#206

Biological Assessment of

Florida Cities Gulf Gate Wastewater Treatment Plant

Sarasota County

NPDES #FL0032816

Sampled April 1997

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October 1997

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Florida Cities Gulf Gate
County: Sarasota
NPDES Number: FL0032816
State Permit Expiration Date: 1 May 1997

Toxics Sampling Inspection (XSI)

Date Sampled: 14 April 1997

Results: Atrazine was the only organic constituent detected in the effluent sample, at a level below the minimum quantitation limit. No metals were found at levels exceeding Class III standards. Sediments from Matheny Creek exhibited more PAH contamination than those of Clower Creek, particularly at test site 1 where five compounds were detected at concentrations greater than the "probable effect level".

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 14 April 1997

Results: The effluent was not acutely toxic to the cladoceran, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, in 48 hour static bioassays.

Impact Bioassessment Inspection (IBI)

Date Sampled: 14 April 1997

Results: Several quantitative measures of benthic macroinvertebrate community health indicated degradation in Matheny Creek, compared with Clower Creek. The Shannon-Weaver diversity index declined by 32% at test site 1 and 68% at test site 2, compared with the reference site, both representing violations of the biological integrity criterion (62.302.530(11) FAC). Considering the good performance of the WWTP, as well as the obvious habitat disturbance and stormwater inputs in the Matheny Creek watershed, the data suggest the degradation was caused by sources other than the Gulf Gate facility. The phytoplankton data did not indicate that the Gulf Gate discharge was responsible for any disruption of the algal community in Matheny Creek. Chlorophyll *a* at the Clower Creek reference site (20.8 µg/L) was higher than the values found in approximately 93% of other Florida estuary systems, but decreased to normal levels at the test sites.

Water Quality Inspection (WQI)

Date Sampled: 14 April 1997

Results: Dissolved oxygen at the reference site and the two test sites did not comply with the Class III minimum for marine waters (4.0 mg/L), violating Rule 62-302.530(31) FAC. Nutrient concentrations in the effluent were low, and in compliance with permit limits. Total phosphorus was moderately elevated at all three sites, and nitrate-nitrite at test site 1 (2.9 mg/L) exceeded the values found in 95% of Florida's estuaries, suggesting nitrogen inputs from sources other than the discharge (*e.g.* residential/commercial stormwater runoff). Algal growth potential (AGP) results exceeded the "problem threshold" level of 10 mg dry wt/L at all three receiving water sites. AGP was highest at test site 1 (55.1 mg/dry wt/L), coinciding with the elevated nitrate-nitrite concentrations there.

Introduction

The Florida Cities Gulf Gate Wastewater Treatment Plant is located in Sarasota County, Florida (see maps in Appendix). Treatment at this 1.8 MGD advanced wastewater treatment (AWT) facility consists of activated sludge processing, clarification, biological contact, filtration, chlorination for disinfection, and dechlorination prior to discharge into the Class III Matheny Creek. From the point of discharge, Matheny Creek flows approximately another 0.5 mile before emptying into Little Sarasota Bay. Monthly average flow during this survey was 1.491 MGD.

Permit limits, required by Grizzle-Figg legislation, are as follows: BOD and TSS (5 mg/L annual average, 6.25 mg/L monthly average, 7.25 mg/L weekly average, and 10 mg/L maximum), fecal coliform bacteria (25 organisms/100 mL maximum), total nitrogen (3 mg/L annual average), total phosphorus (1.0 mg/L annual average), dissolved oxygen (5.0 mg/L minimum), flow (1.8 MGD maximum), pH (6.0 to 8.5 SU), and total residual chlorine (0.01 mg/L maximum at discharge).

With the exception of minor problems (*e.g.*, chlorine meter malfunction), the operation of the plant appears to have been satisfactory, having consistently met AWT permit limits for the past year.

Results of sediment organics analyses at the study sites

	Reference Site	Test Site 1†	Test Site 2†
Organic Constituents (ug/L)			
Benzo (a) anthracene	190 I	1500 I**	690 I*
Benzo (b) fluoranthene	260 I	3200 I	1300 I
Benzo (k) fluoranthene	200 I	2700 I	980 I
Benzo (a) pyrene	200 I	2100 I**	910 I*
Benzo (g,h,i) perylene		1200 I	490 I
Butyl benzyl phthalate	660	3900 I	1400 I
Bis (2-ethylhexyl) phthalate	770 I	7500 I	
Chrysene	220 I	2600 I**	1000 I*
Di-n-butyl phthalate	2100		
Fluoranthene	410*	4100**	1700 I*
Indeno (1,2,3-cd) pyrene		1100 I	490 I
Phenanthrene	200 I		540 I*
Pyrene	360*	3400 I**	1500 I*

† - The minimum detection limits for these samples were elevated due to the required sample dilution
I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit
*- Value is greater than the 'No Effect Level'
** - Value is greater than the 'Probable Effect Level'

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological communi- acid extractables, and pesticide extractables). Sediment samples from the study sites were also collected for organics analyses. Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP 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 *Selenastrum capricornutum* for the freshwater effluent, and *Dunaliella tertiolecta* for the marine receiving water sites, followed Miller *et al.* (1978) and EPA (1974).

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.

Habitat Assessment: Seven attributes known to have potential effects on the freshwater stream biota were evaluated and scored, with 20 points possible for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points). For marine systems, overall habitat quality is also assigned to one of four categories: Optimal (75-100 points); Suboptimal (50-75 points); Marginal

(25-49 points); and Poor (0-24 points) (see habitat assessment field sheets in Appendix B).

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

Ephemeroptera/Plecoptera/Trichoptera Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Community structure: Substantial shifts in the 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.

