

Biological Assessment of

Cocoa Beach Sewage Treatment Plant

Brevard County

NPDES #FL0021105

Sampled 23 October 1990

June 1991

Biology Section
Division of Administrative and Technical Services

Introduction

The City of Cocoa Beach Sewage Treatment Plant is located in Brevard County on the Minuteman Causeway in Cocoa Beach, Florida. It is a 6.0 MGD design capacity contact stabilization sewage treatment facility. Filtration and chemical treatment are used for phosphorus reduction. The plant is situated next to a privately owned golf course and utilizes the ponds on the golf course for additional retention/treatment. A portion of the effluent is used for irrigation of the course. This facility, which has a public access reclaimed water system, received the 1986 Florida Department of Environmental Regulation award for best publicly owned treatment plant in the central Florida district. The plant discharges to the Banana River, which is an Outstanding Florida Water and an Aquatic Preserve. The Banana River is part of the Indian River lagoon estuary system. Because it does not receive the intense flushing and mixing of other sections of the lagoon, it is more heavily influenced by wind-driven currents than by tidal action.

The FDER and NPDES permits limit the levels of total nitrogen to 6.0 mg/l, and total phosphorus to 1.0 mg/l. The FDER permit requires that no fecal coliforms be detected in the effluent, while the NPDES permit allows 200 colonies/100 ml. The NPDES permit restricts total residual chlorine to 0.01 mg/l. For the period of July 1989 to August 1990, the facility exceeded the permit limitations for these parameters on each occasion sampled (Appendix).

In May 1987, the Biology Section performed static acute bioassays on chlorinated and dechlorinated effluent from this facility. The chlorinated sample was toxic to all three test organisms, *Ceriodaphnia dubia*, *Daphnia pulex*, and *Notropis leedsi*.

Methods

The focus of this investigation, conducted on 23 October, 1990, was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located nearby in the Banana River) and a test site (the area near the discharge) (see maps in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites (Appendix). Supplemental physical/chemical data were also collected on the effluent and study sites (Appendix). Acute screening toxicity bioassays using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms were performed on an effluent sample (Peltier and Weber 1985, FDER 1985). The effluent was also analyzed for organic constituents (base neutral, acid and pesticide extractables) and metals. Methods used for all chemical analyses are on file at the Central DER Chemistry Laboratory.

Benthic macroinvertebrates communities were evaluated at the reference and test sites. Collection methods consisted of an abbreviated qualitative effort. Bacterial populations were analyzed for total and fecal coliforms according to APHA (1989). Algal Growth Potential tests, using Selenastrum capricornutum as the test organism, followed Miller et al. (1978).

Results and Discussion

The discharge sample was not acutely toxic to the fish, *Notropis leedsi*, or to the crustacean, *Ceriodaphnia dubia*. No total residual chlorine was present. All effluent organic constituents determined from a single grab sample were below detection limits (Appendix). The following metals were detected in the effluent sample: Copper (11 µg/l), iron (52 µg/l), strontium (2200 µg/l), and zinc (15 µg/l). These concentrations are not considered to be deleterious to marine organisms.

Nutrient levels measured in the effluent were in excess of the facility's permit limits . Total and orthophosphate were 3.7 and 3.3 mg P/l, respectively (Appendix). Nitrogen containing compounds were as follows; TKN (3.5 mg N/l), NO2NO3 (5.5 mg N/l) and NH3 (1.5 mg N/l). Algal growth potential in the effluent (127.9 mg dry wt/l) reflected the high nutrient conditions.

The 1990 305(b) report rated the water quality of the Banana River (from Port Canaveral to the the southern confluence of the Banana River with the Indian River) as only fair, predominantly due to somewhat elevated nitrogen, phosphorus, and chlorophyll *a* levels. For example, water collected during six sampling events from a station approximately two miles north of the Cocoa Beach outfall had an average total phospho-

rus of 0.12 mg/l and a mean chlorophyll *a* of 23 µg/l. The plant's monthly operating report data and the nutrient data obtained in the present sampling suggest that the Cocoa Beach facility is contributing to these observed problems.

Results of bacterial analyses indicated 140 organisms/100 ml for total coliforms and 72 organisms/100 ml for fecal coliforms (Appendix). Since bacteria was sampled downstream of the golf course ponds (see map in Appendix), the very stringent requirement of zero colonies/100 ml (intended as a reuse criterion) does not apply. The observed bacteria levels are considered normal for surface waters.

Taxonomically, benthic macroinvertebrate communities at the two sites appeared fairly similar, with 20 taxa in common. The total taxa found at each site (38 at the reference site, 36 at the test site) was somewhat reduced from that found in the Banana River in a previous sampling. In 1977, fifty-two taxa were recovered from a site several miles north of the present study area (Ross and Jones 1979). Further basin-wide quantitative sampling of parameters such as phytoplankton, chlorophyll *a*, nutrients, algal growth potential, and macroinvertebrates would be helpful in determining the extent and severity of eutrophication in the Banana River.

Conclusions

The discharge from Cocoa Beach STP was not toxic to the fish, *Notropis leedsi*, or the invertebrate, Ceriodaphnia dubia, in 48 hour static acute bioassays. No organic priority pollutants were detected. Nitrogen and phosphorus concentrations were measured in the effluent in excess of permit limitations. These nutrient levels, as well as the elevated algal growth potential determined during the present sampling, indicate that the STP is contributing to eutrophication problems in the Banana River. Total and fecal coliform bacteria counts were considered normal for surface waters. Results of macroinvertebrate sampling were inconclusive, but suggest that taxa richness has been reduced since 1977, possibly due to system-wide nutrient enrichment.

