

Biological Assessment of

City of Sarasota Wastewater Treatment Plant

Sarasota County

NPDES #FL0040771

Sampled October 1996

February 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: City of Sarasota WWTP
County: Sarasota
NPDES Number: FL0040771
State Permit Expiration Date: 31 January, 1997

Toxics Sampling Inspection (**XSI**)

Date Sampled: 28 October, 1996

Results: No organic pollutants were detected in the effluent sample. No metals were found in the effluent above Class III water quality standards.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 28 October, 1996

Results: The sample of undiluted effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi.*

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 28 October, 1996

Results: Results from benthic macroinvertebrate sampling were extremely unusual, in that zero organisms were recovered from the three sites. These results indicate severe degradation or other disruption throughout the area, potentially due to non-point source pollution or to some other phenomenon not adequately described during this investigation. An extreme algae bloom was occurring in Whitaker Bayou at the time of sampling, with chlorophyll *a* ranging from 23.2 µg/L to 477 µg/L. These chlorophyll *a* levels exceeded those found in 95% of Florida's estuaries, with the test site 2 concentration exceeding the 95th percentile value by well over an order of magnitude. Algal diversity was extremely poor at the test sites due to the overwhelming dominance of the dinophyte, *Cryptoperidinium* sp., in the samples. Given the disturbed conditions of the Whitaker Bayou benthic macroinvertebrate and algal communities, additional study of this area, to determine the extent of the problem and possible causes, appears warranted.

Water Quality Inspection (**WQI**)

Date Sampled: 28 October, 1996

Results: The dissolved oxygen in the bottom layer violated Class III marine water quality standards at the reference site (2.1 mg/L) and at test site 1 (3.3 mg/L) (Rule 62-302.530(31) FAC). Nutrient enrichment was evident at all three sites, and the primary cause appeared to be urban stormwater inputs. Total phosphorus, TKN, and ammonia at receiving water sites were generally higher than effluent concentrations. The phosphorus values at the reference site and test site 1 were higher than those found in 80% of other Florida estuaries, while those at test site 2 (with 1.0 mg/L) exceeded the 95th percentile. TKN was exceptionally elevated at test site 2 (with 5.7 mg/L), being higher than those found in 95% of Florida's estuaries. Algal Growth Potential (AGP) levels were above the "problem threshold" of 10.0 mg dry wt/L at all three receiving water stations.

Introduction

The City of Sarasota Wastewater Treatment Plant is located in Sarasota County (see maps in Appendix). This 10.2 MGD advanced wastewater treatment facility treats domestic waste via a "modified Bardenpho" process. Effluent is either delivered to a public access reuse system or discharged into Whitaker Bayou. The mean discharge to Whitaker Bayou from the facility during October, 1996, was 11.2 MGD.

Discharge limits to Whitaker Bayou are based upon stream flow at the 38th Street gage. When the flow exceeds 3 cfs, the effluent must comply with the following limitations: CBOD (3.0 mg/L as a monthly average), TSS (5.0 mg/L as a monthly average), total phosphorous (1.0 mg/L as a monthly average), total nitrogen (3.0 mg/L as a monthly average) and dissolved oxygen (6.0 mg/L minimum). When the flow is less than 3 cfs, the following effluent limits apply: CBOD (2.0 mg/L as a monthly average), TSS (5.0 mg/L as a monthly average), total phosphorous (1.0 mg/L as a monthly average), total nitrogen (3.0 mg/L as a monthly average) and dissolved oxygen (6.0 mg/L minimum). The permit further stipulates that the amount of wastewater discharged to Whitaker Bayou shall not exceed 30% of the actual annual wastewater flow over the five year term of the permit.

The City of Sarasota WWTP was previously under a consent order because of problems in complying with minimal negative impact criteria and for providing insufficient wastewater reuse areas. In June, 1995, the effluent was chronically toxic to *Ceriodaphnia dubia*.

Major characteristics of community structure of reference and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	0	0	0
Phytoplankton Algae			
Number of Taxa	10	4	5
Shannon-Weaver Diversity	2.45	0.62	0.28
Chlorophyll a (µg/L)	1 U	23.2	477
Algal Density (#/mL)	1,396.8	5,489.7	49,989.5
% Blue-green	0.75	0	0
% Dinophyceae	30.7	90.4	97.5
% Diatoms	3.8	4.4	1.7
Algal Growth Potential (mg dry wt/l)	23.76	24.29	67.47

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 Bowlees Creek, approximately 4.5 miles north of the discharge site) and two test sites (bracketing the discharge in Whitaker Bayou near Tamiami Trail) (see maps in the 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* and *Cyprinella leedsi* 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 with 3 petite Ponar dredge samples per station (Ross 1990). Phytoplankton was sampled at both reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* for the freshwater discharge and *Dunaliella tertiolecta* for the saltwater receiving water sites, followed Miller *et al.* (1978) and EPA (1974). Sediment from reference and test sites was analyzed for grain size and percent organic matter (Ross 1990).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed

to determine the effects of a discharge. These are briefly discussed here.

Habitat Assessment: Attributes known to have potential effects on the estuarine biota were evaluated and scored. Based on the sum of these individual scores, overall habitat quality is 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).

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.

