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Biological Assessment of

Apalachicola WWTP

Franklin County

NPDES #FL00038857

Sampled February 1998

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November 1998

Biology Section
Division of Administrative and Technical Services
Bureau of Laboratories

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: City of Apalachicola WWTP
County: Franklin
NPDES Number: FL0038857
State Permit Expiration Date: 31 December 1997 (extended until action is taken)

Toxics Sampling Inspection (XSI)

Date Sampled: 24 February 1998

Results: No organic pollutants were detected in the effluent. Effluent iron (1,110 µg/L) and silver (0.42 µg/L) exceeded Class III water quality standards, representing violations of Rules 62-302.530(39) and 62-302.530(60) FAC, respectively.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 24 February 1998

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 24 February 1998

Results: Periphyton communities at the Huckleberry Creek test site differed from those found at the nearby control stream, Tilton Creek. These changes may have been related to the somewhat higher pH, conductivity, and nutrient regime of the test site, or due to differences in the respective wetland-dominated headwaters. Benthic macroinvertebrate communities collected via dip-net sweeps and Hester-Dendys indicated stressed conditions at both the control and test sites. It is probable that periodic desiccation is the dominant factor stressing the invertebrates in both streams. No additional degradation attributable to the discharge was evident.

Water Quality Inspection (WQI)

Date Sampled: 24 February 1998

Results: Nutrient concentrations at the test site were not particularly elevated for a Florida stream, although they were higher than those observed at the control site. Neither the control site (0.3 mg dry wt/L) or the test site (3.8 mg dry wt/L) exceeded the algal growth potential "problem threshold" of 5 mg dry wt/L. Effluent dissolved oxygen (2.0 mg/L) did not comply with the facility's permit limit.

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 Apalachicola Wastewater Treatment Plant is located in Franklin County, Florida (see maps in Appendix). Treatment at this 1.0 MGD domestic wastewater facility consists of bar screens, followed by an aerated grit chamber, surge tank, single stage biological nitrification, clarification, single-stage biological nitrification, clarification, flow metering chlorination, and a holding pond. Sludge is treated by aerobic digestion followed by sand drying beds and ultimate disposal at the landfill. The effluent is discharged into a municipally-owned wetland (Huckleberry Swamp), which flows into Huckleberry Creek, and ultimately into Apalachicola Bay.

State permit limits for the Apalachicola WWTP effluent are listed in Table 1. Monthly operating report data and other sources indicated numerous permit violations (see Appendix). On April 28, 1997, a consent order was drafted due to the many permit violations which occurred from January 15, 1997, to March 31, 1997. These included exceedances of total nitrogen, ammonia, biochemical oxygen demand, and total suspended solids. The state permit expired on December 31, 1997, but has been extended until an agency action can be developed and a new permit issued. Past impact assessments conducted on February 26, 1991, revealed elevated concentrations of total nitrogen, total phosphorus, biological oxygen demand, chlorophyll *a*, and algal growth potential in Huckleberry Swamp.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. Field samples were collected on February 24, 1998. A comparison of biological community health was made between a control site (in Tilton Creek, which is located approximately 1,500 meters from the discharge) and a test site (located in Huckleberry Creek, approximately 1,000 meters from the discharge after having passed through Huckleberry Swamp) (see maps in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and for organic constituents (base, neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

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

Benthic macroinvertebrate communities were evaluated at control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip-net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days.

Phytoplankton were sampled at both control and test sites via subsurface grabs. Periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. Chlorophyll *a* was also determined for phytoplankton communities. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests.

All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of the SOP's can be viewed on our web site at 'www.dep.state.fl.us/labs/sops.htm'.

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat assessment, taxa richness, Shannon-Weaver Diversity Index, the Florida Index, Ephemeroptera/Plecoptera/Trichoptera (EPT) Index, community composition, functional feeding groups, algal biomass, and the Stream Condition Index (SCI). For a discussion of each of these measures, see *Explanation of Measurements of Community Health* in Appendix.

For graphical purposes, the percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus control site divided by the control site (Figure 1). The percent differences between the control and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to bluegreen algae ratio, and the % filter-feeders are measured as the control site minus test site divided by the control site (Figure 2).

The following personnel were involved in this investigation: Derek Adkins and Glenn Butts

(DEP Northwest District), Julie Baughman, Ken Espy, Marshall Faircloth, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Chris Morgan, Urania Quintana, Johnny Richardson, Lisa Tamburello, David Whiting, and Vicki Whiting (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, Russel Frydenborg, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality was "optimal" at the control (126 points) and test (115 points) sites (see Habitat Assessment Field Data Sheets in Appendix). Woody debris, leaf packs, undercut banks, and roots made up about 15% of the substrate at both sites. During sampling, leaves and debris were observed at 0.3 meters above the water level, indicating recent flooding. Water velocity was "marginal" at both sites.

The pH at the test site (6.7 SU) was substantially higher than the control site (4.1 SU), probably due to the influence of the discharge, which had a pH of 7.1 SU (Table 1). This variation in pH of 2.6 SU, from that of the background, is a violation of Class III water quality standards (Rule 62-302.530(52)(c) FAC). Typical, swamp-flow dominated streams in the area have naturally low pH. Dissolved oxygen at the test site (6.7 mg/L) and the control site (5.2 mg/L) complied with the Class III water quality standard of 5.0 mg/L. Dissolved oxygen in the effluent was 2.0 mg/L, a violation of the facility's permit limit of 5.0 mg/L. The effluent BOD was 6.15 mg/L which was below the permit limit of 10.0 mg/L. Specific conductance was higher at the test site (162 µmhos/cm) than at the control site (45 µmhos/cm), probably due to the influence of the discharge, which had a conductivity of 650 µmhos/cm.

No organic pollutants were detected in the effluent. Aluminum, cadmium, copper, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards (Table 1). The iron (1,110 µg/L) and silver (0.42 µg/L) concentrations measured in the effluent represent violations of Class III water quality standards (Rules 62-302.530(39) and 62-302.530(60) FAC, respectively.

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

Fecal and total coliforms in the Apalachicola WWTP discharge were 22 counts/100mL and 880 counts/100mL, respectively. These levels were in compliance with permit limits and Class III water quality standards. Further, all study site levels of fecal and total coliform and *Escherichia coli* complied with permit limits and Class III water quality standards (Table 1).

