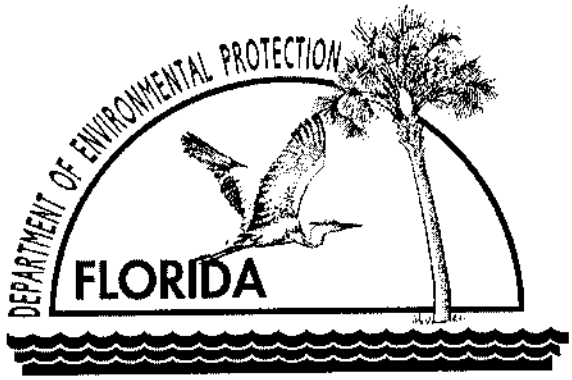
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Biological Assessment of

Panama City Beach WWTP

Bay County

NPDES #FL0021512

Sampled November and December 1998

September 1999

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:	Panama City Beach WWTP
County:	Bay
NPDES Number:	FL0021512
Permit Expiration Date:	1/31/2002

Toxics Sampling Inspection (XSI)

Date Sampled: 2 November 1998

Results: Copper was detected in the effluent at a level equal to the facility's permit limit (2.9 µg/L). Lead was detected at a level below the practical quantitation limit. No other metals or organic pollutants were detected in the effluent.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 2 November 1998

Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay.

Impact Bioassessment Inspection (IBI)

Date Sampled: 2,3 November 1998, 2 December 1998

Results: There were major changes in the composition of the phytoplankton and macroinvertebrate communities between the control and test sites. The differences in the these communities can be attributed to the extreme differences in salinity between the control site (13.6 ppt) and test site (0.6 ppt) rather than the effect of the facility's effluent.

Water Quality Inspection (WQI)

Date Sampled: 2,3 November 1998, 2 December 1998

Results: The dissolved oxygen concentration at the control site was below Class II water quality standards (Rule 62-302.530 (31) FAC). The effluent coliform results were outside acceptable dilution ranges as were the test site fecal coliforms. The test site total coliforms (3,700 counts/100ml) exceeded the Class II water quality standard (Rule 62-302.530(6) FAC). Extremely high nutrient levels in the effluent contributed to the elevated levels of ortho-phosphate, total phosphorus, and nitrate+nitrite at the test site where levels were significantly higher than levels found in over 95% of other Florida streams. AGP at the test site (77.5 mg dry wt/L) greatly exceeded the control site level (0.3 mg/L dry wt) and the 5 mg dry wt/L "problem threshold" for freshwater systems. The low effluent AGP (0.2 mg dry wt/L) may be indicative of algal growth inhibition.

This biological assessment was prepared by DEP staff to provide information to be used in reviewing an NPDES permit renewal application for the subject facility. This assessment will be used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The Panama City Beach Wastewater Treatment Plant is located in Bay County, Florida (see map in the Appendix). This 7.0 MGD treatment facility operates in activated sludge mode and consists of three extended aeration trains (two 2.5 MGD units and one 2.0 MGD unit) and has provisions for pretreatment, nitrification, reaeration, secondary clarification, filtration, digestion, chlorination, dechlorination, and sludge handling (see Facility Summary in Appendix). The treatment facility is also equipped with an 8.66 MG emergency holding pond. The effluent is discharged into an unnamed ditch that eventually flows into the Class II West Bay at discharge location D001. The flow during this survey was 5.195 MGD.

State permit limits for the Panama City Beach WWTP are listed in Table 1. According to the facility's monthly operating reports, from 5/97 through 3/98, and 7/98, the plant's effluent copper levels exceeded the daily maximum limit of 2.9 µg/L. However, the facility has been under a "report only" status for total recoverable copper since October 1, 1997. The facility is required to be in complete compliance with EPA permit FL0021512 no later than October 31, 1999. The facility's effluent total ammonia levels exceeded the permit limit of 2.0 mg/L in January of 1998. The operator was unsure of the cause of the elevated total ammonia but an unknown amount of fuel and aqueous film forming foam was discharged into the system from the local Navy Base, which recently came on line with the facility. The facility's most recent permit issued on 9/26/97 revised the whole effluent toxicity testing requirement from acute testing every two months to chronic testing biannually. For the period 2/97 through 4/98, routine testing was performed in 2/97, 4/97, 6/97, 8/97, 10/97 and 4/98. Only the 10/97 routine test failed with a No Observed Effect Concentration (NOEC) of 25% for *Ceriodaphnia dubia*. The resulting three additional tests passed, all with a NOEC >100%.

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 at Botheration Bayou at an unnamed dirt road) and a test site (located at the Panama City Beach ditch located at Powerlines Road approximately 900 meters downstream of 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. Data for this report was collected on November 2 and 3, 1998, and on December 2, 1998. The effluent was analyzed for nutrients, metals, and 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 screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia*, and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample. Bacterial populations were analyzed for total and fecal coliforms.

Benthic macroinvertebrates were evaluated at the control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip-net sweeps. Additional invertebrate collections would normally be accomplished using Hester-Dendy multiplate samplers incubated for 28 days. However, due to low water levels additional macroinvertebrates were collected with one petite Ponar grab at the control and test sites.

Periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. The periphyton rack at the control site was found on the bank, dry. Because of this, comparisons between control and test sites periphyton communities could not be made. Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was determined for the phytoplankton communities. Algal Growth Potential (AGP) tests were performed using *Selenastrum capricornutum* as the test organism for the freshwater effluent and test site and *Dunaliella tertiolecta* for the marine control site. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). 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,

Table 1. Effluent limits and summary of chemistry data.

Panama City Beach WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)				
	-	None Detected	-	-
Metals (µg/L)				
Aluminum	≤ 1.5 **	50 U	-	-
Arsenic	≤ 50 **	20 U	-	-
Cadmium	≤ 9.3 **	0.05 U	-	-
Chromium	-	10 U	-	-
Copper	≤ 2.9 *	2.9	-	-
Iron	≤ 1,000 **	15 U	-	-
Lead	≤ 5.6 *	0.10 I	-	-
Mercury	≤ 0.025 **	0.10 U	-	-
Nickel	≤ 8.3 **	6 U	-	-
Selenium	≤ 5.0 **	40 U	-	-
Silver	≤ 0.07 **	0.04 U	-	-
Zinc	≤ 86 **	6.0 U	-	-
Nutrients (mg/L)				
Ortho-phosphate	Report	3.0	0.03	2.6
Total phosphorus	Report	2.9	0.06	3.0 A
Ammonia	2.0 *d	0.03 I	0.02	0.01 A
Unionized Ammonia	0.02 *d	< 0.02	-	-
Nitrate+Nitrite	Report	15	0.01 I	16
TKN	Report	6.2	0.78	0.97 A
Organic Nitrogen	≤ 3.0 *c	6.2	0.76	0.96
Total Nitrogen	≤ 3.0 *d	21.2	0.78	17
General Phys-Chem Parameters				
Habitat Assessment	-	-	62	23
DO (mg/L)(11-2-98)	≥ 6.0 *	7.9	2.0	6.7
DO (mg/L)(12-2-98)	-	-	0.4	6.7
pH (SU) (11-2-98)	6.0-7.3 *	6.7	6.4	6.8
pH (SU) (12-2-98)	-	-	6.1	6.5
Color (Pt-Co)	-	5.0	90	25
Turbidity (NTU)	-	0.4	3	4
Conductivity (µmhos/cm) (11-2-98)	Report	1,013	20,272	1,033
Conductivity (µmhos/cm) (12-2-98)	-	-	22,213	1,125
Temperature (°C) (11-2-98)	Report	25.0	24.2	28.8
Temperature (°C) (12-2-98)	-	-	20.4	22.4
Salinity (ppt) (11-2-98)	-	0.6	12.3	0.6
Salinity (ppt) (12-2-98)	-	-	13.6	0.6
BOD 5 day (mg/L)	-	2.5 A	3.0 A	1.7 A
Flow (MGD)	7.0 *b	5.195	-	-
Hardness (mg $CaCO_3$)	-	149.7	-	-
AGP (mg dry wt/L)	-	0.2	0.3	77.5
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	NOEC	Not Toxic	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-
Microbiology (# counts/100mL)				
Fecal Coliforms	86 *d	4 B	620	120 B
Total Coliforms	-	16 B	740	3,700

