

Biological Assessment of

Quincy Sewage Treatment Plant

Gadsden County

NPDES #FL0029033

Sampled November 1991

March 1992

Biology Section
Division of Technical Services

Department of Environmental Regulation
Results of Fifth Year Inspections

Discharger: Quincy Sewage Treatment Plant
County: Gadsden
NPDES Number: FL0029033
State Permit Expiration Date: 1 August 1992

Toxics Sampling Inspection (XSI)

Date Sampled: 4 November 1991

Results: Metals analysis revealed the presence of aluminum (280 µg/L), cadmium (0.08 µg/L), copper (15 µg/L), iron (334µg/L), silver (0.6 µg/L), and zinc (37 µg/L). Tests for organic constituents detected gamma-BHC, or Lindane (0.14 µg/L), and possibly Endosulfan II (0.02 µg/L). The silver, zinc, and gamma-BHC concentrations are in violation of Class III surface water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 4 November 1991

Results: Extremely toxic to *Ceriodaphnia dubia*, killing all organisms within 24 hours. Not toxic to *Notropis leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 4 November 1991

Results: Benthic macroinvertebrate communities in Quincy Creek were healthy, diverse, with many clean water indicator organisms being well represented. No adverse effects from the addition of STP discharge were observed. Likewise, the periphyton community was characterized by a diatom-dominated assemblage with high taxa richness. Algal populations were almost identical above and below the discharge. It is possible that the extensive swamp located between the discharge and the downstream station was responsible for mitigating some of the detrimental characteristics (*e.g.*, toxicity) of the effluent.

Water Quality Inspection (WQI)

Date Sampled: 4 November 1991

Results: Total coliforms (8500 organisms/100 ml) and fecal coliforms (1100 org/100 ml) measured in the effluent were in violation of Class III standards (17-302.560(5) FAC). Neither bacterial group exceeded standards at the study sites. Nutrients were elevated in the effluent, particularly TKN (14 mg/L) and total ammonia (9.6 mg/L). An increase in ammonia was noted at the downstream site, ranking this area of Quincy Creek higher than 71.6% of typical Florida streams. Nitrate-nitrite concentrations at the Quincy Creek study sites were higher than 87% of other Florida streams, but appeared to be caused by sources (*e.g.*, agriculture) other than the STP.

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 City of Quincy Sewage Treatment Plant, located in Gadsden County, Florida, is a 1.5 MGD contact stabilization facility. Treatment includes aerobic digestion and dewatering on sludge drying beds. Dried sludge is transported to the Quincy-Byrd landfill for disposal. Effluent is discharged via a 500 ft pipe from the chlorine contact chamber to a very swampy portion of Quincy Creek, which flows into the Little River, and ultimately to Lake Talquin.

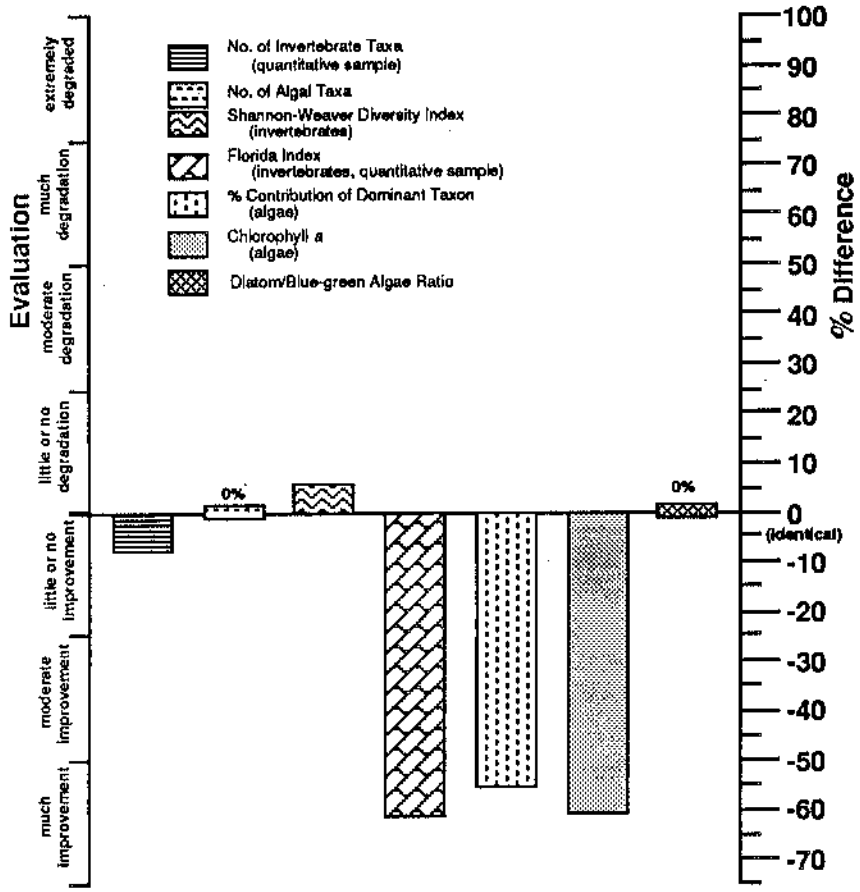
A 1983 assessment performed by the FDER Northwest District indicated that a 95% reduction in biological diversity occurred in Quincy Creek below the discharge (as stated in a 1985 Consent Order). The 1985 consent order was filed to initiate a program to eliminate inflow/infiltration problems. The plant was upgraded in 1987. Since that time, the most consistent problem has been with high total ammonia values, with other permit parameters in compliance (for details on permit limits and non-compliance, see the Facility Summary in the Appendix). A June, 1991, inspection also revealed pump station and flow meter difficulties, as well as other maintenance flaws.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located above the plant in Quincy Creek) and a test site (the area down gradient of the discharge) (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms, were per-