Considering the effluent concentrations of total phosphorus (2.5 mg/L), ammonia (5.0 mg/L), orthophosphate (1.8 mg/L), and nitrate+nitrite (0.086 mg/L), nutrient concentrations at the test site were relatively low, although they were higher than those observed at the control site. For example, ammonia increased from 0.013 mg/L at the control site to 0.022 mg/L at the test site, while nitrate+nitrite,

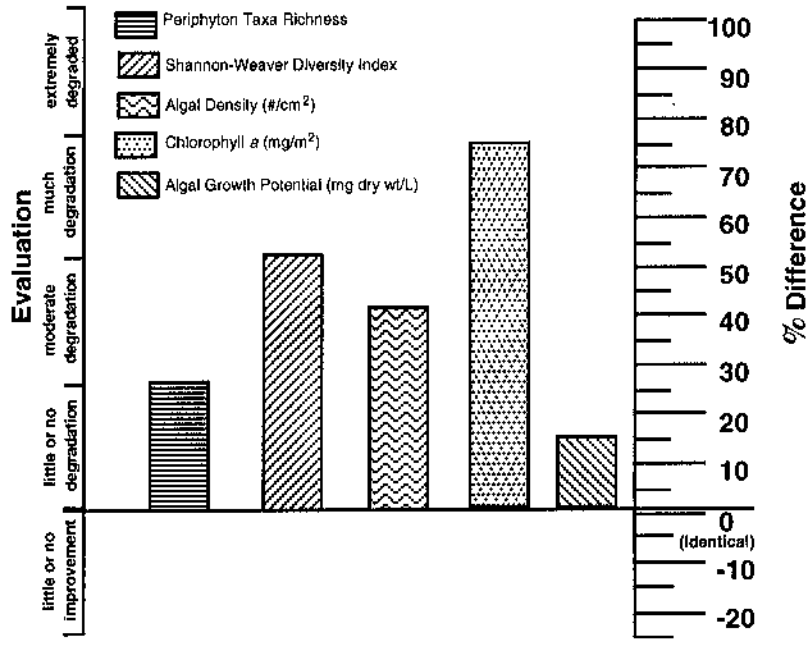


Figure 1. Effect of discharge on the phytoplankton community.

Table 1. Effluent permit limits and summary of chemistry data.

City of Apalachicola WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
None detected				
Metals (µg/L)				
Aluminum	≤ 1,500 **	226 J	-	-
Arsenic	≤ 50 **	40 U	-	-
Cadmium	≤ 2.1 **c	0.07 I	-	-
Chromium	≤ 404 **c	10 U	-	-
Copper	≤ 24 **c	11	-	-
Iron	≤ 1,000 **	1110	-	-
Lead	≤ 9.0 **c	1.2	-	-
Mercury	≤ 0.012 **	0.10 U	-	-
Nickel	≤ 315 **c	7 U	-	-
Selenium	≤ 5.0 **	50 U	-	-
Silver	≤ 0.07 **	0.42	-	-
Zinc	≤ 212 **c	31	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	1.8	0.004 U	-
Total phosphorus	≤ 3.67 *a	2.5	0.010 I	0.17
Ammonia	-	5.0	0.013 I	0.022
Nitrate+Nitrite	-	0.086	0.004 U	0.017
TKN	≤ 14.6 *a	7.7	0.60	0.66
Total Nitrogen	≤ 15.25 *a	7.79	-	-
General Phys-Chem Parameters				
Habitat Assessment	-	-	126	115
D.O. (mg/L)	≥ 5.0 *	2.0	5.2	6.7
pH (SU)	6.0-8.0 *	7.1	4.1	6.7
Conductivity (µmhos/cm)	-	650	45	162
Temperature (°C)	-	16.2	13.4	11.8
B.O.D., 5 day (mg/L)	≤ 10.0 *a	6.15	-	-
Tot. Residual Chlorine (mg/L)	≤ 0.01 *	0.03 U	-	-
Flow (MGD)	≤1.0 *	0.622	-	-
Hardness (mg $CaCO_3$)	-	226.5	-	-
AGP (mg dry wt/L)	-	-	0.256 I	3.823
Toxicity				
Bioassay Fish	-	no mortality	-	-
Bioassay Invertebrate	-	no mortality	-	-
Microbiology (# organisms/100 mL)				
Escherichia Coli	-	36	22	62
Fecal Coliforms	≤200 *	22	6	36
Total Coliforms	-	880	80	250

* Permit limit
** Class III water quality standard
a - Annual average
c - Value is calculated based on hardness
I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit
J - Estimated value
U - Material analyzed for but not detected; value reported is the minimum detection limit

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

City of Apalachicola WWTP	Control Site	TestSite
Phytoplankton Algae		
Number of Taxa	10	18
Shannon-Weaver Diversity	2.4	3.3
Chlorophyll a (µg/L)	1.12 U	1.12 U
Algal Density (#/mL)	185	347
% Blue-green	4	4
% Green	75	48
% Diatoms	6	33
% Cryptophyceae	15	14
% Other	0.0	1
Periphyton Algae		
Number of Taxa	19	14
Shannon-Weaver Diversity	3.3	1.6
Algal Density (#/cm^2)	12,826	541,667
Chlorophyll a (mg/m^2)	0.12 U	8.95
Diatom/Diatom + B-G Ratio	1.0	1.0
% Blue-green	1.0	0.3
% Diatoms	61.0	29.0
AGP (mg dry wt/L)	0.256 I	3.823

I – Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit
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which was undetected at the control site, was 0.017 mg/L at the test site. Total phosphorus was 0.010 mg/L and ortho-phosphate was not detected at the control site. These test site concentrations are not particularly elevated for a Florida stream (see *Table of Typical Water Quality Values* in Appendix).

Neither the control site (0.3 mg dry wt/L) nor the test site (3.8 mg dry wt/L) exceeded the algal growth potential "problem threshold" of 5 mg dry wt/L (Raschke and Schultz 1987).