Literature Cited

American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th ed. New York, N.Y. 1268 p.

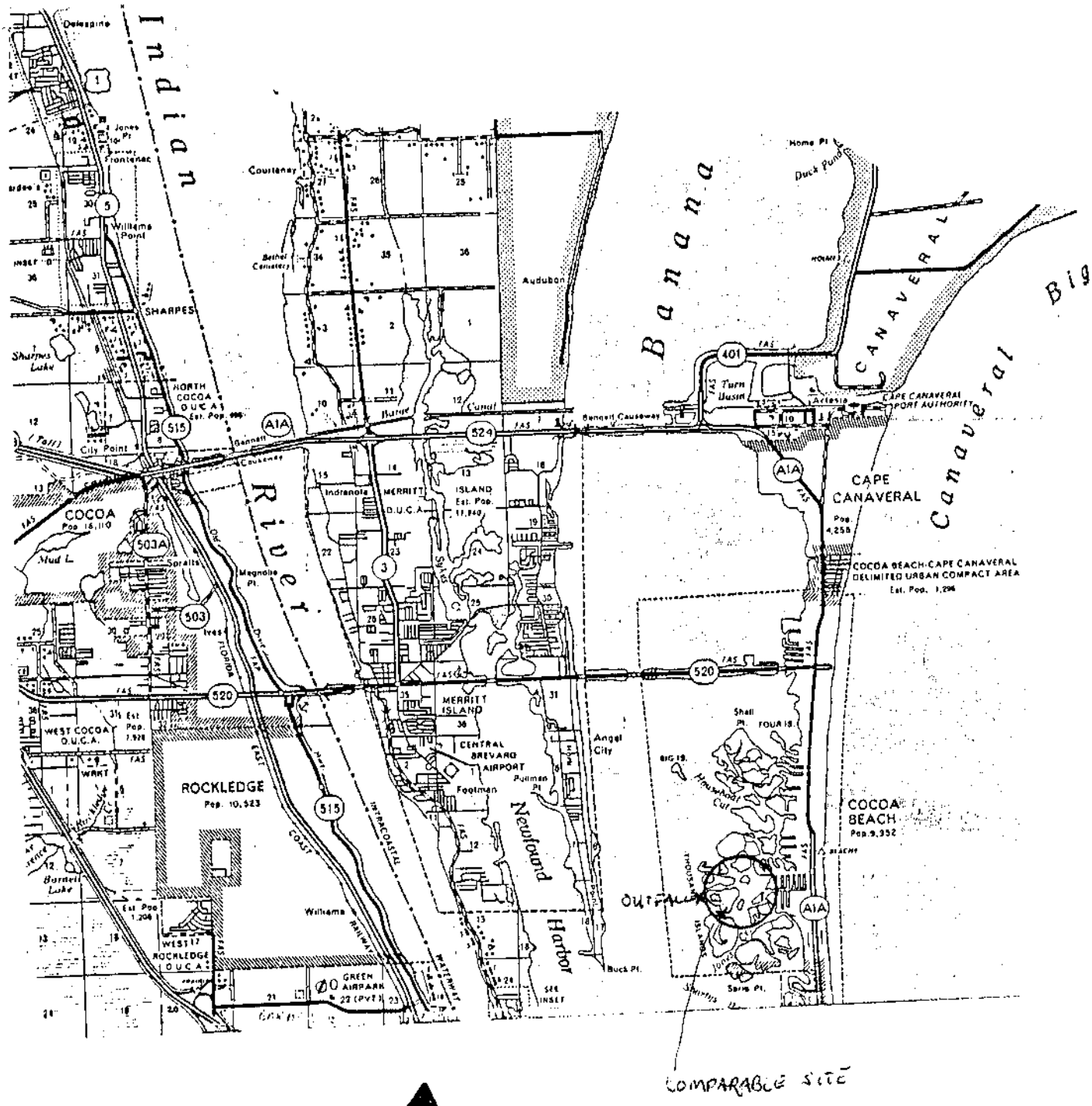
Florida Department of Environmental Regulation. 1985. Quality assurance manual for performing acute toxicity tests. 2nd edition. Fla. Dept. Environmental Regulation, Biology Section, Tallahassee. 53 pp.

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. U. S. Environ. Prot. Agency, EPA-600/9-78-018. 126 p.

Peltier, W. H. and C. I. Weber. 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 3rd edition. EPA/600/4-85/013. U. S. EPA, Cincinnati, Ohio. 216 pp.

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Ross, L. T. and D. A. Jones. 1979. Biological aspects of water quality in Florida. Part II: Nassau - St.Marys, St.Johns, and east coast drainage basins. Fla. Dept. Environ. Reg. Tech. Ser. 4(3): 1-402.



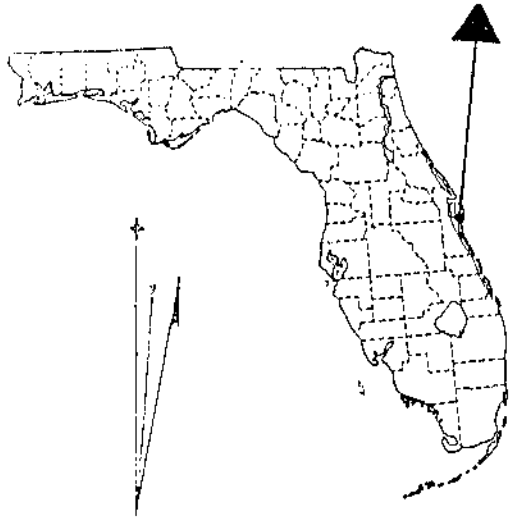


Figure 1. Portions of Brevard County, Florida, including City of Cocoa Beach and the location of the sewage treatment plant.

