

Biological Assessment of
IMC Agrico Company-Port Sutton
Hillsborough
NPDES #FL0000264
Sampled January 1997

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June 1997

Biology Section
Division of Administrative and Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: IMC Agrico, Port Sutton
County: Hillsborough
NPDES Number: FL0000264
NPDES Permit Expiration Date: September 30, 1997

Toxics Sampling Inspection (XSI)

Date Sampled: 27 January 1997

Results: The IMC-Agrico effluent was not sampled during this survey. Copper ($15.6 \mu\text{g/L}$) was detected at test site 1 at a concentration which exceeded the Class III standard of $2.9 \mu\text{g/L}$ for marine waters, a violation of Rule 62-302.530(24) FAC. With no effluent sampled, the source of the copper contamination could not be demonstrated. No organic pollutants were found at test site 1.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 27 January 1997

Results: Water from test site 1 was toxic to *Mysidopsis bahia*, a violation of Rules 62-302.500(1)(d) and 62-302.530(62) FAC. The source of the toxicity could not be shown.

Impact Bioassessment Inspection (IBI)

Date Sampled: 27 January 1997

Results: The macroinvertebrate data indicate that extreme degradation occurred at test site 1, including low taxa richness, dominance of pollution tolerant forms, and a violation of Rule 62-302.530(11) FAC, the biological integrity criterion. The disturbed conditions there could be attributed to acute toxicity, low dissolved oxygen, and elevated copper, as well as the poor habitat characteristics of an industrial canal. The phytoplankton population of test site 1, with elevated chlorophyll *a* and algal biomass, and dominance by an indicator of eutrophication, appeared to be imbalanced due to excess nutrients (Rule 62-302.530(48)(b) FAC). Since the IMC Agrico-Port Sutton effluent was not sampled, it cannot presently be determined what specific source was responsible for the several violations of water quality standards observed in Port Sutton Canal.

Water Quality Inspection (WQI)

Date Sampled: 27 January 1997

Results: Mid-depth dissolved oxygen at test site 1 (3.8 mg/L) did not comply with Class III water quality standards (Rule 62-302.530(31) FAC). Ammonia (0.78 mg/L) and total phosphorus (2.8 mg/L) at test site 1 were particularly elevated. The concentrations exceeded those found in 95% of other Florida estuaries. Total phosphorus levels at the reference site (0.35 mg/L) and at test site 2 (0.37 mg/L) were higher than those found in approximately 85% of Florida's estuaries. As expected from the nutrient data, algal growth potential (AGP) at test site 1 (22.4 mg dry wt/L) was well above the problem threshold of 10.0 mg dry wt/L for marine waters (Ron Raschke, USEPA, pers. comm.). AGP at test site 2 (3.7 mg dry wt/L) and the reference site (1.8 mg dry wt/L) were not unusually elevated.

Introduction

Major characteristics of community structure of control and test sites.

IMC-Agrico Company, Port Sutton facility, is engaged in the transfer, storage, and shipping of phosphate rock, phosphate fertilizers, and ammonia. The facility is located in the northeast corner of Hillsborough Bay on Port Sutton Canal (see map in Appendix). Phosphate rock and fertilizers enter the facility on trucks and rail cars, and these products are loaded onto freighters. The ammonia arrives on ships and is transported off-site via pipeline.

Contaminated stormwater runoff from the operations is pumped through a series of stormwater treatment ponds prior to overflowing into a two cell detention pond. Contaminated and non-contaminated stormwater from the ammonia storage area, scrubber overflow, and baghouse wash area, along with non-contact cooling water, is also routed to the two-cell detention pond. Overflow from this pond is discharged to Port Sutton Canal, a channelized, highly industrial waterway which connects with Hillsborough Bay. While the design flow of the wastewater treatment system is 10 MGD, the actual mean flow is 0.5 MGD.

Although the facility is required to measure and report many parameters (see Appendix), the only effluent limitations are as follows: fluoride (5.0 mg/L), dissolved oxygen (4.0 mg/L minimum, 5.0 mg/L as a daily average), combined radium $^{226} + ^{228}$ (5.0 pCi/L), and pH (6.5 SU to 8.5 SU). The facility has been granted a 125 m x 60 m mixing zone for radium $^{226} + ^{228}$.

There is no record of past permit violations, previous bioassess-

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	10	2	15
Shannon-Weaver Diversity	2.8	0.4	3.6
# Polychaete Taxa	4	1	7
% Tubificidae	32.6	93.4	0
% Polychaeta	23.9	6.6	50
% Amphipods	4.4	0	22.5
% Cumacea	28.3	0	8.2
% Gastropoda	2.2	0	8.2
% Pelecypoda	8.7	0	4.1
% Predator/Carnivores	8.7	0	20.4
% Above-Surface Deposit Feeders	0	0	10.2
% Below Surface Deposit Feeders	47.8	100	20.4
% Scavengers	2.2	0	13.3
% Suspension Feeders	37	0	15.3
Browser-grazers	2.2	0	12.3
Phytoplankton Algae			
Number of Taxa	8	7	10
Shannon-Weaver Diversity	1.2	1.9	1.7
Chlorophyll a ($\mu\text{g/L}$)	1.5 I	15.3	2.3 I
Algal Density ($\#/\text{mL}$)	1306.6	2758	986.3
% Blue-green	1.6	.83	0
% Green	0	48.8	2.1
% Diatoms	98.4	50.4	97.9
Algal Growth Potential (mg dry wt/l)	1.8	22.4	3.7

ments, or enforcement actions associated with this facility.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Hillsborough Bay, approximately 1.5

miles north of Port Sutton Canal, just below the 22nd Street bridge) and two test sites. Test site 1 was located in Port Sutton Canal, approximately 150 m east of the discharge, and test site 2 was located approximately 1000 m west of the discharge, at the mouth of Port Sutton Canal (see map in Appendix). Note that the reference site was located in an open water bay area, test site 1 was situated in a man-made canal, and test site 2 was located at the mouth of the canal where it enters the bay. A habitat assessment was performed *in situ* to establish comparability between sites.

