Florida
Department of Environmental Protection

Biological Assessment of

Pebble Creek Wastewater Treatment Plant

Hillsborough County

NPDES #FL0039896

Sampled August 1993

December 1993

Biology Section
Division of Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Pebble Creek WWTP
County: Hillsborough
NPDES Number: FL0039896
State Permit Expiration Date: 1 April 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 16 August 1993

Results: Atrazine and diazinon were detected in the effluent, at estimated concentrations of 0.16 µg/L and 0.12 µg/L, respectively. While these concentrations are both below known toxic levels, the observed *C. dubia* toxicity could be related to synergistic interaction between the two biocides. No metals were detected in excess of Class III standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 16 August 1993

Results: Acutely toxic to *Ceriodaphnia dubia*, in violation of Rule 17-302.530(62) FAC, Rule 17-302.500(1)(d) FAC, and Rule 17-4.244(3)(a). The discharge was not toxic to *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 16 August 1993

Results: Benthic macroinvertebrate communities were severely disturbed at the test site. Taxa richness, the Florida Index, and the Shannon-Weaver diversity index were extremely low at the test site, representing very unfavorable conditions. The Pebble Creek WWTP violated the biological integrity criterion (Rule 17-302.530(11) FAC) and also the standard prohibiting nutrient induced imbalances in aquatic fauna (Rule 17-302-530(48)(b) FAC). The periphyton community at the test site had high taxa richness and low biomass. Diatoms made up the majority of the periphytic assemblage, although green and blue-green algae were present in Pebble Creek. The data suggest the algal community was not adversely impacted by the discharge.

Water Quality Inspection (WQI)

Date Sampled: 16 August 1993

Results: Effluent dissolved oxygen (4.5 mg/L) violated the facility's permit limit of 6.5 mg/L. Dissolved oxygen at the test site was depressed below Class III Water Quality Standards. Nutrients were elevated in the effluent, particularly nitrate-nitrite, total phosphorus, and ortho-phosphate. The influence of the nutrient rich discharge was apparent at the test site, where concentrations of the above three nutrient compounds were an order of magnitude higher than those measured in the reference site, as well as higher than 95% of other Florida streams. Algal growth potential exceeded the problem threshold throughout the study area. Fecal coliforms were found in the effluent at an estimated concentration of 8 organisms/100 mL, which is within the facility's permit limit (Rule 17-600 FAC). Fecal coliforms did not exceed Class III standards at the test site.

Introduction

The Pebble Creek Service Corporation provides advanced domestic wastewater treatment for a country club and the surrounding residential area in northern Hillsborough County. This 0.4 MGD facility utilizes a combined stage "RABCO" process, which involves ultraviolet disinfection prior to discharge. Effluent is discharged via a 10-12 inch diameter vertical standpipe to Pebble Creek, a Class III waterbody.

Effluent limits are as follows: BOD_5 (3 mg/L annual average), TSS (5 mg/L annual average), fecal coliforms (not detectable), total nitrogen (3 mg/L annual average), TKN (1 mg/L), flow (0.4 MGD), pH (6.0 to 8.5), and dissolved oxygen (minimum of 6.5 mg/L). During the past year, permit violations have included fecal coliforms (range 2 to 114 organisms/100 mL), TKN (range 1.04 to 3.8 mg/L), pH (9.4 SU's), and residual chlorine (range 0.08 to 1.5 mg/L). Enforcement action was taken against the facility in 1992 for irrigating golf courses with treated effluent without a permit. Although the case was closed following payment of fines, the facility has applied for a permit to resume irrigation practices (see Facility Summary in Appendix).

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Rocky Creek) and a test site in Pebble Creek (downstream of discharge, which eventually flows to the Hillsborough River via Trout Creek) (see maps in Appendix). Clay Gully was originally chosen as a reference site, but the lack of flow and recent desiccation of the system disqualified it from serving this purpose. For this reason, data from Rocky Creek, which was sampled in April, 1993. was used as a reference site. 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. Invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Bacterial populations were analyzed for fecal coliforms following the methods of APHA (1989). 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 in this report. Many of these, such as the number of taxa, Shannon-Weaver Diversity Index, and chlorophyll *a* are well known. Others are briefly explained here. 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 (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. A decreased diatom to bluegreen 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. The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, Florida Index and the diatom to bluegreen algae ratio are measured as the reference site minus test site divided by the reference site. The percent

differences between sites involving the percent contribution of dominant taxon, 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: Pat Fricano, Kathy Hicks, and Jim Snitgen (DEP Southwest District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Elizabeth Miller, Urania Quintana, 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