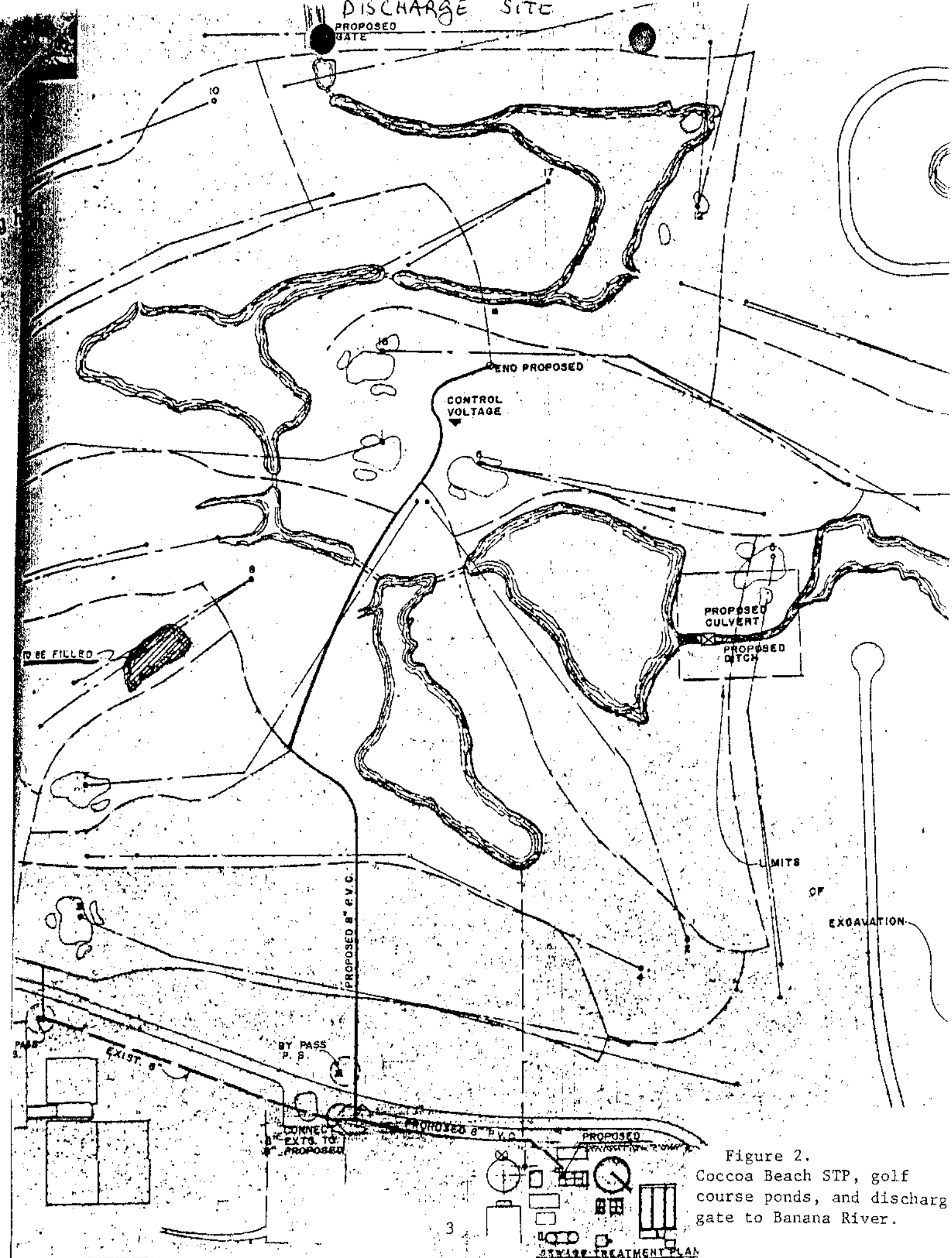


Figure 2.
Coccoa Beach STP, golf course ponds, and discharg gate to Banana River.

DISCHARGE SITE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 10/23/90	RECEIVING BODY OF WATER: INDIAN RIVER

REMARKS:	LOCATION: CITY OF COCOA BEACH STP COCOA P.O. BOX 320280 BEACH COCOA, FLORIDA 32932-0280	FIELD ID/NAME: CITY OF COCOA BEACH STP

Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 8	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 40	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three comunities observed from those listed. **26-37 points**	One comunity observed from those listed. **13-25 points**	No comunities observed from those listed. **0-12 points**
Tidal Fluctuation 1	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 9	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 10	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 76

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/23/90	PHILIP N. KANE, E.I.D.	Philip N. Kane, E.I.D.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

DISCHARGE SITE

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 10/23/90	RECEIVING BODY OF WATER: BANANA RIVER

REMARKS:	LOCATION: CITY OF COCOA BEACH STP P.O. BOX 320280 COCOA, FLORIDA 32932-0280 COCOA BEACH	FIELD ID/NAME: CITY OF COCOA BEACH STP

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category):

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
			80% ✓			20% RECREATIONAL

Local Watershed Erosion (check box): None ☑ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Some potential sources ☑ Obvious sources ☐

