199



Biological Assessment of

Paradise Point Wastewater Treatment Plant

Putnam County

NPDES #FL0043176

Sampled February 1997

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June 1997

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Paradise Point WWTP
County: Putnam
NPDES Number: FL0043176
State Permit Expiration Date: 11/17/97

Toxics Sampling Inspection (XSI)

Date Sampled: 3 February, 1997

Results: No organic pollutants were found in the effluent. All metals detected in the effluent complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 3 February, 1997

Results: The effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*. Although there was 30% mortality in the *Cyprinella leedsi* screening bioassay, a follow up definitive test would be necessary to determine if the effluent is acutely toxic to the fish.

Impact Bioassessment Inspection (IBI)

Date Sampled: 3 & 11 February, 1997

Results: Qualitative measures of macroinvertebrate community health indicated the discharge was having no adverse effects on the receiving water biota. The Stream Condition Index (SCI) placed the reference site in the "good" category and both test sites in the "excellent" category. Periphyton racks were lost at all sites and phytoplankton communities were not sampled at the reference site, so no conclusions can be drawn regarding the discharge's effects on the algal communities in Dunns Creek. Chlorophyll *a*, which was undetected at both test sites, was 9.9 µg/L at the reference site, a value higher than those found in 70% of other Florida streams. The tide was outgoing when the reference site was sampled, causing water to flow from Crescent Lake, a waterbody with historically elevated chlorophyll *a* values.

Water Quality Inspection (WQI)

Date Sampled: 3 & 11 February, 1997

Results: Although effluent nitrate-nitrite (24 mg/L) was extremely elevated, only slight enrichment of this nutrient was observed at the test sites. Nitrate-nitrite at the test sites (0.17 mg/L at both) was higher than approximately 65% of other Florida streams. Other receiving water nutrients were fairly average for Florida streams. Algal growth potential (AGP) exceeded the 5 mg dry wt./L "problem threshold" at the reference site (9.8 mg dry wt./L), test site 1 (15.0 mg dry wt./L), and test site 2 (15.4 mg dry wt./L). The effluent AGP was 191.4 mg dry wt./L.

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 Paradise Point Wastewater Treatment Plant is located in eastern Putnam County, Florida (see map in Appendix). This facility, which serves 25 single family homes, has a design flow of 0.005 MGD. Treatment consists of extended aeration, clarification, chlorination for disinfection, and dechlorination. Effluent is discharged into Dunns Creek, a Class III stream which flows from Crescent Lake into the St. Johns River. Flow during this survey (0.002 MGD) is similar to the 1996 average for the facility. Since 1994, effluent flow has decreased from an average of 0.009 MGD.

State permit limits are as follows: five day CBOD and TSS (20 mg/L as an annual average, 30 mg/L as a monthly average, 45 mg/L as a weekly average, and 60 mg/L maximum), unionized ammonia (0.02 mg/L maximum), total residual chlorine (0.5 mg/L minimum for disinfection and 0.01 mg/L maximum at discharge), pH (6.0 SU to 8.5 SU), fecal coliforms (200 organisms/100 mL as a monthly average and 800 organisms/100 mL maximum), and total ammonia (report only).

In the past year, the facility has exceeded its permit limit for unionized ammonia (on three separate occasions), although in general, the facility has reduced ammonia levels over time. Further, the discharge was insufficiently dechlorinated (with total residual chlorine of 0.03 mg/L) from January, 1996, to November, 1996. In October, 1996, an aeration basin overflow was reported.

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Qualitative			
Number of Taxa	26	36	36
Florida Index	9	9	10
SCI	25	27	27
EPT Index	1	4	4
% Contribution of Dominant Taxon	37.3	28.6	24.7
% Oligochaeta	7.3	11.4	12.9
% Diptera	28.2	32.2	23.9
% Ephemeroptera	2.7	2.4	2.5
% Trichoptera	0	2.1	3.0
% Amphipoda	54.6	35.7	47.8
% Isopoda	2.7	10.7	1.5
% Gastropoda	0.9	2.1	2.5
% Other	3.6	2.9	5.0
% Predators	4.7	9.3	11.6
% Above Surface Deposit Feeders	37.8	23.2	26.0
% Below Surface Deposit Feeders	5.5	10.0	12.4
% Suspension Feeders	4.2	5.4	6.5
% Scrapers	3.2	3.2	1.7
% Shredders	21.9	17.9	16.0
% Scavengers	10.9	15.0	12.4
% Browser-grazer	10.0	14.6	12.4
% Unknown feeding group	1.8	1.4	1.0
Phytoplankton Algae			
Number of Taxa		31	30
Shannon-Weaver Diversity		3.77	3.79
Algal Density (#/mL)		3,559	2,671
Chlorophyll a (µg/L)	9.94	0.88 U	0.88 U
% Blue-green		23.6	24.0
% Green		20.3	19.7
% Diatoms		49.9	52.0
% Cryptophytes		6.2	4.3
Algal Growth Potential (mg dry wt/l)	9.8	15.0	15.4

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located approximately 2 miles southeast of the discharge in Dunns Creek) and two test sites (bracketing the discharge into Dunns Creek). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was

analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Hester-Dendy multiplate samplers were lost at all sites, as were periphyton samplers. Chlorophyll *a* was determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

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.

