

Biological Assessment of

City of Chattahoochee Wastewater Treatment Plant

Gadsden County

NPDES #FL0027669

Sampled December 1993

May 1994

Biology Section
Division of Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: City of Chattahoochee STP
County: Gadsden
NPDES Number: FL0027669
State Permit Expiration Date: 24 October 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 14 December 1993

Results: No organic pollutants or pesticides were detected in the effluent. The few metals found in the discharge were within Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 14 December 1993

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 14 December 1993

Results: Measures of benthic macroinvertebrate community health indicated improved conditions at the test site. Taxa richness, Florida Index, and EPT index values were better at the test site, compared to the reference site, while the Shannon-Weaver diversity was the same at both stations. The Stream Invertebrate Index for Florida (SIIF) supported this trend. While the reference site received 15 SIIF points (indicating moderate impairment), the test site scored 25 points (demonstrating healthy conditions). These data suggest that the pollution sources affecting the reference site (*e.g.*, the Florida State Hospital or stormwater) should be identified and mitigated. Periphyton communities appeared to be only slightly affected by the discharge. There were slight decreases in periphyton chlorophyll *a*, taxa richness, and the diatom to blue-green ratio at the test site, compared to the reference site. *Eunotia pectinalis,* an organism generally associated with mesotrophic to eutrophic waters, was the dominant taxon at both stations.

Water Quality Inspection (WQI)

Date Sampled: 14 December 1993.

Results: Fecal coliforms in the effluent violated the facility's permit limit, while the total coliforms exceeded Class III standards. Fecal coliform violations were found at the test site, while total coliform violations were seen at both the reference and test sites (Rules 17-302.530(6) FAC and 17-302.530(7) FAC). With the exception of nitrate-nitrite, nutrient concentrations of the receiving water stations were fairly average for Florida streams. Nitrate-nitrite concentrations at the reference and test sites were both higher than those found in approximately 90% of typical Florida streams. Previous data suggest that the discharge from the Florida State Hospital WWTP, located upstream, is a potential source of the nutrients. Reference and test site AGP's were both approximately six times higher than the 5 mg dry wt/L "problem threshold". The AGP of the moderately enriched effluent was 118 mg dry wt/L, indicating that it has the potential to contribute to enrichment problems during periods of lower in-stream dilution.

Introduction

The City of Chattahoochee wastewater treatment plant is located in Gadsden County, Florida (see maps in Appendix). This is a 0.5 MGD, contact stabilization facility. Disinfected, dechlorinated effluent is discharged to the Class III Mosquito Creek, a tributary of the Apalachicola River. Sludge is aerobically digested and de-watered in sludge drying beds. Permit limits (as annual averages) are as follows: BOD (20 mg/L), TSS (20 mg/L), TKN (20 mg/L), flow (0.5 MGD), pH (6.0-8.5 S.U.'s), chlorine residual (0.5 mg/L minimum for disinfection, 0.01 mg/L maximum at discharge), dissolved oxygen (4.0 mg/L minimum) and fecal coliform bacteria (200 organisms/100 mL maximum). An annual toxicity test is also required. During the present survey, the flow was 0.27 MGD.

There are several problems reported for this facility. A recent inspection (July 1993) indicated a discolored effluent (ashy appearance), excessive inflow/infiltration, violations of the facility's flow limit, and violations of the minimum chlorine residual limit (water line feeding to the chlorine contact chamber had been shut off). Other violations on record include exceeding the limits for fecal coliforms and TSS, as well as improper chlorination (chlorine residual is routinely below the disinfection minimum, although it also has exceeded the discharge maximum allowed).

Methods

The focus of this investigation was to determine the dischargers' effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Mosquito Creek approximately 100 meters upstream of the discharge) and a test site (located in Mosquito Creek approximately 50 meters downstream of the discharge. 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

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	31	41
Florida Index	15	19
% Contribution of Dominant Taxon	24.4	16.7
EPT Index	2	8
SIIF	15	25
% Ephemeroptera	33	25.6
% Oligochaeta	8	15.6
% Coleoptera	15.9	7.8
% Diptera	37.5	31.1
%Amphipoda	0	12.2
% Odonata	0	4.4
% Other	5.6	3.3
% Predators/Carnivores	11.8	11.7
%Deposit feeders (above surface)/ Collector-Gatherers	56.8	49.7
% Deposit feeders (below surface)	8.9	17.3
% Suspension feeders/Collector-Filterers	5.1	8.0
%Scavengers	0.6	8.0
% Plant piercers	1.3	0
%Scrapers	8.2	7.4
%Shredders	9.0	5.9
% Parasites	0	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	20	22
Florida Index	15	20
Shannon-Weaver Diversity	3.6	3.6
EPT Index	4	6
% Diptera	56.8	56.9
% Ephemeroptera	28.5	29.1
% Plecoptera	8.7	3.5
% Trichoptera	0	5.9
% Megaloptera	3.4	1.2
%Other	2.6	3.4
% Predators	21.3	7.8
% Collector-Gatherers	33.1	45.6
% Collector-Filterers	35.8	25.3
% Scrapers	7.2	13.1
% Shredders	2.5	8.2
% Scavengers	1.0	0

Major characteristics of community structure of control and test sites (continued).

Periphyton Algae		
Number of Taxa	33	25
% Contribution of Dominant Taxon	13.5	18.4
Chlorophyll a (mg/sq. m)	2.8	1.4
Diatom/Diatom + B-G Abundance Ratio	0.96	0.87
% Blue-green	4.2	13.4
% Green	2.7	0
% Diatoms	94.8	86.6
% Other	0.5	0
Algal Growth Potential (mg dry wt/l)	34.1	32.3

screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on effluent samples from the facility (Weber 1991). The effluents were analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on both effluent samples, as well as on water from the reference and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using 20 discrete dip net sweeps. Additional 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 total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