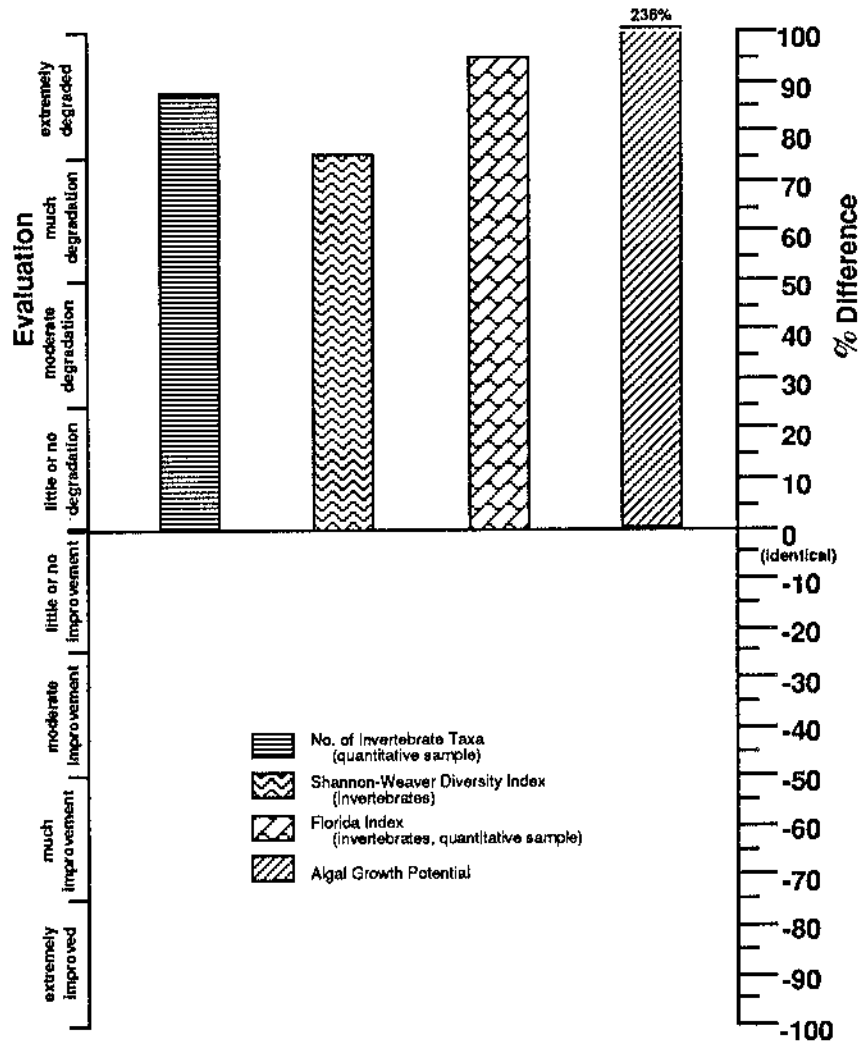
Habitat at the Pebble Creek test site (with 64 points) was somewhat more favorable for the establishment of biological populations than was the habitat present at the Rocky Creek reference site (with 44 points). While the two study areas were similar with regard to flow regime (velocity at both was 0.05 m/sec to 0.1 m/sec), more available substrate (*e.g.*, leaf packs, roots, and undercut banks) was found at the test site. Land was used completely for residential purposes near the test site, while the surrounding land use at the reference site included industrial (60%), agricultural (30%) and residential (10%). Dissolved oxygen was marginally acceptable at the reference site (5.1 mg/L), but D.O. at the test site (4.3 mg/L) was depressed below Class III Water Quality Standards. Dissolved oxygen of the effluent (measured in the field) was 4.5 mg/L, in violation of the facility's permit limit of 6.5 mg/L. Water was fairly neutral at both study stations (pH was 7.4 and 7.0 at reference and test sites, respectively). Conductivity at the reference site (270 µmho/cm) was normal, but was elevated for a freshwater system (1250 µmho/cm) at the Pebble Creek test site (Appendix).

Major characteristics of community structure of control and test sites.

	Rocky Ck. Reference Site	Test Site
Macroinvertebrate Hester-Dendy		
Number of Taxa	64	8
Florida Index	20	1
Shannon-Weaver Diversity	4.21	1.04
% Gastropoda	6.7	84.1
% Diptera	60.2	11.7
% Malacostraca	8.7	4.1
% Oligochaeta	0.8	0
% Odonata	1.2	0
% Ephemeroptera	17.9	0
% Scrapers	15.7	88.5
% Deposit Feeders (above surface)	46.1	4.1
% Predator/Carnivores	6.5	2.8
% Shredders	5.7	2.6
% Suspension feeders/Collector-filterers	20.7	0
% Deposit feeders (below surface)	0.7	0
% Scavengers	3.0	2.0
Periphyton Algae	Reference Site Samplers Lost	
Number of Taxa		37
% Contribution of Dominant Taxon		13.8
Chlorophyll a (mg/sq. m)		0.41
Diatom/Diatom + B-G Abundance Ratio		0.86
% Diatoms		78.3
% Blue-green		12.3
% Green		9.4
Algal Growth Potential (mg dry wt/l)	25.8	85.4

The sample of final effluent was acutely toxic to *Ceriodaphnia dubia*, causing 100% mortality in the 48 hour bioassay. This level of toxicity is in violation of Class III standards, Rule 17-302.530(62) FAC, Rule 17-302.500(1)(d) FAC, and Rule 17-4.244(3)(a). Only one organism died in the *Cyprinella leedsi* test, indicating that the effluent was not acutely toxic to that test organism.

Results of organics analyses on the Pebble Creek effluent revealed presumptive evidence of the presence of atrazine and diazinon, at estimated concentrations of 0.16 µg/L and 0.12 µg/L, respectively. While these levels are both below known toxic levels, the observed *C. dubia* toxicity could possibly be related to synergistic interaction between the two biocides. The following metals were found in the effluent above detection limit: copper (12 µg/L), iron (11 µg/L), and zinc (24 µg/L). None of these



Effect of discharge on receiving stream
(measured as difference between control and test sites).

levels are in excess of Water Quality Standards.

Nutrients were elevated in the effluent, particularly nitrate-nitrite (1.4 mg/L), total phosphorus (1.5 mg/L), and ortho-phosphate (1.4 mg/L). The influence of the nutrient rich discharge was clearly apparent at the test site, as these same three compounds were greater than 95% of typical streams in Florida (see Table of Typical Water Quality Values in Appendix). In contrast, ammonia and TKN were either very low or undetected at the test site. The reference site water was somewhat higher than a typical Florida stream with respect to nutrients, however, concentrations of nitrate-nitrite, total phosphorus, and ortho-phosphate were close to an order of magnitude lower than those measured in Pebble Creek (see chemistry summary table in Appendix).