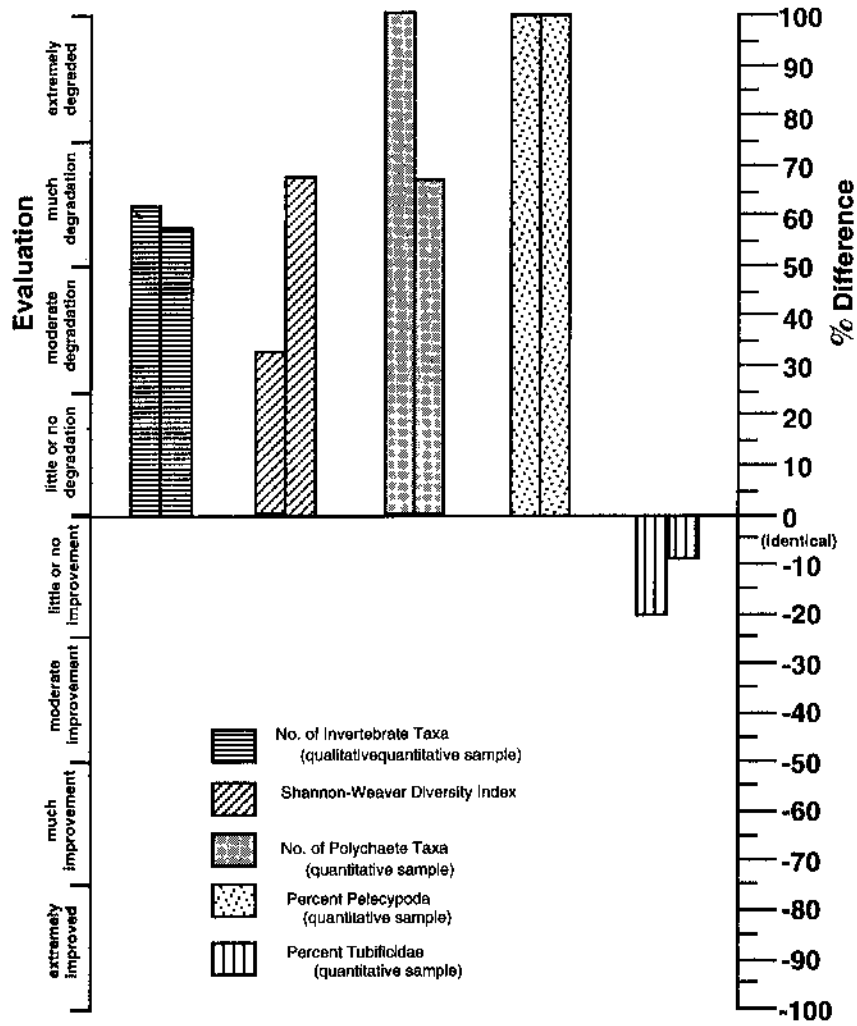
Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream Condition Index for Florida (SCI) is a composite macroinvertebrate metric (Barbour *et al.* 1996). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the number of polychaete taxa, and

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	16	6	7
Shannon-Weaver Diversity	3.1	2.1	1.0
# of Polychaeta	9	0	3
% Polychaeta	71.1	0	92.5
% Oligochaeta	6.9	5.5	6.2
% Tanaidacea	0	31.6	0.5
% Cumacea	3.1	0	0
% Mysidacea	0	0	0.2
% Amphipoda	4.4	62.6	0.6
% Pelecypoda	12.6	0	0
% Predator/Carnivores	22.3	0	39.6
% Above-Surface Deposit Feeders	31.5	31.6	40.3
% Below Surface Deposit Feeders	16.4	5.5	19.2
% Scavengers	2.2	18.6	0.3
% Suspension Feeders	23.6	25.5	0.3
% Browser/Grazer	2.2	18.6	0.3
Phytoplankton Algae			
Number of Taxa	11	15	26
Shannon-Weaver Diversity	2.1	2.4	3.5
Chlorophyll a (µg/L)	20.8	1.6	7.4
Algal Density (#/mL)	6190	4880	3827
% Blue-green	0	5	5
% Green	0	2	4
% Diatoms	8	4	12
Algal Growth Potential (mg dry wt/l)	12.2	55.1	11.6



Effect of discharge on the benthic macroinvertebrate community.

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.

The following personnel were involved in this investigation: Andrea Grainger, James Fine, Joe Squitieri, and Charles Kovach (DEP Southwest District) and Cynthia Brown, Lyn Burton-Hupp, Ken Espy, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Elizabeth Miller, Urania Quintana, Lisa Tamburello, David Whiting, and Vicki Whiting (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

Matheny Creek (test sites) and Clower Creek (reference site), can both be characterized as artificially channelized, impounded (salinity barrier) systems draining residential, agricultural, and commercial land use areas. Habitat quality was within the "marginal" category at all three stations, with the reference site (40 points) scoring slightly better than test site 1 (33 points) or test site 2 (36 points). Channelization was more recent and severe at Matheny Creek, where the south shore consisted almost entirely of vertical seawalls. Sediment oils at the test sites (Matheny Creek) were also more evident than at the reference site (Clower Creek).

Physical/chemical attributes of the three study areas were similar. Mid-depth dissolved oxygen was low, ranging from 2.4 at test site 2 to 3.2 mg/L at the reference site. Dissolved oxygen at all three sites did not comply with the Class III minimum for marine waters of 4.0 mg/L, violating Rule 62-302.530(31) FAC. Salinity and pH at all three sites ranged from 28.0 ppt to 30.2 ppt and from 7.5 SU to 7.7 SU, respectively, while temperature ranged from 24.5 °C to 25.7 °C (Appendix).

The effluent was not toxic to the cladoceran, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, in 48 hour static bioassays (Appendix).

Of the organic constituents analyzed for in the discharge, only atrazine (0.052 µg/L) was detected at a level below the minimum quantitation limit. No metals were detected in the effluent at levels exceeding Class III marine standards.

Nutrient concentrations in the effluent were low, and in compliance with permit limits. Total phosphorus was moderately elevated at all three sites, measured to be 0.25 mg/L at the reference site, 0.28 mg/L at test site 1, and 0.42 mg/L at test site 2. These total phosphorus levels are higher than

those found in approximately 80% to 90% of other Florida estuaries (see Table of Typical Water Quality Values in Appendix). Although the effluent's concentration was very low, nitrate-nitrite levels at test site 1 (2.9 mg/L) exceeded the values found in 95% of Florida's estuaries, suggesting nitrogen inputs from sources other than the discharge (*e.g.* residential/commercial stormwater runoff).

Algal growth potential (AGP) results exceeded the "problem threshold" level of 10 mg dry wt/L (Ron Raschke, U.S. EPA, personal communication) at all three receiving water sites. While the reference site (12.2 mg dry wt/L) and test site 2 (11.6 mg dry wt/L) AGP values were only slightly high, the test site 1 AGP (55.1 mg dry wt/L) was extremely elevated. The effluent AGP was 16.1 mg dry wt/L.

