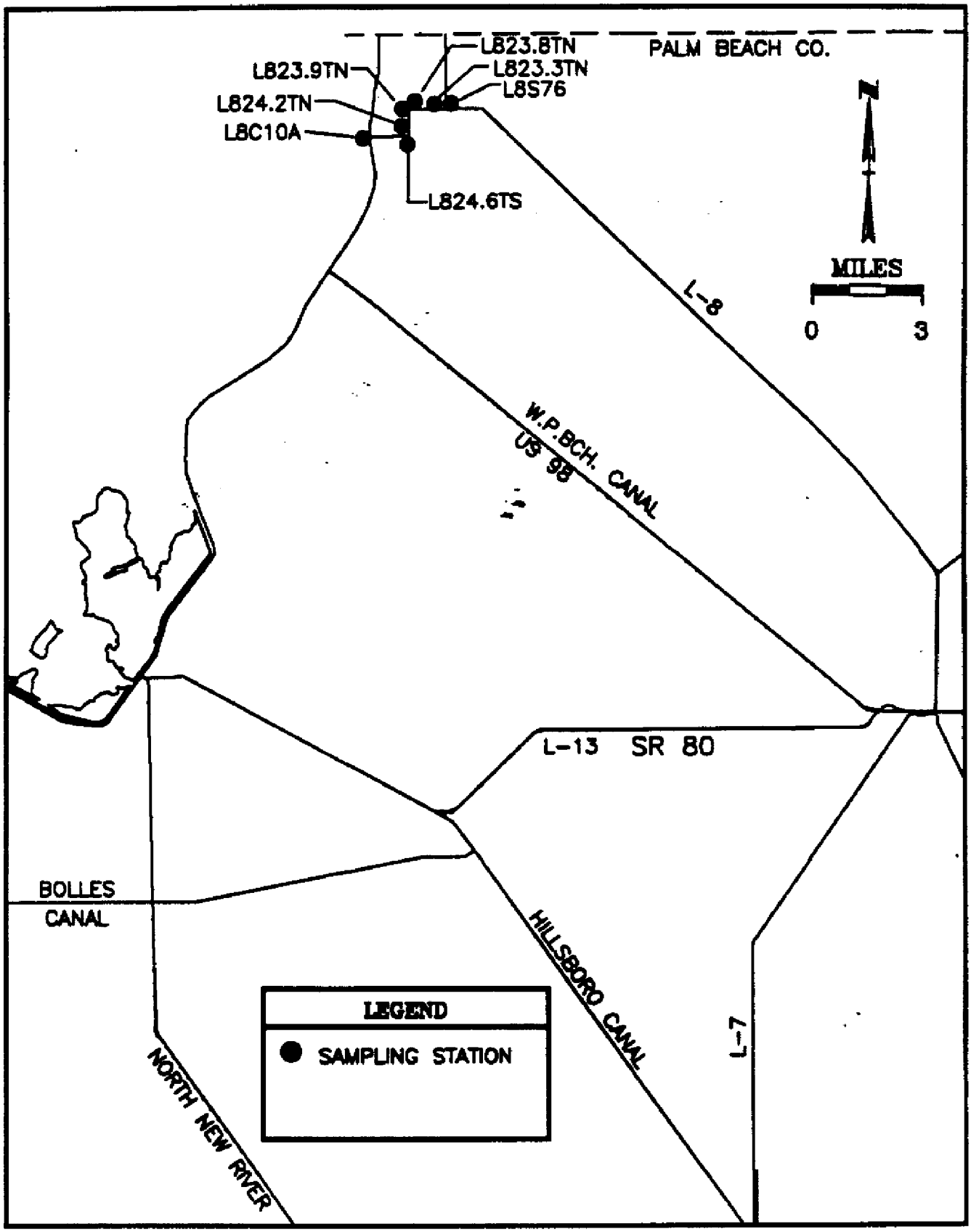

FIGURE 20. Location of Sampling Sites Along the L-8 Canal for the Everglades Agricultural Area Water Quality monitoring Program

TABLE 41. Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
HC00.7TS	262847	802710	Private pump station on the south side of the Hillsboro canal 0.7 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC02.7TS	263014	802819	Private pump station on the south side of the Hillsboro canal 2.7 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC02.8TN	263018	802818	Private pump station on the north side of the Hillsboro canal 2.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC03.9TS	263105	802859	Private pump station on the south side of the Hillsboro canal 3.9 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC04.5TN	263131	802914	Private pump station on the north side of the Hillsboro canal 4.5 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC05.1TN	263158	802936	Private pump station on the north side of the Hillsboro canal 5.1 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC05.2TS	263159	802941	Private pump station on the south side of the Hillsboro canal 5.2 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC08.1TN	263406	803111	Private pump station on the north side of the Hillsboro canal 8.1 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC08.8TS	263435	803141	Private pump station on the south side of the Hillsboro canal 8.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC09.4TN	263500	803157	Private pump station on the north side of the Hillsboro canal 9.4 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC09.5TS	263500	803203	Private pump station on the south side of the Hillsboro canal 9.5 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
HC10.0TN	263528	803218	Private pump station on the north side of the Hillsboro canal 10.0 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC10.6TN	263552	803237	Private pump station on the north side of the Hillsboro canal 10.6 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC10.7TS	263554	803243	Private pump station on the south side of the Hillsboro canal 10.7 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC11.8TN	263643	803317	Private pump station on the north side of the Hillsboro canal 11.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC11.8TS	263641	803320	Private pump station on the south side of the Hillsboro canal 11.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC12.5TN	263712	803341	Private pump station on the north side of the Hillsboro canal 12.5 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC13.0TN	263738	803400	Private pump station on the north side of the Hillsboro canal 13.0 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC13.3TS	263717	803411	Private pump station on the south side of the Hillsboro canal 13.3 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC13.6TN	263804	803420	Private pump station on the north side of the Hillsboro canal 13.6 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC13.8TS	263809	803429	Private pump station on the south side of the Hillsboro canal 13.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC14.0TS	263817	803437	Private pump station on the south side of the Hillsboro canal 14.0 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC14.7TN	263847	803458	Private pump station on the north side of the Hillsboro canal 14.7 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
HC14.9TN	263846	803510	Private pump station on the north side of the Hillsboro canal 14.9 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC15.2TN	263853	803524	Private pump station on the north side of the Hillsboro canal 15.2 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC15.5TS	263857	803541	Private pump station on the south side of the Hillsboro canal 15.5 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC16.8TN	263934	803645	Private pump station on the north side of the Hillsboro canal 16.8 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC16.9TS	263932	803653	Private pump station on the south side of the Hillsboro canal 16.9 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC17.4TN	263951	803721	Private pump station on the north side of the Hillsboro canal 17.4 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC17.9TS	263958	803745	Private pump station on the south side of the Hillsboro canal 17.9 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC19.1TN	264032	803847	Private pump station on the north side of the Hillsboro canal 19.1 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC19.6TS	264040	803911	Private pump station on the south side of the Hillsboro canal 19.6 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC19.7TN	264045	803913	Private pump station on the north side of the Hillsboro canal 19.7 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G
HC22.5TN	264157	804139	Private pump station on the north side of the Hillsboro canal 22.5 miles northwest of pump station S-6.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
L8-C10A	265501	803650	On the east side of Lake Okeechobee at the US HWY 98 bridge over the L-8 canal about 200 feet east of culvert 10A.	1990 - 1992	STE	DS	G
L823.3TN	265543	803519	Private pump station on the north side of the L8 canal, 23.3 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
L823.8TN	265543	803548	Private pump station on the north side of the L8 canal, 23.8 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
L823.9TN	265542	803550	Private pump station on the north side of the L8 canal, 23.9 miles northwest of pump station S5A.	1990 - 1992	STE	US	G
L824.2TN	265523	803551	Private pump station on the north side of the L8 canal, 24.2 miles northwest of pump station S5A.	1990 - 1992	STE	US	G
L824.6TS	265502	803548	Private pump station on the south side of the L8 canal, 24.6 miles northwest of pump station S5A.	1990 - 1992	STE	US	G
L8S76	265542	803454	Spillway on the L8 canal near Lake Okeechobee, 22.8 miles northwest of pump station S5A.	1990 - 1992	STE	US	G
MC00.1TW	261957	804634	Where the L-4 canal drains into the west side of the Miami Canal 0.1 miles north of pump station S8.	1990 - 1992	STE	US	G
MC08.6TE	262657	804852	Private pump station on the east side of the Miami Canal 8.6 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC08.6TW	262657	804855	Private pump station on the west side of the Miami Canal 8.6 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC09.1TE	262722	804859	A gravity fed culvert on the east side of the Miami Canal 9.1 miles north of pump station S8.	1990 - 1992	STE	US	G
MC09.7TW	262748	804908	Private pump station on the west side of the Miami Canal 9.7 miles north of pump station S8.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
MC10.7TE	262842	804917	Private pump station on the east side of the Miami Canal 10.7 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC10.7TW	262842	804920	A gravity fed culvert on the west side of the Miami Canal 10.7 miles north of pump station S8.	1990 - 1992	STE	US	G
MC12.2TW	263000	804939	Private pump station on the west side of the Miami Canal 12.2 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC13.7TE	263119	804955	Private pump station on the east side of the Miami Canal 13.7 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC16.8TE	263357	805032	Private pump station on the east side of the Miami Canal 16.8 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC16.8TW	263355	805035	A gravity fed culvert on the west side of the Miami Canal 16.8 miles north of pump station S8.	1990 - 1992	STE	US	G
MC18.8TE	263540	805029	Private pump station on the east side of the Miami Canal 18.8 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC18.8TW	263538	805033	Private pump station on the west side of the Miami Canal 18.8 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC19.9TE	263633	805014	Bolles Canal culvert on the east side of the Miami Canal 19.9 miles north of pump station S8.	1990 - 1992	STE	US	G
MC19.9TW	263633	805017	Bolles Canal culvert on the west side of the Miami Canal 19.9 miles north of pump station S8.	1990 - 1992	STE	US	G
MC21.5TW	263751	804956	Private pump station on the west side of the Miami Canal 21.5 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC23.0TE	263911	804928	Private pump station on the east side of the Miami Canal 23.0 miles north of pump station S8.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
MC23.0TW	263911	804932	L1 East Canal culvert on the west side of the Miami Canal 23.0 miles north of pump station S8.	1990 - 1992	STE	US	G
MC23.3TW	263924	804928	Private pump station on the west side of the Miami Canal 23.3 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC24.1TE	264002	804914	Private pump station on the east side of the Miami Canal 24.1 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC24.1TW	264002	804917	Private pump station on the west side of the Miami Canal 24.1 miles north of pump station S8.	1990 - 1992	STE	DS	G
MC26.1TW	264137	804828	Private pump station on the west side of the Miami Canal 26.1 miles north of pump station S8.	1990 - 1992	STE	DS	G
NR01.8TE	262127	803316	Private pump station on the east side of the North New River Canal, 1.8 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR02.7TW	262200	803345	Private pump station on the west side of the North New River Canal, 2.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR03.0TE	262213	803353	Private pump station on the east side of the North New River Canal, 3.0 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR03.0TW	262214	803335	Private pump station on the west side of the North New River Canal, 3.0 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR04.1TE	262305	803433	Private pump station on the east side of the North New River Canal, 4.1 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR04.2TW	262307	803438	Private pump station on the west side of the North New River Canal, 4.2 miles north of pump station S7.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
NR05.4TE	262357	803513	Private pump station on the east side of the North New River Canal, 5.4 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR06.6TE	262454	803554	Private pump station on the east side of the North New River Canal, 6.6 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR06.6TW	262454	803557	Private pump station on the west side of the North New River Canal, 6.6 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR07.8TE	262541	803634	Private pump station on the east side of the North New River Canal, 7.8 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR09.0TE	262635	803715	Private pump station on the east side of the North New River Canal, 9.0 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR10.3TE	262726	803755	Private pump station on the east side of the North New River Canal, 10.3 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR10.3TW	262727	803800	Private pump station on the west side of the North New River Canal, 10.3 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR11.4TE	262817	803834	Private pump station on the east side of the North New River Canal, 11.4 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR12.5TE	262903	803910	Private pump station on the east side of the North New River Canal, 12.5 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR12.5TW	262903	803914	Private pump station on the west side of the North New River Canal, 12.5 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR13.0TW	262922	803928	Private pump station on the west side of the North New River Canal, 13.0 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR13.6TW	262948	803949	Private pump station on the west side of the North New River Canal, 13.6 miles north of pump station S7.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
NR14.2TE	263014	804005	Private pump station on the east side of the North New River Canal, 14.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR14.7TE	263039	804024	Private pump station on the east side of the North New River Canal, 14.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR15.4TW	263107	804051	Private pump station on the west side of the North New River Canal, 15.4 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR16.9TE	263212	804138	Private pump station on the east side of the North New River Canal, 16.9 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR18.2TW	263306	804225	Private pump station on the west side of the North New River Canal, 18.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR18.7TE	263330	804235	Private pump station on the east side of the North New River Canal, 18.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR19.2TE	263357	804236	Private pump station on the east side of the North New River Canal, 19.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR19.7TE	263423	804236	Private pump station on the east side of the North New River Canal, 19.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR20.2TW	263449	804240	Private pump station on the west side of the North New River Canal, 20.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR20.7TE	263516	804238	Private pump station on the east side of the North New River Canal, 20.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR22.2TW	263634	804243	Bolles Canal inflow/outflow on the west side of the North New River Canal, 22.2 miles north of pump station S7.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
NR22.7TE	263700	804239	Private pump station on the east side of the North New River Canal, 22.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR23.2TE	263726	804240	Private portable pump station on the east side of the North New River Canal, 23.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR23.7TE	263752	804241	Private pump station on the east side of the North New River Canal, 23.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR24.2TW	263817	804245	Private pump station on the west side of the North New River Canal, 24.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR24.6TW	263838	804245	Private pump station on the west side of the North New River Canal, 24.6 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR25.2TW	263911	804246	Private pump station on the west side of the North New River Canal, 25.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR26.4TE	264010	804244	Private pump station on the east side of the North New River Canal, 26.4 miles north of pump station S7.	1990 - 1992	STE	DS	A
NR26.7TW	264028	804248	Private pump station on the west side of the North New River Canal, 26.7 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR27.6TW	264112	804248	Private pump station on the west side of the North New River Canal, 27.6 miles north of pump station S7.	1990 - 1992	STE	DS	G
NR28.2TW	264145	804248	Private pump station on the west side of the North New River Canal, 28.2 miles north of pump station S7.	1990 - 1992	STE	DS	G
OC00.6TS	264042	802343	Private pump station on the south side of the Ocean Canal, 0.6 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC01.1TS	264040	802419	Private pump station on the south side of the Ocean Canal, 1.1 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
OC01.3TS	264039	802428	Private pump station on the south side of the Ocean Canal, 1.3 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC02.0TN	264043	802503	Private pump station on the north side of the Ocean Canal, 2.0 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC02.6TS	264039	802540	Private pump station on the south side of the Ocean Canal, 2.6 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC04.1TS	264040	802706	Private pump station on the south side of the Ocean Canal, 4.1 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC04.5TN	264043	802758	Private pump station on the north side of the Ocean Canal, 4.5 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC06.0TN	264042	802855	Private pump station on the north side of the Ocean Canal, 6.0 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC06.6TN	264042	802934	Private pump station on the north side of the Ocean Canal, 6.6 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC07.6TS	264039	803031	Private pump station on the south side of the Ocean Canal, 7.6 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC09.2TN	264042	803204	Private pump station on the north side of the Ocean Canal, 9.2 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC10.3TN	264017	803258	Private pump station on the north side of the Ocean Canal, 10.3 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC10.3TS	264012	803258	Private pump station on the south side of the Ocean Canal, 10.3 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
OC11.1TN	263949	803328	Private pump station on the north side of the Ocean Canal, 11.1 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
OC11.8TS	263921	803358	Private pump station on the south side of the Ocean Canal, 11.8 miles west of L12 (Levee #12).	1990 - 1992	STE	DS	G
SDIV2	262147	805436	Down stream of US Sugar Corporations Ranch #2 outfall on the west side of L3, 2.8 miles northwest of Oil Well Bridge.	1990 - 1992	STE	DS	G
WP00.7TN	264107	802246	Private pump station on the north side of the West Palm Beach Canal, 0.7 miles west of pump station S5A.	1990 - 1992	STE	DS	G
WP00.8TN	264108	802248	Private pump station on the north side of the West Palm Beach Canal, 0.8 miles west of pump station S5A	1990 - 1992	STE	DS	G
WP03.6TN	264214	802507	Private pump station on the north side of the West Palm Beach Canal, 3.6 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP04.5TS	264243	802551	Gravity fed culvert on the south side of the West Palm Beach Canal, 4.5 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP04.8TN	264256	802602	Private pump station on the north side of the West Palm Beach Canal, 4.8 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP06.7TN	264400	802727	Gravity fed culvert on the north side of the West Palm Beach Canal, 6.7 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP07.4TS	264418	802756	Private pump station on the south side of the West Palm Beach Canal, 7.4 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP07.5TN	264423	802755	Private pump station on the north side of the West Palm Beach Canal, 7.5 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP08.7TS	264504	802858	Private pump station on the south side of the West Palm Beach Canal, 8.7 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
WP09.1TN	264521	802913	Private pump station on the north side of the West Palm Beach Canal, 9.1 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP09.9TS	264543	802953	Private pump station on the south side of the West Palm Beach Canal, 9.9 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP10.1TN	264555	802959	Gravity fed culvert on the north side of the West Palm Beach Canal, 10.1 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP10.6TS	264607	803021	Private pump station on the south side of the West Palm Beach Canal, 10.6 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP10.8TN	264618	803029	Private pump station on the north side of the West Palm Beach Canal, 10.8 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP12.0TN	264701	803126	Private pump station on the north side of the West Palm Beach Canal, 12.0 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP12.1TS	264701	803134	Private pump station on the south side of the West Palm Beach Canal, 12.1 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP13.7TN	264753	803235	Private pump station on the north side of the West Palm Beach Canal, 13.7 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP14.1TN	264807	803254	Private pump station on the north side of the West Palm Beach Canal, 14.1 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP15.3TS	264845	803351	Private pump station on the south side of the West Palm Beach Canal, 15.3 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP15.4TN	264850	803353	Gravity fed culvert on the north side of the West Palm Beach Canal, 15.4 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP16.0TN	264911	803421	Private pump station on the north side of the West Palm Beach Canal, 16.0 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G

TABLE 41 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Everglades Agricultural Area (EAA) Stormwater Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Total Phosphorus	US/DS	G/A
WP16.8TS	264938	803500	Private pump station on the south side of the West Palm Beach Canal, 16.8 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP17.9TN	265018	803547	Private pump station on the north side of the West Palm Beach Canal, 17.9 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP18.4TS	265030	803609	Private pump station on the south side of the West Palm Beach Canal, 18.4 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP19.3TN	265104	803649	Private pump station on the north side of the West Palm Beach Canal, 19.3 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G
WP19.5TS	265108	803701	Private pump station on the south side of the West Palm Beach Canal, 19.5 miles northwest of pump station S5A.	1990 - 1992	STE	DS	G