Periphyton communities at the test site differed from those found at the nearby control stream, Tilton Creek (Table 2). Neither site was particularly taxa rich, with 19 taxa found at the control site and 14 taxa at the test site. Shannon-Weaver diversity decreased from 3.3 at the control site to 1.6 at the test site, accompanied by large test site increases in algal density (from 12,826/mL at the control site to 541,667/mL at the test site). The dominant cell at the test site was *Characium* sp., a green alga. Chlorophyll *a* was undetected at the control site, but fairly typical at the test site with, 8.95 mg/m^2. These changes may be related to the higher pH, conductivity, and nutrient regime of the test site, or due to differences in the respective wetland-dominated headwaters. The pH at the control site (4.1 SU) was not optimal for abundant algal growth, while the 6.7 SU pH at the test site was more conducive to periphyton growth.

Benthic macroinvertebrate communities collected via dip-net sweeps indicated stressed conditions at both the control and test sites (Table 3). The Florida Index scores were low at both the control (4 points) and test sites (2 points). The EPT Index was similarly depressed, with no EPT's recovered from the control site and only two found at the test site. The pollution-tolerant enchytraeid oligocheates made up 63% of the control site population, while the somewhat-tolerant amphipod, *Hyalella azteca*, composed 57% of the test site population. The Stream Condition Index (SCI) placed both sites (with 13 points each) in the "severely degraded" category (Appendix).

Hester-Dendy results were analogous to the dip-net results (Table 3). Figure 2 indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values suggest that the test site is healthier than the control site. In the Hester-Dendy samples, only 6 taxa were found at the control site, while 13 taxa were recovered from the test site. Shannon-Weaver diversity was 1.8 at the control site and 2.6 at the test site. Suspension feeders were much more common at the control site (with 61% contribution) than at the test site (with 0.2% of the community using the filter-feeding strategy). Each site scored only 5 points on the Florida Index, while no EPT taxa were collected from either site.

Conclusion

Although habitat quality was "optimal" at both sample sites, watershed observations and physiographic data suggest that periodic desiccation may be a factor common to both streams, especially Tilton Creek.

Dissolved oxygen in the effluent (2.0 mg/L) did not comply with the permit limit of 5.0 mg/L. The effluent BOD (6.15 mg/L) also contributed to the low dissolved-oxygen, but did not exceed the permit limit of 10.0 mg/L. The pH at the test site (6.7 SU) was substantially higher than the control site (4.1 SU), probably due to the influence of the discharge, which had a pH of 7.1 SU. Typical, swamp-flow dominated streams in the area have naturally low pH values. This variation in pH is a violation of Class III water quality standards (Rule 62-302.530(52)(c) FAC).

No organic pollutants were detected in the effluent. Aluminum, cadmium, copper, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards. Effluent iron (1,110 µg/L) and silver (0.42 µg/L) concentrations were in violation of Class III water quality standards (Rules 62-302.530(39) and (60) FAC, respectively).

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

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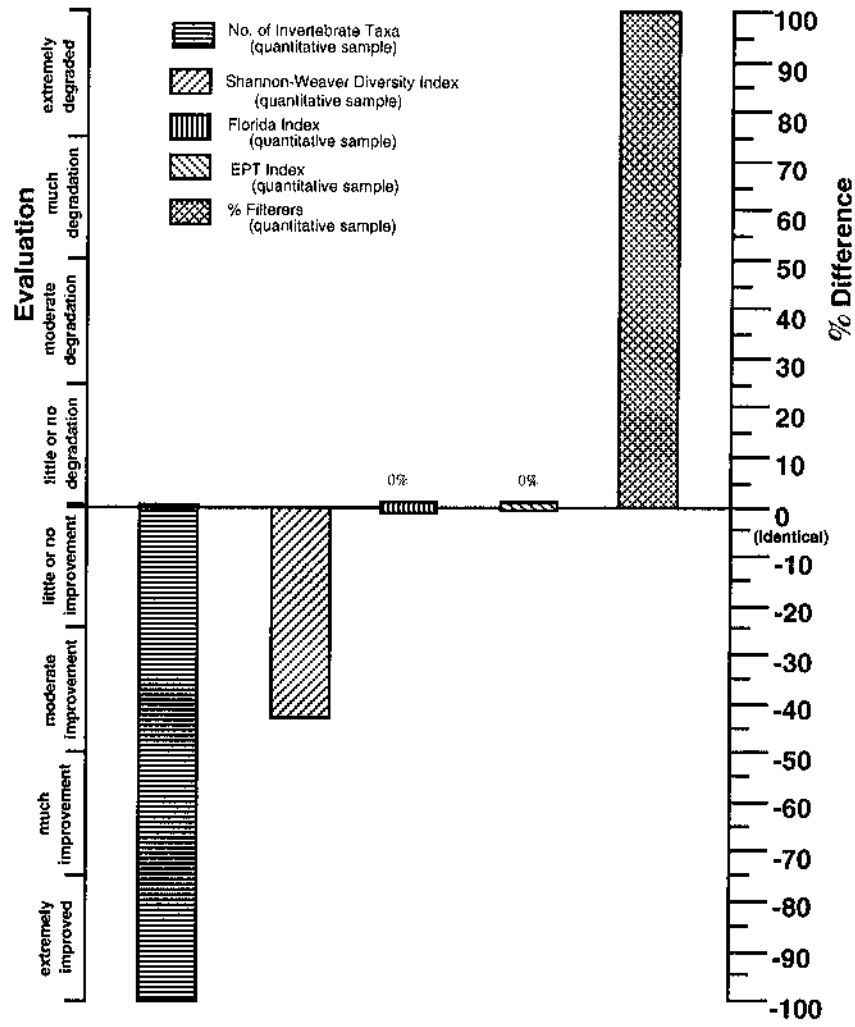


Figure 2. Effect of discharge on the benthic marcroinvertebrate community.

Nutrient concentrations at the test site were not particularly elevated for a Florida stream, although they were higher than those observed at the control site.

Neither the control or test sites exceeded the algal growth potential "problem threshold" of 5 mg dry wt/L.

Periphyton communities at the test site differed from those found at the nearby control stream, Tilton Creek. These changes may have been related to the somewhat higher pH, conductivity, and nutrient regime of the test site, or due to differences in the respective wetland-dominated headwaters.