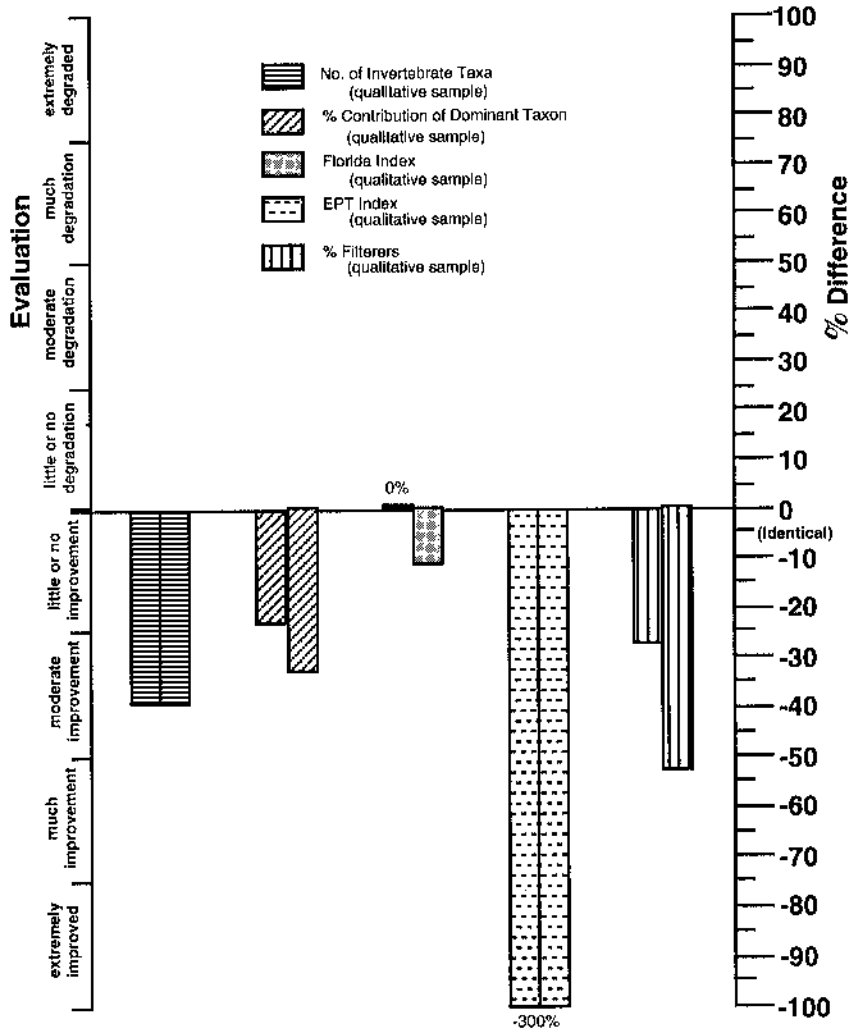
Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

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. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

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

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tub-



Effect of discharge on the benthic macroinvertebrate community.

ificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

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

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

The Stream Condition Index for Florida (SCI) is a composite macroinvertebrate metric (EA Engineering 1994). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SCI calculation table in Appendix).

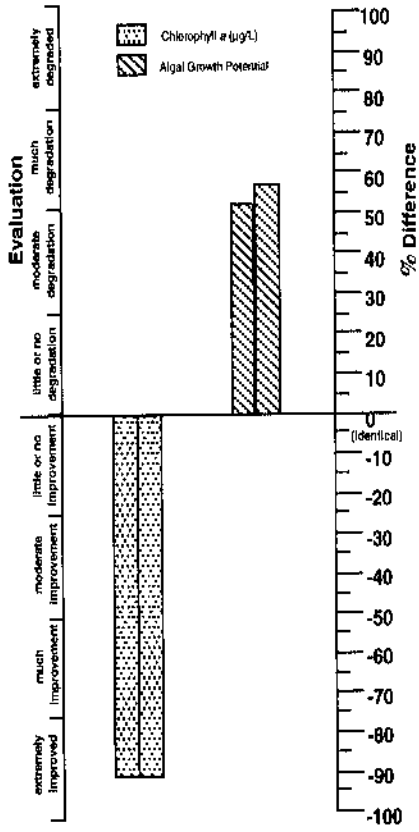
For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Tim McKelvey and Pat O'Connor (DEP NE District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Bart Richard, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Although consisting of predominantly freshwater, Dunns Creek is tidally influenced by the St. Johns River. Habitat assessment scores at the two test sites bracketing the discharge (located approximately 150 feet apart) were identical, with 105 points each. The reference site, with 134 points, scored higher on the habitat assessment, mainly because of a wider riparian buffer zone and better water velocity. Habitat at all three sites was in the optimal category.

The test sites were sampled on an incoming tide. Since they were located near one another, physical/chemical parameters were identical. Dissolved oxygen at the test sites was 8.9 mg/L, conductivity was 466 µmhos/cm, and pH was 6.5 SU. The reference site was sampled on a different day, and the tide was outgoing. Although parameters such as pH (6.9 SU) and dissolved oxygen (8.7 mg/L) were similar, conductivity at the reference site (913 µmhos/cm) was higher than at the test sites.



Effect of discharge on the algal community.

The effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*. Although there was 30% mortality in the *Cyprinella leedsi* screening bioassay, a follow up definitive test would be necessary to determine if the effluent is acutely toxic to the fish.

No organic pollutants were detected in the effluent. Metals detected in the effluent included aluminum (142 µg/L), arsenic (3 µg/L), copper (11 µg/L), chromium (0.9 µg/L), iron (104 µg/L), and zinc (57 µg/L). At a hardness of 143.6 mg $CaCO_3$/L, all these metals complied with Class III water quality standards.

Although effluent nitrate-nitrite (24 mg/L) was extremely elevated, only slight enrichment of this nutrient was observed at the test sites. Nitrate-nitrite at the test sites (0.17 mg/L at both) was higher than approximately 65% of other Florida streams (see table of Typical Water Quality Values in Appendix). Other receiving water nutrients were fairly average for Florida streams (see Chemistry Summary Table in Appendix).

Algal growth potential (AGP) exceeded the 5 mg dry wt./L "problem threshold" at the reference site (9.8 mg dry wt./L), test site 1 (15.0 mg dry wt./L), and test site 2 (15.4 mg dry wt./L) (Raschke and Schultz 1987). The effluent AGP was 191.4 mg dry wt./L.

Qualitative measures of macroinvertebrate community health indicated the discharge was having no adverse effects on the receiving water biota. The figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference.

The dipnet sample results indicated that several macroinvertebrate parameters actually improved at the test sites, when compared with the reference site. For example, taxa richness increased from 26 taxa at the reference site to 36 at both test sites, and the EPT Index increased from 1 at the reference site to 4 at both test sites. The Florida Index, with 9 points at the reference site, 9 at test site 1, and 10 points at test site 2, was similar at all sites. The Stream Condition Index (SCI) placed the reference site in the "good" category and both test sites in the "excellent" category.

Periphyton racks were lost at all sites and phytoplankton communities were not sampled at the reference site, so no conclusions can be drawn regarding the discharge's effects on the algal communities in Dunns Creek. Note that the water at the test sites, at the time of sampling, was flowing from the St. Johns River. Algal community composition at both test sites appeared to be fairly typical of the algal populations found in the upper St. Johns River, with diatoms most abundant, followed by cyanophytes, chlorophytes, and cryptophytes. Shannon-Weaver diversity (3.8 at both sites) is considered good. Chlorophyll *a*, which was undetected at both test sites, was 9.9 µg/L at the reference site, a value higher than those found in 70% of other Florida streams. The tide was outgoing when the reference site was sampled, causing water to flow from Crescent Lake, a waterbody with historically elevated chlorophyll *a* values (Frydenborg *et al.* 1990).

Conclusions

The effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*. Although there was 30% mortality in the *Cyprinella leedsi* screening bioassay, a follow up definitive test would be necessary to determine if the effluent is acutely toxic to the fish.