* Permit limit
** Class II water quality standard
A - Value reported is the mean of two or more determinations
B - Based on colony counts outside the acceptable dilution range
I - Value is < the minimum quantitation limit, and ≥ the minimum detection limit
U - Material analyzed for but not detected; value reported is the minimum detection limit
NOEC - No observed effect concentration < 100% effluent will constitute a violation of this permit
a - monthly average
b - daily average
c - weekly average
d - daily maximum

taxa richness, Shannon-Weaver Diversity Index, the Florida Index, Ephemeroptera/Plecoptera/Trichoptera (EPT) Index, community composition, functional feeding groups, algal biomass, and the Stream Condition Index (SCI). For a discussion of each of these measures, see *Explanation of Measurements of Community Health* in the Appendix.

For graphical purposes, the percent differences between the control and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the percent filter-feeders are measured as the control site minus test site divided by the control site. The percent differences between sites involving the percent contribution, 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: Kenny Ferguson and Glenn Butts (DEP Northwest District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Michael Heyn, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Homann, Amy Weaver, Steve Wolfe, David Whiting, and Vicki McGee (DEP Central Biology Laboratory in Tallahassee). The Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, and Michael Tanski, as well as District representatives reviewed the report.

Results

The habitat quality of the test site was 62% lower than that of the

Table 2. Community structure of control and test sites.

Panama City Beach WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
% Dominant Taxon	16.9	13.9
EPT Index	1	1
Florida Index	4	13
Number of Taxa	17	17
SCI	21	23
Community Composition		
% Amphipoda	4.8	0.0
% Decapoda	7.3	0.0
% Diptera	41.1	36.6
% Gastropoda	0.8	6.9
% Mysidacea	13.0	0.0
% Odonata	16.1	26.7
% Oligochaeta	1.6	15.8
% Polychaeta	14.5	0.0
% Trichoptera	0.8	13.9
Functional Feeding Groups		
% Burrowing Deposit Feeders	1.6	15.8
% Predators	16.5	42.6
% Scrapers	2.0	6.9
% Shredders	4.4	3.5
% Surface Deposit Feeders	37.9	4.5
% Suspension Feeders/Filterers	23.8	26.7
Macroinvertebrate Ponar		
EPT Index	0	0
Florida Index	0	3
Number of Taxa	2	5
Shannon-Weaver Diversity	0.97	0.81
Community Composition		
% Diptera	0.0	9.7
% Gastropoda	0.0	3.2
% Oligochaeta	60.0	87.1
% Polychaeta	40.0	0.0
Functional Feeding Groups		
% Burrowing Deposit Feeders	60.0	87.1
% Other	0.0	9.6
% Surface Deposit Feeders	40.0	3.2
Phytoplankton Algae		
% Blue-green	0.0	4.7
% Diatoms	14.0	90.1
% Green	14.0	4.7
%Cryptophyceae	70.9	0.0
Algal Density (#/mL)	336.1	324.4
Chlorophyll *a* (µg/L)	1.0 U	1.0 U
Number of Taxa	6	10
Shannon-Weaver diversity	1.57	2.36
AGP (mg dry wt/L)	0.3	77.5

U - Analyzed for but not detected; value is minimum detection limit

control site (see Habitat Assessment Data Sheets in the Appendix). The control site score (with 62 points out of 145 possible points) placed it in the "marginal" category while the test site score (with 23 points) was rated as "poor". Differences between the sites were due to increased artificial channelization, habitat smothering, and bank instability at the test site as well as an inadequate riparian buffer zone.

The remaining chemical and biological results for this report are presented in Table 1 and Table 2.

Discussion

Physical/chemical measurements were, in some cases, not comparable at the control and test sites (Table 1). For example, dissolved oxygen at the control site (2.0 mg/L on 11/2/98 and 0.4 mg/L on 12/2/98) was below the Class II water quality standard and well above this level at the test site (6.7 mg/L). The salinity at the test site (0.6 ppt on 11/3/98 and 12/2/98) was significantly lower than at the West Bay-influenced control site (12.3 ppt on 11/3/98 and 13.6 ppt on 12/2/98).

No pesticides, base neutral or acid extractables were detected in the effluent. Copper was detected in the effluent at a level that equaled the facility's permit limit (Table 1). The facility has been under a "report only" status for total recoverable copper since October 31, 1997. Lead was detected at a level below the practical quantitation limit. All other metals complied with the facility's permit and Class II water quality standards. The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to

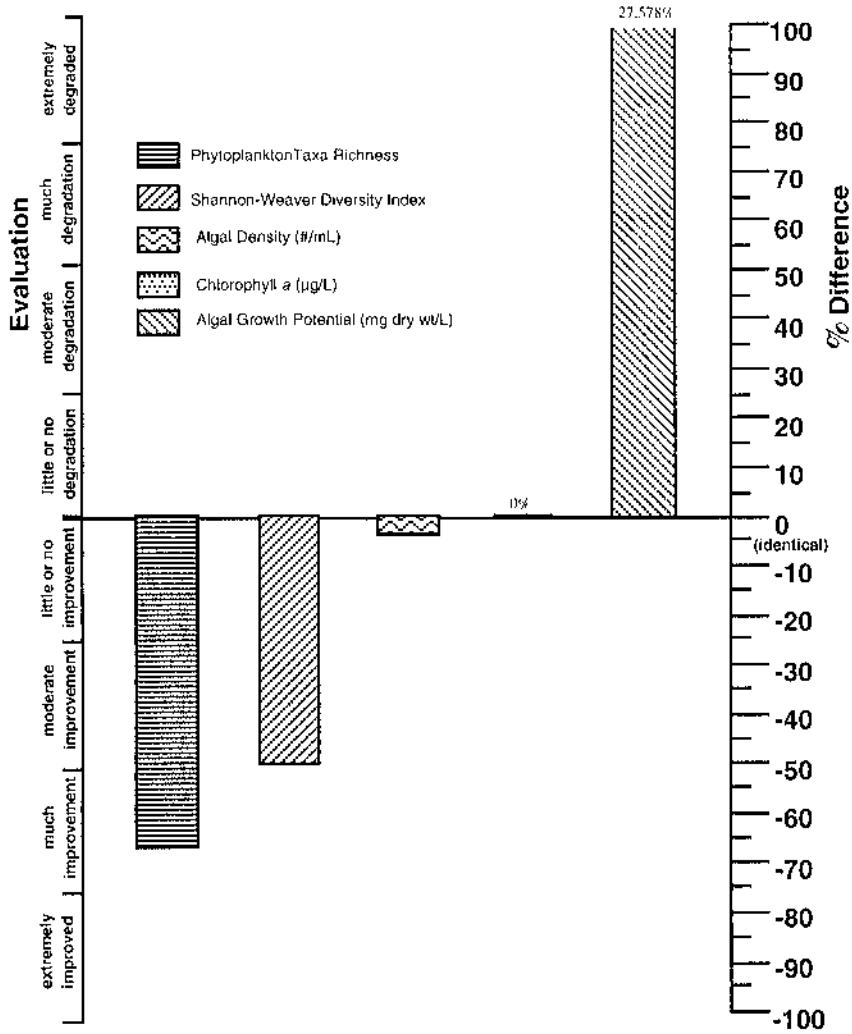


Figure 1. Effect of discharge on the phytoplankton community.

the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay.