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	44	44
Florida Index	32	29
% Contribution of Dominant Taxon	16.5	22.1
% Diptera	38.4	28.9
% Ephemeroptera	12.2	31.9
% Malacostraca	17.2	21.8
% Coleoptera	18.6	8.8
% Trichoptera	4.3	5.3
% Other	9.3	3.3
% Collector-Gatherers	35.6	37.5
% Predators	29.3	18.6
% Collector-Filterers	11.3	23.1
% Scrapers	15.5	17.8
% Shredders	8.2	3.0
Macroinvertebrate Hester-Dendy		
Number of Taxa	25	27
Florida Index	13	21
Shannon-Weaver Diversity	3.6	3.4
% Diptera	70.6	72.4
% Ephemeroptera	16.7	18.6
% Coleoptera	4.8	0.5
% Malacostraca	0	6.7
% Trichoptera	1.6	1.9
% Other	6.4	0
% Collector-Gatherers	50.9	44.1
% Scrapers	18.6	22.6
% Collector-Filterers	10.1	22.2
% Predators	11.9	5.4
% Shredders	8.4	5.7
Periphyton Algae		
Number of Taxa	31	31
% Contribution of Dominant Taxon	59.0	24.9
Chlorophyll a (mg/sq. m)	48.37	19.25
Diatom/Diatom + B-G Abundance Ratio	0.97	0.97
% Blue-green	2.9	2.8
% Green	0.7	2.3
% Diatoms	96.3	94.9



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

formed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. 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 in the effluent were analyzed for total and fecal coliforms following the methods of APHA (1989).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa, Shannon-Weaver Diversity Index, and chlorophyll *a* are well known. Others are briefly explained here. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. A decreased diatom to 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. 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 (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

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

The following personnel were involved in this investigation: Susan

Bland and Frank Leteux (DER Northwest District) and Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandy McClure (Tallahassee Biology Laboratory).