TABLE 42. Statistics for Select Parameters for the Everglades Agricultural Area (EAA) Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus		
	MIN	MEAN	MAX
HC00.7TS	0.071	0.280	0.901
HC02.7TS	0.034	0.132	0.623
HC02.8TN	<0.004	0.060	0.255
HC03.9TS	0.161	0.194	0.227
HC04.5TN	0.023	0.109	0.708
HC05.1TN	0.045	0.075	0.095
HC05.2TS	0.035	0.103	0.422
HC08.1TN	0.021	0.051	0.170
HC08.8TS	0.115	0.387	0.745
HC09.4TN	0.043	0.146	0.280
HC09.5TS	0.050	0.106	0.205
HC10.0TN	0.165	0.313	0.596
HC10.6TN	0.258	0.612	1.127
HC10.7TS	0.091	0.184	0.625
HC11.8TN	0.046	0.165	0.428
HC11.8TS	0.124	0.339	0.741
HC12.5TN	0.040	0.097	0.196
HC13.0TN	0.173	0.173	0.173
HC13.3TS	0.098	0.320	0.879
HC13.6TN	0.076	0.170	0.271
HC13.8TS	0.061	0.169	0.214
HC14.0TS	0.070	0.089	0.120
HC14.7TN	0.041	0.080	0.138
HC14.9TN	0.089	0.223	0.478
HC15.2TN	0.033	0.102	0.197
HC15.5TS	0.091	0.192	0.328
HC16.8TN	0.206	0.206	0.206
HC16.9TS	0.223	0.223	0.223
HC17.4TN	0.193	0.269	0.454
HC17.9TS	0.100	0.150	0.215
HC19.1TN	0.104	0.154	0.223
HC19.6TS	0.311	0.405	0.479
HC19.7TN	0.392	0.533	0.953
HC22.5TN	0.128	0.258	0.329
L8-C10A	0.041	0.121	0.226
L823.3TN	0.046	0.179	0.337
L823.8TN	0.101	0.160	0.245
L823.9TN	0.052	0.117	0.187
L824.2TN	0.134	0.220	0.285
L824.6TS	0.119	0.221	0.291
L8S76	0.024	0.041	0.059
MC00.1TW	0.132	0.132	0.132
MC08.6TE	0.014	0.030	0.067
MC08.6TW	0.029	0.081	0.181
MC09.1TE	0.015	0.079	0.195

TABLE 42 (Continued). Statistics for Select Parameters for the Everglades Agricultural Area (EAA) Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus		
	MIN	MEAN	MAX
MC09.7TW	0.189	0.189	0.189
MC10.7TE	0.026	0.081	0.193
MC10.7TW	0.020	0.217	0.480
MC12.2TW	0.031	0.198	0.606
MC13.7TE	0.022	0.092	0.196
MC16.8TE	0.173	0.273	0.583
MC16.8TW	0.078	0.138	0.264
MC18.8TE	0.054	0.101	0.221
MC18.8TW	0.166	0.166	0.166
MC19.9TE	0.082	0.169	0.262
MC19.9TW	0.147	0.368	0.606
MC21.5TW	0.099	0.270	0.559
MC23.0TE	0.028	0.064	0.134
MC23.0TW	0.079	0.113	0.148
MC23.3TW	0.093	0.148	0.217
MC24.1TE	0.065	0.127	0.183
MC24.1TW	0.065	0.106	0.192
MC26.1TW	0.079	0.079	0.079
NR01.8TE	0.019	0.105	0.377
NR02.7TW	0.023	0.133	0.514
NR03.0TE	0.011	0.063	0.191
NR03.0TW	0.022	0.165	0.713
NR04.1TE	0.055	0.140	0.207
NR04.2TW	0.035	0.148	0.384
NR05.4TE	0.036	0.310	1.014
NR06.6TE	0.087	0.620	2.390
NR06.6TW	0.021	0.116	0.384
NR07.8TE	0.048	0.633	2.006
NR09.0TE	0.045	0.150	0.612
NR10.3TE	0.051	0.208	0.566
NR10.3TW	0.055	0.196	0.394
NR11.4TE	0.080	0.495	1.416
NR12.5TE	0.051	0.145	0.295
NR12.5TW	0.161	0.644	1.706
NR13.0TW	0.034	0.154	0.626
NR13.6TW	0.048	0.051	0.055
NR14.2TE	0.058	0.330	0.689
NR14.7TE	0.059	0.162	0.359
NR15.4TW	0.064	0.180	0.476
NR16.9TE	0.065	0.309	0.939
NR18.2TW	0.095	0.221	0.574
NR18.7TE	0.089	0.198	0.316
NR19.2TE	0.069	0.372	1.013
NR19.7TE	0.366	0.612	1.195

TABLE 42 (Continued). Statistics for Select Parameters for the Everglades Agricultural Area (EAA) Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus		
	MIN	MEAN	MAX
NR20.2TW	0.107	0.229	0.402
NR20.7TE	0.085	0.144	0.202
NR22.2TW	0.077	0.184	0.334
NR22.7TE	0.101	0.154	0.298
NR23.2TE	0.035	0.067	0.152
NR23.7TE	0.038	0.158	0.348
NR24.2TW	0.044	0.083	0.202
NR24.6TW	0.053	0.142	0.349
NR25.2TW	0.063	0.223	0.971
NR26.4TE	0.495	1.035	2.270
NR26.7TW	0.043	0.434	1.023
NR27.6TW	0.068	0.101	0.150
NR28.2TW	0.036	0.079	0.126
OC00.6TS	0.035	0.185	0.999
OC01.1TS	0.113	0.366	0.764
OC01.3TS	0.038	0.082	0.178
OC02.0TN	0.047	0.117	0.267
OC02.6TS	0.073	0.246	0.395
OC04.1TS	0.088	0.260	0.613
OC04.5TN	0.163	0.540	0.921
OC06.0TN	0.080	0.234	0.423
OC06.6TN	0.086	0.211	0.282
OC07.6TS	0.161	0.535	1.477
OC09.2TN	0.059	0.192	0.371
OC10.3TN	0.034	0.111	0.179
OC10.3TS	0.044	0.133	0.278
OC11.1TN	0.311	0.311	0.311
OC11.8TS	0.089	0.223	0.876
SDIV2	0.040	0.040	0.040
WP00.7TN	0.043	0.288	1.047
WP00.8TN	0.047	0.113	0.186
WP03.6TN	0.050	0.122	0.285
WP04.5TS	0.088	0.232	0.625
WP04.8TN	0.060	0.113	0.203
WP06.7TN	0.086	0.519	1.813
WP07.4TS	0.080	0.225	0.512
WP07.5TN	0.093	0.218	0.401
WP08.7TS	0.040	0.130	0.280
WP09.1TN	0.080	0.143	0.362
WP09.9TS	0.056	0.140	0.266
WP10.1TN	0.202	0.410	0.661
WP10.6TS	0.065	0.259	0.888
WP10.8TN	0.053	0.159	0.377
WP12.0TN	0.198	0.352	0.804

TABLE 42 (Continued). Statistics for Select Parameters for the Everglades Agricultural Area (EAA) Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus		
	MIN	MEAN	MAX
WP12.1TS	0.133	0.224	0.362
WP13.7TN	0.161	0.280	0.466
WP14.1TN	0.096	0.335	0.799
WP15.3TS	0.158	0.242	0.324
WP15.4TN	0.179	0.292	0.590
WP16.0TN	0.098	0.281	0.461
WP16.8TS	0.185	0.483	0.791
WP17.9TN	0.132	0.256	0.799
WP18.4TS	0.442	1.318	4.095
WP19.3TN	0.193	0.291	0.388
WP19.5TS	0.440	0.440	0.440

SECTION 15

HOLEY LAND
PROJECT CODES: HOLE and HOLY

Purpose and Scope

In 1983 a Memorandum of Agreement between the Florida Department of Environmental Regulation (FDEP), the Board of Trustees of the Internal Improvement Trust Fund (BTIITF), the South Florida Water Management District, and the Florida Game and Fresh Water Fish Commission (G&FWFC) was established to design and construct a restoration plan for the Holey Land and Rotenberger Tracts as well as a portion of the Seminole Indian Reservation.

In 1990 a Memorandum of Agreement between the SFWMD and G&FWFC was established to begin the monitoring of the Holey Land. The water quality monitoring program involves collecting data, and documenting conditions to better understand the hydrology and environmental resources in achieving the goals of the Holey Land Restoration Project.

Project HOLY is was established specifically to meet the requirements of FDEP Permit #06 500809209.

Project HOLE was a special SFWMD monitoring project that began in 1989 and ended in 1992.

Sampling Locations and Descriptions

The Holey Land monitoring program includes two monitoring projects: "HOLE" monitors 38 surface water quality locations, and "HOLY" monitors seven surface water inflow and outflow structures and four interior sediment sites. The location of these stations are shown in Figure 21. Tables 43 and 44 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 45 and 46 contain statistics for each monitoring location.

Parameter and Sampling Frequencies

Prior to July 1992 project HOLY was sampled weekly for total phosphorus only. The FDEP permit requires the District to monitor surface water on a quarterly basis, and sediment semi-annually.

District Publications
None

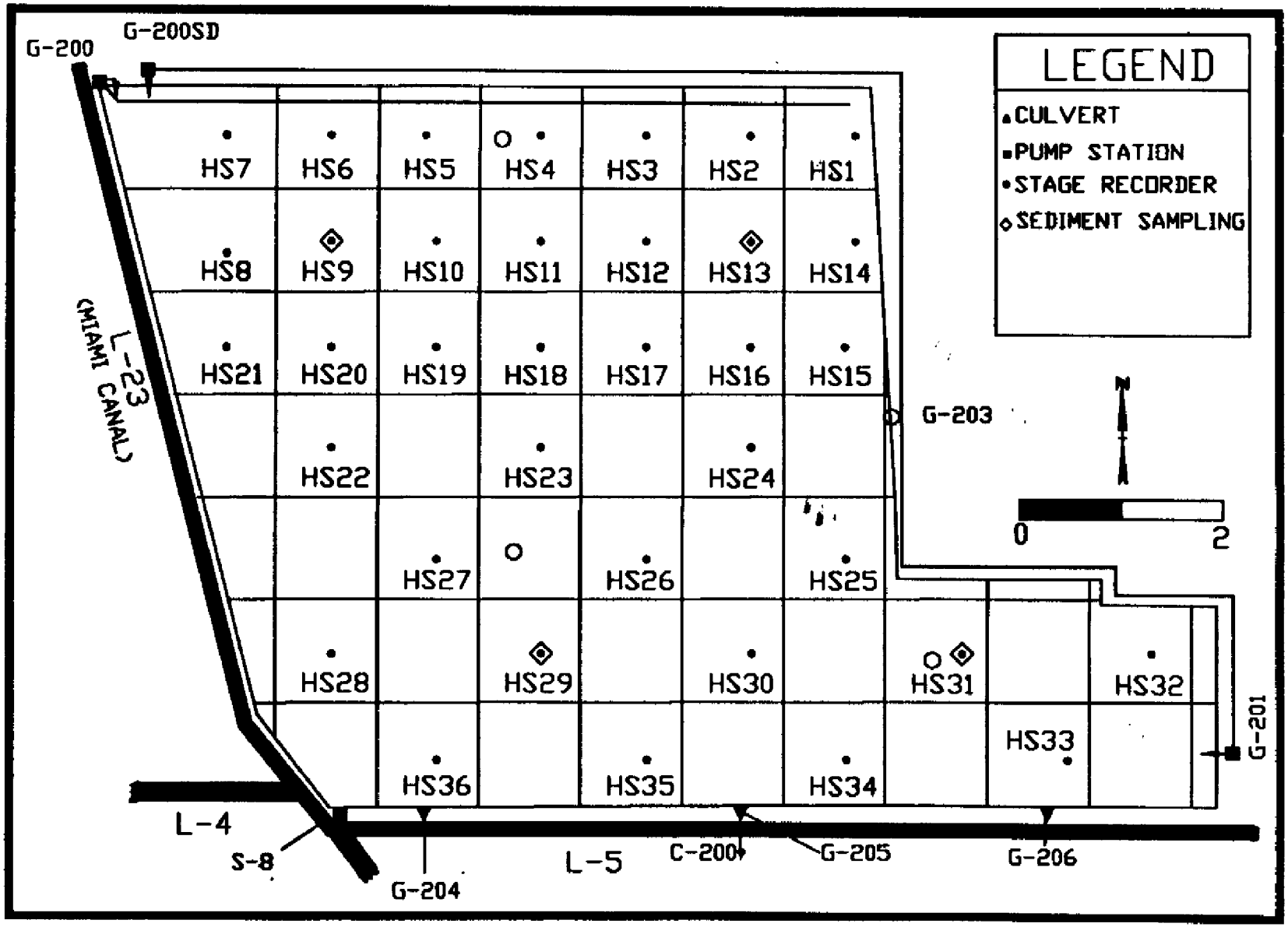

FIGURE 21. Location of Sampling Stations for the Holey Land Water Quality Monitoring Program

TABLE 43. Summary of Sampling Station Locations and Frequency of Collection for the Holey Land Monitoring Programs

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Metals	Organic Priority Pollutants	US/DS	G/A
G200 *	262500	804700	This is a pump station located at the N.W. corner of the Holey Land. It pumps water from the Miami Canal (L-23) into the Holey Land. This station is sampled on the upstream side for project HOLY, and on the downstream side for project HOLE.	1989 - P	QTR	QTR/M	QTR/M	QTR	QTR	US	G
G200SD *	262500	804658	This is a pump station located at the N.W. corner of the Holey Land close to G200. It pumps water from the seepage ditch that runs along the north side of the Holey Land, back into the Holey Land.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
G201 *	262000	803800	This is a pump station located at the S.E. corner of the Holey Land. It pumps water from the seepage ditch which runs along the east side of the Holey Land, back into the Holey Land.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
G204 *	261954	804554	This is a set of culverts located on the L-5 levee near pump station S8. These culverts discharge water from the Holey Land into Water Conservation Area 3A.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
G205 *	261956	804300	This is a set of culverts located on the L-5 levee half way between pump station S8 and G201. These culverts discharge water from the Holey Land into Water Conservation Area 3A.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
G206 *	261958	803909	This is a set of culverts located on the L-5 levee near the S.E. corner of the Holey Land. These culverts discharge water from the Holey Land into Water Conservation Area 3A.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
C200	261953	804300	This is a set of culverts located on the L-5 levee half way between pump station S8 and G201. These culverts discharge water from the Holey Land into Water Conservation Area 3A.	1989 - 1992	-	M	M	-	-	DS	G

* = These stations are sampled under project code HOLY. All others were sampled under project HOLE.

TABLE 43. (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Holey Land Monitoring Programs

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Metals	Organic Priority Pollutants	US/DS	G/A
S8 *	261953	804628	This is a District operated pump station. Water is pump in a southerly direction down the Miami Canal.	1989 - P	QTR	QTR	QTR	QTR	QTR	US	G
HS1	262570	804160	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS2	262570	804250	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS3	262570	804350	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS4	262570	804450	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS5	262570	804560	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS6	262570	804650	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS7	262570	804750	Northern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS8	262480	804750	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS9	262480	804650	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS10	262480	804560	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS11	262480	804450	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS12	262480	804350	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS13	262480	804250	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS14	262480	804160	Transect 1 mile south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS15	262390	804160	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS16	262390	804250	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS17	262390	804350	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS18	262390	804450	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS19	262390	804560	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS20	262390	804650	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS21	262390	804750	Transect 2 miles south of northern transect	1989 - 1992	-	M	M	-	-	-	G
HS22	262305	804650	Middle east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS23	262305	804450	Middle east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS24	262305	804250	Middle east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS25	262210	804160	Transect 2 miles north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS26	262210	804350	Transect 2 miles north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS27	262210	804560	Transect 2 miles north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS28	262130	804650	Transect 1 mile north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS29	262130	804450	Transect 1 mile north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS30	262130	804250	Transect 1 mile north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS31	262130	804060	Transect 1 mile north of southern most transect	1989 - 1992	-	M	M	-	-	-	G

* = These stations are sampled under project code HOLY. All others were sampled under project HOLE.

TABLE 43 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Holey Land Monitoring Programs

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Metals	Organic Priority Pollutants	US/DS	G/A
HS32	262130	803870	Transect 1 mile north of southern most transect	1989 - 1992	-	M	M	-	-	-	G
HS33	262040	803960	Southern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS34	262040	804160	Southern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS35	262040	804350	Southern most east/west transect	1989 - 1992	-	M	M	-	-	-	G
HS36	262040	804560	Southern most east/west transect	1989 - 1992	-	M	M	-	-	-	G

TABLE 44. Summary of Sediment Sampling Station Locations and Frequency of Collection for the Holey Land Monitoring Programs

SFWMD Sta. ID	Lat	Long	Location	POR	Organic Priority Pollutants	Metals	G/A
HOLYSD1	262480	804650	Same location as HS9 in table 44	1989 - P	BA	BA	G
HOLYSD2	262480	804250	Same location as HS13 in table 44	1989 - P	BA	BA	G
HOLYSD3	262130	804450	Same location as HS29 in table 44	1989 - P	BA	BA	G
HOLYSD4	262130	804060	Same location as HS31 in table 44	1989 - P	BA	BA	G

TABLE 45. Statistics for Select Parameters for the Holey Land Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
G200*	0.017	0.045	0.098	<0.004	0.021	0.072	1.79	3.22	5.91	0.091	0.989	3.185
G200	0.007	0.055	0.102	<0.004	0.026	0.061	1.31	2.27	4.34	0.008	0.603	2.084
G200SD	0.009	0.012	0.014	<0.004	0.005	0.008	1.38	1.91	2.29	0.017	0.130	0.537
G201	0.007	0.010	0.021	<0.004	0.004	0.009	1.49	1.97	2.66	0.005	0.211	1.015
G204	0.015	0.035	0.074	<0.004	0.006	0.012	1.21	1.66	2.59	0.025	0.148	0.707
G205	0.015	0.031	0.104	<0.004	0.004	0.006	1.20	1.56	1.96	0.007	0.057	0.339
G206	0.005	0.024	0.148	<0.004	0.011	0.075	1.18	1.92	3.12	0.026	0.099	0.323
C200	0.020	0.025	0.030	<0.004	0.006	0.009	1.63	2.04	2.61	<0.004	0.013	0.033
HS1	0.015	0.039	0.196	<0.004	0.010	0.094	1.87	2.80	6.61	<0.004	0.253	3.582
HS2	0.012	0.043	0.235	<0.004	0.016	0.182	1.11	2.68	5.22	<0.004	0.177	2.740
HS3	0.014	0.038	0.081	<0.004	0.005	0.024	1.94	2.89	5.42	<0.004	0.182	2.418
HS4	0.017	0.073	0.384	<0.004	0.005	0.008	1.95	4.52	14.00	<0.004	0.204	2.106
HS5	0.014	0.035	0.056	<0.004	0.005	0.009	1.88	3.27	5.15	<0.004	0.011	0.038
HS6	0.014	0.045	0.160	<0.004	0.006	0.020	1.15	2.97	6.12	<0.004	0.010	0.044
HS7	0.016	0.046	0.106	<0.004	0.005	0.016	1.88	3.85	6.68	<0.004	0.220	1.209
HS8	0.015	0.039	0.115	<0.004	0.006	0.011	1.90	3.12	4.73	<0.004	0.039	0.294
HS9	0.012	0.043	0.170	<0.004	0.005	0.010	1.97	3.20	8.70	<0.004	0.348	4.446
HS10	0.021	0.030	0.050	<0.004	0.005	0.010	1.69	2.83	4.03	<0.004	0.006	0.011
HS11	0.023	0.052	0.160	<0.004	0.005	0.010	2.03	3.19	7.50	<0.004	0.007	0.020
HS12	0.018	0.051	0.130	<0.004	0.006	0.018	2.04	3.18	5.41	<0.004	0.013	0.092
HS13	0.016	0.047	0.094	<0.004	0.006	0.024	1.90	2.90	4.87	<0.004	0.029	0.411
HS14	0.020	0.041	0.101	<0.004	0.008	0.031	1.84	2.93	5.27	<0.004	0.216	3.089
HS15	0.012	0.027	0.043	<0.004	0.004	0.006	1.79	2.46	4.45	<0.004	0.019	0.099
HS16	0.017	0.066	0.279	<0.004	0.005	0.010	1.65	2.89	7.74	<0.004	0.010	0.056
HS17	0.021	0.047	0.116	<0.004	0.006	0.017	1.68	2.35	3.17	<0.004	0.005	0.009
HS18	0.014	0.030	0.071	<0.004	0.004	0.006	1.53	2.25	3.42	<0.004	0.009	0.055
HS19	0.010	0.038	0.200	<0.004	0.005	0.009	1.60	2.13	2.72	<0.004	0.006	0.017
HS20	0.018	0.035	0.060	<0.004	0.004	0.006	1.18	2.29	3.03	<0.004	0.025	0.278
HS21	0.013	0.038	0.112	<0.004	0.005	0.011	1.65	2.80	4.07	<0.004	0.055	0.009
HS22	0.015	0.049	0.260	<0.004	0.007	0.024	1.88	3.49	10.38	<0.004	0.007	0.031

