Biological Assessment of

Howard F. Curran Advanced Wastewater Treatment Facility

Hillsborough

NPDES #FL0020940

Sampled December 1997

October 1998

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: Howard F. Curran Advanced WWTP
County: Hillsborough
NPDES Number: FL0020940
EPA Permit Expiration Date: September 30, 1998

Toxics Sampling Inspection (**XSI**)

Date Sampled: 8 December 1997

Results: The herbicide atrazine was detected in the effluent below chronically toxic levels. No metals were found at levels exceeding Class III marine water quality standards.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 8 December 1997

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

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 8 December 1997

Results: Measures of macroinvertebrate community health at the test sites were similar to, or better than, the control site, indicating that the discharge was not adversely affecting the receiving water communities. Pollution-sensitive organisms were well represented throughout the study area. Quantitative measures of algal community health did not indicate any degradation at either test site. Chlorophyll *a* was undetected at all three sites.

Water Quality Inspection (**WQI**)

Date Sampled: 8 December 1997

Results: Nutrient levels at all three sites were higher than those found in approximately 85% of Florida's estuaries. Nutrient levels at the test sites were slightly higher than those detected at the control site, suggesting that the effluent was influencing the already enriched waters of Hillsborough Bay. Algal growth potential at all three sampling stations, exceeded the 10 mg dry wt/L "problem threshold" for marine waters.

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 Howard F. Curran (City of Tampa) Advanced Wastewater Treatment Facility is located in Hillsborough County, Florida (see map in Appendix). The designed flow for this municipal facility is 96 MGD, with an annual average flow of 51 MGD. Treatment includes a two-stage, high-rate activated sludge process and denitrification, followed by chlorination and subsequent dechlorination prior to discharging into the Seddon shipping channel which flows into the Class III Hillsborough Bay. Flow during this survey was 76 MGD.

The state permit limits for the Howard F. Curran AWWTF are listed in Table 1. Although monthly operating report results reflect long-term compliance with the permit limits, the facility is currently under an enforcement action for a 1 MGD partially-treated spill into Hillsborough Bay.

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 off Hookers Point in Hillsborough Bay) and two test sites bracketing the discharge (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites.

Acute 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. Invertebrates were collected from 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. Algal Growth Potential (AGP) tests used *Selenastrum capricornutum* as the test organism for the freshwater effluent and *Dunaliella tertiolecta* for the marine receiving-water sites. Sediments from control and test sites were 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'.

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.

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, the Florida Index, Ephemeroptera/Plecoptera/Trichoptera (EPT) Index, community composition, 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 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. 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.

The following personnel were involved in this investigation: Andrea Grainger, Charles Kovach (DEP Southwest District) and Jennifer Eichelberger, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburello, 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, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

The Howard F. Curran AWWTF outfall is located in Seddon Channel at a depth of approximately 9 meters. Habitat quality was "fair" at all three sites (see Marine Habitat Assessment sheets in Appendix). Sediments at all three sites consisted mostly of sand, mud, muck, and silt. All physical and chemical parameters fell within limits normally associated with estuarine systems and did not violate marine water quality standards (Table 1). The water was slightly

turbid at all three sites, with a slight chlorine odor at both test sites.

The herbicide atrazine (0.18 µg/L) was detected in the effluent at a concentration below chronically toxic levels (ACQUIRE 1991) (Table 1). Aluminum, zinc, copper, and iron were detected in the effluent at concentrations that did not violate Class III marine water quality standards.

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

Nutrient levels were elevated at the control site and both test sites, indicating other sources of nutrient enrichment in Hillsborough Bay and Seddon Channel (Table 1). Ortho-phosphate levels at the control site (0.32 mg/L), test site 1 (0.36 mg/L), and test site 2 (0.49 mg/L) exceeded those values typically found in 95% of Florida's estuaries. Total phosphorus was also elevated at all three sites (control site = 0.41 mg/L, test site 1 = 0.44 mg/L, and test site 2 = 0.66 mg/L). These values exceeded those found in 90% of Florida's estuaries. Ammonia levels at the control site (0.077 mg/L), test site 1 (0.08 mg/L), and test site 2 (0.077 mg/L) were higher than those in 60% of other estuaries in Florida. The control site nitrate+nitrite level (0.1 mg/L), exceeded 90% of other Florida's estuaries, while at test site 1 (0.32 mg/L) and test site 2 (0.53 mg/L), nitrate+nitrite levels exceeded those values found in 95% of the state's marine waters.

Algal growth potential at the control site (22.2 mg dry wt/L), test site 1 (24.5 mg dry wt/L), and test site 2 (32.2 mg dry wt/L), exceeded 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 was 31.9 mg dry wt/L.

Quantitative measures of algal community health did not indicate any degradation at either test site (Figure 1). The lower diversity and higher algal density at the control site were due to the larger number of the diatom *Skeletonema* sp. there. In all other respects, the three sites had similar community structure (Table 2). Chlorophyll *a* was undetected at all three sites.