Point-Source Pollution (list location and describe):
CITY OF COCOA BEACH STP

~~Estimated Stream Width (range, m):~~	~~Estimated Stream Depth (range, m):~~	~~yes~~ Impounded ☐
~~High Water Mark (m above bed):~~	Velocity (range, m/s):	~~Channelized~~ ☐

Canopy Cover % (check box): Open: ☑ 100% Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE N/A

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☐ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	✓
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	
Sand:		Mud/Muck (organic):	

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
			Secchi Depth (m):	TO BOTTOM
Top			pH (SU):	7.4
Mid-depth	27.1	7.4	Conductivity (µmho/cm):	36,600
Bottom			Other Parameters:	TD 0.5M SAL 23.1

~~Stream Type (check box):~~ Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): Slick: ☐ Sheen: ☐ Globs: ☐ None: ☑

Clarity (check box): Clear: ☑ Slightly turbid: ☑ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☑ Clear: ☐ Other: ☐

Weather Conditions:
SUN/LIGHT CLOUDS

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☑	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/23/90	PHILIP N. KANE, Ed.D.	Philip N. Kane, Ed.D.

COMPARABLE SITE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 10/23/90	RECEIVING BODY OF WATER: BANANA RIVER

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Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 9	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 10	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 77

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/23/90	PHILIP N. KANE, Ed.D	Philip N. Kane, Ed.D.

COMPARABLE SITE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 10/23/90	RECEIVING BODY OF WATER: BANANA RIVER

REMARKS:	LOCATION: CITY OF COCOA BEACH STP P.O. BOX 320280 COCOA, FLORIDA 32932-0280	FIELD ID/NAME: CITY OF COCOA BEACH STP

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category):

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
			80 %			20 % RECREATIONAL

Local Watershed Erosion (check box): None ☑ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Some potential sources ☑ Obvious sources ☐

Point-Source Pollution (list location and describe):

N/A

~~Estimated Stream Width (range, m)~~:	~~Estimated Stream Depth (range, m)~~:	~~yes~~
~~High Water Mark (m above bed)~~:	Velocity (range, m/s):	Impounded ☐ / ~~Channelized~~ ☐

Canopy Cover % (check box): Open: ☑ 100% Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE N/A

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐ _____

Sediment Oils: Absent: ☐ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	☑
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	
Sand:		Mud/Muck (organic):	

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top			Secchi Depth (m):	TO BOTTOM
Mid-depth	29.1	7.4	pH (SU):	7.4
Bottom			Conductivity (µmho/cm):	36L00
			Other Parameters: TD±0.5M	SAL 23.1

~~Stream Type (check box):~~ Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐ _____

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐ _____

Water Surface Oils (check box): Slick: ☐ Sheen: ☐ Globs: ☐ None: ☑

Clarity (check box): Clear: ☑ Slightly turbid: ☑ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☑ Clear: ☐ Other: ☐ _____

Weather Conditions:

SUN/LIGHT CLOUDS

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☑	☐
Fish	☐	☐	☑	☐
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/23/90	PHILIP N. KANE, Ed.D.	Philip N. Kane, Ed.D.

GMST36 3005X12879 050053 050047 050084 900146 07/89-08/90 10/22/90
PARAMETER RESULT TRENDS 13:18:32

O N FOR 3005M00413 - COCOA BEACH, STP, CITY OF
SITE NAME - COCOA BEACH, CITY OF, STP/EFFLUENT

RPT DATE	FLOW,MONTH AVG 050053 MGD	FLOW, MAX DAILY 050047 MGD	BOD EFF 050084 MG/L	RES SUSP EFF 900146 MG/L
08/00/90	1.970	3.0100	4.2	1.
07/00/90	1.510	2.8000	4.0	0.
06/00/90	.758	2.8900	8.3	2.
05/00/90	.123	.7190	2.7	2.
04/00/90	.970	1.7500	2.2	1. <
03/00/90	5.600	3.1500	8.2	2.
02/00/90	1.900	3.2000	6.2	1. <
01/00/90	2.790	3.5100	2.9	1. <
12/00/89	2.110	2.8600	2.0	1.
11/00/89	2.180	3.2200	3.9	0.
10/00/89	2.820	4.9200	2.8	0.
09/00/89	1.690	2.8700	2.2	1. <
08/00/89	2.060	3.4600	1.7	0.
07/00/89	1.870	3.2000	1.3	1. <
AVERAGE:	2.02507	2.96850	3.75714	0.99857
STD DEV:	1.26450	0.92609	2.28026	0.67939

XMIT HERE FOR NEXT PAGE

GMST36 3005X12879 000400 000600 000665 050060 07/89-08/90 10/22/90
PARAMETER RESULT TRENDS 13:19:14

O N FOR 3005M00413 - COCOA BEACH, STP, CITY OF
SITE NAME - COCOA BEACH, CITY OF, STP/EFFLUENT

RPT DATE	PH 000400 STD UN	NITROGEN(N)TOT 000600 MG/L	PHOSPHORUS TOT 000665 MG/L	CHLORINE RESID 050060 MG/L
08/00/90	7.30	10.30	4.000	.90
07/00/90	7.30	NO RESULT	NO RESULT	.90
06/00/90	7.30	10.80	3.790	1.00
05/00/90	7.20	11.70	4.940	1.30
04/00/90	6.90	9.50	4.700	1.40
03/00/90	7.20	10.90	4.050	1.70
02/00/90	6.90	11.20	3.300	.90
01/00/90	6.90	11.50	2.500	1.90
12/00/89	6.90	13.50	2.300	1.60
11/00/89	7.00	11.40	2.080	1.40
10/00/89	7.00	12.00	1.800	1.20
09/00/89	7.00	15.00	1.860	1.10
08/00/89	7.00	14.00	2.500	1.50
07/00/89	6.90	15.60	2.300	.50
AVERAGE:	7.05714	12.10769	3.08615	1.23571
STD DEV:	0.16523	1.85270	1.09697	0.37950

