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)

<table>
<thead>
<tr>
<th>Date Sampled:</th>
<th>28 October, 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results:</td>
<td>No organic pollutants were detected in the effluent sample. No metals were found in the effluent above Class III water quality standards.</td>
</tr>
</tbody>
</table>

### Compliance Biomonitoning Inspection (CBI)

<table>
<thead>
<tr>
<th>Date Sampled:</th>
<th>28 October, 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results:</td>
<td>The sample of undiluted effluent was not acutely toxic to the invertebrate, Ceriodaphnia dubia, or to the fish, Cyprinella leedsi.</td>
</tr>
</tbody>
</table>

### Impact Bioassessment Inspection (IBI)

<table>
<thead>
<tr>
<th>Date Sampled:</th>
<th>28 October, 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results:</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Water Quality Inspection (WQI)

<table>
<thead>
<tr>
<th>Date Sampled:</th>
<th>28 October, 1996</th>
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</thead>
<tbody>
<tr>
<td>Results:</td>
<td>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.</td>
</tr>
</tbody>
</table>
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.

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

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 Bowles 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 leedsii 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
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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 Rose 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hubert (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 Frydenberg, 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 Bowlies 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 chloroform 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 lewisi.

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 60% (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 96% 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.
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 at test site 1 and 5 taxa at test site 2. Algal diversity followed a similar pattern, decreasing from 2.44 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.

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

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's 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 (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.

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. 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.
Literature Cited


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


### Organic Constituents (ug/L)

<table>
<thead>
<tr>
<th>Organic Constituents</th>
<th>Effluent flow proportion</th>
<th>Effluent time composite</th>
<th>Effluent subsurface grab</th>
<th>Reference Site</th>
<th>Test Site 1</th>
<th>Test Site 2</th>
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<tbody>
<tr>
<td>None detected</td>
<td>-</td>
<td>-</td>
<td>None detected</td>
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### Metals (ug/L)

<table>
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<th>Effluent flow proportion</th>
<th>Effluent time composite</th>
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<td>Aluminum</td>
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<td>186</td>
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<td>-</td>
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<td>Zinc</td>
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### Nutrients (mg/L)

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<th>Nutrient</th>
<th>Effluent flow proportion</th>
<th>Effluent time composite</th>
<th>Effluent subsurface grab</th>
<th>Reference Site</th>
<th>Test Site 1</th>
<th>Test Site 2</th>
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<tr>
<td>Ortho-phosphate</td>
<td>0.056 A</td>
<td>0.044</td>
<td>-</td>
<td>0.17</td>
<td>0.22 A</td>
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<tr>
<td>Total phosphorus</td>
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<td>0.092</td>
<td>-</td>
<td>0.23</td>
<td>0.27</td>
<td>1.0</td>
</tr>
<tr>
<td>Ammonia</td>
<td>0.035 I</td>
<td>0.034 I</td>
<td>-</td>
<td>0.045 A</td>
<td>0.019 I</td>
<td>0.049</td>
</tr>
<tr>
<td>Nitrate-Nitrite</td>
<td>1.7</td>
<td>1.8</td>
<td>-</td>
<td>0.2 A</td>
<td>0.087</td>
<td>0.025 U</td>
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<tr>
<td>TKN</td>
<td>0.64</td>
<td>0.58</td>
<td>-</td>
<td>0.83</td>
<td>0.74</td>
<td>5.7</td>
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</table>

