



Biological Assessment of  
**Falkenburg WWTP**  
Hillsborough County  
NPDES #FL0040614  
Sampled February 1998

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December 1998

**Biology Section**  
**Division of Administrative and Technical Services**  
**Bureau of Laboratories**

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection  
Results of Fifth Year Inspections

Discharger: Falkenburg WWTP  
County: Hillsborough  
NPDES Number: FL0040614  
NPDES Permit Expiration Date: 8 January 2003

**Toxics Sampling Inspection (XSI)**

Date Sampled: 9 February 1998  
Results: No organic pollutants were detected in the effluent sample. Aluminum, lead, copper, iron, and zinc were detected in the effluent at levels that complied with Class III water quality standards for marine systems.

**Compliance Biomonitoring Inspection (CBI)**

Date Sampled: 9 February 1998  
Results: The effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsii*. The effluent CBOD complied with the facility's permit limit (5.0 mg/L).

**Impact Bioassessment Inspection (IBI)**

Date Sampled: 9 February 1998  
Results: Invertebrate communities were reduced at test site 2, downstream of the discharge. Changes in macroinvertebrate communities between the control and test sites could partly be accounted for by differences in sediment grain size. Conditions at test site 2 appeared worse than elsewhere in the canal, possibly due to stress from stormwater inputs and the Falkenburg WWTP discharge. In addition, some measures of algal community health, such as taxa richness, diversity, and percent dominance indicated degradation at test site 2. Chlorophyll *a* was undetected at all three sites.

**Water Quality Inspection (WQI)**

Date Sampled: 9 February 1998  
Results: Nutrient concentrations were relatively low in the effluent, but elevated at the receiving water sites, possibly due to other inputs to the Tampa Bypass Canal. Total phosphorus levels exceeded those levels normally found in 85% of Florida's estuaries at the control and test sites. Similarly, nitrate+nitrite levels at all study sites were greater than those levels found in 95% of Florida's estuaries. AGP at all three sites exceeded the 10 mg dry wt/L "problem threshold" for marine waters, reflecting the elevated nutrient levels throughout the study area.

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide the basis for specific condition recommendations for permit renewal.

## Introduction

The Falkenburg Wastewater Treatment Plant is located in Hillsborough County, Florida (see map in Appendix). Treatment at this 6.0 MGD advanced domestic wastewater treatment plant consists of influent screening, grit removal, anaerobic treatment, aerobic treatment in four aeration tanks, settling, filtering (in five dual-media deep-bed filters with a combined surface area of 2,500 square feet), disinfection in two chlorine contact chambers, dechlorination, and post-aeration. The facility also handles residuals utilizing a gravity belt thickener and a 100,000 gallon storage tank. The actual mean flow during this survey was 3.44 MGD.

The state permit limits for the Falkenburg WWTP are listed in Table 1. Monthly operating report data shows no violations during the past two years (see Facility Summary in Appendix).

## 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 control site (located in the Tampa Bypass Canal, approximately 100 meters upstream of the discharge and across the channel on the opposite shore) and two test sites, also in the Bypass Canal, bracketing the discharge. Although the control site is located within the same canal system, the canal itself is approximately 120 meters wide and quite deep with good flow (see Physical/Chemical Field Data Sheets in

Appendix). A habitat assessment was performed *in situ* to establish comparability between sites.

Supplemental physical/chemical data were also collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and for organic constituents (base neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia*, and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample.

Benthic macroinvertebrate communities were evaluated at control and test sites using three replicate petite Ponar grabs.

Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests.

Sediment from control and test sites was analyzed for grain size and percent organic matter. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of the SOP's can be viewed on our web site at 'www.dep.state.fl.us/labs/sops.htm'.

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat assessment, taxa richness, Shannon-Weaver Diversity Index, numbers of pollution sensitive taxa, community compo-

sition, functional feeding groups, and algal biomass. For a discussion of each of these measures, see *Explanation of Measurements of Community Health* in Appendix.

For graphical purposes, the percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus control site divided by the control site (Figure 1). The percent differences between the control and test sites involving the number of taxa, the diversity index, the number of polychaete taxa, and the % pelecypods are measured as the control site minus test site divided by the control site (Figure 2).

The following personnel were involved in this investigation: Andrea Grainger and Charles Kovach (Southwest District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburrello, David Whiting, Vicki Whiting, and Steve Wolfe (DEP Central Biology Laboratory in Tallahassee). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, and Michael Tanski, as well as District representatives.

## Results and Discussion

This study took place in a saline portion of the Tampa Bypass Canal, a channelized system created for Hillsborough River flood control. Habitat quality at all three sites was less than optimal. Habitat scores at the control site and test

site 2 (21 points each) were lower than test site 1 (38 points). Shorelines at the control and test site 2 were composed mostly of riprap and vertical sea-walls. The shoreline at test site 1 was mostly natural with occasional riprap. All sites were in the "fair" category for community types (see Habitat Assessment Sheets in Appendix). The depth at all three sites was similar (between 4.5 and 5 meters). The pH was near neutral at all three sites (Table 1). Surface salinity ranged from 11.5 ppt at test site 1 to 12.5 ppt at the control site. The salinity was slightly higher at the bottom, ranging from 16.5 ppt to 17 ppt (Table 1). All three sites were adequately oxygenated and similar in clarity (see Physical/Chemical Data Sheets in Appendix).

No organic pollutants were detected in the effluent sample (Table 1).

Aluminum, lead, copper, iron, and zinc were detected in the effluent at levels that complied with Class III water quality standards for marine systems (Table 1).

The effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, during the 48-hour bioassays (Appendix).

The CBOD was less than the minimum detection limit. Similarly, the BOD of the control and test sites was less than the minimum detection limit.

Fecal and total coliforms complied with Class III water quality standards in the effluent sample, as well as at the three study sites (Table 1). Fecal coliform concentrations were less than 4 counts/100 mL in the effluent, 20 counts/100mL at the control site, 100 counts/100 mL at test site 1, and

20 counts/100 mL at test site 2. Total coliform counts were 92 counts/100 mL in the effluent, 680 counts/100mL at the control site, 580 counts/100 mL at test site 1, and 900 counts/100 mL at test site 2.