XMIT HERE FOR NEXT PAGE

GMST36 3005X12879 031616 000630 000620 000300 07/89-08/90 10/22/90
PARAMETER RESULT TRENDS 13:20:42

O N FOR 3005M00413 - COCOA BEACH, STP, CITY OF
SITE NAME - COCOA BEACH, CITY OF, STP/EFFLUENT

RPT DATE	FECAL COLI MF 031616 #/100	NO2 + NO3 N 000630 MG/L	NO3 N 000620 MG/L	DO 000300 MG/L
08/00/90	1. >	NO RESULT	6.400	6.2
07/00/90	NO RESULT	NO RESULT	NO RESULT	NO RESULT
06/00/90	1. <	NO RESULT	.913	6.2
05/00/90	1. <	NO RESULT	8.790	6.6
04/00/90	2. <	NO RESULT	4.000	6.4
03/00/90	2. <	3.710	NO RESULT	NO RESULT
02/00/90	2. <	4.400	NO RESULT	NO RESULT
01/00/90	2. >	6.260	NO RESULT	6.4

Sample Source: City of Cocoa Beach STP

Address/City:

County:

Contact/District:

NPDES Permit #: Outfall #:

Test Number: 1/2 of 2 Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Remarks:

Sample Collection: Date 10-22-90 Time

Test Beginning: Date 10-24-90 Time 3:00

Test Ending: Date 10-26-90 Time 11:00

Test Organism: C. dubia / N. loveni

Life Stage/Age:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0/7.9	8.0 @ 22°C	1330/1413	21.0 @ 22°C
24 hr				
48 hr				

C. dubia

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
control		5	5	5												
control		5	5	5												
control		5	5	5												
control		5	5	5												
100%		5	5	4												
100%		5	5	5												
100%		5	5	5												
100%		5	5	5												
			LB/mf	LB/LB												
control					7.9	7.7	8.2	7.1	8.4	8.2	23.8	23.6	21.9	376	380	384
100%					4.8	7.7	7.9	7.4	8.5	8.4	27.0	24.0	22.0	2180	1857	1738
							mf/LB			mf/LB			mf/LB			
control	49	5	5	5	7.5	8.1	7.9	7.8	8.0	8.1	22.5	22.0	21.3	237	237	237
control	44	5	5	5	7.9	7.9	8.0	7.8	8.1	8.1						
	57	5	5	5	3.9*	8.1	7.8	7.4	8.3	8.2	28.1	22.0	21.3	2350	2070	2070
100%	34	5	5	5	3.9*	8.1	7.6	7.4	8.3	8.2						
Measured/Loaded by		MF	SMC	MF	MF	SMC	SMC	MF	SMC	SMC	MF	SMC	SMC	MF	SMC	SMC
Recorded by		MF	SMC	MF	RPF	MF	SMC	MF	MF	SMC	RPF	MF	SMC	RPF	MF	SMC

Investigators' Signatures

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Clz:					
Lab Tot. Resid. Clz:			0.0	HACH	MF
Alkalinity:			150	"	RPF
Hardness:			175	"	RPF
Total Ammonia:			0.96	PROBE	RPF

Ammonia meter slope: 57.2

* D.O. AERATED TO [illegible] after initial test of [illegible]

Sample Number: 90-OCT-25-12-01 Sample Status: Authorized by Liang T. Lin
Sample Location: Cocoa Beach,Fl.P.O.Box 320280 Matrix: Effluent
Field ID: Storet Station Number:
Date/Time Collected: 23-OCT-1990 11:07:28.75
Comments:

Sample Number: 90-OCT-25-12-01 Test status: Authorized by Laura Harrison
Analysis Id: W-BNA Analysis Description: base-neutral-acid water analysis

Storet Number	Analyte	Result	Units
34205	Acenaphthene	10 U	ug/L
34200	Acenaphthylene	10 U	ug/L
39330	Aldrin	10 U	ug/L
34220	Anthracene	10 U	ug/L
34526	Benzo(a)anthracene	10 U	ug/L
34230	Benzo(b)fluoranthene	10 U	ug/L
34242	Benzo(k)fluoranthene	10 U	ug/L
34247	Benzo(a)pyrene	10 U	ug/L
34521	Benzo(g,h,i)perylene	15 U	ug/L
34292	Benzyl butyl phthalate	10 U	ug/L
	a-BHC	10 U	ug/L
39337	b-BHC	10 U	ug/L
39340	d-BHC	10 U	ug/L
	g-BHC	10 U	ug/L
39120	Benzidine	10 U	ug/L
34273	Bis(2-chloroethyl)ether	10 U	ug/L
34278	Bis(2-chloroethoxy)methane	15 U	ug/L
34283	Bis(2-chloroisopropyl)ether	15 U	ug/L
39100	Bis(2-ethylhexyl)phthalate	10 U	ug/L
34636	4-Bromophenyl phenyl ether	10 U	ug/L
34581	2-Chloronaphthalene	10 U	ug/L
34641	4-Chlorophenyl phenyl ether	10 U	ug/L
34320	Chrysene	10 U	ug/L
39310	4,4'-DDD	10 U	ug/L
39320	4,4'-DDE	10 U	ug/L
39300	4,4'-DDT	10 U	ug/L
34556	Dibenzo(a,h)anthracene	15 U	ug/L
39110	Di-n-butyl phthalate	10 U	ug/L
34536	1,2-Dichlorobenzene	10 U	ug/L
34566	1,3-Dichlorobenzene	10 U	ug/L
34571	1,4-Dichlorobenzene	10 U	ug/L
34631	3,3'-Dichlorobenzidine	10 U	ug/L
39380	Dieldrin	10 U	ug/L
34336	Diethylphthalate	10 U	ug/L
34341	Dimethylphthalate	10 U	ug/L
34611	2,4-Dinitrotoluene	10 U	ug/L
34626	2,6-Dinitrotoluene	10 U	ug/L
34596	Di-n-octyl phthalate	10 U	ug/L
34361	Endosulfan-I	10 U	ug/L

