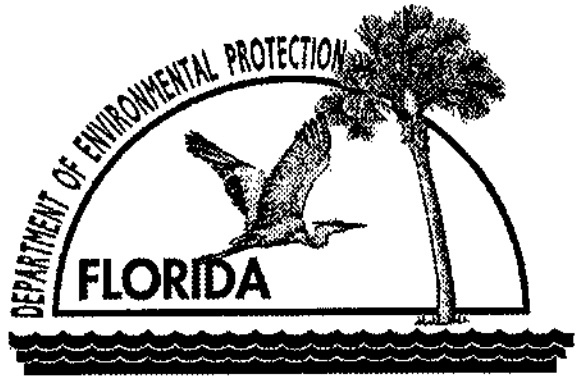


Biological Assessment of

Siesta Key Utility Authority
Wastewater Treatment Plant

Sarasota County

NPDES #FL0025755

Sampled August 1996

November 1996

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Siesta Key Utility Authority WWTP
County: Sarasota
NPDES Number: FL0025755
State Permit Expiration Date: 30 September 1996

Toxics Sampling Inspection (XSI)

Date Sampled: 5 August 1996

Results: Atrazine (0.051 µg/L) was detected in the effluent at a non-problem concentration. Iron (21 µg/L) and zinc (32 µg/L) were present in the effluent at levels which comply with Class III water quality standards for marine waters.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 5 August 1996

Results: The sample of effluent was not acutely toxic to the invertebrates, *Ceriodaphnia dubia* and *Mysidopsis bahia*, or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 5 August 1996

Variations in benthic macroinvertebrate community characteristics between stations appeared to be more related to substrate attributes and recruitment potential from Roberts Bay, than to the influence of the discharge. Shannon-Weaver diversity was high at all sites, ranging from 4.4 to 4.0, and several pollution sensitive taxa were present at the reference and test sites alike, suggesting no adverse effects from the discharge.

The phytoplankton communities in Grand Canal were somewhat perturbed. The phytoplankton assemblage was overwhelmingly dominated by the centric diatom, *Cyclotella* sp., to the extent that Shannon-Weaver diversities were less than one (1.0) at all study sites. Chlorophyll *a* values in Grand Canal were higher than those found in approximately 92% of typical Florida estuary systems. These effects may have been caused by residential stormwater runoff, and the minor differences between sites are probably related to reduced tidal flushing at the test sites.

Water Quality Inspection (WQI)

Date Sampled: 5 August 1996

Results: Nutrients were relatively low in the effluent, which did not appear to cause nutrient enrichment in Grand Canal. Most nutrients were average to slightly above average for a Florida estuary. As would be expected from the moderate nutrient levels, algal growth potential (AGP) was below the "problem threshold" of 10 mg dry wt/L at all three canal stations. Fecal coliform bacteria were extremely low (less than 2 organisms/100 mL) in the effluent, indicating compliance with the facility's permit limit. Similarly, fecal coliforms were very low all at three study sites, suggesting no bacterial contamination. Total suspended solids and CBOD were undetected in the effluent.

Introduction

The Siesta Key Utility Authority operates a 2.7 MGD Type I Advanced Wastewater Treatment facility for the collection, treatment, and disposal of domestic waste on Siesta Key, Sarasota County, Florida (see map in Appendix). Treatment at this contact stabilization plant consists of bar screening, grit removal, flow equalization, nitrification/denitrification, and final clarification. Effluent is chlorinated for disinfection, and then dechlorinated prior to discharge to the Class III Grand Canal, a tidally influenced system connected with Roberts Bay. Average daily flow for the three months preceding this survey was 1.64 MGD.

Permit limits are as follows: flow (2.7 MGD), CBOD and total suspended solids (5 mg/L as an annual average, 6.25 mg/L as a monthly average, 7.5 mg/L as a weekly average, 10 mg/L maximum), fecal coliform bacteria (non-detectable in at least 75% of the samples collected during the monthly reporting period, 25 organisms/100 mL maximum), total nitrogen (3 mg/L as an annual average), total phosphorus (1 mg/L as an annual average), pH (6.0 to 8.5 SU), total residual chlorine (0.01 mg/L), and dissolved oxygen (5.0 mg/L minimum).

The permit requires ambient surface water quality monitoring, which includes nutrients, five day CBOD, conductivity, salinity, temperature, pH, and chlorophyll *a*. Additionally, chronic toxicity bioassays are performed twice a year.

Overall, the facility has been in compliance with permit parameters. Of concern, however, is effluent chronic toxicity. The facility has failed four chronic bioassays in the last two years (see Facility Summary in Appendix).

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	50	27	28
Shannon-Weaver Diversity	4.38	4.17	3.95
# Polychaete taxa	22	9	8
% Polychaeta	65.5	23.7	27.2
% Pelecypoda	7.1	29.0	13.9
% Gastropoda	2.8	4.6	24.1
% Nemertea	0.7	13.7	8.7
% Isopoda	1.9	5.3	10.3
% Cumacea	2.6	3.8	8.2
% Oligochaeta	6.5	2.3	2.6
% Amphipoda	5.8	3.8	2.6
% Anthozoa	1.3	5.3	0.5
% Sipuncula	0.5	3.8	0
% Tanaidacea	3.1	0	1.0
% Echinodermata	0.3	3.1	1.0
% Thoracica	1.8	0	0
% Other	0.1	1.6	0
% Suspension Feeders	14.2	34.1	22.3
% Predator/Carnivores	18.6	28.6	15.9
% Scrapers	2.2	4.6	23.6
% Below Surface Deposit Feeders	22.2	6.7	18.0
% Above Surface Deposit Feeders	11.7	6.1	2.8
% Scavengers	2.2	6.1	6.9
% Browser/Grazers	2.0	4.6	6.4
% Parasites	0.6	0	0
% Unknown FFG	26.2	9.2	4.1
Phytoplankton Algae			
Number of Taxa	14	12	16
Shannon-Weaver Diversity	0.57	0.69	0.84
Chlorophyll a (µg/L)	18.5	26.6	23.1
Algal Density (#/mL)	14,834	27,568	21,056
% Diatoms	97.0	97.9	97.8
% Cryptophyceae	1.2	0.6	0.8
% Chlorophyceae	0.7	0.4	0.8
% Other	1.1	1.1	0.6
Algal Growth Potential (mg dry wt/l)	5.2	2.4	3.0