Results and Discussion

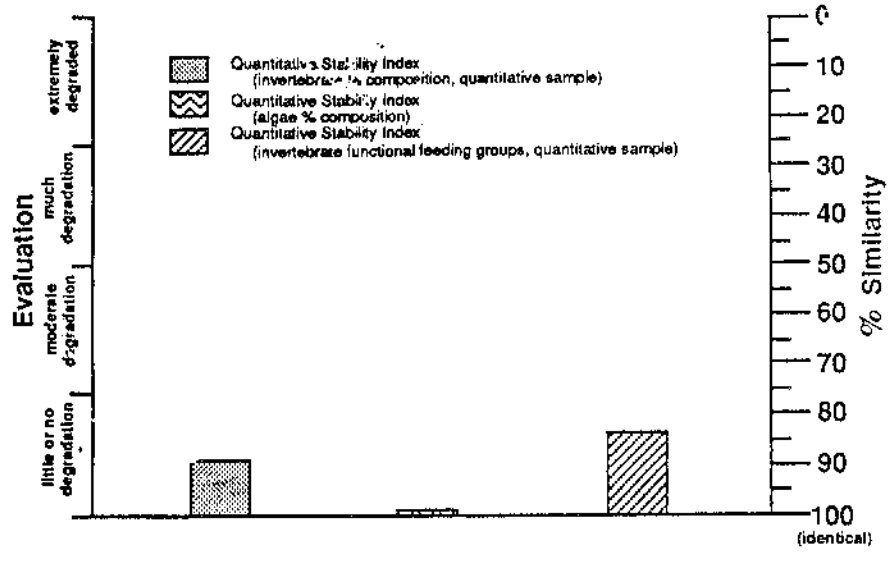
Habitat scores were 51 for the reference site and 73 for the test site (Appendix). The higher quality habitat characteristics noted at the downstream station included more available substrate types, less artificial channelization, and greater bank stability. A greater proportion of land-use surrounding the upstream site was characterized as residential, agricultural, or other, and was probably one reason for the decline in habitat quality. Also, a mining operation located above the facility in Quincy Creek may have some influence on the habitat characteristics at the reference site. Both sites, however, were adequately oxygenated, and of similar conductivities (90 µmho/cm and 100 µmho/cm at reference and test sites, respectively). The pH of the upstream station was slightly more alkaline (7.7) than the near neutral pH of 7.1 measured at the test site (Appendix).

The sample of effluent was extremely toxic to the invertebrate, *Ceriodaphnia dubia*. All test organisms were dead within 24 hours. No mortality was observed in another test using the bannerfin shiner, *Notropis leedsi* (Appendix). The following metals were measured in the effluent at these concentrations: aluminum (280 µg/L), cadmium (0.08 µg/L), copper (15 µg/L), iron (334 µg/L), silver (0.6 µg/L), and zinc (37 µg/L). The silver and zinc levels were in violation of Class III standards of 0.07 µg/L and 30 µg/L, respectively. Analysis of organic constituents revealed gamma-BHC (Lindane) at 0.14 µg/L and the equivocal presence of Endosulfan II at 0.02 µg/L. Both of these pesticides are well in excess of ambient standards. It is likely that they, along with the silver and zinc measured in the effluent, were contributors to the observed toxicity.

Total and ortho-phosphorus measured in the effluent were 0.91 mg/L and 0.48 mg/L, respectively. An effluent TKN value of 14.0 mg/L and an effluent total ammonia concentration of 9.6 mg/L were of concern, since high ammonia levels have been the most consistent permit excursion. At the two study sites, phosphorus-containing compounds were typical for a Florida stream. STORET data from 1617 Florida stream stations, for the period of 1980 to 1989, have been compiled into a percent distribution, found in the Appendix (Joe Hand, personal communication). Data from this present investigation were evaluated against these values. The ammonia concentration at the downstream site (0.15 mg/L) was higher than 71.6% of representative streams in the state, probably a direct result of the STP input. While nitrate-nitrite was not detected in the effluent, it was elevated at both the reference and test sites, at levels that were 87% and 89% higher than the STORET data streams. The source of this NO_2NO_3 enrichment was not apparent, but may be related to runoff from agricultural lands, which are extensive in this area.

Bacterial populations measured in the effluent were in violation of ambient standards, 17-302.560(5) (FAC). Total and fecal coliforms were 8500 organisms/100 ml and 1100 org/100 ml, respectively. Although total coliform bacteria were more abundant at the test site, neither group exceeded Class III standards at the study sites (see chemistry summary table).

Both qualitative and quantitative measures of benthic macroinvertebrate community assessment



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

indicated healthy and diverse populations above and below the discharge in Quincy Creek (see table, figures, and taxa lists in Appendix). The figure on p. 2 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 p. 2 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Taxa richness was higher at the test site (25 and 27 at reference and test sites, respectively), and Shannon-Weaver diversity was slightly lower downstream. Neither difference, however, indicated any significant degradation or improvement. Florida Index was 61.5% higher at the test site in Hester-Dendy samples, but was 9.4% lower when samples were collected with dip nets. Quantitative stability indices for community structure and functional feeding groups further demonstrated the lack of differences (*i.e.*, no degradation) between the reference and test sites.

The periphyton communities above and below the plant discharge were nearly identical. Thirty-one taxa were collected from both sites, predominately diatoms. The QSI for community structure (98.4%) also illustrates the strong similarity of these two areas of Quincy Creek. Chlorophyll *a* values were substantially higher at the reference site. This contrast in biomass accumulation may be due to differences in shading during the incubation period, which would influence the chlorophyll content of the algal cells, combined with the variation in cell size.