Continued

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
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N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
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N/A - Not applicable NR - Not requested

Cont. from previous page for Sample Number: 90-OCT-25-12-01 Analysis_id: W-ENA

34356	Endosulfan-II	10 U	ug/L
34351	Endosulfan-sulfate	10 U	ug/L
39390	Endrin	10 U	ug/L
34366	Endrin-aldehyde	10 U	ug/L
34376	Fluoranthene	10 U	ug/L
34381	Fluorene	10 U	ug/L
39410	Heptachlor	10 U	ug/L
39420	Heptachlor-epoxide	10 U	ug/L
39700	Hexachlorobenzene	15 U	ug/L
34391	Hexachlorobutadiene	10 U	ug/L
34396	Hexachloroethane	60 U	ug/L
34386	Hexachlorocyclypentadiene	10 U	ug/L
34403	Indeno(1,2,3-cd)pyrene	10 U	ug/L
34408	Isophorone	10 U	ug/L
34696	Naphthalene	10 U	ug/L
34447	Nitrobenzene	10 U	ug/L
34438	N-Nitrosodimethylamine	50 U	ug/L
34428	N-Nitrosodi-n-propylamine	10 U	ug/L
34433	N-Nitrosodiphenylamine	15 U	ug/L
34671	PCB-1016	10 U	ug/L
39488	PCB-1221	10 U	ug/L
39492	PCB-1232	10 U	ug/L
39496	PCB-1242	10 U	ug/L
39500	PCB-1248	10 U	ug/L
39504	PCB-1254	10 U	ug/L
39508	PCB-1260	10 U	ug/L
	PCB-1262	10 U	ug/L
34461	Phenanthrene	10 U	ug/L
34469	Pyrene	10 U	ug/L
39400	Toxaphene	10 U	ug/L
34551	1,2,4-Trichlorobenzene	10 U	ug/L
34462	4-Chloro-3-methyl phenol	15 U	ug/L
34586	2-Chlorophenol	15 U	ug/L
34601	2,4-Dichlorophenol	15 U	ug/L
34606	2,4-Dimethylphenol	15 U	ug/L
34616	2,4-Dinitrophenol	30 U	ug/L
34657	2-Methyl-4,6-dinitrophenol	30 U	ug/L
34591	2-Nitrophenol	15 U	ug/L
34646	4-Nitrophenol	50 U	ug/L
39032	Pentachlorophenol	15 U	ug/L
34694	Phenol	15 U	ug/L
34621	2,4,6-Trichlorophenol	15 U	ug/L

Comments (1):
(2):
(3):
(4):
(5):
(6):

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U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-OCT-25-13-01
Sample Location: Cocoa Beach,Fl.P.O.Box 320280
Field ID: City of Cocoa Beach STP
Date/Time Collected: 23-OCT-1990 11:19:10.95
Comments:

Sample Status: Authorized by Tim Fitzpatrick
Matrix: Effluent
Storet Station Number:

Sample Number: 90-OCT-25-13-01
Analysis Id: HG-H-W

Test status: Authorized by Tim Fitzpatrick
Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.1 K	ug/L

Sample Number: 90-OCT-25-13-01
Analysis Id: W-ICP-23

Test status: Authorized by Tim Fitzpatrick
Analysis Description: ICP multielement analysis for water samples

Storet Number	Analyte	Result	Units
01106	Aluminum	42 T	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	NR	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	6 U	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	11 A	ug/L
01045	Iron	52	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	30 U	ug/L
01077	Silver	NR	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	2200	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	15 A	ug/L
	Comment	NONE	

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SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-11755

Received: 02 NOV 90

Dr. Yuh-Hsu Pan
DER-Chemistry Section
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Project: T118/District Samples

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11755-36	6869	Client
11755-37	6870	
11755-38	6884	
11755-39	6885	
11755-40	6886 COCOA BEACH OUTFALL	

PARAMETER	11755-36	11755-37	11755-38	11755-39	11755-40
Ammonia-N, mg/l	1.5	<0.030	0.081	0.070	0.089
Nitrate + Nitrite-N, mg/l	5.5	<0.050	0.10	0.11	0.11

Sample Number: 90-OCT-25-15-01 Sample Status: Authorized by Yuh-Hsu Pan
Sample Location: Cocoa Beach,Fl.P.O.Box 320280 Matrix: Effluent
Field ID: Storet Station Number:
Date/Time Collected: 23-OCT-1990 10:30:16.49
Comments:

Sample Number: 90-OCT-25-15-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N_KJEL_TOT	3.5 A	mg N/L