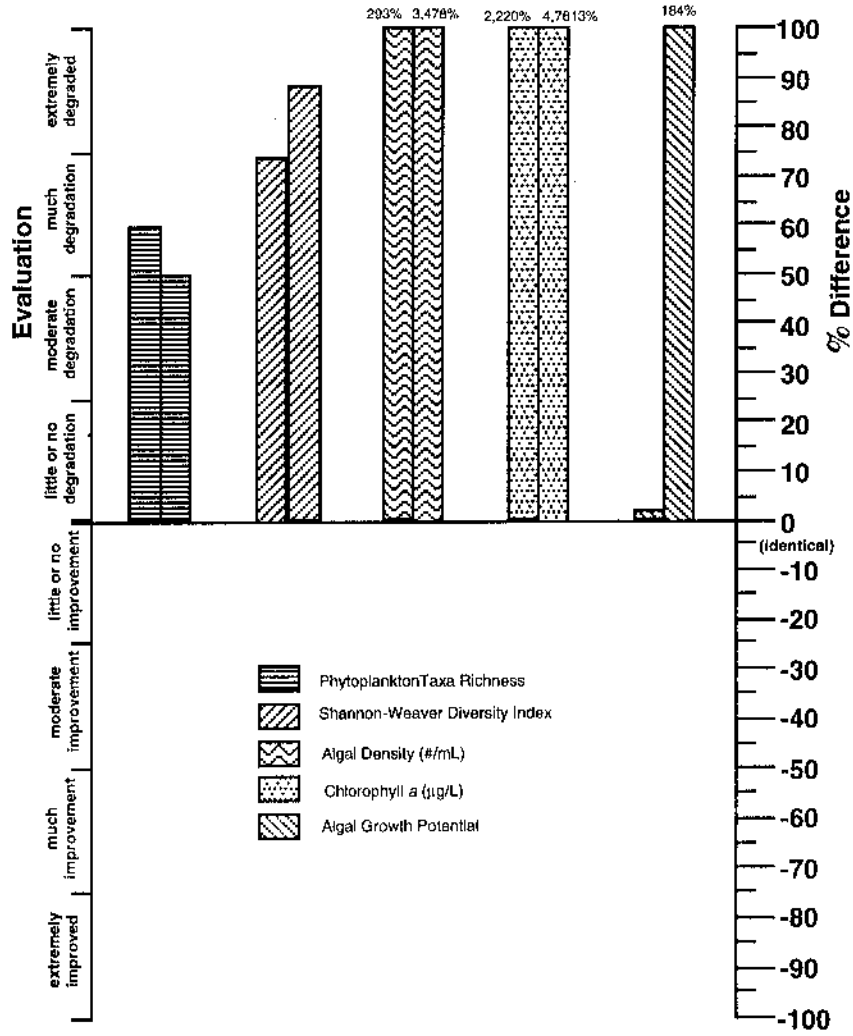
Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity (Rule 62-302.530(11) FAC). Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical 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.



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.

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 and the diversity index 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 SW District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Bart Richard, 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 test sites were situated within Whitaker Bayou, a heavily urbanized and channelized tidal creek, with a shoreline consisting almost entirely of vertical seawalls. The reference site was located approximately 4.5 miles north, in Bowlees Creek, a system with similar habitat characteristics, as well as surrounding land use. Habitat quality was "marginal" at all three receiving water sites, with the reference site scoring 31 points, test site 1 receiving 32 points, and test site 2 scoring 36 points. Commercial, residential and industrial land-uses dominated at all three sites. Marinas are located in the vicinity of each site. Petroleum hydrocarbons were observed at all sites, both in the sediments and on the water's surface. In the past, nearby residents have complained of chlorine odors near the test sites.

Physical/chemical parameters varied between the receiving water stations. The surface layer dissolved oxygen ranged from 6.0 mg/L at the reference site to 7.8 mg/L at test site 2. The bottom layer dissolved oxygen was normal at test site 2 (7.1 mg/L), but dropped dramatically at the reference site (2.1 mg/L) and test site 1 (3.3 mg/L), where it violated Class III marine water quality standards (Rule 62-302.530(31) FAC). The surface salinity at all three sites ranged from 10 ppt at test site 1 to 22 ppt at test site 2. Note that these two sites are situated approximately 200 m apart. The bottom salinities were higher, with 35 ppt at the reference site, 24 ppt at test site 1, and 27 ppt at test site 2. The pH ranged from 7.2 SU to 7.6 SU.

No organic pollutants were detected in the effluent sample. No metals were found in the effluent above Class III water quality standards.

The sample of undiluted effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi.*

Nutrient enrichment was evident at all three sites, and the primary cause appeared to be urban stormwater inputs. For example, total phosphorus at the reference site (0.23 mg/L), test site 1 (0.27 mg/L), and test site 2 (1.0 mg/L) were significantly higher than effluent concentrations (which were 0.092 mg/L in the timed composite sample and 0.1 mg/L in the flow proportionate sample). Note that these phosphorus values are higher than those found in 80% (the reference site and test site 1) to 95% (test site 2) of other Florida estuaries (see Table of Typical Water Quality Values in Appendix). Ammonia concentrations at the reference site (0.045 mg/L and at test site 2 (0.049 mg/L) exceeded the effluent level (0.035 mg/L or less). Conversely, despite 1.8 mg/L of nitrate-nitrite being detected in the timed composite effluent sample, nitrate-nitrite levels were higher at the reference site (0.2 mg/l) when compared with test site 1 (0.087 mg/l) or test site 2 (0.025 mg/l). TKN was exceptionally elevated at test site 2 (with 5.7 mg/L), being higher than those found in 95% of Florida's estuaries. In contrast, effluent TKN was relatively normal (0.58 mg/L to 0.64 mg/L).