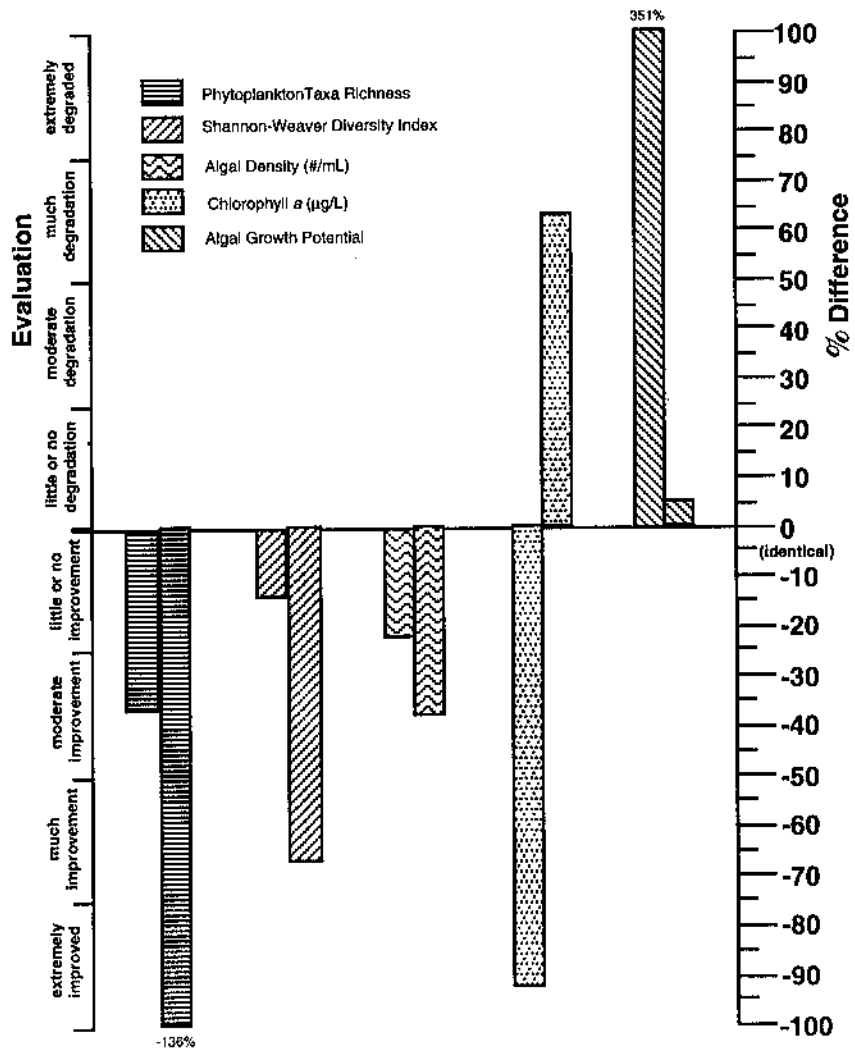
As previously indicated, it appears there are other nutrient sources in Matheny Creek upstream of the discharge, and the effluent is not the sole contributor to the enrichment problem. According to the 1990 Florida Water Quality Assessment 305(b) Technical Appendix, Matheny Creek has a past history of low dissolved oxygen readings and nutrient loading. Agricultural and urban stormwater run-off is a recurrent problem in this basin (Sarasota Bay Basin) as a whole (FDEP 1996).

Analyses of the sediments collected from the reference and test sites yielded several polycyclic aromatic hydrocarbons (PAH's) (see table). While the reference site contained lower concentrations of PAH's, two compounds (fluoranthene and pyrene) were present above the sediment quality "no effect level". Both sites in Matheny Creek were notably more degraded in terms of PAH contamination, particularly test site 1. Five compounds (benzo (a) anthracene, benzo (a) pyrene, chrysene, fluoranthene, and pyrene) were detected at concentrations greater than the "probable effect level" suggested by MacDonald (1993). The PAH concentrations found in Matheny Creek are consistent with the stormwater inputs, and correspond to the visual observation of sediment oils at the two test sites.

Quantitative measures of benthic macroinvertebrate community health indicated degradation in Matheny Creek, compared with Clower Creek. The figure on p. 3 indicates the degree of difference between the control 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 control. The lower right figure summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Sixteen macroinvertebrate taxa were found at the reference site, decreasing to 6 taxa at test site 1 and 7 taxa at test site 2. Additionally, the Shannon-Weaver diversity index declined by 32% at test site

Effect of discharge on the algal community.



1 and 68% at test site 2, compared with the reference site, representing violations of the biological integrity criterion (62.302.530(11) FAC). Communities at both test sites exhibited decreases in the number of polychaete taxa and percent pelecypods when compared to the reference site. Pelecypods, shown by Engle *et al.* (1994) to be pollution sensitive, were found only at the reference site.

The pollution tolerant polychaete, *Laeoneris culveri,* was the most abundant taxon at the reference site and at test site 2, while test site 1 was dominated by the amphipod, *Grandidierella bonnieroides.* Pollution sensitive invertebrates (Farrell 1992) were not common at any of the three sites. Pollution sensitive taxa at the reference site included *Prionospio heterobranchia, Oxyurostylis* sp., and *Cyclaspis varians.* At test site 1, the only sensitive taxon found was *Corophium acherusicum,* while at test site 2, the only such taxon was *Mysidopsis* sp.

The figure on p. 4 represents changes in the phytoplankton algal community. As we noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Phytoplankton taxa richness at the reference site (11 taxa) was lower than either test site 1 (15 taxa) or test site 2 (26 taxa). Algal diversity followed a similar pattern, being lowest at the reference site (2.1), intermediate at test site 1 (2.4), and highest at test site 2 (3.5). Conversely, algal density was highest at the reference site (6,190 (cells/mL) decreasing to 4,880 (cells/mL) at test site 1, and 3,827 (cells/mL) at test site 2. Chlorophyll *a* at the reference site (20.8 µg/L) was higher than those found in approximately 93% of other Florida estuary systems, but decreased to normal levels at test site 1 (1.6 µg/L) and test site 2 (7.4 µg/L). These data do not indicate that the Florida Cities Gulf Gate discharge is responsible for any disruption of the algal community in Matheny Creek.

Conclusions

Dissolved oxygen at the reference site and the two test sites did not comply with the Class III minimum for marine waters (4.0 mg/L), violating Rule 62-302.530(31) FAC.

The effluent was not acutely toxic to the cladoceran, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi,* in 48 hour static bioassays.

No organic constituents were detected in the discharge above their respective minimum quantitation limits. No metals were detected in the effluent at levels exceeding Class III marine standards.

Nutrient concentrations in the effluent were low, and in compliance with permit limits. Total phosphorus was moderately elevated at all three sites, and nitrate-nitrite at test site 1 (2.9 mg/L) exceeded the values found in 95% of Florida's estuaries, suggesting nitrogen inputs from sources other than the discharge (*e.g.* residential/commercial stormwater runoff).

Algal growth potential (AGP) results exceeded the "problem threshold" level of 10 mg dry wt/L at all three receiving water sites. AGP was highest at test site 1 (55.1 mg/dry wt/L), coinciding with the elevated nitrate-nitrite there.