* = STATION COLLECTED DOWN STREAM

TABLE 45 (Continued). Statistics for Select Parameters for the Holey Land Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
HS23	0.017	0.027	0.044	<0.004	0.006	0.015	1.23	2.41	3.56	<0.004	0.009	0.039
HS24	0.014	0.034	0.078	<0.004	0.005	0.010	1.47	2.34	4.66	<0.004	0.038	0.510
HS25	0.012	0.035	0.129	<0.004	0.007	0.024	1.50	2.22	3.15			
HS26	0.013	0.028	0.052	<0.004	0.004	0.005	1.52	2.10	2.87			
HS27	0.013	0.034	0.082	<0.004	0.005	0.010	1.59	2.64	4.01	<0.004	0.008	0.023
HS28	0.013	0.023	0.037	<0.004	0.006	0.014	1.67	2.46	3.84	<0.004	0.033	0.264
HS29	0.016	0.051	0.234	<0.004	0.005	0.012	1.52	3.12	5.07	<0.004	0.010	0.034
HS30	0.021	0.039	0.094	<0.004	0.007	0.021	1.34	2.90	5.08	<0.004	0.173	2.152
HS31	0.023	0.064	0.217	<0.004	0.019	0.139	1.34	3.83	10.04	<0.004	0.492	4.842
HS32	0.021	0.062	0.116	<0.004	0.013	0.038	1.36	3.40	9.38	<0.004	0.049	0.367
HS33	0.023	0.075	0.145	<0.004	0.006	0.012	1.33	3.59	6.52	<0.004	0.038	0.239
HS34	0.015	0.068	0.376	<0.004	0.033	0.276	1.58	2.75	5.59	<0.004	0.008	0.019
HS35	0.007	0.055	0.299	<0.004	0.030	0.257	1.47	3.08	5.55	<0.004	0.011	0.022
HS36	0.017	0.069	0.506	<0.004	0.005	0.009	1.62	2.76	4.38	<0.004	0.009	0.024

TABLE 46. 1989 - 1991 Statistics for Select Parameters for the Holey Land Monitoring Program

SFWMD

Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
G200*	0.017	0.045	0.098	<0.004	0.021	0.072	1.79	3.22	5.91	0.091	0.989	3.185
G200	0.007	0.055	0.102	<0.004	0.026	0.061	1.31	2.27	4.34	0.008	0.603	2.084
G200SD	0.009	0.012	0.014	<0.004	0.005	0.008	1.38	1.91	2.29	0.017	0.130	0.537
G201	0.007	0.010	0.021	<0.004	0.004	0.009	1.49	1.97	2.66	0.005	0.211	1.015
G204	0.015	0.035	0.074	<0.004	0.006	0.012	1.21	1.66	2.59	0.025	0.148	0.707
G205	0.015	0.031	0.104	<0.004	0.004	0.006	1.20	1.56	1.96	0.007	0.057	0.339
G206	0.005	0.024	0.148	<0.004	0.011	0.075	1.18	1.92	3.12	0.026	0.099	0.323
C200	0.020	0.025	0.030	<0.004	0.006	0.009	1.63	2.04	2.61	<0.004	0.013	0.033
HS1	0.015	0.039	0.196	<0.004	0.010	0.094	1.87	2.80	6.61	<0.004	0.253	3.582
HS2	0.012	0.043	0.235	<0.004	0.016	0.182	1.11	2.68	5.22	<0.004	0.177	2.740
HS3	0.014	0.038	0.081	<0.004	0.005	0.024	1.94	2.89	5.42	<0.004	0.182	2.418
HS4	0.017	0.073	0.384	<0.004	0.005	0.008	1.95	4.52	14.00	<0.004	0.204	2.106
HS5	0.014	0.035	0.056	<0.004	0.005	0.009	1.88	3.27	5.15	<0.004	0.011	0.038
HS6	0.014	0.045	0.160	<0.004	0.006	0.020	1.15	2.97	6.12	<0.004	0.010	0.044
HS7	0.016	0.046	0.106	<0.004	0.005	0.016	1.88	3.85	6.68	<0.004	0.220	1.209
HS8	0.015	0.039	0.115	<0.004	0.006	0.011	1.90	3.12	4.73	<0.004	0.039	0.294
HS9	0.012	0.043	0.170	<0.004	0.005	0.010	1.97	3.20	8.70	<0.004	0.348	4.446
HS10	0.021	0.030	0.050	<0.004	0.005	0.010	1.69	2.83	4.03	<0.004	0.006	0.011
HS11	0.023	0.052	0.160	<0.004	0.005	0.010	2.03	3.19	7.50	<0.004	0.007	0.020
HS12	0.018	0.051	0.130	<0.004	0.006	0.018	2.04	3.18	5.41	<0.004	0.013	0.092
HS13	0.016	0.047	0.094	<0.004	0.006	0.024	1.90	2.90	4.87	<0.004	0.029	0.411
HS14	0.020	0.041	0.101	<0.004	0.008	0.031	1.84	2.93	5.27	<0.004	0.216	3.089
HS15	0.012	0.027	0.043	<0.004	0.004	0.006	1.79	2.46	4.45	<0.004	0.019	0.099
HS16	0.017	0.066	0.279	<0.004	0.005	0.010	1.65	2.89	7.74	<0.004	0.010	0.056
HS17	0.021	0.047	0.116	<0.004	0.006	0.017	1.68	2.35	3.17	<0.004	0.005	0.009
HS18	0.014	0.030	0.071	<0.004	0.004	0.006	1.53	2.25	3.42	<0.004	0.009	0.055
HS19	0.010	0.038	0.200	<0.004	0.005	0.009	1.60	2.13	2.72	<0.004	0.006	0.017
HS20	0.018	0.035	0.060	<0.004	0.004	0.006	1.18	2.29	3.03	<0.004	0.025	0.278
HS21	0.013	0.038	0.112	<0.004	0.005	0.011	1.65	2.80	4.07	<0.004	0.055	0.009

* = Station Collected Down Stream

TABLE 46 (Continued). 1989 - 1991 Statistics for Select Parameters for the Holey Land Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
HS22	0.015	0.049	0.260	<0.004	0.007	0.024	1.88	3.49	10.38	<0.004	0.007	0.031
HS23	0.017	0.027	0.044	<0.004	0.006	0.015	1.23	2.41	3.56	<0.004	0.009	0.039
HS24	0.014	0.034	0.078	<0.004	0.005	0.010	1.47	2.34	4.66	<0.004	0.038	0.510
HS25	0.012	0.035	0.129	<0.004	0.007	0.024	1.50	2.22	3.15	<0.004	0.019	0.098
HS26	0.013	0.028	0.052	<0.004	0.004	0.005	1.52	2.10	2.87	<0.004	0.007	0.025
HS27	0.013	0.034	0.082	<0.004	0.005	0.010	1.59	2.64	4.01	<0.004	0.008	0.023
HS28	0.013	0.023	0.037	<0.004	0.006	0.014	1.67	2.46	3.84	<0.004	0.033	0.264
HS29	0.016	0.051	0.234	<0.004	0.005	0.012	1.52	3.12	5.07	<0.004	0.010	0.034
HS30	0.021	0.039	0.094	<0.004	0.007	0.021	1.34	2.90	5.08	<0.004	0.173	2.152
HS31	0.023	0.064	0.217	<0.004	0.019	0.139	1.34	3.83	10.04	<0.004	0.492	4.842
HS33	0.023	0.075	0.145	<0.004	0.006	0.012	1.33	3.59	6.52	<0.004	0.038	0.239
HS34	0.015	0.068	0.376	<0.004	0.033	0.276	1.58	2.75	5.59	<0.004	0.008	0.019
HS35	0.007	0.055	0.299	<0.004	0.030	0.257	1.47	3.08	5.55	<0.004	0.011	0.022
HS36	0.017	0.069	0.506	<0.004	0.005	0.009	1.62	2.76	4.38	<0.004	0.009	0.024

SECTION 16

WATER CONSERVATION AREA INFLOWS AND OUTFLOWS
PROJECT CODE: CAMB

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 that receive waters from a variety of land uses, such as; agricultural, native and improved pastures, and urban and rural communities. The water quality monitoring program provides a water quality and nutrient loading data base for:

1. Complying with monitoring requirements of the Everglades National Park (TENP) 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 and Seminole Indian Tribes 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 Department of Environmental Protection "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 at a few stations back to 1973. These data can indicate trends in the changes in water quality, allow for better management of the system, and monitor for environmental enhancement or degradation. Values that deviate significantly from established criteria may signal a concern requiring immediate attention.

Sampling Locations and Descriptions

The locations of the 59 sites monitored under this program are shown in Figures 21 and 22. Table 47 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 48 and 49 contain statistics for each monitoring location.

District Publications

Gleason, P. (1974). Chemical Quality of Water in Conservation Area 2A and Associated Canals. SFWMD,Tech. Pub. No. 74-1.

Lutz, J. (1977). Water Quality and Nutrient Loadings of the Major Inflows from the Everglades Agricultural Area to the Conservation Areas, Southeast Florida. SFWMD, Tech. Pub. No. 77-6.

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.

Swift, D.R. (1981). Preliminary Investigation of Periphyton and Water Quality Relationships in the Everglades Water Conservation Areas. SFWMD, Tech. Pub. No. 81-5.

Swift, D.R. and R. Nicholas. (1987). Periphyton and Water Quality Relationships in the Everglades Water Conservation Areas. SFWMD, Tech. Pub. No. 87-2.

Water Chemistry Div. (1984). North New River Backpumping Water Quality Impact Study Report No.1, Preconstruction and Initial Operation. SFWMD, Tech. Memo. March 1984.

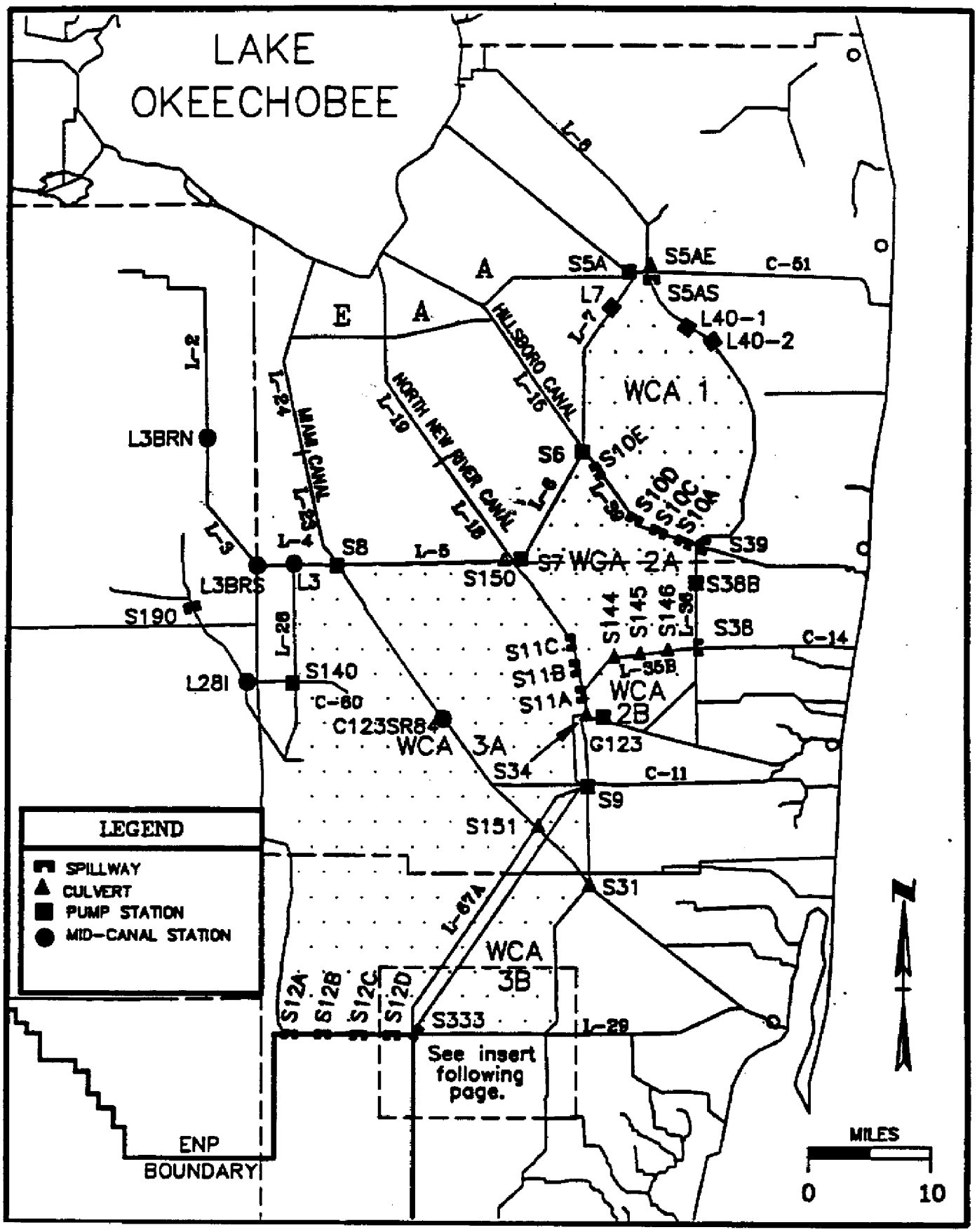

FIGURE 22. Location of Sampling Stations for the Water conservation Area inflow/Outflow Water Quality Monitoring program

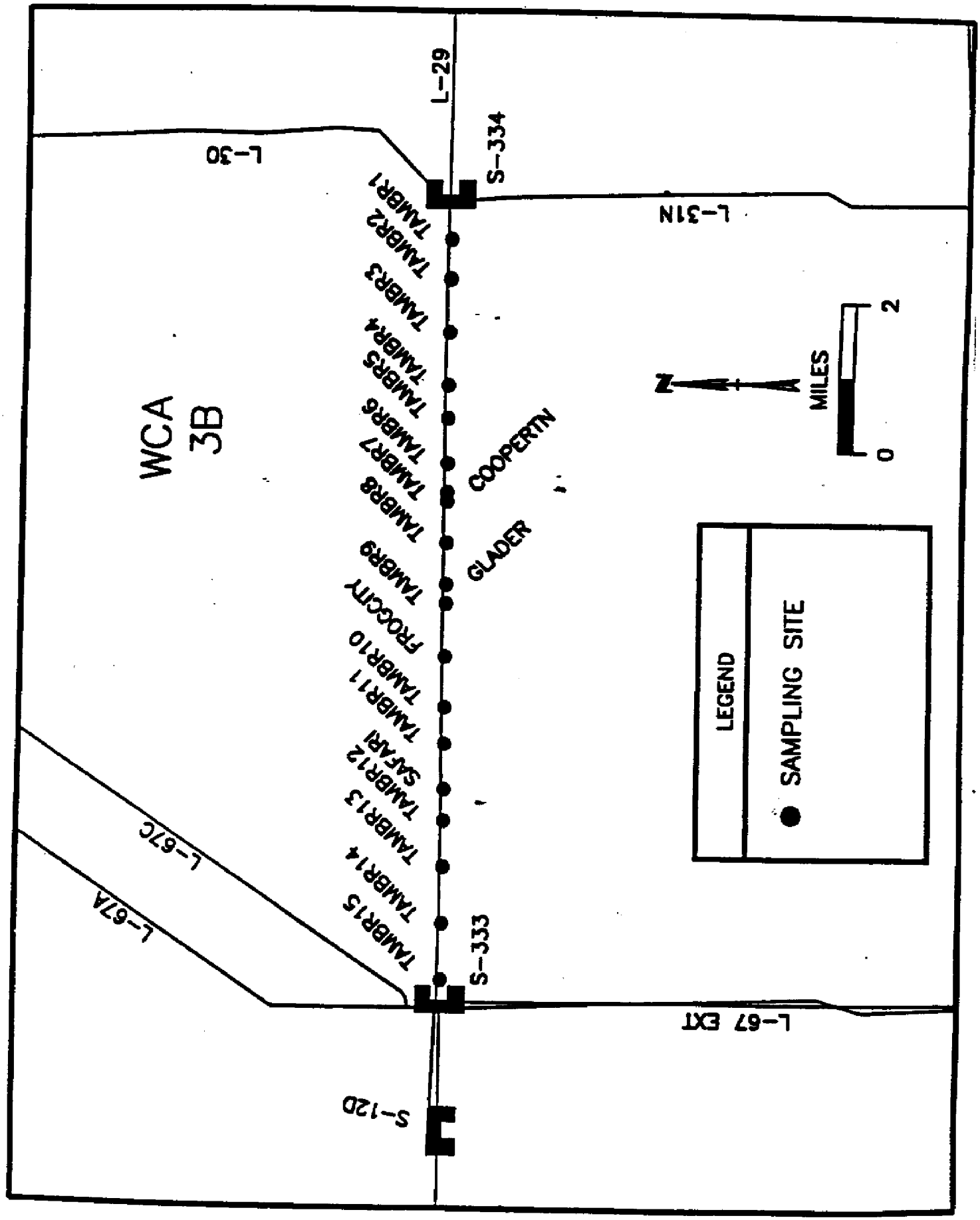

FIGURE 23. Location of Sampling Stations for the Water conservation Area Inflow/Outflow Water Quality Monitoring Program

TABLE 47. Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S5A	264101	802205	A District controlled water pumping station located at the northern most end of WCA1 near State Road 80. S-5A pumps water from the EAA, L-8, and the C-51 basin into WCA1.	1974 - P	BWF/M	W/BWF/M	QTR	BA	US	G/A
S5AS	264101	802151	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.	1979 - P	BWF	BWF	QTR	BA	US	G
S5AE	264104	802150	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 can flow either east or west through this structure.	1982 - P	BWF	BWF	QTR	BA	US	G
S6	262822	802650	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 into WCA1.	1974 - P	BWF/M	W/BWF/M	QTR	BA	US	G/A
S7	262007	803213	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-27. Water is pumped in a southerly direction down the North New River Canal into WCA2. There is also a sluice gate that can be open to let water gravity flow northward.	1974 - P	BWF/M	W/BWF/M	QTR	BA	US	G/A
S8	261953	804628	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 into WCA3. There is also a sluice gate that can be opened to let water gravity flow northward.	1973 - P	BWF/M	W/BWF/M	QTR	BA	US	G/A