Algal Growth Potential (AGP) levels were above the "problem threshold" of 10.0 mg dry wt/L at all three receiving water stations (Ron Raschke, USEPA, pers.

comm.). AGP was 23.8 mg dry wt/L at the reference site, 24.3 mg dry wt/L at test site 1, and 67.5 mg dry wt/L at test site 2. The effluent AGP was 28.7 mg dry wt/L.

Results from benthic macroinvertebrate sampling were extremely unusual, in that zero organisms were recovered from the three petite Ponar grabs of the sediments at each of the three sites. No macroinvertebrates were found in any of the samples, including the reference site. These results indicate severe degradation or other disruption throughout the area. These effects may be due to non-point source pollution, (*e.g.*, habitat problems, petroleum contaminated sediments, low dissolved oxygen) or to some other phenomenon not adequately described during this investigation. Further study of this area, to determine the extent of the problem and possible causes, appears warranted.

The figure on p. 2 represents changes in the phytoplankton algal community. Larger differences (that is higher, percentages) correspond with greater degrees of degradation. An extreme algae bloom was occurring in Whitaker Bayou at the time of sampling. Chlorophyll *a* was elevated at test site 1 (23.2 µg/L) and excessively elevated at test site 2 (477 µg/L). These chlorophyll *a* levels exceeded those found in 95% of Florida's estuaries, with the test site 2 concentration exceeding the 95th percentile value by well over an order of magnitude. Phytoplankton taxa richness decreased from 10 taxa at the reference site to 4 taxa test site 1 and 5 taxa at test site 2. Algal diversity followed a similar pattern, decreasing from 2.45 at the reference site to 0.62 at test site 1 and 0.28 at test site 2. These extremely poor diversity values at the test sites were due to the overwhelming dominance of the dinophyte, *Cryptoperidinium* sp., in the samples. *Cryptoperidinium* sp. accounted for 90.4% of the total population at test site 1 and 96.6% of the population at test site 2. Given the disturbed conditions of the Whitaker Bayou algae, additional study is recommended.

Conclusions

The dissolved oxygen concentration in the bottom layer violated Class III marine water quality standards at the reference site (2.1 mg/L) and at test site 1 (3.3 mg/L) (Rule 62-302.530(31) FAC).

No organic pollutants were detected in the effluent sample. No metals were found in the effluent above Class III water quality standards.

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Algal Growth Potential (AGP) levels were above the "problem threshold" of 10.0 mg dry wt/L at all three receiving water stations (Ron Raschke, USEPA, pers. comm.). AGP was 23.8 mg dry wt/L at the reference site, 24.3 mg dry wt/L at test site 1, and 67.5 mg dry wt/L at test site 2. The effluent AGP was 28.7 mg dry wt/L.

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Literature Cited

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

Aquatic Toxicity Information Retrieval Data Base (AQUIRE). 1994. U.S. EPA Environmental Research Laboratory, Duluth, MN.

Chang, S., F. W. Steimle, R. N. Reid, S. A. Fromm, V. S. Zdanowicz, and R. A. Pikanowski. 1992. Association of benthic macrofauna with habitat types and quality in the New York Bight. Mar. Ecol. Prog. Ser. 89: 237-251.

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

Environmental Protection Agency. 1974. Marine algal assay procedure: Bottle test. Nat'l Environ. Res. Center, Office of Res. and Dev., U.S. EPA, Corvallis, Oregon. 43 p.

Engle, V. D., J. K. Summers, and G. R. Gaston. 1994. A benthic index of environmental condition of Gulf of Mexico estuaries. Estuaries 17(2): 372-384.

Farrell, D. H. 1992. A community based metric for marine benthos. Fla. Dept. Environ. Reg. SW Dist. Office. unpublished rept. 15 p.

FDEP. 1994. Lake bioassessments for the determination of nonpoint source impairment in Florida. Fla. Dept. Environ. Prot. Biology Section, Tallahassee, Fla. 73 p.

Hudson, P. L., D. R. Lenat, B. A. Caldwell, and D. Smith. 1990. Chironomidae of the Southeastern United States: A checklist of species and notes on biology, distribution, and habitat. U. S. Fish Wildl. Serv., Fish. Wildl. Res. 7. 46 pp.

Hulbert, J. L. 1990. A proposed lake condition index for Florida. North Amer. Benth. Soc. 38th Ann. Mtg., Blacksburg, VA, 11 p.

Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. J. N. Am. Benthol. Soc. 12(3): 270-290.

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

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

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

Weber, C. I. 1991. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Whitmore, T. J. 1989. Florida diatom assemblages as indicators of trophic state and pH. Limnol. Oceanogr. 34(5): 882-895.