Conclusions

The sample of effluent collected from Quincy STP was not toxic to the fish, *Notropis leedsi*, but was extremely toxic to the cladoceran, *Ceriodaphnia dubia*, killing all test organisms within 24 hours. Several organic chemicals and metals were detected in the effluent which could have contributed to the observed toxicity. These included gamma-BHC (0.14 µg/L), possibly Endosulfan II (0.02 µg/L), copper (15 µg/L), silver (0.6 µg/L), and zinc (37 µg/L). The gamma-BHC (Lindane), silver, and zinc concentrations are in violation of water quality standards for Class III freshwaters.

Nutrient concentrations were elevated in the effluent, particularly TKN and total ammonia (14 mg/L and 9.6 mg/L, respectively). Ammonia was also higher at the test site than at the reference, apparently due to the discharge. Nitrate-nitrite was moderately high at both reference and test sites, and, therefore, could not be attributed to the wastewater influence.

Bacterial populations in the effluent violated Class III standards (17-302.560(5) FAC). Total and fecal coliforms were 8500 organisms/100 ml and 1100 org/100 ml, respectively. Although total coliform bacteria were more abundant at the test site, neither group exceeded standards at the study sites.

Benthic macroinvertebrate communities were healthy and diverse both above and below the plant discharge. Some measurements indicated improved conditions downstream of the plant, but most differences between the two study sites were insignificant. Apparently, the extensive swamp system between the point of discharge and the test site is successful in mitigating the toxic effects of the effluent.

Periphyton communities were also unimpacted by the discharge. A typical, diatom-dominated assemblage with high taxa richness was present at both study 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.

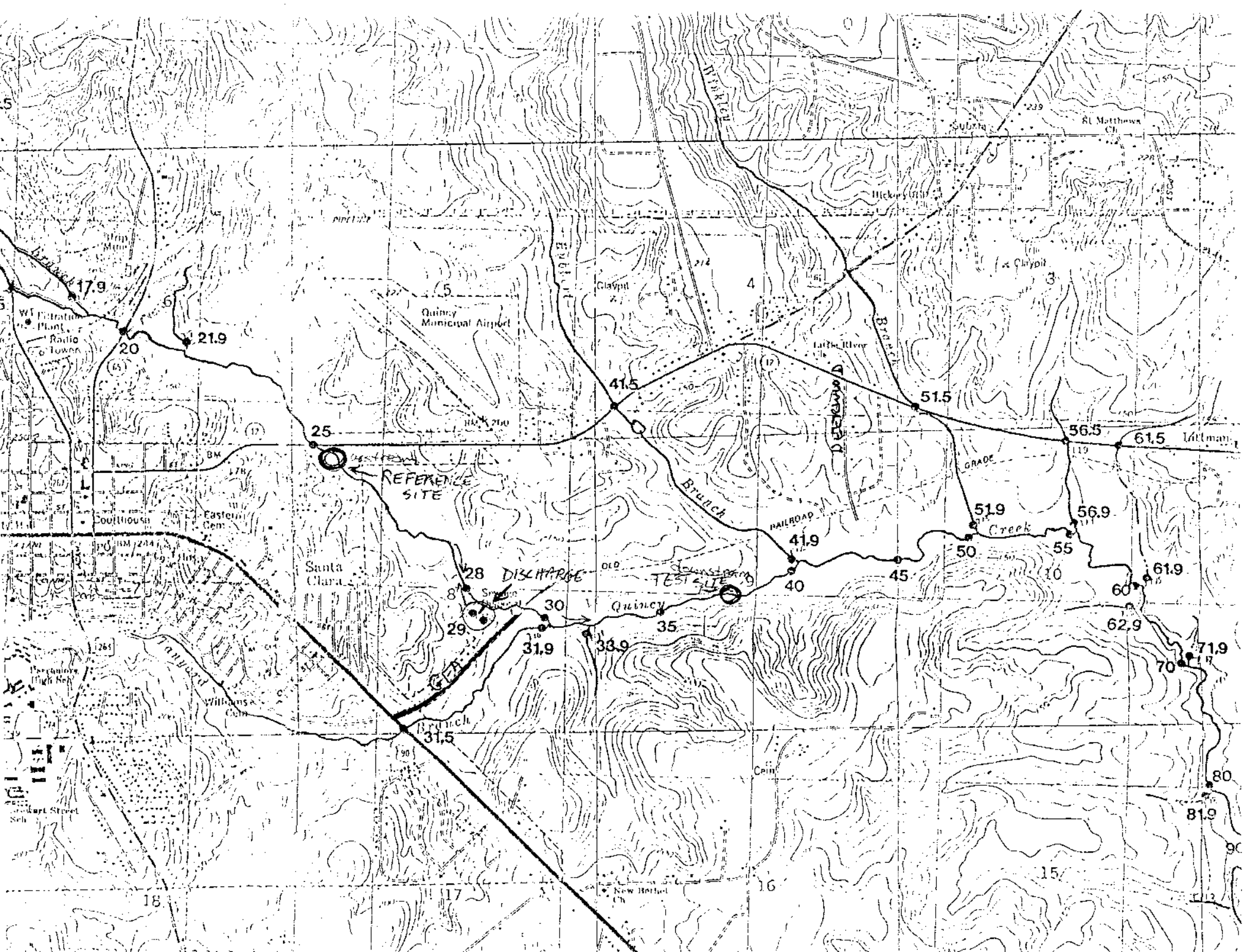
Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