Sediments collected from the reference and test sites contained several polycyclic aromatic hydrocarbons (PAH's). Two compounds were present above the sediment quality "no effect level" at the reference site. Both sites in Matheny Creek were notably more degraded in terms of PAH contamination, particularly test site 1. Five compounds were detected at concentrations greater than the "probable effect level". Elevated PAH concentrations are not unusual in systems with stormwater inputs, and likely to have contributed to the degradation observed in the benthic macroinvertebrate communities.

Several quantitative measures of benthic macroinvertebrate community health indicated degradation in Matheny Creek, compared with Clower Creek. The Shannon-Weaver diversity index declined by 32% at test site 1 and 68% at test site 2, compared with the reference site, both representing violations of the biological integrity criterion (62.302.530(11) FAC). Considering the good performance of the WWTP, as well as the increased amount of habitat disturbance, stormwater inputs, and sediment organics in the Matheny Creek watershed, the data suggest the degradation was caused by sources other than the Gulf Gate facility.

The phytoplankton data did not indicate that the Florida Cities Gulf Gate discharge was responsible for any disruption of the algal community in Matheny Creek. Chlorophyll *a* at the Clower Creek reference site (20.8 µg/L) was higher than the values found in approximately 93% of other Florida estuary systems, but decreased to normal levels at the test sites.

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Chemistry summary table for

Florida Cities Gulf Gate	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
Atrazine	0.052 I			
Metals (ug/L)				
Aluminum	35 U			
Arsenic	40 U			
Calcium	52 A			
Cadmium	0.05 U			
Copper	10 U			
Chromium	10 U			
Iron	66 A			
Lead	20 U			
Magnesium	22 A			
Mercury	0.1 U			
Nickel	6 U			
Selenium	50 U			
Silver	0.04 U			
Zinc	16 I			
Nutrients (mg/L)*				
Ortho-phosphate	0.59 A	0.18	0.13 A	0.33
Total phosphorus	0.72	0.25	0.28	0.42 A
Ammonia	0.065 A	0.064	0.12 A	0.041 J
Unionized Ammonia	0.074 A			
Nitrate+Nitrite	0.04	0.04 U	2.9	0.04 U
TKN	0.87	0.8	0.81	0.88 A
General Phys-Chem Parameters				
Habitat Assessment		40	33	36
D. O. (mg/L)	7.4	2.9	2.4	3.2
pH (SU)	7.0	7.7	7.5	7.7
Specific Conductance (µmho)	667	46,300	44,400	39,900
Salinity (ppt)	0.4	30.2	28.9	28.0
Temperature (°C)	27.3	24.5	25.7	25.4
Algal Growth Potential (mg dry wt/L)	16.1	12.2	55.1	11.6
Toxicity				
Bioassay Fish	Not Toxic			
Bioassay Invertebrate	Not 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

J - Estimated value

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

* - Effluent values are the result of composite samples, except for unionized ammonia. That and all study site nutrient calues are grab sample results.

Typical Values for Selected Parameters in Florida Waters

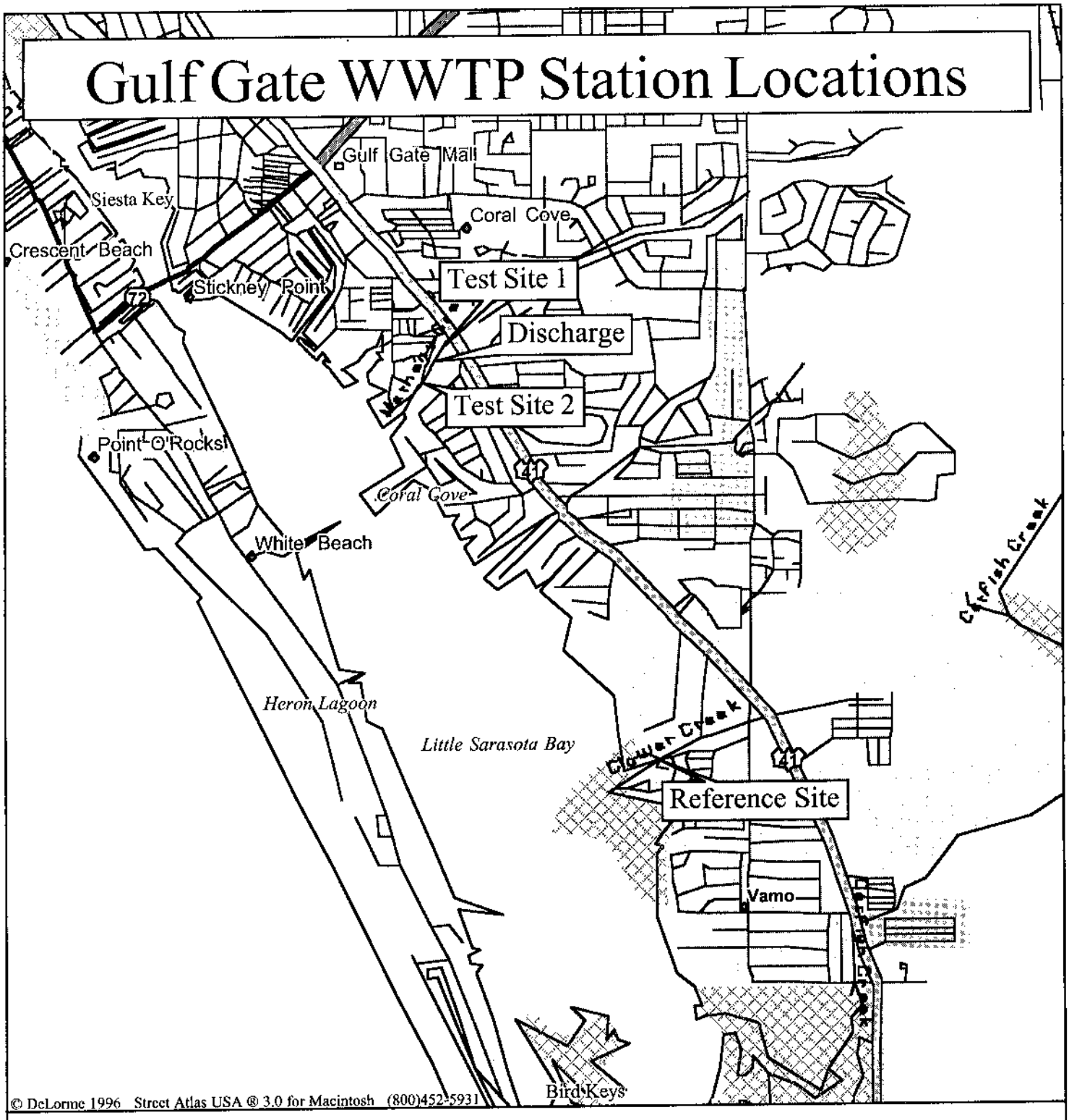
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	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
NO2-NO3	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 Phosphate	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 *a*	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
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	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-Phosphate	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 *a*	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
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	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-Phosphate	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/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

Gulf Gate WWTP Station Locations



Mag 14.00
Tue Jul 29 07:29 1997
Scale 1:31,250 (at center)
2000 Feet
1000 Meters

- Secondary SR, Road, Hwy Ramp
- State Route
- US Highway
- Primary State Route
- Railroad
- Point of Interest
- Town, Small City

Geographic Feature
- Locale
- Population Center
- Land
- Lake, Ocean
- Woodland
- Sand

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Florida Cities/Gulf Gate | Date Summary Prepared: 3/26/97

Location (attach detailed map): | County: Sarasota | District: SW District

Federal Permit # and expiration date: FL0032816 4/30/97 | State GMS # and State expiration date: 4058 P01625 5/1/97 | Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Domestic wastewater treatment and disposal plant.