Quantitative measures of benthic macroinvertebrate community health indicated that the discharge was not adversely affecting the receiving water communities. Figure 2 indicates the degree of difference between the invertebrate populations of the control and test site. Larger degrees of differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site is better than the control site.

Macroinvertebrate taxa richness increased from the control site (25 taxa), to test site 2 (with 37 taxa), and to test site 1 (with 44 taxa) (Table 2). Diversity was highest at test site 1 (4.2), decreasing at test 2 (3.8), and at the control site (3.4). Similarly, the number of polychaeta taxa was highest at test site 1 (with 22 taxa), decreasing somewhat at test site 2 (18 taxa), and further decreasing at the control site (12 taxa). The pollution-sensitive (Farrell 1992) polychaete family, Cirratulidae, was well represented at all three sites. Gastropods were the next dominant taxa (Table 2). Pelecypods (normally considered pollution-sensitive) were present in low numbers at all three sites. *Mactra fragilis*, however, a very sensitive species, was present at all three study sites. Pollution-sensitive cumaceans were also collected at all three study sites; *Cyclaspis varians* was very abundant at test site 2 (20% contribution) while *Oxyurostylis* sp. (1%) was present in low numbers at test site 1. The control site had a marginal number of cumaceans (<1% contribution). Tubificids, normally pollution indicators, increased from 1% at the control site, to 3%, and 8% at test site 1 test site 2, respectively.

Conclusions

The herbicide atrazine was detected in the effluent at a concentration below chronically toxic levels. Aluminum, zinc, copper, and iron were detected in the effluent sample, but did not exceed the Class III water quality standards for a marine system.

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

Effluent nutrient levels were somewhat elevated, although not to unusual levels for municipal wastewater. Nutrient levels were high at all three study sites, with the test sites having slightly higher levels than the control site, indicating that the discharger may be having an adverse effect on the already enriched Hillsborough Bay.

Algal growth potential at all three sampling stations exceeded the 10 mg dry wt/L "problem threshold" for marine waters, reflecting the elevated nutrient levels throughout the study area. The effluent AGP was 31.9 mg dry wt/L.

Table 1. Effluent limits and summary of chemistry data.

Howard F. Curran AWWTP	Effluent Limits	Effluent Samples	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
Atrazine	–	0.18 I	–	–	–
Metals (µg/L)					
Aluminum	≤ 1500 *	61 I	–	–	–
Arsenic	≤ 50 **	40 U	–	–	–
Cadmium	≤ 9.3 **c	0.02 I	–	–	–
Chromium	≤ 50 **	10 U	–	–	–
Copper	≤ 2.9 **	2.3	–	–	–
Iron	≤ 300 **	99	–	–	–
Lead	5.6 **c	0.2 U	–	–	–
Mercury	≤ 0.025 **	0.1 U	–	–	–
Nickel	≤ 8.3 **	7 U	–	–	–
Selenium	≤ 71 **	50 U	–	–	–
Zinc	≤ 86 **	17 I	–	–	–
Nutrients (mg/L)					
Ortho-phosphate	Report	2.0	0.32	0.36	0.49
Total phosphorus	Report	2.2	0.41	0.44 A	0.66
Ammonia	–	0.41 A	0.77	0.08	0.077
Nitrate+Nitrite	Report	1.7	0.1	0.32	0.53
TKN	–	1.2	0.56	0.63 A	0.61
Total Nitrogen	≤ 3 *a	2.9	0.66	0.95	1.14
General Phys-Chem Parameters					
Habitat Assessment	–	–	34	38	38
D.O. (mg/L) surface	≥ 5.0 *	–	7.8	8.3	7.4
D.O. (mg/L) mid-depth	–	–	7.1	7.3	6.6
D.O. (mg/L) bottom	–	–	7.2	6.9	6.9
pH (SU) surface	6.0 - 8.5 *	–	7.6	7.3	7.4
pH (SU) mid-depth	–	–	7.7	7.7	7.7
pH (SU) bottom	–	–	7.7	7.6	7.7
Conductivity (µmhos/cm) surface	–	–	30,400	31,600	29,600
Conductivity (µmhos/cm) mid-depth	–	–	34,400	35,000	35,700
Conductivity (µmhos/cm) bottom	–	–	35,000	36,000	36,900
Temperature (°C) surface	–	–	18.5	18.8	19.4
Temperature (°C) mid-depth	–	–	18.4	18.3	18.2
Temperature (°C) bottom	–	–	18.3	18.2	18.0
Salinity (ppt) surface	–	–	21.1	22.1	20.6
Salinity (ppt)mid-depth	–	–	24.2	24.8	25.3
Salinity (ppt) bottom	–	–	24.8	25.5	26.2
Flow (MGD)	≤ 96.0 *	76	–	–	–
AGP (mg dry wt/L)	–	31.9	22.2	24.5	32.2
Toxicity					
Bioassay - Fish	–	Not toxic	–	–	–
Bioassay - Invertebrate	–	Not toxic	–	–	–

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

Quantitative measures of algal community health did not indicate any degradation at either test site. Chlorophyll *a* was undetected at all three sites.