Chemistry summary table for City of Sarasota WWTP	Effluent flow porportion-ate	Effluent time composite	Effluent sub-surface grab	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)						
None detected	-	-	None detected	-	-	-
Metals (ug/L)						
Aluminum	-	-	106	-	-	-
Arsenic	-	-	20 U	-	-	-
Copper	-	-	5 I	-	-	-
Chromium	-	-	5 U	-	-	-
Iron	-	-	28	-	-	-
Lead	-	-	10 U	-	-	-
Mercury	-	-	0.10 U	-	-	-
Nickel	-	-	4 U	-	-	-
Selenium	-	-	30 U	-	-	-
Zinc	-	-	23	-	-	-
Nutrients (mg/L)						
Ortho-phosphate	0.056 A	0.044	-	0.17	0.22A	0.15
Total phosphorus	0.1	0.092	-	0.23	0.27	1.0
Ammonia	0.035 I	0.034 I	-	0.045 A	0.019 I	0.049
Nitrate+Nitrite	1.7	1.8	-	0.2 A	0.087	0.025 U
TKN	0.64	0.58	-	0.83	0.74	5.7
General Phys-Chem Parameters						
Habitat Assessment	-	-	-	31	32	36
Dissolved Oxygen (mg/L) surface	-	-	-	6	6.4	7.8
Dissolved Oxygen (mg/L) mid-depth	-	-	-	2.9	4.7	6.3
Dissolved Oxygen (mg/L) bottom	-	-	-	2.1	3.3	7.1
pH (SU) surface	-	-	-	7.3	7.6	7.5
pH (SU) mid-depth	-	-	-	7.4	7.2	7.3
pH (SU) bottom	-	-	-	7.3	7.2	7.5
Salinity (ppt) surface	-	-	-	14	10	22
Salinity (ppt) mid-depth	-	-	-	31	22	23
Salinity (ppt) bottom	-	-	-	35	24	27
Temperature (° C) Surface	-	-	-	24	26	27
Temperature (° C) mid-depth	-	-	-	27	27	27
Temperature (° C) bottom	-	-	-	27	27	27
Algal Growth Potential (mg dry wt/L)	-	-	28.66	23.76	24.29	67.47
Toxicity						
Bioassay Fish-Dechlorinated	-	-	Not-toxic	-	-	-
Bioassay Invertebrate-Dechlorinated	-	-	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

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

Typical Values for Selected Parameters in Florida Waters

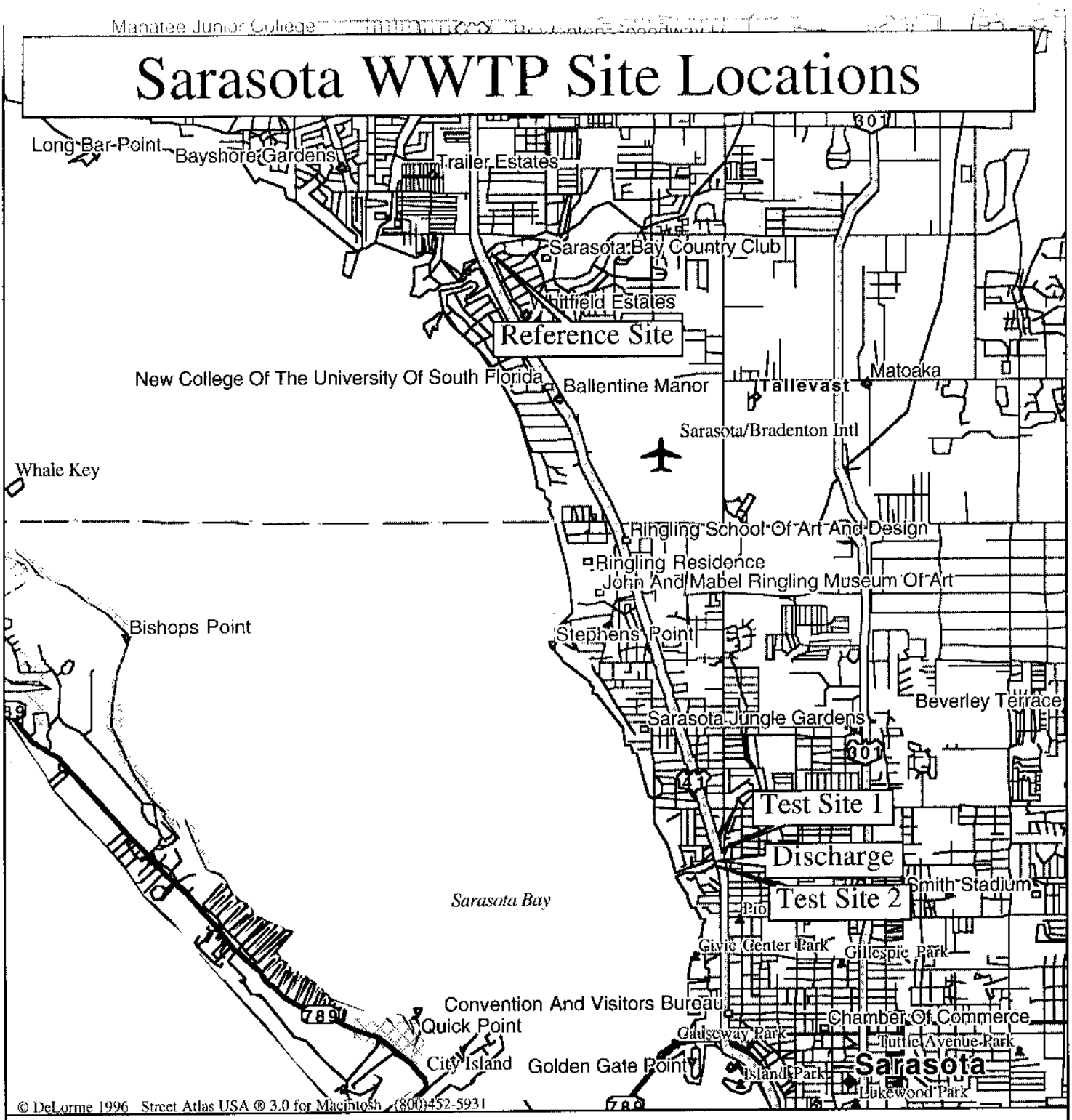
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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