The IMC Agrico-Port Sutton effluent was not sampled during this survey. Acute toxicity bioassays, using *Mysidopsis bahia* and *Menidia beryllina* as test organisms, were performed on water samples from test site 1. Test site 1 water was also analyzed for nutrients, metals, and organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the reference site and test site 2. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from three replicate petite Ponar grabs. Phytoplankton was sampled at both reference and test sites. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Dunaliella tertiolecta* for the marine receiving water sites, followed EPA (1974). Sediment from reference and test sites was analyzed for grain size and percent organic matter (Ross 1990).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

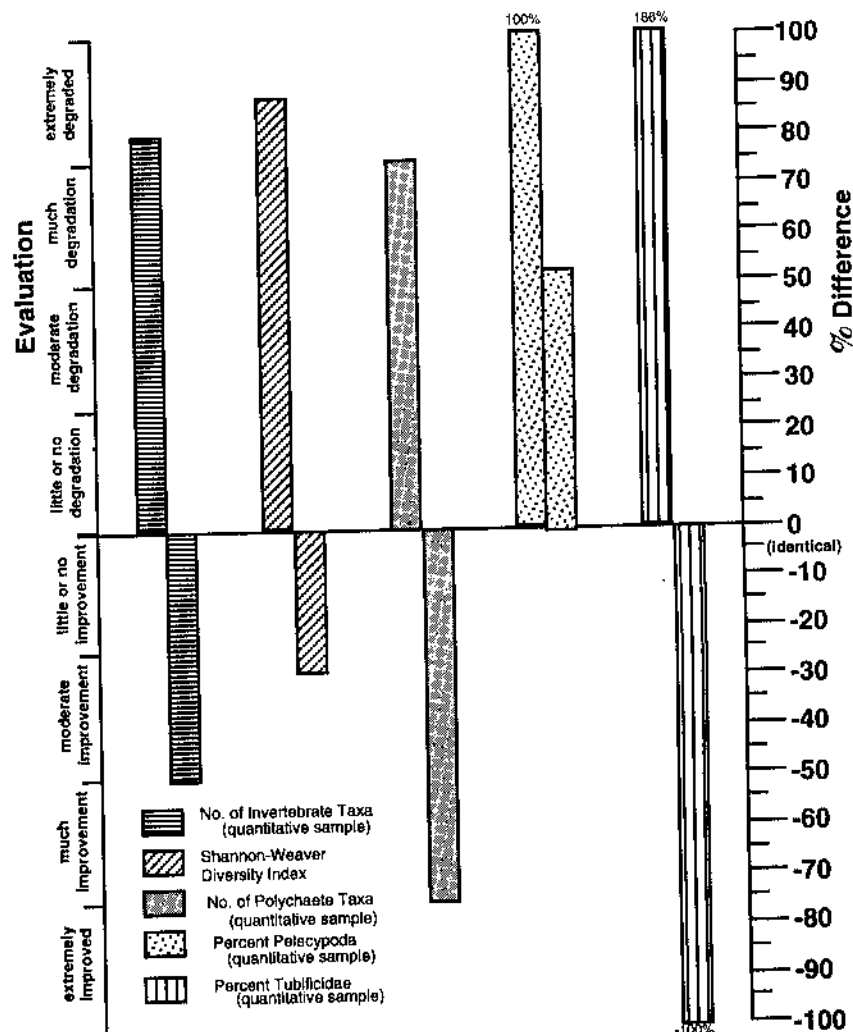
Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient

enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant tax-

on) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et*



Effect of discharge on the benthic macroinvertebrate community. The left bar for each parameter depicts differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

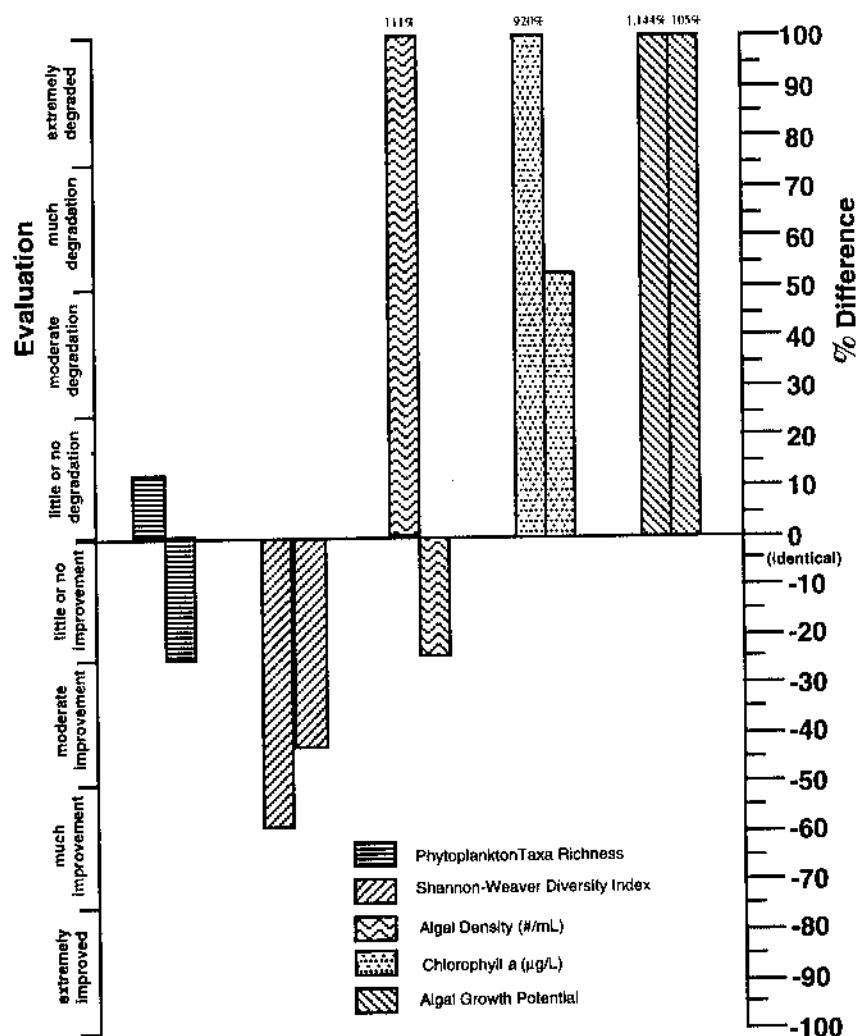
al. (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the diatom to blue-green algae ratio, the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.



Effect of discharge on the algal community. The left bar for each parameter depicts differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

The following personnel were involved in this investigation: Brad Lamb (DEP Southwest District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Elizabeth Miller, Bart Richard, Urania Quintana, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

There were major differences between the reference and test sites established for this study. The reference site was located in an open water bay area, while test site 1 was situated in a highly industrial, man-made canal, and test site 2 was located at the mouth of the canal where it enters the bay. Therefore, it was not surprising that habitat quality at the reference site

(with 60 points) was better than that of test site 1 (25 points) or test site 2 (40 points).