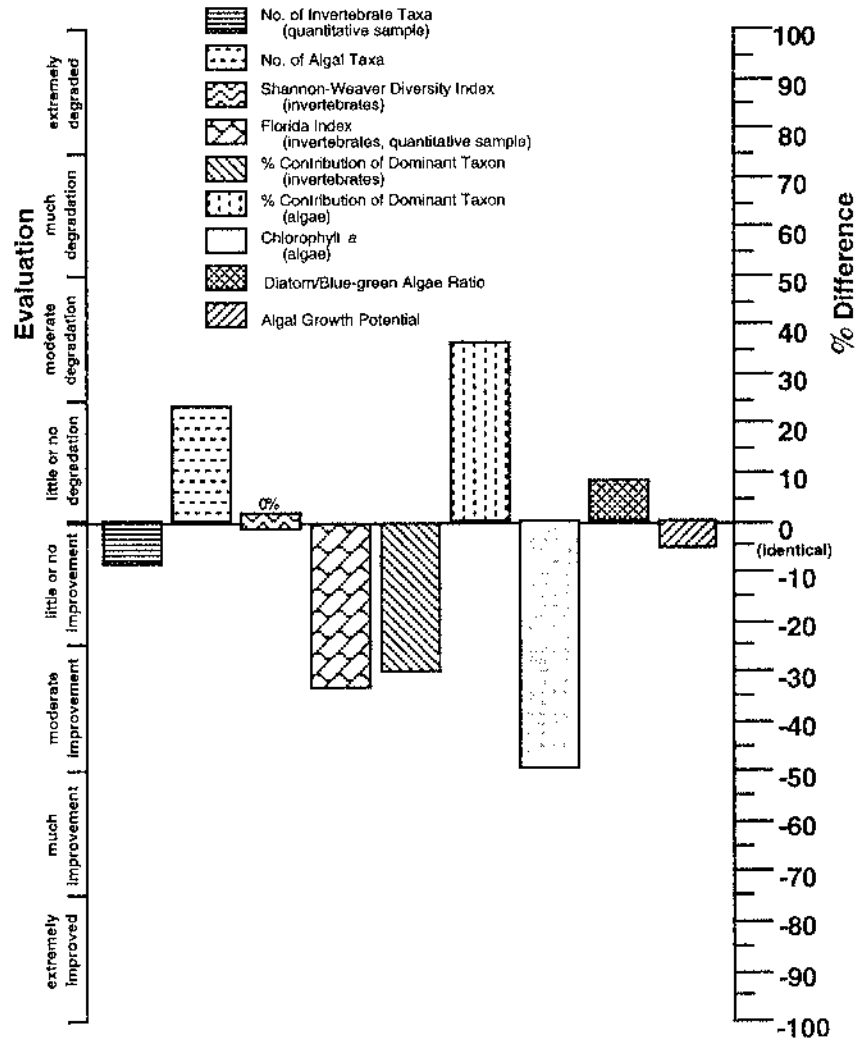
Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed in this report. Many of these, such as the number of taxa and Shannon-Weaver Diversity Index 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). The Ephemeroptera/Plecoptera/Trichoptera (EPT) Index is calculated by summing the number of distinct taxa of EPT's represented in a sample. A higher EPT Index is associated with good water quality. Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. 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). The Stream Invertebrate Index for Florida (SIIF) is a composite metric which is based upon the macroinvertebrate communities found at Florida Eco-regional reference sites sampled with dip net sweeps (EA Engineering 1994). The SIIF assigns 5, 3, or 1 point(s) to a variety of invertebrate parameters, depending on how closely that parameter approaches the expected Eco-regional reference condition. Five points is the best score for metrics which are particularly strong at discriminating between healthy and impaired sites (see SIIF calculation table in Appendix). The following parameters are used in calculating the SIIF for the Panhandle: taxa richness, EPT Index, % contribution of the dominant taxa, % Diptera, Florida Index, % suspension feeders/filterers, and % shredders (EA Engineering 1994). In the Panhandle, 23-29 SIIF points indicates no impairment, 15-22 points indicates moderate impairment, and 7-14 points is clear evidence of severe degradation. In the Florida Peninsula, these same parameters, along with the # of crustacean and mollusk taxa and the % of crustacean and mollusk taxa, are used to calculate the SIIF. In the Peninsula, 27-33 SIIF points indicates no impair-

ment, 17-26 points indicates moderate impairment, and 9-16 points is clear evidence of severe degradation.

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 blue-green 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: Glenn Butts and Dawn Gorres (DEP Northwest District) and Chris Barge, Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathy Lurding, Edward Miller, Liz Miller, Urania Quintana, Landon Ross, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Bioassessment Review Committee, consisting of Jan Mandrup-Poulsen, Wayne Magley, and Mike Tanski, as well as District representatives.



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

Results and Discussion

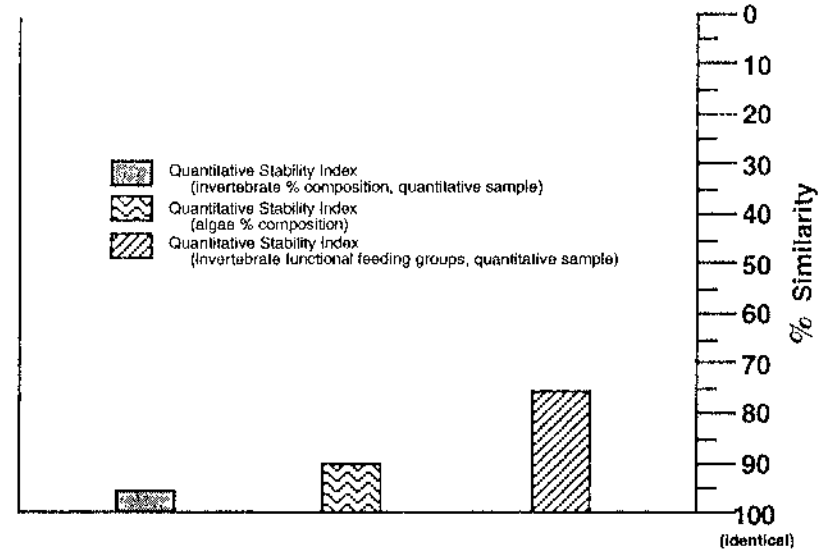
Habitat quality was similar at both study sites (habitat scores were 85 and 79 for reference and test sites, respectively). The reference site had more available substrate and somewhat better water velocity than did the test site. The latter scored higher with respect to riparian zone vegetation, bank stability, and artificial channel alterations. Water velocity was the same at both sites (0.3 m/sec), and the pH was near neutral (6.9 at the reference; 7.5 at the test site). Specific conductance was slightly higher at the downstream station (400 µmhos/cm and 600 µmhos/cm at reference and test sites, respectively). Dissolved oxygen was 8.2 mg/L at the reference site and 8.5 mg/L at the test site.

The sample of Chattahoochee WWTP effluent was not toxic to the test organisms, *Cyprinella leedsi* and *Ceriodaphnia dubia*.

No organic priority pollutants were found in the discharge. The metals aluminum (219 µg/L), iron (98 µg/L), and zinc (41 µg/L) were detected in the effluent at levels exceeding the practical quantitation limit. At the calculated hardness of 117.1 mg/L $CaCO_3$, these values were within Class III water quality standards.