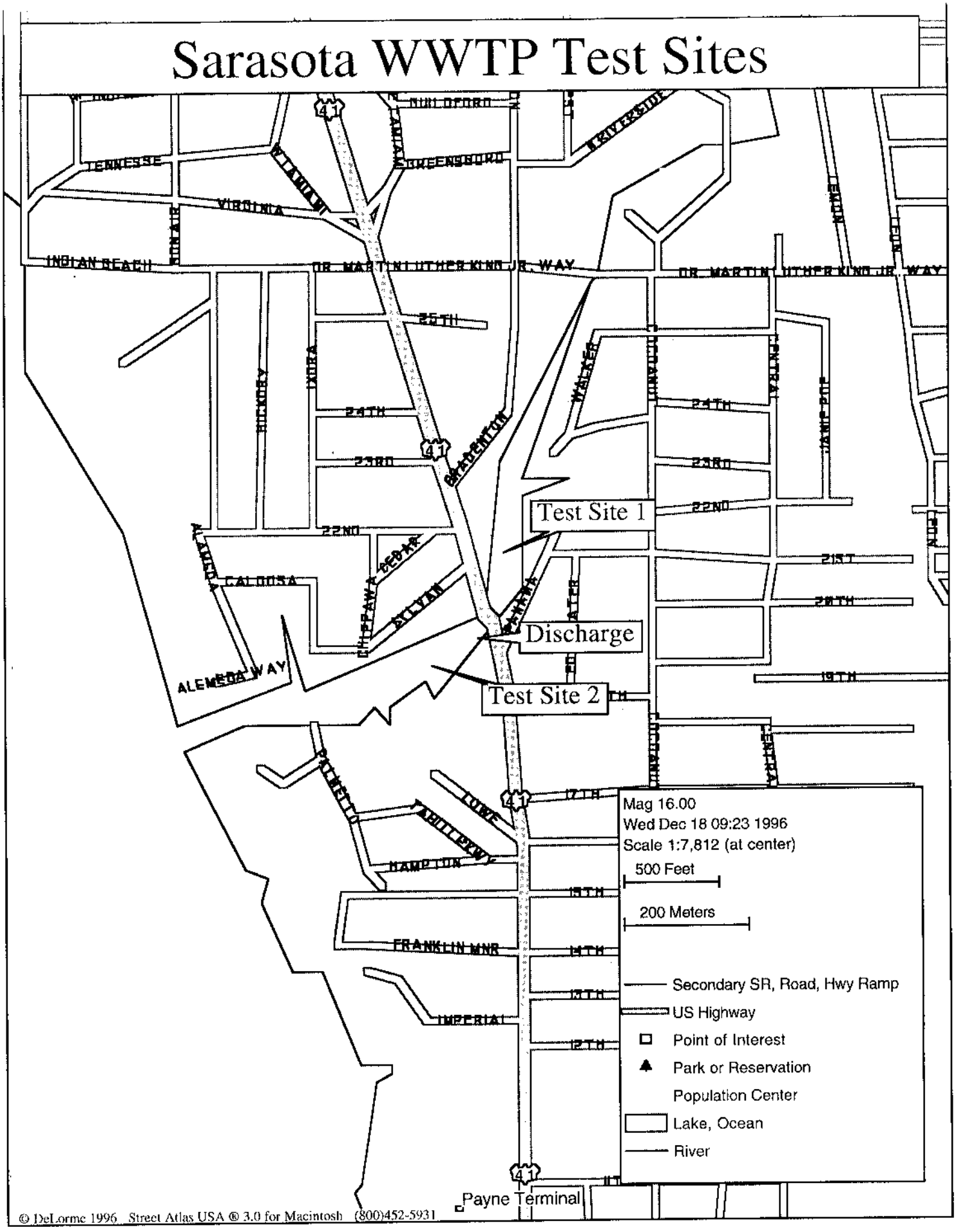
Sarasota WWTP Site Locations



Mag 13.00
Wed Dec 18 09:27 1996
Scale 1:62,500 (at center)
1 Miles
2 KM

- Secondary SR, Road, Hwy Ramp
- Major Connector
- State Route
- US Highway
- Point of Interest
- Town, Small City
- Large City
- Geographic Feature
- Park or Reservation
- Sched Service Airport
- Locale
- County Boundary
- Population Center
- Land

Sarasota WWTP Test Sites



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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: City of Sarasota		**Date Summary Prepared :** 10/7/96
Location (attach detailed map): See attachments	**County** Sarasota	**District** SW District
Federal Permit # FL0040771 **and expiration date:** 1/31/97	**State GMS # and** 4058M00609 **State expiration date:**	**Facility Type:** Industrial (Municipal) Federal Agricultural **Other (list):**

Function of facility: AWT for the City of Sarasota

Description of treatment process:

Operation of a 10.2 MGD annual average (and 13.0 MGD maximum month) "modified Bardenpho" advanced wastewater treatment plant (AWWTP) with the reuse of reclaimed water for irrigation of urban public access areas including golf courses and agricultural land used for pasture or citrus crop, and discharge of the reclaimed water into Whitaker Bayou, under specific conditions set forth below.

Receiving waters: Whitaker Bayou to Sarasota Bay	**Classification:** I II (III)	
Design Flow: 10.2 Annual 13.0 monthly	**Mean Flow:** 11.2 MGD (10/95)	**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.