Nutrient concentrations in the effluent were similar to those found at all three receiving water stations. Total phosphorus levels exceeded those levels normally found in 85% of Florida's estuaries at the control site (0.35 mg/L), test site 1 (0.37 mg/L), and test site 2 (0.36 mg/L). Similarly, nitrate+nitrite levels were greater than those levels found in 95% of Florida's estuaries,

with 0.26 mg/L at the control site, 0.24 mg/L at test site 1, and 0.28 mg/L at test site 2 (Table 1). Ammonia was reported at levels that were less than the minimum quantitation limit, and greater than or equal to the minimum detection limit, at all three sites. Although ortho-phosphate levels at test site 1 (0.33 mg/L) and test site 2 (0.34 mg/L) were elevated, these samples were held beyond their normal holding times.

Algal growth potential at the control site (20.8 mg dry wt/L), test site 1 (19.1 mg dry wt/L), and test site 2 (20.7 mg dry wt/L), all exceed-

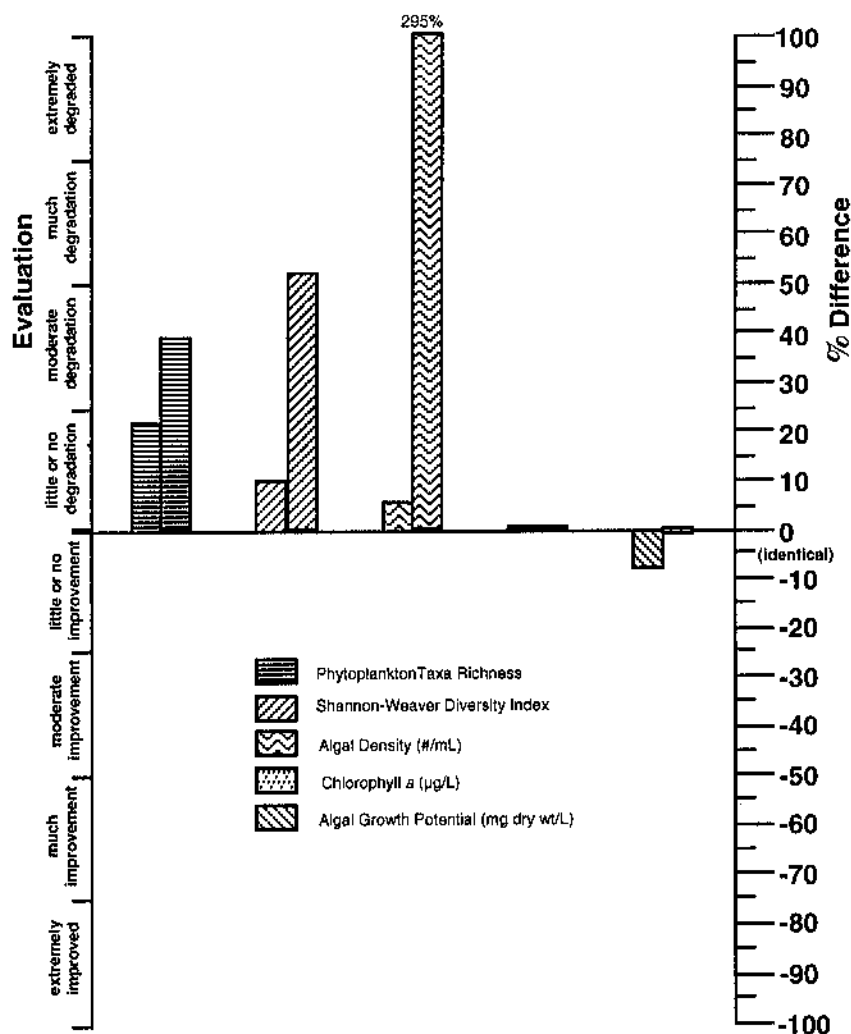


Figure 1. Effect of discharge on the phytoplankton community.

Table 1. Effluent limits and summary of chemistry data.

Falkenburg W WTP	Effluent Limits	Effluent Sample	Control Site	Test Site 1	Test Site 2
<b>Organic Constituents (µg/L)</b>					
None detected	-	-	-	-	-
<b>Metals (µg/L)</b>					
Aluminum	≤ 1,500 **	45 I	-	-	-
Arsenic	≤ 50 **	40 U	-	-	-
Cadmium	≤ 9.3 **	0.02 U	-	-	-
Copper	≤ 2.9 **	1.4 J	-	-	-
Iron	≤ 300 **	100	-	-	-
Lead	≤ 5.6 **	0.2 I	-	-	-
Mercury	≤ 0.025 **	0.1 U	-	-	-
Nickel	≤ 8.3 **	7 U	-	-	-
Selenium	≤ 71 **	50 U	-	-	-
Silver	≤ 2.3 **	0.05 U	-	-	-
Zinc	≤ 86 **	32 J	-	-	-
<b>Nutrients (mg/L)</b>					
Ortho-phosphate	-	-	0.02	0.33 Q	0.34 Q
Total phosphorus	1 *a	0.36	0.35	0.37	0.36 A
Ammonia	-	0.1 U	0.14 I	0.15 I	0.17 I
Total Nitrogen	3 *a	1.3	1.15	1.15	1.2
Nitrate+Nitrite	-	0.27	0.26	0.24	0.28
TKN	-	1.1	0.89	0.91	0.92 A
<b>General Phys-Chem Parameters</b>					
Habitat Assessment	-	-	21	38	21
D.O. (mg/L) surface	-	7.1	7.3	6.7	6.8
D.O. (mg/L) mid	-	-	7.6	5.9	6.4
D.O. (mg/L) bottom	-	-	6.0	5.2	5.4
pH (SU) surface	6.0 - 8.5 *	6.9	7.6	7.5	7.5
pH (SU) mid	-	-	7.6	7.6	7.6
pH (SU) bottom	-	-	7.6	7.6	7.6
Conductivity (µmhos/cm) surface	-	1,062	19,100	17,500	18,100
Conductivity (µmhos/cm) mid	-	-	20,500	19,600	20,400
Conductivity (µmhos/cm) bottom	-	-	25,000	25,000	24,600
Temperature (°C) surface	-	20.2	17.7	17.2	17.7
Temperature (°C) mid	-	-	16.8	16.8	16.8
Temperature (°C) bottom	-	-	16.6	16.6	16.7
BOD (mg/L)	-	-	2 U	2 U	2 U
CBOD (mg/L)	5 *a	2 U	-	-	-
TSS (mg/L)	5 *a	1 U	6	7	5
Turbidity (NTU)	-	0.4	1.9	2.1	1.6
Tot. Residual Chlorine (mg/L)	0.01 *	0.01	-	-	-
Flow (MGD)	6.0 *	3.4	-	-	-
AGP (mg dry wt/L)	-	18.97	20.8	19.1	20.7
<b>Toxicity</b>					
Bioassay Fish	-	Not Toxic	-	-	-
Bioassay Invertebrate	-	Not Toxic	-	-	-
<b>Microbiology (# organisms/100 mL)</b>					
Fecal Coliforms	Non-detectable	4 K	20 K	100 J	20 K
Total Coliforms	-	92	680	580	900