Benthic macroinvertebrate communities collected via dip-net sweeps and Hester-Dendys indicated stressed conditions at both the control and test sites. It is probable that periodic desiccation is the dominant factor stressing the invertebrates in both streams. No additional degradation attributable to the discharge was evident.

Watershed observations, coupled with the coastal physiographic nature of the study sites, may

Table 3. Major characteristics of macroinvertebrate community structure of control and test sites.

City of Apalachicola WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	18	16
Florida Index	4	2
SCI	13	13
EPT Index	0.0	2
% Dominant Taxon	63	57
Community Composition		
% Amphipoda	4	57
% Coleoptera	1	0.0
% Diptera	24	7
% Ephemeroptera	0.0	2
% Gastropoda	0.0	15
% Isopoda	1	17
% Oligochaeta	70	2
% Other	1	0.0
Functional Feeding Groups		
% Predators	4	2
% Burrowing Deposit Feeders	70	2
% Surface Deposit Feeders	9	34
% Suspension Feeders	11	2
% Scrapers	0.0	15
% Shredders	2	29
Macroinvertebrate Hester-Dendy		
Number of Taxa	6	13
Florida Index	5	5
Shannon-Weaver Diversity	1.8	2.6
EPT Index	0.0	0.0
Community Composition		
% Coleoptera	17	0.3
% Diptera	83	3
% Amphipoda	6	17
% Gastropoda	0.0	45
% Isopoda	0.0	36
% Trombidiformes	6	0.0
Functional Feeding Groups		
% Predators	20	0.3
% Surface Deposit Feeders	8	8
% Suspension Feeders	61	0.2
% Scrapers	0.0	45
% Shredders	0.0	8

help explain the macroinvertebrate data. The swampy headwaters of both Tilton and Huckleberry Creeks are only slightly above sea level, with flow in the streams appearing to be highly dependant upon local rainfall. It is probable that Tilton Creek goes dry during periods of little or no rainfall. This periodic desiccation would be the dominant factor stressing the invertebrates at the control site. Even though sampling occurred shortly after flooded conditions, water velocity and depth was rather low in both streams.

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Explanation of Measurements of Community Health

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

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

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

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

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

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

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

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

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

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

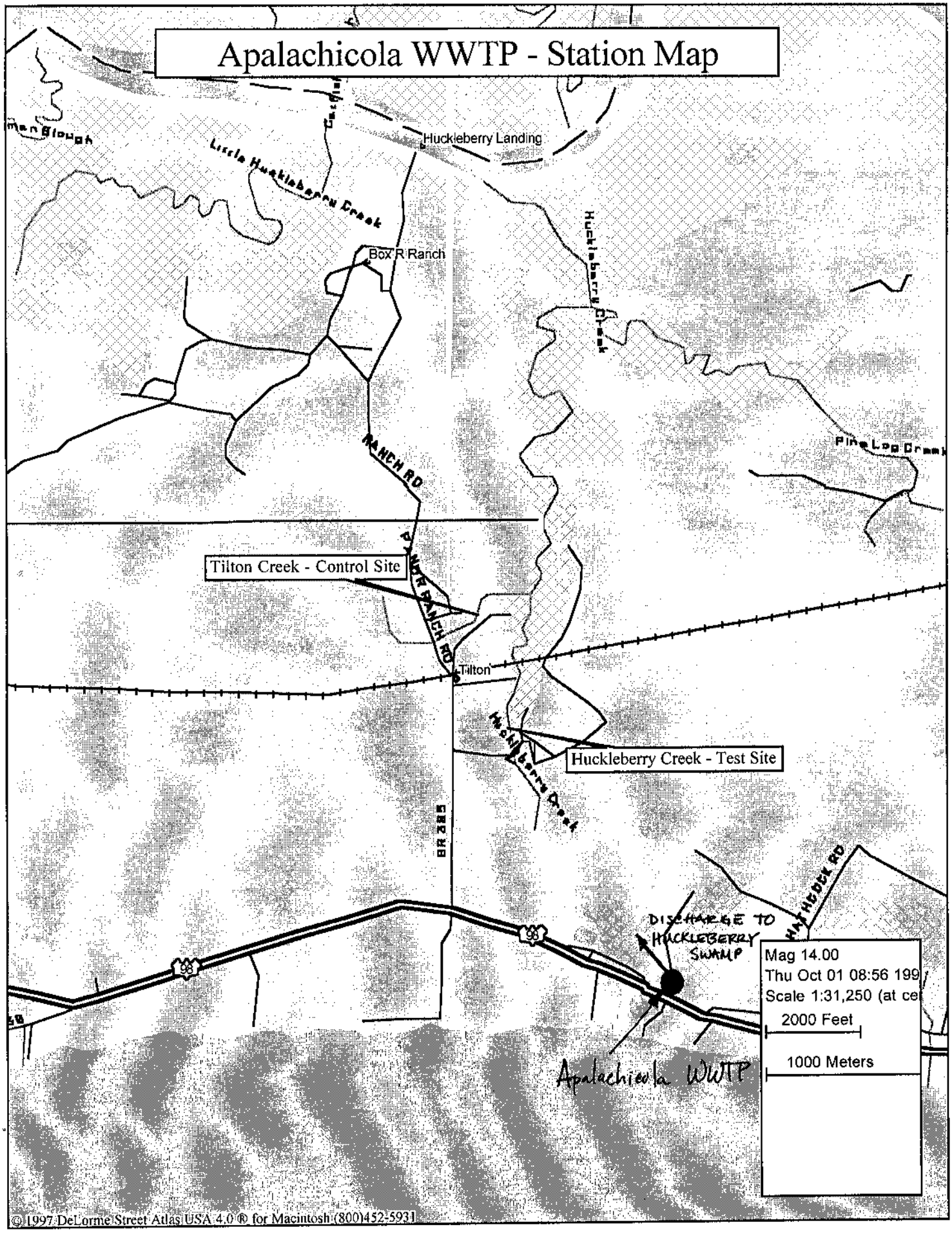
Typical Values for Selected Parameters in Florida Waters