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Literature Cited

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

Aquatic Toxicity Information Retrieval Data Base (AQUIRE). 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.

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

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

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

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

Frydenborg, R. B., K. M. Lurding, and L. T. Ross. Biological water quality characteristics of the Crescent Lake Basin, Florida. Fl. Dept. Environ. Reg. Biology Section. 92 p.

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

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

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

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

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

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

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

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

Chemistry summary table for Paradise Point WWTP

	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
None Detected				
Metals (ug/L)				
Aluminum	142 A			
Arsenic	3 I			
Cadmium	2 U			
Copper	11 A			
Chromium	0.9 I			
Iron	104 A			
Lead	2 U			
Mercury	0.10 U			
Nickel	4 U			
Selenium	2 U			
Silver	1 U			
Zinc	57 A			
Nutrients (mg/L)				
Ortho-phosphate	2.8 A	0.005 I	0.037	0.032 A
Total phosphorus	2.8 A	0.067	0.066	0.066
Ammonia	0.010 U	0.028	0.034 A	0.030 A
Nitrate+Nitrite	24	0.072	0.17	0.17 A
TKN	1.1	0.94	1.1	1.0
General Phys-Chem Parameters				
Habitat Assessment		134	105	105
D. O. (mg/L)	7.7	8.7	8.9	8.9
pH (SU)	7.5	6.9	6.5	6.5
Specific Conductance (µmhos/cm)	1167	913	466	466
Temperature (°C)	17.5	26.7	16.0	16.0
Total Suspended Solids (mg/L)	9	13	8	6
Biological Oxygen Demand, 5 day (mg/L)	3	<2	<2	<2
Algal Growth Potential (mg dry wt/L)	191.4	9.8	15.0	15.4
Toxicity				
Bioassay Fish	30% Mortality			
Bioassay Invertebrate	No Mortality			

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

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

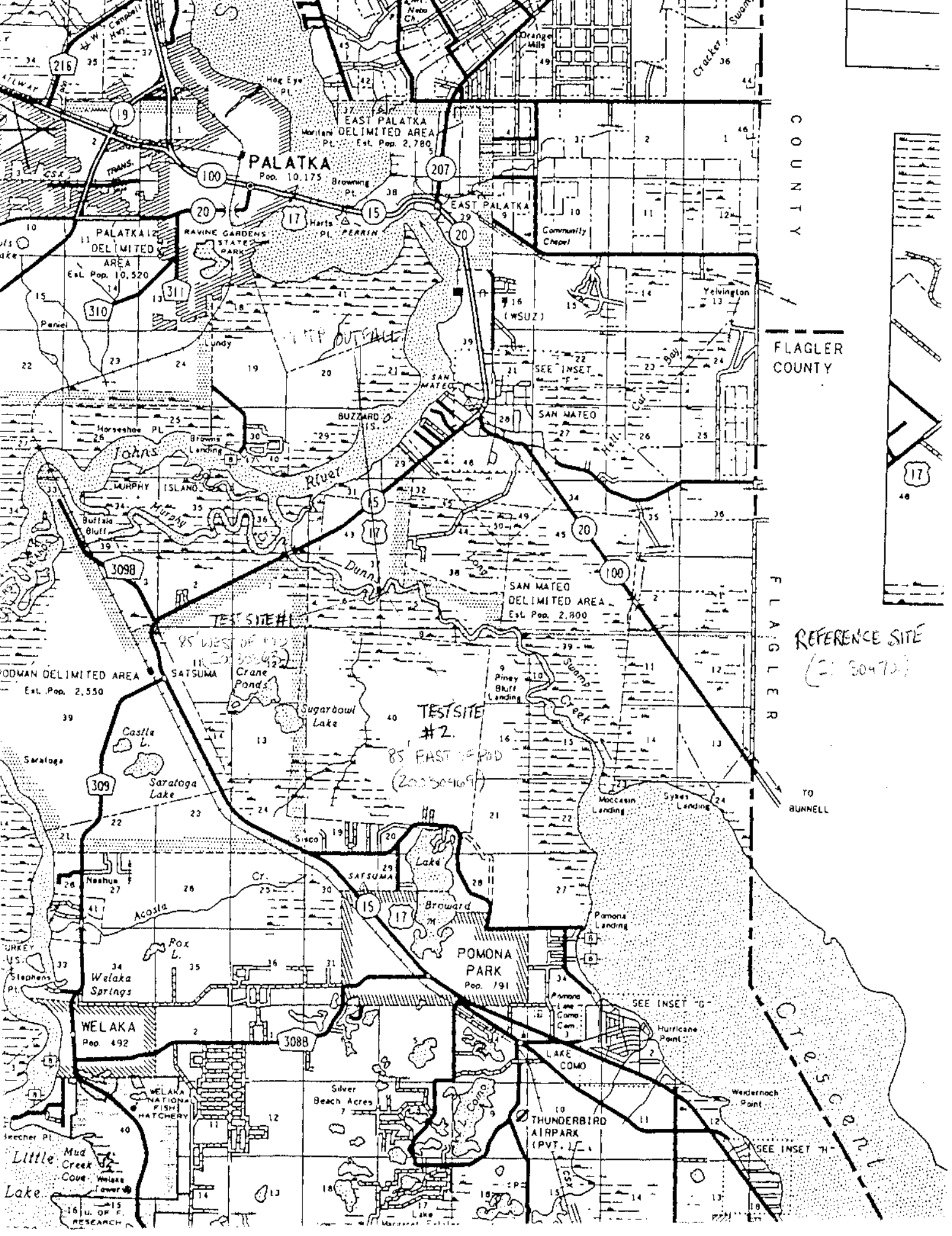
U - Material analyzed for but not detected; value reported is the minimum detection limit