\* Permitlimit

\*\* Class III water quality standard

a - Annual average

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

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

J - Estimated value

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

Q - Sample held beyond normal holding time

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

Table 2. Major characteristics of community structure of control and test sites.

Falkenburg WWTP	Control Site	Test Site 1	Test Site 2
<b>Macroinvertebrate Qualitative</b>			
Number of Taxa	21	16	7
Shannon-Weaver Diversity	2.4	2.6	1.9
No. Polychaete Taxa	11	7	3
<b>Community Composition</b>			
% Chironomidae	0.0	0.4	9
% Cumacea	0.0	0.0	2
% Decapoda	0.2	0.0	0.0
% Gastropoda	2	3	0.0
% Mysidacea	0.2	2	2
% Pelecypoda	11	14	0.0
% Polychaeta	82	76	84
% Thoracica	5	4	0.0
% Tubificidae	0.0	0.0	0.0
% Other	0.0	0.6	3
<b>Functional Feeding Groups</b>			
% Burrowing Deposit Feeders	1	0.4	0.0
% Predators/Carnivores	1	3	8
% Plant piercers	21	22	18
% Surface Deposit Feeders	31	29	33
% Suspension Feeders	45	45	32
% Unknown	1	0.6	9
<b>Phytoplankton Algae</b>			
Number of Taxa	23	18	14
Shannon-Weaver Diversity	3.8	3.4	1.9
Chlorophyll a ( $\mu\text{g/L}$ )	1.0 U	1.1 U	1.0 U
Algal Density (#/mL)	359	382	1,418
% Blue-green	9	13	2
% Cryptophytes	29	27	42
% Diatoms	33	52	6
% Dinoflagellates	16	0.0	45
% Green	11	8	3
AGP (mg dry wt/L)	20.8	19.1	20.7

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

ed the 10 mg dry wt/L "problem threshold" (EPA 1974) for marine waters, reflecting the elevated nutrient levels throughout the study area (Table 1). The effluent AGP (18.97 mg dry wt/L) was less than receiving water values.

Although some measures of algal community health, such as taxa richness, diversity, and percent dominance, indicate degradation at test site 2, it is unclear whether or not the discharge is causing these effects. There were factors in addi-

tion to the discharge which may have affected the phytoplankton communities. For example, test site 2 was located directly downstream from a CSX railroad, and it is possible there were stormwater inputs from the ditches which are commonly found beside railroads. Test site 2 had higher algal density than the control site or test site 1 due to increased numbers of the (non-toxic) dinoflagellate, *Peridinium* sp., and the cryptophyte, *Chroomonas* sp. Because these two

organisms accounted for approximately 86% of the community, diversity at test site 2 was decreased by 52% when compared to the control site. There is currently insufficient data to determine the discharger's influence in causing the dominance of these two phytoplankton taxa. Both test sites had considerably lower taxa richness than the control site. According to Figure 1, algal density at test site 2 appears to be greatly increased when compared to the control site

and test site 1. The actual number however, is not that significant. Chlorophyll *a* was undetected at all three sites.

Sediments at the two test sites consisted mainly of mud, muck, and silt, while the control site was made up largely of sand, with some mud and muck (see Marine Habitat Assessment Sheets). Sediment particle size was very similar at the two test sites, with 85% of the substrate consisting of particles 0.25 mm or smaller. On the other hand, 78% of the particles at the control site were 0.25 mm or greater.

Changes in macroinvertebrate communities between the control and test sites could largely be accounted for by differences in sediment grain size. Figure 2 indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the control.

Macroinvertebrate taxa richness was highest at the control site with 21 taxa, intermediate at test site 1, with 16 taxa, and decreasing to 7 taxa at test site 2 (Table 2). Note that taxa richness at test site 2 was 66% lower than that found at the control site. Shannon-Weaver diversity was similar between the control site (2.4) and test site 1 (2.6), but decreased by 21% at test site 2, where diversity was 1.9. The number of polychaete taxa declined from 11 taxa at the control site to 7 taxa at test site 1 and 3 taxa at test site 2. All three sites were dominated by the pollution-tolerant polychaete, *Streblospio benedicti*, which made up approximately 50% of the total community sampled at the control site, 41% at test site 1, and 56% at test site 2. Pelecypods,