Mid-depth dissolved oxygen at test site 1 (3.8 mg/L) did not comply with Class III water quality standards (Rule 62-302.530(31) FAC, but was acceptable at the other two sites (6.2 mg/L at the reference site and 6.8 mg/L at test site 2). Had bottom dissolved oxygen measurements been taken, values would possibly have been lower. The mid-depth pH values at test site 2 and the reference site were similar (7.8 SU and 7.5 SU, respectively) while the pH at test site one was reduced by greater than one Standard Unit (6.4 SU). Mid-depth salinity ranged from 40.1 ppt at the reference site to 40.6 ppt at test site 1.

The effluent was not sampled during this survey. Instead, a water sample from test site 1 was used for toxicity testing. Exposure to test site 1 water resulted in 5% mortality to the fish, *Menidia beryllina*, and 55% mortality to the mysid shrimp, *Mysidopsis bahia*. The toxicity demonstrated in the *Mysidopsis bahia* test is a violation of Rules 62-302.500(1)(d) and 62-302.530(62) FAC. Because the IMC-Agrico effluent was not sampled, the toxicity can not be attributed to their discharge.

Copper (15.6 µg/L) was detected at test site 1 at a concentration which exceeded the Class III standard of 2.9 µg/L for marine waters, a violation of Rule 62-302.530(24) FAC. Again, the source of the copper contamination could not be demonstrated. No organic pollutants were found at test site 1.

Ammonia (0.78 mg/L) was particularly elevated at test site 1, where the ammonia concentration was higher than those found in 95%

of other Florida estuaries. Similarly, total phosphorus at test site 1 (2.8 mg/L) greatly exceeded the values found in 95% of other Florida estuaries. These results indicate undesirable nutrient enrichment in Port Sutton Canal, potentially due to IMC-Agrico or another source in the area. Total phosphorus levels at the reference site (0.35 mg/L) and at test site 2 (0.37 mg/L) were higher than those found in approximately 85% of Florida's estuaries.

As expected from the nutrient data, algal growth potential (AGP) at test site 1 (22.4 mg dry wt/L) was well above the problem threshold of 10.0 mg dry wt/L for marine waters (Ron Raschke, USEPA, pers. comm.). AGP at test site 2 (3.7 mg dry wt/L) and the reference site (1.8 mg dry wt/L) were not unusually elevated.

Quantitative measures of benthic macroinvertebrate community health suggested that even though the reference site was not pristine, extreme biological impairment was observed at test site 1. The figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site is better than the reference site.

Taxa richness at the reference site (10 taxa) was somewhat low for a Florida estuary (approximately 80% of other estuarine samples have better values) (see Table of Typical Water Quality Values in Appendix). While taxa richness at test site 2 (15 taxa) was closer to normal (near the 40th percentile of other Florida estuaries), test site 1, with only 2 taxa, was lower than 95% of other Florida estuary sys-

tems. Shannon-Weaver diversity at the reference site (2.8) was fairly average, decreasing to an unusually low level (0.4) at test site 1. Again the diversity at test site 1 was worse than the values found 95% of other Florida estuaries. This 86% reduction in diversity between the reference site and test site 1 indicates a violation of the biological integrity criterion there (Rule 62-302.530(11) FAC). Test site 2 diversity (3.6) was somewhat better than average for a Florida estuary.

A total of 4 polychaete taxa were recovered from the reference site, while only 1 polychaete taxon was found at test site 1. Seven polychaete taxa were recovered from test site 2. Pelecypods represented 8.7% of the reference site population, 0% of the test site 1 population, and 4.1% of the test site 2 benthic community. The relative lack of polychaete taxa and pelecypods at test site 1 is another indication of disturbance there. A few pollution sensitive (Farrell 1992) marine taxa, such as *Ampelisca* spp., *Cyclaspis varians*, and *Eteone heteropoda*, were found at both the reference site and at test site 2. In contrast, the taxa found at test site 1, *Capitella* sp. and Tubificidae, are known to be tolerant of polluted conditions.

In summary, the macroinvertebrate data indicate that extreme degradation (including a biological integrity violation) was observed at test site 1. The disturbed conditions there could be attributed to the acute toxicity, low dissolved oxygen, and elevated copper, as well as the poor habitat characteristics of an industrial canal. Since the IMC Agrico-Port Sutton effluent was not sampled, it can not presently be determined what specific source was

responsible for the several violations of water quality standards observed in Port Sutton Canal.

The figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Phytoplankton taxa richness ranged from 7 taxa at test site 1 to 10 taxa at test site 2. Algal Shannon-Weaver diversity was low at all sites, ranging from 1.2 to 1.9. Algal density at test site 1 (2,758 cells/mL) was over double that of the reference site (1,306 cells/mL) or test site 2 (986 cells/mL). Similarly, while chlorophyll *a* was low at the reference site and at test site 2, chlorophyll *a* at test site 1 (15.3 µg/L) was higher than the values found in approximately 85% of Florida's estuaries. Test site 1 was dominated by *Cylindrotheca* sp., an alga associated with eutrophic conditions (Lowe 1974). The phytoplankton population of test site 1, with elevated chlorophyll *a* and algal biomass, and dominance by an indicator of eutrophication, appeared to be imbalanced due to excess nutrients (Rule 62-302.530(48)(b) FAC).

Conclusions

Mid-depth dissolved oxygen at test site 1 (3.8 mg/L) did not comply with Class III water quality standards (Rule 62-302.530(31) FAC).

The IMC-Agrico effluent was not sampled during this survey. Acute toxicity was demonstrated in water from test site 1, a violation of Rules 62-302.500(1)(d) and 62-302.530(62) FAC.

Copper (15.6 µg/L) was detected at test site 1 at a concentration which exceeded the Class III standard of 2.9 µg/L for marine waters, a violation of Rule 62-302.530(24) FAC. With no effluent samples, the source of the copper contamination could not be demonstrated. No organic pollutants were found at test site 1.

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The macroinvertebrate data indicate that extreme degradation occurred at test site 1, including low taxa richness, dominance of pollution tolerant forms, and a violation of Rule 62-302.530(11) FAC, the biological integrity criterion. The disturbed conditions there could be attributed to acute toxicity, low dissolved oxygen, and elevated copper, as well as the poor habitat characteristics of an industrial canal.