Typical Values for Selected Parameters in Florida Waters

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

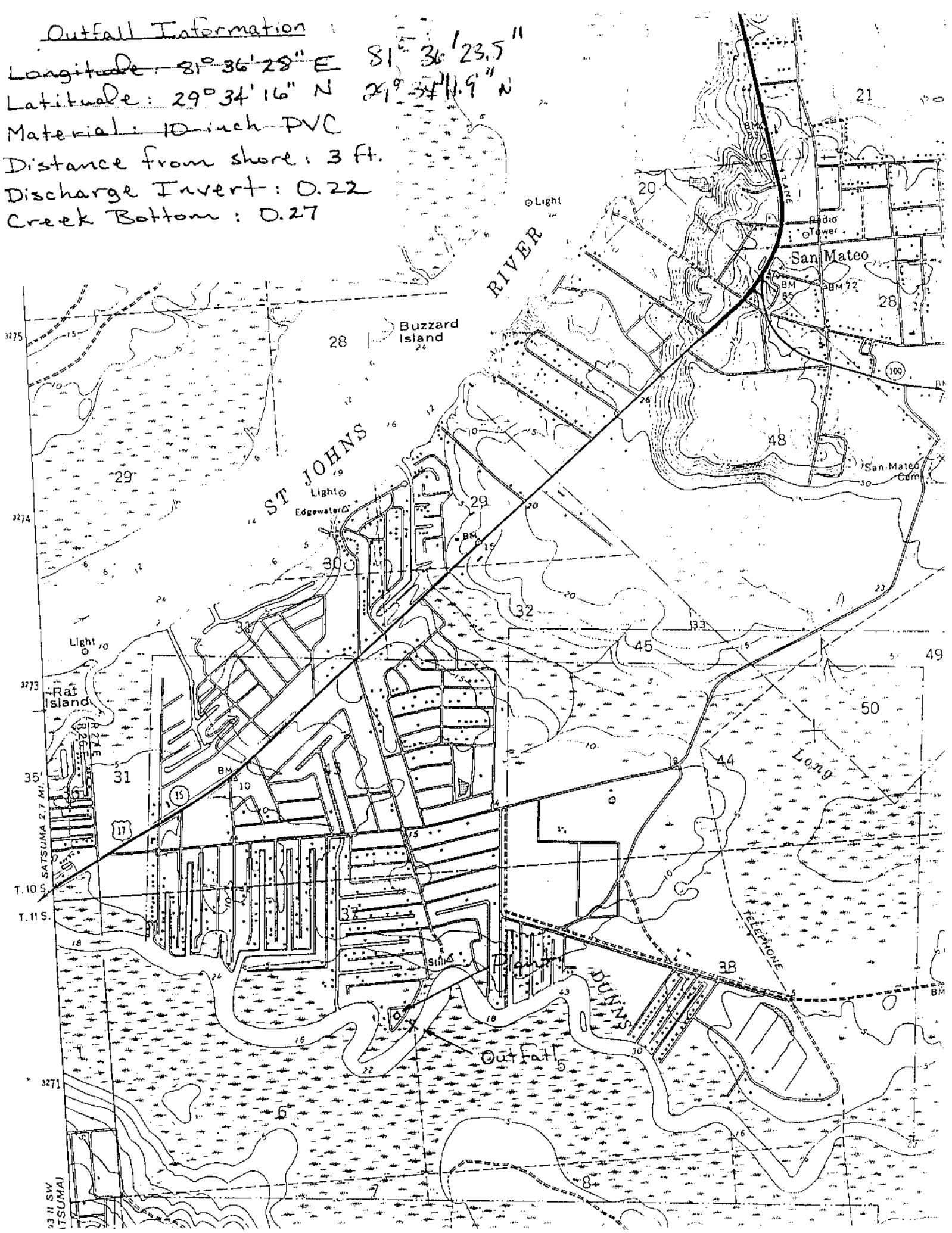
Parameter	Percentile Distribution 5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	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
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphate	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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


PALATKA
Pop. 10,175
EAST PALATKA
DELIMITED AREA
Est. Pop. 2,780
PALATKA 12
DELIMITED
AREA
Est. Pop. 10,520
RAVINE GARDENS
STATE PARK
EAST PALATKA
Community Chapel
Yelvington
(WSUZ)
FLAGLER
COUNTY
SEE INSET "F"
SAN MATEO
SAN MATEO
DELIMITED AREA
Est. Pop. 2,800
BUZZARD I.
Horseshoe Pt.
Browns Landing
Johns
River
MURPHY ISLAND
Murphy
Buffalo Bluff
Dunns
Creek
Hell
Cut
Swamp
TEST SITE #1
85' WEST OF RD
(20030612)
REFERENCE SITE
(20030712)
FODMAN DELIMITED AREA
Est. Pop. 2,550
SATSUMA
Crane Ponds
Sugarbowl Lake
TEST SITE
#2.
85' EAST OF RD
(20030619)
Piney Bluff Landing
Swamp
Creek
Castle L.
Saratoga
Saratoga Lake
Moccasin Landing
Sykes Landing
TO BUNNELL
Sisco
Lake
SATSUMA
Nashua
Cr.
Acosta
Broward
Pomona Landing
Fox L.
POMONA
PARK
Pop. 791
Welaka Springs
SEE INSET "G"
Pomona Lake Camp Com.
Hurricane Point
WELAKA
Pop. 492
LAKE COMO
Silver Beach Acres
Camp
Wederneck Point
WELAKA NATIONAL FISH HATCHERY
TO THUNDERBIRD AIRPARK (PVT.)
SEE INSET "H"
Little Lake
Mud Creek Cove
Welaka Tower
U. OF F. RESEARCH
Ocklawaha Canal
CSX
TRANS.
Hog Eye Pl.
Orange Mills
Cracker Swamp
Harts Pt.
PERRIN
Lundy
Daniel
Campbell Hwy.
Nebo Ch.
Stephens Pt.
Beecher Pt.
216
19
100
20
17
15
207
310
311
309
3098
3088

Outfall Information

~~Longitude: 81° 36' 28" E~~ 81° 36' 23.5"
~~Latitude: 29° 34' 16" N~~ 29° 34' 11.9" N
~~Material: 10-inch PVC~~
Distance from shore: 3 ft.
Discharge Invert: 0.22
Creek Bottom: 0.27



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: PARADISE POINT WWTP		Date Summary Prepared: 2/3/97
Location (attach detailed map): PARADISE POINT CIRCLE EAST PALATKA	County: PUTNAM	District: NORTHEAST - JACKSONVILLE
Federal Permit # FL0043176 and expiration date: 9/30/99	State GMS # and 3154P03272 State expiration date: 11/17/97 (D054-216103)	Facility Type: Industrial (Municipal) Federal Agricultural Other (list): COUNTY OWNED

Function of facility:

Description of treatment process:
A 0.005 MGD EXTENDED AERATION WASTEWATER TREATMENT FACILITY CONSISTING OF 1 AERATION BASIN, 1 CLARIFIER 1 CHLORINE CONTACT CHAMBER, AND DECHLORINATION BASIN

Receiving waters: DUNN'S CREEK	Classification: I II (III)	
Design Flow: 0.005 MGD	Mean Flow: ADF .002 .005	Flow during survey: .002

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

therefore, the best time to sample is:

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

NO MIXING ZONE

List effluent limits (if necessary, attach relevant paperwork):

Parameter	Limit (units)
FLOW	0.005 MGD
CBOD5 & TSS	ANNUAL - 20 mg/L MONTHLY - 30 mg/L WEEKLY - 45 mg/L ONE TIME MAX - 60 mg/L
UN-IONIZED AMMONIA	ANNUAL, MONTHLY, WEEKLY AND ONE TIME MAX 0.02 mg/L
TRC (DECHLOR)	0.01 mg/L
TRC (DISINFECTION)	0.5 mg/L
PH	6.0 - 8.5
FECAL COLIFORM	MONTHLY 200/100 mL ONE TIME MAX 800/100 mL

Describe special permit conditions and permit modifications:

PARADISE POINT WWTP
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

8" PVC pipe extends 6' from bank, and has a "T" fitting. This outfall is located 150' east of the original discharge pipe.