### General Phys-Chem Parameters

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<tr>
<th>Parameter</th>
<th>Effluent flow proportion</th>
<th>Effluent time composite</th>
<th>Effluent subsurface grab</th>
<th>Reference Site</th>
<th>Test Site 1</th>
<th>Test Site 2</th>
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<tbody>
<tr>
<td>Habitat Assessment</td>
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<td>31</td>
<td>32</td>
<td>36</td>
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<tr>
<td>Dissolved Oxygen (mg/L) surface</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>6.4</td>
<td>7.8</td>
</tr>
<tr>
<td>Dissolved Oxygen (mg/L) mid-depth</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.9</td>
<td>4.7</td>
<td>6.3</td>
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<tr>
<td>Dissolved Oxygen (mg/L) bottom</td>
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<td>-</td>
<td>-</td>
<td>2.1</td>
<td>3.3</td>
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</tr>
<tr>
<td>pH (SU) surface</td>
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<td>-</td>
<td>-</td>
<td>7.3</td>
<td>7.6</td>
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<td>-</td>
<td>-</td>
<td>7.4</td>
<td>7.2</td>
<td>7.3</td>
</tr>
<tr>
<td>pH (SU) bottom</td>
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<td>-</td>
<td>-</td>
<td>7.3</td>
<td>7.2</td>
<td>7.5</td>
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<td>-</td>
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<td>Salinity (ppt) mid-depth</td>
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<td>23</td>
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<td>Salinity (ppt) bottom</td>
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<td>-</td>
<td>-</td>
<td>35</td>
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<td>27</td>
</tr>
<tr>
<td>Temperature (°C) Surface</td>
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<td>-</td>
<td>-</td>
<td>24</td>
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<tr>
<td>Temperature (°C) mid-depth</td>
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<td>-</td>
<td>-</td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Temperature (°C) bottom</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Algal Growth Potential (mg dry wt/L)</td>
<td>-</td>
<td>-</td>
<td>28.66</td>
<td>23.76</td>
<td>24.29</td>
<td>67.47</td>
</tr>
</tbody>
</table>

### Toxicity

<table>
<thead>
<tr>
<th>Toxicity Parameter</th>
<th>Effluent flow proportion</th>
<th>Effluent time composite</th>
<th>Effluent subsurface grab</th>
<th>Reference Site</th>
<th>Test Site 1</th>
<th>Test Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioassay Fish-Dechlorinated</td>
<td>-</td>
<td>-</td>
<td>Not-toxic</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bioassay Invertebrate-Dechlorinated</td>
<td>-</td>
<td>-</td>
<td>Not-toxic</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>5%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>95%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STREAMS</strong> (1617 stations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phytoplankton Chlorophyll α</td>
<td>0.22</td>
<td>0.52</td>
<td>0.94</td>
<td>1.60</td>
<td>3.02</td>
<td>4.63</td>
<td>6.72</td>
<td>9.87</td>
<td>14.68</td>
<td>27.35</td>
<td>48.70</td>
</tr>
<tr>
<td>Periphyton Chlorophyll α</td>
<td>0.31</td>
<td>0.43</td>
<td>0.77</td>
<td>1.04</td>
<td>2.16</td>
<td>2.94</td>
<td>6.45</td>
<td>10.51</td>
<td>17.00</td>
<td>39.51</td>
<td>60.85</td>
</tr>
<tr>
<td>H-D Diversity</td>
<td>0.84</td>
<td>2.12</td>
<td>2.48</td>
<td>2.74</td>
<td>2.88</td>
<td>3.09</td>
<td>3.25</td>
<td>3.40</td>
<td>3.52</td>
<td>3.76</td>
<td>3.90</td>
</tr>
<tr>
<td>Qualitative Taxa Richness</td>
<td>9.00</td>
<td>12.00</td>
<td>17.00</td>
<td>20.00</td>
<td>22.00</td>
<td>24.50</td>
<td>26.00</td>
<td>28.00</td>
<td>31.00</td>
<td>37.00</td>
<td>53.00</td>
</tr>
<tr>
<td>H-D Taxa Richness</td>
<td>6.00</td>
<td>6.50</td>
<td>9.00</td>
<td>11.50</td>
<td>13.00</td>
<td>15.00</td>
<td>17.00</td>
<td>21.50</td>
<td>26.00</td>
<td>29.00</td>
<td>32.00</td>
</tr>
<tr>
<td>TKN</td>
<td>0.30</td>
<td>0.39</td>
<td>0.56</td>
<td>0.73</td>
<td>0.87</td>
<td>1.00</td>
<td>1.11</td>
<td>1.26</td>
<td>1.49</td>
<td>1.95</td>
<td>2.80</td>
</tr>
<tr>
<td>Ammonia</td>
<td>0.02</td>
<td>0.02</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>0.08</td>
<td>0.11</td>
<td>0.14</td>
<td>0.20</td>
<td>0.34</td>
<td>0.60</td>
</tr>
<tr>
<td>NO2-NO3</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
<td>0.10</td>
<td>0.14</td>
<td>0.20</td>
<td>0.32</td>
<td>0.64</td>
<td>1.05</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td>0.10</td>
<td>0.13</td>
<td>0.18</td>
<td>0.25</td>
<td>0.39</td>
<td>0.74</td>
<td>1.51</td>
<td>1.51</td>
</tr>
<tr>
<td>Ortho Phosphate</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.11</td>
<td>0.17</td>
<td>0.27</td>
<td>0.59</td>
<td>1.37</td>
<td>1.37</td>
</tr>
<tr>
<td>Turbidity</td>
<td>0.60</td>
<td>0.90</td>
<td>1.20</td>
<td>1.45</td>
<td>2.10</td>
<td>2.80</td>
<td>3.60</td>
<td>4.50</td>
<td>6.65</td>
<td>10.45</td>
<td>16.30</td>
</tr>
</tbody>
</table>