Description of treatment process:
A 1.8 mgd AWT plant with preliminary treatment of screens and grit removal, then to an activated sludge process, and clarification then through rotating biological contactors, final clarification and filtration. The effluent is chlorinated, dechlorinated and discharged to Matheny Creek.

Receiving waters: Matheny Creek to Little Sarasota Bay | Classification: I II (III)

Design Flow: 1.8 | Mean Flow: 1.35 3-month ADF | Flow during survey:

Discharge is: (Continuous) Intermittent Seasonal Rainfall dependent
Other (describe)

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):

No

List effluent limits (if necessary, attach relevant paperwork):

Describe special permit conditions and permit modifications:

Parameter	Unit	Minimum	Maximum	Type Sample	Frequency
Permitted Capacity	mgd	-	1.8 ann. avg.	***fmt	
CBOD5* & Total Suspended Solids*	mg/L	0	5 annual 6.25 weekly 7.5 monthly 10 any one sample	****fpc ****fpc ****fpc grab	Weekly Weekly Weekly Weekly
Total Nitrogen (as N)	mg/L	0	3 annual average	****fpc	Weekly
Dissolved Oxygen	mg/L	5.0	-	grab	Daily
Fecal coliform	#/100ml	0	**25	grab	Daily
Total Phosphorus (as P)	mg/L	0	1 annual average	****fpc	Weekly
pH	STD UNITS	6.00	8.5	Continuous	
Total Residual Chlorine	mg/L	0	0.01	grab	Daily

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Gulfgate WWTP
(Facility)

Description of permitted outfall(s):
Effluent is discharged from the WWTP via a 4000 ft long pipeline into Matheney Creek which flows into Little Sarasota Bay.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:
For four days in Dec. 96 the minimum chlorine residual dropped below the 1.0 minimum. All were suspected to be instrument problems; no fecal violations were reported for these days. An upset, apparently not adversely affecting effluent quality was reported for 1/4/97.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
An FYI-S was conducted 23 July 1991. The summary sheet for U is attached to this submittal.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
MOR data reflects compliance with the effluent limits imposed by the permit. Flows are near capacity.

Additional information:

Staff contributing to this review (signature):

Andrea Granger	(Biologist)
Joe Squitieri	(Inspector)
	(Engineer)
	( )
	( )
	( )

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		4/14/97	1415	Clower Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
low tide, poor weather	Sarasota	Florida Cities - Gulf gate	Reference Site

RIPARIAN ZONE/INSTREAM FEATURES

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

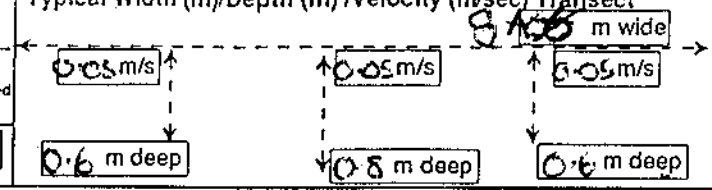
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
5		20	20	35	20		

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: 1 — *List & map dominant vegetation on back*

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Artificially Channelized ☐ no ☐ recent, severe ☒ some recovery ☐ mostly recovered

Artificially Impounded ☒ yes upstream is west ☐ more sinuous

High Water Mark: 0.3 (m above present water level) + 0.8 (present depth in m) = 1.1 (m above bed)

Canopy Cover % : Open : ☐ Lightly Shaded (1-45%): ☒ 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:~~ on sides of creek

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt			
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):	Salinity ppt		Secchi (m):
Top								
Mid-depth	0.2	24.49	7.7	2.9	46,300	30.2		VOB
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: ☐

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

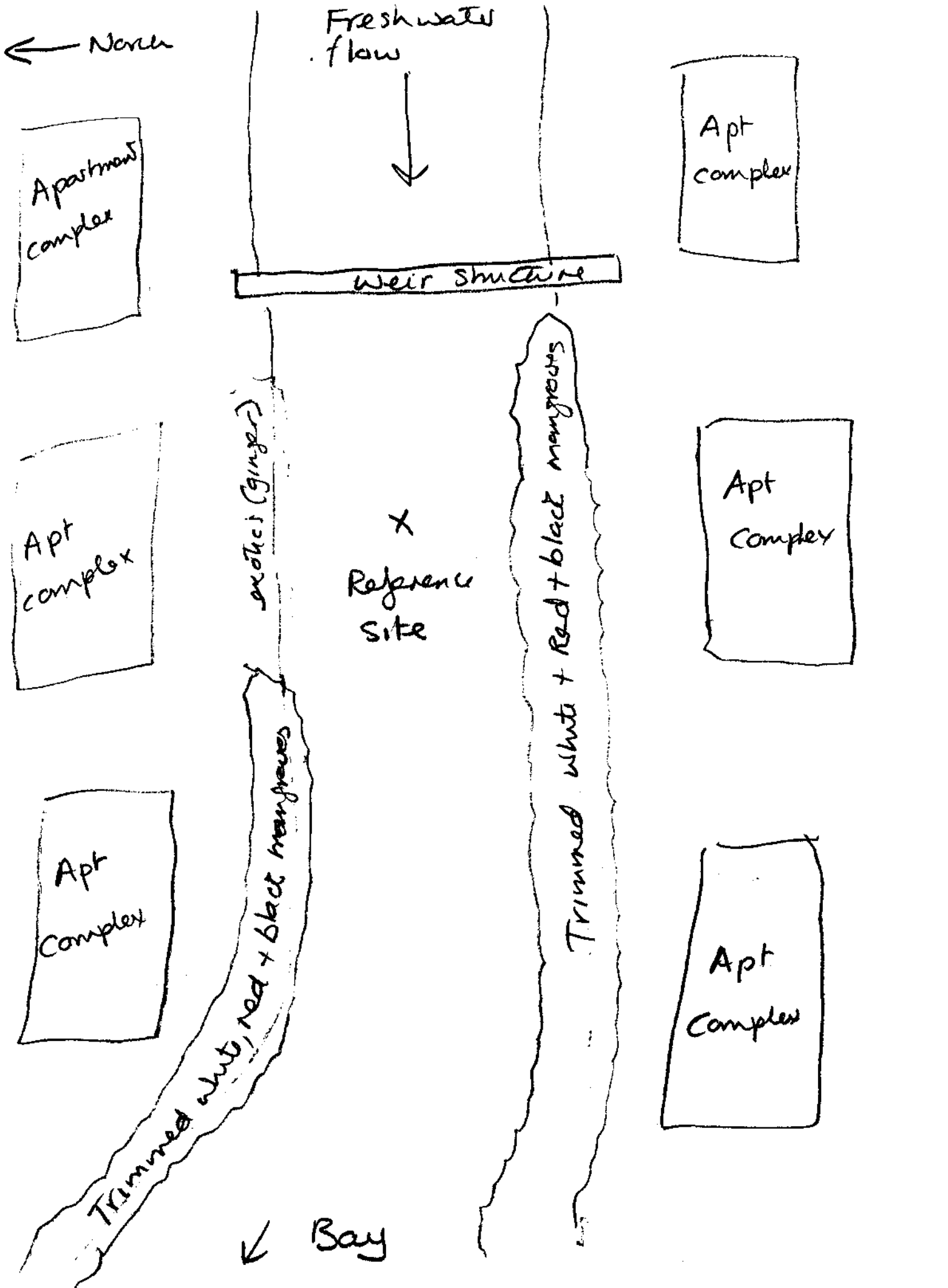
Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☒ Opaque: ☐