Effluent total and fecal coliform counts were outside the acceptable dilution range (Table 1). Test site total coliforms (3,700 counts/100ml) exceeded the Class II water quality standard (Rule 62-302.530 (6) FAC) and the test site fecal coliforms were also outside the acceptable dilution range (Table 1).

Extremely high nutrient levels in the effluent contributed to the elevated levels of nutrients at the test site (Table 1). For example, ortho-phosphate, total phosphorus, and nitrate+nitrite at the test site were significantly higher than those levels found in over 95% of other Florida streams (see *Typical Values of Selected Parameters in Florida Waters* in the Appendix). Due to the input of nutrients from the effluent, the test site AGP greatly exceeded the 5 mg dry wt/L "problem threshold" for freshwater systems (Raschke and Schultz 1987). The AGP at the control site was much lower than the threshold (Table 1). Considering the elevated nutrients in the effluent, the effluent AGP value (0.2 mg dry wt/L) may indicate algal growth inhibition.

Figure 1 represents changes in the phytoplankton community. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Because of the extreme differences in salinity between the control and test sites, the phytoplankton algal communities were radically different. For example, Cryptophyceae made up almost 71% of the control site community while none were found at the test site (Table 2). Diatoms made up 90% of the test site community and only 14% of the control site community. Phytoplankton taxa richness was 67% higher and the Shannon-Weaver diversity was 50% higher at the test site compared to the control site (Table 2). Chlorophyll *a* was undetected at both study sites.

Figure 2 represents changes in the macroinvertebrate community. Larger differences (higher percentages) correspond with greater degrees of degradation. The differences in habitat quality and salinity regimes between the study sites are most likely responsible for any differences in community structure. In the Ponar samples, the macroinvertebrate communities at both study sites were poor, with few overall taxa and no pollution-sensitive organisms (see Macroinvertebrate Taxa Lists in the Appendix).

Qualitative sampling showed little difference in taxa richness, the EPT score, or percent dominant taxa between the control and test sites. There were however major differences in the community composition between the control and test sites (Table 2). For example, groups such as Mysidacea made up 13.0% of the control site community but were not found at the test site. *Hobsonia florida*, an estuarine polychaete, made up 14.5% of the control site but was not found at the

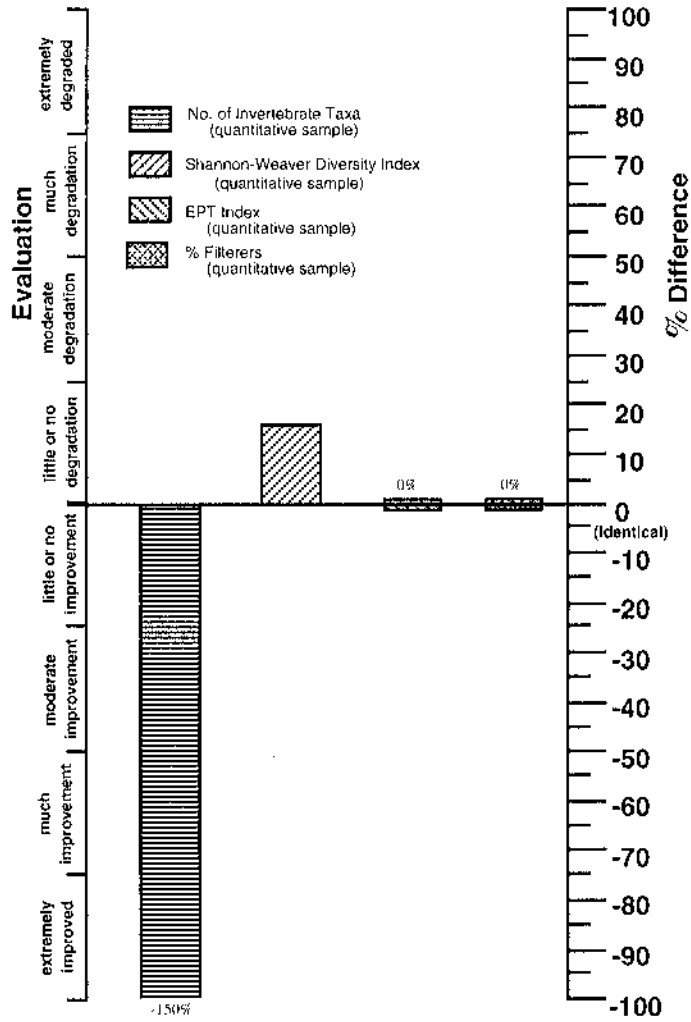


Figure 2. Effect of discharge on the benthic community.

at both sites as would be expected in a non-flowing, wetland system (Table 2). The physical and chemical differences between the sampling sites were at least partly responsible for the differences in the phytoplankton and macroinvertebrate communities.

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Typical Values for Selected Parameters in Florida Waters

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

Parameter	Percentile Distribution 5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30

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

Explanation of Measurements of Community Health

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

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

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

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

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. The Florida Index, assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy.