Nutrients were moderately elevated in the effluent sample, but were well within the permit requirements (see Chemistry Sum-

mary Table in Appendix). With the exception of nitrate-nitrite, nutrient concentrations of the receiving water stations were fairly average for Florida stream systems (see table of Typical Water Quality Parameters in Appendix). Nitrate-nitrite concentrations, which were 0.61 mg/L at the reference site and 0.62 mg/L downstream, were both higher than those found in approximately 90% of typical Florida streams. The discharge from the Florida State Hospital WWTP, which is located about one mile upstream from the reference site, is the possible source of this nitrate-nitrite. Nitrate-nitrite concentrations in the Florida State Hospital effluent have previously been measured at 9.6 mg/L, causing elevated nitrate-nitrite (0.6 mg/L) in Mosquito Creek (see Appendix).



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

Algal growth potential (AGP) results demonstrated that there was an enrichment problem in Mosquito Creek, but that the Chattahoochee WWTP was not the sole source of the nutrients. Reference site AGP was 34.1 mg dry wt/L, while the test site AGP decreased to 32.3 mg dry wt/L. Again, high AGP's at the upstream site are probably related to other sources, such as the Florida State Hospital WWTP effluent. According to Raschke and Schultz (1987), at AGP levels above 5 mg dry wt/L, enrichment problems such as excessive algal growth and D.O. sags are likely to occur. The AGP of the Chattahoochee effluent was 118 mg dry wt/L, indicating that it has the potential to contribute to enrichment problems during periods of lower instream dilution.

Fecal and total coliforms in the Chattahoochee WWTP discharge were 670 organisms/100 mL and 30,000 organisms/100 mL, respectively. The fecal coliforms violated the facility's permit limit, while the total coliforms exceeded Class III standards. Fecal coliform bacteria counts were 2,100 organisms/100 mL at the reference site and 3,200 organisms/100 mL at the test site. Total coliform bacteria levels were 18,000 organisms/100 mL at the reference site and 20,000 organisms/100 mL at the test site. Therefore, fecal coliform violations occurred at the test site, while total coliform violations were seen at both the reference and test sites (Rules 17-302.530(6) FAC and 17-302.530(7) FAC).

Quantitative measures of benthic macroinvertebrate community health indicated somewhat improved conditions at the test site. The figure on p. 3 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference. The figure on this page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation. A complete taxa list is in the Appendix.

On the basis of artificial substrate samplers, species richness was slightly better at the test site, increasing from 20 taxa at the reference site to 21 taxa below the discharge. The Florida Index was 15 at the reference site, increasing to 20 at the test site. Shannon-Weaver diversity was identical at both sites (3.6). The Quantitative Stability Index for percent composition, as well as the QSI for functional feeding groups, indicated no major differences between sites.

Dip net samples showed even more improvement in the macroinvertebrate communities downstream of the discharge. For example, taxa richness, the Florida Index, and the EPT Index increased by 32%, 27%, and 300%, respectively, between the reference and test sites. The Stream Invertebrate Index for Florida (SIIF) supported this trend. While the reference site

received 15 SIIF points (indicating moderate impairment), the test site scored 25 points (demonstrating healthy conditions). These data suggest that the pollution sources affecting the reference site (*e.g.*, the Florida State Hospital or stormwater) should be identified and mitigated.

Periphyton communities appeared to be only slightly affected by the discharge. While 33 taxa were collected at the reference site, 25 were represented in the test site sample (see taxa list in Appendix). There was a slight decrease in periphyton biomass (chlorophyll *a*) at the test site (1.4 mg/m^2), compared to the upstream condition (2.8 mg/m^2). The diatom, *Eunotia pectinalis,* was the dominant taxon at both stations (13.4% at the reference site, 18.4 % at the test site). *Eunotia pectinalis* is a taxon generally associated with mesotrophic to eutrophic waters (Whitmore 1989). While diatoms were most numerous at both stations (94.8% at the test site, 86.6% at the reference site), the test site had a somewhat higher abundance of cyanophytes, leading to a slight decrease in the diatom to blue-green ratio. The QSI for percent composition indicated strong similarity between the sites.

Conclusions

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

No organic pollutants or pesticides were detected in the effluent. The few metals detected in the effluent were within Class III water quality standards.

Nutrients were moderately elevated in the effluent sample, but were well within the permit requirements. With the exception of nitrate-nitrite, nutrient concentrations of the receiving water stations were fairly average for Florida stream systems. Nitrate-nitrite concentrations at the reference and test sites were both higher than those found in approximately 90% of typical Florida streams. Previous data suggests that the discharge from the Florida State Hospital WWTP, which is located about one mile upstream from the reference site, is a potential source of this nitrate-nitrite.

Algal growth potential (AGP) results demonstrated that there was an enrichment problem in Mosquito Creek, but that the Chattahoochee WWTP was not the sole source of the nutrients. Reference and test site AGP's were both approximately six times higher than the 5 mg dry wt/L "problem threshold", although the test site value was slightly less than the upstream level. The AGP of the Chattahoochee effluent was 118 mg dry wt/L, indicating that it has the potential to contribute to enrichment problems during periods of lower in-stream dilution.

Fecal coliforms in the effluent violated the facility's permit limit, while the total coliforms exceeded Class III standards. Fecal coliform violations were found at the test site, while total coliform violations were seen at both the reference and test sites (Rules 17-302.530(6) FAC and 17-302.530(7) FAC).

Measures of benthic macroinvertebrate community health indicated improved conditions at the test site. Taxa richness, Florida Index, and EPT index values were better at the test site, compared to the reference site, while the Shannon-Weaver diversity was the same at both stations. The Stream Invertebrate Index for Florida (SIIF) supported this trend. While the reference site received 15 SIIF points (indicating moderate impairment), the test site scored 25 points (demonstrating healthy conditions). These data suggest that the pollution sources affecting the reference site (*e.g.*, the Florida State Hospital or stormwater) should be identified and mitigated.

Periphyton communities appeared to be only slightly affected by the discharge. There were slight decreases in periphyton chlorophyll a, taxa richness, and the diatom to blue-green ratio at the test site, compared to the reference site. *Eunotia pectinalis,* an organism generally associated with mesotrophic to eutrophic waters, was the dominant taxon at both stations. The QSI for percent composition indicated a strong similarity between the sites.

Literature Cited

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

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

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

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

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

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

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

Chemistry summary table for City of Chattahoochee WWTP.