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

Weather Conditions/Notes:
Cold front moved into west coast — rainy, cold and windy.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Granger	Andrea Granger	4/14/97


North
Freshwater flow
Apartment complex
Apt complex
Weir structure
Apt complex
Apt Complex
exotics (Ginger)
X
Reference site
Trimmed white + Red + black mangroves
Trimmed white, red + black mangroves
Apt Complex
Apt Complex
Bay

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		4/14/97	Clower Creek.

REMARKS:	LOCATION:	FIELD ID/NAME:
Cold front hitting west coast FL, cold, rainy + very windy.	Florida Cities - Gulfgate	Reference Site

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 5	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** red, white, black mangroves trimmed.	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 5	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	a salinity barrier is present but flow is predominantly stormwater from residential + commercial areas.		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 7	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: Weather was so bad we couldn't get boat out into Sarasota's Intercoastal waterway

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4/14/97	Grainger	Andrea Grainger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-90)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	24010038	4/14/97		Mathery Creek

REMARKS: Low tide, poor weather conditions	COUNTY: Sarasota	LOCATION: Florida Cities - Gulfgate	FIELD ID/NAME: Test Site 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
10		20	20	40	10		

Local Watershed Erosion (check box): None [ ] Slight [ ] Moderate [X] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Slight [ ] Moderate potential [ ] Obvious sources [X]

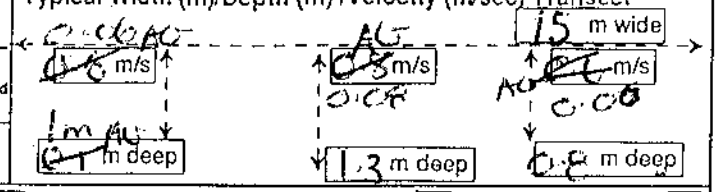
Width of riparian vegetation (m) on least buffered side: — *List & map dominant vegetation on back*

Artificially Channelized [ ] no [X] recent, severe [ ] some recovery [ ] mostly recovered

Artificially Impounded [X] yes upstream is river more sinuous

High Water Mark: 0.3 (m above present water level) + 1.3 (present depth in m) = 1.6 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover %: Open: [X] Lightly Shaded (11-45%): [ ] Moderately Shaded (46-80%): [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [ ] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [Y] Other: [ ]

Sediment Oils: Absent: [ ] Slight: [ ] Moderate: [Y] 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			
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):	Salinity		Secchi (m):
Top								
Mid-depth	0.5	25.77	7.46	2.36	44,400	28.9		0.6
Bottom								

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

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [ ] Sheen: [X] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [ ] Slightly turbid: [ ] Turbid: [X] Opaque: [ ]

Color (check box): Tannic: [ ] Green (algae): [X] Clear: [ ] Other: [ ]

Weather Conditions/Notes:
Cold front just moved in, cold, rainy & very windy!

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[X]	[ ]	[ ]
Fish	[ ]	[ ]	[X]	[ ]
Aquatic Macrophytes	[ ]	[X]	[ ]	[ ]
Iron/sulfur Bacteria	[X]	[ ]	[ ]	[ ]

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	4/14/97

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	24 CC036	4/14/97	Matheny Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Cold front hitting west coast, cold, rainy and very windy	Florida Cities - Gulfgate	Test Site 1

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations (5)	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 (15)	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** White + black mangrove Untrimmed	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 (5 2/4)	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	a salinity barrier is present. Flow is from residential + agricultural areas.		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**

This creek has dredged within past 10 years

TOTAL SCORE 33

COMMENTS: Very poor weather conditions.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4/14/97	Grainger	Andrea Grainger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	24010039	4/14/97	1145	Mathemy Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide. Poor weather	Sarasota	Florida Cities - Gulfgate	Test Site 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
10		20	20	40	10		

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: — *List & map dominant vegetation on back*

Artificially Channelized ☐ no ☐ ☒ ☐ (recent, severe / some recovery / mostly recovered)

Artificially Impounded ☒ yes (upstream is weir / more sinuous)

High Water Mark: 0.3 (m above present water level) + 0.7 (present depth in m) = 1 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect: 15 m wide

A	A1	A2
0.8 m/s	0.5 m/s	0.8 m/s
0.08	0.08	A0.08
0.5 m deep	0.7 m deep	0.4 m deep

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			
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):	Sal. ppt		Secchi (m):
Top								
Mid-depth	0.3	25.44	7.67	3.18	39,900	28		0.5
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: ☐