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.

Chemistry summary table for

Quincy STP	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
Gamma-BHC	0.14 J		
Endosulfan II	0.02 QT		
Metals (ug/L)			
Aluminum	280		
Arsenic	20 U		
Barium	15 U		
Cadmium	0.08 T		
Copper	15		
Chromium	10 U		
Iron	334		
Lead	2 U		
Mercury	0.1 U		
Nickel	5 U		
Selenium	1 U		
Silver	0.6		
Zinc	37		
Nutrients (mg/L)			
Ortho-phosphorus	0.48	0.048 A	0.080 A
Total phosphorus	0.91	0.10 K	0.10 K
Ammonia	9.6 J	0.04 A	0.15 A
Nitrate+Nitrite	0.04 U	0.51 A	0.60 A
TKN	14.0	0.10 K	0.21
Other Parameters			
Habitat Assessment		51	73
D.O. (mg/L)	7.1	8.8	8.0
pH (SU's)	7.7	7.7	7.1
Conductivity (µmhos/cm)	350	90	100
Temperature (°C)	15.0	8.0	8.0
BOD (mg/L)	2.8		
Bioassay Fish	Not Toxic		
Bioassay Invertebrate (24 hr LC50)	100 K		
Fecal coliform (org/100 ml)	1100 A	700	700
Total coliform (org/100 ml)	8500 A	1200	2000

A - Value reported is the mean of two or more determinations
J - Estimated value
K - Actual value is known to be less than value given
T - Value reported is less than the practical quantitation limit
U - Material analyzed for but not detected; value reported is the minimum detection limit
Q - Evidence that analyte is present in sample is equivocal


17.9
21.9
20
25
REFERENCE SITE
41.5
51.5
56.5
61.5
Littman
Branch
Quincy
Creek
51.9
56.9
41.9
50
55
61.9
60
62.9
71.9
70
80
81.9
45
40
35
30
31.9
33.9
31.5
28
29
DISCHARGE
TEST SITE
Santa Clara
Quincy Municipal Airport
Courthouse
Eastern Cem
Williams Cem
Claypit
Hickory Hill
St Matthews Ch
New Bethel Ch
Tanyard
Dickert Street
RAILROAD GRADE
Little River
Dickey
Quincy
18
17
16
15

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name:		Prepared by: Date:
Location (attach detailed map):	County	District
Federal Permit # and expiration date:	State GMS # and State expiration date:	Facility Type: Industrial Municipal Federal Agricultural Other (list):

Function of facility:

Description of treatment process:

Receiving waters:	Classification:
Design Flow: 1.5 MGD	Actual Mean Flow:

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

therefore, the best time to sample is:

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

List effluent limits:

Parameter	Limit (units)

Describe special permit conditions and permit modifications:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

(Facility)

Description of permitted outfall(s):

From chlorine contact chamber pipe travels 50 ft and discharges to Quincy Creek.
As of 10-1-91 operator says the water from 2 channels will be split 1/2 to go to discharge point.

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

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

10/16/53 Source assessment performed at the plant. A reduction in the integrity of the water in Quincy Creek downstream of the plant discharge
8/54 Consent order in effect included the following:
(1) Tasker program to eliminate coliform contamination
(2) Every month a report to be submitted stating what is being done to correct the problem

Upgrading is to be completed by 11/91.