The phytoplankton population of test site 1, with elevated chlorophyll *a* and algal biomass, and dominance by an indicator of eutrophication, appeared to be imbalanced due to excess nutrients (Rule 62-302.530(48)(b) FAC). Since the IMC Agrico-Port Sutton effluent was not sampled, it can not presently be determined what specific source was responsible for the several violations of water quality standards observed in Port Sutton Canal.

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**Chemistry Summary Table
for IMC Agrico - Port Sutton.**
**Reference
Site**
Test Site 1
Test Site 2

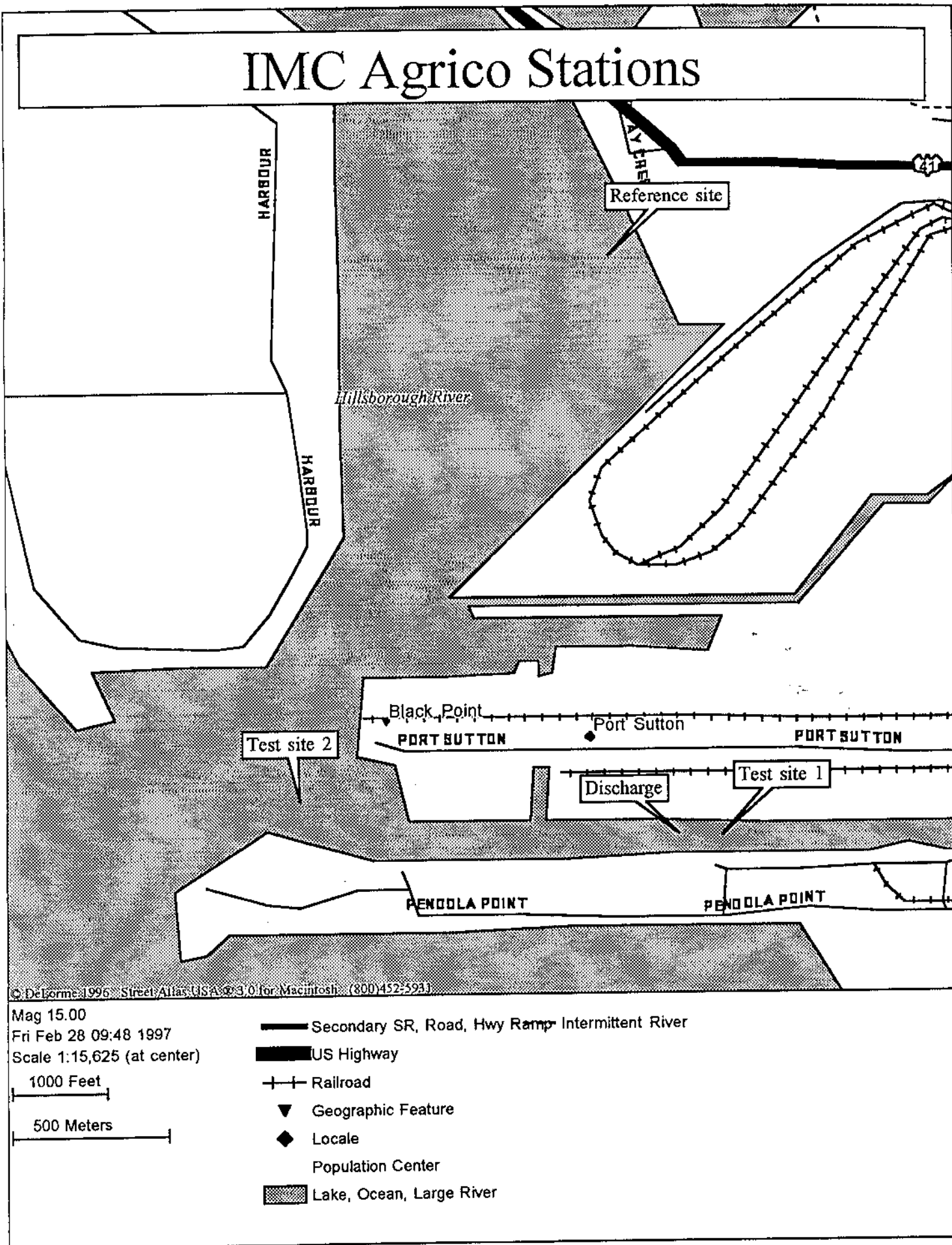
Organic Constituents (ug/L)			
	-	None detected	-
Metals (ug/L)			
Aluminum	-	270	-
Arsenic	-	2 U	-
Cadmium	-	2 U	-
Copper	-	15.6	-
Chromium	-	20 U	-
Iron	-	249	-
Lead	-	10 U	-
Mercury	-	0.1 U	-
Nickel	-	4 U	-
Selenium	-	2 U	-
Silver	-	0.4 U	-
Zinc	-	16 I	-
Nutrients (mg/L)			
Ortho-phosphate	0.24	0.13	0.2
Total phosphorus	0.35 A	2.8	0.37
Ammonia	0.057	0.78	0.054 A
Nitrate+Nitrite	0.005 I	0.02 U	0.004 I
TKN	0.53 A	1.5	0.5
General Phys-Chem Parameters			
Habitat Assessment	60	25	40
Mid-depth dissolved oxygen (mg/L)	6.2	3.8	6.8
Mid-depth pH (SU)	7.8	6.4	7.5
Mid-depth Specific Conductance (µmhos/cm)	51,780	6,030	54,300
Mid-depth Salinity (ppt)	40.1	4.2	40.4
Mid-depth Temperature (°C)	18	15	19
Algal Growth Potential (mg dry wt/L)	1.8	22.4	3.7
Toxicity			
Bioassay Fish	-	5% mortality	-
Bioassay Invertebrate	-	55% mortality- Acutely Toxic	-

A - Value reported is the mean of two or more determinations

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

U - Material analyzed for but not detected; value reported is the minimum detection limit