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

① UN-IONIZED NH_3
8/96 .010
5/96 1.00
4/96 .093

② MAX TRC - FROM 1/96 THROUGH 11/96 THE MAX TRC WAS 0.03 mg/L. (PRIOR TO DISCHARGE TO DOUGS CREEK)

PLANT UPSETS
- AERATION BASIN OVERFLOWED - REPORTED 10-7-96 BY THE OPERATOR

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

NONE CONDUCTED.

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

THE FLOWS TO THE PLANT ARE LOWER THAN IN THE PREVIOUS TWO YEARS GENERALLY, THE 3-MONTH ADF IS .002-.003 MGD (WHEREAS ~~IN~~ DURING 1995 AND 1994 THE 3-MONTH ADF WAS BETWEEN .002 TO .009 MGD)

THE UN-IONIZED ~~AMM~~ AMMONIA HAS DECLINED IN 1996, WITH A FEW EXCEPTIONS NOTED ABOVE, UN-IONIZED NH_3 IS USUALLY .001 mg/L. THE PARAMETER WAS NOT MONITORED ON A MONTHLY BASIS IN 1995 OR 1994; HOWEVER WHEN IT WAS SAMPLED THE RESULTS WERE GREATER THAN OR EQUAL TO THE PERMIT REQUIREMENT OF 0.02 mg/L.

Additional information:

Staff contributing to this review (signature):

TIM McKELVEY	(Biologist)
STEPHANIE JENKINS	(Inspector)
STEPHANIE JENKINS	(Engineer)
PAT O'CONNOR	(Biologist)
	( )
	( )

PARADISE POINT FY2 — REFERENCE SITE — DUNN'S CREEK

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: SJ97 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 2ce3c470	DATE (M/D/Y): 2/11/97	TIME: 14:00	RECEIVING BODY OF WATER: DUNN'S CREEK

REMARKS: FY15 PARADISE POINT WWTP	COUNTY: PUTNAM	LOCATION: 1/2 way between Crescent Lake and outfall, north shore	FIELD IDNAME: PARADISE POINT FY1 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)
100							wetlands

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

Artificially Impounded ☐ yes — more sinuous

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect: ____ m wide; m/s, m/s, m/s; ____ m deep, ____ m deep, ____ m deep

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	20	5		Sand	30	5	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	20	5		Other:			
Rock or Shell Rubble	0			Other: detritus	10		
Undercut banks/Roots	20	5		*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):	SAL		Secchi (m):
Top								
Mid-depth	.6	17.64	6.85	8.68	913	0.5		.6
Bottom								

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

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

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

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

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

Weather Conditions/Notes: Cool, Sunny, Northeast breeze 10 knots

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

SAMPLING TEAM: TIM MCKELVEY PAT O'CONNOR — SIGNATURE: Tim McKelvey — DATE: 2/11/97

PARADISE POINT FYI'S

REFERENCE SITE DUNN'S CREEK

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030470	DATE (M/D/Y): 2/11/97	RECEIVING BODY OF WATER: DUNN'S CREEK

REMARKS:	LOCATION:	FIELD ID/NAME:
PARADISE POINT WWTP FYI'S	1/2 way between Crescent Lake and outfall, north shore	REFERENCE SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [18]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 (18) 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [16] OUTGOING/tidal	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 (16)	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [20]	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
Deposition (detritus) [15]	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 [20]	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 [20]	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 [20]	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. (20) 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two 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. 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.

[134] **TOTAL SCORE**

Comments: reference site done 1 week later than test sites #'s 1 & 2.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/11/97	Tmi McKelvey / Pat O'Connor	Tmi McKelvey

TEST SITE #1, WEST

2.00 30563

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: SCSI / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 2.00 30563	DATE (M/D/Y): 2/3/97	TIME: 1540	RECEIVING BODY OF WATER: DUNNS CREEK

REMARKS: Joint DEP test site #2, check location	COUNTY: PUTNAM	LOCATION: DUNNS CREEK ~ 100 ft WEST OF P.O.D.	FIELD ID/NAME: TEST SITE #1 WEST OF POD

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)
				2%			1% Water

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

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

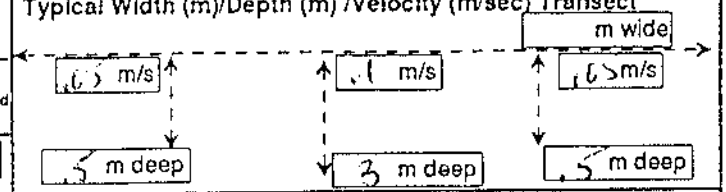
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 2 ft (m above present water level) + 12 FT (present depth in m) = 14 FT (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)	2%	5	dipnet	Sand			
Leaf Packs or Mats				Mud/Muck/Silt	30	5	dipnet
Aquatic Vegetation	35	5	dipnet	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	2%	5	dipnet	*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								
Mid-depth	1m	11.6 C	6.5	5.9	466			.3
Bottom								

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

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

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

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

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

Weather Conditions/Notes: Warm, 70's F, slight breeze, sunny

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Tim McKelvey / Pat O'Connor	Tim McKelvey	2/3/97

PARADISE POINT FY+3

TEST SITE #1, WEST

20030363

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030363	DATE (M/D/Y): 2/3/97	RECEIVING BODY OF WATER: DUNN'S CREEK

REMARKS: same as test site #2 due to close location	LOCATION: DUNNS CREEK 2100 FT WEST OF POD	FIELD ID/NAME: TEST SITE #1 WEST OF POD

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [13]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 **13** 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [10] (flooding tide, incoming)	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec **10** 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [20]	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
Deposition [16]	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 [18]	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 [5]	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 [18]	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 **18** 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two 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. 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.

[105] **TOTAL SCORE**

Comments: tidal influence, incoming tide just beginning.

ANALYSIS DATE: 2/3/97	ANALYST: Tim McKelvey / Pat O'Connor	SIGNATURE: Tim McKelvey

* - due to the fact that the outfall pipe was less than 20 ft from the north bank of Dunns Creek, and was not located where the main flow and mixing occurred, the bracket of test site #1 and #2 was less than 150 feet apart, there was no change in habitat assessment between the two.