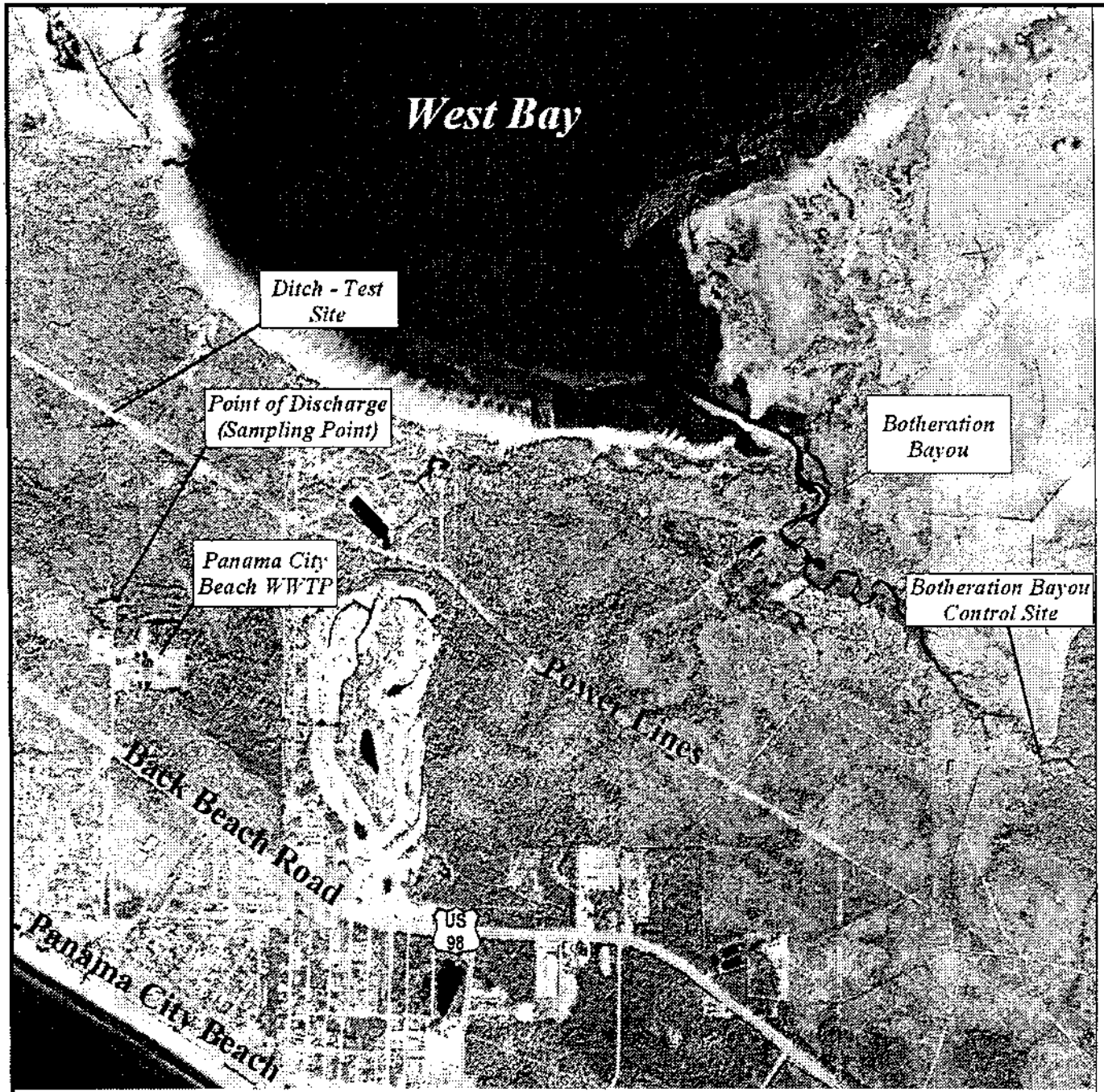
Ephemeroptera/Plecoptera/Trichoptera (EPT) Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

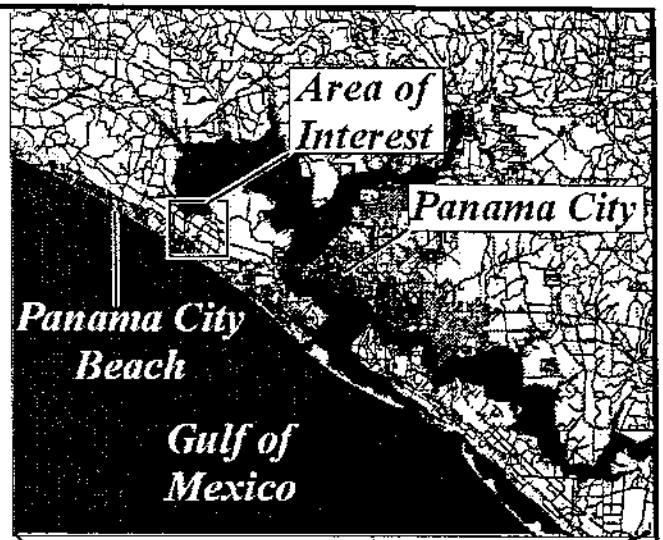
Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation.

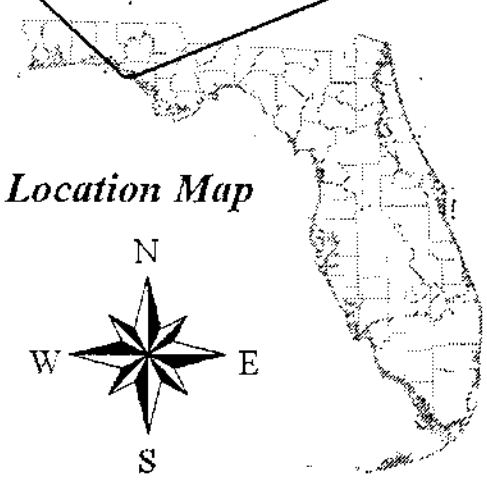
Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.

Functional Feeding Groups: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996) developed for Florida. The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).







Panama City Beach Wastewater Treatment Plant

5th Year Bioassessment Sampling Locations

October 8, 1998, by Eric P. Ericson, (850) 595-8300

Facility Summary

Facility Name: Panama City Beach WWTF Date Summary Prepared: 10/9/98

Location map: County: Bay District: Northwest/10

NPDES Permit # FL0021512-01 State Permit # FI0021512-01 Facility Type: Dom.
expiration date: 1/31/02 expiration date: 1/31/02

State and Federal permit combined under Federal permit number

Function of facility: To operate a 7.0 MGD WWTF with final effluent discharge to an unnamed ditch to West Bay (Class II) at discharge location D001.

Description of treatment process: The treatment facility will operate in the activated sludge mode. The wastewater treatment facility consists of three extended aeration trains [two 2.5 MGD units and one 2.0 MGD unit]. The treatment facility has provisions for pretreatment, nitrification, reaeration, secondary clarification, filtration, digestion, chlorination, dechlorination, and sludge handling, The treatment facility is equipped with an 8.66 mg emergency holding pond.

Receiving waters: unnamed ditch to West Bay at
Classification II
Discharge Location D001.

Design Flow: 7.0 MGD Mean Flow: 4.172 MGD Flow during survey: 5.195 MGD

Discharge is: Continuous Best time to sample is: N/A

If facility has a mixing zone, give details (size, parameters, etc.) N/A

List effluent limits (attach relevant paperwork):

Federal/State Effluent Limits for Discharge Point D001

Parameter	Frequency	Sample Type	Limit (units)
Oxygen, Dissolved	5/week	24 Hr. Composite	6.0 mg/L(daily min.)

pH	Continuous	Recorder	6.0 (min) to 7.3 (max)
TSS	5/week	24 Hr. Composite	40.0 mg/L (daily max)
			24.0 mg/l (wkly avg.)
			20.0 mg/L (mo. avg.)
			20.0 mg/L (ann. avg.)
Nitrogen, Organic, Total as N	5/week	24 Hr. Composite	3.0 mg/L (daily max.)
			3.0 mg/L (wkly avg.)
			3.0 mg/L (mo. avg.)
NO2+NO3, Total as N	Monthly	24 Hr. Composite	Report mg/L (daily max.)
			Report mg/L (wkly. avg.)
			Report mg/L (mo. avg.)
			Report mg/L (ann. avg.)
Nitrogen, Ammonia, Total as NH4	5/week	24 Hr. Composite	2.0 mg/L (daily max)
Flow	Continuous	Flow Meter	7.0 MGD (mo. avg)
Total Residual Chlorine (for Dechlorination)	1/week	Grab	0.01 mg/L (daily max.)
Total Residual Chlorine (for Disinfection)	Continuous	Recorder	1.0 mg/L (daily min.)
Coliform, Fecal	5/week	Grab	14/100 ml (mo. median)
			86/100 ml (max)
			14/100 ml (annl avg.)