	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
none detected			
Metals (ug/L)			
Aluminum	219		
Arsenic	20 U		
Antimony	15 U		
Cadmium	0.08 U		
Copper	5 U		
Chromium	10 U		
Iron	98		
Lead	15 U		
Mercury	0.20 U		
Nickel	5 U		
Selenium	30 U		
Silver	0.07 I		
Zinc	41		
Nutrients (mg/L)			
Ortho-phosphate	0.80	0.038 I	0.045 I
Total phosphorus	1.1	0.052	0.060 A
Ammonia	2.4	0.020 U	0.020 U
Nitrate+Nitrite	2.2	0.61	0.62
TKN	4.2	0.27	0.30 A
Other Parameters			
Habitat Assessment		85	79
D.O. (mg/L)		8.2	8.5
pH (SU's)	7.3	6.9	7.5
Conductivity (µmhos/cm)	435	400	600
Temperature (°C)		16.5	12.0
Hardness (mg/L CaCO3)	117.1		
BOD5 (N-Inhibited, mg/L)	9.85 A		
TSS (mg/L)	22.0		
AGP (mg dry wt/L)	118.6	34.1	32.3
Bioassay Fish	not toxic		
Bioassay Invertebrate	not toxic		
Fecal coliform (org/100 mL)	670	2100	3200
Total coliform (org/100mL)	30,000	18,000	20,000

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

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

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

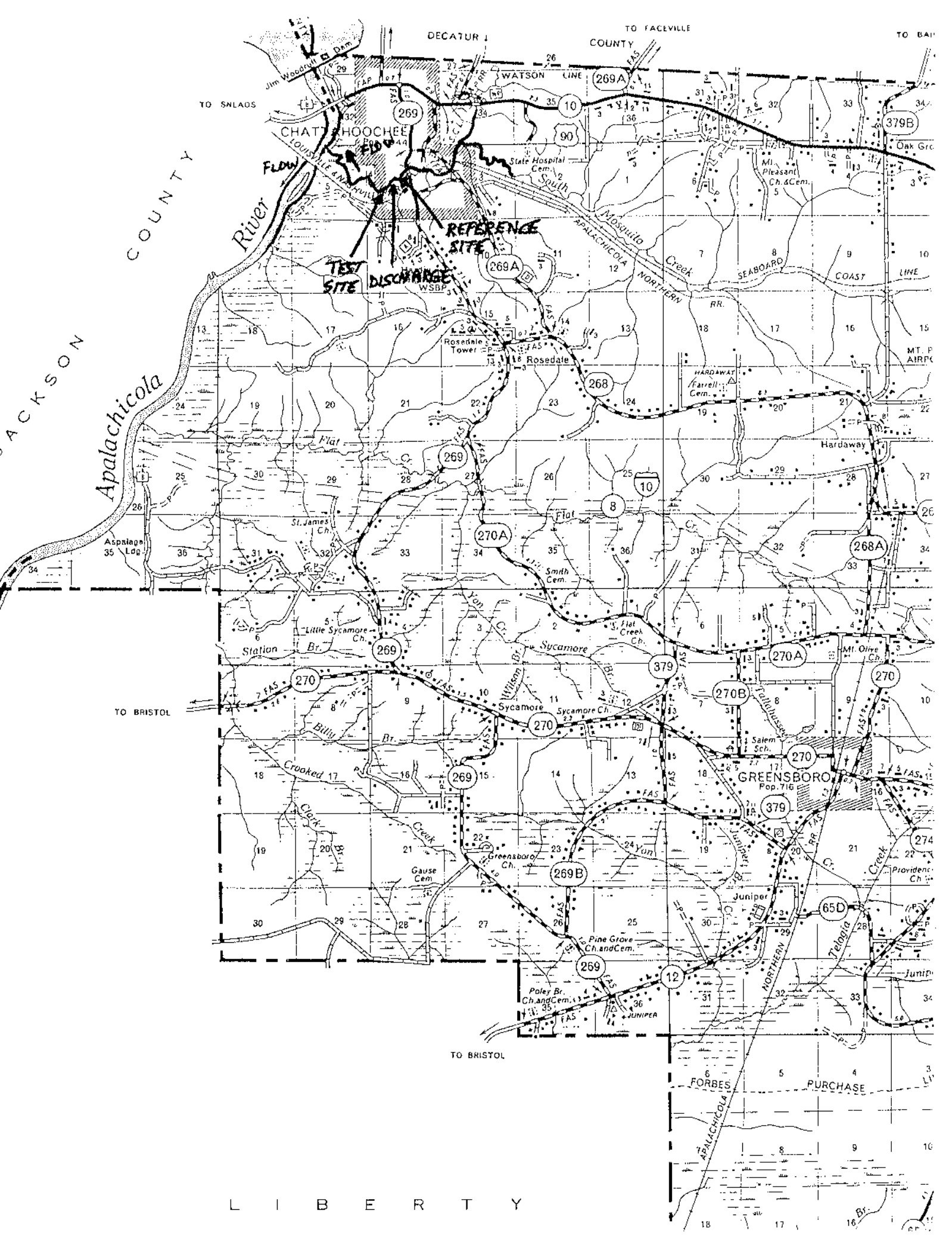
Typical Values for Selected Parameters in Florida Waters

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

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


DECATUR
TO FACEVILLE
COUNTY
TO BAI
WATSON LINE
269A
10
379B
Oak Gro
Jim Woodruff Dam
TO SNLAOS
269
CHATTAHOOCHEE
Pop. 44
FLOW
River
Louisville & Nashville
State Hospital Cem.
South
Mt. Pleasant Ch. & Cem.
90
REFERENCE SITE
TEST SITE
DISCHARGE
WSBP
Mosquito Creek
APALACHICOLA NORTHERN RR.
SEABOARD COAST LINE
269A
Rosedale Tower
Rosedale
268
HARDAWAY
Farrell Cem.
MT. P
AIRPO
Hardaway
Flat Cr.
269
10
8
St. James Ch.
Flat
270A
Asplage Log
Smith Cem.
268A
Yon Cr.
Little Sycamore Ch.
Station Br.
269
Flat Creek Ch.
Sycamore
379
270A
Mt. Olive Ch.
270
Wilson Br.
Sycamore Br.
270B
Tallahassee
TO BRISTOL
270
Sycamore Ch.
Billy Br.
Salem Sch.
270
Crooked Creek
269
GREENSBORO
Pop. 716
379
Juniper Br.
Yon Cr.
Greensboro Ch.
269B
Gause Cem.
Juniper
65D
Providence Ch.
Telogia Creek
Pine Grove Ch. and Cem.
269
12
NORTHERN
Poley Br. Ch. and Cem.
JUNIPER
TO BRISTOL
FORBES
PURCHASE
APALACHICOLA
L I B E R T Y
Jackson County
Apalachicola