Methods

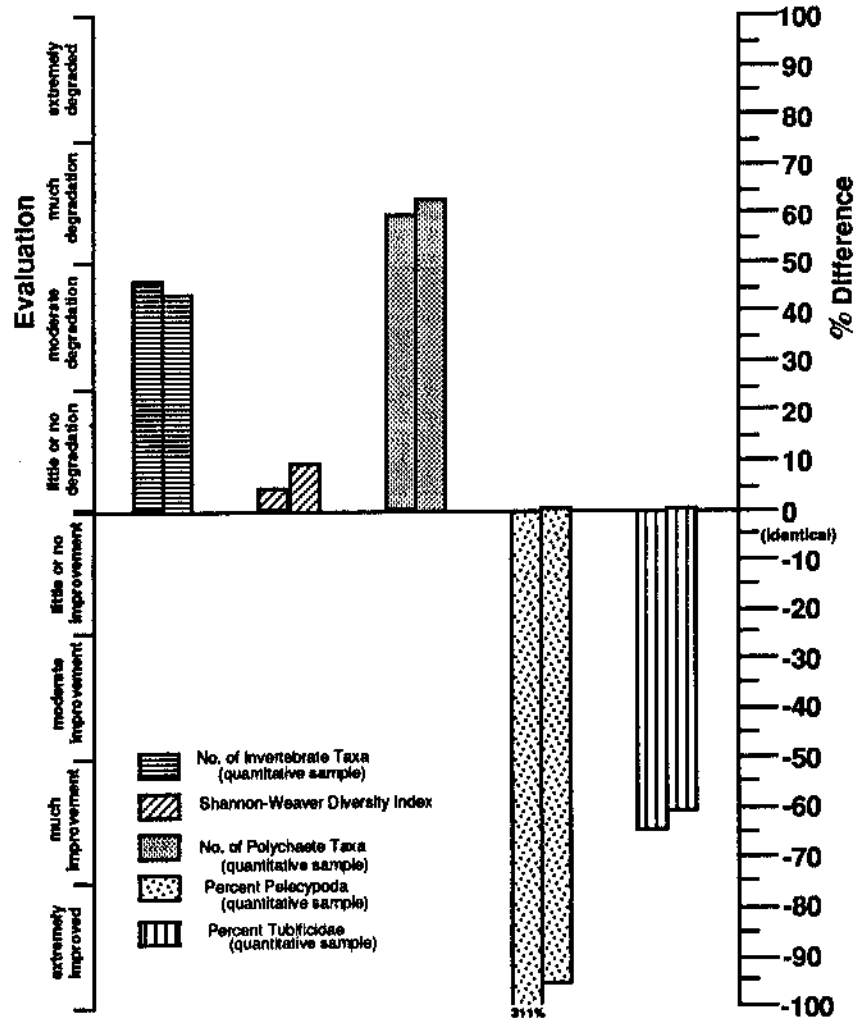
The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Grand Canal, approximately 1,000 m northwest of the outfall, and approximately 750 m from where Grand Canal meets Roberts Bay) and two test sites (bracketing the discharge in Grand Canal, approximately 1,700 to 1,800 m from where Grand Canal meets Roberts Bay) (see maps in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia*, *Cyprinella leedsi*, and *Mysidopsis bahia* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). 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 using three replicate petite Ponar grabs. Phytoplankton was sampled at both reference and test sites via subsurface grabs (Ross 1990). Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests were performed, using *Selenastrum capricornutum* as the test organism for the freshwater effluent (Miller *et al.* 1978) and *Dunaliella tertiolecta* for the marine receiving waters (EPA 1974). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Sediment from reference and test sites was analyzed for particle grain size (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.

Habitat Assessment: Seven attributes known to have potential ef-



Effect of discharge on the benthic macroinvertebrate community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

fects on the 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); or Poor (0-34 points).

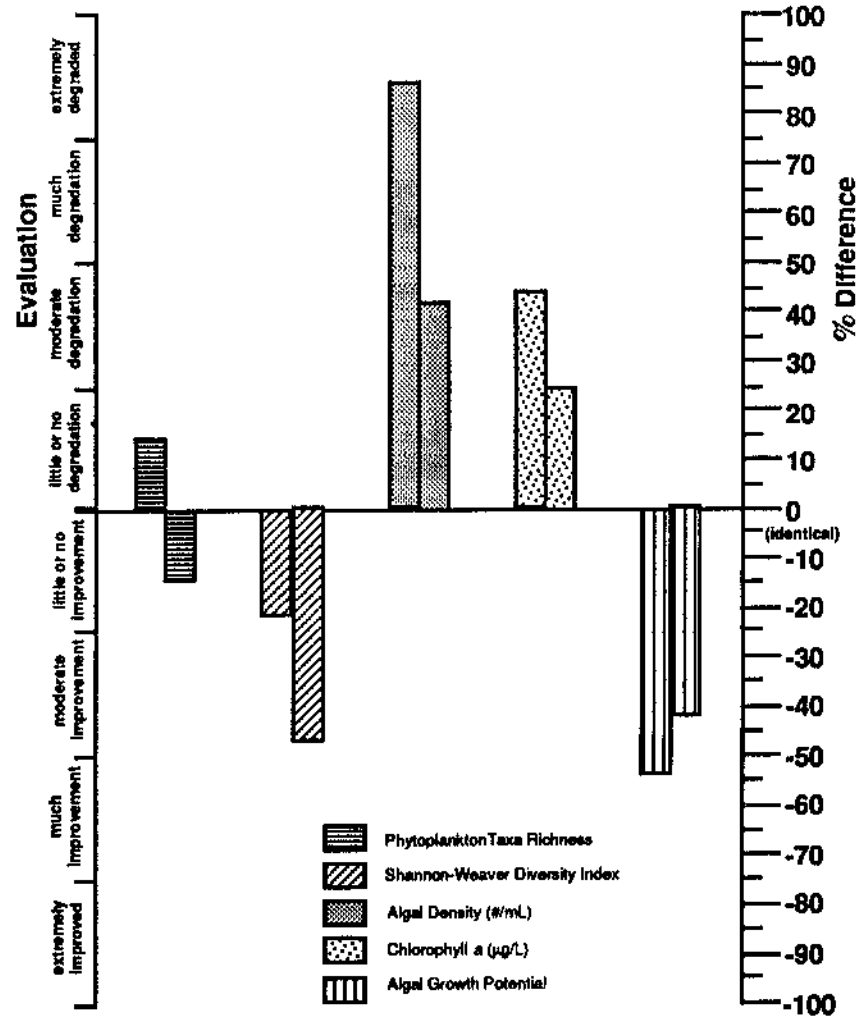
Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

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 Hudson *et al.* (1990), Lenat (1993), and Chang *et al.* (1992) 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 proportions of major groups of organisms, compared to reference conditions, may indicate degradation.