| **LAKE** (477 stations)   |       |       |       |       |       |       |       |       |       |       |       |
| Phytoplankton Chlorophyll α| 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  | 0.16  | 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 α| 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 α (μg/L), Periphyton Chlorophyll α (μg/m²), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates.
Facility Name: City of Sarasota

Location (attach detailed map): See attachments

County: Sarasota

District: SW District

Federal Permit #: FLO040771

State GMS #: 0034000692

State expiration date: 1/31/97

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 (AWTTP) 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 MGD

Mean Flow: 1.2 m³/s (n/s)

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 16th Street gage and the effluent quality comply with the following limitations:

<table>
<thead>
<tr>
<th>Whitaker Bayou Streamflow</th>
<th>&gt; 3 cfs</th>
<th>&lt; 3 cfs</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Temperature</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>BOD</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>COD</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>N, mg/l</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

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 gage times. Streamflow shall be monitored through a real time communication link (telemetry) with the USGS gages at 39th 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 permitted discharge 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 CBOD's levels for more info on CBOD please refer to submission this packet...
Description of permitted outfall(s):
  Outfall 07 discharges to Alafia 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 FY1-5 or FY1-3 performed on this facility.
  2) Surface water's files for this facility indicate
    an MNL study was conducted from 1990 to
    1993.

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

Additional information:
  City of Sarasota will use under a consent
  order because of problems
  in complying with MNL
  and providing sufficient
  surface area.

Staff contributing to this review (signature):
  (Biologist)
  (Inspector)
  (Engineer)
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 Kruttje 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.

D.E.P.

cc: Ed Snipes
STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET
(5-10-94)

RECEIVING BODY OF WATER: Bowlegs Creek
FIELD SITE: Reference Site

LOW HILL
COUNTY: Sarasota
LOCATION: City of Sarasota

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)

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):
- List & map dominant vegetation on back
- Typical Width (m)/Depth (m)/Velocity (m/sec) Transect:
  - 4.07 m/s
  - 3.5 m wide
  - 1 m deep

Artificially Channelized: No Yes
Artificially Impounded: No Yes

High Water Mark:
- [Diagram showing water levels]
- 1 m deep

Canopy Cover %:
- Open: Yes
- Lightly Shaded (11-45%)
- Moderately Shaded (46-60%)
- Heavily Shaded

SEDIMENT/SUBSTRATE

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic Other

Sediment Oils: Absent Slight Moderate Profuse

Sediment Deposition: Sludge Sand smothering Silt smothering Other

Substrate Types
- Woody Debris (Snags)
- Leaf Packs or Mats
- Aquatic Vegetation
- Rock or Shell-Rubble
- Undercut banks/Roots

Substrate Types
- % coverage
- # times sampled
- Method
- % coverage
- # times sampled
- Method

WATER QUALITY

- Top 0.5 24.16 7.28 5.94 22.7 1
- Mid-depth 1 26.98 7.4 2.92 4.79
- Bottom 1.7 27.03 7.33 2.14 53.00

System Type: Stream 3rd - 4th order 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:
Stromy, cloudy and no breeze

Sampling Tech: Andrea Grainger
Signature: Andrea Grainger
Date: 8/26/94
### State of Florida
#### Department of Environmental Regulation
##### Marine Benthic Habitat Assessment Field Data Sheet