ATTACHMENT A

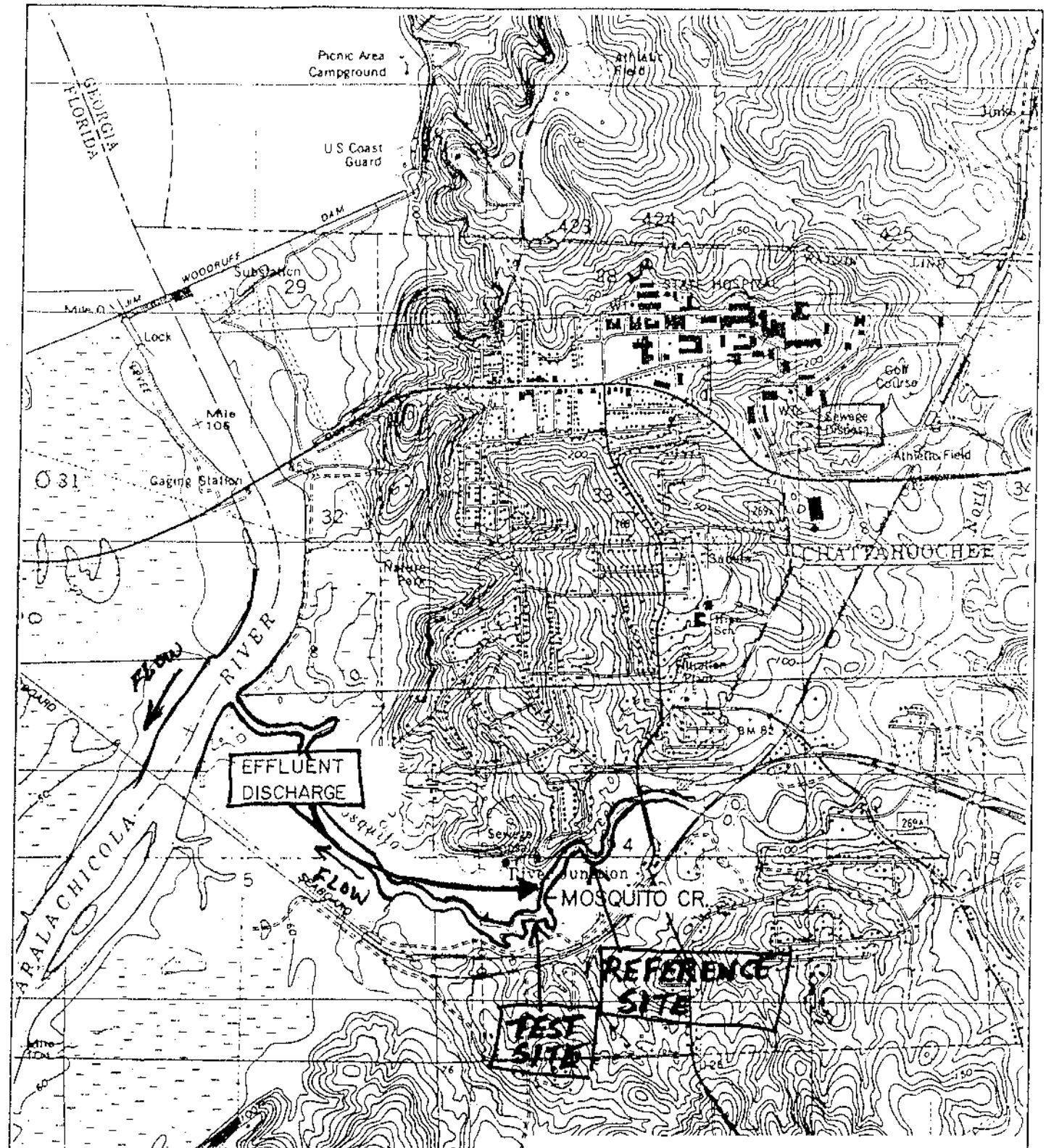
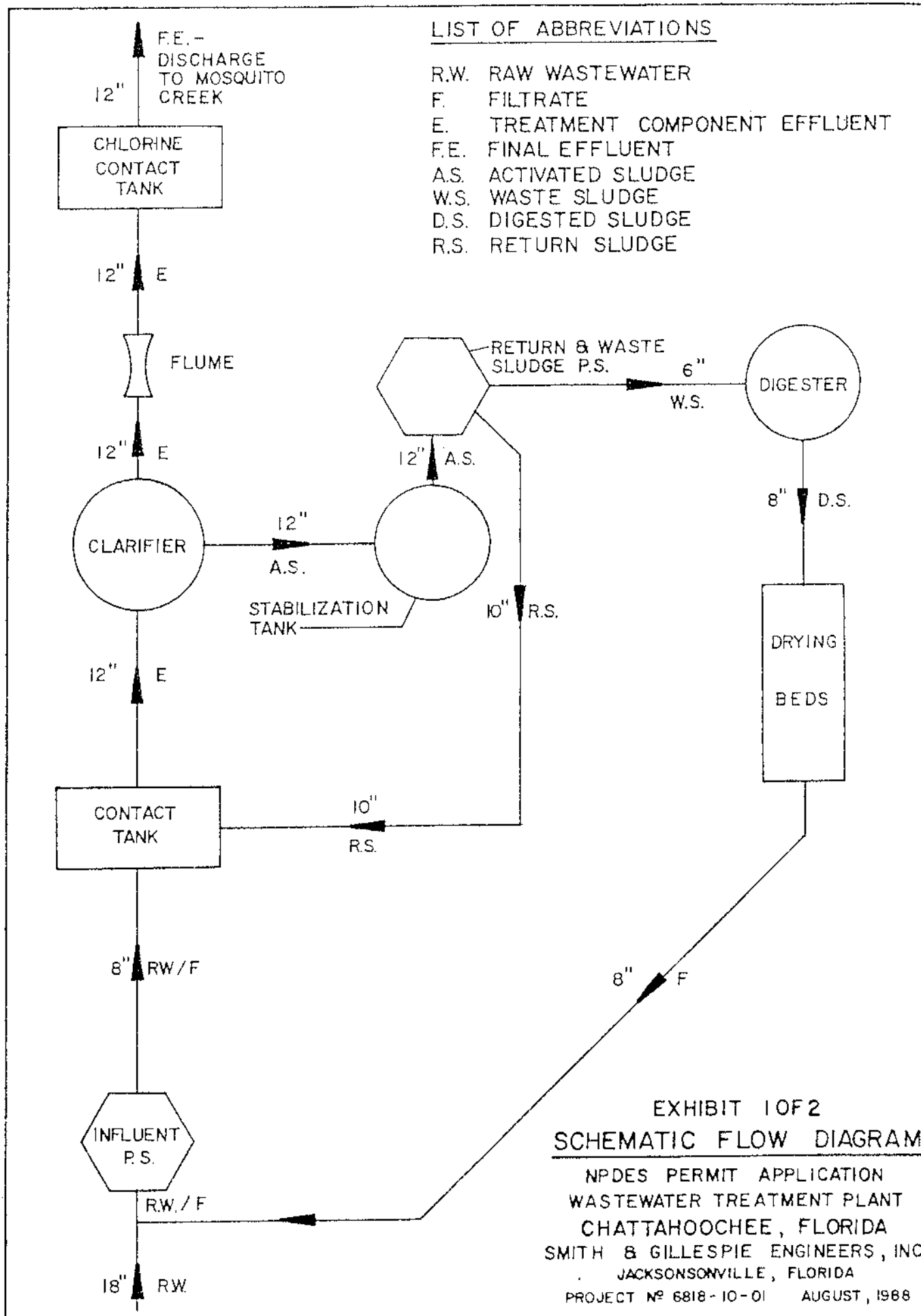