Algal growth potential (AGP) indicated problems throughout the study area. A problem threshold of 5 mg dry wt/L was established by Raschke and Schultz (1987) to predict the likelihood of the detrimental consequences of nutrient enrichment, such as excessive algal or macrophyte growth, D.O. sags, and fish kills. Effluent AGP was 113 mg dry wt/L, while AGP of the reference and test sites was 25.9 mg dry wt/L and 85.4 mg dry wt/L, respectively. The nearly fourfold increase in AGP observed at the test site is an obvious result of the WWTP discharge into Pebble Creek. Higher than expected AGP at the reference site was probably related to agricultural run-off and WWTP discharges in the area.

Fecal coliforms were found in the effluent at an estimated concentration of 8 organisms/100 mL, which is within the facility's permit limit (Rule 17-600 FAC). Fecal coliforms were within Class III standards at the test site (640 organisms/100 mL), but were substantially greater than those found in the effluent.

Benthic macroinvertebrate communities were severely stressed at the test site. The figure on this page indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values usually mean that the test site is better than the control. The figure on p. 4 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation, unless the test site is better than the reference site. The average abundance of each individual taxon appears in the Appendix.

Taxa richness was indicative of healthy conditions at the reference site (with 64 taxa) decreasing by 87.5% at the test site (only 8 taxa present). The observed taxa richness at the test site was 85% less than that of other streams throughout Florida. The 95% decrease in the Florida Index score at the test site also demonstrated that grossly unfavorable conditions were present downstream of the discharge. The reference site received 20 Florida Index points, while the test site scored only 1 point. A

minimum Florida Index value of 15 points is generally expected from this part of the state. Shannon-Weaver diversity was reduced by 75.3% from the reference to test site, dropping from 4.2 to 1.0. The test site diversity value is less than 94% of other Florida stream systems. Furthermore, the qualitative stability indices for percent composition and functional feeding groups indicated very large differences between the healthy reference site biota and the perturbed test site populations. Since favorable habitat and flow were present at the test site, the problems found in Pebble Creek were related to the nutrient-rich, toxic discharge, as well as to the low D.O. conditions. These data clearly indicate degradation at the test site, and that the Pebble Creek WWTP violated the biological integrity criterion (Rule 17-302.530(11) FAC) and also the standard prohibiting nutrient induced imbalances in aquatic fauna (Rule 17-302-530(48)(b) FAC).

Although no reference site periphyton community data were available, the test site attached algal community did not appear to be disturbed. For example, 37 taxa (an acceptable number) were identified from the test site. Diatoms made up the majority of the community, although green and blue-green algae were also present. Given the elevated nutrient levels and AGP of the test site, the low chlorophyll *a* value (0.41 mg/m^2) was surprising. The data suggest the algal community was not adversely impacted by the discharge.

Conclusions

The sample of final effluent from the Pebble Creek WWTP was acutely toxic to *Ceriodaphnia dubia*, causing 100% mortality in the 48 hour bioassay. This toxicity is in violation of Class III standards, Rule 17-302.530(62) FAC, Rule 17-302.500(1)(d) FAC, and Rule 17-4.244(3)(a). The discharge was not toxic to *Cyprinella leedsi*.

Effluent dissolved oxygen (4.5 mg/L) violated the facility's permit limit of 6.5 mg/L. Dissolved oxygen at the test site was depressed below Class III Water Quality Standards.

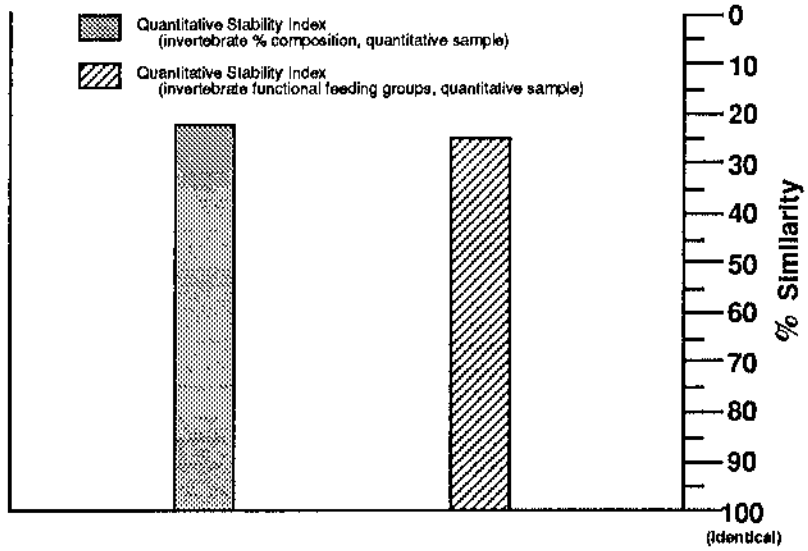
Atrazine and diazinon were detected (presumptive evidence) in the effluent, at estimated concentrations of 0.16 µg/L and 0.12 µg/L, respectively. While these concentrations are both below known toxic levels, the observed *C. dubia* toxicity could be related to synergistic interaction between the two biocides. No metals were detected in excess of Class III standards.