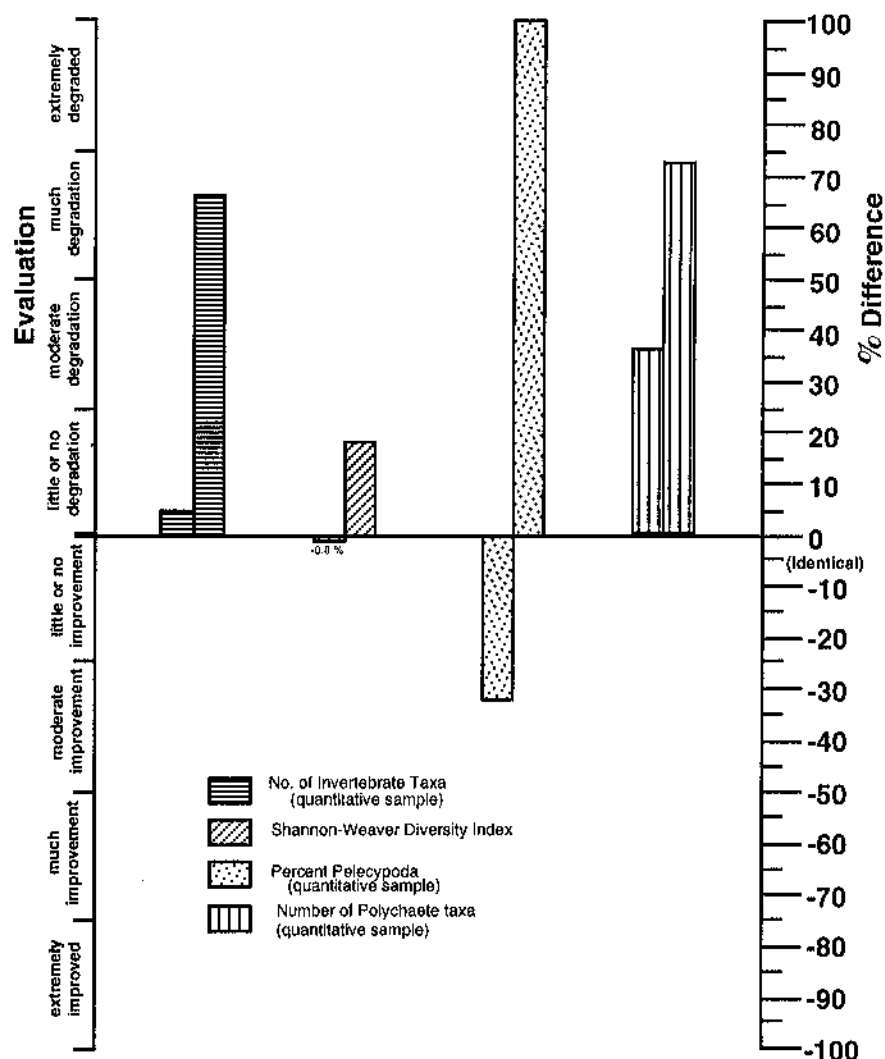


Figure 2. Effect of discharge on the benthic macroinvertebrate community.

which are considered good-water quality indicators, made up 11% of the total community sampled at the control site and 14% of the test site 1 population (with one species represented), but were completely absent from test site 2. Pollution-sensitive mysids, such as *Americamysis bahia* and *A. almyra*, were found at all three study sites in low numbers. Tubificid worms, normally pollution-indicators, were absent from all three sites.

## Conclusions

No organic pollutants were detected in the effluent sample.

Aluminum, lead, copper, and zinc were detected in the effluent at levels that complied with Class III water quality standards for marine systems.

The sample of effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, during the 48-hour bioassays.

The effluent CBOD complied with the facility's permit limit.

Fecal and total coliforms complied with Class III water quality standards in the effluent sample, as well as at the three study sites.

Nutrient concentrations were relatively low in the effluent, but elevated at the receiving water sites, possibly due to other inputs to the Tampa Bypass Canal. Total phosphorus levels exceeded those levels normally found in 85% of Florida's estuaries at the control and test sites. Similarly, nitrate+nitrite levels at all study sites were greater than those levels found in 95% of Florida's estuaries.

AGP at all three sites exceeded the 10 mg dry wt/L "problem threshold" for marine waters, reflecting the elevated nutrient levels throughout the study area.

Although some measures of algal community health, such as taxa richness, diversity, and percent dominance indicated degradation at test site 2, data were insufficient to determine if the discharge was causing these effects. Chlorophyll *a* was undetected at all three sites.

Invertebrate communities were particularly reduced at test site 2. Changes in macroinvertebrate communities between the control and test sites could largely be accounted for by differences in sediment grain size. It is unclear whether substrate differences are a direct result of the facility's discharge.

Macroinvertebrate taxa richness was highest at the control site, intermediate at test site 1, and decreasing to 7 taxa at test site 2. Shannon-Weaver diversity was similar between the control site (2.4) and test site 1 (2.6), but decreased by 21% at test site 2, where

diversity was 1.9. The number of polychaete taxa declined from 11 taxa at the control site to 7 taxa at test site 1 and 3 taxa at test site 2. All three sites were dominated by the pollution-tolerant polychaete, *Streblospio benedicti*. Pelecypods made up 11% of the total community sampled at the control site, 14% of the test site 1 community, but were completely absent from test site 2. Pollution-sensitive mysids, such as *Americamysis bahia* and *A. almyra*, were found at all three study sites in low numbers. Conditions at test site 2 appeared worse than elsewhere in the canal, possibly due to stress from stormwater inputs and the Falkenburg WWTP discharge.

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## Explanation of Measurements of Community Health

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

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

**Shannon-Weaver diversity:** This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant 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. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

**Community structure:** Substantial shifts in proportions of major groups of organisms, compared to control 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).

**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).

**Algal biomass:** High algal biomass (algal density or chlorophyll *a*) implies nutrient stress.

# Typical Values for Selected Parameters in Florida Waters

Adapted from Joe Hand, FDER, personal communication, 1991

(data was collected between 1980 and 1989)

## Percentile Distribution

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

(1617 stations)

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

### LAKES

(477 stations)