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


Apalachicola WWTP - Station Map
Huckleberry Landing
Little Huckleberry Creek
Box R Ranch
Huckleberry Creek
RANCH RD
Pine Log Creek
Tilton Creek - Control Site
Tilton
Huckleberry Creek - Test Site
BR 385
DISCHARGE TO HUCKLEBERRY SWAMP
Mag 14.00
Thu Oct 01 08:56 199
Scale 1:31,250 (at ce
2000 Feet
1000 Meters
Apalachicola WWTP
© 1997 DeLorme Street Atlas USA 4.0 ® for Macintosh (800)452-5931

Facility Summary

Facility Name: Apalachicola Waste Water Date Summary Prepared:02/25/98

Location map: County: Franklin District:
Northwest\10
P.O. Box 10
Apalachicola, FL 32329

NPDES\State Permit #DT19-226155 Facility Type: Ind.
expiration date:December 31, 1997 Dom. Fed. Agric.
(has been extended until an agency action can be made)

Function of facility: 1.0 MGD Wastewater Treatment Facility to wetland (Huckleberry Swamp) to Huckleberry Creek.

Description of treatment process: Wastewater treatment is provided by bar screens, followed by an aerated grit chamber, surge tank, single stage biological nitrification, clarification, flow metering chlorination, and a holding pond. Sludge is treated by aerobic digestion followed by sand drying beds and ultimate disposal at the landfill.

Receiving waters:Huckleberry Swamp to Huckleberry Creek Classification: I
II III

Design Flow: 1.0 MGD Mean Flow: 0.878 Flow during survey:0.622

Discharge is: Continuous Intermittent Seasonal Rainfall dependent
Other (describe)
best time to sample is:

If facility has a mixing zone, give details (size, parameters, etc.)
NONE

List effluent limits (attach relevant paperwork):

Parameter	Frequency	Sample Type	Limit (units)
Flow	Continuos		1.0 MGD (max. mo. avg. daily flow)
pH-Eff	Continuos	Grab	6.0 (min) 8.0 (max)

Chlorine (1) Residual	Continuos	Grab	0.01 mg/L (max)
Dissolved Oxygen	Daily, 7/wk	Grab	5.0 mg/L (min)
CBOD5-Inf	Weekly	16 hr. Comp	N/A
CBOD5-Eff mg/L (max.	Weekly	16 hr. Comp	10.0 annual avg.)
Suspended Solids-Inf	Weekly	16 hr. Comp	N/A
Suspended mg/L (max. Solids-Eff	Weekly	16 hr. Comp	15.0 annual avg.)
Fecal Colliform	Weekly	Grab	200/100 mL (max)
TKN mg/L (max	Weekly	16 hr. Comp	14.6 annual avg.)
Total Phosphorus mg/L (max	Weekly	16 hr. Comp	3.67 annual avg.)
NO2-NO3	Weekly	16 hr. Comp	N/A
Temperature	Weekly	Grab	N/A
Total Nitrogen mg/L (max	Weekly	16 hr. Comp	15.25 annual avg)
Ammonia	Weekly	16 hr. Comp	N/A

List permit violations (from MOR data or other source) and plant upsets within past year:
10/31/95 Permit Effluent Violation--Suspended Solids
10/31/95 Permit Effluent Violation--Suspended Solids
10/31/95 Permit Effluent Violation--Nitrogen & Ammonia
11/30/95 Permit Effluent Violation--Suspended Solids
11/30/95 Permit Effluent Violation--BOD, 5-Day Percent Removal
11/30/95 Permit Effluent Violation--Nitrogen & Ammonia
12/31/95 Permit Effluent Violation--BOD, 5-Day Percent Removal
12/31/95 Permit Effluent Violation--Nitrogen & Ammonia
1/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
1/31/96 Permit Effluent Violation--Nitrogen & Ammonia
1/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
2/29/96 Permit Effluent Violation--Suspended Solids
2/29/96 Permit Effluent Violation--BOD, 5-Day Percent Removal

2/29/96 Permit Effluent Violation--Nitrogen & Ammonia
3/31/96 Permit Effluent Violation--Suspended Solids
3/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
5/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
5/31/96 Permit Effluent Violation--Nitrogen & Ammonia
6/30/96 Permit Effluent Violation--Nitrogen & Ammonia
2/28/95-7/31/96 Continuing Noncompliance--Suspended Solids
2/28/95-7/31/96 Continuing Noncompliance--Fecal Coliform
2/28/95-7/31/96 Continuing Noncompliance--Total Residual Chlorine
8/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
8/31/96 Permit Effluent Violation--Nitrogen & Ammonia
9/30/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
9/30/96 Permit Effluent Violation--Nitrogen & Ammonia
1/31/95-9/30/96 Continuing Noncompliance-- Nitrogen & Ammonia
11/30/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
11/30/96 Permit Effluent Violation--BOD violation/mo. avg. single sample
11/30/96 Permit Effluent Violation--Nitrogen & Ammonia
12/31/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
12/31/96 Permit Effluent Violation--Nitrogen & Ammonia
1/31/97 Permit Effluent Violation--BOD, 5-Day Percent Removal
1/31/96 Permit Effluent Violation--Nitrogen & Ammonia
1/31/96 Permit Effluent Violation--BOD violation/mo. avg. single sample
2/28/96 Permit Effluent Violation--BOD, 5-Day Percent Removal
2/28/96 Permit Effluent Violation--Nitrogen & Ammonia
2/28/96 Permit Effluent Violation--BOD violation/mo. avg. single sample
3/31/97 Permit Effluent Violation--BOD, 5-Day Percent Removal
3/31/97 Permit Effluent Violation--Nitrogen & Ammonia
***On April 28, 1997 a consent order was being drafted due to the violations occurring from 1/15/97-3/31/97.
4/30/97 Permit Effluent Violation--BOD, 5-Day Percent Removal
4/30/97 Permit Effluent Violation--Nitrogen & Ammonia
4/30/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
5/31/97 Permit Effluent Violation--BOD, 5-Day Percent Removal
5/31/97 Permit Effluent Violation--Nitrogen & Ammonia
5/31/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
6/30/97 Permit Effluent Violation--Nitrogen & Ammonia
2/28/95/6/30/97 Continuing Noncompliance-- BOD violation/mo. avg. single sample
7/31/97 Permit Effluent Violation--Nitrogen & Ammonia
7/31/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
2/28/95-7/31/96 Continuing Noncompliance--Fecal Coliform
2/28/95-7/31/96 Continuing Noncompliance--Total Residual Chlorine
2/28/95-7/31/96 Continuing Noncompliance--Suspended Solids
8/31/97 Permit Effluent Violation--Suspended Solids
8/31/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
8/31/97 Permit Effluent Violation--Nitrogen & Ammonia
8/31/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
9/30/97 Permit Effluent Violation--Nitrogen & Ammonia
9/30/97 Permit Effluent Violation--BOD violation/mo. avg. single sample
2/28/95-9/30/96 Continuing Noncompliance--Flow,in conduit or thru threat
2/28/95-9/30/96 Continuing Noncompliance-- Nitrogen & Ammonia
2/28/95-9/30/96 Continuing Noncompliance-- BOD, 5-Day Percent Removal
10/31/97 Permit Effluent Violation--Nitrogen & Ammonia
10/31/97 Permit Effluent Violation--BOD violation/mo. avg. single sample