IMC Agrico Stations



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: <u>Imc-Agrico Co. Pt Sutton</u>		Prepared by: <u>Brad Lamb</u> Date:	
Location (attach detailed map): <u>attached</u>	County: <u>Hillsborough</u>	District: <u>SWD</u>	
Federal Permit # and expiration date: <u>FL 6000264 / Oct. 29, 1998</u>	State-GMS # and State-expiration date: <u>FL 0000264 / Oct. 29, 1998</u>	Facility Type: <u>Industrial</u> Municipal Federal Agricultural Other (list):	
Function of facility: <u>Facility transfers, stores and ships phosphate rock, phosphate fert. and ammonia.</u>			
Description of treatment process: <u>Contaminated stormwater run-off from the operations are pumped through a series of stormwater ponds prior to overflowing into a two cell detention pond. Contaminated and non-contaminated stormwater along with noncontact cooling water from the ammonia storage area and scrubber underflow and baghouse wash water is also routed to the two-cell detention pond. Overflow from the pond is discharged from outfall 001 to Port Sutton Channel.</u>			
Receiving waters: <u>Tampa Bay via Pt. Sutton</u>		Classification: <u>Class III, Marine</u>	
Design Flow: <u>> 10 mgd</u>		Actual Mean Flow: <u>~ .5 mgd</u>	
Discharge is: <u>Continuous</u> Intermittent Seasonal Rainfall dependent Other (describe): therefore, the best time to sample is: <u>anytime</u>			
If facility has a mixing zone, give details (size, parameters affected, etc.): <u>Yes, mixing zone is for Combined Radium 226+228. The size is 125 m length by the width of the channel (125m x 60 m).</u>			
List effluent limits: <u>See Attached</u>		Describe special permit conditions and permit modifications: <u>n/a</u>	
Parameter	Limit (units)		

Inle Pt-Sutton

(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

One primary outfall - 001:
5004- Emergency outfall
5006- Emergency outfall

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: n/a

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

n/a

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:

overall, Tampa Bay is improving through the continued efforts of
FDEP and TBNEP.

Additional information:

Typical Values for Selected Parameters in Florida Waters

Adapted from Joe Hand, FDER, personal communication, 1991

(data was collected between 1980 and 1989)

Percentile Distribution

Parameter	5 %	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	95 %
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STREAMS

(1617 stations)

Phytoplankton Chlorophyll <i>a</i>	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll <i>a</i>	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO ₂ -NO ₃	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30

LAKES

(477 stations)

Phytoplankton Chlorophyll <i>a</i>	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH ₃ +NH ₄	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO ₂ -NO ₃	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00

ESTUARIES

(690 stations)

Phytoplankton Chlorophyll <i>a</i>	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH ₃ +NH ₄	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO ₂ -NO ₃	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:

Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m²), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

Existing Pollution Abatement Facilities

Contaminated stormwater runoff from the phosphate rock, fertilizer unloading, storage and loading areas are pumped through a series of stormwater treatment ponds prior to overflowing into a two cell detention pond. Contaminated and non-contaminated stormwater along with non-contact cooling water from the ammonia storage area and scrubber underflow and baghouse wash water is also routed to the two cell detention pond. Overflow from the pond is discharged from Outfall 001 to Port Sutton Channel. Storm water runoff from various areas of the facility may be discharged during emergency or upset conditions to the Channel through Outfalls S-004 and S-006.

Proposed Construction

Scrubber underflow water and baghouse wash water will be treated with a flocculant prior to being routed to two new scrubber settling ponds arranged in series. Wastewater from the second settling pond will be returned to the scrubbers for reuse. In the event of mechanical failure or excessive rainfall wastewater from the second settling pond may overflow into the two cell detention basin which contains non-process stormwater runoff, and non-contact cooling water. Overflow from the two cell detention basin is discharged via Outfall 001. Storm water runoff from various areas of the facility may be discharged during emergency or upset conditions to the Channel through Outfalls S-004 and S-006.

2. PROPOSED EFFLUENT LIMITATIONS

Serial 001 - Combined once-through non-contact heat exchange water, and treated stormwater.

<u>Effluent Characteristics</u>	<u>Daily Minimum</u>	<u>Daily Average</u>	<u>Daily Maximum</u>
Flow, MGD	N/A	Report	Report
Total Suspended Solids (TSS), mg/l	N/A	Report	Report
Total Non-volatile, Non-filterable Residue (FS), mg/l	N/A	Report	Report
Total Phosphorus (as P), mg/l	N/A	Report	Report
Total Nitrogen (as N) mg/l	N/A	Report	Report
Un-ionized Ammonia (as N), mg/l	N/A	Report	Report
Total Ammonia (as N), mg/l	N/A	Report	Report
Fluoride, mg/l	N/A	Report	5.0
Specific Conductance, micromhos/cm	N/A	Report	Report
Temperature, °C	N/A	N/A	Report
pH, std. units	6.5	N/A	8.5
Dissolved Oxygen, mg/l	4.0*	N/A	N/A
Combined Radium 226 & 228, pCi/l	N/A	N/A	5.0

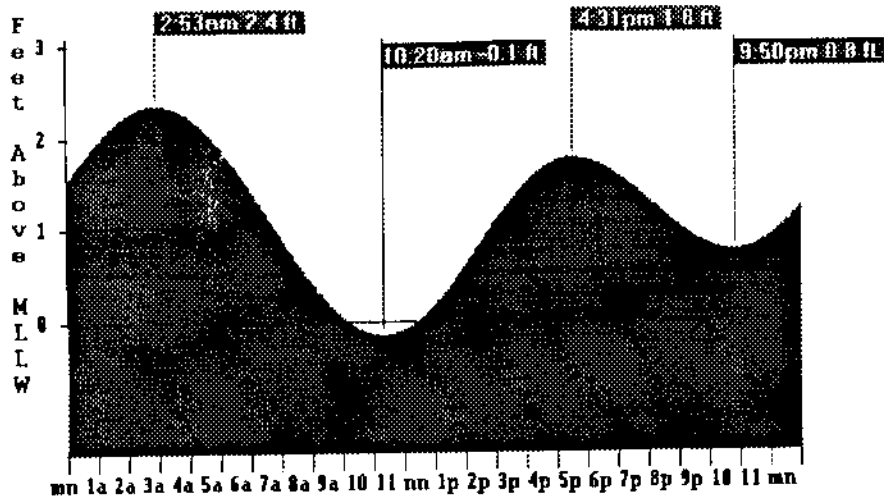
*24-hr. average must not be less than 5.0 mg/l