Nutrients were elevated in the effluent, particularly nitrate-nitrite, total phosphorus, and ortho-phosphate. The influence of the nutrient rich discharge was apparent at the test site, where concentrations of the above three nutrient compounds were nearly an order of magnitude higher than those measured in the reference site, as well as higher than 95% of other Florida streams.

Effluent and test site algal growth potential (113 mg dry wt/L and 85.4 mg dry wt/L, respectively) were three to five times greater than that of the reference site, an obvious result of the WWTP discharge into Pebble Creek.

Fecal coliforms were found in the effluent at an estimated concentration of 8 organisms/100 mL, which is within the facility's permit limit (Rule 17-600 FAC). Fecal coliforms did not exceed Class III standards at the test site.

Benthic macroinvertebrate communities were severely disturbed at the test site. Taxa richness, Florida Index and the Shannon-Weaver diversity index were extremely low at the test site, representing very unfavorable conditions. The Pebble Creek WWTP violated the biological integrity criterion (Rule 17-302.530(11) FAC) and also the standard prohibiting nutrient induced imbalances in aquatic fauna (Rule 17-302-530(48)(b) FAC).



Effect of discharge on receiving stream
(measured as similarity between control and test sites).

The periphyton community at the test site had high taxa richness and low biomass. Diatoms made up the majority of the periphytic assemblage, although green and blue-green algae were present in Pebble Creek. The data suggest the algal community was not adversely impacted by the discharge.

Literature Cited

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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.

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Chemistry summary table for Pebble Creek WWTP	Effluent	Rocky Ck. Reference Site	Test Site
Organic Constituents (ug/L)			
Atrazine	0.16 N		
Diazinon	0.12 N		
Metals (ug/L)			
Aluminum	100 U		
Antimony	15 U		
Arsenic	20 U		
Cadmium	Blank Contaminated		
Copper	12 A		
Chromium	10 U		
Iron	11 A		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Selenium	30 U		
Silver	0.05 U		
Zinc	24 A		
Nutrients (mg/L)			
Ortho-phosphate	1.4	0.089	1.5 A
Total phosphorus	1.5	0.12	1.5
Ammonia	0.022 I	0.072	0.020 U
Nitrate+Nitrite	1.4	0.29	1.2 A
TKN	0.58	0.69	0.54
Other Parameters			
Habitat Assessment		44	64
D.O. (mg/L)	4.5	5.1	4.3
pH (SU's)	7.8	7.4	7.0
Conductivity (µmhos/cm)	1250	556	1250
Temperature (°C)	28.0	21.7	29.0
Hardness (mg CaCO3)	209		220
Bioassay Fish	Not Toxic		
Bioassay Invertebrate	LC50 < 100%		
Fecal coliforms (org/100 ml)	8 J		640
Algal Growth Potential (mg dry wt/L)	113.0	25.85	85.4

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

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

J - Estimated value

N - Presumptive evidence of presence of material

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

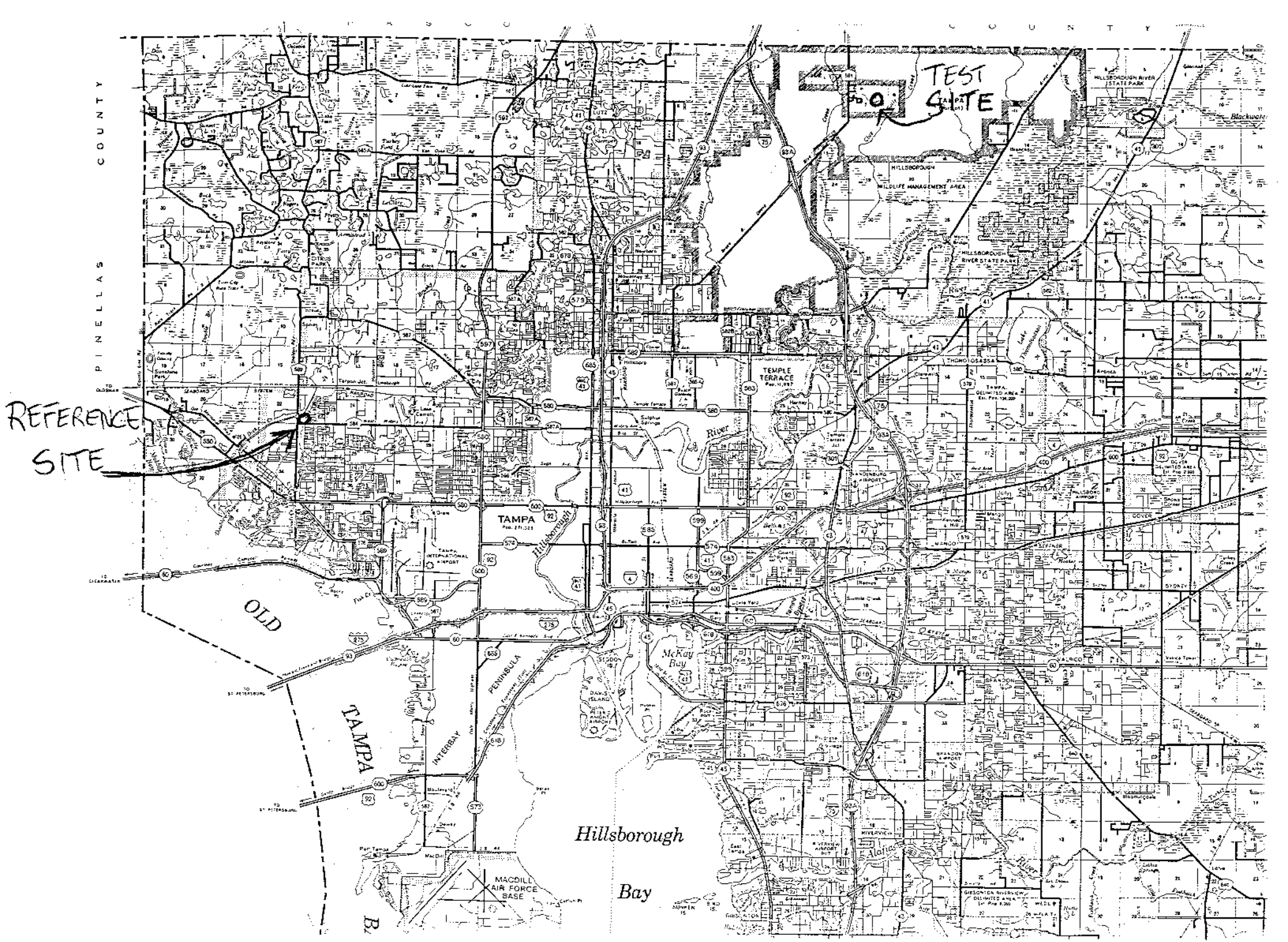
Typical Values for Selected Parameters in Florida Waters