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

Review of the records from 1984 to present shows compliance with the limits. Recently, the facility has been in violation of the limits for Fecal Coliform.
Other parameters sampled for are satisfactorily in compliance with the limits.
The maximum for chlorine residual was 1.0 mg/l.

Additional information: See Attached MOR info 1984 → 1991

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:
		11-4-91	Quincy Creek

REMARKS:	LOCATION: Quincy STP upstream	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 12	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 28	Max. observed; >0.3 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 **0-7 points**
Artificial Channel/ Flow Alteration 2	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 6	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 3	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
	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	51

COMMENTS:		

ANALYSIS DATE:	ANALYST:	SIGNATURE:
		Lynn Burton

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:
		11-4-91	Quincy Creek

REMARKS:	LOCATION: Quincy STP downstream	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	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 28	Max. observed; >0.3 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 **0-7 points**
Artificial Channel/ Flow Alteration 12	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 8	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 5	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
	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	73

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		11-4-91	10:00A	Quincy Creek

REMARKS:	LOCATION: Quincy STP Upstream	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
70		10	10%			

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):

Estimated Stream Width (range, m): 6	Estimated Stream Depth (range, m): .5		yes
High Water Mark (m above bed): 2	Velocity (range, m/s): .3	Impounded ☐ Channelized ☑	

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☐ Moderately Shaded: ☑ 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
Rock or Shell Rubble				Woody Debris (Snags)	5	5	
Aquatic Vegetation				Leaf Packs/Roots	5	5	
Sand	80	5		Undercut Banks	10	5	
Other:				Mud/Muck			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	Secchi Depth (m):	
Top	3°	8.2	pH (SU):	7.1
Mid-depth			Conductivity (µmho/cm):	96
Bottom			Other Parameters:	

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☑ _____

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

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

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

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

Weather Conditions: Cold 50-60° F Sunny

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
11-4-91	[illegible]	Lynn Burton

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		11-4-11	11:30A	Quincy Creek

REMARKS:	LOCATION: Quincy STP downstream	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
95%			5%			

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): NPS = stormwater

Estimated Stream Width (range, m): 6	Estimated Stream Depth (range, m): .5-1		yes
High Water Mark (m above bed): 2	Velocity (range, m/s): .3	Impounded ☑ / Channelized ☐	

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☐ Moderately Shaded: ☑ 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
Rock or Shell Rubble				Woody Debris (Snags)	10	5	
Aquatic Vegetation	5	3		Leaf Packs/Roots	25	5	
Sand	50	5		Undercut Banks	15	2	
Other:				Mud/Muck			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	Secchi Depth (m):	
Top	3	9.0	pH (SU):	7
Mid-depth			Conductivity (µmho/cm):	100
Bottom			Other Parameters:	

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☑

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

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

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

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

Weather Conditions: Cold 50-60° F Sunny

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: QUINCY STP
Address/City:
County: GADSDEN
Contact/District: RUSS FRYDENBORG/TALL
NPDES Permit #: FL0029033 Outfall #:

Sample Collection: Date 11/4/91 Time 0900
Test Beginning: Date 11/5/91 Time 1400
Test Ending: Date 11/6/91 Time 1445
Test Organism: C. DUBIA
Life Stage/Age: < 24 HOURS

Test Number: 1 of 2 Test Type: (Screening) | Definitive
(Static) Static Renewal | Flow-through

Remarks:
TERMINATED TEST AT 24 HRS

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 9@9	8.8@22.0	22.0@21.6	1323@21.8
24 hr	7@7, 9@9	8.7@23.0	22.7@22.4	1347@22.8
48 hr				

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	A	5	5		8.2	8.0		21.5	22.2		9.1	8.0		139	141	
control	B	5	5			8.0						8.2			143	
control	C	5	5			8.0						8.2			149	
control	D	5	5			8.1						8.3			148	
100%	A	5	0		7.3	8.1		21.0	22.2		4.9	8.0		408	382	
100%	B	5	0			8.1						8.3			407	
100%	C	5	0			8.1						8.0			398	
100%	D	5	0			8.1						8.2			414	
Measured/Loaded by:		AJ	KP		VS	ER		ER			ER	ER		VS	ER	
Recorded by:		KP	KP		ER	VS		VS			VS	KP		ER	VS	