Effect of discharge on the algal community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

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 (see SCI calculation table in Appendix).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving 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 and Joe Squitieri (DEP Southwest District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, 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

The receiving water in this study can be characterized as an artificially channelized canal, draining the residential area of Siesta Key. All three stations received very low habitat assessment scores, with 40 points at the reference site, 28 points at test site 1, and 46 points at test site 2. The shoreline at the reference site and test site 1 consisted almost entirely of vertical seawalls, with limited community types present (oysters in beds or on seawalls). Habitat was slightly more diverse at test site 2, as mangroves were also found there. The potential effects from stormwater runoff were equally significant at all three sites.

Sediments throughout Grand Canal consisted of sand, gravel, and shell. Sediment grain size analyses indicated the two test sites were very similar, with the majority of particles in the 0.125 to 0.25 mm category (84% and 80% at test site 1 and test site 2, respectively). Sediments at the reference site were also dominated by particles in this size class (62%), but had a greater proportion of coarse (> 2.0 mm) material present (20% of the total). This is probably related to the fact that the reference site was situated closer to the mouth of Grand Canal, where it would receive more wave action or tidal current velocity from Roberts Bay. A slight amount of oil was observed in sediments from all three sites, as well as an oily sheen on the surface of the water.

Physical/chemical attributes of the three study areas were virtually identical. Surface dissolved oxygen ranged from 6.2 to 6.0 mg/L, pH from 8.0 to 7.7 SU, salinity from 28.1 to 26.2 ppt, and temperature ranged from 31.8 to 31.3 °C. Water from the reference and both test sites was visibly turbid, with a green color (Appendix).

The pesticide atrazine (0.051 µg/L) was detected in the effluent at a concentration well below chronically toxic levels (AQUIRE 1996). The metals iron (21 µg/L) and zinc (32 µg/L) were also measured in the discharge at concentrations that complied with Class III standards for marine waters.

The sample of final effluent was not acutely toxic to the invertebrates, *Ceriodaphnia dubia* and *Mysidopsis bahia*, or to the fish, *Cyprinella leedsi*. No mortality occurred in the invertebrate bioassays, while 10% of the fish died in the *C. leedsi* test (Appendix). This mortality is within acceptable control ranges.

Fecal coliform bacteria were extremely low in the effluent (less than 2 organisms/100 mL). Fecal coliforms at the three study sites were also low, with 20 organisms/100 mL at the reference site, less than 20 organisms/100 mL at test site 1, and 14 organisms/100 mL at test site 2.

Total suspended solids and five day CBOD were below detection limits in the effluent.

Nutrients were relatively low for a domestic wastewater effluent, and there was little evidence that the facility was causing nutrient enrichment in the Grand Canal. For example, ammonia was undetected at both test sites, and the reference site ammonia value (0.1 mg/L) was nearly double that of the effluent (0.052 mg/L). Similarly, even though the effluent nitrate-nitrite concentration was 1.4 mg/L, nitrate-nitrite was undetected at the reference site and test site 1, and was a moderate 0.06 mg/L at test site 2. Total phosphorus at the reference site (0.15 mg/L) was only slightly less than the test site values (0.18 mg/L at both the test sites). The fact that total phosphorus concentrations at all three sites

exceeded those values found in approximately 60% of other Florida estuaries suggests a source other than the discharge (*e.g.*, residential stormwater runoff).

As expected from the low to moderate nutrient levels, algal growth potential (AGP) ranged from 5.2 mg dry wt/L at the reference site to 2.4 mg dry wt/L at test site 1. These values are well below the "problem threshold" of 10 mg dry wt/L (Ron Raschke, U.S. EPA, personal communication). Effluent AGP was 16.6 mg dry wt/L.

Variations in benthic macroinvertebrate community characteristics between stations appeared to be more related to substrate attributes and recruitment potential from Roberts Bay, than to the influence of the discharge. 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.

A substantially greater number of taxa were found at the reference site (50 taxa) compared with the test sites (27 and 28 taxa at test sites 1 and 2, respectively). This increase in taxa richness largely consisted of additional polychaete taxa, and to a lesser extent, gastropod taxa, not found at the test sites (see taxa list in Appendix). The reference site was located approximately 750 meters from the entrance to Roberts Bay, from which recruitment of the predominantly sessile invertebrates would be expected via incoming currents. The percentage of coarse particles in the sediment was also higher at the reference site. The test sites, located deeper in the man-made canal system (approximately one mile from the mouth) had a higher percent of fine sediment particles and would potentially receive less biological recruitment from Roberts Bay.

The increase in polychaete taxa (and density) at the reference site, compared to the test sites, was offset by a greater relative abundance of pelecypods at the test sites. Although the presence of oyster beds was noted at the reference site (and a high population of *Crassostrea virginica*), a larger proportion of sediment-dwelling bivalves were found at the test sites. It is probable that the greater amount of fine (0.125 - 0.25 mm) particles measured in test site sediments influenced the abundance of these organisms. The fact that these sediment dwelling pelecypods are also suspension feeders accounts for the better representation of filter feeders at the test sites.

Some notable similarities in the macroinvertebrate communities were also evident. Shannon-Weaver diversity was high at all sites, ranging from 4.4 to 4.0. Additionally, several organisms considered by Farrell (1992) to be pollution sensitive were present at the reference and test sites alike. These included the gastropod, *Olivella* sp., the pelecypods, *Amygdalum papyrium* and *Parastarte triquetra*, the cumacean, *Cyclaspis varians*, and the echinoderm, *Amphipholis* sp. The presence of such pollution sensitive taxa at the test sites suggests the discharge was not adversely affecting the invertebrate communities in Grand 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. The phytoplankton community in Grand Canal appeared perturbed. The phytoplankton assemblage was overwhelmingly dominated by the centric diatom, *Cyclotella* sp., to the extent that Shannon-Weaver diversities were less than one (1.0) at all study sites. Algal density was somewhat elevated at the test sites compared to the reference site. Chlorophyll *a* values at the study sites were higher than those found in approximately 92% of typical Florida estuary systems. These effects may be due to residential stormwater runoff, and differences between sites are likely to be related to reduced tidal flushing at the test sites.

Conclusions

The sample of final effluent was not acutely toxic to the invertebrates, *Ceriodaphnia dubia* and *Mysidopsis bahia*, or to the fish, *Cyprinella leedsi*.

Atrazine (0.051 µg/L) was detected in the effluent at a non-problem concentration. Iron (21 µg/L) and zinc (32 µg/L) were present in the effluent at levels which comply with Class III water quality standards for marine waters.