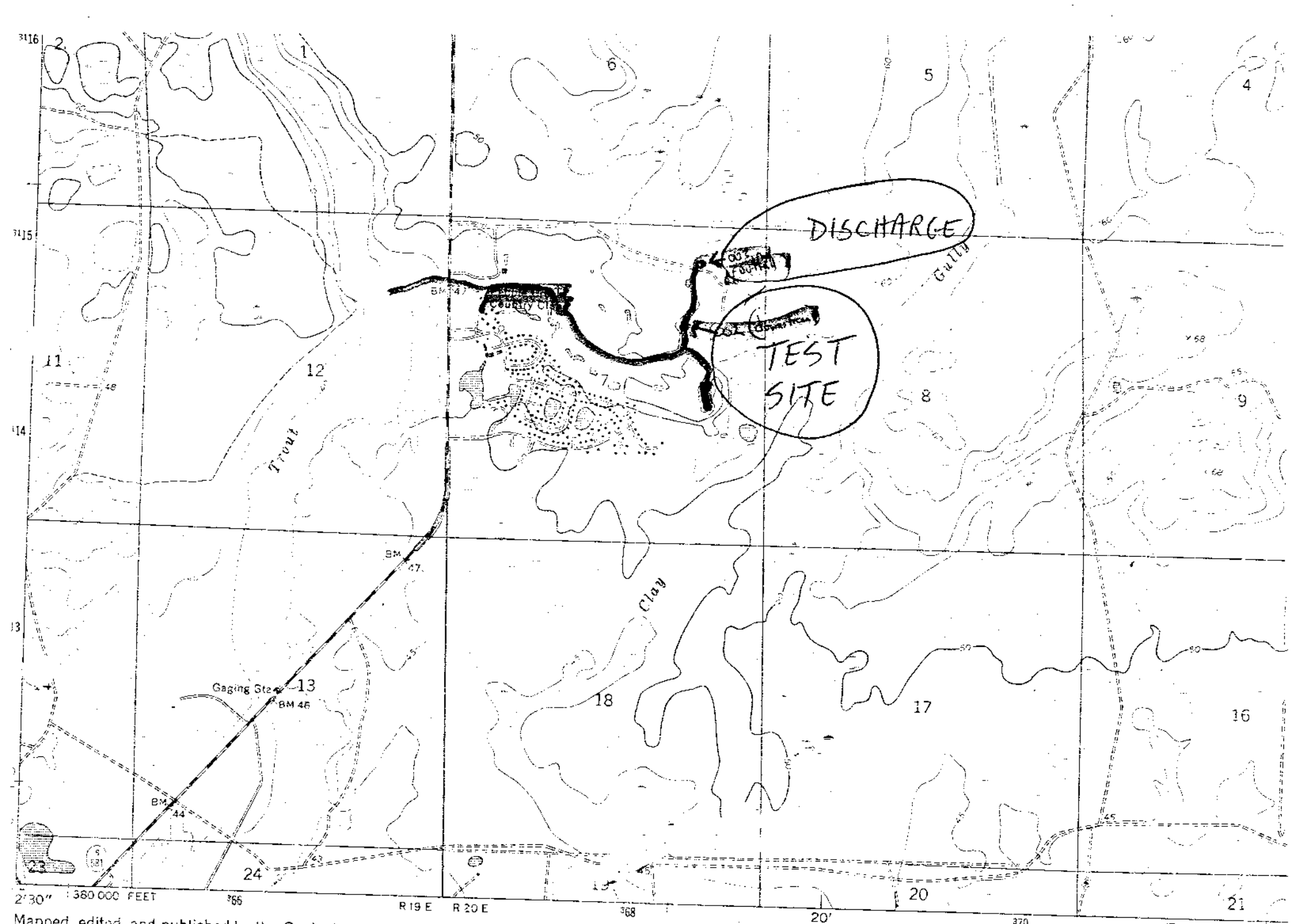
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

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

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


TEST SITE
REFERENCE SITE
PINELLAS COUNTY
TEMPLE TERRACE
TAMPA
Hillsborough River
OLD TAMPA BAY
McKay Bay
Hillsborough Bay
PENINSULA
INTERBAY
MACDILL AIR FORCE BASE
TAMPA INTERNATIONAL AIRPORT
HILLSBOROUGH RIVER STATE PARK
HILLSBOROUGH WILDLIFE MANAGEMENT AREA
RIVERVIEW
BRANDON
SEFFNER
SYDNEY
DOVER
PLANT CITY
GIBSONTON
ALAFIA RIVER