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S9	260340	802638	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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S10A	262133	801846	These are all gate type structures located along L-39 between	1978 - P	BWF	BWF	QTR	BA	US	G
S10C	262216	802110	WCA1 and WCA2A on the Hillsboro Canal. S10A,S10C, and	1978 - P	BWF	BWF	QTR	BA	US	G
S10D	262317	802256	S10D are one, three, and six miles west of S-39 on L-39,	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S10E	262733	802614	respectively. S10E is about 100 yards east of S6 on L-39. Water flows from WCA1 into WCA2A through these structures.	1985 - P	BWF	BWF	QTR	BA	US	G
S11A	261036	802656	These are gate type structures located along US-27 beginning	1978 - P	BWF	BWF	QTR	BA	US	G
S11B	261208	802716	approximately two miles north of State Road 84, and are spaced	1978 - P	BWF	BWF	QTR	BA	US	G
S11C	261345	802737	approximately two miles apart. Water flows from WCA2A into WCA3A through these structures.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S34	260858	802634	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.	1978 - P	BWF	BWF	QTR	BA	US	G
S38	261344	801756	A small gate type structure located on the east side of WCA2A at the intersection of L-36 and L-35B seven miles west of State Road 7, water flows eastward into C-14 canal.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S39	262119	801752	A small gate type structure located at the south end of WCA1 at the intersection of L-36 L-39, and L-40 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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S144	261304	802353	These are all single gated culverts 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.	1978 - P	BWF	BWF	QTR	BA	US	G
S145	261317	802158		1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S146	261330	802001		1978 - P	BWF	BWF	QTR	BA	US	G
S150	262004	803223	A series of gated culverts located west of S-7 across US-27. Water flows southward through this structure into WCA3A.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
L3	261952	804956	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 into WCA3A.	1978 - P	BWF/M	BWF/M	QTR	BA	-	G
L3BRN	262600	805650	This sample is collected from the Deer Fence Canal bridge on L-3, which is the second wooden bridge north along L-3. Water flows in a southerly direction at this point.	1984 - P	BWF/M	BWF/M	QTR	BA	-	G
L28I	260954	804943	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.	1978 - P	BWF	BWF	QTR	BA	-	G
S140	261017	804940	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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S151	260040	803037	A series of gated culvert 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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S333	254542	804027	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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S12D	254542	804055	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.	1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S12C	254542	804338		1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S12B	254541	804611		1978 - P	BWF/M	BWF/M	QTR	BA	US	G
S12A	254541	804917		1978 - P	BWF/M	BWF/M	QTR	BA	US	G
G123	260859	802634	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.	1982 - P	BWF	BWF	QTR	BA	US	G
S31	255633	802625	A series of gated culverts located on the east side of WCA3A on the Miami Canal near US-27. Water flows southeast through this structure down the Miami Canal.	1987 - P	BWF/M	BWF/M	QTR	BA	US	G
S190	261701	805805	A gate type structure located on the L-28 Intercepter Canal about 2 1/2 miles south of State Road 833 along the north feeder canal that leads into the L-28 Intercepter Canal, which is located within the Big Cypress Seminole Indian Reservation.	1987 - P	BWF/M	BWF/M	QTR	BA	US	G
L3BRS	261950	805253	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.	1987 - P	BWF/M	BWF/M	QTR	BA	-	G

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
L40-1	263629	801717	Pump stations on the NE side of WCA-1 owned by the Acme Improvement District. L40-1 pumps water into WCA-1. L40-2 can pump water into WCA-1 or take water out of WCA-1 for irrigation.	78-80,89-P	BWF/M	BWF/M	QTR	BA	US	G
L40-2	263535	801617		78-80,89-P	BWF/M	BWF/M	QTR	BA	US	G
L7	263827	802432	A series of gated culverts located on the NW side of WCA-1. The water samples are collected from the WCA-1 side of the culverts. Water flows out of WCA-1 through this structure.	78-80,89-P	BWF/M	BWF/M	QTR	BA	US	G
S38B	261700	801752	A set of four culverts under the L-36 levee half way between S-38 and S-39. The water samples are collected from the WCA-2A side of the culverts.	1990 - P	BWF	BWF	QTR	BA	US	G
C123SR84	260845	803758	This sample is collected from the Miami Canal where it crosses under State Road 84. Water flows in a southerly direction at this point.	1988 - P	BWF/M	BWF/M	QTR	BA	-	G

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Total Phosphorus	G/A
TAMBR1	254538	803023	Culvert under US Highway 41, 0.3 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR2	254538	803053	Culvert under US Highway 41, 0.8 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR3	254538	803134	Culvert under US Highway 41, 1.5 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR4	254538	803215	Culvert under US Highway 41, 2.2 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR5	254538	803241	Culvert under US Highway 41, 2.7 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR6	254538	803317	Culvert under US Highway 41, 3.3 miles west of District spillway S-334.	1991-P	WF	WF	G
COOPERTN	254538	803340	Culvert under US Highway 41, 3.7 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR7	254538	803347	Culvert under US Highway 41, 3.85 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR8	254538	803420	Culvert under US Highway 41, 4.4 miles west of District spillway S-334	1991-P	WF	WF	G
GLADER	254538	803453	Culvert under US Highway 41, 5.0 miles west of District spillway S-334.	1991-P	WF	WF	G

TABLE 47 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Water Conservation Areas Inflows/Outflows Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Total Phosphorus	G/A
TAMBR9	254538	803508	Culvert under US Highway 41, 5.3 miles west of District spillway S-334.	1991-P	WF	WF	G
FROGCITY	254538	803550	Culvert under US Highway 41, 6.0 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR10	254538	803630	Culvert under US Highway 41, 6.7 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR11	254538	803659	Culvert under US Highway 41, 7.2 miles west of District spillway S-334.	1991-P	WF	WF	G
SAFARI	254538	803735	Culvert under US Highway 41, 7.9 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR12	254538	803800	Culvert under US Highway 41, 8.35 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR13	254538	803836	Culvert under US Highway 41, 8.95 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR14	254538	803920	Culvert under US Highway 41, 9.7 miles west of District spillway S-334.	1991-P	WF	WF	G
TAMBR15	254538	804004	Culvert under US Highway 41, 10.5 miles west of District spillway S-334.	1991-P	WF	WF	G

TABLE 48. Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program for Period of Record

SFWMD

Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S5A	0.026	0.162	0.581	<0.002	0.094	0.524	0.73	5.60	18.68	0.010	1.877	12.156
S5AS	0.030	0.163	0.456	<0.002	0.102	0.397	0.80	3.54	12.09	<0.004	0.527	4.787
S5AE	0.023	0.115	0.560	<0.004	0.061	0.376	0.87	2.37	6.13	0.010	0.352	2.684
S6	<0.002	0.092	0.872	<0.002	0.054	0.849	0.60	4.21	17.04	<0.004	0.959	10.313
S7	0.006	0.074	1.030	<0.002	0.041	0.922	0.88	3.37	10.67	<0.004	0.888	6.660
S8	0.005	0.101	0.933	<0.002	0.045	0.596	0.76	3.18	17.40	<0.004	0.845	8.900
S9	<0.002	0.018	0.172	<0.002	0.006	0.100	0.51	1.99	8.71	<0.003	0.061	0.834
S10A	0.007	0.064	0.162	<0.002	0.032	0.146	0.78	2.82	11.54	<0.004	0.411	6.043
S10C	0.010	0.131	3.435	<0.002	0.073	1.290	0.77	3.83	22.84	<0.004	0.652	5.083
S10D	0.008	0.120	1.347	<0.002	0.072	1.274	1.16	3.68	14.73	<0.004	0.629	6.330
S10E	0.032	0.136	0.484	<0.004	0.064	0.188	1.64	3.63	7.67	<0.004	0.474	3.227
S11A	<0.003	0.029	0.192	<0.002	0.011	0.163	0.91	2.30	6.29	<0.004	0.146	1.460
S11B	<0.002	0.051	0.446	<0.002	0.027	0.412	1.22	2.57	6.23	<0.004	0.333	3.185
S11C	0.007	0.058	0.556	<0.002	0.027	0.345	1.00	2.56	6.96	<0.004	0.360	4.405
S34	<0.002	0.020	0.112	<0.002	0.004	0.040	1.29	2.30	6.02	<0.004	0.086	1.225
S38	<0.002	0.023	0.132	<0.002	0.006	0.068	0.75	2.33	7.65	<0.004	0.076	2.102
S39	0.008	0.061	0.280	<0.002	0.024	0.238	0.57	2.64	10.96	<0.004	0.229	5.945
S144	<0.002	0.020	0.148	<0.002	0.006	0.053	0.44	2.44	9.61	<0.004	0.083	2.267
S145	<0.002	0.017	0.122	<0.002	0.006	0.097	1.11	2.28	6.01	<0.004	0.082	2.691
S146	<0.002	0.018	0.101	<0.002	0.006	0.040	0.80	2.26	4.90	<0.004	0.055	0.871
S150	0.008	0.064	0.202	<0.002	0.032	0.130	0.99	2.90	7.85	<0.004	0.604	5.349
L3	<0.002	0.103	0.860	<0.002	0.057	0.586	0.62	1.78	5.93	<0.004	0.094	3.447
L3BRN	0.018	0.107	0.485	<0.004	0.049	0.206	<0.50	1.56	3.09	<0.004	0.092	1.191
L3BRS	0.033	0.116	0.514	<0.004	0.066	0.359	0.64	1.44	2.32	<0.004	0.120	1.028
L28I	0.012	0.054	0.666	<0.002	0.020	0.472	0.10	1.37	3.62	<0.004	0.036	0.804

TABLE 48 (Continued). Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
S140	0.008	0.074	0.688	<0.002	0.034	0.501	0.52	1.68	7.30	<0.004	0.081	5.463
S151	0.005	0.030	0.171	<0.002	0.009	0.093	0.69	2.11	5.05	<0.004	0.157	2.089
S333	0.003	0.019	0.167	<0.002	0.006	0.077	0.75	1.85	5.80	<0.004	0.110	1.851
S12D	<0.002	0.018	0.132	<0.002	0.005	0.061	0.29	1.82	5.41	<0.004	0.096	2.480
S12C	<0.002	0.017	0.142	<0.002	0.005	0.068	0.52	1.71	9.13	<0.004	0.071	2.091
S12B	<0.002	0.018	0.593	<0.002	0.005	0.057	0.35	1.60	5.53	<0.004	0.044	1.541
S12A	<0.002	0.020	0.253	<0.002	0.005	0.072	0.51	1.56	7.85	<0.004	0.025	0.495
G123	<0.004	0.020	0.080	<0.004	0.006	0.072	0.66	1.87	3.07	<0.004	0.089	0.600
S31	<0.004	0.028	0.141	<0.004	0.012	0.149	0.87	1.57	3.31	<0.004	0.106	1.836
S190	0.017	0.074	0.275	<0.004	0.033	0.168	0.58	1.28	2.41	<0.004	0.106	1.445
L40-1	0.011	0.060	0.299	<0.002	0.024	0.212	0.79	3.36	8.96	<0.004	0.456	4.245
L40-2	0.009	0.088	0.221	<0.002	0.042	0.137	0.88	3.39	9.36	<0.004	0.534	4.571
L7	0.006	0.090	1.415	<0.002	0.052	1.106	1.79	4.38	11.84	<0.004	0.207	5.503
S38B	0.011	0.020	0.045	<0.004	0.005	0.012	0.87	1.34	2.12	0.052	0.278	0.835
C123SR84	0.009	0.049	0.112	<0.004	0.012	0.040	0.80	1.63	5.30	<0.004	0.163	3.447

TABLE 48 (Continued). Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus	Total Nitrogen	Nitrite + Nitrate (NOX)
TAMBR1	0.005	0.017	0.039			
TAMBR2	<0.004	0.016	0.047			
TAMBR3	0.008	0.017	0.056			
TAMBR4	0.008	0.019	0.073			
TAMBR5	0.005	0.014	0.023			
TAMBR6	<0.004	0.012	0.017			
COOPERTN	0.006	0.015	0.034			
TAMBR7 *	-	-	-			
TAMBR8	0.006	0.012	0.019			
GLADER	0.006	0.015	0.026			
TAMBR9	0.011	0.013	0.014			
FROGCITY	0.009	0.012	0.015			
TAMBR10	0.009	0.012	0.017			
TAMBR11	0.006	0.017	0.055			
SAFARI	<0.004	0.015	0.037			
TAMBR12	0.008	0.013	0.016			
TAMBR13	0.010	0.014	0.022			
TAMBR14	0.010	0.014	0.018			
TAMBR15	0.013	0.024	0.041			

* = SAMPLES NEVER COLLECTED AT THIS SITE.

TABLE 49. 1989 - 1991 Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S5A	0.037	0.172	0.409	0.007	0.094	0.324	0.73	4.16	10.31	0.045	1.102	4.484
S5AS	0.030	0.127	0.342	<0.004	0.064	0.239	0.80	2.13	4.39	0.012	0.238	1.761
S5AE	0.058	0.125	0.344	0.022	0.068	0.289	0.98	2.16	4.53	0.010	0.400	1.742
S6	0.016	0.097	0.322	<0.004	0.056	0.218	1.04	2.96	6.36	<0.004	0.597	2.585
S7	0.015	0.077	0.309	<0.004	0.039	0.244	0.95	2.36	4.96	0.017	0.457	1.976
S8	0.030	0.084	0.418	<0.004	0.029	0.171	0.95	2.53	10.80	<0.004	0.706	5.293
S9	0.005	0.021	0.105	<0.004	0.006	0.021	0.68	1.58	2.53	<0.004	0.095	0.834
S10A	0.041	0.094	0.162	0.011	0.046	0.081	0.94	1.85	2.64	0.012	0.113	0.541
S10C	0.043	0.909	3.435	0.024	0.350	1.290	2.06	7.45	22.84	0.006	0.070	0.117
S10D	0.029	0.107	0.252	<0.004	0.044	0.206	1.41	2.83	7.00	0.005	0.305	3.192
S10E	0.088	0.165	0.484	0.020	0.069	0.165	2.21	3.66	7.67	0.008	0.294	0.923
S11A	0.006	0.029	0.192	<0.004	0.016	0.163	0.91	1.59	2.88	0.006	0.101	1.144
S11B	0.010	0.044	0.256	<0.004	0.026	0.218	1.22	1.79	3.10	0.007	0.136	1.446
S11C	0.009	0.070	0.556	<0.004	0.029	0.235	1.02	2.01	4.66	<0.004	0.205	2.099
S34	0.011	0.040	0.084	<0.004	0.007	0.026	1.49	1.76	2.18	0.020	0.192	0.408
S38	<0.004	0.036	0.132	<0.004	0.009	0.068	0.75	1.86	7.65	<0.004	0.078	0.808
S39	0.018	0.093	0.280	<0.004	0.035	0.238	1.20	2.25	7.70	<0.004	0.190	3.626
S144	0.006	0.009	0.011	<0.004	0.004	0.006	1.24	1.86	2.25	0.008	0.059	0.252
S145	0.005	0.009	0.014	<0.004	0.004	0.004	1.31	1.67	1.98	<0.004	0.079	0.427
S146	0.006	0.009	0.010	<0.004	0.004	0.004	1.15	1.66	2.08	0.006	0.019	0.063
S150	0.010	0.080	0.186	<0.004	0.040	0.124	1.02	2.30	4.53	0.024	0.494	1.721
L3	0.016	0.068	01161	<0.004	0.024	0.128	0.81	1.49	2.71	<0.004	0.110	1.137
L3BRN	0.022	0.094	0.485	<0.004	0.040	0.130	<0.50	1.42	3.09	<0.004	0.156	1.191
L3BRS	0.033	0.092	0.241	<0.004	0.045	0.141	0.80	1.39	2.23	<0.004	0.142	1.028
L28I	0.021	0.051	0.172	<0.004	0.011	0.069	0.62	1.10	1.73	<0.004	0.053	0.804
S140	0.009	0.033	0.108	<0.004	0.008	0.028	0.52	1.35	2.26	<0.004	0.084	1.246

TABLE 49 (Continued). 1989 - 1991 Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S151	0.009	0.049	0.166	<0.004	0.015	0.093	0.96	1.84	3.99	0.008	0.287	1.886
S333	<0.004	0.019	0.050	<0.004	0.005	0.018	0.86	1.58	2.41	0.005	0.097	0.342
S12D	<0.004	0.021	0.059	<0.004	0.005	0.003	0.98	1.54	2.38	0.006	0.087	0.508
S12C	<0.004	0.020	0.048	<0.004	0.005	0.027	0.52	1.43	2.03	<0.004	0.077	0.307
S12B	<0.004	0.020	0.057	<0.004	0.005	0.012	0.75	1.47	2.54	<0.004	0.071	0.516
S12A	<0.004	0.026	0.103	<0.004	0.005	0.011	0.51	1.44	3.70	<0.004	0.053	0.289
G123	0.009	0.020	0.080	<0.004	0.007	0.072	0.66	1.70	2.85	0.010	0.111	0.600
S31	<0.004	0.029	0.141	<0.004	0.012	0.116	0.90	1.48	3.31	<0.004	0.160	1.836
S190	0.017	0.069	0.275	<0.004	0.030	0.168	0.67	1.22	2.41	<0.004	0.153	1.445
L40-1	0.019	0.050	0.231	<0.004	0.015	0.179	0.79	2.33	6.55	0.043	0.301	4.245
L40-2	0.022	0.100	0.213	<0.004	0.041	0.137	0.88	2.01	3.85	0.007	0.173	1.288
L7	0.044	0.162	0.489	0.015	0.076	0.347	1.79	2.52	3.67	0.005	0.149	0.662
S38B	0.011	0.020	0.045	<0.004	0.005	0.012	0.87	1.34	2.12	0.052	0.278	0.835
C123SR84	0.009	0.048	0.112	<0.004	0.010	0.040	0.80	1.70	5.30	0.004	0.194	3.447
TAMBR1	0.005	0.017	0.039	-	-	-	-	-	-	-	-	-
TAMBR2	<0.004	0.016	0.047	-	-	-	-	-	-	-	-	-
TAMBR3	0.008	0.017	0.056	-	-	-	-	-	-	-	-	-
TAMBR4	0.008	0.019	0.073	-	-	-	-	-	-	-	-	-
TAMBR5	0.005	0.014	0.023	-	-	-	-	-	-	-	-	-
TAMBR6	<0.004	0.012	0.017	-	-	-	-	-	-	-	-	-
COOPERTN	0.006	0.015	0.034	-	-	-	-	-	-	-	-	-
TAMBR7 *	-	-	-	-	-	-	-	-	-	-	-	-
TAMBR8	0.006	0.012	0.019	-	-	-	-	-	-	-	-	-
GLADER	0.006	0.015	0.026	-	-	-	-	-	-	-	-	-
TAMBR9	0.011	0.013	0.014	-	-	-	-	-	-	-	-	-
FROGCITY	0.009	0.012	0.015	-	-	-	-	-	-	-	-	-

TABLE 49 (Continued). 1989 - 1991 Statistics for Select Parameters for the Water Conservation Areas Inflow/Outflow Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
TAMBR10	0.009	0.012	0.017	-	-	-	-	-	-	-	-	-
TAMBR11	0.006	0.017	0.055	-	-	-	-	-	-	-	-	-
SAFARI	0.005	0.015	0.037	-	-	-	-	-	-	-	-	-
TAMBR12	0.008	0.013	0.016	-	-	-	-	-	-	-	-	-
TAMBR13	0.010	0.014	0.022	-	-	-	-	-	-	-	-	-
TAMBR14	0.010	0.014	0.018	-	-	-	-	-	-	-	-	-
TAMBR15	0.013	0.024	0.041	-	-	-	-	-	-	-	-	-

* = Samples never collected at this site because of no flow.