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

Past impact assessments conducted on February 26,1991 revealed high nitrogen and phosphorus in the Apalachicola WWTP effluent. The receiving wetland was found to be very high in TN, TP, BOD, ammonia, chlorophyll and AGP.

See Attachment

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

No samples have been taken

Additional information:

Staff contributing to this review (signature)

Glenn Butts

Biologist

Inspector

Engineer

Derek Adkins

Other

Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 2/24/98	TIME Start 9:00am 9:25 finish	RECEIVING BODY OF WATER: Outfall
REMARKS:	COUNTY: Franklin	LOCATION: Apalachicola WWTP of ~ - Hwy 98		FIELD ID/NAME: settling pond + pump station

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)

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

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

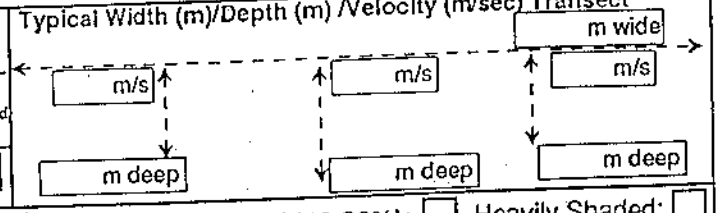
Width of riparian vegetation (m) on least buffered side: *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

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

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots							

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth		16.2	7.1	2.0	650			
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: pH meter stirred at 7.99 + 7.03 (D.O. in settling pond 2.3) Sunny Breezy 50°F

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

SAMPLING TEAM: Chris Morgan, Vicki Whitington, Ken Sapp

SIGNATURE:

DATE 2/24/98

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-90)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/DD/Y):	TIME	RECEIVING BODY OF WATER:
		2/24/98	10:09 / 10:20	Huckleberry Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Franklin	Huckleberry creek	Test 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)

Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [X] Slight [ ] Moderate potential [ ] Obvious sources [ ]

Width of riparian vegetation (m) on least buffered side: >18m — *List & map dominant vegetation on back*

Artificially Channelized [X] no [ ] recent, severe [ ] some recovery [ ] mostly recovered, more sinuous

Artificially Impounded [ ] yes

High Water Mark: .2 (m above present water level) + .9 (present depth in m) = 1.1 (m above bed)

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

Flooded!

.1 m/s, 9 sec	m/s, 6 sec.	m/s, 6 sec.	m wide
.6 m deep	.9 m deep	.7 m deep	

6.1

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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] 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)	10	IIII DH		Sand			
Leaf Packs or Mats	1	III		Mud/Muck/Silt			
Aquatic Vegetation	2	IIII		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	1	III		*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	0.3	11.8	6.7	6.7	162			
Bottom								

System Type : Stream: [X] (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: [ ] Wetland: [ ] Estuary: [ ] Other: [ ]

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [X] Green (algae): [ ] Clear: [ ] Other: [ ]

Weather Conditions/Notes:
cool, sunny 60's
Flooded out of Banks

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

SAMPLING TEAM:	SIGNATURE:	DATE:
VW, CM, KE		2/24/98

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 2/24/98	RECEIVING BODY OF WATER:

REMARKS:	LOCATION: Huckleberry Creek	FIELD ID/NAME: Test site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **7**	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 **20**	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 **18**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 **18** 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

115 TOTAL SCORE

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-90)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		2/24/98	11:41 a.m. 12:00	

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Franklin	Tilton creek	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)
2	98						

Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [X] Slight [ ] Moderate potential [ ] Obvious sources [ ]

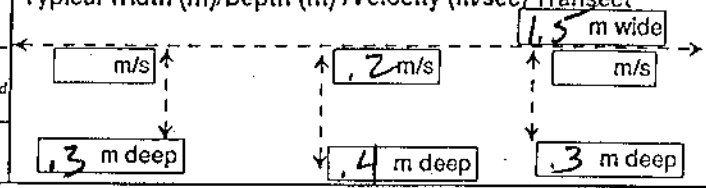
Width of riparian vegetation (m) on least buffered side: >18 — *List & map dominant vegetation on back*

Artificially Channelized [X] no [ ] recent, severe [ ] some recovery [ ] mostly recovered

Artificially Impounded [ ] yes — more sinuous

High Water Mark: .4 m (m above present water level) + .3 (present depth in m) = .7 (m above bed)

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



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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] 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)	3	6		Sand	93	2	
Leaf Packs or Mats	6	6		Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	3	6		*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		13.4	4.10	5.2	45 µmho/cm			
Bottom								

System Type : Stream: [X] (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: [ ] Wetland: [ ] Estuary: [ ] Other: [ ]

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [X] Green (algae): [ ] Clear: [ ] Other: [ ]

Weather Conditions/Notes: Sunny

Evidence of recent flooding, well defined leaf pks @ .3m above water level. Tribs cut into main ck

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

SAMPLING TEAM:	SIGNATURE:	DATE:
KE, VW, CM.		2/24/98

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE(M/D/Y): 2/24/98	RECEIVING BODY OF WATER:

REMARKS:	LOCATION: Tilton creek	FIELD ID/NAME: Reference site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [9]	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 [18]	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 [19]	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 riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. (20) 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