Both test sites showed good benthic macroinvertebrate diversity, high taxa richness, and the presence of pollution-sensitive species. Although all three study sites were dominated by pollution-tolerant taxa, pollution-sensitive taxa were also present at all three sites, suggesting that the discharger was having no adverse effect on the receiving waters.

Literature Cited

Aquatic Toxicity Information Retrieval Data Base (AQUIRE). 1991. U.S. EPA Environmental Research Laboratory, Duluth, Mn.

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

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

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

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

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

FDEP. 1996. Water-quality assessment for the State of Florida: Section 305(b). Fla. Dept. Environ. Prot., Div. Water Facilities, Tallahassee, Fla. 294 p.

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

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

Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027F. U. S. EPA, Cincinnati, Ohio. 216 pp.

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

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

Howard F. Curran AWWTF	Control Site	Test Site 1	Test Site 2
Macroinvertebrate			
Number of Taxa	25	44	37
Shannon-Weaver Diversity	3.4	4.2	3.8
No. Polychaete Taxa	12	22	18
Community Composition			
% Amphipoda	4	8	9
% Cirripedia	5	23	2
% Cumacea	0.7	1	20
% Decapoda	0	1	1
% Gastropoda	0.7	13	27
% Nemertea	6	3	0.2
% Pelecypoda	2	2	0.6
% Polychaeta	77	44	32
% Tubificidae	1	3	8
% Other	2	4	2
Functional Feeding Groups			
% Browsers-grazers	2	3	4
% Burrowing Deposit Feeders	2	6	18
% Predators/Carnivores	41	9	10
% Scavengers	3	5	4
% Scrapers	0	4	27
% Surface Deposit Feeders	23	28	8
% Suspension Feeders	28	45	29
% Unknown	0.7	1	0.1
Phytoplankton Algae			
Number of Taxa	13	14	14
Shannon-Weaver Diversity	1.7	2.2	2.6
Chlorophyll *a* (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	1,678	479	229
% Blue-green	0.6	0	1
% Cryptophytes	20	61	32
% Diatoms	73	23	60
% Dinoflagellates	0	13	5
% Green	6	1	1
AGP (mg dry wt/L)	22.2	24.5	32.2

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

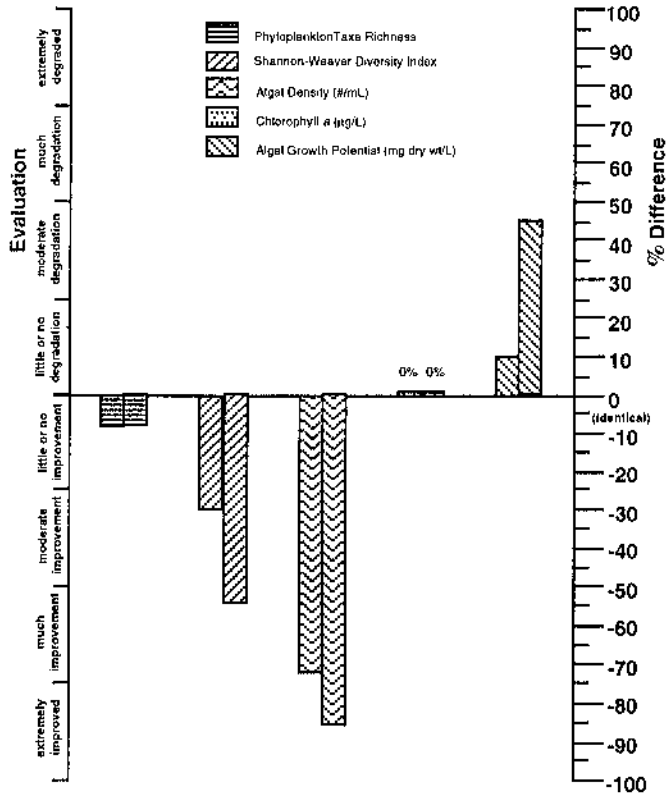


Figure 1. Effect of discharge on the algal community.