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

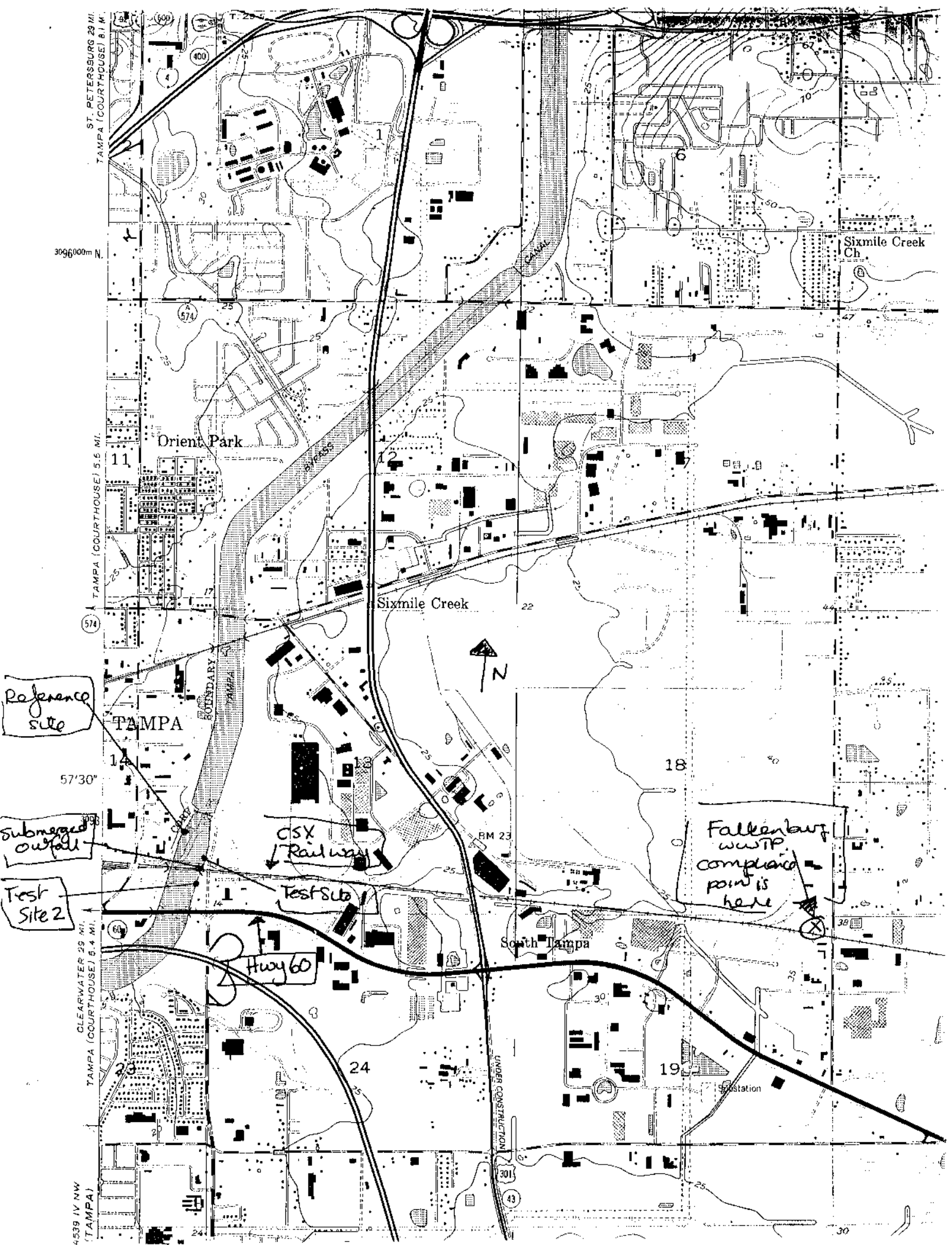
### ESTUARIES

(690 stations)

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

Units:

Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m<sup>2</sup>), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates



ST. PETERSBURG 29 MI.  
TAMPA (COURTHOUSE) 8.1 MI.

3096000m N.

TAMPA (COURTHOUSE) 5.6 MI.

574

Orient Park

Sixmile Creek

Sixmile Creek Ch

TAMPA

Reference site

Submerged outfall

Test Site 2

CSX  
Railway

Test Site

Hwy 60

South Tampa

Falkenburg  
wwTP  
compliance  
point is  
here

CLEARWATER 29 MI.  
TAMPA (COURTHOUSE) 5.4 MI.

4539 IV NW  
(TAMPA)

UNDER CONSTRUCTION

301  
43

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL REGULATION  
FACILITY SUMMARY

Facility Name: <u>Falkenberg WWTP</u>		Date Summary Prepared: <u>11/21/97</u>	
Location (attach detailed map):	County <u>Hillsborough</u>	District <u>500 District</u>	
Federal Permit # <u>FL0040614</u> and expiration date:	State GMS # and State expiration date: <u>5/1/90</u> <u>4029C10050</u>	Facility Type: <u>Industrial</u> <u>Municipal</u> Federal Agricultural Other (list):	
Function of facility: <u>Domestic wastewater treatment plant</u>			

**Description of treatment process:**

An existing 6.0 mgd annual average daily flow Type I oxidation ditch advanced domestic wastewater treatment plant consisting of the following units: Influent screening, grit removal, four (4) anoxic tanks with a combined capacity of 1.248 million gallons, four (4) aeration tanks with a combined capacity of 6.668 million gallons, four (4) final settling tanks with a combined capacity of 3.0 million gallons and a combined surface area of 31,400 square feet, five (5) dual-media deep-bed filters with a combined surface area of 2,500 square feet, a 76,296 gallon clear well, two (2) chlorine contact chambers using gaseous chlorine with a combined capacity of 300,000 gallons, two (2) dechlorination/reaeration tanks with a combined capacity of 83,357 gallons, a 5.0 million gallon reclaimed water storage tank, and residuals handling facilities which include a gravity belt thickener and a 100,000 gallon storage tank. Residuals will be transported to the Valrico Residuals Management Facility for treatment and disposal.

Receiving waters: <u>Palm River</u>	Classification: <u>I II III</u> <u>None</u>
Design Flow: <u>6.0</u>	Mean Flow: <u>3.44 mgd Annual Av.</u> Flow during survey:

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

therefore, the best time to sample is:

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

No - Phosphorus waiver applied for

List effluent limits (if necessary, attach relevant paperwork): Describe special permit conditions

5A. The effluent shall be sampled in accordance with Chapter 17-601, F.A.C. and shall meet the following limitations:

Parameter	Unit	Minimum	Maximum	Sample	
				Type	Frequency
Permitted Capacity (flow)	mgd	-	6.00 Annual Avg	***rfm&t	Continuous
pH	std un	6.00	8.50	meter	Continuous
CBOD <sub>5</sub>	mg/L	-	5 Annual Avg.	*fpc	Daily/5 wk
Total Suspended Solids	mg/L	-	5 Annual Avg.	*fpc	Daily/5 wk
Total Nitrogen	mg/L	-	3 Annual Avg.	*fpc	Daily/5 wk
Total Phosphorous	mg/L	-	1 Annual Avg.	*fpc	Daily/5 wk
Cl <sub>2</sub>	mg/L	-	0.01	grab	Hourly
Fecal coliform	#/100	-	**Non-Detectable	grab	Daily/5 wk

\*fpc - flow proportional composite - 24 hours

\*\*Non-detectable in at least seventy-five (75%) of samples collected during the monthly operating period (e.g. 23 per 30 samples).