[92] **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Apalachicola WWTP
County: Franklin
Contact / District: Glenn Butts / Northeast
NPDES Permit #: FL0038857
LIMS Sample #: 309355 NW - DIST LIMS Job #: 1998 DA-25-01
sample log: 3/20/98 DW

Sample Collection: Date 2-24-98 Time 09:00
Test Beginning: Date 2-25-98 Time 11:00a
Test Ending: Date 2-27-98 Time 10:45
Organism Batch #: 11 Diluent Batch #: 9
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.5-25.5 °C
incubator 23.9-25.0 °C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.2 @ 25.1 °C	96.7 @ 96.3 984 @ 1005 @ 24.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.4 @ 22.4	8.2 @ 25.3 °C	9760 @ 10059 983 @ 96.3 987 @ 1005 @ 24.6 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 23.9	8.1 @ 25.5 °C	98.5 @ 96.3 995 @ 1005 @ 25.4 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm))		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control A	A	5	5	5	8.0		8.2	23.7		24.5	8.2		7.8	165		175
Control B	B	5	5	5	~~7.0~~		8.2			24.5			7.8			180
Control C	C	5	5	5			8.2			24.5			7.7			180
Control D	D	5	5	5			8.2			24.4			~~7.5~~			185
100% A	A	5	5	5	7.2		8.5	25.0		24.3	5.8		7.9	725		765
100% B	B	5	5	5			8.5			24.4			7.8			760
100% C	C	5	5	5			8.5			24.4			7.8			755
100% D	D	5	5	5			8.5			24.3			7.8			785
Measured/Loaded by:		FW	MF	MF	MF	MF	MF	MF		MF	MF		MF	MF		MF
Recorded by:		MF	MF	MF	FW	FW	FW	FW		FW	FW		FW	FW		FW

Investigators' Signatures
Marshall Faircloth
Jane Merkert

Water Quality Parameters (Salt Water / Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		Not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	DR-100	FW
Alkalinity (mg/L as $CaCO_3$):	75	163	Hach	FW
Hardness (mg/L as $CaCO_3$):	86	276	Hach	FW
Total ammonia (mg/L as N):	<0.017	5.44	ORION	FW/MF

Ammonia Meter #98136 Ammonia Meter Slope: -59.7 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

reviewer

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Apalachicola WWTP
County: Franklin
Contact / District: Glenn Butts / Northeast
NPDES Permit #: FL0038857
LIMS Sample #: 309355 **LIMS Job #:** 998 02-25-01 (NW Dist)
sample log: 3/20/98 ow

Sample Collection: Date 2-24-98 Time 09:00
Test Beginning: Date 2-25-98 Time 1100
Test Ending: Date 2-27-98 Time 10:45
Organism Batch #: 12 **Diluent Batch #:** Well H2O
Organism Age: 13 days
Test Organism: Cyprinella leedsi

Test Type: Screening | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 24.5-25.5°C
incubator 25.0-26.0°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.0	8.2 @ 25.1 °C	96.7 @ 96.3 944 @ 1005 @ 24.5°C (9750 µS)
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.4 @ 22.4	8.2 @ 25.3 °C	98.3 @ 96.3 983 @ 1005 @ 24.6 °C (10089 µS)
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 23.9	8.1 @ 25.5 °C	98.5 @ 96.3 995 @ 1005 @ 25.4 °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	G8 9	5	5	5	7.9	8.1	8.3	24.7	25.2	24.3	8.0	7.9	7.7	250	265	275
Control B	G4 10	5	5	5	7.9	8.2	8.3	24.8	25.2	25.7	8.0	7.9	7.8	250	265	275
Control C	G10 11	5	5	5	7.9	8.2	8.3	24.8	25.4	25.7	8.0	8.0	8.0	250	275	275
Control D	G12	5	5	5	7.9	8.2	8.3	24.8	25.4	25.8	8.0	7.8	7.7	255	275	280
100 % A	G13	5	5	5	7.3	7.9	8.1	25.6	25.7	25.5	6.0	7.0	7.2	770	760	770
100 % B	G14	5	5	5	7.3	7.9	8.1	25.8	25.3	25.7	5.9	6.9	7.0	775	765	780
100 % C	G15	5	5	5	7.2	7.9	8.1	25.7	25.5	25.7	5.8	6.6	6.6	770	780	790
100% D	G16	5	5	5	7.2	7.9	8.1	25.5	25.6	26.1	5.8	6.6	6.9	770	780	795
Measured/Loaded by:		MF	MF	MF	DMF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW

Investigators' Signatures
Marshall Faircloth
Tim Hendrick

Salt Water: (Well Water)

Water Quality Parameters (verified by MF)

	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		Not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	DR700	FW
Alkalinity (mg/L as $CaCO_3$):	125	130	Hach	FW
Hardness (mg/L as $CaCO_3$):	125	226	Hach	FW
Total ammonia (mg/L as N):	<0.017	5.45	Orion	FW/MF

Ammonia — Ammonia — Ammonia — Control — Sample
Meter #90126 Meter Slope: -54.7 — Blank: (0.0) — Salinity: 0 ppt — Salinity: 0 ppt

Apalachicola WWTP - Control Site

Macroinvertebrate Dip-net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	18	≥27	26-14	<14	3
EPT Index	0	≥6	5-3	<3	1
# Chironomid Taxa	3	≥9	8-5	<5	1
% Contribution of Dominant Taxon	63	≤25	26-62	>62	1
% Diptera	24	-	≤60	>60	3
Florida Index	4	≥13	12-7	<7	1
% Suspension feeders/Filterers	11	≥13	12-7	<7	3
Total Score		**Panhandle**			**13**
Interpretation of Scores		**Excellent**			27-33
		Good			21-26
		Poor			14-20
		Severely Degraded			**7-13**

Winter Index Period: Stream Condition Index (SCI) for Florida Panhandle (April 1996)