Sample Number: 90-OCT-25-15-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	3.7 A	mg P/L

Sample Number: 90-OCT-25-15-02 Sample Status: Authorized by Yuh-Hsu Pan
Sample Location: Cocoa Beach,Fl.P.O.Box 320280 Matrix: Field Blank
Field ID: Field Blank Storet Station Number:
Date/Time Collected: 23-OCT-1990 10:30:16.49
Comments:

Sample Number: 90-OCT-25-15-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N_KJEL_TOT	0.43 A	mg N/L

Sample Number: 90-OCT-25-15-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	0.11 A	mg P/L

End of Report

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N/A - Not applicable NR - Not requested

Sample Number: 90-OCT-25-14-01 Sample Status: Authorized by Yuh-Hsu Pan
Sample Location: Cocoa Beach,Fl.P.O.Box 320280 Matrix: Effluent
Field ID: Storet Station Number:
Date/Time Collected: 23-OCT-1990 11:26:24.32
Comments:

Sample Number: 90-OCT-25-14-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-CL Analysis Description: Analysis for chloride in water

Storet Number	Analyte	Result	Units
00940	Chloride	500 A	mg Cl/L

Sample Number: 90-OCT-25-14-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-F Analysis Description: Analysis for fluoride in water

Storet Number	Analyte	Result	Units
00951	Fluoride	0.58 A	mg F/L

Sample Number: 90-OCT-25-14-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	O-Phosphate-P	3.3 A	mg P/L

Sample Number: 90-OCT-25-14-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-SO4 Analysis Description: Analysis for sulfate in water

Storet Number	Analyte	Result	Units
00945	Sulfate	120 A	mg SO4/L

End of Report

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L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

JOB ID: _____

SAMPLE ID: _____

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY SAMPLE SUBMITTAL FORM
PAGE 1

COLLECTION TIME A — GRAB SAMPLE

COLLECTION TIME B — COMPOSITE SAMPLE
BEGIN: _____
END: _____

SUBMITTING AGENCY CODE:	SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	COLLECTION DATE (M/D/Y):	DEPTH, FEET:
	PT SOURCE STUDY		10-23-90	SURF

COUNTY OF SAMPLE ORIGIN:	SAMPLE LOCATION:	FIELD ID/NAME:
BREVARD	COCOA BEACH INWTP	DISCHARGE

WATER
- ☐ SURFACE (FRESH)
- ☐ GROUND
- ☐ SURFACE (SALT)
- ☐ DRINKING
- ☐ TRIP BLANK
- ☒ EFFLUENT
- ☐ FIELD BLANK
- ☐ EQUIPMENT BLANK

SOIL/SEDIMENT
- ☐ SOIL
- ☐ FRESHWATER SEDIMENT
- ☐ MARINE SEDIMENT
- ☐ SLUDGE

TISSUE
- ☐ PLANT
- ☐ FISH
- ☐ SHELLFISH
- ☐ OTHER

CHEMICAL WASTE
- ☐

PRGRM. MOD. #: 1601

NPDES NUMBER (& OUTFALL NO., IF APPLICABLE):
(required for all discharge related samples)

FIELD PARAMETERS MEASURED BY (NAME):

(SIGNATURE):

SAMPLED BY (NAME): Phil Lane

(SIGNATURE):

FIELD REPORT PREPARED BY (NAME):

(SIGNATURE):

FIELD PARAMETERS	UNITS	CODE*	VALUE
CHLORINE, TOTAL RESIDUAL	mg/l	50060	
DISSOLVED OXYGEN (PROBE)	mg/l	00299	
pH	stnd. units	00400	
SALINITY	PPTh	00480	
SECCHI DEPTH	m	00078	
SPECIFIC CONDUCTANCE	µmho/cm	00094	
TEMPERATURE	°C	00010	

ANALYSIS/METHOD REQUESTED	SAMPLE CONTAINER DESCRIPTION	NO. OF CONTAINERS SUBMITTED	PRESERVATIVE USED

NOTE, FILL OUT PAGE 2 (REVERSE) IF ANY LAB PARAMETERS LISTED THERE ARE DESIRED

SEND COPIES OF ANALYSIS REORT TO:
- ☐ SUBMITTING AGENCY
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

*STORET CODES MAY ONLY APPLY TO FIELD MEASUREMENTS

☐ SUBMITTING OFFICE FILL IN SHADED AREAS

PLEASE TYPE OR PRINT CLEARLY

JOB ID: _____

SAMPLE ID: _____

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY SAMPLE SUBMITTAL FORM
PAGE 1

COLLECTION TIME A — GRAB SAMPLE:

COLLECTION TIME B — COMPOSITE SAMPLE
BEGIN: _____
END: _____

SUBMITTING AGENCY CODE:	SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	COLLECTION DATE (M/D/Y):	DEPTH, FEET:
	PT SOURCE STUDY		10-23-90	SURF

COUNTY OF SAMPLE ORIGIN:	SAMPLE LOCATION:	FIELD ID/NAME:
BREVARD	COCOA BEACH INWTP	DISCHARGE

WATER
- ☐ SURFACE (FRESH)
- ☐ GROUND
- ☐ SURFACE (SALT)
- ☒ EFFLUENT
- ☐ DRINKING
- ☐ TRIP BLANK
- ☐ FIELD BLANK
- ☐ EQUIPMENT BLANK