EXHIBIT 2 OF 2

LOCATION MAP

NPDES PERMIT APPLICATION
WASTEWATER TREATMENT PLANT
CHATTAHOOCHEE, FLORIDA
SMITH & GILLESPIE ENGINEERS, INC.
JACKSONSONVILLE, FLORIDA
PROJECT Nº 6818-10-01 AUGUST, 1988


LIST OF ABBREVIATIONS
R.W. RAW WASTEWATER
F. FILTRATE
E. TREATMENT COMPONENT EFFLUENT
F.E. FINAL EFFLUENT
A.S. ACTIVATED SLUDGE
W.S. WASTE SLUDGE
D.S. DIGESTED SLUDGE
R.S. RETURN SLUDGE
F.E. - DISCHARGE TO MOSQUITO CREEK
12"
CHLORINE CONTACT TANK
12" E
FLUME
12" E
CLARIFIER
12" A.S.
STABILIZATION TANK
12" E
CONTACT TANK
RETURN & WASTE SLUDGE P.S.
6" W.S.
DIGESTER
12" A.S.
8" D.S.
10" R.S.
DRYING BEDS
10" R.S.
8" RW/F
8" F
INFLUENT P.S.
R.W./F
18" R.W.
EXHIBIT 1 OF 2
SCHEMATIC FLOW DIAGRAM
NPDES PERMIT APPLICATION
WASTEWATER TREATMENT PLANT
CHATTAHOOCHEE, FLORIDA
SMITH & GILLESPIE ENGINEERS, INC.
JACKSONSONVILLE, FLORIDA
PROJECT Nº 6818-10-01 AUGUST, 1988

Facility Information Sheet

Facility Name: City of Chattahoochee Wastewater Treatment Facility

GMS# 1020M02034 Permit # D020-169703 (exp 10/94)

NPDES permit # FL0037869

Facility Location: (road) 211 Palm Street

(city) Chattahoochee

(county) Gadsden

Receiving Water: Mosquito Creek to Apalachicola River

Chlorination Type of Sample: ____Chlorinated
XX Sample collected after dechlorination
____Non-chlorinated

Design Flow: 0.500 MGD Average Flow: 0.393 MGD

Type of Facility: Domestic Industrial Other_____

Type of Treatment that Wastewater Receives Prior to Discharge:

The City of Chattahoochee operates a 0.500 MGD contact stabilization WWTF with discharge to Mosquito Creek. The facility employs aerobic digestion of the sludges with dewatering on sludge drying beds. The WWTF does dechlorinate.

Additional Comments: * Annual bioassay required *

July 14, 1993 inspection revealed the following: effluent had ashy appearance, inflow/infiltration continues to be a problem, daily flows continue to exceed facility capacity, no chlorine residual because the water line feeding chlorine to the contact chamber had been shut off, fecal coliform above limits for February & March 1993, daily chlorine residual (before dechlorination) tends to be < 0.5 mg/l.

Violations include: chlorine residual either below min/above max (Jan-May 1993, Oct-Nov 1992) and suspended residuals above max in March 93.

prepared by Dawn M. Gorres, E I (Pensacola)

Sampling requirements/Limits

Parameters	Limitation
Flow	0.5 MGD (max annual avg)
pH - effl	6.00 to 8.50
Chlorine resid	0.5 mg/l (min)
BOD5	20 mg/l (max annual avg)
Total nonfilt resid (SS)	20 mg/l (max annual avg)
TKN	20 mg/l (max)
DO	4 mg/l (min)
Fecal coliform	200/100 ml (max)

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:
	31010076	12-14-93	10:15	Mosquito Creek

REMARKS:	LOCATION: Up-stream Btwn 2 logs Approx. 100 yd From discharge	FIELD ID/NAME:
		Ref-Chattahoochee

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest %	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
50	25		15		10	

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

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

Point-Source Pollution (list location and describe): Hwy - Jumping Ar. W. Branch

Estimated System Width (range, m): 6-10	6-10	Estimated System Depth (range, m): 1-1.5	1-1.5
High Water Mark (m above bed): 1.5	1-1.5	Velocity (range, m/s): .3	3 m/s

yes: 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)		3		Riffles (over logs)	5		
Leaf Packs	3	5		Sand	30-35	2	
Aquatic Vegetation	30-35			Mud/Muck/Silt			
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots	5-10	10		Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top		16.5	6.9	8.2	400			
Mid-depth								
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: Clear, sunny with a few clouds, cool

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

SAMPLING TEAM:	SIGNATURE:	DATE:
C. LeDuc, B. Wynn, L. Burton	Christine G. Lee	12/14/93

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	31010076	12.14.93	Mosquito Creek

REMARKS:	LOCATION: upstream Approx 40 yds from discharge	FIELD ID/NAME:
		Ref. Chattahoochee

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 25 (25)	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 25 (25)	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 13 (13)	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 7 (7)	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 10	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		TOTAL SCORE
5 (5)	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	85 (85)

COMMENTS: water level down .5 m

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12/14/93	L. Burton	L Burton

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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:
	31010125	12-14-93	11:00	Mosquito Creek

REMARKS:	LOCATION: Downstream Approx. 400 yds of Dishaye	FIELD ID/NAME: Test- Chattahoochee

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest 15	Field/Pasture	Agricultural	Residential	Commercial	5 Industrial	Other (Specify)
50	25		15		10 Sewage treatment	

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):
STP 400 yds upstream WWTP

Estimated System Width (range, m): 6-10	6-10	Estimated System Depth (range, m): 1-1.5	1-1.5	yes
High Water Mark (m above bed): 1.5	1-1.5	Velocity (range, m/s): .3	.25-.7 m/s	Impounded ☐ Channelized ☐

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	3	4		Riffles	2	1	
Leaf Packs	30	5		Sand	65		
Aquatic Vegetation				Mud/Muck/Silt			
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots	70	10		Other:			

5 EACH

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top		12	7.5	8.5	600			
Mid-depth								
Bottom								