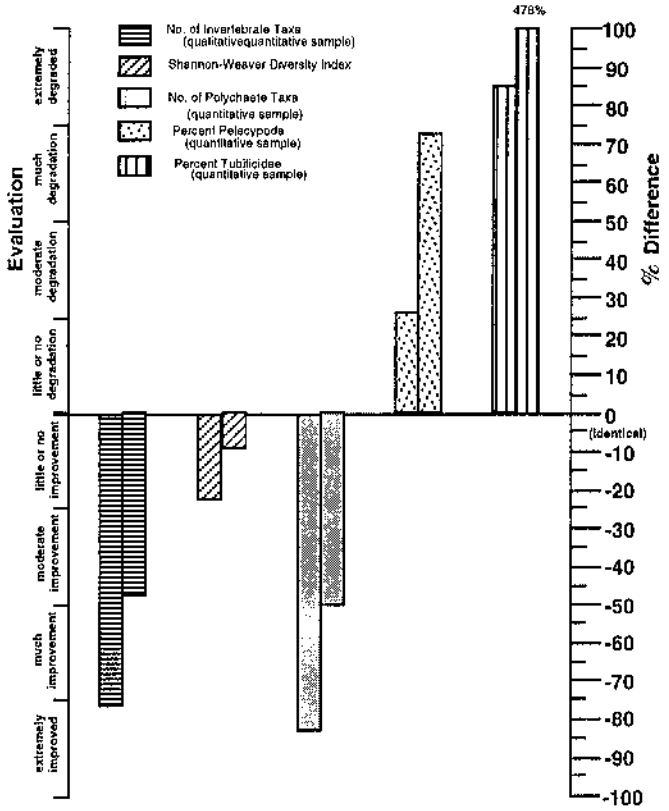


Figure 2. Effect of discharge on the benthic macroinvertebrate community.

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)

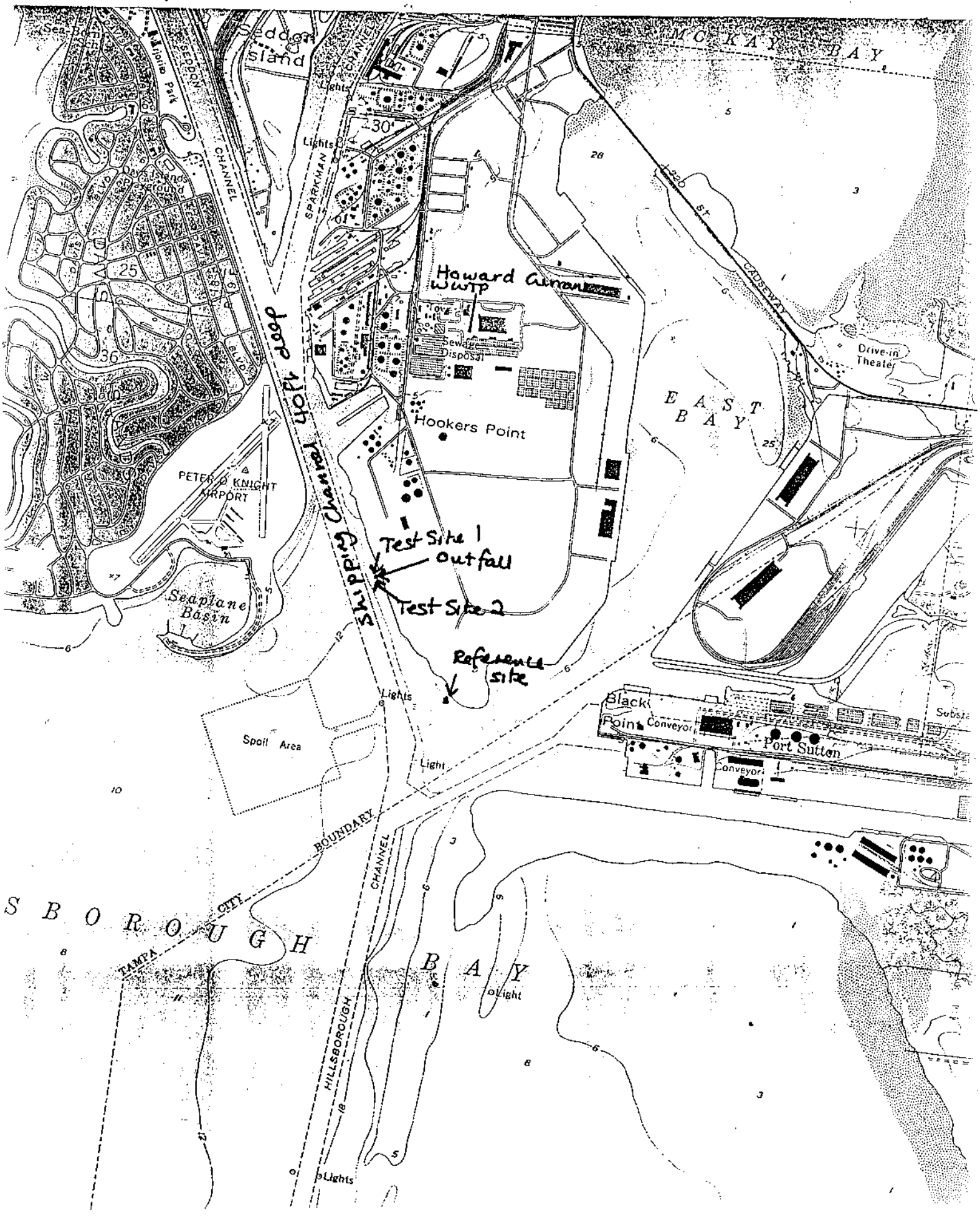
Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:

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

Location of facility and Ambient Sites for Howard Curran WWTP's FY1-5



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: City of Tampa - Howard Curren WWTP		Date Summary Prepared: 12/5/97.
Location (attach detailed map):	County: Hillsborough	District: SW District
Federal Permit # and expiration date: FL0020940	State GMS # and 4/10/96 State expiration date: 4029 MO 3950	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Treatment of domestic wastewaters from City of Tampa service area to advanced standards for discharge to Hillsborough Bay

Description of treatment process:
A 96.0 MGD two-stage, high-rate activated sludge process and denitrification filters followed by chlorine for disinfection and SO_2 for dechlorination prior to discharge.

Receiving waters: Hillsborough Bay Tampa Bay	Classification: I II (III)	
Design Flow: 96.0 MGD, Annual Average	Mean Flow: 51.0 MGD - Annual Average	Flow during survey: 76.0 MGD

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.):
N/A - although they have requested a mixing zone
Phosphorus limit was waived, under Beizzle-fig.

Parameter	Unit	Minimum	Maximum	Type Sample Frequency	Conditions
CBOD5 and Suspended Solids	mg/l	-	5 annual avg	**fpc Daily 7 days/wk	
Influent CBOD5 and Suspended Solids	mg/l	Report	-	**fpc Daily 7 days/wk	
Fecal Coliform	#100	*Non-detectable	25	grab Daily 7 days/wk	
Total Nitrogen	mg/l	-	3 annual avg	**fpc Daily 7days/wk	
Ortho Phosphorous	mg/l	Report	-	**fpc Daily 7days/wk	
Total Phosphorous	mg/l	Report	-	**fpc Daily 7days/wk	
Total Residual Chlorine	mg/l	-	0.01	grab Hourly/24 any sample hrs/day	
Flow	mgd	-	70.0 ADF	***rmf&t Continuous	
pH	STD UN	6.00	8.50	****meter Continuous	
DO	mg/l	5.00	-	****meter Continuous	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

(Facility)

Description of permitted outfall(s):

D001 - Discharges to shipping chanel in Hillsborough Bay - 29.1 feet in depth

D002 - Intermittent discharge to Hillsb. Bay, only during times of high plant flow & high tides.
& D003

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: A minor number of chlorine residuals below 1.0 mg/L have been reported, typically very short duration..

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

Current enforcement action for a 1.0 MGD partially treated sewage spill to bay in July, 1995, due to an abnormal event. Tracking under OGC case # 96-3452.

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

MOR results reflect long-term compliance with the permit limitations.

Additional information:

Staff contributing to this review (signature):

(Biologist)

(Inspector)

(Engineer)

(

(

(

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		12/8/97	1130	Hillsborough Bay / Tampa

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Hillsboro'	Howard Curran WWTP aka Hookers Pt WWTP	Reference Site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
—	—	—	—	20	30	50	—

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

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

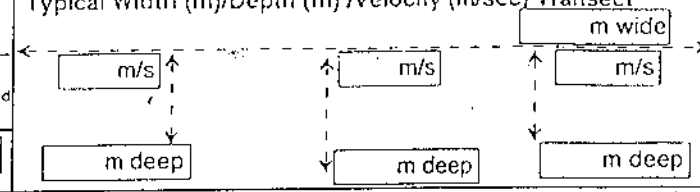
~~Width of riparian vegetation~~ (m) on ~~least buffered side:~~ — *List & map dominant vegetation on back*

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

~~Artificially Impounded~~ ☐ yes

High Water Mark: 3 (m above present water level) + 0.5 (present depth in m) = 3.5 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
~~Woody Debris (Snags)~~				Sand			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
~~Rock or Shell Bubble~~				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	18.54	7.57	7.80	30,400			1.5
Mid-depth	1.5	18.39	7.68	7.10	34,400			
Bottom	3.0	18.34	7.66	7.22	35,000			

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

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

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

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

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

Weather Conditions/Notes:
Sunny, few clouds, a gentle breeze

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

SAMPLING TEAM: Granger / Kovach

SIGNATURE: Chelsea Granger

DATE: 12/18/

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/DY):	RECEIVING BODY OF WATER:
		12/8/97	Hillsborough Bay / Tampa Bay

REMARKS:	LOCATION: Howard Curran WWTP aka Hookers Point WWTP	FIELD ID/NAME:
		Reference Site

Habitat Parameter	Score	Excellent	Good	Fair	Poor
Littoral Alterations	4	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points rippap + seawalls	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed	12	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 barnacles + oysters growing on seawalls + rip-rap.
Tidal Fluctuation	5	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations	3	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action	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, flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type	8	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 34