34. Discharge to Whitaker Bayou

Discharge of dechlorinated reclaimed water meeting the requirements of Specific Condition # 6 above to Whitaker Bayou, at the existing outfall, is permitted when the streamflow at Whitaker Bayou at the 38th Street gage and the effluent quality comply with the following limitations:

	Whitaker Bayou > 3 Cfs	Streamflow < 3 Cfs
$CBOD_5$ * mg/l	3.0	2.0
TSS,* mg/l	5.0	5.0
Total P*, mg/l	1.0	1.0
Total N, mg/l	3.0	3.0
Dissolved Oxygen mg/l	6.0 (minimum)	6.0 (minimum)

* All figures except dissolved oxygen represent average values for the number of days of discharge during each calendar month at the respective stream flows. Streamflow shall be monitored through a real time communication link (telemetry) with the USGS Stream gage at 38th Street.

35. Over the five year term of the permit, discharge to Whitaker Bayou shall not exceed 30 percent of the actual wastewater flow. If the discharge to Whitaker Bayou exceeds 30 percent of the actual flow, then the permittee shall have violated this permit once for each calendar year in which the permittee discharged to Whitaker Bayou more than 30 percent of the actual flow to the treatment plant for that calendar year.

Describe special permit conditions and permit modifications:

* See CBOD5 levels
For more info on CBOD please refer to submittals in this packet.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

City of Sarasota
(Facility)

Description of permitted outfall(s):

Outfall 001 discharges to Whitaker Bayou, in the southwest corner under the Tamiami Trail bridge. The outfall is submerged.

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

All the NPDES permit required acute toxicity tests have resulted in passing tests, however, a NPDES required chronic toxicity test demonstrated the effluent was toxic in June 1995. This test was conducted 06/07-14/95, and demonstrated NOEC values of 50% effluent for Ceriodaphnia dubia fecundity and survival. The survival rate of C. dubia in the 100% effluent was 0%. For more information on this test please refer to my memo dated 22 September 1995 (SWFTA #2702).

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

1) There have been no FY91-5s or FY91-3s performed on this facility.
2) Surface waters files for this facility indicate an MNI study was conducted from 1990 to 1993.

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

There is no data to compare.

Additional information:

City of Sarasota WWTP was under a consent order because of problems in complying with MNI and providing sufficient dilution.

Staff contributing to this review (signature):

Candace Francis (Biologist)
Joseph Iglesias (Inspector)
(Engineer)
( )
( )
( )

Florida Department of
Environmental Protection

Memorandum

TO: Michael Hickey, Water Facilities Administrator
Southwest District

FROM: Al Bishop, P.E., Administrator
Point Source Evaluation Section

DATE: January 24, 1994

SUBJECT: City of Sarasota WWTP Effluent BOD

This is in response to the City of Sarasota's questions as relayed to us by Ed Snipes. Any one of the following discharge conditions is acceptable with respect to impact on Whitaker Bayou, assuming a discharge of 13 MGD at a DO of 6.0 mg/L:

1. Monthly average CBOD5 limit of 2 mg/L, discharge permitted at any streamflow.

2. Monthly average CBOD5 limit of 3 mg/L, no discharge if streamflow less than 3 cfs (as measured at USGS gauge located at 38th St.).

3. Monthly average CBOD5 limit of 5 mg/L, no discharge if streamflow less than 5 cfs.

We do not view the introduction of a variable CBOD limit in which a higher CBOD concentration is permitted on higher streamflow days to be a viable option unless the operational ability to comply to such a scheme can be clearly demonstrated.

Data provided by the City and by Camp Dresser & McKee indicate that of the 335 discharge days between August, 1991 and October, 1993, streamflow was below 5 cfs (at gauge) for 93 days (maximum of 10 consecutive days) and below 3 cfs for 15 days (maximum of 4 consecutive days).

Please contact me or Peter Krottje if you have any further questions.

AB/PK

cc: Ed Snipes ✓

TO: Michael Hickey, Water Facilities Administrator
Southwest District

FROM: Al Bishop, P.E., Administrator
Point Source Evaluation Section

DATE: January 5, 1994

SUBJECT: City of Sarasota WWTP Effluent DO

We have reviewed the dissolved oxygen (DO) analyses submitted by Camp, Dresser, and McKee on December 15, 1993. The submitted material provides adequate assurance that the facility can consistently meet a DO concentration of 6.0 mg/L at the point of discharge to Whitaker Bayou. The results of our recent WASP modeling runs indicate that a DO of 6.0 mg/L is acceptable with respect to impact on the receiving water. We continue to have concerns regarding effluent biochemical oxygen demand (BOD), however. As we stated in our November 18, 1993 teleconference, modeling indicates that a BOD5 greater than 2.0 mg/L will have more than minimum negative impact on Whitaker Bayou during low flow conditions.

If we may be of additional assistance, please contact me or Peter Krottje at Suncom 278-0780.

cc: Ed Snipes

D.E.P.
JAN 2 1 1994
SOUTHWEST DISTRICT
TAMPA

Stormwater drains oil/grease/gas from boats

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:
	24010049	10/29/96	0730	Bowlees Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide	Sarasota	City of Sarasota WWTP	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)
				50	50		

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: 0

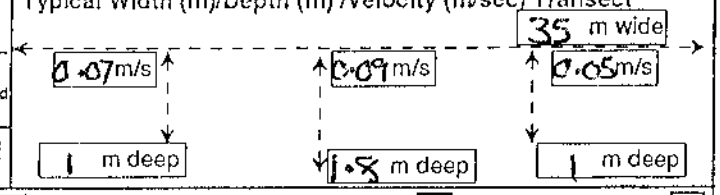
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 0.00 (m above present water level) + 1.8 (present depth in m) = 2 (m above bed)

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



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	0.5	24.16	7.28	5.96	22.7			1
Mid-depth	1	26.98	7.4	2.92	47.4			
Bottom	1.7	27.03	7.33	2.14	53.00			