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Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken Dec. 1971. Field checked 1973

(THONOTOSASSA)

SCALE 1:24'000

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Pebble Creek Service Corp.		Date Summary Prepared: Sept. 3, 1993
Location (attach detailed map):	County: Hillsborough	District: SW
Federal Permit # and expiration date: FL0039896 Feb 28, 1997	State GMS # and State expiration date: 4029P00093 April 1, 1994	Facility Type: Industrial Municipal Federal Agricultural Other (list): Private, Franchise

Function of facility:
Advanced Domestic Wastewater

Description of treatment process:
The facility is a 0.540 MGD Type I Combined Stage "RABCO" Process. It employs ultraviolet disinfection prior to discharge to Pebble Creek

Receiving waters: Pebble Creek	Classification: I (II) III	
Design Flow: 0.540 MGD	Mean Flow: 0.182	Flow during survey:

Discharge is: Continuous (Intermittent) Seasonal Rainfall dependent Other (describe) Intermittent nature is due to daily long duration backwash cycles for each of 3 filters.

therefore, the best time to sample is: Probably late afternoon

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

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

Parameter	Limit (units)
$CBOD_5$	3 mg/l Annual Avg
TSS	5 " " "
Fecal Coliform	Non-detectable
Total Nitrogen	3 mg/l Annual Avg
Total Kjeldahl N.	1 mg/l
Flow	0.4 MGD
pH	6.00 to 8.50
Dissolved O_2	Minimum of 6.5 mg/l

Describe special permit conditions and permit modifications:
permit # DO29-160887B was modified twice since issuance. Flow rate was reduced from 0.540 to 0.4 MGD.
Certified operator attendance was reduced from 16 hrs/day 7 days/week to 8 hrs/day 7 days/week

Pebble Creek
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):
The outfall consists of a 10-12 inch dia vertical standpipe located about 300 yards east of the plant on the north side of Resorta Park Dr. A warning sign is posted

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

	F. Coliform	TKN	pH
June 93			9.4
April 93		3.03	
Dec 92		1.1	
Oct 92		1.04	
Sept 92		1.2	
Aug 92	56	1.3	

	F. Coliform	Cl_2	TKN
6-30-93	2	0.09	
6-25	7	0.09	
6-22		0.08	
6-16		0.3	
6-14		1.5	1.5
6-9	111		1.16
5-14-93	114		3.5
8-13-92	75		2.18

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
EPC is not aware of any previous bioassessments. EPC has no records on previous WQBEL's.

In 1992 Administrative enforcement action was taken when it was learned the facility was irrigating golf courses with effluent. Penalties were paid and the line connect the plant with a golf course pond was cut. The case has been closed.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
MOR's report fecal coliform as non-detectable almost always. However, EPC's data indicates fecal coliform counts in the 5-25/100ml range are chronically present. Other data is fairly consistant. occasional episodes of elevated Kjeldahl and total nitrogen are documented by MOR's and EPC.

Additional information: The facility has applied for a permit to construct golf course irrigation. A third set of ultraviolet lamps has been installed. Low levels of residual Cl_2 are chronically present. This may be due to method interference. The facility was chlorinating RAS to control a filamentous bacteria problem

Staff contributing to this review (signature):

(Biologist)

B. J. W. Burkett EPC (Inspector)

(Engineer)

( )

( )

( )

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: SW-TAM-WTF	STORET STATION NUMBER:	DATE (M/D/Y): 4-22-93	TIME 9:45	RECEIVING BODY OF WATER: Rocky Creek

REMARKS: Gambusia, Tilapia, Lemna, Ludwigia, Sagittaria, Eichornia, Salvinia, Alternanthera, Pithophora or Spyrogyra

LOCATION: REFERENCE SITE FOR RIVER OAKS WWTP Downstream

FIELD ID/NAME: REFERENCE SITE 002 FOR RIVER OAKS WWTP

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
	20%	10%	10%		60%	

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): Dairy Farm (includes pigs and chickens also) is about one mile upstream. It discharges during rainstorms to Channel A.

Estimated System Width (range, m): 8-10 m	Estimated System Depth (range, m): 0.5-2 M	yes
High Water Mark (m above bed): 1.0 M	Velocity (range, m/s): 0.05-0.1 M	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)	5%	7		Riffles			
Leaf Packs				Sand	82%	6	
Aquatic Vegetation	8%	7		Mud/Muck/Silt	5%	6	
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top								
Mid-depth	0.26	21.7	7.35	5.09	556			
Bottom								

System Type : Stream: ☑ (Sand Bottomed, Swamp & Bog, Alluvial, Sand Bot w/ Spring, Calcareous, 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:
Sunny
65°F
Breeze from NE

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Jim Snitgen Kathryn Hicks	Kathryn A. Hicks	4-22-93

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
			10:55	

REMARKS: Only flow	LOCATION:	FIELD ID/NAME:
		2

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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): Pebble Creek WWTP

Estimated System Width (range, m): 0.33 - 1.0	Estimated System Depth (range, m): 0 - 0.33		yes
High Water Mark (m above bed): 1.5	Velocity (range, m/s): 0.05 - 0.10	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)	5%			Riffles			
Leaf Packs	5%			Sand	70%		
Aquatic Vegetation				Mud/Muck/Silt	5%		
Rock or Shell Rubble				Benthic leaf mats	5%		
Undercut Banks/Roots	10%			Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top								
Mid-depth	0.33	29	7.00	4.3	1250			
Bottom								