I. Effluent Limitations and Monitoring Requirements:

A. Surface Water Discharges

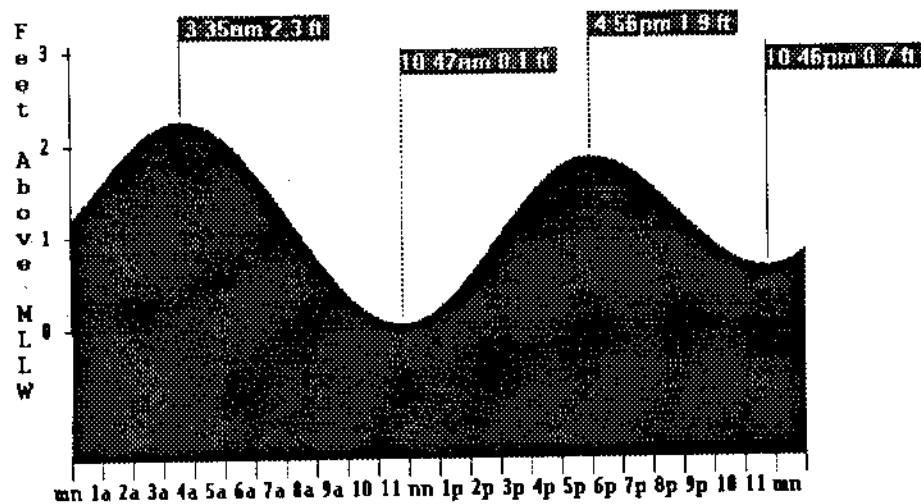
1. During the period beginning on the effective date and lasting through the expiration date of this permit, the permittee is authorized to discharge from Outfall 001 contaminated and uncontaminated storm water along with non-contact cooling water from various areas of the facility. Such discharge shall be limited and monitored by the permittee as specified below:

Parameters (units)	Discharge Limitations			Monitoring Requirements	
	Daily Min.	Monthly Avg	Daily Max.	Frequency	Sample Type
Site I.D. 12576					
Flow, MGD	N/A	Report	Report	Continuous	Recorder
Total Suspended Solids (TSS), mg/l	N/A	Report	Report	Weekly	24-Hour Composite
Total Non-volatile, Non-filterable Residue (FS), mg/l	N/A	Report	Report	Weekly	24-Hour Composite
Total Phosphorus (as P), mg/l	N/A	Report	Report	Weekly	24-Hour Composite
Total Nitrogen (as N) mg/l	N/A	Report	Report	Weekly	24-Hour Composite
Un-ionized Ammonia (as N), mg/l	N/A	Report	Report	Weekly	Calculated
Total Ammonia (as N), mg/l	N/A	Report	Report	Weekly	Grab
Fluoride, mg/l	N/A	Report	5.0	Weekly	24-Hour Composite
Specific Conductance, micromhos/cm	N/A	Report	Report	Weekly	Grab
Temperature, °C	N/A	Report	Report	Weekly	Grab
pH, std. units	See Specific Condition I.A.4.				
Dissolved Oxygen, mg/l	See Specific Condition I.A.6.				
Combined Radium 226 & 228, pCi/l	See Specific Condition I.A.9.				



Tampa Hillsborough Bay SUN Jan 26, 1997 EST
TideMaster - (C) Zephyr Services, Pittsburgh PA

12:00M	1.6 ft	5:00a	1.9 ft	10:00a	-0.1 ft	3:00p	1.5 ft	8:00p	1.1 ft
1:00a	2.0 ft	6:00a	1.5 ft	11:00a	0.0 ft	4:00p	1.8 ft	9:00p	0.9 ft
2:00a	2.3 ft	7:00a	0.9 ft	12:00N	0.2 ft	5:00p	1.8 ft	10:00p	0.8 ft
3:00a	2.4 ft	8:00a	0.5 ft	1:00p	0.6 ft	6:00p	1.6 ft	11:00p	0.9 ft
4:00a	2.3 ft	9:00a	0.1 ft	2:00p	1.1 ft	7:00p	1.4 ft	12:00M	1.3 ft



Tampa Hillsborough Bay Mon Jan 27, 1997 EST
TideMaster - (C) Zephyr Services, Pittsburgh PA

12:00M	1.3 ft	5:00a	2.1 ft	10:00a	0.2 ft	3:00p	1.5 ft	8:00p	1.3 ft
1:00a	1.7 ft	6:00a	1.7 ft	11:00a	0.1 ft	4:00p	1.8 ft	9:00p	1.0 ft
2:00a	2.0 ft	7:00a	1.3 ft	12:00N	0.3 ft	5:00p	1.9 ft	10:00p	0.8 ft
3:00a	2.3 ft	8:00a	0.8 ft	1:00p	0.6 ft	6:00p	1.8 ft	11:00p	0.7 ft
4:00a	2.3 ft	9:00a	0.4 ft	2:00p	1.1 ft	7:00p	1.6 ft	12:00M	0.9 ft

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-88)

Reference

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (MM/DD/YY): <u>1/27/97</u>	TIME: <u>11:00</u>	RECEIVING BODY OF WATER: <u>TAMPA BAY</u>
SUBMITTING AGENCY NAME: _____				

REMARKS: _____	COUNTY: <u>(29)</u> <u>Hillsb</u>	LOCATION: <u>Causeway & East Bay</u>	FIELD ID NAME: <u>(upstream)</u> <u>Reference Site 1</u>
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RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):													
Forest/Natural <u>30</u>	Silviculture _____	Field/Pasture _____	Agricultural _____	Residential _____	Commercial _____	Industrial <u>70</u>	Other (Specify) _____						
Local Watershed Erosion (check box): None <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy <input type="checkbox"/>													
Local Watershed NPS Pollution (check box): No evidence <input type="checkbox"/> Slight <input checked="" type="checkbox"/> Moderate potential <input type="checkbox"/> Obvious sources <input type="checkbox"/>													
Width of riparian vegetation (m) on least buffered side: <u>3</u>		List & map dominant vegetation on back		Typical Width (m)/Depth (m)/Velocity (m/sec) Transect									
Artificially Channeled <input checked="" type="checkbox"/> no <input type="checkbox"/> recent, severe some recovery mostly recovered more channelized				<table style="width:100%"> <tr> <td style="text-align:center">m/s</td> <td style="text-align:center">m/s</td> <td style="text-align:center">m/s</td> </tr> <tr> <td style="text-align:center">m deep</td> <td style="text-align:center">m deep</td> <td style="text-align:center">m deep</td> </tr> </table>				m/s	m/s	m/s	m deep	m deep	m deep
m/s	m/s	m/s											
m deep	m deep	m deep											
Artificially Impounded <input type="checkbox"/> yes													
High Water Mark: <u>1</u> + <u>0.25</u> = <u>1.25</u> <small>(m above present water level) (present depth in m) (m above bed)</small>													
Canopy Cover % : Open : <input checked="" type="checkbox"/> Lightly Shaded (11-45%): <input type="checkbox"/> Moderately Shaded (46-80%): <input type="checkbox"/> Heavily Shaded: <input type="checkbox"/>													