BOD, Carbonaceous	5/week	24 Hr. Composite	20.0 mg/L (daily max.)
5-day			12.0 mg/L (wkly. avg.)
			10.0 mg/L (mo. avg.)
			10.0 mg/L (ann. avg.)
Phosphorus, Total as P	Monthly	24 Hr. Composite	Report mg/L (daily max.)
			Report mg/L (wkly avg.)
			Report mg/L (mo. avg.)
			Report mg/L (ann. avg.)
7-day Chronic Static % effluent (daily min) Renewal Daphnia (Ceriodaphnia dubia)		Semi-Annual 24 Hr. Composite	100
7-day Chronic Static (daily min) Renewal Fathead Minnow (Pimephales promelas)	Semi-Annual	24 Hr. Composite	100 % effluent
Lead, Total Recoverable max)	Monthly	24 Hr. Composite	5.6 ug/L (daily
Copper, Total Recoverable max)	Monthly	24 Hr. Composite	2.9 ug/L (daily
Un-ionized Ammonia mg/L (daily max)		5/week Calculated	0.02
Temperature range)	5/week	Grab	Report deg C (daily

Effluent Limits for Additional Monitoring Location Sites
SWD-24166, SWD-24167, SWD-24168, SWD-24169, SWD-24170, SWD-24171

Parameter	Frequency	Sample Type	Limit (units)
Dissolved Oxygen (field)	1/week	Grab	Report mg/L (daily range)
Specific Conductivity (field)	1/week	Grab	Report umhos/cm (daily range)

pH (field) units (daily range)	1/week	Grab	Report std.
Carbonaceous Biochemical Oxygen Demand (5 day)	1/month	Grab	Report mg/L (daily range)
TKN	1/month	Grab	Report mg/L (daily range)
Total Ammonia	1/month	Grab	Report mg/L (daily range)
NO2/NO3	1/month	Grab	Report mg/L (daily range)
Total Phosphorus	1/month	Grab	Report mg/L (daily range)
Orthophosphorous	1/month	Grab	Report mg/L (daily range)
Chlorophyll A	1/month	Grab	Report mg/L (daily range)

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

Renewal Total Recoverable Cu (limit of 2.9 ug/L daily max) *		7-Day Chronic Static Daphnia (Ceriodaphnia dubia) (limit of 100 % effluent daily min)
5.4 ug/L May 1997	6.2 ug/L Jan. 5, 1998	<100 Oct. 1997
11.0 ug/L June 1997	8.3 ug/L Jan. 20, 1998	
3.3 ug/L July 1997	3.5 ug/L Feb. 4, 1998	Nitrogen, Ammonia, Total as NH4 ** ~~NH_3~~
3.7 ug/L Aug. 1997	7.2 ug/L Feb. 22, 1998	(limit of 2.0 mg/L daily max)
4.9 ug/L Sept. 1997	4.0 ug/L March 4, 1998	
3.4 ug/L Oct. 1997	8.1 ug/L March 23, 1998	2.02 mg/L Jan. 18, 1998
4.7 ug/L Nov. 1997	3.7 ug/L July 1, 1998	3.00 mg/L Jan. 19, 1998
3.8 ug/L Dec. 1997	3.1 ug/L July 20, 1998	3.05 mg/L Jan. 20, 1998
		2.20 mg/L Jan. 21, 1998

* The facility has been under a "report only" status for total recoverable copper since October 1, 1997. The facility required to be in complete compliance with EPA permit FL0021512 no later than October 31, 1999.

** The operator is unsure of the cause of the elevated ~~NH4~~ but an unknown amount of fuel and A.F.F.F. (Aqueous Film Forming Foam) was discharged into the system from the local Navy Base, which recently came on line with the facility.

***June 1998 unavailable for review

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

The facility's most recent permit issued in 9/26/97 revised the whole effluent toxicity testing requirement from acute testing every 2 months to chronic testing biannually. For the period 2/97 through 4/98, routine testing was performed in 2/97, 4/97, 6/97, 8/97, 10/97 and 4/98. Only the 10/97 routine test failed with an NOEC of 25% for Ceriodaphnia dubia. The resulting 3 additional CD tests passed, all with an NOEC>100%.

Discuss comparability of MOR results to past FDEP results and whether there are trends (improving, declining) in the data set: No definite trends can be identified within the data set.

Additional information:

Staff contributing to this review (signature)

Glenn Butts

Biologist

Inspector

Engineer

Kenny Ferguson

Other

Effluent

Module No. 1506

Sample No. 1 [illegible]79

State of Florida
Department of Environmental Protection
Laboratory Submittal Form

Sample Grab Time: 1005
Composite Sample Begin Time:
Compostie Sample End Time :

Submitting Agency/Code: 8010

Storet Station/GMS/Field Indent: 1003M02216

Collection Date (m/d/y): 11-02-98

County of Sample Origin: BAY

Sample Location: PANAMA CITY BEACH WWTP

NPDES ID: FL0021512

Water		Soils/Sediment		Tissue		Chemical
X Effluent	___ Trip Blank	___ Terrestrial	___ Fish		(Circle)	
___ Surface Fresh	___ Field Blank	___ Freshwater Sed	___ Shellfish		Reactive	
___ Surface Salt	___ Equipment	___ Marine Sed	___ Other			
___ Ground Water	Blank	___ Sludge			Flammable	
___ Stormwater	___ Duplicate					

Field Parameters Measured By-
Name: Glenn Butts
Signature:

Material Sampled By-
Name:
Signature:

Field Report Prepared By
Signature:

Field Parameters	Units	Code	Value
Total Residual Chlorine	mg/l	50060	
DO (Probe)	mg/l	299	7.92
PH Field	S.U.	400	6.73
Salinity	PPT	480	
Conductivity Field	umhos/cm	94	1013
Sample Depth	Feet	460	1.0
Water Temp	oC	10	25.04

X	Parameter	Units	Code	Value	X	Parameter	Units	Code	Value
X	BOD, 5-day	mg/l	310	2.5A		Chlorophyll (b)	ug/l	32212	
	CBOD, 5-day	mg/l	80082			Chlorophyll (c)	ug/l	32214	
X	NFLT Residue	mg/l	530	54	X	Hardness	mg/l	900	
	DO (Winkler)	mg/l	300			Alkalinity	mg/l	410	
	pH Lab	S.U.	403			Oil and Grease	mg/l	556	
X	Turbidity	NTU	82079	0.4		N-NH3	mg/l	610	
X	Color	Pt-Co	80	5		N-NO2-NO3	mg/l	630	
	Conductivity Lab	umohs/cm	95			Un-ion NH3	mg/l	619	
X	Total Coliform (MF)	#/100ml	31501	16B		N-TKN	mg/l	625	
X	Fecal Coliform (MF)	#/100ml	31616	4B		PO4 Total	mg/l	665	
	Chlorophyll (A) (non-corrected)	ug/l	32211			Chloride	mg/l	940	
	Chlorophyll (A) (corrected)	ug/l	32210			Sulfate	mg/l	945	

Remarks:

Sampled by: Glenn Butts Date: 11-02-98

Received by: [signature] Date: 11/2/98

Reviewed by: [signature] Date: 11/20/98

Test site

Module No. 1506 901810

Sample No. 2

State of Florida

Department of Environmental Protection

Laboratory Submittal Form

Sample Grab Time: 1140

Composite Sample Begin Time:

Compostie Sample End Time :