COMMENTS: Tide going out. weather is fair

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12/8/97	Granger	Candrea Granger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		12/8/97	1000	Hillsborough Bay / Tampa Bay

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Hillsboro'	Howard Curran WWTP aka Hookers Pt WWTP	Test Site 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
—	—	—	—	20	30	50	—

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

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

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

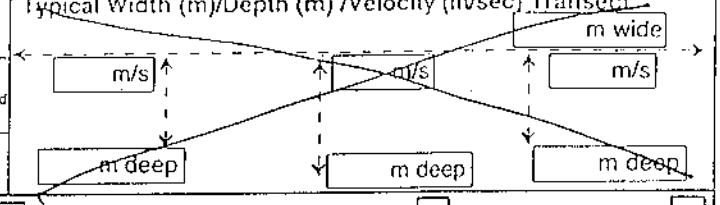
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 5 (m above present water level) + 0.5 (present depth in m) = 5.5 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

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

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.1	18.82	7.20	8.31	31,600			1.5
Mid-depth	2.5	18.27	7.65	7.26	35,000			
Bottom	5.0	18.17	7.60	6.87	36,000			

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

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

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

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

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

Weather Conditions/Notes:
Sunny, few cloudy, a gentle breeze

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Granger / Kovach	Andrea Granger	12/13/97

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		12/8/97	Hillsborough Bay / Tampa Bay

REMARKS:	LOCATION:	FIELD ID/NAME:
	Howard Curran WWTP aka Hookers pt WWTP	Test Site 1

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations (Ac 3.5)	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points all rip-rap	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed (12)	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points oysters, barnacles growing on rip-rap.
Tidal Fluctuation (5)	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations (3)	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action (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, flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type (11 Ac 11.8 Ac)	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: Tide going out. Weather is fair

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12/8/97	Grainger	Sandra Grainger

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/DAY):	TIME	RECEIVING BODY OF WATER:
		12/8/97	1045	Hillsborough Bay/TampaBay

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Hillsboro	Howard Curran WWTP AKA Hookers Pt WWTP	Test Site 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
~	~	~	~	20	30	50	~

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

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

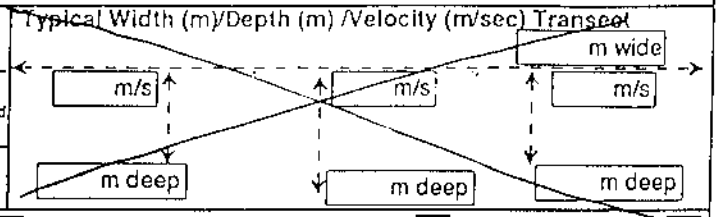
~~Width of riparian vegetation (m) on least buffered side:~~ *List & map dominant vegetation on back*

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

~~Artificially Impounded~~ ☐ yes

High Water Mark: 0.5 (m above present water level) + 10 (present depth in m) = 10.5 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

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

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.1	19.43	7.39	7.40	29,600			1.5
Mid-depth	5.0	18.24	7.70	6.60	35,700			
Bottom	10.0	18.00	7.69	6.87	36,900			

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

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

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

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

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

Weather Conditions/Notes:
Sunny, some clouds. Tide was going out.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Granger / Kovach	Edward Granger	12/13/97

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		12/8/97	Hillsborough Bay / Tampa Bay

REMARKS:	LOCATION:	FIELD ID/NAME:
	Howard Curran WWTP aka Hooker's Pt WWTP	Test Site 2

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations: 5	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points all rip-rap.	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 12	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points oysters, barnacles growing on rip-rap
Tidal Fluctuation: 5	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 3	Only natural runoff. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 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: 11	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: Tide going out. Weather is fair

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12/8/97	Granger	Candrea Granger

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/DY):	RECEIVING BODY OF WATER:
		12/8/97	Hillsborough Bay / Tampa Bay

REMARKS:	LOCATION:	FIELD ID NAME:
	Howard Curran WWTP aka Hooker's Pt WWTP	Test Site 2

Habitat Parameter / Score	Excellent	Good	Fair	Poor
Littoral Alterations: 5	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points all rip-rap.	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 12	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points oysters, barnacles growing on rip-rap
Tidal Fluctuation: 5	>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
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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: 11	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: 33

COMMENTS: Tide going out. Weather is fair

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12/8/97	Granger	Candrea Granger