PARADISE POINT FYI 5

TEST SITE #2, EAST

20030469

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030469	DATE (M/D/Y): 2/3/97	TIME 1430	RECEIVING BODY OF WATER: DUNN CREEK

REMARKS: H.D. dipersphyton missing	COUNTY: PUTNAM	LOCATION: DUNN CREEK, 100FT EAST OF WWTP OUTFALL	FIELD ID/NAME: EAST SAMPLE SITE OF OUTFALL BRACKET

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) WETLANDS
				30%			70%

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: 46m

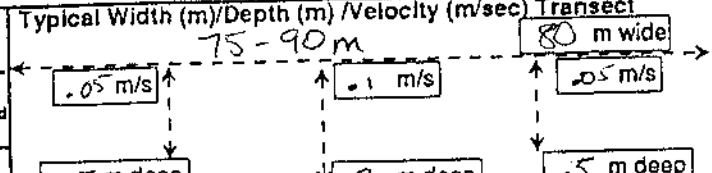
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 2FT (m above present water level) + 12FT (present depth in m) = 14FT. (m above bed)

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



Canopy Cover % : Open : ~~10~~ 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)	20	5	dipnet	Sand			
Leaf Packs or Mats	0			Mud/Muck/Silt	30	5	dipnet
Aquatic Vegetation	30	5	dipnet	Other:			
Rock or Shell Rubble	0			Other:			
Undercut banks/Roots	20	5	dipnet				

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								.3
Mid-depth	1m	16.0	6.5	8.9	466			
Bottom								

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

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

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

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

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

Weather Conditions/Notes: WARM, 70°F's, slight breeze, sunny.

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

SAMPLING TEAM: Tim McKelvey / Pat O'Connor

SIGNATURE: Tim McKelvey

DATE: 2/3/97

* - Local Watershed Erosion:

there are only a few houses (25) connected to the WWTP, the surrounding houses, up and down the creek are served by septic tank and drainfield - this area is subject to high water at times.

Another source is Dead Lake and Crescent Lake, agricultural runoff.

* - Canopy Cover - lightly shaded on the banks where samples were taken, but open in the center of the channel. Lots had not been totally cleared, still trees and native vegetation, woody shrubs, etc. at edge of water line.

PARADISE POINT FYLS

TEST SITE #2, EAST

20030469

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030469	DATE (M/D/Y): 2/3/97	RECEIVING BODY OF WATER: DUNNS CREEK

REMARKS: H.D. & Periphyton rack missing	LOCATION: DUNN CREEK ~100 FT EAST OF WWTP OUTFALL	FIELD ID/NAME: EAST SAMPLE SITE OF OUTFALL BRACKET

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **13**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 (13) 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **10**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec (10) 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **20**	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
Deposition **16**	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 **18**	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 **5**	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 **18**	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 (18) 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two 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. 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.

105 TOTAL SCORE

Comments: tidal, incoming tide
OUTFALL PIPE 20FT FROM BANK

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/3/97	Tim McKelvey/Pat O'Connor	Tim McKelvey

* - Bottom Substrate / Available Cover:

On the North bank, the habitat is considered "suboptimal" since there is development, many of the lots have some bulkhead or riprap of some sort and have installed a boat ramp, creating some disturbance of the habitat. However, across the creek on the south bank there is an undisturbed wetlands that would have an "optimal" rating.

* - Water Velocity

Tide was beginning to move, suspect a greater velocity further into the tide.

* - Riparian Buffer Zone Width

~~Lots~~ South bank was > 18m, undisturbed wetlands.

* - Riparian Zone Vegetation Quality

Scored well on the north bank because many of the lots where not completely cleared to the waterline, still some good native vegetation, especially on the undeveloped lots between houses/trailers.

IMPAIRED JOINT VENTURE

REFERENCE SITE

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	26	≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	5
EPT Index	1	≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	1
# Chironomid Taxa	14	≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	5
% Contribution of Dominant Taxon	31.3	≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	5
% Diptera	38.2	-	≤60	>60		-	≤52	>52		-	≤67	>67	3
Florida Index	9	≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	5
% Suspension feeders/Filterers	4.2	≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	1
Total Score		Panhandle				Peninsula				Northeast			25
Interpretation of Score		Excellent			27-33	Excellent			27-33	Excellent			26-31
		Good			21-26	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

TEST SITE 1

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	36	≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	5
EPT Index	4	≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	3
# Chironomid Taxa	9	≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	5
% Contribution of Dominant Taxon	25.4	≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	5
% Diptera	32.2	-	≤60	>60		-	≤52	>52		-	≤67	>67	3
Florida Index	9	≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	5
% Suspension feeders/Filterers	5.4	≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	1
Total Score		Panhandle				Peninsula				Northeast			27
Interpretation of Score		Excellent			27-33	Excellent			27-33	Excellent			26-31
		Good			21-26	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

TEST SITE 2

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	**Panhandle**				**Peninsula**				**Northeast**			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	36	≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	5
EPT Index	4	≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	3
# Chironomid Taxa	16	≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	5
% Contribution of Dominant Taxon	24.7	≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	5
% Diptera	23.9	-	≤60	>60		-	≤52	>52		-	≤67	>67	3
Florida Index	10	≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	5
% Suspension feeders/Filterers	6.5	≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	1
Total Score		**Panhandle**				**Peninsula**				**Northeast**			27
Interpretation of Score		**Excellent**			27-33	**Excellent**			27-33	**Excellent**			26-31
		Good			21-26	**Good**			21-26	**Good**			20-25
		Poor			14-20	**Poor**			14-20	**Poor**			14-19
		Severely Degraded			7-13	**Severely Degraded**			7-13	**Severely Degraded**			7-13

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	**Panhandle**				**Peninsula**				**Northeast**			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa		≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	
EPT Index		≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	
# Chironomid Taxa		≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	
% Contribution of Dominant Taxon		≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	
% Diptera		-	≤60	>60		-	≤52	>52		-	≤67	>67	
Florida Index		≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	
% Suspension feeders/Filterers		≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	
Total Score		**Panhandle**				**Peninsula**				**Northeast**			
Interpretation of Score		**Excellent**			27-33	**Excellent**			27-33	**Excellent**			26-31
		Good			21-26	**Good**			21-26	**Good**			20-25
		Poor			14-20	**Poor**			14-20	**Poor**			14-19
		Severely Degraded			7-13	**Severely Degraded**			7-13	**Severely Degraded**			7-13