\*\*\*rfm&t - recording flowmeter and totalizer

DEPARTMENT OF ENVIRONMENTAL REGULATION  
FACILITY SUMMARY

Hillsborough Bay  
(Facility)

Description of permitted outfall(s):

An existing 6.0 mgd annual average daily flow permitted discharge (D001) to Palm River (the Hillsborough Bypass Canal) which flows to Hillsborough Bay which flows to Tampa Bay. The discharge D001 is located in Hillsborough County approximately at latitude 28° 01' 30" North and longitude 82° 08' 18" West.

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

No significant violations noted

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

No Enforcement Action  
Limits imposed by F.S. 403.086, "Grizzle Tigg"

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

N/A

Additional information:

Staff contributing to this review (signature):

*[Signature]* (Biologist)

*[Signature]* (Inspector)

*[Signature]* (Engineer)

( )

( )

( )

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

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (MM/DD): <u>2/9/98</u>	RECEIVING BODY OF WATER: <u>Palm River</u>
SUBMITTING AGENCY NAME: _____			

REMARKS: _____	LOCATION: <u>Falkenburg WWTP</u>	FIELD ID NAME: <u>Reference Site</u>
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Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 24	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 213	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation 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 0	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 2	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 0	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 21

COMMENTS: \_\_\_\_\_

ANALYSIS DATE: <u>2/9/98</u>	ANALYST: <u>Grainger</u>	SIGNATURE: <u>Carlene J. [Signature]</u>
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almost  
nighttime  
incoming

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

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): 2/9/98	TIME: 1300	RECEIVING BODY OF WATER: Palm River
SUBMITTING AGENCY NAME: _____				

REMARKS: _____	COUNTY: Hills	LOCATION: Falkenburg WWTP	FIELD ID NAME: Reference Site
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**RIPARIAN ZONE/INSTREAM FEATURES**

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

Forest/Natural 20	Silviculture 	Field/Pasture 5	Agricultural 	Residential 35	Commercial 20	Industrial 20	Other (Specify) 
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Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

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

Width of riparian vegetation (m) on least buffered side: 0.5

List & map dominant vegetation on back

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

120 m wide		

Artificially Channelized ☐ no ☒ yes ☐ some recovery ☐ mostly recovered ☐ more sinuous

Artificially Impounded ☐ yes ☒ no ☐ some recovery ☐ mostly recovered ☐ more sinuous

High Water Mark: 0.3 + 4.5 = 4.8  
(m above present water level) (present depth in m) (m above bed)

4.5 m deep

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

**SEDIMENT/SUBSTRATE**

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

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

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

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

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Secchi (m):
Top	0.1	17.67	7.61	7.28	19,100	1.2
Mid-depth	2.3	16.77	7.60	7.60	20,500	
Bottom	4.5	16.55	7.61	6.03	25,000	

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: ☐ Globbs: ☐ Slick: ☐

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

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

<p>Weather Conditions/Notes: Sunny, few clouds, slight breeze. Large number of Turkey Buzzards on bank eating dead picoscomus + tilapia.</p>	<p>Abundance:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <th>Absent</th> <th>Rare</th> <th>Common</th> <th>Abundant</th> </tr> <tr> <td>Periphyton</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Fish</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Aquatic Macrophytes</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Iron/sulfur Bacteria</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		Absent	Rare	Common	Abundant	Periphyton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Aquatic Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Absent	Rare	Common	Abundant																						
Periphyton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																						
Aquatic Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						

SAMPLING TEAM: Grainger / Kovach	SIGNATURE: Candace Grainger	DATE: 2/13/98
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STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL REGULATION  
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (MO/Y): <u>2/9/98</u>	RECEIVING BODY OF WATER: <u>Palm River</u>
SUBMITTING AGENCY NAME: _____			

REMARKS: <u>Flood control structure open and water flowing into Palm River</u>	LOCATION: <u>Falkenburg WWTP</u>	FIELD ID NAME: <u>Test Site 1</u>
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Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 8	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed 26	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 <u>oysters, mangroves</u> <u>26 poor quality</u>	One community observed from those listed. 13-25 points	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 <u>2</u>	<0.25 m. 0-1 point
Freshwater Discharges/Alterations 0	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 <u>0</u>
Flow and Wave Action 2	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 <u>2</u>
Sediment Type 0	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 38

COMMENTS: alot of dead fresh water fish - Tilapia and Plecostomus. Probably Sweep over flood gate from Tampa Bay Pass canal.

ANALYSIS DATE: <u>2/9/98</u>	ANALYST: <u>Crainiger</u>	SIGNATURE: <u>Carolee Crainiger</u>
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**STATE OF FLORIDA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

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

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): <b>2/9/98</b>	TIME: <b>1100</b>	RECEIVING BODY OF WATER: <b>Palm River</b>
SUBMITTING AGENCY NAME: _____				

REMARKS: <b>water flowing over flood control structure</b>	COUNTY: <b>Hills</b>	LOCATION: <b>Falkenburg WWTP</b>	FIELD ID NAME: <b>Down stream Test Site 1</b>
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**RIPARIAN ZONE/INSTREAM FEATURES**

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

Forest/Natural <b>20</b>	Silviculture <b>0</b>	Field/Pasture <b>5</b>	Agricultural <b>0</b>	Residential <b>35</b>	Commercial <b>20</b>	Industrial <b>20</b>	Other (Specify) <b>0</b>
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Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

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

Width of riparian vegetation (m) on least buffered side: **0.5** List & map dominant vegetation on back

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

Artificially Impounded ☐ yes ☐ no

High Water Mark: **0.3** + **5** = **5.3**  
(m above present water level) (present depth in m) (m above bed)

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

**SEDIMENT/SUBSTRATE**

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt			
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	<b>0.1</b>	<b>4.17.20</b>	<b>7.50</b>	<b>6.72</b>	<b>17,500</b>	<b>1 1/2</b>
Mid-depth	<b>2.3</b>	<b>16.83</b>	<b>7.58</b>	<b>5.91</b>	<b>19,600</b>	
Bottom	<b>5</b>	<b>16.56</b>	<b>7.59</b>	<b>5.23</b>	<b>25,000</b>	

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: ☐ Globbs: ☐ Slick: ☐

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

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

Weather Conditions/Notes: <b>sunny, few clouds, slight breeze</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Abundance:</th> <th>Absent</th> <th>Rare</th> <th>Common</th> <th>Abundant</th> </tr> <tr> <td>Periphyton</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Fish</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Aquatic Macrophytes</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Iron/sulfur Bacteria</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Abundance:	Absent	Rare	Common	Abundant	Periphyton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Aquatic Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abundance:	Absent	Rare	Common	Abundant																						
Periphyton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																						
Aquatic Macrophytes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
Iron/sulfur Bacteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						