25155 91-NOV-05-05-04

BIOLOGY Matrix: W-EFFLUENT
Date Collected: 4-NOV-1991 09:00:00.
Field ID:#3
BSY-SN-CLD BSY-SN-FSH

Investigators' Signatures

Kim Pearce
Elena Rodriguez HRS
HRS

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			not	measured	
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	130	57	97	Hach	AJ
Hardness:	135	~~35~~	45	Hach	AJ
Total Ammonia:					

Ammonia Meter Slope: _____ Ammonia Blank: _____ Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: QUINCY STP
Address/City:
County: GADSDEN
Contact/District: RUSS FRYDENBORG / TALL
NPDES Permit #: FL0029033 Outfall #:

Sample Collection: Date 11/4/91 Time 0900
Test Beginning: Date 11/5/91 Time 1400
Test Ending: Date 11/7/91 Time 1400
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 18 DAYS

Test Number: 2 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 9@9	8.8@22.0	22.0@21.6	1323@21.8
24 hr	7@7, 9@9	8.7@23.0	22.7@22.4	1347@22.8
48 hr	7@7, 9@9	8.8@22.0	22.0@22.3	1353@23.1

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
control	92	5	5	5	7.7	8.1	8.3	22.0	22.0	22.5	9.5	8.3	8.6		237	243
control	57	5	5	5	7.8	8.1	8.3				9.5	8.3	8.7	234	237	243
100%	8	5	5	5	7.3	7.7	8.0	22.5	22.0	22.3	10.2	7.4	8.0		432	438
100%	23	5	5	5	7.2	7.7	7.9				10.4	7.0	7.6	439	431	441
	8 rept.										8.5					
	23 rept.										8.6					
											BUBBLE RAISED MEMBRANE. REMOVED & REPLACED WITH NEW MEMBRANE.					
Measured/Loaded by:		KP	KP	KP	ELR	ER	VS	ER	ER	VS	ER	ER	VS	VS	ER	VS
Recorded by:		KP	KP	KP	VS	VS	ER	VS	ICP	ER	VS	KP	ER	ER	VS	ER

Investigators' Signatures

Kim Pearce
Elena M Rodriguez HRS
Kristine Madsen HRS

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			not measured		
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	130	57	97	HACH	AJ
Hardness:	135	75	45	Hach	AJ
Total Ammonia:					

Ammonia Meter Slope: _____ Ammonia Blank: _____ Salinity Sample: _____ ppt

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

Macroinvertebrate taxa list for Quincy STP, Gadsden County, collected on Hester-Dendy multiplate samplers on 2 December 1991.

	Reference Site	Test Site
Coleoptera		
Ancyronyx variegata	2	–
Macronychus glabratus	4	–
Microcylloepus sp.	–	1
Stenelmis sp.	1	–
Diptera		
Ablabesmyia mallochi	–	6
Corynoneura sp.	28	2
Cricotopus bicinctus	–	2
Cricotopus/Orthocladius grp. sp.	1	4
Dicrotendipes neomodestus	–	1
D. nervosus	1	–
Hemerodromia sp.	1	–
Kiefferulus dux	2	–
Meropelopia sp.	1	–
Nanocladius sp.	–	1
Parakiefferiella sp.	–	3
Polypedilum convictum grp.	10	2
P. fallax grp.	11	1
P. illinoense	–	2
P. scalaenum	1	–
Psectrocladius sp.	–	1
Rheocricotopus robacki	10	5
Rheotanytarsus distinctissimus grp.	–	4
R. exiguus grp.	–	6
Stilocladius sp.	–	6
Tanytarsus sp.	8	57
Thienemaniella sp.	–	4
Tipula sp.	1	–
Tribelos fuscicorne	–	1
T. jucundum	1	–
Undetermined dipteran pupa	13	45
Ephemeroptera		
Baetis intercalaris	–	1
Hexagenia sp.	–	1
Isonychia arida	–	2
Stenonema smithae	21	34
Undetermined baetid	–	1
Gastropoda		
Undetermined ancylid	2	–
Hebetancyclus excentricus	2	–
Malacostraca		
Hyalella azteca	–	14
Megaloptera		

Nigronia serricornis	1	–
Odonata		
Gomphus sp.	1	–
Pelecypoda		
Sphaerium/Musculium sp.	1	–
Plecoptera		
Acroneuria arenosa	1	–
Trichoptera		
Cheumatopsyche sp.	2	4

Macroinvertebrate taxa list for Quincy STP, Gadsden County, collected via discrete dip net sweeps from all available habitats on 4 November 1991.