System Type : Stream: ☒ (Sand Bottomed, Swamp & Bog, Alluvial, Sand Bot w/ Spring, Calcareous, Misc.) 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: ☒ Slightly turbid: ☐ Turbid: ☐ ✓ Opaque: ☐

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

Weather Conditions:
Clear sunny w/ few clouds cool

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

SAMPLING TEAM:	SIGNATURE:	DATE:
CLeDuc & Edwin L Burton		12/14/93

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:
	31010125	12-14-93	Mosquito Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
	Downstream Approx 40 yd @ discharge	Test - Chattahoochee

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20 16	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 22 22	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 13 13	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 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 10 10	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		TOTAL SCORE
5 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	79

COMMENTS: Water level drop .5

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12-14-93	S. Zwyn	Steve Zwyn

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: CHATTAHOOCHEE
Location:
County:
Contact/District: LYN BURTON TALLA.
NPDES Permit #: FL00 27669 Outfall #:

Sample Collection: Date 12-14-93 Time 11:15
Test Beginning: Date 12-14-93 Time 15:00
Test Ending: Date 12-16-93 Time 15:00
Organism Batch #: 122 Diluent Batch #: 33
Organism Age: ≤ 24 hours
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks:

67277 93-DEC-14-20

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	21.7 @ 21.7	8.6 @ 22.8	933 @ 1,000 9100 @ 10,000 @ 23.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.0 @ 21.1	8.6 @ 22.3	940 @ 1,000 9100 @ 10,000 @ 23.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.7	8.6 @ 22.8	963 @ 1,000 923 @ 10,000 @ 23.0 °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	5	5	5	8.2		8.2	22.1		23.1	8.1		8.3	160		180
control	B	5	5	5			8.2						8.4			185
control	C	5	5	5			8.2						8.4			185
control	D	5	5	5			8.2						8.4			190
100%	A	5	5	5	7.5		8.4	22.4		23.1	8.0		8.3	405		415
100%	B	5	5	5			8.4						8.3			435
100%	C	5	5	5			8.4						8.3			440
100%	D	5	5	5			8.4						8.3			440
Measured/Loaded by:		MF	TR	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		MF	TR	MF	KP		TR	KP		TR	KP		TR	KP		TR

Investigators' Signatures

Kim Pearce
Marshall Faircloth
Tobin C. Raden

Reviewer

form updated 7/6/93

	Salt Water/ Well Water	Water Quality Parameters 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	TR
Alkalinity:	125	75	175	Hach	TR
Hardness:	120	80	435	Hach	TR
Total Ammonia:	<0.017	<0.017	1.66	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: CHATTAHOOCHEE
Location:
County:
Contact/District: LYN BURTON TALLA.
NPDES Permit #: FL00 27669 Outfall #:

Sample Collection: Date 12-14-93 Time 11:15
Test Beginning: Date 12-14-93 Time 15:00
Test Ending: Date 12-16-93 Time 15:00
Organism Batch #: 52 Diluent Batch #: well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

67277 93-DEC-14-20

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

Test Number: 2 of 2

Remarks:

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	21.7 @ 21.7	8.6 @ 22.8	933 @ 1,000 9100 @ 10,000 @ 23.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.0 @ 21.1	8.6 @ 22.3	940 @ 1,000 9100 @ 10,000 @ 23.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.7	8.6 @ 22.8	963 @ 1,000 9230 @ 10,000 @ 23.0 °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	29	5	5	5	7.8	7.9	8.2	23.7	22.2	22.0	8.3	7.9	8.8	245	250	235
control	18	5	5	5	7.8	7.9	8.2			21.9	8.3	8.1	9.2	240	250	235
100%	22	5	5	5	7.3	7.5	7.9	23.3	22.3	22.0	8.4	6.4	8.0	435	440	425
100%	4	5	5	5	7.3	7.5	7.9			21.9	8.4	6.5	7.9	435	440	425
Measured/Loaded by:		MF	TR	MF	MF	KP	ME	MF	KP	MF	MF	KP	ME	MF	KP	ME
Recorded by:		MF	TR	MF	KP	TR	TR	KP	TR	TR	KP	TR	TR	KP	TR	TR

Investigators' Signatures

Kim Pearce
Marshall Faircloth
Robin C. Radon

Reviewer

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR 100	TR
Alkalinity:	125	75	175	Hach	TR
Hardness:	120	80	435	Hach	TR
Total Ammonia:	<0.017	<0.017	1.66	Orion	MF

Ammonia Meter #: Ammonia Meter Slope: -58.8 Ammonia Blank: <0.017 Control 0 ppt Sample 0 ppt

CHATTAHOOCHEE NWTP
DIP NET DATA

REFERENCE SITE

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF)
(Draft Version 1994)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Panhandle (65, 75a)				Peninsula (75b, c, d)			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31	16–30	0–15	5	≥ 27	14–26	0–13	
EPT Index	≥ 7	4–6	0–3	1		≥ 4	0–3	
% Contribution of Dominant Taxon		≤ 20	> 20	1		≤ 37	> 37	
Florida Index	≥ 18	9–17	0–8	3	≥ 7	4–6	0–3	
% Diptera		≤ 38	> 38	3		≤ 32	> 32	
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6	1	≥ 8	4–7	0–3	
% Shredders		≥ 10	0–9	1		≥ 13	0–12	
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	
Total Score	Panhandle			15	Peninsula			
Interpretation of Score	No Impairment			29-23	No Impairment			33-27
	Moderate Impairment			22-15	Moderate Impairment			26-17
	Severe Degradation			14-7	Severe Degradation			16-9

TEST SITE

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF)
(Draft Version 1994)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Panhandle (65, 75a)				Peninsula (75b, c, d)			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31	16–30	0–15	5	≥ 27	14–26	0–13	
EPT Index	≥ 7	4–6	0–3	5		≥ 4	0–3	
% Contribution of Dominant Taxon		≤ 20	> 20	3		≤ 37	> 37	
Florida Index	≥ 18	9–17	0–8	5	≥ 7	4–6	0–3	
% Diptera		≤ 38	> 38	3		≤ 32	> 32	
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6	3	≥ 8	4–7	0–3	
% Shredders		≥ 10	0–9	1		≥ 13	0–12	
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	
Total Score	Panhandle			25	Peninsula			
Interpretation of Score	No Impairment			29-23	No Impairment			33-27
	Moderate Impairment			22-15	Moderate Impairment			26-17
	Severe Degradation			14-7	Severe Degradation			16-9

Periphyton taxa list and densities (#/mm^2) for Chattahoochee WWTP, collected via glass microscope slides in Mosquito Creek on 12 December 1993.