SAMPLING TEAM: <b>Craininger / Kowach</b>	SIGNATURE: <b>Craininger</b>	DATE: <b>2/13/98</b>
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STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL REGULATION  
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (MM/DD): <u>2/9/98</u>	RECEIVING BODY OF WATER: <u>Palm River</u>
SUBMITTING AGENCY NAME: _____			

REMARKS: <u>Large number of Turkey buzzards feeding on dead freshwater fish</u>	LOCATION: <u>Falkenburg WWTP</u>	FIELD ID NAME: <u>Test Site 2</u>
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Habitat Parameter <div style="border: 1px solid black; padding: 2px; text-align: center;">Score</div>	Excellent	Good	Fair	Poor
Littoral Alterations <div style="border: 1px solid black; padding: 2px; text-align: center;">4</div>	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points <u>rip rap</u>	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed <div style="border: 1px solid black; padding: 2px; text-align: center;">13</div>	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points <u>oysters on rip rap</u>	No communities observed from those listed. 0-12 points
Tidal Fluctuation <div style="border: 1px solid black; padding: 2px; text-align: center;">2</div>	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/Alterations <div style="border: 1px solid black; padding: 2px; text-align: center;">0</div>	Only natural runoff. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action <div style="border: 1px solid black; padding: 2px; text-align: center;">2</div>	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type <div style="border: 1px solid black; padding: 2px; text-align: center;">0</div>	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE 

21

COMMENTS:

ANALYSIS DATE: <u>2/9/98</u>	ANALYST: <u>Crainger</u>	SIGNATURE: <u>Candrea Crainger</u>
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STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: _____	STORET STATION NUMBER: _____	DATE (M/D/Y): <u>2/9/98</u>	TIME: <u>1200</u>	RECEIVING BODY OF WATER: <u>Palm River</u>
SUBMITTING AGENCY NAME: _____				

REMARKS: <u>upstream</u>	COUNTY: <u>Hills</u>	LOCATION: <u>Falkenburg water</u>	FIELD ID/NAME: <u>Test Site 2.</u>
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**RIPARIAN ZONE/INSTREAM FEATURES**

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

Forest/Natural <u>20</u>	Silviculture <u>  </u>	Field/Pasture <u>5</u>	Agricultural <u>  </u>	Residential <u>35</u>	Commercial <u>20</u>	Industrial <u>20</u>	Other (Specify) <u>  </u>
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Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

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

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

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

Artificially Impounded ☐ yes ☐ no

High Water Mark: 4.5 + 0.3 = 4.8  
(m above present water level) (present depth in m) (m above bed)

Typical Width (m)/Depth (m)/Velocity (m/sec) Transect  
   m/s    m/s    m/s  
3.5 m deep    m deep 4.5 m deep  
120 m wide

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)	<u>  </u>	<u>  </u>	<u>  </u>	Sand	<u>  </u>	<u>  </u>	<u>  </u>
Leaf Packs or Mats	<u>  </u>	<u>  </u>	<u>  </u>	Mud/Muck/Silt	<u>  </u>	<u>  </u>	<u>  </u>
Aquatic Vegetation	<u>  </u>	<u>  </u>	<u>  </u>	Other:	<u>  </u>	<u>  </u>	<u>  </u>
Rock or Shell Rubble	<u>  </u>	<u>  </u>	<u>  </u>	Other:	<u>  </u>	<u>  </u>	<u>  </u>
Undercut banks/Roots	<u>  </u>	<u>  </u>	<u>  </u>	Draw aerial view sketch of habitats found in 100 m section			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/L):	Cond. (µmho/cm) or Salinity (ppt):	Secchi (m):
Top	<u>0.1</u>	<u>17.67</u>	<u>7.51</u>	<u>6.82</u>	<u>18,100</u>	<u>1 1/2</u>
Mid-depth	<u>2.25</u>	<u>16.80</u>	<u>7.59</u>	<u>6.39</u>	<u>20,400</u>	
Bottom	<u>4.5</u>	<u>16.70</u>	<u>7.57</u>	<u>5.43</u>	<u>24,600</u>	

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: ☐ Globbs: ☐ Slick: ☐

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

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

Weather Conditions/Notes: <u>sunny, few clouds, slight breeze.</u> <u>Large flock of white pelicans present.</u>	Abundance: Periphyton <input type="checkbox"/> Absent <input checked="" type="checkbox"/> Rare <input type="checkbox"/> Common <input type="checkbox"/> Abundant <input type="checkbox"/> Fish <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Aquatic Macrophytes <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Iron/sulfur Bacteria <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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SAMPLING TEAM: <u>Cramer / Kovach</u>	SIGNATURE: <u>condrea pramgo</u>	DATE: <u>2/13/98</u>
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# FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Falkenburg WWTP  
 County: Hillsborough  
 Contact / District: Andrea Grainger / Southwest  
 NPDES Permit #: FL0040641  
 LIMS Sample #: 306006 LIMS Job #: 1998-02-11-07

Sample Collection: Date 2/18/98 Time 1445  
 Test Beginning: Date 2/10/98 Time 1550  
 Test Ending: Date 2/12/98 Time 1500  
 Organism Batch #: 7 Diluent Batch #: 5  
 Organism Age: < 24 hours  
 Test Organism: Ceriodaphnia dubia

sample log: 2/17/98 DW  
 Test Type: Screening | Definitive  
Static | Static Renewal | Flow-through  
 Temperature range: room 23.0-24.8°C  
 incubator 23.9-25.0°C  
 Test Number: 1 of 2  
 Remarks: D = dead, M = missing

Instrument Calibrations: pH meter # 7851  
 Temperature °C 90H018262  
 D.O. mg/L 90H018262  
 Conductivity µmhos/cm G9005749  
 0 hr 7.0 @ 7.0 21.5 @ 21.5 8.2 @ 25.3 °C 99.8 @ 96.3  
9.0 @ 9.0 989 @ 1005 @ 25.7 °C  
 24 hr 7.0 @ 7.0 22.3 @ 22.4 8.1 @ 25.5 °C 10.5 @ 96.3  
9.0 @ 9.0 978 @ 1005 @ 25.9 °C  
 48 hr 7.0 @ 7.0 23.5 @ 23.5 8.2 @ 24.9 °C 98.6 @ 96.3  
9.0 @ 9.0 490 @ 1005 @ 24.5 °C