SECTION 17

THE BISCAYNE BAY WATER QUALITY MONITORING PROGRAM

Purpose and Scope

The current Biscayne Bay water quality monitoring program consists of 89 fixed stations distributed throughout Biscayne Bay as defined in the Biscayne Bay SWIM plan and the major tributaries within its watershed. The program was established in 1979 by Dade County's Department of Environmental Resources Management (DERM). The District began funding the program in 1988 within the Biscayne Bay SWIM program in cooperation with Dade County. Prior to that time there were 48 monitoring stations located in saline waters. The SWIM program put greater emphasis on the contributions from the tributaries. Since 1988, 41 additional stations have been added to the canal network. In addition, some parameters were added to augment the existing set. The primary objectives of the program are:

1. Establishing and maintaining baseline water quality data for use in support of objectives No. 2 and 3 and providing reliable data to specialized and independent studies;

2. Determining geographical trends in water quality to characterize the system, determine loads and investigate sources. The results are heavily utilized to structure priorities and actions in the Biscayne Bay SWIM plan; and

3. Determining temporal trends in water quality for characterizing natural and anthropogenic influences over time and determine the effectiveness of management practices.

The collection and analysis of the samples are contractually done by DERM.

Sampling Locations and Descriptions

The locations of the 89 sites monitored under this program are shown in Figures 24 & 25. Table 50 lists all station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Table 51 contains statistics for each monitoring location.

District Publications

Biscayne Bay SWIM Plan. (1989). Planning Department, SFWMD.

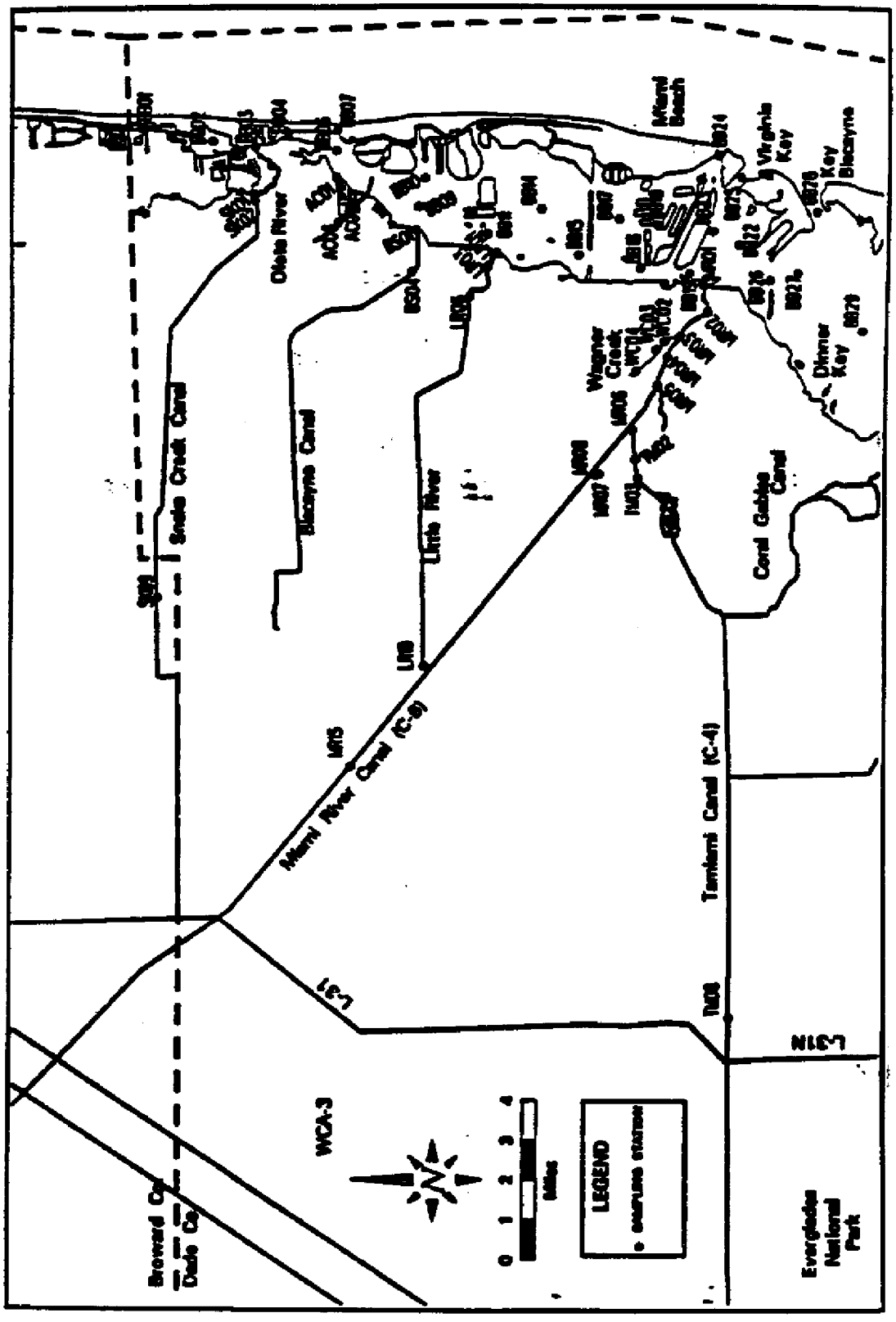

FIGURE 24. Location of Sampling Stations for the Biscayne Bay Water Quality Monitoring Program

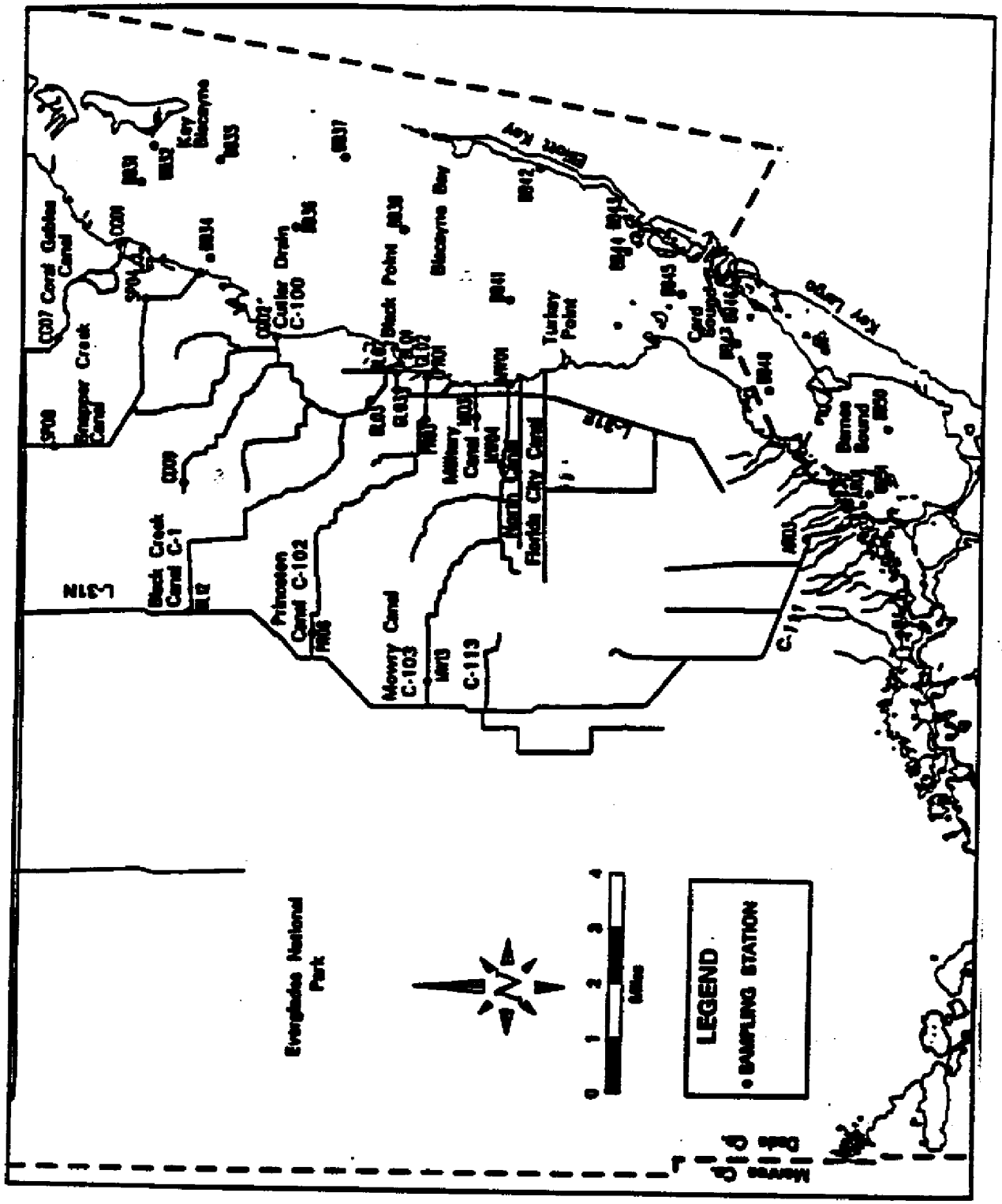

FIGURE 25. Location of Sampling Stations for the Biscayne Bay Water Quality monitoring Program

TABLE 50. Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
AC01	255400	800838	Mouth of New Arch Creek	1979-P	M	M	-	M	DS	G
AC02	255337	800915	Arch Creek southern mouth west of Bayshore Dr. bridge	1988-P	M	M	-	M	DS	G
AC03	255358	800941	Arch Creek south side of foot bridge at Enchanted Forest Park	1988-P	M	M	B	M	US	G
AR01	251523	802515	Mouth of Aerojet Canal (C-111)	1989-P	M	M	B	M	DS	G
AR03	251725	802640	East side of U.S. 1 bridge on Aerojet Canal (C-111)	1989-P	M	M	B	M	US	G
BB01	255808	800725	Intracoastal Waterway at Dade Broward line	1979-P	M	-	-	M	DS	G
BB02	255638	800745	Intracoastal Waterway at green marker no. 49; Near center of Dumfoundling Bay	1979-P	M	M	B	M	DS	G
BB03	255543	800754	Mouth of Oleta River at Intracoastal Waterway	1979-P	M	-	-	M	DS	G
BB04	255501	800737	Intracoastal Waterway at red marker no. 4	1979-P	M	M	-	M	DS	G
BB06	255400	800759	Intracoastal Waterway at red marker no. 8	1979-P	M	M	-	M	DS	G
BB07	255358	800730	Thirty meters west of A1A bridge in Haulover Inlet	1979-P	M	-	-	M	DS	G
BB09	255215	800922	Intracoastal Waterway at red marker no. 18	1979-P	M	M	-	M	DS	G
BB10	255207	800842	West of Biscayne Point at red marker no. 2	1979-P	M	-	-	M	DS	G
BB11	255047	801001	Ten meters south of Pelican Harbor Park pier	1979-P	M	-	-	M	DS	G
BB14	254938	800927	North of Julia Tuttle Causeway; 2 km. east of Intracoastal Waterway green marker no. 31	1979-P	M	M	B	M	DS	G
BB15	254851	801032	Intracoastal Waterway at green marker no. 39	1979-P	M	-	-	M	DS	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
BB16	254733	801051	Intracoastal Waterway at green marker no. 45	1979-P	M	-	-	M	DS	G
BB17	254801	800943	Midway between Julia Tuttle Causeway and San Marino Is.; 1 km. north of San Marino Is.	1979-P	M	M	-	M	DS	G
BB18	254711	800951	Midway between San Marino Island and Hibiscus Island	1979-P	M	-	-	M	DS	G
BB19	254630	801059	Intracoastal Waterway thirty meters south of Dodge Island bridge	1979-P	M	-	-	M	DS	G
BB22	254527	801020	Midway between Miami Marine Stadium and NOAA slip at Dodge Island ; 1.4 km. east of Intracoastal Waterway green marker no. 67	1979-P	M	M	B	M	DS	G
BB23	254600	801000	Fisherman's Channel green marker no.13	1979-P	M	-	-	M	DS	G
BB24	254553	800812	Miami Main Ship Channel red marker no. 16	1979-P	M	-	-	M	DS	G
BB25	254524	800844	Norris Cut midway between Virginia Key and Fisher Island	1979-P	M	-	-	M	DS	G
BB26	254447	801110	North side of Rickenbacker Causeway bridge and 30 meters west of Intracoastal Waterway	1979-P	M	-	-	M	DS	G
BB27	254411	801100	Intracoastal Waterway green marker no. 71	1979-P	M	M	-	M	DS	G
BB28	254347	800934	Bear Cut thirty meters west of center bridge span	1979-P	M	-	-	M	DS	G
BB29	254247	801222	Dinner Key Channel green marker no. 1	1979-P	M	M	-	M	DS	G
BB31	254134	801228	Midway (3 km.) east from mouth of Coral Gables Waterway to Key Biscayne	1979-P	M	M	B	M	DS	G
BB32	254106	801102	West of Cape Florida at red channel marker no. 4	1979-P	M	-	-	M	DS	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
BB34	253902	801530	Two kilometers east of mouth of Snapper Creek (C-2)	1979-P	M	-	-	M	DS	G
BB35	253842	801139	West of Safety Valve shoals at green marker no. 1	1979-P	M	M	-	M	DS	G
BB36	253557	801415	At mid bay red marker no. 2	1979-P	M	M	-	M	DS	G
BB37	253412	801130	West of Ragged Keys at green marker no. 1B	1979-P	M	-	-	M	DS	G
BB38	253202	801420	At southern entrance to the Featherbed Bank channel at marker no. 5	1979-P	M	M	-	M	DS	G
BB41	252812	801706	Entrance to Turkey Point Channel; marker no. 1	1979-P	M	M	-	M	DS	G
BB42	261643	801134	Fifty meters west of entrance to Elliott Key Harbor	1979-P	M	-	-	M	DS	G
BB43	252343	801402	Caesar's Creek mid channel opposite Adams Key Park Service pier	1979-P	M	-	-	M	DS	G
BB44	252359	801510	Intracoastal Waterway at red marker no.8	1979-P	M	M	-	M	DS	G
BB45	252203	801652	Intracoastal Waterway at Cutter Bank red marker no. 14	1979-P	M	-	-	M	DS	G
BB46	252002	801614	Angelfish Creek at red channel marker no. 10	1979-P	M	-	-	M	DS	G
BB47	251959	801848	Center of Card Sound four kilometers south of Cutter Bank	1979-P	M	M	B	M	DS	G
BB48	251848	802040	Intracoastal Waterway in Card Bank Channel at green marker no. 17	1979-P	M	-	-	M	DS	G
BB50	251430	802210	Barnes Sound Intracoastal Waterway midway between Card Sound bridge and Jewfish Creek	1989-P	M	M	-	M	DS	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
BB51	251510	802450	Center of Manatee Bay 500 meters north of Aerojet Channel	1989-P	M	M	-	M	DS	G
BL01	253206	801934	Mouth of Black Creek (C-1) and Goulds Canal	1979-P	M	M	B	M	DS	G
BL02	253229	801948	Black Creek (C-1) at entrance bridge (S.W. 87 Ave.) to Black Point Marina	1988-P	M	M	-	M	DS	G
BL03	253310	802107	Black Creek (C-1) east side of 97 Ave. bridge	1988-P	M	M	B	M	US	G
BL12	253940	802950	Black Creek (C-1) east side of Krome Ave. (S.W. 177 Ave.) bridge	1991-P	M	M	B	M	US	G
BS01	255218	800955	Mouth of Biscayne Canal (C-8)	1979-P	M	M	B	M	DS	G
BS04	255224	801054	Biscayne Canal (C-8) at footbridge near N.W. 107 St.	1988-P	M	M	B	M	US	G
BS10	255512	801926	Biscayne Canal (C-8) east side of bridge of Palmetto Expressway access road	1991-P	M	M	B	M	US	G
CD02	253637	801836	Cutler Drain (C-100) east side of Old Cutler Road bridge	1990-P	M	M	B	M	US	G
CD09	253955	802430	Cutler Drain (C-100) east side of S.W. 134 Ave. bridge	1991-P	M	M	B	M	US	G
CG01	254211	801448	Mouth of Coral Gables Waterway (C-3)	1979-P	M	M	-	M	DS	G
CG07	254430	801840	Coral Gables Waterway (C-3) east side of S.W. 72 Ave.	1991-P	M	M	B	M	US	G
GL02	253213	801957	Goulds Canal just east of earthen plug	1988-P	M	M	-	M	DS	G
GL03	253212	802039	North side of bridge at Goulds Canal and L-31E confluence	1988-P	M	M	-	M	US	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
LR01	255035	801027	Northern mouth of Little River (C-7)	1979-P	M	M	B	M	DS	G
LR03	255046	801046	Little River (C-7) at the intersection of the northern and southern discharge points near Belle Mead Is.	1988-P	M	M	-	M	DS	G
LR06	255109	801128	Little River (C-7) east side of N.W. 2 Ave. bridge	1990-P	M	M	B	M	US	G
LR10	255209	802022	Little River (C-7) north side of Galloway Rd. (N.W. 87 Ave.) bridge	1991-P	M	M	B	M	US	G
MI03	252920	802145	Military Canal west side of S.W. 107 Ave. bridge	1988-P	M	M	B	M	US	G
MR02	254606	801152	Miami River thirty meters upstream of N.W. 2 Ave. bridge	1984-P	M	M	-	M	DS	G
MR03	254641	801226	Miami River midway between mouth of Wagner Creek and 5 St. bridge	1984-P	M	M	B	M	DS	G
MR04	254656	801255	Miami River thirty meters upstream of N.W. 12 Ave. bridge	1984-P	M	M	-	M	DS	G
MR05	254709	801336	Miami River thirty meters downstream of mouth of Comfort Canal (C-5)	1984-P	M	M	-	M	DS	G
MR06	254741	801440	Miami River thirty meters downstream from mouth of Tamiami Canal (C-4)	1984-P	M	M	B	M	DS	G
MR07	254824	801544	Miami River ten meters downstream of salinity control structure (S-26)	1984-P	M	M	-	M	DS	G
MR08	254829	801544	Miami Canal (C-6) east side of Le Jeune Rd. (N.W. 42 Ave.) bridge	1988-P	M	M	B	M	US	G
MR15	255343	802246	Miami Canal (C-6) west side of N.W. 138 St. bridge	1991-P	M	M	B	M	US	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
MW01	252809	802027	Mouth of Mowry Canal (C-103)	1979-P	M	M	-	M	DS	G
MW04	252825	802345	Mowry Canal (C-103) east side of S.W. 117 Ave. bridge	1991-P	M	M	B	M	US	G
MW13	253100	803235	Mowry Canal (C-103) east side of S.W. 217 Ave. bridge	1991-P	M	M	B	M	US	G
PR01	253107	802006	Mouth of Princeton Canal (C-102)	1990-P	M	M	-	M	DS	G
PR03	253110	802150	Princeton Canal (C-102) east side of S.W. 97 Ave. bridge	1991-P	M	M	B	M	US	G
PR08	253511	803040	Princeton Canal (C-102 west side of S.W. 197 Ave. bridge	1991-P	M	M	B	-	US	G
SK01	255545	800902	Mouth of Snake Creek (C-9)	1988-P	M	M	-	M	DS	G
SK02	255544	809010	Snake Creek (C-9) east side of Biscayne Blvd. bridge	1988-P	M	M	B	M	US	G
SK09	255750	801840	Snake Creek (C-9) east side of Ludlam Rd. (N.W. 67 Ave.) bridge	1991-P	M	M	B	M	US	G
SP01	253925	801606	Mouth of Snapper Creek (C-2)	1979-P	M	M	B	M	DS	G
SP04	254121	801705	Snapper Creek (C-2) south side of footbridge along Red Rd. (S.W. 57 Ave.) and south of Killian Dr. (S.W. 104 St.)	1991-P	M	M	B	M	US	G
SP08	254436	802304	Snapper Creek (C-2) west side of Snapper Creek Canal Dr. bridge	1991-P	M	M	B	M	US	G
TM02	254738	801523	Tamiami Canal (C-4) east side of Douglas Rd. (N.W. 37 Ave.) bridge	1988-P	M	M	-	M	DS	G

TABLE 50 (Continued). Summary of Sampling Locations and Frequency of Collection for the Biscayne Bay Water Quality Monitoring Program.