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Howard Curren WWTP
County: Hillsborough
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL00
LIMS Sample #: 202928 **LIMS Job #:** 97-DEC-09-23
sample log: 12/2/97 DW
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Temperature range: room 24.0-25.0°C MF
incubator 25.0-26.5°C 26.5°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 12-8-97 Time 16:30
Test Beginning: Date 12-9-97 Time 15:20
Test Ending: Date 12-11-97 Time 1530
Organism Batch #: 94 **Diluent Batch #:** well
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.7	8.3 @ 24.8 °C	101.3 @ 103.6 977 @ 1005 @ 24.5 °C 9,870 @ 10,357
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.8	8.2 @ 25.1 °C	103.0 @ 103.6 989 @ 1005 @ 25.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.8 @ 22.9	8.3 @ 24.8 °C	102.4 @ 103.6 976 @ 1005 @ 24.2 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctr A	E17	5	5	5	7.9	8.4	8.4	24.4	24.9	25.0	7.7	7.7	7.3	255	260	260
Ctr B	E18	5	5	5	7.9	8.4	8.4	24.4	25.1	24.9	7.8	7.8	7.3	255	260	265
Ctr C	E19	5	5	5	7.9	8.4	8.4	24.4	24.9	24.5	7.9	7.9	7.3	255	260	260
Ctr D	E20	5	5	5	7.9	8.4	8.4	24.5	26.0	24.5	7.9	8.0	7.3	255	265	260
100% A	E21	5	5	5	7.4	8.2	8.3	24.7	25.5	24.5	7.6	7.7	7.2	830	855	840
100% B	E22	5	5	5	7.4	8.2	8.3	24.7	26.2	24.3	7.6	7.7	7.3	840	890	875
100% C	E23	5	5	5	7.4	8.2	8.3	24.7	25.3	24.5	7.6	7.5	7.3	840	860	860
100% D	E24	5	5	5	7.4	8.2	8.3	24.7	25.2	24.5	7.5	7.5	7.3	840	860	855
Measured/Loaded by:		DW	DW	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		DW	DW	MF	DW	DW	MF	DW	DW	MF	DW	DW	MF	DW	DW	MF

Investigators' Signatures
Marshall Faircloth
reviewer
form updated 4/01/96

Water Quality Parameters verified by MF

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR100	DW
Alkalinity (mg/L as $CaCO_3$):	120		120	Hach	125
Hardness (mg/L as $CaCO_3$):	125		195	Hach	125
Total ammonia (mg/L as N):	<0.017		<0.017	Omin	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.4 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Howard Curran WWTP
County: Hillsborough
Contact / District: Andrea Obringer / Southwest
NPDES Permit #: FL00
LIMS Sample #: 202928 LIMS Job #: 97-DEC-09-23
sample log: 12/[illegible]/97 DW

Sample Collection: Date 12-8-97 Time 16:30
Test Beginning: Date 12-9-97 Time 15:30
Test Ending: Date 12-11-97 Time 15:30
Organism Batch #: 48 Diluent Batch #: 55
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: ~~Screening~~ (circled) | Definitive
Static (circled) | Static Renewal | Flow-through
Temperature range: room 24.0-25.0°C
incubator ~~25.0-25.5~~ MF 24.4-25.5°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0; 9.0 @ 9.0	22.3 @ 22.3	8.3 @ 24.8 °C	101.3 @ 103.6; 977 @ 1005 @ 24.5 °C
24 hr	7.0 @ 7.0; 9.0 @ 9.0	23.8 @ 23.8	8.2 @ 25.1 °C	~~98.8~~ 103.0 @ ~~1008.7~~ 103.6; 989 @ 1005 @ 25.0 °C
48 hr	7.0 @ 7.0; 9.0 @ 9.0	22.8 @ 22.9	8.3 @ 24.8 °C	102.9 @ 103.6; 976 @ 1005 @ 24.2 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) / Cond. (µmhos/cm) (circled) 0 hr	Cond. 24 h	Cond. 48 h
Ctr	A	5	5	5	8.1		8.2	23.4		23.5	7.7		7.9	170		180
Ctr	B	5	5	5			8.3			23.4			7.9			195
Ctr	C	5	5	5			8.3			23.3			7.9			195
Ctr	D	5	5	5			8.3			23.3			7.9			205
100%	A	5	5	5	7.4		8.5	23.7		23.5	7.7		7.9	805		810
100%	B	5	5	5			8.5			23.4			7.9			830
100%	C	5	5	5			8.5			23.4			7.9			805
100%	D	5	5	5			8.5			23.3			7.9			920
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		DW	MF	MF	DW		MF	DW		MF	DW		MF	DW		MF

Investigators' Signatures
[signature]
Marshall Faircloth
[signature]

Water Quality Parameters verified by MF

	Salt Water / Well Water / 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	not measured			
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	ORION	DW
Alkalinity (mg/L as $CaCO_3$):	65	120	Hach	MF
Hardness (mg/L as $CaCO_3$):	80	195	Hach	MF
Total ammonia (mg/L as N):	<0.017	<0.017	Orion	MF

Ammonia [illegible] Ammonia [illegible] Meter Slope: -58.4 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Phytoplankton taxa list and densities (#/mL) for Howard Curran WWTP, collected via subsurface grabs in Hillsborough Bay on 8 December, 1997.