TEST SITE 2

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	**Panhandle**				**Peninsula**				**Northeast**			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	36	≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	5
EPT Index	4	≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	3
# Chironomid Taxa	16	≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	5
% Contribution of Dominant Taxon	24.7	≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	5
% Diptera	23.9	-	≤60	>60		-	≤52	>52		-	≤67	>67	3
Florida Index	10	≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	5
% Suspension feeders/Filterers	6.5	≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	1
Total Score		**Panhandle**				**Peninsula**				**Northeast**			27
Interpretation of Score		**Excellent**			27-33	**Excellent**			27-33	**Excellent**			26-31
		Good			21-26	**Good**			21-26	**Good**			20-25
		Poor			14-20	**Poor**			14-20	**Poor**			14-19
		Severely Degraded			7-13	**Severely Degraded**			7-13	**Severely Degraded**			7-13

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	**Panhandle**				**Peninsula**				**Northeast**			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa		≥27	26-14	<14		≥ 27	26-14	<14		≥18	17-9	<9	
EPT Index		≥6	5-3	<3		≥ 4	3-2	<2		-	≥3	<3	
# Chironomid Taxa		≥9	8-5	<5		≥9	8-5	<5		≥4	3-2	<2	
% Contribution of Dominant Taxon		≤25	26-62	>62		≤30	31-65	>65		≤37	38-69	>69	
% Diptera		-	≤60	>60		-	≤52	>52		-	≤67	>67	
Florida Index		≥ 13	12-7	<7		≥10	9-5	<5		≥ 6	5-3	<3	
% Suspension feeders/Filterers		≥ 13	12-7	<7		≥15	14-8	<8		≥ 25	25-13	<13	
Total Score		**Panhandle**				**Peninsula**				**Northeast**			
Interpretation of Score		**Excellent**			27-33	**Excellent**			27-33	**Excellent**			26-31
		Good			21-26	**Good**			21-26	**Good**			20-25
		Poor			14-20	**Poor**			14-20	**Poor**			14-19
		Severely Degraded			7-13	**Severely Degraded**			7-13	**Severely Degraded**			7-13

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Paradise Point
County: Putnam
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0043176
LIMS Sample #: 167073 LIMS Job #: 97-FEB-04-14
sample log: 2-13-97
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.2-26.0°C
incubator 24.4-25.4°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Sample is very Turbid - chunky debris - algae. DO = 1.6 aerated sample 35 minutes DO = 4.9 after pouring into test vessel

Sample Collection: Date 2-3-97 Time 1200
Test Beginning: Date 2-4-97 Time 1532
Test Ending: Date 2-6-97 Time 1530
Organism Batch #: 4 Diluent Batch #: 3
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.5	8.3 @ 24.9 °C	1048 @ 1018 993 @ 1001 @ 24.9 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 23.9	8.1 @ 25.6 °C	1020 @ 1018 998 @ 1001 @ 24.7 °C FOC50@9885
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.2	8.8 @ 22.1 °C	1032 @ 1010 1006 @ 1061 @ 25.1 °C 1011@9885

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
Control A	A	5	5	5	8.3		8.3	24.0		25.0	7.9		7.8	185		205
Control B	B	5	5	5			8.3			25.0			7.8			200
Control C	C	5	5	5			8.3			24.9			7.8			205
Control D	D	5	5	5			8.3			24.6			7.7			220
100% A	A	5	5	5	8.0		7.9	23.8		24.9	4.9		7.7	2830		2970
100% B	B	5	5	5			7.9			24.9			7.6			3120
100% C	C	5	5	5			7.9			24.9			7.6			3230
100% D	D	5	5	5			7.9			24.6			7.5			3340
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MC		MF
Recorded by:		MF	MF	MF	MF		JS	MF		JS	MF		JS	MF		JS

Investigators' Signatures

Marshall Faircloth
Julie Sharpe
Keri Johnson

J H Wolfe
reviewer

form updated 4/01/96

Salt Water: (Well Water) / 20% Min Water

Water Quality Parameters

	Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			>2.2	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L)	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$)	125	75	155	Hach	ND
Hardness (mg/L as $CaCO_3$)	130	90	155	Hach	ND
Total ammonia (mg/L as N)		<0.017	<0.017	orion	MF

Ammonia Meter #98:36 Meter Slope: -54.8
Ammonia Blank: <0.017
Control Salinity: 0 ppt
Sample Salinity: 1.4 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Paradise Point
County: Putnam
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0043176
LIMS Sample #: 167073 LIMS Job #: 97-FEB-04-14
sample log: 2-13-97

Sample Collection: Date 2-3-97 Time 1200
Test Beginning: Date 2-4-97 Time 1530
Test Ending: Date 2-6-97 Time 1530
Organism Batch #: 6 Diluent Batch #: Well H2O
Organism Age: 12 days
Test Organism: ~~Cerio~~ Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 24.0–26.0°C
incubator 24.4–25.4°C
Test Number: 2 of 2

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0; 9.0 @ 9.0	23.5 @ 23.5	8.3 @ 24.9 °C	104.8 @ 101.8; 993 @ 1001 @ 24.9 °C
24 hr	7.0 @ 7.0; 9.0 @ 9.0	23.9 @ 23.9	8.1 @ 25.6 °C	102.0 @ 101.8; 998 @ 1001 @ 24.7 °C; 10050 @ 9885
48 hr	7.0 @ 7.0; 9.0 @ 9.0	23.1 @ 23.2	8.8 @ 22.1 °C	103.2 @ 101.8; 1006 @ 1001 @ 25.1 °C; 10110 @ 9885

Remarks: D = dead, M = missing
Sample is very turbid - chunky debris - algae. brown and white floaters. DO = 1.6. aerated sample for 45 minutes, DO = 6.4 after pouring into test vessels.
A D.O. checked at 1600 = 3.8 Started aeration in controls and test vessels MF 2/4/97

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
Control A	B1	5	5	5	7.9	8.5	8.5	25.2	23.0	22.2	7.9	8.3	8.5	255	255	280
Control B	B2	5	5	5	7.9	8.5	8.5	25.2	23.0	21.9	8.0	8.3	8.5	255	255	275
Control C	B3	5	5	5	7.9	8.5	8.6	25.3	23.0	21.9	8.0	8.4	8.6	255	255	275
Control D	B4	5	5	5	7.9	8.5	8.6	25.2	23.0	22.2	7.9	8.4	8.6	255	255	270
100% A	B5	5	4 1D	4	8.0	7.9	8.1	24.0	23.1	22.4	6.4	8.2	8.1	3010	3130	3300
100% B	B6	5	5	5	8.0	7.9	8.0	23.9	23.2	22.2	6.4	8.1	8.1	3010	3220	3390
100% C	B7	5	3 2D	3	8.0	7.9	8.0	23.9	23.3	22.1	6.4	8.1	8.3	3010	3140	3300
100% D	B8	5	2 3D	2	8.0	7.9	8.0	23.9	23.3	22.3	6.4	7.9	8.2	3010	3170	3340
Measured/Loaded by:		ND	ND	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		JS	ND	MF	ND	ND	JS	ND	ND	JS	ND	ND	JS	ND	ND	JS

A Aeration continued for duration of the test. MF 2-6-97

Investigators' Signatures
Marshall Fairbanks
[signature]
Julie Sharpe
Keri Johnson

[signature]
reviewer

	Salt Water / (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			>2.2	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	125	75	155	Hach	ND
Hardness (mg/L as $CaCO_3$):	130	90	155	Hach	ND
Total ammonia (mg/L as N):	<0.017		<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -54.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 1.4 ppt

form updated 4/01/96

Benthic macroinvertebrate taxa list for Paradise Point WWTP, collected via 20 discrete dip net sweeps in Dunn's Creek, on 3 February, 1997.