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Metals	Bacteria	US/DS	G/A
TM03	254735	801551	Tamiami Canal (C-4) east side of Le Jeune Rd. (N.W. 42 Ave.) bridge	1988-P	M	M	B	M	US	G
TM08	254539	802852	Tamiami Canal (C-4) west side of Krome Ave. (S.W. 177 Ave.) bridge	1991-P	M	M	B	M	US	G
WC02	254701	801233	Mouth of Seybold Canal	1987-P	M	M	-	M	DS	G
WC03	254711	801244	Wagner Creek south side of N.W. 14th St. bridge	1988-P	M	M	-	M	DS	G
WC04	254737	801315	Wagner Creek south side of N.W. 20th St. bridge	1988-P	M	M	B	M	DS	G

TABLE 51. Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
AC01	<0.001	0.013	0.054	<0.01	0.06	0.40
AC02	0.003	0.019	0.073	<0.01	0.10	0.29
AC03	0.003	0.171	0.925	<0.01	0.08	0.30
AR01	0.003	0.010	0.040	<0.01	0.03	0.12
AR03	0.003	0.007	0.030	<0.01	0.06	0.25
BB01	0.006	0.033	0.122	-	-	-
BB02	0.002	0.020	0.065	<0.01	0.10	2.40
BB03	0.002	0.022	0.054	-	-	-
BB04	0.001	0.015	0.057	<0.01	0.04	0.25
BB06	<0.001	0.011	0.046	<0.01	0.03	0.20
BB07	0.001	0.012	0.115	-	-	-
BB09	<0.001	0.014	0.063	<0.01	0.03	0.20
BB10	0.001	0.013	0.102	-	-	-
BB11	0.001	0.013	0.045	-	-	-
BB14	<0.001	0.010	0.063	<0.01	0.02	0.20
BB15	0.001	0.012	0.238	-	-	-
BB16	0.001	0.009	0.080	<0.01	0.04	0.13
BB17	<0.001	0.011	0.053	<0.01	0.03	0.20

TABLE 51 (Continued). Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
BB18	0.001	0.008	0.020	-	-	-
BB19	<0.001	0.009	0.066	-	-	-
BB22	<0.001	0.010	0.055	<0.01	0.02	0.17
BB23	0.001	0.008	0.020	-	-	-
BB24	<0.001	0.008	0.030	-	-	-
BB25	0.001	0.008	0.023	-	-	-
BB26	0.001	0.010	0.059	-	-	-
BB27	<0.001	0.010	0.075	<0.01	0.03	0.27
BB28	0.001	0.008	0.060	-	-	-
BB29	0.001	0.007	0.082	<0.01	0.03	0.14
BB31	<0.001	0.007	0.050	<0.01	0.02	0.35
BB32	<0.001	0.008	0.062	<0.01	0.01	0.02
BB34	<0.001	0.008	0.074	<0.01	0.02	0.22
BB35	<0.001	0.008	0.045	<0.01	0.02	0.23
BB36	<0.001	0.007	0.039	<0.01	0.03	0.40
BB37	<0.001	0.007	0.052	-	-	-
BB38	<0.001	0.008	0.066	<0.01	0.02	0.18
BB41	<0.001	0.008	0.058	<0.01	0.04	0.34

TABLE 51 (Continued). Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
BB42	0.001	0.006	0.025	-	-	-
BB43	<0.001	0.008	0.168	-	-	-
BB44	<0.001	0.008	0.039	<0.01	0.02	0.22
BB45	<0.001	0.006	0.041	-	-	-
BB46	<0.001	0.007	0.023	-	-	-
BB47	0.001	0.008	0.044	<0.01	0.03	0.48
BB48	0.001	0.007	0.045	0.02	0.03	0.03
BB50	0.001	0.005	0.020	<0.01	0.01	0.12
BB51	0.001	0.005	0.020	<0.01	0.02	0.20
BL01	0.001	0.018	0.110	<0.01	0.07	0.48
BL02	0.001	0.015	0.049	<0.01	0.06	0.29
BL03	0.001	0.013	0.055	<0.01	0.08	0.30
BL12	0.011	0.021	0.040	<0.01	0.03	0.10
BS01	0.001	0.018	0.060	<0.01	0.05	0.42
BS04	0.005	0.027	0.090	<0.01	0.26	1.80
BS10	0.010	0.023	0.040	<0.01	0.27	0.40
CD02	0.003	0.016	0.036	<0.01	0.07	0.37

TABLE 51 (Continued). Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
CD09	0.008	0.020	0.040	<0.01	0.10	0.23
CG01	<0.001	0.012	0.054	<0.01	0.04	0.29
CG07	0.020	0.052	0.080	<0.01	0.18	0.76
GL02	0.009	0.027	0.079	<0.01	0.09	0.70
GL03	0.003	0.014	0.042	0.01	1.37	3.70
LR01	<0.001	0.017	0.072	<0.01	0.05	0.26
LR03	0.003	0.024	0.058	<0.01	0.10	0.40
LR06	0.010	0.038	0.066	<0.01	0.43	3.60
LR10	0.006	0.017	0.040	<0.01	0.08	0.20
MI03	0.003	0.021	0.100	<0.01	0.50	1.78
MR01	<0.001	0.015	0.097	<0.01	0.04	0.27
MR02	<0.001	0.024	0.072	<0.01	0.11	0.40
MR03	0.003	0.027	0.080	<0.01	0.13	0.52
MR04	<0.001	0.028	0.072	<0.01	0.13	0.52
MR05	0.005	0.029	0.080	<0.01	0.13	0.57
MR06	0.010	0.036	0.200	<0.01	0.12	0.37
MR07	0.011	0.038	0.128	<0.01	0.08	0.47

TABLE 51 (Continued). Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
MR08	0.003	0.020	0.047	<0.01	0.13	0.40
MR15	0.004	0.017	0.030	<0.01	0.05	0.12
MW01	0.002	0.013	0.079	0.04	0.19	1.16
MW04	0.004	0.014	0.020	1.60	1.99	3.10
MW13	0.010	0.018	0.030	<0.01	0.21	0.79
PR01	0.003	0.020	0.100	<0.01	0.97	2.80
PR03	0.005	0.013	0.020	2.70	3.58	4.20
PR08	0.014	0.022	0.030	<0.01	0.52	2.81
SK01	0.003	0.021	0.076	<0.01	0.11	0.37
SK02	0.003	0.017	0.043	<0.01	0.20	0.51
SK09	0.009	0.016	0.030	<0.01	0.08	0.18
SP01	<0.001	0.012	0.053	<0.01	0.04	0.44
SP04	0.009	0.018	0.037	0.03	0.17	0.30
SP08	0.006	0.028	0.124	<0.01	0.09	0.22
TM02	<0.001	0.027	0.071	<0.01	0.13	0.50
TM03	0.002	0.022	0.121	<0.01	0.18	0.60
TM08	0.007	0.016	0.040	<0.01	0.06	0.10

TABLE 51 (Continued). Statistics for Select Parameters From the Biscayne Bay Water Quality Monitoring Program for Period of Record.

SFWMD Sta. ID	Total Phosphate Phosphorus			Nitrite + Nitrate (NO_x)		
	MIN	MEAN	MAX	MIN	MEAN	MAX
WC02	0.013	0.062	0.158	<0.01	0.10	0.29
WC03	0.007	0.098	0.381	<0.01	0.09	0.70
WC04	0.005	0.233	0.790	<0.01	0.08	1.22

SECTION 18

EVERGLADES NATIONAL PARK
PROJECT CODES: ENP and EVER

Purpose and Scope

The Everglades National Park (TENP) water quality monitoring programs were established to address the quality of water entering and leaving TENP as well as the interior of TENP. 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 TENP through water control structures along L-67A, L-31W and C-111. In October 1985, the District agreed to take over the responsibility for analyzing the samples collected from the interior of TENP. The collection of the water samples from the interior of TENP are collected by TENP personnel. All appropriate sampling supplies are provided by the District.

These water quality monitoring programs provide a water quality and nutrient loading data base for:

1. Determining long and short term trends necessary to identify the downstream impacts of the Lake Okeechobee Technical Advisory Committee (LOTAC) / Surface Water Improvement and Management (SWIM) plan implementation for the Everglades Agricultural Area.

2. 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."

3. Comparing standards that were established for inflow water quality to TENP. These standards are based on historical (1970-1978) average annual concentrations. At least annually, the District, TENP, 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 TENP shall be taken by the COE, National Park Service, and the District." The data analyzed by the District are forwarded to TENP and the COE on a monthly basis.

Sampling Locations and Descriptions

The locations of the sites monitored under these programs are shown on Figures 26 and 27. Project ENP consists of seven inflow/outflow sites, and project EVER consists of nine interior sites. There are 10 additional watershed monitoring sites associated with this program, these are; S-12D, S-12B, S-333, L3BRN, L-28I, S-140, S-11C, S-7, S-8, and S-9 which are shown on Figure 22, and are described in Section 16. Table 52 and 53 list all the station ID's, latitudes and longitudes, brief station descriptions, the period of record, the frequency of collection for each parameter group, whether the sample is collected upstream or downstream, and type of sample collection. Tables 54 through 57 contain statistics for each monitoring location.

District Publications

Everglades SWIM Plan. (1990), Planning Department, SFWMD.

Lake Okeechobee Monitoring and Research Plan. (1986), FDEP.

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

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.

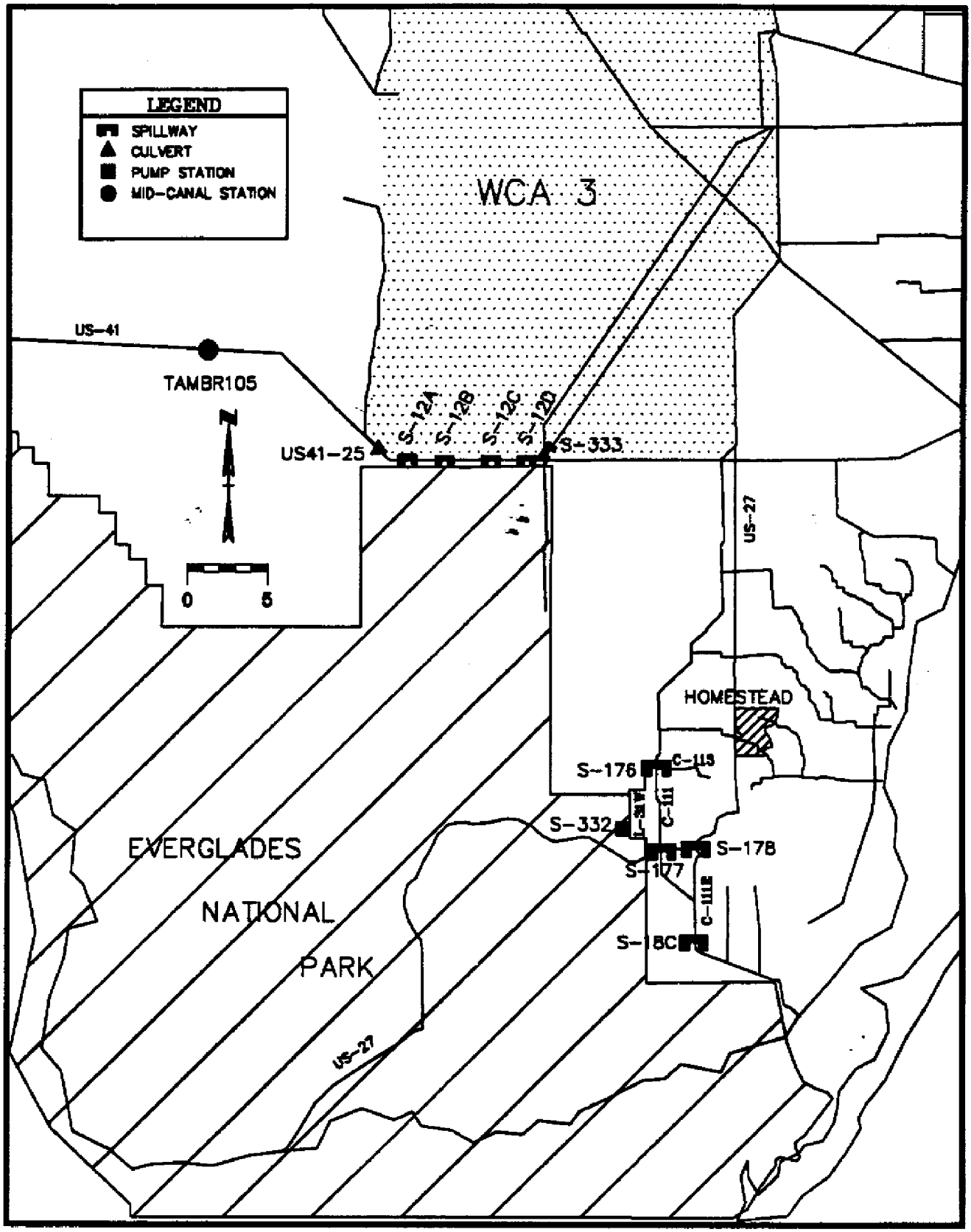

FIGURE 28. Location of the Inflow/Outflow Sampling Stations for the Everglades National Park Water Quality Monitoring Program

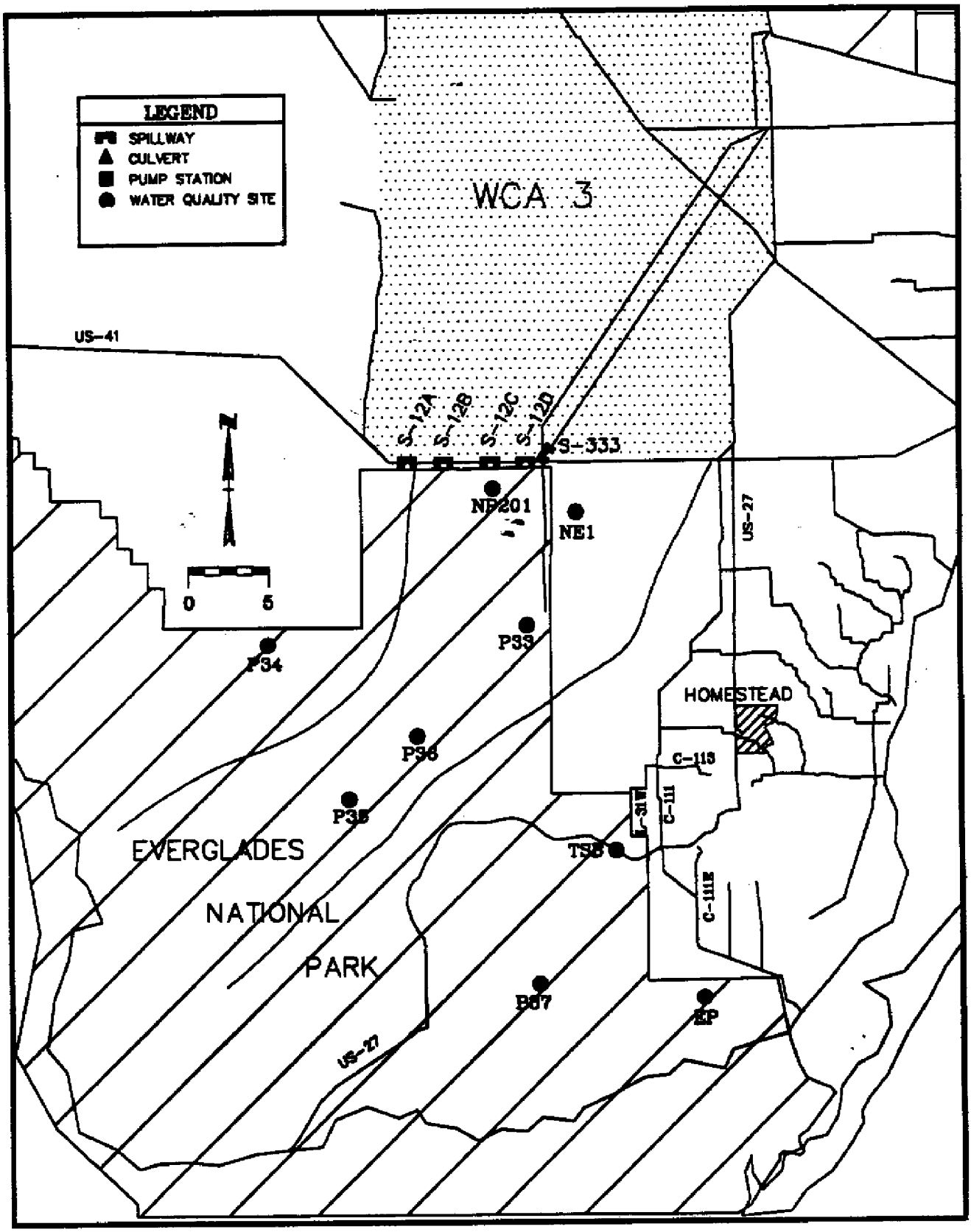

FIGURE 27. Location of the Interior Sampling Stations for the Everglades National Park Water Quality Monitoring Program

TABLE 52. Summary of Sampling Station Locations and Frequency of Collection for the Everglades National Park (ENP) Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	US/DS	G/A
S18C	251950	803203	A gate type structure located on C-111 south of SR-27. The water flows southward through this structure.	1983 - P	BWF/M	BWF/M	BWF/M	M	US	G
S176	252855	803345	A gate type structure located at the head of the C-111 immediately upstream of C-113 north of Homestead. Water flows southward through this structure.	1983 - P	BWF/M	BWF/M	BWF/M	BA	US	G
S177	252407	803329	A gate type structure located on C-111 and US-27 west of Homestead. The water flows southward through this structure.	1983 - P	BWF/M	BWF/M	BWF/M	BA	US	G
S178	252427	803127	A gate type structure located at the head of C-111E and US-27 southwest of Homestead. The water flows southward through this structure.	1983 - P	BWF/M	BWF/M	BWF/M	BA	US	G
S332	252524	803524	A District controlled water pumping station located on the east boundary of the ENP on the L-31W levee at Taylor Slough southwest of Homestead. The water is pumped into the ENP through this structure.	1983 - P	BWF/M	BWF/M	BWF/M	M	US	G
TAMBR105	255049	805705	This sample is taken from bridge No. 105 on US-41 (Tamiami Trail) located 12 miles northwest of S-12A. Water flows southward under this bridge.	1985 - P	BWF/M	BWF/M	BWF/M	M	-	G
US41-25	254621	805023	This sample is taken from bridge No. 25 on US-41 (Tamiami Trail) located two miles northwest of S-12A. Water flows southwest through this small culvert that runs under US-41.	1984 - P	BWF/M	BWF/M	BWF/M	M	-	G