Fecal coliform bacteria were extremely low (less than 2 organisms/100 mL) in the effluent, indicating compliance with the facility's permit limit. Similarly, fecal coliforms were very low all three study sites, suggesting no bacteri-

al contamination. Total suspended solids and five day CBOD were undetected in the effluent.

Nutrients were relatively low in the effluent, and did not appear to cause nutrient enrichment in Grand Canal. Most nutrients were average to slightly above average for a Florida estuary. As would be expected from the low to moderate nutrient levels, algal growth potential (AGP) was below the "problem threshold" of 10 mg dry wt/L at all three canal stations.

Variations in benthic macroinvertebrate community characteristics between stations appeared to be more related to substrate attributes and recruitment potential from Roberts Bay, than to the influence of the discharge. Shannon-Weaver diversity was high at all sites, ranging from 4.4 to 4.0, and several pollution sensitive taxa were present at the reference and test sites alike. These included the gastropod, *Olivella* sp., the pelecypods, *Amygdalum papyrium* and *Parastarte triquetra*, the cumacean, *Cyclaspis varians*, and the echinoderm, *Amphipholis* sp. The presence of such pollution sensitive taxa at the test sites suggests the discharge was not adversely affecting the invertebrate communities in Grand Canal.

The phytoplankton communities in Grand Canal were somewhat perturbed. The phytoplankton assemblage was overwhelmingly dominated by the centric diatom, *Cyclotella* sp., to the extent that Shannon-Weaver diversities were less than one (1.0) at all study sites. Chlorophyll *a* values at the study sites were higher than those found in approximately 92% of typical Florida estuary systems. These effects may have been caused by residential stormwater runoff, and the minor differences between sites are probably related to reduced tidal flushing at the test sites.

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Chemistry summary table for

Siesta Key Utility WWTP	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
Atrazine	0.051 I			
Metals (ug/L)				
Aluminum	100 U			
Arsenic	20 U			
Cadmium	0.05 U			
Copper	5 U			
Chromium	5 U			
Iron	21			
Lead	10 U			
Mercury	0.10 U			
Nickel	4 U			
Selenium	30 U			
Silver	0.04 U			
Zinc	32			
Nutrients (mg/L)				
Ortho-phosphate	0.26 A	0.067	0.054 A	0.09
Total phosphorus	0.35	0.15 A	0.18	0.18
Ammonia	0.052 A	0.10 A	0.02 U	0.02 U
Nitrate+Nitrite	1.4	0.02 U	0.02 U	0.06
TKN	0.96	0.58 A	0.77	0.68
General Phys-Chem Parameters				
Habitat Assessment		40	28	46
D. O. (mg/L)	6.9	6.2	6.2	6.0
pH (SU)	6.8	8.0	7.7	7.7
Specific Conductance (µmhos/cm)	1960			
Salinity (ppt)		28.1	26.5	26.2
Temperature (°C)	30.9	31.8	31.3	31.4
CBOD5 (mg/L)	2 U			
TSS (mg/L)	1 U			
Algal Growth Potential (mg dry wt/L)	16.6	5.2	2.4	3.0
Toxicity				
Bioassay Freshwater Invertebrate	No Mortality			
Bioassay Freshwater Fish	10% Mortality			
Bioassay Marine Invertebrate	No Mortality			
Microbiological Communities (organisms/100 mL)				
Fecal Coliform	2 K	20 J	20 K	14 J
Sediment Grain Size (%)				
< 0.063 mm		2	2	2
0.063 mm - 0.125 mm		2	7	6
0.125 mm - 0.25 mm		62	84	80
0.25 mm - 0.5 mm		7	3	4
0.5 mm - 2.0 mm		7	3	4
> 2.0 mm		20	2	4

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

K - Actual value is known to be less than value given

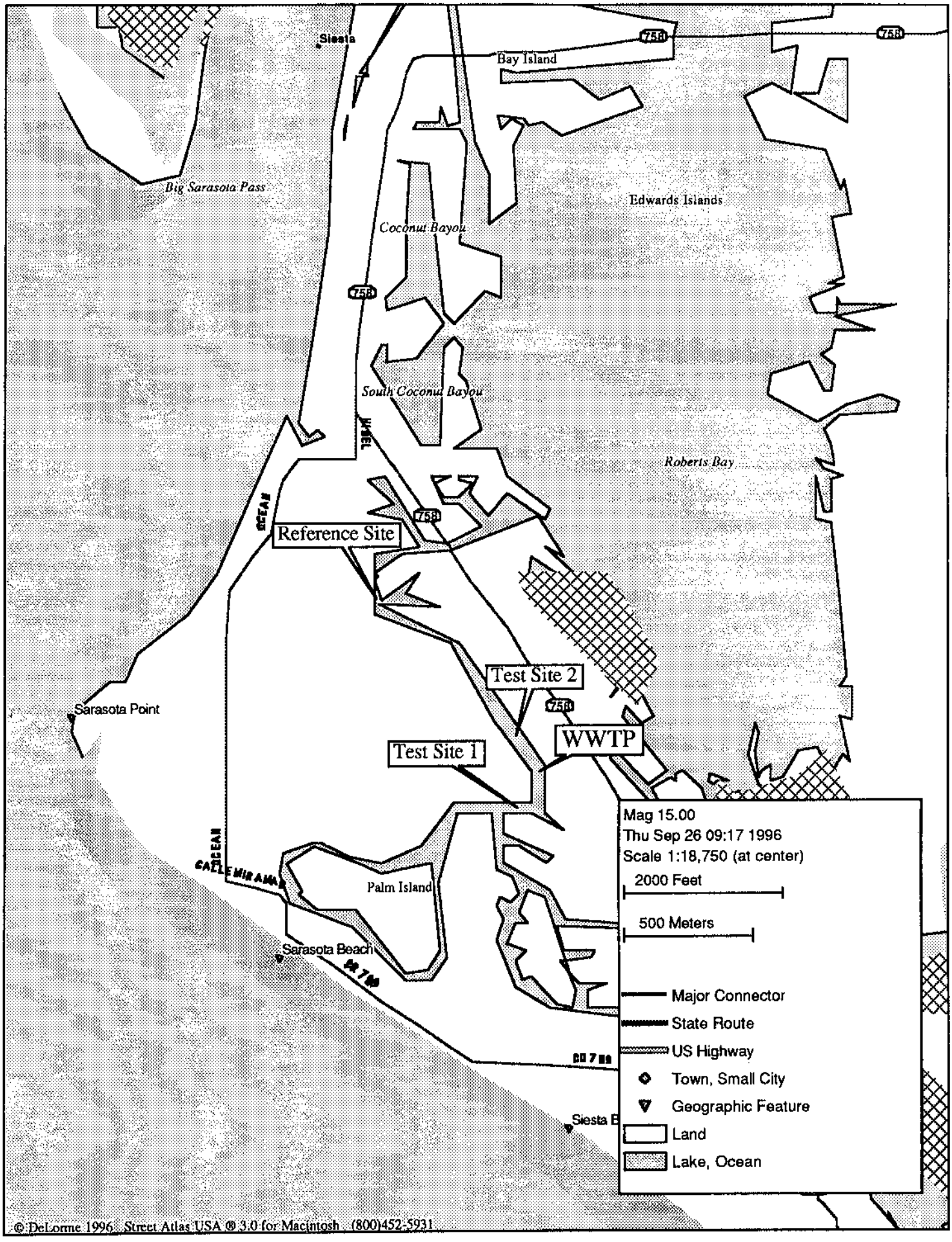
U - Material analyzed for but not detected; value reported is the minimum detection limit