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: <input checked="" type="checkbox"/> Sewage: <input type="checkbox"/> Petroleum: <input type="checkbox"/> Chemical: <input type="checkbox"/> Anaerobic: <input type="checkbox"/> Other: <input type="checkbox"/>			
Sediment Oils: Absent: <input type="checkbox"/> Slight: <input checked="" type="checkbox"/> Moderate: <input type="checkbox"/> Profuse: <input type="checkbox"/>			
Sediment Deposition: Sludge: <input type="checkbox"/> Sand smothering: <input type="checkbox"/> (none slight moderate severe) Silt smothering: <input type="checkbox"/> (none slight moderate severe) Other: <input type="checkbox"/>			
Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	_____	_____	_____
Leaf Packs or Mats	_____	_____	_____
Aquatic Vegetation	_____	_____	_____
Rock or Shell Rubble	_____	_____	_____
Undercut banks/Roots	_____	_____	_____
Substrate Types	% coverage	# times sampled	method
Sand	<u>100%</u>	<u>3</u>	<u>Pence</u>
Mud/Muck/Silt	_____	_____	_____
Other:	_____	_____	_____
Other:	_____	_____	_____

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Secchi (m):
Top	_____	_____	_____	_____	_____	<u>N/A</u>
Mid-depth	<u>0.6</u>	<u>18.3</u>	<u>7.79</u>	<u>6.12</u>	<u>51.780</u>	
Bottom	_____	_____	_____	_____	_____	

System Type : Stream: <input type="checkbox"/> (1st - 2nd order 3rd - 4th order) <input type="checkbox"/> (5th - 6th order 7th order or greater) <input type="checkbox"/> Lake: <input type="checkbox"/> Wetland: <input type="checkbox"/> Estuary: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>																												
Water Odors (check box): Normal: <input checked="" type="checkbox"/> Sewage: <input type="checkbox"/> Petroleum: <input type="checkbox"/> Chemical: <input type="checkbox"/> Other: <input type="checkbox"/>																												
Water Surface Oils (check box): None: <input checked="" type="checkbox"/> Sheen: <input type="checkbox"/> Globbs: <input type="checkbox"/> Slick: <input type="checkbox"/>																												
Clarity (check box): Clear: <input type="checkbox"/> Slightly turbid: <input checked="" type="checkbox"/> Turbid: <input type="checkbox"/> Opaque: <input type="checkbox"/>																												
Color (check box): Tannic: <input checked="" type="checkbox"/> Green (algae): <input type="checkbox"/> Clear: <input type="checkbox"/> Other: <input type="checkbox"/>																												
Weather Conditions/Notes: <u>Clear, Sunny, Amb. Temp ~ 70° F</u>		<table border="1" style="width:100%"> <tr> <th>Abundance:</th> <th>Absent</th> <th>Rare</th> <th>Common</th> <th>Abundant</th> </tr> <tr> <td>Periphyton</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Fish</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Aquatic Macrophytes</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Iron/sulfur Bacteria</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		Abundance:	Absent	Rare	Common	Abundant	Periphyton	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Aquatic Macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Iron/sulfur Bacteria	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abundance:	Absent	Rare	Common	Abundant																								
Periphyton	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																								
Aquatic Macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
Iron/sulfur Bacteria	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								

SAMPLING TEAM: <u>J. Spencer, B. Lamb</u>	SIGNATURE: <u>[Signature]</u>	DATE: <u>2/17/97</u>
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): _____	RECEIVING BODY OF WATER: TAMPA BAY
SUBMITTING AGENCY NAME: _____			


REMARKS: _____	LOCATION: Inland Agave - Pt. Sutton	FIELD ID/NAME: TEST SITE #1
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Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 3	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 13	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 communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation 3	>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 2	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 1	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 3	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 **25**

COMMENTS:

Shipping Channel

ANALYSIS DATE: 11/21/07	ANALYST: Brad Lamb	SIGNATURE: 
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-86)

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (MM/DD): 4/27/97	TIME: 1230	RECEIVING BODY OF WATER: TAMPA BAY
SUBMITTING AGENCY NAME: _____				

REMARKS: _____	COUNTY: Hills	LOCATION: Jac Port Substn	FIELD NAME: TEST SITE #1
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RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural 10	Silviculture _____	Field/Pasture _____	Agricultural _____	Residential _____	Commercial 30	Industrial 60	Other (Specify) _____
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Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☒ Moderate potential ☐ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: **2** List & map dominant vegetation on back

Artificially Channeled ☐ no ☒ recent, covers some recovery mostly recovered more obvious

Artificially Impounded ☐ yes _____

High Water Mark: **5** + **5** = **10**
(m above present water level) (present depth in m) (m above bed)

Canopy Cover %: Open ☐ Lightly Shaded (11-45%): ☒ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

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

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

Sediment Deposition: Sludge: ☐ Sand smothering: none slight ☒ moderate severe Silt smothering: none slight ☒ moderate severe Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	_____	_____	_____	Sand	_____	_____	_____
Leaf Packs or Mats	_____	_____	_____	Mud/Muck/Silt	100	3	Probe
Aquatic Vegetation	_____	_____	_____	Other:	_____	_____	_____
Rock or Shell Rubble	_____	_____	_____	Other:	_____	_____	_____
Undercut banks/Roots	_____	_____	_____	Draw aerial view sketch of habitats found in 100 m section			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Sacchi (m):
Top	_____	_____	_____	_____	_____	_____
Mid-depth	_____	15	6.93	3.84	50,500	_____
Bottom	_____	_____	_____	_____	_____	_____

System Type: Stream: ☐ (1st - 2nd order 3rd - 4th order 5th - 6th order 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☒ Other: ☐

Water Odors (check box): Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☒ **SO₂**

Water Surface Oils (check box): None: ☒ Sheen: ☐ Globbs: ☐ Slick: ☐

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

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

Weather Conditions/Notes: **Clear, 70°F, lt. wind**

Abundance:	Absent	Rare	Common	Abundant
Periphyton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquatic Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLING TEAM: Spencer, Lamb	SIGNATURE: D. B. Lamb	DATE: 2/17/97
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): <u>1/27/97</u>	RECEIVING BODY OF WATER: <u>Tampa Bay</u>
SUBMITTING AGENCY NAME: _____			

REMARKS: _____	LOCATION: <u>South side of Pt. Sutton</u>	FIELD ID/NAME: <u>TEST SITE #2</u> <u>Reference Site #2</u>
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Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations <u>3</u>	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 <u>10</u>	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 communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation <u>3</u>	>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 <u>4</u>	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 <u>5</u>	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 <u>5</u>	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 40

COMMENTS:

ESTUARY - SANDY AREA ADJ. TO INDUSTRIAL PORT

ANALYSIS DATE: <u>1/27/97</u>	ANALYST: <u>Brad Lamb</u>	SIGNATURE: <u>[Signature]</u>
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): 1/27/97	TIME: 1:30	RECEIVING BODY OF WATER: Tampa Bay
SUBMITTING AGENCY NAME: _____				

REMARKS: _____	LOCATION: South Side of Pt. Suwan	FIELD ID/NAME: Transect #2 Site #2
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RIPARIAN ZONE/INSTREAM FEATURES

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

Forest 20	Field/Pasture	Agricultural	Residential	Commercial 10	Industrial 70	Other
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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):
 Industrial Port, power plants nearby etc...