**Submitting Agency Code:** [Blank]
**Submitting Agency Name:** [Blank]

**Station Number:** 24010049
**Date:** 10/28/86
**Receiving Body of Water:** Bearers Creek

**Remarks:** Low tide

**Location:** City of Samoset, FLIP
**Field ID Name:** Conference Site

<table>
<thead>
<tr>
<th>Habitat Parameter</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Littoral Alterations</strong></td>
<td>None—Unaltered shoreline. 9-10 points</td>
<td>Mostly natural shoreline, but with occasional riprap. 6-8 points</td>
<td>Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points</td>
<td>Shoreline consisting almost entirely of vertical seawalls. 0-2 points</td>
</tr>
<tr>
<td><strong>Community Types Observed</strong></td>
<td>At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, salt marsh, natural beach, or tidal creek. 38-50 points</td>
<td>Two or three communities observed from those listed. 26-37 points</td>
<td>One community observed from those listed. 13-25 points</td>
<td>No communities observed from those listed. 0-12 points</td>
</tr>
<tr>
<td><strong>Tidal Fluctuation</strong></td>
<td>&gt;0.75 m. 4-5 points</td>
<td>0.6 - 0.75 m. 3 points</td>
<td>0.25 - 0.5 m. 2 points</td>
<td>&lt;0.25 m. 0-1 point</td>
</tr>
<tr>
<td><strong>Freshwater Discharges/Alterations</strong></td>
<td>Only natural runoff. 9-10 points</td>
<td>Mostly natural runoff, but with a few, small stormwater sources. 6-8 points</td>
<td>Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points</td>
<td>Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points</td>
</tr>
<tr>
<td><strong>Flow and Wave Action</strong></td>
<td>Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points</td>
<td></td>
<td></td>
<td>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</td>
</tr>
<tr>
<td><strong>Sediment Type</strong></td>
<td>Combination of sand, gravel, and shell. 12-15 points</td>
<td>Primarily sand, with small areas of mud. 8-11 points</td>
<td>Mixture of sand and mud, or well-aerated mud only. 4-7 points</td>
<td>Anaerobic mud. 0-3 points</td>
</tr>
</tbody>
</table>

**Total Score:** 31

**Comments:**

**Analysis Date:** 10/28/86
**Analyst:** Andrea Granger
**Signature:** [Signature]
STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: [REDACTED]  STATION NUMBER: 24010051
DATE (MM/DD): 8/16/16  TIME (HH:MM): 9:20
RECEIVING BODY OF WATER: Waterway Bayou
COUNTY: Sarasota  LOCATION: City of Sarasota/WWP  FIELD NAME: Test Site 1

RIPARIAN ZONE/STREAM FEATURES
Predominant Land-Use in Watershed (specify relative percent in each category):
- Forest/Natural  - Silviculture  - Field/Pasture  - Agricultural  - Residential  - Commercial  - Industrial  - Other (Specify)

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: 60
Artificially Channelized: No  Yes
Artificially Impounded: No  Yes
High Water Mark: 0.5 m  1.75 m  Total 2.25 m
Canopy Cover %: Open  Lightly Shaded  Moderately Shaded  Heavily Shaded

SEDIMENT/SUBSTRATE
Sediment Odors: Normal  Sewage  Petroleum  Chemical  Anaerobic  Other
Sediment Oils: Absent  Slight  Moderate  Profuse
Sediment Deposition: Sludge  Moderate  Silt  Other
Substrate Types: Woody Debris (Snags)  Leaf Packs or Mats  Aquatic Vegetation  Rock or Shore Rubble  Undercut banks/Roots

WATER QUALITY
Depth (m): 0.3  Mid-depth  Bottom
Temp. (°C): 26.07  26.92  26.91
pH (SU): 7.59  7.17  7.16
D.O. (mg/L): 6.38  3.47  3.34
Cond. (μmho/cm) or Salinity (ppt): 17.2  47.2  37.6
Secchi (m): 1.2
System Type: Stream  Lake  Wetland  Estuary  Other
Water Odors (check box): Normal  Sewage  Petroleum  Chemical  Other
Water Surface Oils (check box): None  Sheen  Gloos  Slick
Clarity (check box): Clear  Slightly turbid  Turbid  Opaque
Color (check box): Tannic  Green (algae)  Clear  Other  Sediment Stirred up by tidal

Weather Conditions/Notes: Cloudy, little wind

Sampled Date: 8/16/16

Andrea Granger  Signature:  Date: 8/16/16
## Habitat Parameter

<table>
<thead>
<tr>
<th>Habitat Parameter</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
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<td>One community observed from those listed. 13-25 points</td>
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</tr>
<tr>
<td>Tidal Fluctuation</td>
<td>&gt;0.75 m. 4-5 points</td>
<td>0.5 - 0.75 m. 3 points</td>
<td>0.25 - 0.5 m. 2 points</td>
<td>&lt;0.25 m. 0-1 point</td>
</tr>
<tr>
<td>Freshwater Discharges/A</td>
<td>Only natural runoff. 9-10 points</td>
<td>Mostly natural runoff, but with a few, small stormwater sources. 6-8 points</td>
<td>Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points</td>
<td>Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points</td>
</tr>
<tr>
<td>Alterations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow and Wave Action</td>
<td>Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points</td>
<td></td>
<td></td>
<td>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</td>
</tr>
<tr>
<td>Sediment Type</td>
<td>Combination of sand, gravel, and shell. 12-15 points</td>
<td>Primarily sand, with small areas of mud. 8-11 points</td>
<td>Mixture of sand and mud, or well-aerated mud only. 4-7 points</td>
<td>Anaerobic mud. 0-3 points</td>
</tr>
</tbody>
</table>