System Type : Stream: [✓] (Sand Bottomed, Swamp & Bog, Alluvial, Sand Bot w/ Spring, Calcareous, 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: Cloudy, 85°F

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[✓]	[ ]	[ ]	[ ]
Fish	[ ]	[ ]	[✓]	[ ]
Aquatic Macrophytes	[✓]	[ ]	[ ]	[ ]
Iron/sulfur Bacteria	[✓]	[ ]	[ ]	[ ]

SAMPLING TEAM:	SIGNATURE:	DATE:
Pat Frieans, Jim Snitzer, Kathy Hicks		

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: SW-TAM-WTF	STORET STATION NUMBER:	DATE (M/D/Y): 4-22-93	RECEIVING BODY OF WATER: Rocky Creek

REMARKS: Gambusia, Tilapia, Ludwigia Sagittaria, Lemna, Salvinia, Eichornia, Alternanthera, Pithophora or Spyrogyra	LOCATION: REFERENCE SITE for IMPACT River Oaks Downstream ck.	FIELD ID/NAME: REFERENCE SITE

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 10	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 12	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 7	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 4	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 6	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 44

COMMENTS:

ANALYSIS DATE: 4-22-93	ANALYST: Kathryn Hicks Jim Snitgen	SIGNATURE: Kathryn A. Hicks

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:

REMARKS: Gambusia,	LOCATION:	FIELD ID/NAME:

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 26	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 8	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 12	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 9	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 9	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 0	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	TOTAL SCORE 64

COMMENTS:

ANALYST: Pat Freano Jim Snitgen Kathy Hicks	SIGNATURE: Kathy A. Hicks Pat Freano

ANALYSIS DATE:

Sample Source: PEBBLE CREEK VILLAGE
Location:
County: HILLSBOROUGH
Contact/District: PAT FRICANO / SW
NPDES Permit #: FL0039896 Outfall #:

Sample Collection: Date 8/16/93 Time 11:15
Test Beginning: Date 8/17/93 Time 1200
Test Ending: Date 8/19/93 Time 1230
Organism Batch #: 105 Diluent Batch #: 19
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia dubia

60634 93-AUG17-24 entered 8/19 mf

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:
$Cl^- = 0.07$ mg/L

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	24.1 @ 24.2	8.3 @ 24.0	1005 @ 1,000 9670 @ 10,000 @ 24.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.4 @ 24.5	8.4 @ 24.0	1010 @ 1,000 9680 @ 10,000 @ 24.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.0 @ 25.1	8.3 @ 24.6	1010 @ 1,000 9690 @ 10,000 @ 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	UNCORRECTED 24 h	UNCORRECTED 48 h
Control	A	5	5	5	8.1		8.3	23.9		25.2	8.1		7.8	170		185
Control	B	5	5	5			8.3			25.1			7.9			180
Control	C	5	5	5			8.3			24.9			7.9			180
Control	D	5	5	5			8.3			24.7			7.8			170
100%	A	5	5	0	8.4		8.8	23.5		25.7	7.7		7.6	935		935
100%	B	5	5	0			8.8			25.2			7.8			950
100%	C	5	5	0			8.8			24.8			7.9			935
100%	D	5	5	0			8.8			24.8			7.9			940
Measured/Loaded by:		KP	JR	TR	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TR	TM	TR	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures
Tobin C. Rader
Tina Mikulski
Marshall Faircloth

Reviewer

	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0	—	KH
Lab Total Residual Cl2:	<0.03	<0.03	0.07	DR-100	TM
Alkalinity:	125	70	260	Hach	TM
Hardness:	120	80	205	Hach	TR
Total Ammonia:	<0.017	<0.017	<0.017	orion	mf

Ammonia Meter #98136 Ammonia Meter Slope: -54.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: PEBBLE CREEK VILLAGE
Location:
County: HILLSBOROUGH
Contact/District: PAT FRICANO / SW
NPDES Permit #: FL0039896 Outfall #:

Sample Collection: Date 8/16/93 Time 11:15
Test Beginning: Date 8/17/93 Time 1200
Test Ending: Date 8/19/93 Time 1230
Organism Batch #: 34 Diluent Batch #: Well
Organism Age: 9 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) Definitive (Static) Static Renewal | Flow-through
93-AUG-17-24 60634 extend 8/19 mr

Test Number: 2 of 2

Remarks: $Cl^- = 0.07$ mg/L

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	24.1@24.2	8.3@24.0	1005@1,000; 9670@10,000@24.7°C
24 hr	7.0@7.0, 9.0@9.0	24.4@24.5	8.4@24.0	1010@1,000; 9680@10,000@24.5°C
48 hr	7.0@7.0, 9.0@9.0	25.0@25.1	8.3@24.6	1010@1,000; 9690@10,000@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
Control A	120	5	5	5	7.8	8.1	8.2	24.1	24.3	24.4	8.1	7.1	7.4	245	245	245
Control B	390	5	5	5	7.8	8.1	8.2			24.2	8.1	7.0	7.3	245	245	245
100% A	891	5	4	4	8.3	8.5	8.6	23.1	24.3	24.4	7.7	6.6	7.3	970	985	985
100% B	413	5	5	5	8.3	8.5	8.6			24.4	7.7	6.5	7.4	970	985	985
Measured/Loaded by:		TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM
Recorded by:		TR	TM	TM	TR	TR	TM	TR	TR	TR	TR	TR	TR	TR	TR	TR

Investigators' Signatures
Robin C. Rader
Tina Mikulsky
Marshall Faircloth

Reviewer

	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0	—	KH
Lab Total Residual Cl2:	<0.03	<0.03	0.07	DR-100	TM
Alkalinity:	125	70	260	Hach	TM
Hardness:	120	80	205	Hach	TR
Total Ammonia:	<0.017	<0.017	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -54.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/0/93

Benthic macroinvertebrate taxa list for Pebble Creek WWTP, collected via Hester-Dendy artificial substrates in Rocky Creek (reference site), on 22 April, 1993, and downstream of the outfall in Pebble Creek (test site), on 16 August, 1993. Densities, in number/m^2, represent the mean of three replicates.