Submitting Agency/Code: 8010

Storet Station/GMS/Field Indent: 32.03.0064

Collection Date (m/d/y): 11-03-98

County of Sample Origin: BAY

Sample Location: PC Beach ditch at powerlines road

NPDES ID:

Water	Soils/Sediment	Tissue	Chemical
___ Effluent	___ Trip Blank	___ Terrestrial	___ Fish	(Circle)
X Surface Fresh	___ Field Blank	___ Freshwater Sed	___ Shellfish	Reactive
___ Surface Salt	___ Equipment	___ Marine Sed	___ Other	
___ Ground Water	Blank	___ Sludge		Flammable
___ Stormwater	___ Duplicate			

Field Parameters Measured By-

Name: Glenn Butts

Signature:

Material Sampled By-

Name:

Signature:

Field Report Prepared By

Signature:

Field Parameters	Units	Code	Value
Total Residual Chlorine	mg/l	50060	
DO (Probe)	mg/l	299	6.7
PH Field	S.U.	400	6.8
Salinity	PPT	480	
Conductivity Field	umhos/cm	94	1033
Sample Depth	Feet	460	
Water Temp 28.8	oC	10	28.8

X	Parameter	Units	Code	Value	X	Parameter	Units	Code	Value
X	BOD, 5-day	mg/l	310	1.7 A	✓	Chlorophyll (b)	ug/l	32212	
	CBOD, 5-day	mg/l	80082			Chlorophyll (c)	ug/l	32214	
X	NFLT Residue	mg/l	530	7	X	Hardness	mg/l	900	
	DO (Winkler)	mg/l	300			Alkalinity	mg/l	410	
	pH Lab	S.U.	403			Oil and Grease	mg/l	556	
X	Turbidity	NTU	82079	4		N-NH3	mg/l	610	
X	Color	Pt-Co	80	25		N-NO2-NO3	mg/l	630	
	Conductivity Lab	umohs/cm	95			Un-ion NH3	mg/l	619	
X	Total Coliform (MF)	#/100ml	31501	3760	✓	N-TKN	mg/l	625	
X	Fecal Coliform (MF)	#/100ml	31616	120 B	✓	PO4 Total	mg/l	665	
	Chlorophyll (A) (non-corrected)	ug/l	32211			Chloride	mg/l	940	
	Chlorophyll (A) (corrected)	ug/l	32210			Sulfate	mg/l	945	

Remarks:

Sampled by: Glenn Butts Date: 11-03-98

Received by: [illegible] Date: 11/3/98

Reviewed by: [illegible] Date: 11/20/98

Control Site

Module No. 1506 — 011817

Sample No. 3

State of Florida
Department of Environmental Protection
Laboratory Submittal Form

Sample Grab Time: 1035
Composite Sample Begin Time:
Compostie Sample End Time :

Submitting Agency/Code: 8010
Storet Station/GMS/Field Indent: 32.03.0066
Collection Date (m/d/y): 11-03-98
County of Sample Origin: BAY
Sample Location: BROTHERATION BAYOU AT DIRT ROAD
NPDES ID:

Water		Soils/Sediment	Tissue	Chemical
___ Effluent	___ Trip Blank	___ Terrestrial	___ Fish	(Circle)
X Surface Fresh	___ Field Blank	___ Freshwater Sed	___ Shellfish	Reactive
___ Surface Salt	___ Equipment	___ Marine Sed	___ Other	
___ Ground Water	Blank	___ Sludge		Flammable
___ Stormwater	___ Duplicate			

Field Parameters Measured By-
Name: Glenn Butts
Signature:

Material Sampled By-
Name:
Signature:

Field Report Prepared By
Signature:

Field Parameters	Units	Code	Value
Total Residual Chlorine	mg/l	50060	
DO (Probe)	mg/l	299	1.99
PH Field	S.U.	400	6.38
Salinity	PPT	480	
Conductivity Field	umhos/cm	94	20272
Sample Depth	Feet	460	3.0
Water Temp	oC	10	24.21

X	Parameter	Units	Code	Value	X	Parameter		Code	Value
X	BOD, 5-day	mg/l	310	30A		Chlorophyll (b)	ug/l	32212	
	CBOD, 5-day	mg/l	80082			Chlorophyll (c)	ug/l	32214	
X	NFLT Residue	mg/l	530	24A	X	Hardness	mg/l	900	
	DO (Winkler)	mg/l	300			Alkalinity	mg/l	410	
	pH Lab	S.U.	403			Oil and Grease	mg/l	556	
X	Turbidity	NTU	82079	3		N-NH3	mg/l	610	
X	Color	Pt-Co	80	90		N-NO2-NO3	mg/l	630	
	Conductivity Lab	umohs/cm	95			Un-ion NH3	mg/l	619	
X	Total Coliform (MF)	#/100ml	31501	740		N-TKN	mg/l	625	
X	Fecal Coliform (MF)	#/100ml	31616	620		PO4 Total	mg/l	665	
	Chlorophyll (A) (non-corrected)	ug/l	32211			Chloride	mg/l	940	
	Chlorophyll (A) (corrected)	ug/l	32210			Sulfate	mg/l	945	

Remarks:

Sampled by: Glenn Butts Date: 11-03-98

Received by: [illegible] Date: 11/3/98 Reviewed by: [illegible] Date: 11/10/98

POWAR DATA SHEET

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8070 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 32.03.0064	DATE (M/D/Y): 11/02/98	TIME	RECEIVING BODY OF WATER: WEST BAY

REMARKS:	LOCATION: PC BEACH DITCH AT	FIELD ID/NAME:
TEST SITE	POWERLINES ROAD	# 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
					20	80 Silvicult

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

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

Point-Source Pollution (list location and describe): WWTP Effluent, Siltation

Estimated System Width (range, m): 1.2	Estimated System Depth (range, m): .2	yes
High Water Mark (m above bed):	Velocity (range, m/s): 0.1-0.25	Impounded ☐ Channelized ☒

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 Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☒ Shell: ☐ Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Riffles			
Leaf Packs				Sand	97		POWAR
Aquatic Vegetation				Mud/Muck/Silt	2		
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other:	1		

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top	0.2	28.8	6.8	6.7	1033			>0.5
Mid-depth								
Bottom								

System Type : Stream: ☒ (Sand Bottomed / Sand Bot w/ Spring / Swamp & Bog / Calcareous / Alluvial / Misc.) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

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

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

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

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

Weather Conditions: Clear

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS, L. DONEGAN, S. KELLY	Glenn Butts	

MI-FW-QLDC

LAB ID 359090

SCI SWEEP DATA SHEET

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

MG 12/4/98

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	32.03.0064	12-02-98	1130	PC Beach Ditch

REMARKS:	COUNTY:	LOCATION:	FIELD NAME:
SCI SWEEPS TEST SITE	BAY	AT Powerlines Road	#2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify)
	99						1 Dump

Local Watershed Erosion: None: ☐ Slight: ☐ Moderate: ☐ Heavy: ☐

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☐ Moderate potential: ☐ Obvious sources: ☐

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

List & map dominant vegetation: Pine trees, Forbs, Grass on back

Typical Width (m)/Depth (m)/Velocity (m/sec) Transect: 2.5 m wide

Artificially Channelized ☐ NO / Artificially Impounded ☑ YES: none Ditched

.1 m/s	.2 m/s	.3 m/s
.2 m deep	.4 m deep	.3 m deep

High Water Mark: .4 + .3 = .7
(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: ☐ H_2S Other: ☐