	Reference	Test Site 1	Test Site 2
Cnidaria			
Hydrozoa sp.	–	–	24
Oligochaeta			
Bratislavia unidentata	–	35	–
Dero pectinata	–	–	12
Dero trifida	–	–	24
Eclipidrilus palustris	–	35	–
Haber speciosus	23	–	12
Limnodrilus hoffmeisteri	143	359	252
Nais communis	–	35	–
Pristina synclites	–	35	–
Pristinella sima	–	–	12
Spirosperma ferox	23	71	–
Gastropoda			
Littoridinops monroensis	–	107	–
Physella sp.	23	–	–
Ancylidae	–	–	12
Hydrobiidae	–	–	48
Trombidiformes			
Piona sp.	–	35	36
Unionicola sp.	23	35	24
Isopoda			
Caecidotea sp.	23	–	–
Cassidinidea ovalis	–	503	24
Sphaeroma destructor	–	35	–
Sphaeroma terebrans	47	–	–
Uromunna sp.	–	–	12
Amphipoda			
Gammarus sp.	455	1438	504
Hyalella azteca	983	359	468
Amphipoda	–	–	180
Decapoda			
Callinectes sapidus	–	35	–
Palaemonetes sp.	23	–	–
Ephemeroptera			
Caenis sp.	71	71	60
Stenonema smithae	–	35	–
Odonata			
Argia sp.	–	–	36
Enallagma sp.	–	–	24
Coenagrionidae	–	35	–
Gomphidae	–	35	–
Coleoptera			
Dubiraphia sp.	47	–	–

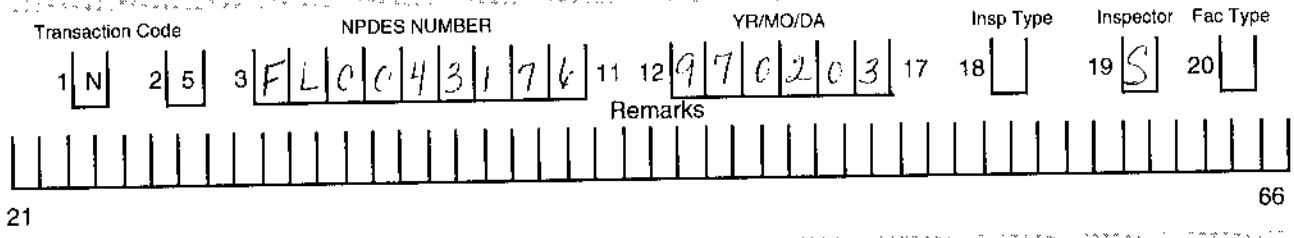
Trichoptera			
Ceraclea sp.	–	–	12
Cyrnellus fraternus	–	–	36
Cyrnellus sp.	–	35	–
Oecetis sp.	–	71	24
Diptera			
Ablabesmyia mallochi	23	–	–
Ablabesmyia rhamphe grp.	47	35	24
Asheum beckae	23	71	–
Cladotanytarsus sp.	95	35	84
Clinotanypus sp.	–	35	12
Coelotanypus sp.	–	71	12
Cricotopus bicinctus grp.	23	–	–
Cryptochironomus sp.	–	35	–
Dicrotendipes modestus	–	143	60
Dicrotendipes simpsoni	95	251	72
Glyptotendipes sp.	23	71	36
Nanocladius distinctus	23	–	–
Nanocladius sp.	23	35	12
Palpomyia/Bezzia grp.	–	71	–
Parachironomus carinatus	23	–	–
Polypedilum halterale grp.	23	107	12
Polypedilum sp.	–	107	36
Procladius sp.	–	–	24
Stenochironomus sp.	95	71	48
Tanytarsus sp. l epler	23	35	12
Tanytarsus sp. t epler	–	–	12
Tribelos fuscicornis	71	251	12
Tribelos jucundus	–	–	12
Tribelos sp.	23	107	24
Xenochironomus xenolabis	23	71	24
Chironomidae	47	–	48
Diptera	23	–	–

Phytoplankton taxa list and densities (#/mL) for Paradise Point WWTP, collected via subsurface grabs in Dunn's Creek, on 3 February, 1997.

	Test Site 1	Test Site 2
Cyanophyceae		
Anabaena sp.	16	–
Aphanocapsa sp.	49	58
Aphanothece sp.	8	8
Chroococcus sp.	25	–
Cylindrospermopsis sp.	–	8
Dactylococcopsis sp.	173	156
Gloeocapsa sp.	8	8
Lyngbya contorta	156	58
Lyngbya sp.	8	16
Merismopedia sp.	148	99
Microcystis sp.	82	107
Oscillatoria sp.	164	123
Bacillariophyceae		
Coscinodiscus sp.	8	33
Cyclotella sp.	140	115
Cymbella sp.	–	8
Fragilaria sp.	526	444
Melosira sp.	945	674
Nitzschia sp.	33	66
Rhizosolenia sp.	16	16
Diatomaceae	–	33
Pennales	107	–
Chlorophyceae		
Ankistrodesmus sp.	115	49
Chlamydomonas sp.	16	16
Chlorella sp.	16	8
Cosmarium sp.	8	–
Crucigenia sp.	–	8
Dictyosphaerium sp.	8	41
Elakatothrix sp.	8	–
Franceia sp.	–	16
Golenkinia sp.	16	41
Oocystis sp.	16	16
Pteromonas sp.	41	8
Scenedesmus sp.	181	205
Tetraedron sp.	107	8
Tetrastrum sp.	90	82
Chlorophyceae	82	25
Ulotrichaceae	16	–
Cryptophyceae		
Chroomonas sp.	164	74

Cryptomonas sp.	58	41

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



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