	Rocky Ck. Reference Site	Pebble Ck. Test Site
Acarina		
Sperchon sp.	1.0	–
Diptera		
Ablabesmyia mallochi	2.0	–
A. rhamphe grp.	58.6	1.0
Asheum beckae	30.3	–
Chironomus sp.	–	6.1
Cladotanytarsus sp.	17.2	–
Cricotopus bicinctus	14.1	–
Cryptochironomus sp.	3.0	–
Cryptotendipes sp.	6.1	–
D. neomodestus	339.4	–
D. simpsoni	141.4	–
Endochironomus nigricans	3.0	–
E. subtendens	52.5	–
Glyptotendipes sp.	48.5	–
Goeldichironomus natans ?	–	2.0
Labrundinia neopilosella	3	–
L. pilosella	3	–
Nanocladius sp.	3	–
Palpomyia grp. sp.	3	–
Parachironomus directus	3	–
Polypedilum tritum	–	1.0
Pseudochironomus sp.	187.9	–
Tanytarsus sp. A Epler	3.0	–
T. sp. C Epler	31.3	–
T. sp. G Epler	9.1	–
T. sp. K Epler	21.2	–
T. sp. L Epler	31.3	–
T. sp. T Epler	13.1	–
Xenochironomus xenolabis	2.0	–
Undetermined dipteran pupa	37.4	7.1
Ephemeroptera		
Caenis sp.	292.9	–
Callibaetis floridanus	25.3	–
Stenonema exiguum	1.0	–
Stenacron sp.	1.0	–
S. interpunctatum	1.0	–
Gastropoda		
Amnicola dalli johnsoni	2.0	–

Hebetancyclus excentricus	38.4	–
Micromenetus dilatus	5.1	–
M. floridensis	8.1	–
Physella sp.	39.4	–
Planorbella duryi	25.3	–
Pseudosuccinea columella	1.0	–
Pyrogophorus platyrachis	–	123.2
Hirudinea		
H. triserialis	1.0	–
Malacostraca		
Hyalella azteca	155.6	1.0
Procambarus sp.	–	1.0
P. fallax	–	4.0
Odonata		
Enallagma cardenium	2.0	–
E. pollutum	12.1	–
Epitheca princeps	1.0	–
Ischnura hastata	3.0	–
I. posita	1.0	–
I. ramburii	2.0	–
Pachydiplax longipennis	1.0	–
Oligochaeta		
Aulodrilus pigueti	5.1	–
Chaetogaster limnaei	1.0	–
D. pectinata	1.0	–
Nais communis	1.0	–
N. pardalis	5.1	–
Stylaria lacustris	1.0	–
Pelecypoda		
Sphaerium or *Musculium* sp.	15.2	–
Platyhelminthes		
Dugesia sp.	7.1	–
Rhynchocoela		
Prostoma rubra	1.0	–
Trichoptera		
Cyrnellus sp.	5.1	–
C. fraternus	5.1	–
Hydropsyche sp.	17.2	–
Oecetis sp.	5.1	–
Orthotrichia sp.	17.2	–
Oxyethira sp.	5.1	–

Periphyton taxa list and densities (#/mm^2) for Pebble Creek WWTP, collected via glass microscope slides in Pebble Creek downstream of the discharge (test site), on 16 August, 1993. No specific reference site data were available.

	Test Site
Diatoms	
Achnanthes affinis	2
A. delicatula	2
A. exigua	30
A. lanceolata	2
A. linearis	8
A. minutissima	2
Amphora normanii	8
Anomoeonies vitrea	–
Caloneis sp.	–
Cocconeis placentula	40
Cyclotella meneghiniana	4
Diploneis ovalis	–
Eunotia monodon	2
E. pectinalis	19
Frustulia rhomboides v. *capitata*	–
Gomphonema sp.	4
G. affine	–
G. gracile	2
G. parvulum	4
Navicula sp.	2
N. capitata	–
N. confervacea	2
N. constans	2
N. cryptocephala	2
N. gysingensis	–
N. halophila	–
N. minima	19
N. pupula	2
N. pupula v. *mutata*	2
N. pupula v. *rectangularis*	–
N. pygmaea	2
N. viridula	4
Neidium affine	–
Nitzschia amphibia	30
N. microcephala	4
N. obtusa	–
N. palea	11
N. romana	2
N. tryblionella	–
Pinnularia sp.	–
P. intermedia	2
P. subcapitata	11
Synedra ulna	–
Unidentified pennate diatom	–

Chlorophyta	
Ankistrodesmus sp.	2
Coelastrum sp.	–
Cosmarium sp.	–
Gloeocystis sp.	–
Scenedesmus sp.	4
Staurastrum sp.	–
Stigeocolonium sp.	17
Uronema sp.	4
Cyanophyta	
Anabaena sp.	–
Chroococcus sp.	15
Lyngbya sp.	6
Oscillatoria sp.	8
Phormidium sp.	6
Rhabdoderma sp.	–
Total	288

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0039896		930816		B	S	2

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FLC03986		930816		X	S	2

Remarks

21 66