## TOTAL SCORE

32

**COMMENTS:**

**ANALYSIS DATE:** 10/28/96  
**ANALYST:** Andrea Granger  
**SIGNATURE:** Andrea Granger
**State of Florida**
**Department of Environmental Protection**

**Physical/Chemical Characterization Field Data Sheet**

**Submitting Agency Code:**

**Submitting Agency Name:**

**Station Number:** 24010052

**Date/Time:** 10/28/96, 10:10

**Receiving Body of Water:** Whitaker Bayou

**Remarks:** Lake Hole

**County:** Sarasota

**Location:** City of Sarasota WTP

**Field Name:** Test Site 2

### Riparian Zone/Stream Features

- **Predominant Land-Use in Watershed**: Residential 20%, Commercial 30%
- **Local Watershed Erosion** (check box): None, Slight [X], Moderate, Heavy
- **Local Watershed NPS Pollution** (check box): No evidence, Slight, Moderate potential, Obvious sources [X]
- **Width of riparian vegetation**: 35 m wide
- **Artificially Channelized**: No
- **Artificially Impounded**: Yes
- **High Water Mark**: 0.5 m + 1.5 m = 2.0 m above present water level
- **Canopy Cover %**: Open [X], Lightly Shaded (11-45%)

### Sediment/Substrate

- **Sediment Odors**: Normal, Sewage [X], Petroleum, Chemical, Anaerobic [X], Other: Chlorine [X]
- **Sediment Oils**: Absent [X], Slight, Moderate, Profuse [X]
- **Sediment Deposition**: Sludge [X], Sand smothering: Silt smothering: Other
- **Substrate Types**: Woody Debris (% coverage # times sampled method)
  - Substrate Types: Sand, Mud/Muck/Silt, Other
  - Substrate Types: Woody Debris (% coverage # times sampled method)
  - Woody Debris (% coverage): Other
  - Sand: Other
  - Mud/Muck/Silt: Other
  - Other: Other

### Water Quality

- **Depth (m)**: Top 0.3, Mid-depth 0.7, Bottom 1.3
- **Temperature (°C)**: Top 27.7, Mid-depth 27.06, Bottom 26.62
- **pH (SU)**: Top 7.46, Mid-depth 7.32, Bottom 7.51
- **D.O. (mg/l)**: Top 7.75, Mid-depth 6.28, Bottom 7.07
- **Cond. (umho/cm) or Salinity (ppt)**: Top 34.6, Bottom 36.6
- **Secchi (m)**: 0.3

### System Type

- **Stream**: 1st - 2nd order
- **Lake**: No
- **Wetland**: No
- **Estuary**: Yes
- **Other**: No

### Water Odors (check box)

- Normal [X], Sewage, Petroleum, Chemical, Other

### Water Surface Oils (check box)

- None [X], Sheen [X], Glob, Slick

### Clarity (check box)

- Clear [X], Slightly turbid, Turbid, Opaque [X], Other: Due to plume

### Color (check box)

- Tannic, Green (algae), Clear [X], Other: Brownish/red [X]

### Weather Conditions/Notes

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

### Abundance

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

### Sampling Team

- **Andrea Grainger**
## STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

**REM: Littoral Alterations**
- None—Unaltered shoreline. 9-10 points

**Score**

**Community Types Observed**
- At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltmarsh, and beach, or tidal creek. 38-50 points

**Tidal Fluctuation**
- >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**
- Only natural runoff. 9-10 points

**Flow and Wave Action**
- Light to moderate wave action present except under the most extreme weather conditions. Flow unrestricted by manmade structures. 9-10 points