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

Sediment Deposition: Sludge: ☐ Sand smothering: none Silt smothering: none Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags) ✓	1	1	D Net	Sand ✓	94		Dip Net
Leaf Packs or Mats				Mud/Muck/Silt ✓	2		
Aquatic Vegetation ✓	2	1		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots ✓	1	1		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):	Time		Secchi (m):
Top								
Mid-depth	0.4	22.37	6.50	6.71	1125		—	>0.4
Bottom								

System Type: Stream: ☑ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☐ Sewage: ☑ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☐ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☑

Color: Tannic: ☐ Green (algae): ☐ Clear: ☑ Other: ☐

Weather Conditions/Notes: Clear, Periphyton rock recovered

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

Sampling Team: BUTTS, DONELAN, FERGUSON

Signature: Glenn Butts

Date:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 32.03.0064	DATE (M/D/Y):	RECEIVING BODY OF WATER: WEST BAY

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
TEST SITE	BAY	PC BEACH DITCH AT POWERLINES ROAD	# 2

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability **7**	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity **11**	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Artificial Channelization **1**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Habitat Smothering **1**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **1**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **1**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **1**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

23 TOTAL SCORE

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
11-03-98	G. BUTTS, L. DONELAN	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Ponar

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8070 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 32.03.0066	DATE (M/D/Y): 11/3/98	TIME:	RECEIVING BODY OF WATER: WEST BAY

REMARKS:	LOCATION: BROTHERATION BAYOU AT DIRT ROAD	FIELD ID/NAME: # 3
CONTROL SITE		

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						100 Silviculture

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

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

Point-Source Pollution (list location and describe): DIRT ROAD RUNOFF, SILVICULTURE

Estimated System Width (range, m): 4.5	Estimated System Depth (range, m): .2-1.0	yes
High Water Mark (m above bed): 1.2	Velocity (range, m/s): .01-.1	Impounded ☐ Channelized ☐

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 Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☒ Shell: ☐ Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Riffles			
Leaf Packs				Sand	97		
Aquatic Vegetation				Mud/Muck/Silt	1		
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots	2			Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top	0.5	24.21	6.38	1.99	20272			0.3
Mid-depth								
Bottom								

System Type : Stream: ☐ (Sand Bottomed, Sand Bot w/ Spring, Swamp & Bog, Calcareous, Alluvial, Misc) Lake: ☐ Wetland: ☐ Estuary: ☑ Other: ☐

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

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

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

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

Weather Conditions: clear

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS, L. DONELAN, S. KELLY	Glenn Butts	

M1-FW-QLDC

LAB ID 359091

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

MW 12/4/98

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 32.03,0066	DATE: 12-02-98	TIME: 1005	RECEIVING BODY OF WATER: BROTHERATION BAYOU

REMARKS: SCI SWEEPS CONTROL SITE	COUNTY: BAY	LOCATION: AT DIRT ROAD	FIELD NAME: # 3

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify)
	99						Marsh 1

Local Watershed Erosion: None: ☐ Slight: ☑ Moderate: ☐ Heavy: ☐

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☑ Moderate potential: ☐ Obvious sources: ☐

Width of riparian vegetation (m) on least buffered side: 12

List & map dominant vegetation: Pine trees on back Salt Marsh

Artificially Channelized ☒ NO ☐ YES — none

Artificially Impounded

High Water Mark: .7 + .6 = 1.3 (m above present water level) (present depth in m) (m above bed)

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

6 m wide

Tidal Influence

0 m/s, .4 m deep | @ m/s, .7 m deep | 0 m/s, 1.2 m deep

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

SEDIMENT SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☑ H_2S Other: ☐

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

Sediment Deposition: Sludge: ☐ Sand smothering: none Silt smothering: none Other: ☐

Salt Marsh - Juncus roemarinus, Spartina sp.

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	20		
Leaf Packs or Mats				Mud/Muck/Silt	78		
Aquatic Vegetation	1			Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	1			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):	Time		Secchi (m)
Top								
Mid-depth	0.6	20.38	6.06	0.39	22213	1005	—	0.3
Bottom								

System Type: Stream: ☐ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☑ Other: ☐

Water Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☐ Sheen: ☐ Globs: ☐ Slick: ☑ Rolling

Clarity: Clear: ☐ Slightly Turbid: ☑ Turbid: ☐ Opaque: ☐

Color: Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes: Periphyton rock recovered, but found on bank, dry.

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

Sampling Team: BUTTS, DONELAN, FERGUSON

Signature: Glenn Butts

Date:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 32.03.0066	DATE (M/D/Y):	RECEIVING BODY OF WATER: WEST BAY

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
CONTROL SITE	BAY	BROTHERATION BAYOU AT DIRT ROAD	# 3

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability **5**	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity **3**	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Artificial Channelization **14**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Habitat Smothering **7**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **14**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **4**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **10**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

5 Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

62 TOTAL SCORE

Comments: Juncus marsh

ANALYSIS DATE:	ANALYST:	SIGNATURE
11-03-98	G. BUTTS, LDONELAN	Glenn Butts

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Panama City Beach WWTP
County: Bay
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0021512
LIMS Sample #: 354565 LIMS Job #: TLH-1998-11-03-51
sample log 11/5/98 dw
Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 11/2/98 Time 10:05
Test Beginning: Date 11/3/98 Time 14:20
Test Ending: Date 11/15/98 Time 13:45
Organism Batch #: 84 Diluent Batch #: well H2O
Organism Age: 12 Dmp SRT toxicant batch #: NA
Test organism: Cyprinella leedsi

Remarks: Room Temperature Range 23.5°c - 25.0°c
Incubator #3 Temperature Range 23.8°c-25.5°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	Cond. 24 h	Cond. 48 h
CTL A	G9	5	5	5	7.8	8.3	8.3	24.4	24.4	24.8	7.6	7.6	8.0	240	245	260
CTL B	G10	5	5	5	7.8	8.3	8.3	24.4	24.3	24.0	7.6	7.0	8.0	245	250	255
CTL C	G11	5	5	5	7.8	8.3	8.3	24.2	24.1	24.6	7.5	7.6	8.0	245	250	260
CTL D	G12	5	5	5	7.8	8.3	8.3	23.9	24.1	24.3	7.6	7.8	8.0	240	250	255
100% A	G13	5	5	5	6.9	7.6	7.5	24.4	24.0	24.2	7.6	7.0	7.9	970	950	1040
100% B	G14	5	5	5	6.9	7.5	7.5	24.3	24.1	24.2	7.6	7.4	8.1	980	995	1045
100% C	G15	5	5	5	6.8	7.5	7.5	24.3	24.1	24.4	7.7	7.3	8.2	995	990	1045
100% D	G16	5	5	5	6.9	7.5	7.5	24.2	24.1	24.1	7.8	7.5	8.1	995	990	1050
measured by:		DW	CH	FW	DW	CH	MF	DW	CH	MF	DW	CH	MF	DW	CH	MF
recorded by:		DW	CH	FW	CH	CH	FW	CH	CH	FW	CH	CH	FW	CH	CH	FW

Investigators' Signatures

Cynthia Heard
Marshall Brown
David A. Webb
Frank Nordt
DW
reviewer

form updated 5/22/98

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NOT MEASURED	—	—	—
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-700	CH	FW
Alkalinity (mg/L as $CaCO_3$):	130		42	Hach	CH	FW
Hardness (mg/L as $CaCO_3$):	125		155	Hach	CH	FW
Total ammonia (mg/L as N):	<0.017		<0.017	ORion	FW	FW
Salinity:	0		0	YSI	FW	FW