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm)		
		0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control	A	5	5	5	8.1		8.0	21.7		23.9	8.4		7.6	185		205
Control	B	5	5	5			8.2			23.8			7.6			180
Control	C	5	5	5			8.7			23.8			7.6			185
Control	D	5	5	5			8.2			23.7			7.6			195
100%	A	5	5	5	7.6		8.7	22.5		23.8	8.2		7.7	980		985
100%	B	5	5	5			8.7			23.9			7.7			1015
100%	C	5	5	5			8.7			23.9			7.7			1050
100%	D	5	5	5			4.7			23.9			7.7			1095
Measured/Loaded by:		MF	MF	MF	DW		MF	DW		MF	DW		MF	DW		MF
Recorded by:		MF	FW	MF	MF		FW	MF		FW	MF		FW	MF		FW

Investigators' Signatures

Marshall Faircloth  
Mark W. White  
Taylor Lee Green

Salt Water

Well Water

Water Quality Parameters verified by MF

20% Min Water	Sample	Method	Measured by
	0.01	—	Kovacs
< 0.03	0.06	PR-10	TL/DW
61	167	Hach	FW
81	227	Hach	FW
20.017	20.017	Orion	MF

Total ammonia (mg/L as N)

Ammonia Ammonia

Ammonia

Control

Sample

Blank

Salinity

Salinity

-58.6

0 ppt

0 ppt



Phytoplankton taxa list and densities (#/mL) for Falkenburg WWTP, collected via subsurface grabs in Palm River on 9 February, 1998.

	Control Site	Test Site 1	Test Site 2
<b>Bacillariophyceae</b>			
<i>Biddulphia</i> sp.	6	20	6
<i>Chaetoceros</i> sp.	18	49	6
<i>Coscinodiscus</i> sp.	—	3	6
<i>Cyclotella</i> sp.	29	49	18
<i>Cylindrotheca</i> sp.	—	3	—
<i>Nitzschia</i> sp.	3	6	—
<i>Rhizosolenia</i> sp.	41	43	36
<i>Skeletonema</i> sp.	—	14	—
<i>Thalassiothrix</i> sp.	3	3	—
Undetermined Biddulphiaceae	9	9	—
Undetermined pennate diatom	9	—	6
<b>Chlorophyceae</b>			
<i>Golenkinia</i> sp.	3	—	—
<i>Scenedesmus</i> sp.	26	29	30
<i>Selenastrum</i> sp.	6	—	—
<i>Tetraedron</i> sp.	—	3	—
<i>Tetrastrum</i> sp.	—	—	6
Undetermined Chlorophyceae	3	—	—
<b>Cryptophyceae</b>			
<i>Chroomonas</i> sp.	79	90	592
<i>Cryptomonas</i> sp.	24	12	—
<b>Cyanophyceae</b>			
<i>Aphanocapsa</i> sp.	6	—	—
<i>Chroococcus</i> sp.	—	3	—
<i>Dactylococcopsis</i> sp.	15	32	6
<i>Lyngbya contorta</i>	6	6	6
<i>Merismopedia</i> sp.	6	9	12
<b>Dinophyceae</b>			
<i>Ceratium</i> sp.	3	—	—
<i>Peridinium</i> sp.	9	—	634
<i>Prorocentrum</i> sp.	6	—	—
Undetermined Dinophyceae	38	—	—
<b>Euglenophyceae</b>			
<i>Euglena</i> sp.	12	—	54

Benthic macroinvertebrate taxa list for Falkenburg WWTP, collected via Ponar grab samples in Palm River, on 2 February, 1998. Densities, in number/m<sup>2</sup>, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
<b>Cirripedia</b>			
<i>Balanus</i> sp.	444	125	-
<b>Cumacea</b>			
<i>Cyclaspis</i> sp.	-	-	14
<b>Decapoda</b>			
Undetermined Palaemonidae	14	-	-
<b>Diptera</b>			
<i>Chaoborus albatus</i>	-	-	14
Undetermined Chironomidae	-	14	56
<b>Gastropoda</b>			
<i>Rictaxis punctostriatus</i>	97	-	-
Undetermined Gastropoda	-	14	-
Undetermined Hydrobiidae	97	69	-
<b>Mysidacea</b>			
<i>Americamysis almyra</i>	14	14	-
<i>Americamysis bahia</i>	-	14	14
Undetermined Mysidae	-	42	-
<b>Pelecypoda</b>			
<i>Macra fragilis</i>	28	-	-
<i>Modiolus demissus</i>	14	-	-
<i>Musculus lateralis</i>	14	-	-
<i>Mytilopsis leucophaeata</i>	875	444	-
Undetermined Mytilidae	14	-	-
<b>Polychaeta</b>			
<i>Capitella</i> sp.	-	14	-
<i>Eurythoe</i> sp.	28	-	-
<i>Gyptis brevipalpa</i>	14	-	-
<i>Hobsonia florida</i>	14	14	-
<i>Nereis succinea</i>	83	69	-
<i>Pectinaria gouldi</i>	111	-	-
<i>Polydora ligni</i>	417	250	-
<i>Polydora</i> sp.	292	-	-
<i>Stenoninereis martini</i>	1861	681	111
<i>Streblospio benedicti</i>	4361	1292	347
Undetermined Ampharetidae	14	-	-
Undetermined Nephtyidae	14	-	-
Undetermined Nereidae	-	69	69
<b>Turbellaria</b>			
<i>Stylochus</i> sp.		14	-



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

Transaction Code			NPDES NUMBER								YR/MO/DA				Insp Type	Inspector	Fac Type													
1	N		2	5		3	F	L	0	0	4	0	6	1	4	11	12	9	8	0	2	0	9	17	18	X	19	S	20	I
Remarks																														

21

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

Transaction Code			NPDES NUMBER								YR/MO/DA				Insp Type	Inspector	Fac Type													
1	N		2	5		3	F	L	0	0	4	0	6	1	4	11	12	9	8	0	2	0	9	17	18	B	19	S	20	I
Remarks																														

21

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