TABLE 53. Summary of Sampling Station Locations and Frequency of Collection for the Interior of the Everglades National Park Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions	Trace Metals	G/A
P33	253630	804130	This station is located at stage recorder NP-33, which is located in Shark Slough just west of the southern end of the L-67X levee.	1985 - P	M	M	M	M	G
P34	253630	805530	This station is located at stage recorder NP-34, which is located west of Shark Slough near the western boundary of the Big Cypress Basin.	1986 - P	M	M	M	M	G
P35	252739	805156	This station is located at stage recorder NP-35, which is located near the south west end of Shark River Slough.	1985 - P	M	M	M	M	G
P36	253139	804745	This station is located at stage recorder NP-36, which is located in the middle of Shark River Slough.	1985 - P	M	M	M	M	G
P37	251708	804119	This station is located at stage recorder NP-207, which is located in the middle of Taylor Slough.	1985 - P	M	M	M	M	G
NE1	254150	803805	This station is located at stage recorder NESRS1, which is located just outside the Everglades National Park boundary, about 5 miles south of Cooper Town which is on US 41.	1986 - P	M	M	M	M	G
NP201	254305	804333	This station is located at stage recorder NP-201, which is located about 4 miles south of S-12C which is on US 41.	1986 - P	M	M	M	M	G
EP	251609	803017	This station is located at stage recorder EP SW/GW, which is located about 4 miles south of S-18C near the southeast corner of the ENP boundary.	1986 - P	M	M	M	M	G
TSB	252405	803625	This station is located at the bridge crossing Taylor Slough on the main road going through the ENP.	1985 - P	M	M	M	M	G

TABLE 54. Statistics for Select Parameters for the Everglades National Park Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S18C	<0.004	0.008	0.039	<0.004	0.004	0.017	0.20	1.00	3.19	<0.004	0.066	0.760
S176	<0.004	0.015	0.103	<0.004	0.005	0.030	0.62	1.42	4.01	<0.004	0.103	1.680
S177	<0.004	0.011	0.046	<0.004	0.004	0.008	0.39	1.23	3.07	<0.004	0.081	0.443
S178	<0.004	0.025	0.123	<0.004	0.006	0.025	0.10	1.03	3.64	<0.004	0.074	2.244
S332	<0.004	0.012	0.291	<0.004	0.004	0.021	0.22	1.02	3.27	<0.004	0.081	2.105
TAMBR105	<0.004	0.039	0.313	<0.004	0.013	0.200	<0.50	1.05	4.53	<0.004	0.057	1.005
US41-25	<0.004	0.023	0.256	<0.004	0.006	0.036	0.53	1.17	3.25	<0.004	0.046	0.569

TABLE 55. 1989 - 1991 Statistics for Select Parameters for the Everglades National Park Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S18C	<0.004	0.008	0.024	<0.004	0.004	0.017	0.51	0.79	1.99	0.005	0.108	0.760
S176	<0.004	0.021	0.103	<0.004	0.005	0.030	0.62	1.23	2.26	0.007	0.173	0.865
S177	<0.004	0.014	0.046	<0.004	0.004	0.008	0.51	1.05	3.07	0.005	0.143	0.443
S178	0.006	0.036	0.123	<0.004	0.006	0.022	0.52	1.07	3.64	<0.004	0.146	2.244
S332	<0.004	0.014	0.057	<0.004	0.005	0.021	0.52	1.06	3.27	0.008	0.162	2.105
TAMBR105	0.007	0.050	0.313	<0.004	0.016	0.079	<0.50	1.01	4.53	<0.004	0.111	1.005
US41-25	0.005	0.024	0.092	<0.004	0.006	0.027	0.54	1.00	2.22	<0.004	0.063	0.569

TABLE 56. Statistics for Select Parameters for the Interior of the Everglades National Park Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
P33	<0.004	0.018	0.546	<0.004	0.005	0.020	0.65	1.93	21.13	<0.004	0.042	0.576
P34	<0.004	0.008	0.029	<0.004	0.005	0.015	0.51	1.14	3.75	<0.004	0.086	2.030
P35	<0.004	0.020	0.137	<0.004	0.005	0.063	0.51	1.51	6.97	<0.004	0.055	0.449
P36	<0.004	0.064	1.137	<0.004	0.006	0.046	0.51	2.50	17.70	<0.004	0.053	1.049
P37	<0.004	0.009	0.074	<0.004	0.004	0.014	<0.50	1.40	7.77	<0.004	0.371	6.901
NE1	<0.004	0.013	0.045	<0.004	0.006	0.026	0.66	2.10	3.70	<0.004	0.021	0.199
NP201	<0.004	0.008	0.031	<0.004	0.005	0.022	0.71	1.41	3.73	<0.004	0.027	0.321
EP	<0.004	0.008	0.034	<0.004	0.005	0.014	<0.50	1.55	5.51	<0.004	0.015	0.084
TSB	<0.004	0.017	0.133	<0.004	0.006	0.052	<0.50	0.99	4.36	<0.004	0.169	3.060

TABLE 57. 1989 - 1991 Statistics for Select Parameters for the Interior of the Everglades National Park Monitoring Program

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus			Total Nitrogen			Nitrite + Njtrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
P33	<0.004	0.037	0.546	<0.004	0.005	0.012	1.03	2.71	21.13	<0.004	0.082	0.576
P34	<0.004	0.007	0.020	<0.004	0.004	0.007	0.52	0.77	1.14	<0.004	0.013	0.039
P35	<0.004	0.027	0.137	<0.004	0.009	0.063	1.27	2.04	6.97	<0.004	0.051	0.318
P36	<0.004	0.097	1.137	<0.004	0.008	0.046	1.40	7.72	80.93	0.006	4.469	78.953
P37	<0.004	0.005	0.009	<0.004	0.004	0.005	<0.50	0.61	0.76	<0.004	0.017	0.049
NE1	<0.004	0.019	0.045	<0.004	0.005	0.026	1.58	2.42	3.70	<0.004	0.022	0.108
NP201	<0.004	0.009	0.031	<0.004	0.004	0.008	1.00	1.47	3.73	<0.004	0.029	0.074
EP	<0.004	0.006	0.011	<0.004	0.005	0.009	<0.50	1.06	2.00	<0.004	0.012	0.047
TSB	<0.004	0.024	0.133	<0.004	0.010	0.052	<0.50	0.88	1.70	<0.004	0.116	1.087

SECTION 19

ROUTINE PESTICIDE MONITORING NETWORK
PROJECT CODE: PEST

Purpose and Scope

The Routine Pesticide monitoring network encompasses an area from north of Okeechobee, south to the Everglades National Park (TENP). The pesticide monitoring program was established to provide a water quality data base for:

1. Complying with monitoring requirements of the Lake Okeechobee Operating Permit #50-0679349 issued by the Florida Department of Environmental Regulation (FDEP);

2. Complying with the Memorandum of Agreement (MOA) between the Miccosukee Tribe of Florida and the South Florida Water Management District (District);

3. Complying with the MOA between TENP, District, and Army Corps of Engineers (COE);

4. Implementing Lake Okeechobee Technical Advisory Committee (LOTAC)'s recommendation for a comprehensive monitoring and research plan as described in FDEP'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. Initially only a few stations were collected for a narrow range of pesticides. The routine network was significantly expanded in 1984 and again in 1988, to form the framework of the 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.

The analyses are done contractually with FDEP laboratory in Tallahassee.

Sampling Locations and Descriptions

The locations of the 27 sites monitored under this program are shown in Figure 28. Table 58 lists all the station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection of pesticides, whether the sample is collected upstream or downstream, and type of sample collection.

Pesticide Sampling Frequency

Prior to 1991 water and sediment samples were collected quarterly. In 1991 the frequency was changed to that shown on Table 58.

District Publications

Lake Okeechobee Monitoring and Research Plan. (1986), FDEP.

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

Pfeuffer, R. J. (1989). Lake Okeechobee Pesticide Monitoring Report, 1987. SFWMD, Tech. Memo. March 1989.

Pfeuffer, R. J. (1991). Pesticide Residue Monitoring in Sediment and Surface Water Within the SFWMD, Volume 2. SFWMD, Tech. Pub. No. 91-1.

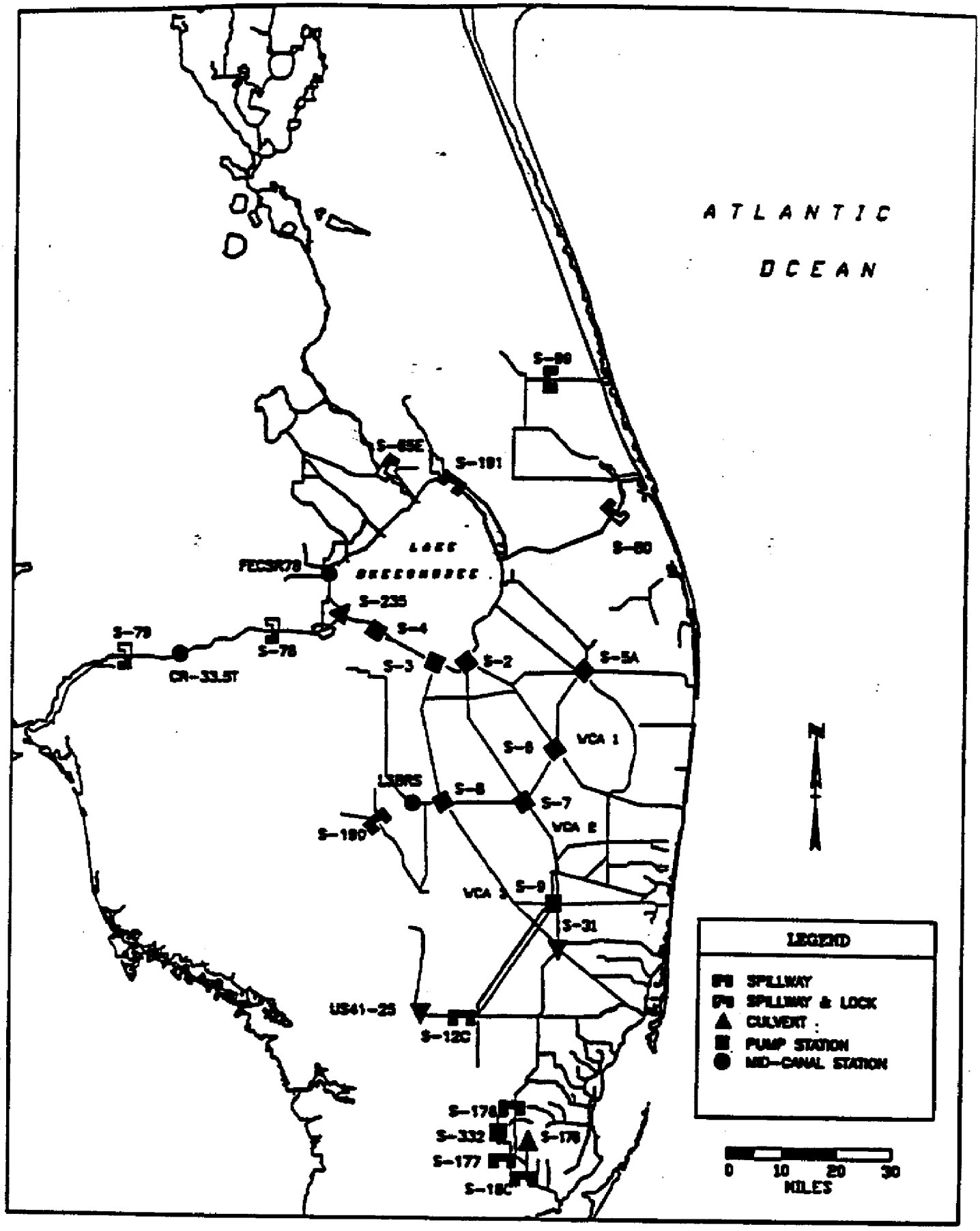

FIGURE 28. Location of Sampling Stations for the Routine Pesticide Water Quality monitoring program

TABLE 58. Summary of Sampling Station Locations and Frequency of Collection for the Routine Pesticide Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Pesticide Species	US/DS	G/A
FECSR78	265744	810715	Collected from the bridge on State Road 78 where it crosses Fisheating Creek. Water can flow towards Lake Okeechobee or water can flow west in this canal at this point depending on water stages.	1987-P	BM/H2O,BA/SED	-	G
L3BRS	261950	805253	Collected from 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 3 1/2 miles west of WCA3A.	1987-P	BM/H2O,BA/SED	-	G
S2	264200	804300	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.	1984-P	BM/H2O,BA/SED	US	G
S3	264155	804825	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.	1984-P	BM/H2O,BA/SED	US	G
S4	264722	805743	A District controlled water pumping station on C-20 near Clewiston that pumps water into Lake Okeechobee.	1984-P	BM/H2O,BA/SED	US	G
S5A	264101	802205	A District controlled water pumping station located at the northern most end of WCA1 at State Road 80. S-5A pumps water from the EAA, L-8, and the C-51 basin into WCA1.	1987-P	BM/H2O,BA/SED	US	G

TABLE 58 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Routine Pesticide Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Pesticide Species	US/DS	G/A
S6	262822	802650	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 into WCA1.	1984-P	BM/H2O,BA/SED	US	G
S7	262007	803213	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-27. Water is pumped in a southerly direction down the North New River Canal into WCA2. There is also a sluice gate that can be opened to let water gravity flow northward.	1984-P	BM/H2O,BA/SED	US	G
S8	261953	804628	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 into WCA3. There is also a sluice gate that can be opened to let water gravity flow northward.	1984-P	BM/H2O,BA/SED	US	G
S9	260340	802638	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.	1985-P	BM/H2O,BA/SED	US	G
S12C	254542	804338	A gate type structure located along US-41 at the south end of WCA3A. It is 2 miles west of S-333. Water flows southward from WCA3A through this structure into the ENP.	1984-P	BM/H2O,BA/SED	US	G
S18C	251950	803203	A gate type structure located on C-111 south of SR-27. The water flows southward through this structure.	1980-P	BM/H2O,BA/SED	US	G
S31	255633	802624	A series of gated culverts located on the east side of WCA3A on the Miami Canal near SR-997. Water flows southeast through this structure down the Miami Canal.	1987-P	BM/H2O,BA/SED	US	G

TABLE 58 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Routine Pesticide Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Pesticide Species	US/DS	G/A
S65E	271335	805742	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.	1987-P	BM/H2O,BA/SED	US	G
S176	252855	803345	A gate type structure located at the head of the C-111 near C-113 west of Homestead. Water flows southward through this structure.	1984-P	BM/H2O,BA/SED	US	G
S177	252407	803329	A gate type structure located on C-111 and SR-27 southwest of Homestead. The water flows southward through this structure.	1984-P	BM/H2O,BA/SED	US	G
S178	252427	803127	A gate type structure located at the head of C-111E and SR-27 southwest of Homestead. The water flows southward through this structure.	1984-P	BM/H2O,BA/SED	US	G
S190	261701	805805	A gate type structure located on the L-28 Intercepter Canal about 2 1/2 miles south of State Road 833 along the north feeder canal that leads into the L-28 Intercepter Canal, which is located within the Big Cypress Seminole Indian Reservation.	1987-P	BM/H2O,BA/SED	US	G
S191	271135	804535	A large gate type structure on the north side of Lake Okeechobee at Nubbin Slough. Water flows into the Lake through this structure. Water samples are collected from the US-441 bridge on the north side of this structure.	1987-P	BM/H2O,BA/SED	US	G
S332	252524	803524	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.	1980-P	BM/H2O,BA/SED	US	G

TABLE 58 (Continued). Summary of Sampling Station Locations and Frequency of Collection for the Routine Pesticide Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Pesticide Species	US/DS	G/A
US41-25	254621	805023	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.	1984-P	BM/H2O,BA/SED	-	G
S235	265021	810509	A small culvert type structure 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.	1987-P	BM/H2O,BA/SED	US	G
S78	264722	811811	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.	1988-P	BM/H2O,BA/SED	US	G
S79	264314	814107	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.	1988-P	BM/H2O,BA/SED	US	G
CR-33.5T	264233	813330	Collected in the Townsend Canal on the north side of the State Road 80 bridge.	1988-P	BM/H2O,BA/SED	-	G
S80	270639	801706	S-80 is a large spillway 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.	1988-P	BM/H2O,BA/SED	US	G
S99	272820	802848	S-99 is a spillway on the C-25 canal near Ft. Pierce. The water flow at this point is toward the east.	1988-P	BM/H2O,BA/SED	US	G

SECTION 20

ATMOSPHERIC DEPOSITION MONITORING PROGRAM

PROJECT CODE: RAIN

Purpose and Scope

The Wet/Dry Atmospheric Deposition monitoring program encompasses an area from the northern end of the Kissimmee River, south to the Everglades National Park. From 1974 to 1987 bulk rain collectors were used to collect rain water samples. In 1987 the District switched to Wet/Dry precipitation collectors, and in March of 1992, based on recommendations from the USGS, the District changed its protocol for the Wet/Dry precipitation collectors to that used by the National Atmospheric Deposition Program (NADP).

The rain program was established to provide a water quality data base for:

1. Determining nutrient concentrations in wet and dry atmospheric deposition;

2. Determining nutrient loading rates;

3. Refine trend analysis; and

4. Determining spatial variability.

Sampling Locations and Descriptions

The locations of the seven wet/dry atmospheric monitoring locations are shown on Figure 29. Table 59 lists all the station ID's, latitude and longitude, a brief station description, the period of record, and the frequency of collection for each parameter group. Tables 60 and 61 contain statistics for each monitoring location.

District Publications

Abtew, Wossenu., J. Obeysekera, G. Shih. (1992). Spatial Analysis for Monthly Rainfall in South Florida. SFWMD. Manuscript, December 1992.

Khanal, N., R. L. Hamrick. (1971). A Stochastic Model for Daily Rainfall Data Synthesis. SFWMD. Tech. Memo. August 1971.

Khanal, N., R. L. Hamrick. (1982). Long Term Tropical Storm Incidence Kissimmee River Basin Rainfall Analysis. SFWMD. Tech. Memo. April 1982.

MacVicar, T.K. (1983). Rainfall Averages and Selected Extremes for Central and South Florida. SFWMD. Tech. Pub. No. 83-02.

Sculley, S., Water Resources. (1986). Frequency Analysis of SFWMD Rainfall. SFWMD. Tech. Pub. No. 86-6.

Shih, G. (1983). Data Analysis to Detect Rainfall Changes in South Florida. SFWMD. Tech. Memo. May 1983.

Shih, G., Resource Planning Department. (1984). A Time Series Analysis of South Florida Rainfall Records. SFWMD. Tech. Memo. May 1984.