	Control Site	Test Site 1	Test Site 2
Bacillariophyceae			
Chaetoceros sp.	–	–	9
Coscinodiscus sp.	–	9	9
Cyclotella sp.	58	19	6
Cylindrotheca sp.	–	13	6
Melosira sp.	–	–	6
Navicula sp.	–	3	–
Nitzschia sp.	–	3	–
Rhizosolenia sp.	10	–	–
Skeletonema sp.	1109	44	94
Synedra sp.	39	–	–
Undetermined pennate diatom	10	19	9
Chlorophyceae			
Crucigenia sp.	19	6	–
Elakatothrix sp.	–	–	3
Scenedesmus sp.	10	–	–
Schroederia sp.	10	–	–
Tetraedron sp.	10	–	–
Tetraselmis sp.	–	6	–
Undetermined chlorophyceae	48	–	–
Cryptophyceae			
Chroomonas sp.	338	291	68
Cryptomonas sp.	–	3	6
Cyanophyceae			
Dactylococcopsis sp.	10	–	–
Oscillatoria sp.	–	–	3
Dinophyceae			
Ceratium sp.	–	50	6
Peridinium sp.	–	9	3
Prorocentrum sp.	–	3	3
Euglenophyceae			
Euglena sp.	10	–	–

Benthic macroinvertebrate taxa list for Howard Curran Waste Water Treatment Plant, collected via Ponar grab samples in Hillsborough Bay, on 8, December 1998. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Actiniaria			
Undetermined Actiniaria	–	–	56
Amphipoda			
Ampelisca sp.	14	125	–
Ampelisca abdita	56	14	528
Grandidierella bonnieroides	–	14	14
Listriella barnardi	–	–	14
Parametopella sp.	14	28	42
Undetermined Amphilochidae	–	14	–
Undetermined Haustoriidae	–	14	–
Holothiurodian			
Leptosynapta sp.	–	14	–
Cumacea			
Cyclaspis sp.	14	–	14
Cyclaspis varians	–	–	1361
Oxyurostylis sp.	–	28	14
Decapoda			
Palaemonetes sp.	–	14	–
Pinnixa sp.	–	–	69
Undetermined Decapoda	–	14	–
Undetermined Xanthidae	–	–	14
Gastropoda			
Anachis obesa	–	69	–
Crepidula sp.	–	236	–
Cyclostremiscus sp.	14	–	–
Mitrella lunata	–	14	–
Oliva sayana	–	14	28
Physella sp.	–	14	444
Undetermined Gastropoda	–	–	1403
Nemertea			
Undetermined Nemertea	125	69	14
Oligochaeta			
Undetermined Tubificidae	28	69	569
Ophiurida			
Undetermined Ophiuridae	28	–	–
Pelecypoda			
Corbula contracta	14	–	14
Corbula swiftiana	–	–	14
Mactra fragilis	14	28	14
Tellina sp.	14	14	–
Polychaeta			
Undetermined Amphinomidae	250	–	42
Apoprionospio sp.	–	28	–
Capitella sp.	–	14	–
Capitella capitata	14	–	97

Glycera sp.	–	–	56
Glycinde sp.	–	–	14
Lumbrineris sp.	–	14	–
Mediomastus californiensis	–	–	528
Minuspio sp.	694	236	764
Mooreonuphis sp.	–	14	–
Nephtys sp.	28	–	28
Nereis succinea	–	14	42
Onuphis sp.	–	28	–
Paraprionospio pinnata	–	14	–
Phyllodoce mucosa	–	–	42
Poecilochaetus sp.	–	28	–
Prionospio sp.	42	28	83
Prionospio cristata	–	14	–
Prionospio heterobranchia	28	–	–
Prionospio pygmaea	–	42	–
Sigalion arenicola	–	14	–
Sigambra sp.	181	42	83
Sigambra tentaculata	139	–	97
Sthenelais sp.	28	–	–
Sthenelais limicola	–	–	28
Streblospio benedicti	–	–	28
Syllis sp.	–	28	–
Tharyx sp.	–	83	–
Undetermined Capitellidae	–	–	56
Undetermined Chrysopetalidae	–	–	167
Undetermined Cirratulidae	56	375	83
Undetermined Goniadidae	14	–	–
Undetermined Nereidae	–	14	28
Undetermined Poecilochaetidae	–	14	–
Undetermined Sabellidae	–	14	–
Undetermined Spionidae	42	83	–
Undetermined Syllidae	–	14	–
Polycladida			
Stylochus sp.	14	–	–
Sipuncula			
Undetermined Sipuncula	–	56	–
Cirripedia			
Balanus sp.	97	611	167
Turbellaria			
Dugesia sp.	–	14	–

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0020940		971208		X	S	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0020940		971208		B	S	1

Remarks

21 66