SOIL/SEDIMENT
- ☐ SOIL
- ☐ FRESHWATER SEDIMENT
- ☐ MARINE SEDIMENT
- ☐ SLUDGE

TISSUE
- ☐ PLANT
- ☐ FISH
- ☐ SHELLFISH
- ☐ OTHER

CHEMICAL WASTE
- ☐

PRGRM. MOD. #	NPDES NUMBER (& OUTFALL NO., IF APPLICABLE):
1601	(required for all discharge related samples)

FIELD PARAMETERS MEASURED BY (NAME):

(SIGNATURE):

SAMPLED BY (NAME): Phil Lewis

(SIGNATURE):

FIELD REPORT PREPARED BY (NAME):

(SIGNATURE):

FIELD PARAMETERS	UNITS	CODE*	VALUE
CHLORINE, TOTAL RESIDUAL	mg/l	50060	
DISSOLVED OXYGEN (PROBE)	mg/l	00299	
pH	std. units	00400	
SALINITY	PPTh	00480	
SECCHI DEPTH	m	00078	
SPECIFIC CONDUCTANCE	µmho/cm	00094	
TEMPERATURE	°C	00010	

ANALYSIS/METHOD REQUESTED	SAMPLE CONTAINER DESCRIPTION	NO. OF CONTAINERS SUBMITTED	PRESERVATIVE USED

NOTE, FILL OUT PAGE 2 (REVERSE) IF ANY LAB PARAMETERS LISTED THERE ARE DESIRED

SEND COPIES OF ANALYSIS REORT TO:
- ☐ SUBMITTING AGENCY
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

*STORET CODES MAY ONLY APPLY TO FIELD MEASUREMENTS

☐ SUBMITTING OFFICE FILL IN SHADED AREAS

PLEASE TYPE OR PRINT CLEARLY

Benthic macroinvertebrate taxa list collected via qualitative methods in the vicinity of the Cocoa Beach Sewage Treatment Plant, Brevard County, Florida.

	Test Site	Reference Site
Amphipoda		
Grandidierella bonnieroides	+	+
Corophium cf. sp.	+	+
cf. *Cymadusa compta*	–	+
Gammarus cf. *mucronatus*	+	+
Gitanopsis laguna	–	+
Stenothoe minuta	–	+
Undetermined Amphipoda	+	–
Ascidea		
Undetermined Ascidea	+	+
Cirripedia		
Balanus cf. *eburneus*	–	+
Cnidaria		
Undetermined Hydrozoa	–	+
Merostomata		
Limulus polyphemus	–	+
Cumacea		
Cyclaspis varians	+	–
Oxyurostylis smithi	+	+
Decapoda		
Palaemonetes cf. *intermedius*	+	–
Palaemonetes pugio	+	+
Palaemonetes vulgaris	–	+
Petrolisthes galathinus	+	+
Rhithropanopeus harrisii	+	+
Undetermined Decapoda	+	–
Gastropoda		
Acteocina canaliculata	–	+
Crepidula maculosa	–	+
Crepidula fornicata	+	–
cf. *Haminoea solitaria*	–	+
Melongena corona	–	+
Nassarius vibex	+	+
Isopoda		
Edotea montosa	+	+
Erichsonella cf. *crenulata*	+	+
Exosphaeroma faxoni	+	–
Sphaeroma quadridentatum	+	+
Mysidacea		
Bowmaniella cf. sp.	+	–
Mysidopsis almyra	+	–
Mysidopsis bigelowi	–	+
Nematoda		
Undetermined Nematoda	–	+

Ophiuroidea		
Ophiophragmus filograneus	+	+
Pelecypoda		
Amygdalum papyrium	+	–
Mulinia lateralis	+	+
Platyhelminthes		
Euplana gracilis	–	+
Polychaeta		
Axiothella sp. A	+	+
Capitella cf. *capitata*	+	+
Eteone heteropoda	+	+
Gyptis brevipalpa	+	–
Mediomastus ambiseta	+	+
cf. *Neanthes acuminata*	–	+
Pectinaria gouldii	+	–
Potamilla cf. *reniformis*	–	+
Prionospio heterobranchia	–	+
Schistomeringos cf. *rudolphi*	+	–
Scolelepsis cf. *squamata*	+	–
Scolelepsis texana	–	+
Scoloplos rubra	+	–
Streblospio benedicti	+	+
Undetermined Nereidae	+	–
Undetermined Maldanidae	+	–
Sipuncula		
Phascolion strombi	+	+
Total Taxa	**36**	**38**

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger: Cocoa Beach Sewage Treatment Plant
County: Brevard
NPDES Number: FL0021105
State Permit Expiration Date: June 15, 1991

Toxics Sampling Inspection (XSI)

Date Sampled: 10-23-90
Results: No organic priority pollutants detected. No metals detected at concentrations considered harmful.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 10-23-90
Results: No toxicity to *Ceriodaphnia dubia* or *Notropis leedsi*

Impact Bioassessment Inspection (IBI)

Date Sampled: 10-23-90
Results: Algal growth potential and nitrogen and phosphorus concentrations measured in effluent indicate contribution to eutrophication problems in the Banana River. Macroinvertebrate taxa richness appeared reduced compared to a past sampling.

Water Quality Inspection (WQI)

Date Sampled: 10-23-90
Results: Nitrogen and phosphorus levels elevated, exceeding both FDER and NPDES permit limits.

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

1	2	3	NPDES NUMBER	11	12	YR/MO/DA	17	18	Insp Type	19	Inspector	20	Fac Type
Transaction Code													
N	5		FL0021105			901015			B X		5		1

Remarks

21 66

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide specific condition recommendations for renewal to resolve any concerns.