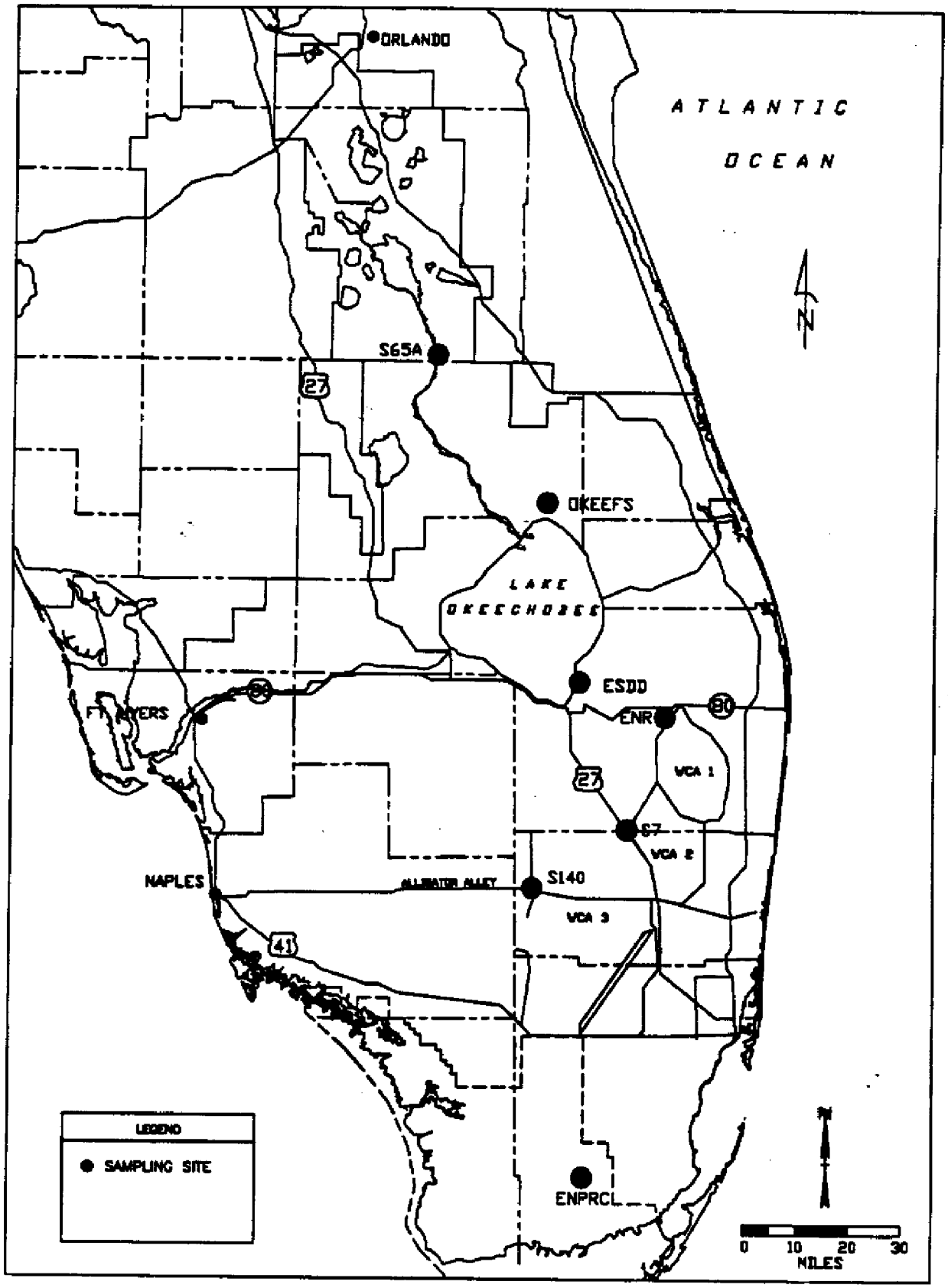

FIGURE 29. Location of Sampling Sites for the Atmospheric Deposition Monitoring Program

TABLE 59. Summary of Sampling Station Locations and Frequency of Collection for the Atmospheric Deposition Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Major Ions
S65AWET S65ADRY	273944	810803	On the grounds near S65A, which is located on the Kissimmee River 10.5 miles south of Lake Kissimmee.	89-92/92 - P	BW/W	BW/W	BW/W
OKEEFSW OKEEFSD	271503	804715	This site is located at the Okeechobee Field Station.	87-92/92 - P	BW/W	BW/W	BW/W
ESDDWET ESDDDRY	264455	804105	On the grounds near the East Shore Drainage District pumping station. Also known as Culvert 12. This site is located near the Herbert Hoover Dike on the southeast side of Lake Okeechobee.	88-92/92 - 93	BW/W	BW/W	BW/W
S7 WET S7 DRY	262007	803213	50 yards north of pump station S-7, which is just off US-27 at the intersection of the North New River Canal (L-18), L-5, and L-6.	88-92/92 - P	BW/W	BW/W	BW/W
ENRWET ENRDRY	263900	802516	This site is located within the Everglades Nutrient Removal Project(ENR), which is located about 2 miles SW of District pump station S-5A off the L-7 levee.	1992 - P	W	W	W
S140WET S140DRY	261017	804940	About 50 yards north of District pump station S-140, which is located near the west side of Water Conservation Area 3A, on the L-28 canal near I-75.	89-92/92 - P	BW/W	BW/W	BW/W
ENPRCWET ENPRCDRY	254621	805023	This site is located on the grounds of the Everglades National Park Research Center, which is located in the Everglades National Park.	87-92/92 - 92	BW/W	BW/W	BW/W

TABLE 60. Statistics for Select Parameters for the Atmospheric Deposition Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S65AWET	<0.004	0.063	0.792	<0.50	1.00	5.43	0.019	0.197	1.574
S65ADRY	0.005	0.244	1.623	<0.50	1.93	15.24	0.008	0.151	1.739
OKEEFSW	<0.004	0.026	0.524	<0.50	0.98	11.70	0.019	0.190	1.817
OKEEFSD	<0.004	0.069	0.538	0.52	0.98	11.67	0.011	0.152	1.654
ESDDWET	<0.004	0.045	0.424	0.56	0.95	4.59	0.007	0.224	1.061
ESDDDRY	<0.004	0.148	0.701	0.53	4.04	8.81	0.005	0.226	1.240
S7 WET	<0.004	0.031	0.379	0.54	1.01	2.91	0.035	0.279	0.854
S7 DRY	<0.004	0.071	1.177	0.52	2.94	19.16	<0.004	0.197	1.311
ENRWET	<0.004	0.013	0.112	0.53	0.78	2.04	0.031	0.218	1.538
ENRDRY	<0.004	0.061	0.751	0.52	1.08	8.88	0.021	0.138	1.101
S140WET	<0.004	0.076	1.135	<0.50	1.28	7.18	0.013	0.294	4.118
S140DRY	<0.004	0.172	12.180	<0.50	0.92	6.06	0.006	0.178	4.177
ENPRCWET	<0.004	0.091	2.380	<0.50	1.58	21.40	<0.004	0.178	1.719
ENPRCDRY	<0.004	0.057	0.725	<0.50	1.04	14.58	<0.004	0.112	0.873

TABLE 61. 1990 - 1992 Statistics for Select Parameters for the Atmospheric Deposition Monitoring Program

SFWMD

Sta. ID	Total Phosphorus			Total Nitrogen			Nitrite + Nitrate (NOX)		
	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX
S65AWET	<0.004	0.065	0.792	<0.50	1.01	5.43	0.019	0.220	1.574
S65ADRY	0.005	0.264	1.623	<0.50	2.04	15.24	0.011	0.156	1.739
OKEEFSW	<0.004	0.026	0.452	0.52	1.11	11.70	0.019	0.222	1.817
OKEEFSD	<0.004	0.073	0.506	0.52	1.02	11.67	0.019	0.169	1.654
ESDD WET	<0.004	0.058	0.424	0.56	0.98	4.59	0.007	0.245	1.061
ESDD DRY	0.011	0.146	0.701	0.53	3.37	8.17	0.005	0.209	1.240
S7 WET	<0.004	0.042	0.379	0.54	1.07	2.60	0.035	0.319	0.854
S7 DRY	<0.004	0.078	1.177	0.52	2.82	19.16	<0.004	0.180	1.311
ENRWET	<0.004	0.012	0.112	0.54	0.77	2.04	0.035	0.242	1.538
ENRDRY	<0.004	0.070	0.751	0.53	1.22	8.88	0.030	0.153	1.101
S140WET	<0.004	0.098	1.135	<0.50	1.45	7.18	0.013	0.337	4.118
S140DRY	<0.004	0.206	12.180	<0.50	0.93	6.06	0.007	0.202	4.177
ENPRCWET	<0.004	0.014	0.203	0.51	1.21	21.40	0.012	0.209	1.719
ENPRCDRY	<0.004	0.067	0.725	<0.50	0.92	4.54	0.024	0.126	0.873

SECTION 21

MANATEE BAY / LONG SOUND
PROJECT CODE: MBLS

Purpose and Scope

The MBLS water quality monitoring program is conducted in the C-111 canal, Manatee Bay, Barnes Sound, and Long Sound areas. This monitoring program is conducted in conjunction with the C-111 monitoring and operation permit # 131654749. Water quality monitoring occurs when at least 3 of the 13 culverts are opened at S-197. Various biological and hydrological monitoring will occur at the same time. Other environmental monitoring is conducted in these same areas by TENP and DERM. The MBLS water quality monitoring program provides a data base for:

1. Determining Manatee Bay/ Barnes Sound salinity responses to storm related discharges at S-197;

2. Establishing salinity gradients in Northeast Florida Bay associated with normal flow diversions through the C-111 gaps;

3. Monitoring any additional influx of nutrients in the TENP eastern panhandle resulting from through the gaps;

4. Monitoring salinity and water quality impacts downstream of S-21 (C-1W diversions); and

5. Establishing spatial impacts on salinity gradients, and how quickly they are re-established following a discharge event.

Sampling Locations and Descriptions

The location of the 22 sites monitored under this program are shown on Figure 30. Currently nutrients and physical parameters are sampled for at 8 of the 22 sites, and only physical parameters are sampled at the remaining 14 sites. Table 62 lists all station ID's, latitude and longitude, a brief station description, the period of record, the frequency of collection for each parameter group, and type of sample collection. Tables 63 and 64 contain statistics for each monitoring location.

District Publications

Monitoring and Operating plan for C-111 Interim Construction Project. Permit # 131654749, (1991), SFWMD, Department of Research.

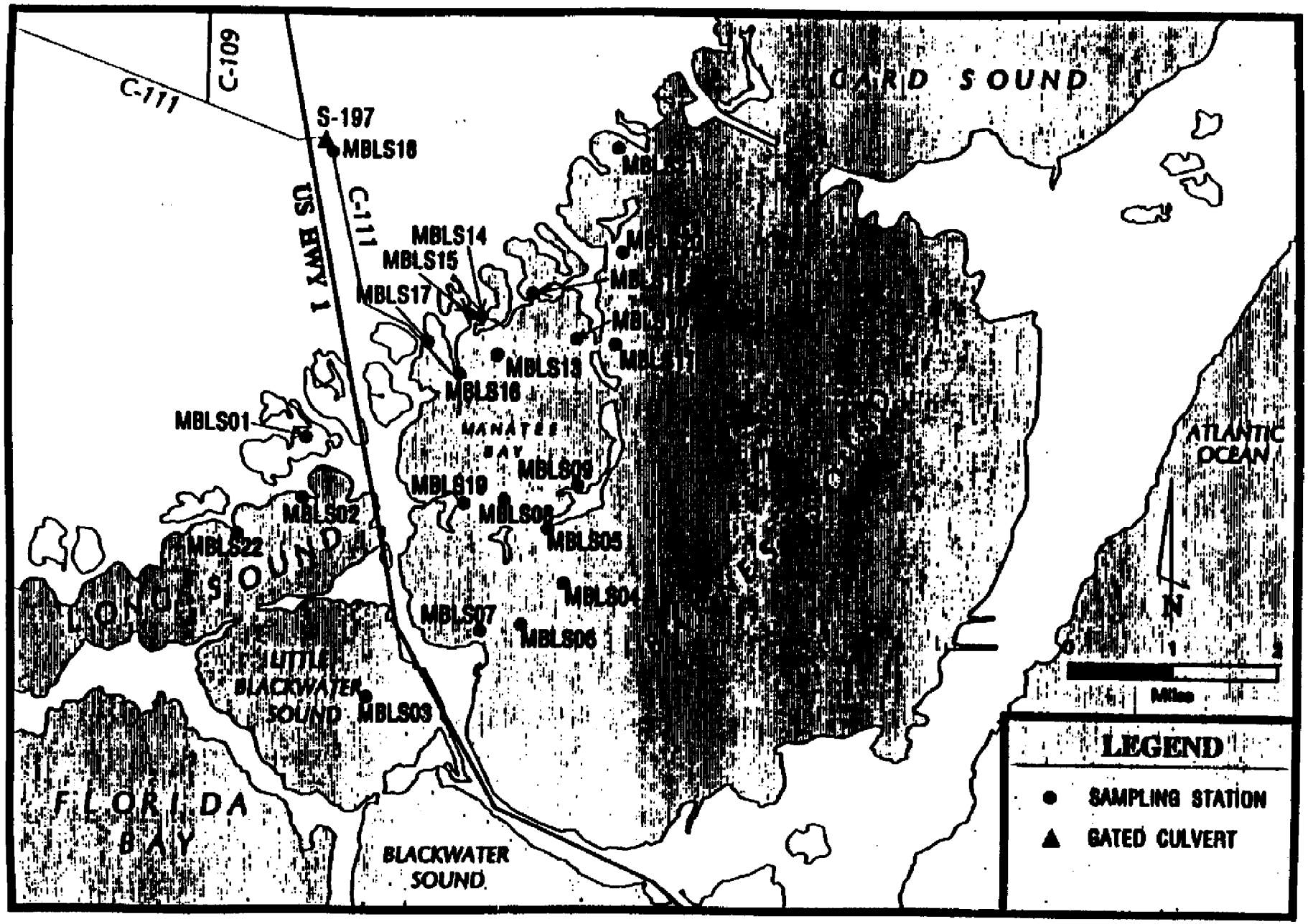

FIGURE 30. Location of Sampling Stations for the Manatee Bay/Long Sound Water Quality Monitoring programs

TABLE 62. Summary of Sampling Locations and Frequency of Collection for the Manatee Bay / Long Sound Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Chlorophylls	G/A
MBLS01	251453	802647	NE corner of Long Sound in small bay.	1985 - P	STE	-	-	-
MBLS02	251423	802649	NE corner of Long Sound proper.	1985 - P	STE	STE	STE	G
MBLS03	251244	802614	Central Little Blackwater Sound.	1985 - P	STE	STE	STE	G
MBLS04	251340	802423	West Central Barnes Sound.	1986 - P	STE	STE	STE	G
MBLS05	251407	802432	NW of MBLS04, 100 yards off East Island.	1991 - P	STE	-	-	-
MBLS06	251319	802447	Western Barnes Sound just S.E. of Little #6 Island.	1991 - P	STE	-	-	-
MBLS07	251316	802510	N.W. of MBLS06 at marker #2.	1988 - P	STE	-	-	-
MBLS08	251422	802456	S.W. Manatee Bay.	1991 - P	STE	-	-	-
MBLS09	251429	802415	Southern Manatee Bay, N. side of East Island. 200 yards N.E. of platform.	1986 - P	STE	-	-	-
MBLS10	251541	802415	N.E. of MBLS09 in Manatee Bay, 1/4 mile west of cut in key.	1985 - P	STE	-	-	-
MBLS11	251539	802353	Western Barnes Sound, east of MBLS10, through cut in key 200 yards out.	1991 - P	STE	-	-	-
MBLS12	251604	802440	N.E. Manatee Bay in small bay N.W. of MBLS10.	1991 - P	STE	-	-	-
MBLS13	251544	802502	Northern Manatee Bay S.W. of MBLS12.	1986 - P	STE	STE	STE	G

TABLE 62 (Continued). Summary of Sampling Locations and Frequency of Collection for the Manatee Bay / Long Sound Monitoring Program

SFWMD Sta. ID	Lat	Long	Location	POR	Physical Parameters	Nutrients	Chlorophylls	G/A
MBLS14	251553	802509	Northern Manatee Bay in small bay, just north of MBLS13.	1991 - P	STE	-	-	-
MBLS15	251554	802515	N.W. of MBLS13 in Northern Manatee Bay, in small bay.	1991 - P	STE	-	-	-
MBLS16	251524	802521	N.W. Manatee Bay at end of C-111 canal, at marker #6.	1991 - P	STE	-	-	-
MBLS17	251540	802538	C-111 canal where road ends on east side of canal.	1985 - P	STE	-	-	-
MBLS18	251712	802630	Downstream side of S-197.	1985 - P	STE	-	-	-
MBLS19	251420	802519	S.W Manatee Bay, two platforms at this site, one is a stage recorder.	1991 - P	STE	STE	STE	G
MBLS20	251625	802349	N.E. Barnes Sound	1991 - P	STE	STE	STE	G
MBLS21	251722	802347	N.E. Manatee Bay, also N.E. of MBLS20.	1991 - P	STE	STE	STE	G
MBLS22	251405	802725	N.E. Long Sound, just west of MBLS02. Recorder at this site.	1991 - P	STE	STE	STE	G

TABLE 63. Statistics for Select Parameters for the Manatee Bay / Long Sound Monitoring Program for Period of Record

SFWMD Sta. ID	Total Phosphorus			Ortho Phosphorus		
	MIN	MEAN	MAX	MIN	MEAN	MAX
MBLS01	<0.004	0.008	0.017	<0.004	0.004	0.008
MBLS02	<0.004	0.008	0.016	<0.004	0.005	0.010
MBLS03	<0.004	0.009	0.059	<0.004	0.006	0.033
MBLS04	<0.004	0.012	0.085	<0.004	0.006	0.014
MBLS05*	-	-	-	-	-	-
MBLS06*	-	-	-	-	-	-
MBLS07*	-	-	-	-	-	-
MBLS08*	-	-	-	-	-	-
MBLS09	<0.004	0.009	0.019	<0.004	0.011	0.122
MBLS10*	-	-	-	-	-	-
MBLS11*	-	-	-	-	-	-
MBLS12*	-	-	-	-	-	-
MBLS13	<0.004	0.011	0.039	<0.004	0.005	0.014
MBLS14*	-	-	-	-	-	-
MBLS15*	-	-	-	-	-	-
MBLS16*	-	-	-	-	-	-
MBLS17	<0.004	0.009	0.016	<0.004	0.004	0.006
MBLS18	<0.004	0.010	0.031	<0.004	0.005	0.007
MBLS19	0.006	0.012	0.023	-	-	-
MBLS20	<0.004	0.013	0.036	-	-	-
MBLS21	<0.004	0.009	0.020	-	-	-
MBLS22	<0.004	0.008	0.013	-	-	-

* = Only physical parameters are collected at the sites.

TABLE 64. 1990 - 1992 Statistics for Select Parameters for the Manatee Bay / Long Sound Monitoring Program

SFWMD Sta. ID	Total Phosphorus		
	MIN	MEAN	MAX
MBLS01*	-	-	-
MBLS02	<0.004	0.009	0.016
MBLS03	<0.004	0.008	0.013
MBLS04	<0.004	0.018	0.085
MBLS05*	-	-	-
MBLS06*	-	-	-
MBLS07*	-	-	-
MBLS08*	-	-	-
MBLS09*	-	-	-
MBLS10*	-	-	-
MBLS11*	-	-	-
MBLS12*	-	-	-
MBLS13	<0.004	0.011	0.019
MBLS14*	-	-	-
MBLS15*	-	-	-
MBLS16*	-	-	-
MBLS17*	-	-	-
MBLS18*	-	-	-
MBLS19	0.007	0.013	0.023
MBLS20	<0.004	0.011	0.023
MBLS21	<0.004	0.010	0.020
MBLS22	<0.004	0.009	0.013

* = Only physical parameters are collected at the sites.

APPENDIX

ABBREVIATIONS