Typical Values for Selected Parameters in Florida Waters

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

Parameter	Percentile Distribution										
	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 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 *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-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 *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-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/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates


Siesta
Bay Island
Big Sarasota Pass
Edwards Islands
Coconut Bayou
South Coconut Bayou
Roberts Bay
Reference Site
Test Site 2
WWTP
Test Site 1
Sarasota Point
Palm Island
Sarasota Beach
Siesta B
Mag 15.00
Thu Sep 26 09:17 1996
Scale 1:18,750 (at center)
2000 Feet
500 Meters
Major Connector
State Route
US Highway
Town, Small City
Geographic Feature
Land
Lake, Ocean
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Siesta Key Utility Authority WWTP		Date Summary Prepared: 7/23/96
Location (attach detailed map): included	County: Sarasota	District: SW (Tampa)
Federal Permit # and expiration date: FL0025755 exp 9/30/95	State GMS # and State expiration date: 4058PGM506 DO58-214159 exp 7/25/97	Facility Type: Industrial / Municipal / Federal / Agricultural / Other (list): Private Domestic

Function of facility: AWT for residents on Siesta Key; Domestic wastewater treatment & disposal

Description of treatment process:
Contact stabilization process consisting of bar screen grit removal, flow equalization and secondary treatment process. Followed by nitrification/denitrification and final clarification. Chlorination and dechlorination prior to discharge

Receiving waters: Grand Canal to Roberts Bay.	Classification: I / II / (III)	
Design Flow: 2.7 mgd	Mean Flow: 1.64 MG (Max) 3 month AADF	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.):

None

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

Parameter	Unit	Min-imum	Maximum	Type Sample	Frequency
Permitted Capacity	(flow) mgd	-	2.7	***rft	continuous
CBOD5**** and Total Suspended Solids****	mg/L	0	5 annual 6.25 monthly 7.5 weekly 10 any one sample	**fpc **fpc **fpc **fpc/or grab	weekly weekly weekly weekly
Fecal Coliform	#/100 mL	*	*25	grab	weekly
Total Nitrogen (as N)	mg/L	0	3 annual avg.	**fpc	weekly
Total Phosphorus (as P)	mg/L	0	1 annual avg.	**fpc	weekly
pH	STD UNITS	6.00	8.5	metered	continuous
Total Residual Chlorine	mg/L	0	0.01 any one sample	grab	every hour 16hrs/day 7 days/wk
Dissolved Oxygen	mg/L	5.0	--	grab	daily

* Non-detectable in at least seventy-five percent (75%) of the samples collected during the monthly reporting period.
** Flow proportional composite (hourly samples for a minimum of 16 hours/day)
*** Recording flowmeter & totalizer
**** Influent shall be monitored and reported monthly [Rule 17-601.300(2), F.A.C.]

Describe special permit conditions and permit modifications:

Sampling frequency for Ceriodaphnia dubia, recent test results from every 2 months to twice annual in 12/94.

Siesta Key
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s): Outfall 001 discharges domestic wastewater effluent via an enclosed pipe to Grand Canal.

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

11/27 - 12/4/95 routine 7-day chronic toxicity test failed, NOEC for C. dubia was <100% for fecundity

12/5 - 12/14/95 1st follow-up test failed; NOEC for C dubia was <100%. Second follow-up passed.

5/21-28/96 routine 7-day chronic toxicity test failed; NOEC <100% for C. dubia fecundity and M. beryllina growth.

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

- I cannot locate any previous bioassessments or WQBEL performed on this facility.
- There are no current or previous enforcement actions.
- This plant has been NWT through County ordinances
- There is a current ambient surface water quality monitoring program in effect through the permit.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set: No results to compare.

Additional information: This facility has passed all its DEP required acute tox test, however it had failed a chronic toxic test recently. This is a salt water environment.

Staff contributing to this review (signature):

Andrea Grau (Biologist)

Joseph Lightsey (Inspector)

(Engineer)

( )

( )

( )

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:
		8/5/96	Grand Canal (Sarasota Bay)

REMARKS:	LOCATION:	FIELD ID/NAME:
Low tide	Siesta Key Utilities Authority	Reference Site

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 0	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: 18	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** oyster bed	No communities observed from those listed. **0-12 points**
Tidal Fluctuation: 2	>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: 4	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: 4	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: 12	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: Lots of docks with boats moored. Area was totally seawalled.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/5/96	Andrea Grainger	Andrea Grainger

STATE OF FLORIDA west of SIKUA outfall
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:
		8/5/96	Grand Canal (Roberts Bay)

REMARKS:	LOCATION:	FIELD ID/NAME:
Low Tide.	Siesta Key Utilities Authority	Test Site 1

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 0	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: 6	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 oysters on seawalls
Tidal Fluctuation: 2	>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: 4	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: 4	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	— manmade canal.	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: 12	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 28

COMMENTS: Sunny day. A lot of boats moored in canal

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/5/96	Andrea Grainger	Andrea Grainger

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:
		8/5/96	Grand Canal (Roberts Bay)

REMARKS:	LOCATION:	FIELD ID/NAME:
Low tide	Siesta Key Utilities Authority	Test Site 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 4	None—Unaltered shoreline. **9-10 points** Some areas without seawalls.	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 20	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** mangroves	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 2	>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 4	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 4	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 12	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 46

COMMENTS: Lots of docks and moored boats. Areas without seawalls had a fringe of mangroves -