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:

~~Sunny~~, cloudy and no breeze

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	8/29/96

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:
	24010049	10/28/96	Bowlees Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
low tide	City of Sarasota WWTP	Reference Sub

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 2	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 13	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points oysters, barnacles on seawalls	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: 3	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	—	—	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: 5	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 31

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/28/96	Andrea Granger	Andrea Granger

Stormwater drains
Residential run-off
grass clippings
oil/gas/grease
trash bags

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-95)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	24010051	8/28/96	9:20	Whitaker Bayou

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide,	Sarasota	City of Sarasota WWTP	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 ☐ Slight ☒ Moderate ☐ Heavy ☐

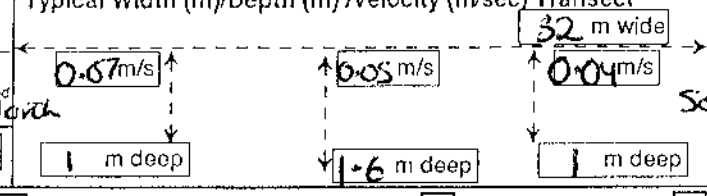
Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☒

Width of riparian vegetation (m) on least buffered side: 0 | *List & map dominant vegetation on back*

Artificially Channelized ☐ no ☒ ☐ ☐ ☐
Artificially Impounded ☐ yes — recent, severe | some recovery | mostly recovered, more stable | natural

High Water Mark: 0.5 (m above present water level) + 1.75 (present depth in m) = 2.25 (m above bed)

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



Scale →

Canopy Cover %: Open: ☐ Lightly Shaded (1-45%): ☒ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

very lightly 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	26.07	7.59	6.38	17.2			1.2
Mid-depth	1	26.92	7.17	4.72	34.3			
Bottom	1.5	26.91	7.16	3.34	37.6			

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: ☒ Sediments stirred up by tidal action

Weather Conditions/Notes:
Cloudy, ~~[illegible]~~, little wind

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	8/29/96

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:
	24010051	10/28/96	Whitaker Bayou

REMARKS:	LOCATION:	FIELD ID/NAME:
Low tide	City of Sarasota WWTP	Test Site 1

Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 1	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed 13	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points barnacles & oysters on seawalls.	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 5	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 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 6	Anaerobic mud. 0-3 points

TOTAL SCORE 32

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/28/96	Andrea Grainger	Andrea Grainger

① & mammals in the water
② Stormwater outfalls.
③ The water from the outfall was stirring up the bottom sediments.

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:
	24010052	10/28/96	1010	Whitaker Bayou

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Low tide	Sarasota	City of Sarasota WWTP	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)
				20	80		

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: 0

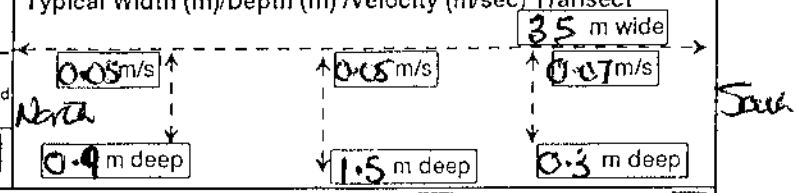
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 1.5 (present depth in m) = 2.0 (m above bed)

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



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

SEDIMENT/SUBSTRATE

Neighbors were complaining to me about odors

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

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	27.27	7.48	7.75	34.6			0.3
Mid-depth	0.7	27.06	7.32	6.28	36.6			
Bottom	1.3	26.62	7.51	7.09	42.3			

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: ☒ due to plume

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

Weather Conditions/Notes: There was a plume in the bayou due to the WWTP effluent stirring up the sediments.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Andrea Grainger	Andrea Grainger	10-28-96

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:
	24010052	10/28/96	Whitaker Bayou

REMARKS:	LOCATION:	FIELD ID/NAME:
Low Tide	City of Sarasota NWPP	Test Site 2

Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 4	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 oysters + barnacles on seawalls, docks + rip-rap.	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 5	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type 3	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE 36

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/28/96	Andrea Grainger	Andrea Grainger

FDEP Biology Section — Acute Bioassay Bench Sheet

ıple Source: City of Sarasota WWTP
County: Sarasota
ıct / District: Andrea Grainger / SW
ES Permit #: FL0040771
S Sample #: 157547 LIMS Job #: 96-OCT-29-20
sample log 11-1-96
Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through

Sample Collection: Date 10/28/96 Time 1320
Test Beginning: Date 10/29/96 Time 1500
Test Ending: Date 10/31/96 Time 1500
Organism Batch #: 82 Diluent Batch #: 82 well DI
Organism Age: 11 days
Test Organism: Cyprinella (eggs)