	Reference Site	Test Site
Bacillariophyta		
Achnanthes exigua	8	2
Achnanthes lanceolata	16	2
Achnanthes peregallii	3	2
Achnanthes lanceolata v. *apiculata*	3	–
Achnanthes lanceolata v. *dubia*	54	7
Bacillaria paradoxa	3	–
Cocconeis placentula	19	5
Cymbella tumida	3	2
Eunotia curvata	22	2
Eunotia naegelii	22	5
Eunotia pectinalis	70	37
Fragilaria vaucheriae	–	2
Frustulia rhomboides	–	20
Gomphonema parvulum	14	10
Gomphonema turris	3	–
Melosira varians	22	24
Navicula capitata	3	–
Navicula exigua	5	2
Navicula minima	16	10
Navicula pupula	3	2
Navicula rhynchocephala	38	–
Navicula viridula	22	10
Nitzschia amphibia	3	2
Nitzschia intermedia	–	2
Nitzschia longissima	–	2
Nitzschia palea	16	5
Nitzschia sinuata v. *tabellaria*	3	–
Pinnularia sp.	3	–
Pinnularia major	49	–
Surirella ovalis	3	–
Synedra rumpens	57	10
Synedra ulna	14	5
Chlorophyta		
Elakatothrix sp.	3	–
Cryptophyta		
Cryptomonas sp.	3	–
Cyanophyta		
Chroococcus	16	–
Cylindrospermopsis sp.	3	–
Lyngbya sp.	–	5
Oscillatoria sp.	3	–
Phormidium sp.	–	22

Taxa list for Chattahoochee WWTP collected via 20 dip net sweeps, above and below the discharge in Mosquito Creek, Gadsden County, on 14 December, 1993.

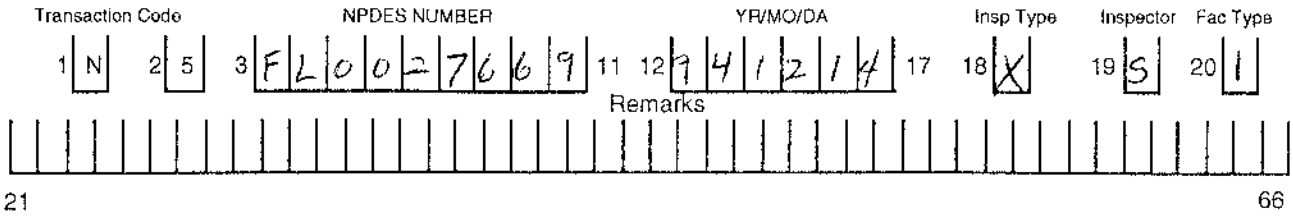
	Reference Site	Test Site
Acarina		
Undetermined oribatid	1	–
Amphipoda		
Hyalella azteca	–	11
Coleoptera		
Ancyronyx variagata	1	–
Dineutus discolor	–	1
Dubiraphia vittata	–	1
Macronychus sp.	–	1
Stenelmis sp.	10	4
Tropisternus sp.	3	–
Decapoda		
Procambarus sp.	1	–
Diptera		
Ablabesmyia mallochi	2	2
Chironomus sp.	–	2
Conchapelopia sp.	–	1
Cricotopus bicinctus	–	1
Cricotopus / Orthocladius sp.	1	–
Cryptochironomus sp.	–	1
Hemerodromia sp.	1	1
Meropelopia sp.	1	–
Microtendipes pedellus	–	1
Parakiefferiella sp.	1	2
Polypedilum convictum grp.	1	–
Polypedilum fallax grp.	1	–
Polypedilum illinoense	7	4
Procladius sp.	1	–
Rheocricotopus robacki	5	1
Rheotanytarsus exiguus grp.	4	2
Saetheria sp.	–	1
Simulium sp.	–	1
Stenochironomus sp.	1	–
Tanytarsus sp. C Epler	–	1
Tanytarsus sp. L Epler	–	1
Tanytarsus sp. M Epler	–	1
Tribelos jucundum	2	–
Xestochironomus sp.	1	–
Undetermined orthoclad	–	1
Undetermined Chironomidae	1	–
Undetermined Tipulidae	1	1
Undetermined dipteran pupa	2	3
Ephemeroptera		
Eurylophella temporalis	25	15
Isonychia sp.	–	1
Leptophlebia bradleyi	4	1
Leptophlebia intermedia	–	3

Stenonema smithae	–	1
Tricorythodes albilineatus	–	1
Undetermined Leptophlebiidae	–	1
Hemiptera		
Undetermined hemipteran	1	–
Isopoda		
Asellus sp.	–	1
Lepidoptera		
Undetermined lepidopteran	1	–
Megaloptera		
Corydalus cornutus	1	–
Odonata		
Argia sp.	–	1
Epiaeschna heros	–	1
Undetermined Gomphidae	–	2
Oligochaeta		
Allonais inaequalis	1	–
Bratislava unidentata	–	1
Eclipidrilus palustris	1	–
Eclipidrilus sp.	1	1
Limnodrilus hoffmeisteri	3	11
Pristina synclites	1	–
Spirosperma ferox	–	1
Pelecypoda		
Sphaerium or *Musculium* sp.	–	1
Plecoptera		
Taeniopteryx sp.	–	1

Taxa list for Chattahoochee WWTP collected via Hester-Dendy artificial substrates, above and below the discharge, in Mosquito Creek, Gadsden County, on 14 December, 1993.

	Reference Site	Test Site
Amphipoda		
Hyalella azteca	1	–
Coleoptera		
Macronychus glabratus	–	2
Stenelmis sp.	–	1
Diptera		
Chironomus sp.	–	1
Conchapelopia sp.	1	–
Cricotopus bicinctus	–	1
Cricotopus/Orthocladius sp.	–	1
Goeldichironomus holoprasinus	1	–
Polypedilum convictum grp.	1	1
Polypedilum fallax grp.	1	–
Polypedilum illinoense	1	–
Parametriocnemus sp.	–	1
Rheocricotopus robacki	1	8
Rheotanytarsus distinctissimus grp.	1	4
Rheotanytarsus exiguus grp.	14	4
Simulium sp.	–	1
Stictochironomus sp.	–	1
Tanytarsus sp.	–	2
Tanytarsus sp. A Epler	1	–
Tanytarsus sp. L Epler	1	–
Thienemanniella sp.	2	2
Undetermined dipteran pupa	8	22
Ephemeroptera		
Eurylophella temporalis	6	11
Isonychia sp.	3	1
Stenonema exiguum	6	12
Stenonema smithae	–	1
Megaloptera		
Corydalus cornutus	2	1
Oligochaeta		
Limnodrilus hoffmeisteri	1	–
Plecoptera		
Acroneuria arenosa	5	3
Trichoptera		
Cheumatopsyche sp.	0	5

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)