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/5/96	Andrea 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:
		8/5/96	1530	Grand Canal (Roberts Bay)

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide	Sarasota	Siesta Key Utilities Authority	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)
				100%			

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

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

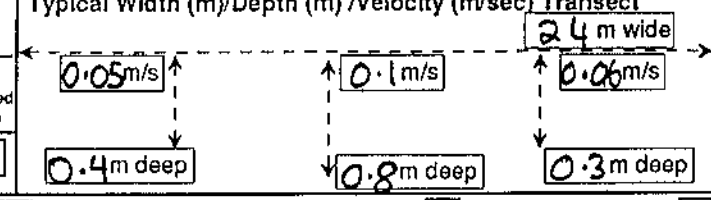
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

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

Artificially Impounded [ ] yes more sinuous

High Water Mark: 0.3 (m above present water level) + 0.8 (present depth in m) = 1.1 (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: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [ ] Slight: [X] 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. (umho/cm) or Salinity (ppt):			Secchi (m):
Top	0.8	31.8	8.00	6.19	28.1			VOB
Mid-depth								
Bottom								

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

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:
Sunny, breezy, storm clouds building far in the east, very hot.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	8/5/96

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:
		8/5/96	1100	Grand Canal (Roberts Bay)

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low Tide	Sarasota	Siesta Key Utilities Authority	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)
				100%			

Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]
no seawall

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

Width of riparian vegetation (m) on least buffered side: 0

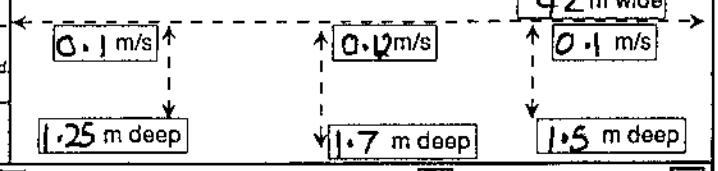
List & map dominant vegetation on back

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

Artificially Impounded [ ] yes

High Water Mark: 0.3 (m above present water level) + 1.7 (present depth in m) = 2.0 (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: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [ ] Slight: [X] 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. (umhos/cm) or Salinity (ppt):			Secchi (m):
Top	0.3	31.25	7.7	6.21	26.5			1m
Mid-depth	0.6	31.31	7.72	5.6	26.9			
Bottom	1.3	31.37	7.73	5.05	27.1			

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

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:
Sunny, slight breeze, a few clouds, very hot.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	8/6/96

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:
		8/5/96	1130	Grand Canal (Robert's)

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide	Sarasota	Siesta Key (Phillips Auditorium)	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)
				100%			

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

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

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect: 41 m wide; 0.1 m/s; 0.4 m/s; 0.12 m/s; 1.5 m deep; 1.7 m deep; 1.3 m deep

Artificially Channelized ☐ no ☐ recent, severe ☐ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 0.3 (m above present water level) + 1.7 (present depth in m) = 2.0 (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			
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):			Secchi (m):
Top	0.3	31.36	7.72	5.97	26.2			1m
Mid-depth	0.8	31.28	7.83	5.33	26.9			
Bottom	1.5	31.28	7.87	5.36	27.1			

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

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

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

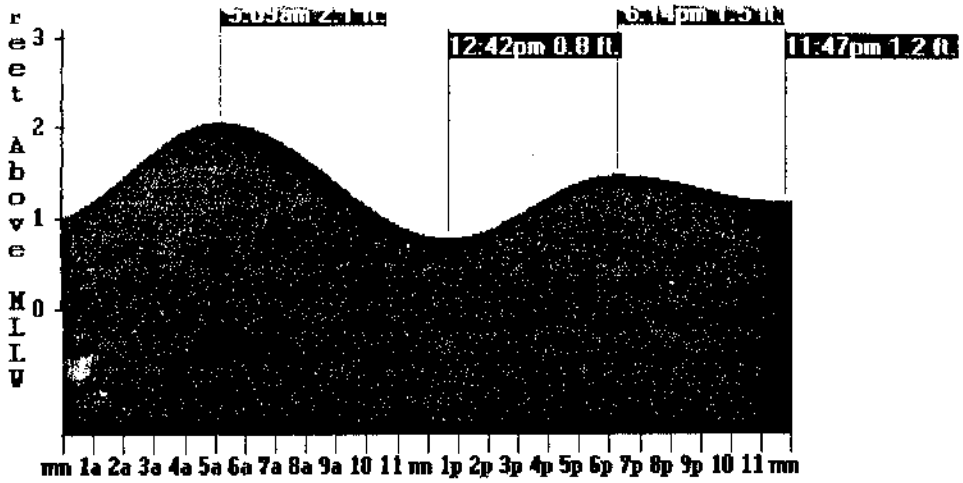
Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☒ Opaque: ☐

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

Weather Conditions/Notes: Sunny day, breezy, some clouds, very hot.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Granger	Andrea Granger	8/6/96



Cortez Sarasota Bay Mon Aug 5, 1996 EDT

TideMaster - (C) Zephyr Services, Pittsburgh PA

12:00M	1.0 ft	5:00a	2.1 ft	10:00a	1.2 ft	3:00p	1.1 ft	8:00p	1.4 ft
1:00a	1.2 ft	6:00a	2.1 ft	11:00a	1.0 ft	4:00p	1.3 ft	9:00p	1.4 ft
2:00a	1.5 ft	7:00a	1.9 ft	12:00N	0.8 ft	5:00p	1.4 ft	10:00p	1.3 ft
3:00a	1.8 ft	8:00a	1.7 ft	1:00p	0.8 ft	6:00p	1.5 ft	11:00p	1.2 ft
4:00a	2.0 ft	9:00a	1.4 ft	2:00p	0.9 ft	7:00p	1.5 ft	12:00M	1.2 ft

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Siesta Key
County: Sarasota
Contact / District: Lisa Carter / Southwest
NPDES Permit #: FL0025755
LIMS Sample #: 14787 LIMS Job #: 96-AQ6-06-30-01
sample log 8/9/96 DW

Sample Collection: Date 8-5-96 Time 1020
Test Beginning: Date 8-6-96 Time 1440
Test Ending: Date 8-8-96 Time 1440
Organism Batch #: 33 Diluent Batch #: 35
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through

Test Number: 1 of 3

Remarks:
* Wrote tests 2 info on front of DB 8/6/96

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	24.5 @ 24.4	8.3 @ 24.4 °C	101.2 @ 101.5 988 @ 1006 @ 24.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.8	8.4 @ 24.1 °C	104.0 @ 101.5 999 @ 1006 @ 24.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.5	8.4 @ 23.8 °C	105.4 @ 101.5 992 @ 1006 @ 24.9 °C