: Number: 2 of 2

narks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 7.0 @ 9.0	23.7 @ 23.7	8.2 @ 25.1 °C	100.8 @ 92.8 988 @ 1075 @ 25.0 °C (9960 ②, 9966)
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.2	8.4 @ 24.3 °C	104.9 @ 92.8 1002 @ 1072 @ 25.3 °C (9940, 9966)
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.2	8.4 @ 24.1 °C	103.2 @ 92.8 995 @ 1079 @ 25.0 °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
12 A	A1	5	5	5	8.1	8.4	8.5	24.2	25.1	25.4	7.9	7.9	7.9	250	260	265
12 B	A2	5	5	5	8.1	8.4	8.5	24.2	25.0	25.0	7.9	7.8	7.6	250	235	260
12 C	A3	5	5	5	8.1	8.4	8.5	24.2	25.1	24.6	7.9	7.9	7.6	250	260	260
12 D	A4	5	5	5	8.1	8.4	8.5	24.2	25.3	25.0	7.9	7.8	7.7	250	260	265
20 % A	A5	5	5	5	7.7	8.3	8.4	24.7	25.2	25.2	7.5	7.7	7.7	1420	1465	1515
20 % B	A6	5	5	5	7.7	8.3	8.4	24.7	25.1	25.0	7.5	7.7	7.6	1425	1465	1500
20 % C	A7	5	5	5	7.7	8.3	8.4	24.7	25.2	24.5	7.5	7.6	7.8	1425	1480	1500
20 % D	A8	5	5	5	7.7	8.3	8.4	24.7	24.8	24.5	7.5	7.6	7.8	1425	1460	1510
Measured/Loaded by:		DW	MF	DW	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		DW	MF	DW	JS	ND	DB	JS	ND	DB	JS	ND	DB	JS	ND	DB

Investigators' Signatures

Deann Mechalske
Julie Thorpe
Marshall Faircloth

Water Quality Parameters

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):					
Lab Total Residual Cl2 (mg/L):	<.03	<.03	<.03	DR-10C	JS
Alkalinity (mg/L as $CaCO_3$):	125	70	150	HACH	DN
Hardness (mg/L as $CaCO_3$):	125	80	236	HACH	DN
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	CRICN	DN

Ammonia Meter #98136 Meter Slope: -54.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Sarasota WWTP
County: Sarasota
Contact / District: Andrea Grainger / SW
NPDES Permit #: FL0040771
LIMS Sample #: 157947 **LIMS Job #:** 96-OCT-29-20
sample log 11-1-96
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2
Remarks: 0 = Dead

Sample Collection: Date 10/28/96 Time 1320
Test Beginning: Date 10/29/96 Time 1320
Test Ending: Date 10/31/96 Time 1430
Organism Batch #: 48 **Diluent Batch #:** 46
Organism Age: <24hr
Test Organism: Ceriodaphnia dubia

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	23.7 @ 23.7	8.2 @ 25.1 °C	100.8 @ 92.8 988 @ 1079 @ 25.0 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.2	8.4 @ 24.3 °C	9860 & 9960 104.9 @ 92.8 1002 @ 1079 @ 25.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.2	5.4 @ 24.1 °C	?940 ?960 1032 @ 928 995 @ 1079 @ 25.0 °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
Ctl A	A	5	5	5	8.0		8.1	23.4		24.4	7.9		7.4	175		185
Ctl B	B	5	5	5			8.1			24.4			7.5			185
Ctl C	C	5	5	5			8.2			24.3			7.5			180
Ctl D	D	5	5	5			8.2			24.0			7.5			195
100% A	A	5	5	5	7.8		6.5	23.5		24.3	7.9		7.7	1300		1495
100% B	B	5	5	5			8.5			24.3			7.7			1445
100% C	C	5	5	5			8.5			24.2			7.7			1420
100% D	D	5	5	4 [1]			8.5			24.1			7.7			1445
Measured/Loaded by:		MF	MF	DW	MF		DW	MF		DW	MF		DW	MF		DW
Recorded by:		MF	MF	DW	JS		JS	JS		JS	JS		JS	JS		JS

Investigators' Signatures

Donna Nicholson
Julie Sharpe
Marshall Faircloth
Ted Simon

reviewer

form updated 4/01/96

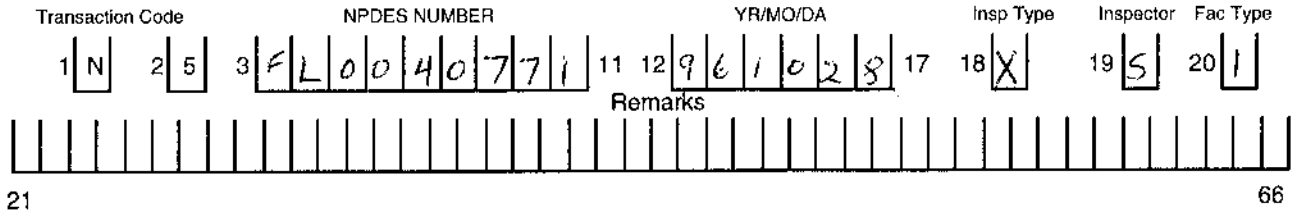
Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):					
Lab Total Residual Cl2 (mg/L):	<.03	<.03	<.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	125	70	150	HACH	DN
Hardness (mg/L as $CaCO_3$):	125	80	236	HACH	DN
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	ORION	DN

Ammonia Meter #98136 Ammonia Meter Slope: -54.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Phytoplankton taxa list and densities (#/mL) for the City of Sarasota WWTP, collected via subsurface grabs inWhitaker Bayou (test sites) and Bowlees Creek (refernce site) on 28 October, 1996.

	Refernce Site	Test Site 1	Test Site 2
Cyanophyceae			
Lyngbya sp.	11	-	-
Bacillariophyceae			
Skeletonema sp.	32	239	420
Rhizosolenia setigera	-	-	420
Nitzschia sp.	21	-	
Euglenophyceae			
Eutreptia sp.	357	286	420
Euglena sp.	315	-	-
Dinophyceae			
Cryptoperidinium sp.	389	4917	48309
Peridinium sp.	11	48	420
Ceratium sp.	21	-	-
Cryptophyceae			
Chroomonas sp.	210	-	-
Cryptomonas sp.	32	-	-

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



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