Estimated Stream Width (range, m): 200 Estimated Stream Depth (range, m): 1-15

High Water Mark (m above bed): _____ Velocity (range, m/s): _____

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

Impounded ☐ Channelized ☒

SEDIMENT/SUBSTRATE

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	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Rock or Shell Rubble				Woody Debris (Snags)			
Aquatic Vegetation				Leaf Packs/Roots			
Sand	95	3	Ponar	Undercut Banks			
Other:				Mud/Muck	5	3	Ponar

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	Secchi Depth (m):	N/A
Top			pH (SU):	7.50
Mid-depth	19	16.95	Conductivity (µmho/cm):	54,300
Bottom			Other Parameters:	

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

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

Water Surface Oils (check box): Slick ☐ Sheen ☐ Globbs ☐ None ☒

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

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

Weather Conditions:	Abundance:	Absent	Rare	Common	Abundant
Clean, lt. wind, Temp 70°F	Periphyton	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Aquatic Macrophytes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ANALYSIS DATE: 1/27/97	ANALYST: B. Lamb	SIGNATURE:
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): <u>1/27/97</u>	RECEIVING BODY OF WATER: <u>Tampa Bay</u>
SUBMITTING AGENCY NAME: _____			

REMARKS: _____	LOCATION: <u>Causeway & EAST BAY</u>	FIELD ID NAME: <u>Reference Site</u>
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Habitat Parameter <div style="border: 1px solid black; padding: 2px;">score</div>	Excellent	Good	Fair	Poor
Littoral Alterations <div style="border: 1px solid black; padding: 2px;">5</div>	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 <div style="border: 1px solid black; padding: 2px;">33</div>	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 communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation <div style="border: 1px solid black; padding: 2px;">3</div>	>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 <div style="border: 1px solid black; padding: 2px;">3</div>	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 <div style="border: 1px solid black; padding: 2px;">9</div>	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 <div style="border: 1px solid black; padding: 2px;">7</div>	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 <div style="border: 1px solid black; padding: 2px; display: inline-block;">60</div>
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COMMENTS: <u>ESTUARY</u>

ANALYSIS DATE: <u>1/27/97</u>	ANALYST: <u>Brad Lamb</u>	SIGNATURE: <u>[Signature]</u>
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form updated 4/01/96

Benthic macroinvertebrate taxa list for IMC-Agrico Co., collected via Ponar grab samples in Tampa Bay, on 27 January, 1997. Densities, in number/m², represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Polychaeta			
<i>Eteone heteropoda</i>	42	-	111
<i>Mystides borealis</i>	14	-	-
<i>Nereis succinea</i>	-	-	28
<i>Laeonereis culveri</i>	-	-	14
Undetermined Orbiniidae	14	-	28
<i>Leitoscoloplos</i> sp.	-	-	14
<i>Prionospio heterobranchia</i>	-	-	28
<i>Streblospio benedicti</i>	-	-	14
<i>Capitella</i> sp.	83	153	42
<i>Capitella capitata</i>	-	-	56
Oligochaeta			
Undetermined Tubificidae	208	2167	-
Gastropoda			
<i>Pyramidella</i> sp.	14	-	56
Pelecypoda			
<i>Parastarte triquetra</i>	56	-	28
Cumacea			
<i>Oxyurostylis</i> sp.	42	-	-
<i>Cyclaspis</i> sp.	-	-	14
<i>Cyclaspis varians</i>	139	-	42
Tanaidacea			
<i>Hargeria rapax</i>	-	-	28
Isopoda			
<i>Edotea montosa</i>	-	-	14
Amphipoda			
<i>Ampelisca</i> sp.	28	-	42
<i>Ampelisca abdita</i>	-	-	56
<i>Ampelisca vadorum</i>	-	-	56
Ophiuridae			
	-	-	14

Phytoplankton taxa list and densities (#/mL) for IMC-Agrico Co., collected via subsurface grabs in Tampa Bay, on 27 January, 1997.

	Refernce Site	Test Site 1	Test Site 2
Cyanophyceae			
<i>Oscillatoria</i> sp.	21	-	-
<i>Spirulina</i> sp.	-	11	-
<i>Anabaena</i> sp.	-	11	-
Bacillariophyceae			
<i>Paralia</i> sp.	-	-	55
<i>Skeletonema</i> sp.	1054	-	705
<i>Cyclotella</i> sp.	-	-	14
<i>Coscinodiscus</i> sp.	-	-	7
<i>Chaetoceros</i> sp.	11	-	-
Undetermined Pennales	21	80	48
<i>Fragilaria</i> sp.	32	-	-
<i>Asterionella</i> sp.	63	-	27
<i>Cocconeis</i> sp.	21	-	14
<i>Navicula</i> sp.	42	34	27
<i>Gyrosigma</i> sp.	-	115	-
<i>Nitzschia</i> sp.	-	-	48
<i>Cylindrotheca</i> sp.	42	1161	21
Chlorophyceae			
<i>Chlorella</i> sp.	-	-	21
<i>Oocystis</i> sp.	-	724	-
<i>Crucigenia</i> sp.	-	621	-

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

Transaction Code			NPDES NUMBER								YR/MO/DA				Insp Type	Inspector	Fac Type											
1	N	2	5	3	F	L	0	0	0	0	2	6	4	11	12	9	7	0	1	2	7	17	18	X	19	S	20	2
Remarks																												

21

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

Transaction Code			NPDES NUMBER								YR/MO/DA				Insp Type	Inspector	Fac Type											
1	N	2	5	3	F	L	0	0	0	0	2	6	4	11	12	9	7	0	1	2	7	17	18	B	19	S	20	2
Remarks																												

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