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Panama City Beach WWTP
County: Bay
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0021512
LIMS Sample #: 354565 LIMS Job #: TLH-1998-11-03-51
sample log 11/5/98 dw
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Sample Collection: Date 11/2/98 Time 10:05
Test Beginning: Date 11/3/98 Time 1510
Test Ending: Date 11/5/98 Time 13:45
Organism Batch #: 48 Diluent Batch #: 53
Organism Age: <24hours SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

Remarks: Room Temperature Range 23.5°C - 25.0°C
Incubator #2 Temperature Range - 23.5°C - 24.5°C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CTL A		5	5	5	8.2		8.2	24.1		23.8	7.4		8.2	170		195
CTL B		5	5	5			8.2			23.7			8.2			200
CTL C		5	5	5			8.2			23.8			8.2			195
CTL D		5	5	5			8.2			23.8			8.2			205
100% A		5	5	5	7.0		7.8	24.7		23.9	7.1		8.3	955		980
100% B		5	5	5			7.8			23.9			8.3			1055
100% C		5	5	5			7.8			23.9			8.3			1055
100% D		5	5	5			7.8			23.9			8.3			1135
measured by:		MF	DAW	FW	DAW		MF	DAW		MF	DAW		MF	DAW		FW
recorded by:		DAW	FW	FW	CH		MF	CH		MF	CH		MF	CH		FW

Investigators' Signatures

	Salt Water / Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured	—	—	—
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR 700	CH	FW
Alkalinity (mg/L as $CaCO_3$):		84	42	Hach	CH	FW
Hardness (mg/L as $CaCO_3$):		90	155	Hach	CH	FW
Total ammonia (mg/L as N):		<0.017	<0.017	Orion	FW	FW
Salinity:		0	0	YSI	FW	FW

reviewer form updated 5/22/98

Panama City Beach WWTF
Control

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	17	≥31	30-16	<16	3
EPT Index	1	≥7	6-4	<4	1
# Chironomid Taxa	8	≥9	8-5	<5	3
% Contribution of Dominant Taxon	17	≤22	23-61	>61	5
% Diptera	41	-	≤50	>50	3
Florida Index	4	≥16	15-8	<8	1
% Suspension feeders/Filterers	24	≥12	11-6	<6	5
Total Score		**Panhandle**			**21**
Interpretation of Scores		**Excellent**			27-33
		Good			**21-26**
		Poor			14-20
		Severely Degraded			7-13

Summer Index Period: Stream Condition Index (SCI) for Florida Panhandle (April1996)

Panama City Beach WWTF
Test

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	17	≥31	30-16	<16	3
EPT Index	1	≥7	6-4	<4	1
# Chironomid Taxa	7	≥9	8-5	<5	3
% Contribution of Dominant Taxon	14	≤22	23-61	>61	5
% Diptera	37	-	≤50	>50	3
Florida Index	13	≥16	15-8	<8	3
% Suspension feeders/Filterers	27	≥12	11-6	<6	5
Total Score		**Panhandle**			**23**
Interpretation of Scores		**Excellent**			27-33
		Good			**21-26**
		Poor			14-20
		Severely Degraded			7-13

Summer Index Period: Stream Condition Index (SCI) for Florida Panhandle (April1996)

Phytoplankton taxa list and densities (#/mL) for Panama City Beach WWTP, collected via subsurface grabs in Brotherations Bayou (control) and Panama City Beach Ditch (test), November 2 and 3, 1998.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	–	3
Centrales sp.	4	–
Cyclotella sp.	39	6
Gomphonema sp.	–	3
Navicula sp.	–	34
Nitzschia sp.	4	21
Pennales sp.	–	217
Pinnularia sp.	–	9
Chlorophyceae		
Characium sp.	–	6
Chlamydomonas sp.	23	–
Scenedesmus sp.	–	9
Tetraselmis sp.	4	–
Undetermined Chlorophyceae	23	–
Cryptophyceae		
Chroomonas sp.	219	–
Cryptomonas sp.	20	–
Cyanophyceae		
Dactylococcopsis sp.	–	3
Spirulina sp.	–	3
Undetermined Cyanophyceae	–	9

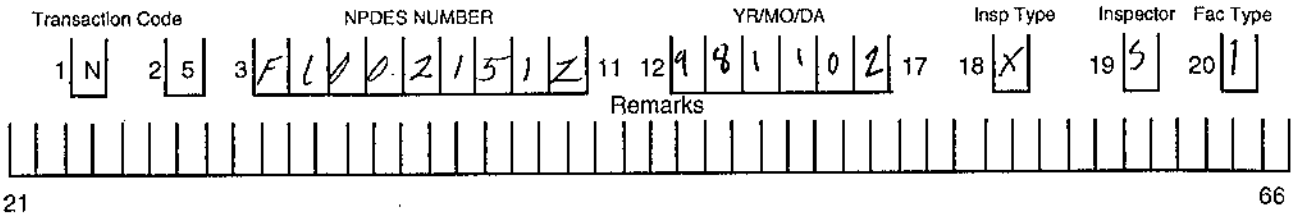
Benthic macroinvertebrate taxa list for Panama City Beach WWTP, collected via Ponar grab samples in Brotherations Bayou (control) and Panama City Beach Ditch (test), on November 2 and 3, 1998.

	Control Site	Test Site
Diptera		
Cricotopus bicinctus	–	42
Pentaneura inconspicua	–	42
Polypedilum scalaenum grp.	–	42
Gastropoda		
Ancylidae	–	42
Oligochaeta		
Limnodrilus hoffmeisteri	125	1125
Polychaeta		
Hobsonia florida	83	–

Benthic macroinvertebrate taxa list for Panama City WWTF, collected via 20 discrete dip net sweeps in Brotherations Bayou (control) and Panama City Beach Ditch (test), on 2, December, 1998.

	Control Site	Test Site
Amphipoda		
Corophium acutum	2	–
Grandidierella bonnieroides	4	–
Decapoda		
Palaemonetes sp.	9	–
Diptera		
Chironomidae	4	2
Cricotopus bicinctus	–	3
Dicrotendipes modestus	21	–
Dicrotendipes neomodestus	1	–
Goeldichironomus sp.	10	–
Labrundinia pilosella	–	2
Pentaneura inconspicua	–	12
Polypedilum illinoense grp.	–	3
Polypedilum sp.	2	–
Polypedilum trigonum	2	–
Polypedilum tritum	7	1
Psectrocladius elatus	3	–
Rheotanytarsus distinctissimus grp.	–	8
Simulium sp.	–	5
Tanytarsus sp.	1	–
Thienemanniella xena	–	*1*
Gastropoda		
Ancylidae	–	5
Planorbidae	–	1
Undetermined Gastropoda	1	1
Mysidacea		
Taphromysis sp.	1	–
Undetermined Mysidacea	15	–
Odonata		
Argia sp.	–	13
Coenagrionidae	3	3
Enallagma cardenium	–	3
Enallagma sp.	–	4
Ischnura sp.	17	4
Oligochaeta		
Enchytraeidae	–	1
Limnodrilus hoffmeisteri	2	14
Naididae	–	1
Polychaeta		
Hobsonia florida	18	–
Tricoptera		
Cheumatopsyche sp.	–	13
Oxyethira sp.	1	–
Undetermined Trichoptera	–	1

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



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