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	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 48 h
Control A	A	5	5	5	8.3		8.3	23.8		24.2	8.0		8.5	175		180
Control B	B	5	5	5			8.3			24.2			8.5			185
Control C	C	5	5	5			8.3			24.2			8.5			190
Control D	D	5	5	5			8.3			24.2			8.5			195
100% A	A	5	5	5	7.7		8.4	23.8		24.1	8.0		8.6	1830		1860
100% B	B	5	5	5			8.4			24.2			8.5			1920
100% C	C	5	5	5			8.5			24.2			8.5			1970
100% D	D	5	5	5			8.5			24.1			8.4			1935
Measured/Loaded by:		TM	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		DW	MF	MF	ND		KH	ND		LM	ND		LM	ND		LM

Investigators' Signatures
Marshall Faircloth
Nick Wright
Dawn Bell
David White
W Morel
Tina Mikulaski
Scott Wolfe
reviewer

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			NO	Measured	
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR100	
Alkalinity (mg/L as $CaCO_3$):	130 *	80	130	HACH	
Hardness (mg/L as $CaCO_3$):	120	80	370	HACH	
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	LM

Ammonia Meter #98136 Ammonia Meter Slope: -56.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 1 ppt

form updated 4/01/96

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Siesta Key
County: Sarasota
Contact / District: Lisa Carter/Southwest
NPDES Permit #: FL0025755
LIMS Sample #: 147875 **LIMS Job #:** 96-AUG-06-30-01
sample log 8/9/96 ow

Sample Collection: Date 8-5-96 Time 1020
Test Beginning: Date 8-6-96 Time 1505
Test Ending: Date 8-8-96 Time 1505
Organism Batch #: 58 **Diluent Batch #:** well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through

Test Number: 2 of 3

Remarks:

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	24.5 @ 24.4	8.3 @ 24.4 °C	1001 @ 101.5 988 @ 1006 @ 24.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.8	8.4 @ 24.1 °C	104.0 @ 101.5 999 @ 1006 @ 24.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.5	8.4 @ 23.8 °C	105.4 @ 101.5 992 @ 1006 @ 24.9 °C

8-8-96 not detectable error

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
Control A	B17	5	5	5	8.0	8.4	8.4	24.3	23.3	23.5	8.0	8.0	8.1	250	245	255
Control B	B18	5	5	5	8.0	8.4	8.5	24.3	23.2	23.4	8.1	8.0	8.1	256	250	260
Control C	B19	5	5	5	8.0	8.4	8.5	24.3	23.3	23.4	8.1	8.0	8.3	250	250	255
Control D	B20	5	5	5	8.0	8.4	8.5	24.4	23.5	23.5	8.1	8.1	8.3	250	250	250
100 % A	B21	5	5	4	7.4	8.0	8.3	24.4	23.4	23.5	8.2 *	7.8	8.1	1945	1915	1940
100 % B	B22	5	5	4	7.4	8.0	8.3	24.3	23.3	23.5	7.7	7.8	8.0	1945	1915	1945
100 % C	B23	5	5	5	7.4	8.0	8.3	24.3	23.4	23.5	7.6	7.7	8.1	1950	1915	1935
100 % D	B24	5	5	5	7.4	8.0	8.3	24.3	23.5	23.5	7.7	7.7	8.2	1950	1915	1935
Measured/Loaded by:		TM	TM		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		OW	TM		ND	DN	LM	ND	DN	LM	ND	DN	LM	ND	DN	LM

* 7.7 called out wrong ≠ 8-6 DO

Investigators' Signatures
Marshall Faircloth
Denise Nicholson
Kristi Leigh
Pam Rae
David Griffitts
Liz Harold
Lynn Mikulski
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		
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR100	DB
Alkalinity (mg/L as $CaCO_3$):	135	—	130	HACH	DB
Hardness (mg/L as $CaCO_3$):	120	—	370	HACH	DB
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	LM

Ammonia Meter #98136 Ammonia Meter Slope: -56.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 1 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Siesta Key
County: Sarasota
Contact / District: Lisa Carter / Southwest
NPDES Permit #: FL0025755
LIMS Sample #: 147875 LIMS Job #: 96-AUG-06-30-01
sample log 8/7/96 DW
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 3 of 3
Remarks:

Sample Collection: Date 8-5-96 Time 1020
Test Beginning: Date 8-6-96 Time 1510
Test Ending: Date 8-8-96 Time 1515
Organism Batch #: 215 Diluent Batch #: 28
Organism Age: 4 days
Test Organism: Mysidopsis bahia

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	24.5 @ 24.4	8.3 @ 24.4 °C 8.4 mg/L @ 24.4 °C	988 @ 1006 9540 @ 9989 @ 24.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.8	10.0 @ 24.1 °C	104.0 @ 101.5 999 @ 1006 @ 24.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.5	8.4 @ 23.8 °C	105.4 @ 101.5 992 @ 1006 @ 24.9 °C

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
Control A	C1	5	4	4	8.5	8.1	7.9	25.1	24.1	24.5	7.5	7.4	7.4	10.45	10.27	10.34
Control B	C2	5	5	5	8.5	8.1	7.9	25.0	24.1	24.4	7.4	7.4	7.4	10.45	10.28	10.36
Control C	C3	5	4	4	8.5	8.1	7.9	25.0	24.0	24.4	7.5	7.3	7.6	10.45	10.27	10.36
Control D	C4	5	5	5	8.5	8.1	7.9	25.0	24.0	24.3	7.4	7.4	7.5	10.42	10.26	10.34
100% A	C5	5	5	5	8.0	8.1	8.2	25.0	24.2	24.4	7.5	6.7	7.5	10.50	10.36	10.42
100% B	C6	5	5	5	8.0	8.1	8.2	25.0	24.1	24.4	7.5	6.7	7.3	10.50	10.33	10.42
100% C	C7	5	5	5	8.0	8.1	8.2	25.0	24.0	24.4	7.5	6.6	7.2	10.49	10.31	10.42
100% D	C8	5	5	5	8.0	8.1	8.2	25.0	24.0	24.4	7.5	6.7	7.2	10.43	10.26	10.36
Measured/Loaded by:		TM	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM	MF	MF	MF	MF
Recorded by:		DW	TM	MF	ND	TM	LM	ND	TM	LM	ND	TM	LM	ND	DN	LM