**Sediment Type**
- Combination of sand, gravel, and shell. 12-15 points

### Habitat Parameter

<table>
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<tr>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>None—Unaltered shoreline. 9-10 points</td>
<td>Mostly natural shoreline, but with occasional riprap. 6-8 points</td>
<td>Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points</td>
<td>Shoreline consisting almost entirely of vertical seawalls. 0-2 points</td>
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<tr>
<td>Two or three communities observed from those listed. 26-37 points</td>
<td>One community observed from those listed. 13-25 points</td>
<td>No communities observed from those listed. 0-12 points</td>
<td></td>
</tr>
<tr>
<td>Only natural runoff. 9-10 points</td>
<td>Mostly natural runoff, but with a few, small stormwater sources. 6-8 points</td>
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</tr>
</tbody>
</table>

### TOTAL SCORE

**COMMENT:**

**ANALYSIS DATE:** 10/28/96

**ANALYST:** Andrea Gramps

**SIGNATURE:** Andrea Gramps
**FDEP Biology Section — Acute Bioassay Bench Sheet**

**Sample Source:** City of Sarasota 24.7.17

**County:** Sarasota

**Act / District:** Andrea Griner

**ES Permit #:** F008402771

**S Sample #:** S5757 LIMS Job #: 86-06-2-24-7-0

**Sample Log:** 11/4/21

**Type:** Screening / Definitive

**Calibrations:** pH meter # 7681

**Instrument:** Static Renewal / Flow-through

**Test Organism:** Pyrrhopus sedis

<table>
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<table>
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<tr>
<th><strong>pH</strong></th>
<th><strong>Temperature (°C)</strong></th>
<th><strong>D.O. (mg/L)</strong></th>
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</thead>
<tbody>
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**Measured/Loaded by:**

<table>
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<tr>
<th><strong>Salt Water</strong></th>
<th><strong>Water Quality Parameters</strong></th>
</tr>
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<tbody>
<tr>
<td>Field Total Residual Cl₂ (mg/L)</td>
<td>Lab Total Residual Cl₂ (mg/L)</td>
</tr>
<tr>
<td>Alkalinity (mg/L as CaCO₃)</td>
<td>Hardness (mg/L as CaCO₃)</td>
</tr>
<tr>
<td>Total ammonia (mg/L as N)</td>
<td>Ammonia</td>
</tr>
</tbody>
</table>

**Ammonia:** Control: 0 ppm Sample: 54.2 ppm

**Salinity:** 0 ppm
FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Sarasota
County: Sarasota
Contact / District: Andrew Eninger / SW
NPDES Permit #: FL0040771
LIMS Sample #: 157947 LIMS Job #: 96-07-27-20

Test Type: Screening / Definitive
Instrument Calibrations: pH meter # 7851

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<td>C2/B</td>
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Measured/Loaded by: Mf Mf Mf Mf Mf Mf Mf Mf
Recorded by: Mf Mf Mf Mf Mf Mf Mf Mf

Salt Water

Field Total Residual Cl2 (mg/L): 0.13
Lab Total Residual Cl2 (mg/L): 0.13
Alkalinity (mg/L as CaCO3): 125
Hardness (mg/L as CaCO3): 175
Ammonia (mg/L as N): 4

Ammonia Control
Blank: 0.017 Salinity: 0.0 ppt Sample: 0.0 ppt

Water Quality Parameters

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<th>Field Water</th>
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Investigators' Signatures

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

<table>
<thead>
<tr>
<th>Reference Site</th>
<th>Test Site 1</th>
<th>Test Site 2</th>
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<tbody>
<tr>
<td><strong>Cyanophyceae</strong></td>
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<tr>
<td>Lyngbya sp.</td>
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<td><strong>Bacillariophyceae</strong></td>
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<tr>
<td>Skeletonema sp.</td>
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<tr>
<td>Rhizosolenia setigera</td>
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<tr>
<td>Nitzschia sp.</td>
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<td><strong>Euglenophyceae</strong></td>
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<tr>
<td>Eutreptia sp.</td>
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<tr>
<td>Euglena sp.</td>
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<tr>
<td><strong>Dinophyceae</strong></td>
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<tr>
<td>Cryptoperidinium sp.</td>
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<tr>
<td>Peridinium sp.</td>
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<td>Ceratium sp.</td>
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<td><strong>Cryptophyceae</strong></td>
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<td>Chromomonas sp.</td>
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<td>Cryptomonas sp.</td>
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Remarks

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<td>F L O D 4 C 7 I</td>
<td>11 12 9 6 l 2 S</td>
<td>17 18 B</td>
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Remarks

21