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

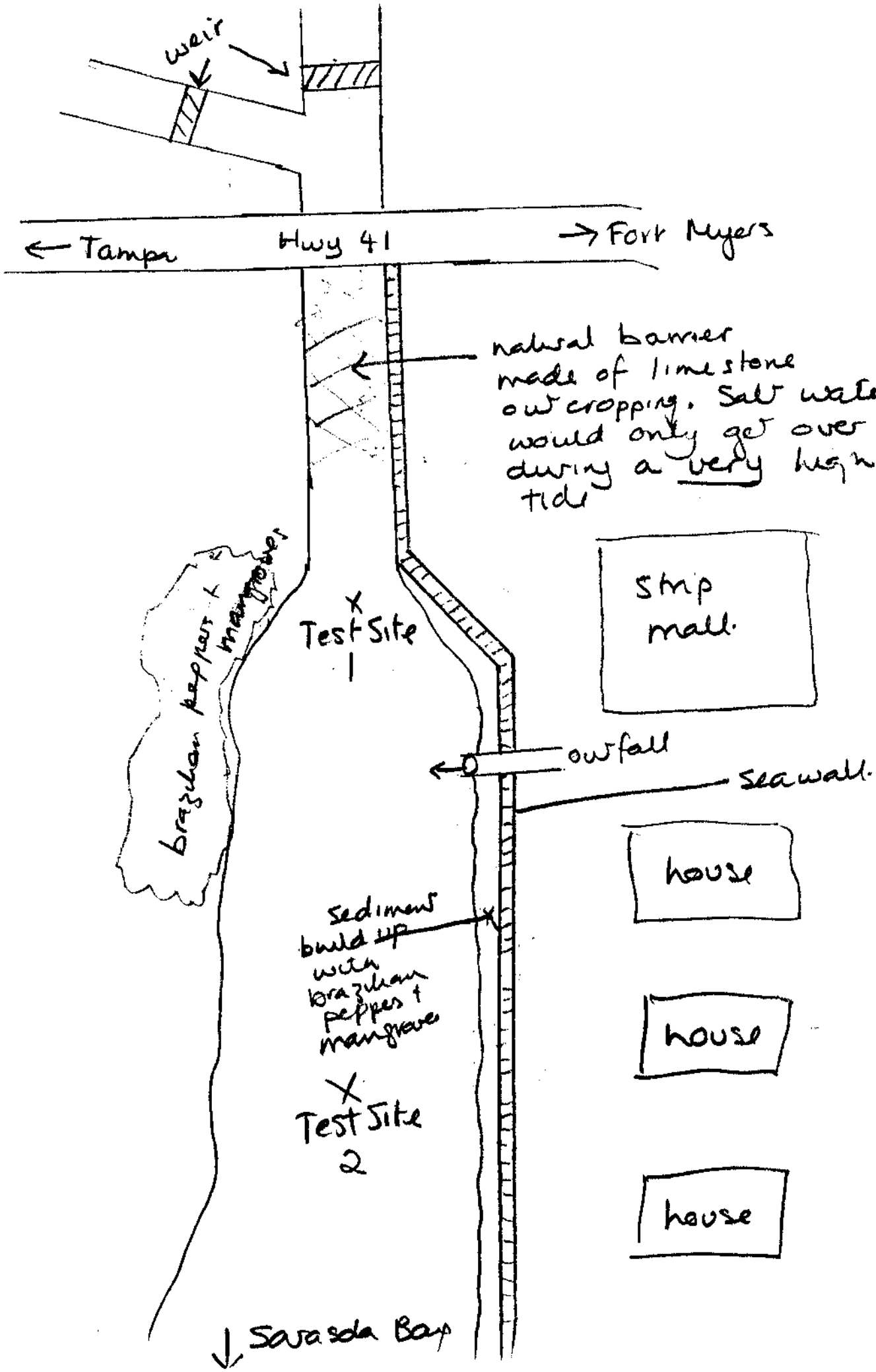
Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☒ Opaque: ☐

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

Weather Conditions/Notes:
Cold front moved into west coast — cold, rainy + very windy.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Granger	Andrea Granger	4/14/97


weir
← Tampa
Hwy 41
→ Fort Myers
natural barrier made of limestone outcropping. Salt water would only get over it during a very high tide
SMP mall.
Test Site 1
brazilian pepper + mangroves
outfall
seawall.
house
sediment build up with brazilian pepper + mangrove
house
Test Site 2
house
↓ Sarasota Bay

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		4/14/97	Matheny Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
Cold front hitting west coast, cold, rainy, and very windy	Florida Cities - Gulfgate	Test Site 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 5	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 15	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** white + black mangroves untrimmed	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 5	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	a salinity is present from residential + agricultural areas	barrier. Flow is	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 6	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**

This creek has been dredged within past 10 yrs

TOTAL SCORE 63

COMMENTS: Very poor weather conditions

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4/14/97	Grainger	Carrie Grainger

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Cities - Gulfgate
County: Sarasota
Contact / District: Ken Edwards / SW
NPDES Permit #: FL0032816
LIMS Sample #: 175316 **LIMS Job #:** 97-APR-15 17
sample log: 4-15-97 MF

Sample Collection: Date 4-14-97 Time 1555
Test Beginning: Date 4-15-97 Time 1500
Test Ending: Date 4-17-97 Time 1500
Organism Batch #: 26 **Diluent Batch #:** Well H2O
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: Screening | Definitive
(Static) Static Renewal | Flow-through
Temperature range: room ~~24-26°C~~ 24.0-26.0°C
incubator ~~24-26°C~~ NA
A. corrected to mid-range of 24.0-26.0°C MF 5/15/97
Test Number: 2 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.3 @ 24.5 °C	104.3 @ 103.2 ~~950~~ 950 @ ~~1001~~ 1001 @ 24.5 °C ~~0.5%~~ @ ~~788.5~~
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.4 @ 23.8 °C	103.6 @ 103.2 ~~979~~ 979 @ ~~1001~~ 1001 @ 24.9 °C ~~988~~ @ ~~788.5~~
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.8 @ 22.8	8.2 @ 24.5 °C	102.3 @ 103.2 ~~986~~ 986 @ ~~1001~~ 1001 @ 24.6 °C ~~994~~ @ ~~788.5~~

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CTL A	E1	5	5	5	7.8	8.3	8.3	24.7	24.1	24.1	7.5	7.5	7.6	250	250	250
CTL B	E2	5	5	5	7.9	8.3	8.4	24.7	24.0	24.1	7.6	7.5	7.7	250	250	250
CTL C	E3	5	5	5	7.9	8.3	8.3	24.7	24.0	24.1	7.6	7.5	7.7	255	250	250
CTL D	E4	5	5	5	7.9	8.3	8.4	24.7	24.0	24.2	7.6	7.6	7.7	250	250	250
100% A	E5	5	5	5	7.1	7.8	8.0	24.5	24.0	24.1	6.7	7.5	7.6	830	840	845
100% B	E6	5	5	5	7.1	7.8	8.0	24.4	24.1	24.0	6.7	7.4	7.6	840	850	850
100% C	E7	5	5	5	7.1	7.8	8.0	24.4	24.1	24.0	6.7	7.4	7.6	850	850	850
100% D	E8	5	5	5	7.1	7.7	8.0	24.4	24.2	24.1	6.9	7.4	7.6	845	850	855
Measured/Loaded by:		KR	KR	ND	JS	KR	JS	JS	KR	JS	JS	KR	JS	JS	KR	JS
Recorded by:		JS	KR	ND	KR	ND	ND	KR	ND	ND	KR	ND	ND	KR	ND	ND