Apalachicola WWTP - Test Site

Macroinvertebrate Dip-net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	16	≥27	26-14	<14	3
EPT Index	2	≥6	5-3	<3	1
# Chironomid Taxa	4	≥9	8-5	<5	1
% Contribution of Dominant Taxon	57	≤25	26-62	>62	3
% Diptera	7	-	≤60	>60	3
Florida Index	2	≥13	12-7	<7	1
Suspension feeders/Filterers	2	≥13	12-7	<7	1
Total Score		**Panhandle**			**13**
Interpretation of Scores		**Excellent**			27-33
		Good			21-26
		Poor			14-20
		Severely Degraded			**7-13**

Winter Index Period: Stream Condition Index (SCI) for Florida Panhandle (April 1996)

Phytoplankton taxa list and densities (#/mL) for City of Appalachicola WWTP, collected via subsurface grabs in Tilton Creek, on 24 February, 1998.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	4	22
Cocconeis sp.	–	4
Cyclotella sp.	4	–
Gomphonema sp.	–	7
Navicula sp.	–	11
Nitzschia sp.	–	48
Pinnularia sp.	4	–
Synedra sp.	–	4
Undetermined pennate diatom	–	18
Chlorophyceae		
Carteria sp.	8	–
Chlamydomonas sp.	50	26
Closterium sp.	4	–
Cosmarium sp.	–	4
Tetraedron sp.	–	4
Ulothrix sp.	–	11
Undetermined Chlorophyceae	77	115
Chrysophyceae		
Synura sp.	–	4
Cryptophyceae		
Chroomonas sp.	15	26
Cryptomonas sp.	12	22
Cyanophyceae		
Dactylococcopsis sp.	8	11
Oscillatoria sp.	–	4
Euglenophyceae		
Euglena sp.	–	7

Periphyton taxa list and densities (#/cm^2) for City of Appalachicola WWTP, collected via glass microscope slides in Huckleberry Creek, on 24 February, 1998.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes hungarica	118	3472
Achnanthes lanceolata dubia	118	1736
Achnanthes linearis	–	1736
Cocconeis placentula	2471	32986
Eunotia curvata	235	1736
Eunotia sp.	353	–
Eunotia tenella	588	–
Frustulia rhomboides	471	–
Gomphonema parvulum	–	1736
Gomphonema sp.	–	1736
Navicula decussis	118	–
Navicula minima	118	32986
Pinnularia subcapitata	118	–
Undetermined pennate diatom	1177	6944
Chlorophyceae		
Characium sp.	3177	375000
Chlamydomonas sp.	471	–
Chlorococcum sp.	–	1736
Mougeotia sp.	941	–
Stigeoclonium sp.	–	5208
Ulothrix sp.	118	–
Undetermined Chlorophyceae	118	–
Chrysophyceae		
Dinobryon sp.	118	–
Cyanophyceae		
Chroococcus sp.	118	–
Merismopedia sp.	–	1736

Benthic macroinvertebrate taxa list for Apalachicola WWTP, collected via 20 discrete dip net sweeps in Huckleberry Creek, on 24 February, 1998.

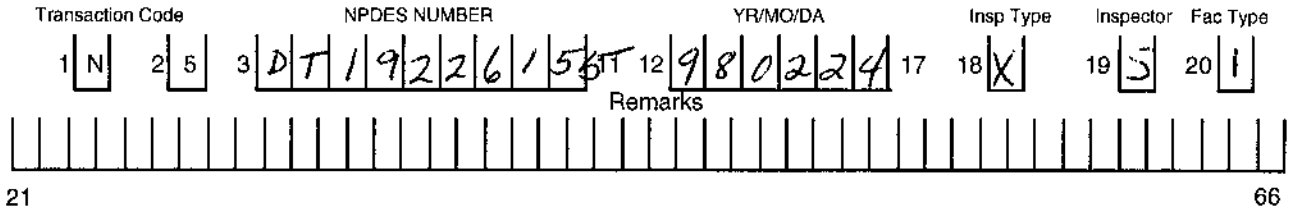
	Control Site	Test Site
Amphipoda		
Crangonyx sp.	6	–
Hyalella azteca	–	65
Coleoptera		
Neoporus sp.	1	–
Collembola		
Undetermined Collembola	1	–
Diptera		
Chironomidae	5	–
Culicoides sp.	1	–
Dicrotendipes simpsoni	–	1
Ephydridae	1	–
Glyptotendipes sp.	–	1
Odontomyia sp.	–	1
Orthocladiinae	3	–
Palpomyia/Bezzia grp. sp.	5	–
Polypedilum illinoense grp. sp.	–	1
Polypedilum tritum	3	–
Sciomyzidae	–	1
Simulium sp.	16	–
Tanytarsus sp.	1	2
Tanytarsus sp. F Epler	–	1
Tanytarsus sp. V Epler	1	–
Tipulidae	2	–
Ephemeroptera		
Baetis sp.	–	1
Caenis sp.	–	1
Gastropoda		
Ancylidae	–	8
Hydrobiidae	–	1
Micromenetus dilatatus	–	2
Physella sp.	–	5
Undetermined Gastropoda	–	1
Hemiptera		
Undetermined Hemiptera	–	1
Isopoda		
Caecidotea sp.	1	19
Oligochaeta		
Dero digitata	1	–
Eclipidrilus palustris	1	–
Eclipidrilus sp.	6	–
Enchytraeidae	100	2
Naididae	1	–

Pristina leidyi	1	–
Tubificidae	1	–
Trombidiformes		
Oribatei sp.	1	–

Benthic macroinvertebrate taxa list for Apalachicola WWTP, collected via Hester-Dendy artificial substrates in Huckleberry Creek, on 24 February, 1998. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Amphipoda		
Crangonyx sp.	3	–
Hyalella azteca	–	127
Undetermined Amphipoda	–	13
Coleoptera		
Dytiscidae	–	3
Neoporus sp.	8	–
Diptera		
Chironomidae	–	3
Corynoneura sp. C Epler	–	3
Corynoneura taris	3	3
Parametriocnemus sp. F Epler	3	–
Simulium sp.	29	–
Tanytarsus sp. G Epler	–	3
Gastropoda		
Ancylidae	–	98
Hebetancylus excentricus	–	122
Micromenetus sp.	–	103
Physella sp.	–	37
Undetermined Gastropoda	–	16
Isopoda		
Caecidotea sp.	–	299
Trombidiformes		
Undetermined Trombidiformes	3	–

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



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