	Reference Site	Test Site
Acarina		
Sperchon sp.	1	–
Coleoptera		
Ancyronyx variegata	16	4
Dineutus discolor	–	5
Dubiraphia sp.	–	2
Gyrinus sp.	–	2
Hydroporus sp.	–	1
Macronychus glabratus	25	13
Stenelmis sp.	11	–
S. sinuata	–	3
Diptera		
Ablabesmyia mallochi	1	–
Chironomus decorus grp.	1	–
Cladotanytarsus sp.	1	–
Cricotopus bicinctus	3	–
Cricotopus/Orthocladius grp.	3	2
Cryptochironomus sp.	1	–
Eriocera sp.	–	1
Helopelopia sp.	1	–
Hexatoma sp.	1	–
Palpomyia grp.	2	2
Parakiefferiella sp.	–	1
Paralauterborniella nigrohalteralis	2	–
Polypedilum convictum grp.	26	4
P. fallax grp.	2	1
P. illinoense	2	15
P. scalaenum	4	–
Potthastia longimana	–	2
Parametriocnemus sp.	2	–
Rheocricotopus robacki	10	4
Rheotanytarsus distinctissimus grp.	2	1
R. exiguus grp.	4	36
Saetheria sp.	1	–
Simulium sp.	–	14
Stenochironomus sp.	9	2
Stelechomyia perpulchra	6	1
Tanytarsus sp.	2	–
Thienemaniella sp.	2	3
Tribelos fuscicorne	11	2
T. jucundum	6	3
Xylotopus par	2	–
Undetermined dipteran pupae	–	1
Undetermined tipulid	–	3

Ephemeroptera		
Baetis sp.	–	7
Caenis sp.	–	14
Hexagenia sp.	1	11
Isonychia sp.	–	1
Stenonema smithae	33	75
Malacostraca		
Asellus sp.	1	–
Hyalella azteca	1	9
Palaemonetes paludosus	–	26
Procambarus sp.	46	39
Megaloptera		
Corydalus cornutus	4	–
Odonata		
Argia moesta	–	1
Calopteryx dimidiata	1	–
Enallagma sp.	–	1
Macromia taeniolata	–	1
Progomphus obscurus	2	1
Stylurus ivae	9	1
Pelecypoda		
Corbicula manilensis	7	4
Plecoptera		
Acroneuria arenosa	–	1
Neoperla carlsoni	–	1
N. clymene	2	–
Trichoptera		
Cheumatopsyche sp.	7	17
Hydropsyche sp.	2	–
Oecetis cinerascens	–	1
Triaenodes sp.	3	–

Periphyton taxa list for Quincy STP, Gadsden County, collected on 2 December 1991.

	Reference Site	Test Site
Diatoms		
Achnanthes sp.	12	–
A. lanceolata v. *dubia*	423	374
A. lanceolata v. *omissa*	35	–
Cymatopleura solea	–	11
Cocconeis placentula	12	11
Cymbella minuta	82	23
Eunotia pectinalis	35	238
Fragilaria pinnata	12	–
Gomphonema gracile	–	68
G. parvulum	2845	998
Melosira varians	–	57
Navicula accomoda	71	113
N. capitata	24	34
N. confervacea	12	–
N. decussis	82	329
N. lepidosa	35	–
N. mutica	–	102
N. pelliculosa	200	–
N. pupula	153	–
N. pupula v. *rectangularis*	–	11
N. pupula v. *rostrata*	12	11
N. rhynchocephala	106	181
N. seminulum	–	68
N. simula	12	–
N. viridula	106	227
Nitzschia acicularis	12	–
N. clausii	12	–
N. filiformis	–	125
N. fonticola	12	–
N. gracilis	–	113
N. palea	306	488
Pinnularia mesogonglya	–	11
Stenopterobia intermedia	12	11
Surirella angustata	–	11
Surirella linearis	24	–
Synedra ulna	–	181
Chlorophyta		
Ankistrodesmus sp.	–	11
Characium sp.	12	–
Chlamydomonas sp.	12	34
Closterium sp.	–	11
Cosmarium sp.	–	11
Oedogonium sp.	–	23

Stigeocolonium sp.	12	–
Cyanophyta		
Anabaena sp.	12	11
Chroococcus sp.	71	–
Plectonema sp.	59	102

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0029033		911104		X	S	1

Remarks

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0029033		911104		B	S	1

Remarks

21 66