Investigators' Signatures Deena Nicholson
Marshall Faircloth
Dan Bell
David Griffin
Liz Monk
Tina Mikulski

reviewer form updated 4/01/96

Salt Water

Water Quality Parameters	Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	[illegible]		Not	Mensural	n
Lab Total Residual Cl2 (mg/L):	2.003	—	2.003	DR100	DB
Alkalinity (mg/L as $CaCO_3$):	60	—	160	HACH	DB
Hardness (mg/L as $CaCO_3$):	—	—	—		
Total ammonia (mg/L as N):	<.017	—	<.017	Orion	LM

Ammonia Meter #98136 Ammonia Meter Slope: -56.8 Ammonia Blank: <.017 Control Salinity: 6.0 ppt Sample Salinity: 6.0 ppt

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 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 *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-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 *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-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/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

Benthic macroinvertebrate taxa list for Siesta Key WWTP, collected via Ponar grab samples in Grand Canal, on 5 August, 1996. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Cnidaria			
Anthozoa	125	–	–
Actiniaria	28	97	14
Platyhelminthes			
Turbellaria	–	14	–
Nemertea			
Rhynchocoela	83	250	236
Polychaeta			
Axiothella	917	–	–
Boccardia	167	–	–
Capitella capitata	–	–	56
Dorvillea rudolphi	14	–	–
Eteone	–	–	14
Eteone heteropoda	–	–	14
Eulalia	14	–	–
Exogone	28	–	–
Fabriciola	1347	–	–
Goniadella	–	–	14
Gyptis brevipalpa	56	–	–
Hemipodus	14	–	–
Hemipodus roseus	–	14	–
Heteropodarke	–	14	–
Laeonereis culveri	417	–	111
Leitoscoloplos	125	28	97
Lysidice	–	14	–
Lysidice ninetta	14	–	–
Marphysa sanguinea	56	–	–
Mooreonuphis	194	111	83
Naineris	333	–	–
Nereis	42	111	–
Odontosyllis	56	–	–
Polydora	56	–	–
Polydora socialis	208	–	–
Prionospio	–	–	14
Prionospio heterobranchia	181	–	–
Syllis	14	–	–
Trypanosyllis	111	–	–
Websterinereis	–	–	14
Capitellidae	361	–	83
Cirratulidae	28	–	–
Dorvilleidae	14	–	–
Eunicidae	14	–	–

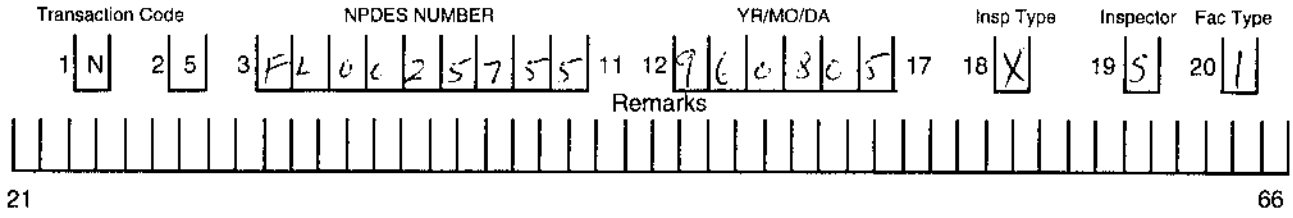
Goniadidae	–	42	14
Hesionidae	28	–	–
Nereidae	194	14	14
Orbiniidae	111	14	181
Phyllodocidae	–	–	28
Sabellidae	1556	14	–
Spionidae	–	14	–
Syllidae	1111	–	–
Polychaeta	222	42	–
Oligochaeta			
Tubificidae	792	42	69
Gastropoda			
Caecum pulchellum	14	–	–
Nassarius vibex	–	–	14
Odostomia	14	–	–
Oliva	69	–	–
Olivella	56	83	625
Pyramidella	28	–	–
Vitrinella helicoidea	139	–	–
Melongenidae	–	–	14
Pyramidellidae	28	–	–
Pelecypoda			
Amygdalum papyrium	111	167	69
Astarte	–	14	–
Crassostrea virginica	653	–	–
Mercenaria	–	14	14
Parastarte	–	–	14
Parastarte triquetra	14	167	69
Tagelus divisus	–	–	14
Tellina	–	–	69
Lyonsiidae	–	111	28
Ostreidae	14	–	28
Tellinidae	14	–	–
Pelecypoda	56	56	69
Thoracica			
Balanus	153	–	–
Thoracica	69	–	–
Mysidacea			
Mysidopsis almyra	–	14	–
Cumacea			
Cyclaspis varians	319	56	194
Spilocuma	–	–	28
Spilocuma watlingi	–	14	–
Tanaidacea			
Kalliapseudes	–	–	28
Hargeria rapax	375	–	–
Isopoda			
Cyathura polita	14	–	–
Edotea montosa	222	97	250

Anthuridae	–	–	28
Amphipoda			
Ampelisca	–	69	28
Ampelisca abdita	–	–	42
Corophium	14	–	–
Gitanopsis	125	–	–
Grandidierella bonnieroides	97	–	–
Aoridae	14	–	–
Caprellidae	431	–	–
Melitidae	14	–	–
Phoxocephalidae	14	–	–
Decapoda			
Rhithropanopeus harrisii	14	–	–
Sipuncula			
Phascolion strombi	14	28	–
Sipunculidae	–	28	–
Sipuncula	42	14	–
Echinodermata			
Amphipholis	–	56	28
Amphipholis squamata	42	–	–

Phytoplankton taxa list and densities (#/mL) for Siesta Key WWTP, collected via subsurface grabs in Grand Canal, on 5 August, 1996.

	Reference Site	Test Site 1	Test Site 2
Chrysophyceae			
Mallomonas	–	53	–
Bacillariophyceae			
Achnanthes	26	–	–
Chaetoceros	131	788	368
Cocconeis	–	–	105
Corethron	26	–	–
Cyclotella	13,863	25,100	18,851
Cylindrotheca	53	–	210
Cymbella	26	–	–
Leptocylindrus	26	630	473
Navicula	–	–	53
Nitzschia	26	158	53
Rhaphoneis	–	–	53
Rhizosolenia	105	158	158
Skeletonema	–	105	53
Synedra	–	–	53
Thalassiosira	53	–	53
Pennales	53	53	105
Chlorophyceae			
Dunaliella	105	53	–
Pyramimonas	53	158	–
Undetermined flagellate	–	53	158
Euglenophyceae			
Phacus	–	–	53
Dinophyceae			
Peridinium	105	105	105
Cryptophyceae			
Chroomonas	184	105	158
Cryptomonas	–	53	–

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



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