Investigators' Signatures

Julie Sharpe
Kellie Ralston
Mashell Faircloth

reviewer form updated 4/01/96

Water Quality Parameters

	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):				Not measured		MF
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS	JS
Alkalinity (mg/L as $CaCO_3$):	115	60	80	Hach	ND	ND
Hardness (mg/L as $CaCO_3$):	130	95	220	Hach	ND	ND
Total ammonia (mg/L as N):	<0.07	<0.07	<0.07	Orion	MF	KR

Ammonia Meter #98136 Ammonia Meter Slope: -54.8 Ammonia Blank: 0.00 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Cities – Gulfgate
County: Sarasota
Contact / District: Ken Edwards / SW
NPDES Permit #: FL0028816
LIMS Sample #: 175316 LIMS Job #: 97-APR-15-17
sample log: 4-18-97 mf

Sample Collection: Date 4-14-97 Time 1555
Test Beginning: Date 4-15-97 Time 1443
Test Ending: Date 4-17-97 Time 1500
Organism Batch #: 15 Diluent Batch #: 14
Organism Age: <24 hours
Test Organism: Ceriodaphnia dubia

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Temperature range: room ~~24-26~~ A 24.0-26.0°C
incubator 24.4-25.6°C A - corrected temp to nearest 0.1°C mf 5/15/97
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.3 @ 24.5 °C	104.3 @ 103.2 980 @ 1001 @ 24.5 °C 9660 @ 9885
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.4 @ 23.8 °C	103.6 @ 103.2 971 @ 1001 @ 24.9 °C 9580 @ 9885
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.8 @ 22.8	8.2 @ 24.8 °C	102.3 @ 103.2 986 @ 1001 @ 24.6 °C 9716 @ 9885

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
		0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
CTL A	A	5	5	5	8.2		8.3	23.4		24.2	7.7		7.3	160		185
CTL B	B	5	5	5			8.3			24.3			7.4			190
CTL C	C	5	5	5			8.3			24.3			7.4			185
CTL D	D	5	5	5			8.3			24.3			7.4			195
100% A	A	5	5	5	7.4		8.3	23.1		24.2	7.7		7.5	730		825
100% B	B	5	5	5			8.3			24.3			7.5			820
100% C	C	5	5	5			8.3			24.3			7.5			835
100% D	D	5	5	5			8.3			24.2			7.5			860
Measured/Loaded by:		KR	ND	ND	JS		JS	JS		JS	JS		JS	JS		JS
Recorded by:		JS	ND	ND	KR		ND	KR		ND	KR		ND	KR		ND

Verified by *

Investigators' Signatures

Julie Sharpe
Kellie Kalston
Marshall Faircloth

A H Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	
Field Total Residual Cl2 (mg/L):				Not measured		MF
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS	JS
Alkalinity (mg/L as $CaCO_3$):	115	60	80	Hach	ND	ND
Hardness (mg/L as $CaCO_3$):	130	85	220	Hach	ND	ND
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	MF	KR

Ammonia Meter #98136 Meter Slope: -54.8
Ammonia Blank: <0.017
Control Salinity: 0 ppt
Sample Salinity: 0 ppt

Benthic macroinvertebrate taxa list for Florida Cities Gulf Gate facility, collected via Ponar grab samples in Matheney Creek, on 4 April 1997. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Polychaeta			
Capitella capitata	194	-	1125
Eteone heteropoda	83	-	-
Hobsonia florida	56	-	-
Laeonereis culveri	806	-	6444
Leitoscoloplos fragilis	14	-	-
Magelona sp.	42	-	-
Prionospio sp.	14	-	-
Prionospio heterobranchia	208	-	-
Streblospio benedicti	125	-	28
Cirratulidae	14	-	-
Nereidae	14	-	444
Oligochaeta	-	-	28
Tubificidae	153	236	514
Pelecypoda			
Macoma sp.	97	-	-
Parastarte sp.	14	-	-
Parastarte triquetra	14	-	-
Rictaxis sp.	42	-	-
Tellinidae	153	-	-
Mysidacea			
Mysidopsis sp.	-	-	14
Cumacea			
Cyclaspis varians	42	-	-
Oxyurostylis sp.	28	-	-
Tanaidacea			
Hargeria rapax	-	1361	42
Amphipoda			
Ampelisca sp.	97	-	-
Corophium acherusicum	-	486	-
Corophium simile	-	611	-
Grandidierella bonnieroides	-	1597	56
Coleoptera			
Peltodytes sp.	-	14	-

Phytoplankton taxa list and densities (#/mL) for Florida Cities Gulf Gate facility, collected via subsurface grabs in receiving water, on 14 April 1997.

	Reference Site	Test Site 1	Test Site 2
Cyanophyceae			
Coelosphaerium sp.	–	2815	83
Dactylococcopsis sp.	–	215	18
Lyngbya sp.	–	54	–
Lyngbya contorta sp.	–	54	28
Marssoniella sp.	–	107	–
Merismopedia sp.	–	456	166
Oscillatoria sp.	–	–	18
Bacillariophyceae			
Achnanthes sp.	77	–	37
Amphora sp.	–	–	9
Chaetoceros sp.	2723	–	534
Cocconeis sp.	–	–	9
Coscinodiscus sp.	–	–	9
Cyclotella sp.	–	134	101
Cylindrotheca sp.	231	–	–
Gomphonema sp.	26	54	18
Melosira sp.	–	–	101
Navicula sp.	51	–	55
Nitzschia sp.	283	27	110
Nitzschia longissima	–	–	18
Rhizosolenia setigera	26	–	18
Skeletonema sp.	2003	161	1012
Pennales	154	–	28
Bacillariophyceae	257	–	9
Chlorophyceae			
Chlorococcum sp.	–	–	18
Oocystis sp.	–	80	18
Pyramimonas sp.	–	27	110
Scenedesmus sp.	–	215	28
Tetraedron sp.	–	–	18
Chlorophyceae	–	–	18
Dinophyceae			
Peridinium sp.	231	349	653
Cryptophyceae			
Chroomonas sp.	77	80	350
Cryptomonas sp.	51	54	18
Tetraselmis sp.	–	–	212

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0033818		970501		X	S	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0033818		970501		B	S	1

Remarks

21 66