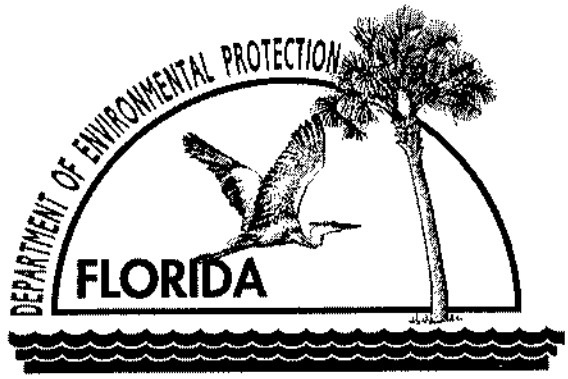
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Biological Assessment of

St. Marks WWTP

Wakulla County

NPDES #FL0040835

Sampled July 1998

March 1999

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:	St. Marks Wastewater Treatment Facility
County:	Wakulla
NPDES Number:	FL0040835
Permit Expiration Date:	4/1/99

Toxics Sampling Inspection (XSI)

Date Sampled: 8 July 1998

Results: Copper (16.1 µg/L) and lead (7.2 µg/L) were detected in the effluent at levels that exceeded Class III marine water quality standards (Rules 62-302.530(24) and (40) FAC, respectively). All other metals detected complied with Class III water quality standards. No organic pollutants were detected in the effluent sample.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 8 July 1998

Results: The effluent was not toxic to the fish, *Cyprinella leedsi*. The *Ceriodaphnia dubia* test also indicated no toxicity, although the test was invalidated due to high control mortality.

Impact Bioassessment Inspection (IBI)

Date Sampled: 8 July 1998

Results: Measures of macroinvertebrate community health indicated that the discharge was not adversely affecting the receiving water communities. Most community parameters were better at the test sites compared to the control site. Pollution-sensitive organisms were represented at all three study sites. Algal densities were low at all three study sites and chlorophyll *a* was undetected. Overall, the facility did not appear to have an adverse effect on the receiving water biological communities.

Water Quality Inspection (WQI)

Date Sampled: 8 July 1998

Results: Nutrient concentrations were somewhat elevated in the effluent sample. Nutrient levels were low in the receiving-water samples with the exception of the nitrate+nitrite, which exceeded levels found in approximately 85% of Florida's estuaries. Algal growth potential (AGP) did not exceed the 10 mg dry wt/L "problem threshold" at any of the study sites. Effluent AGP was not sampled.

This Biological Assessment was prepared by DEP staff to provide information to be used in reviewing an NPDES permit renewal application for the subject facility. This assessment will be used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The St. Marks Wastewater Treatment Plant, is located in Wakulla County, Florida (see maps in the Appendix). This domestic facility operates as an extended-aeration wastewater treatment plant in the activated sludge mode. It has provisions for pretreatment, flow equalization, nitrification, secondary clarification, disinfection, digestion, and recirculation. Digested sludge is taken to the Wakulla County Sanitary Landfill or other sites approved by the Department.

There has been a minor modification to the permit which includes the reduction of the recoverable cadmium monitoring requirements from monthly to quarterly testing and a reduction of the bioassay testing from quarterly to twice a year. The design flow of the plant is 0.05 MGD, with final discharge into the Class III waters of the St. Marks River via a diffuser pipe. The actual mean flow during this survey was 0.032 MGD.

State permit limits for the St. Marks Wastewater Treatment Plant are listed in Table 1. According to the facility's monthly operating reports, in September, 1997, the plant exceeded its permitted limit for total residual chlorine (Appendix). This facility operates under both state and federal permit requirements (Table 1).

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 control site (located within the St. Marks River approximately 300 meters upstream of the discharge on the opposite bank) and two test sites (50 meters above and below) bracketing the discharge (see map in the Appendix). A habitat assessment was performed *in situ* to establish comparability between sites, and supplemental physical/chemical data were also collected on the effluent and study sites on July 8, 1998. 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 screening toxicity bioassays, using the freshwater invertebrate, *Ceriodaphnia dubia,* and the freshwater fish, *Cyprinella leedsi,* as test organisms, were performed on an effluent sample.

Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities. Algal Growth Potential (AGP) tests were preformed using *Selenastrum capricornutum* as the test organism for the freshwater effluent and *Dunaliella tertiolecta* for the marine receiving-water sites.

Bacterial populations were analyzed for total and fecal coliforms. Sediment from control and test sites was analyzed for grain size and percent organic matter.

Benthic macroinvertebrate communities were evaluated at control and test sites using three replicate petite Ponar grabs. Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: taxa richness, Shannon-Weaver Diversity Index, community composition, functional feeding groups, and algal biomass. For a discussion of each of these measures see *Explanation of Measurements of Community Health* in the Appendix.

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'.

For graphical purposes, the percent differences between the control and test sites involving the number of taxa, the diversity index, the number of polychaete taxa, and the % pelecypods, are measured as the control site minus test site divided by the control site. The percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus control site divided by the control site.

The following personnel were involved in this investigation: Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburello, Steve Wolfe, David Whiting, and Vicki Whiting (DEP Central Biology Laboratory in Tallahassee). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, and Michael Tanski, as well as District representatives.

Results

Shorelines at the control and test sites consisted mostly of natu-

Table 1. Effluent limits and summary of chemistry data.

St. Marks WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
	-	None Detected	-	-	-
Metals (µg/L)					
Aluminum	1500 **	213 A	-	-	-
Arsenic	50 **	20 U	-	-	-
Cadmium - grab	9.3 **	0.18 I	-	-	-
Cadmium - composite	Report c*s	0.13 I	-	-	-
Chromium	50 **	10 U	-	-	-
Copper	2.9 **	16.1 A	-	-	-
Iron	300 **	146 A	-	-	-
Lead	5.6 **	7.2 A	-	-	-
Mercury	0.025 **	0.1 U	-	-	-
Nickel	8.3 **	6 U	-	-	-
Selenium	71 **	30 U	-	-	-
Silver	2.3 **	0.05 U	-	-	-
Zinc	≤ 86 **	44.2 J	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	6.0 Q	0.025	0.026	0.027
Total phosphorus	Report b*f	2.6 c	0.046	0.044	0.041
Ammonia	4.0 *s	0.08 cA	0.044	0.045 A	0.038
Nitrate+Nitrite	-	18	0.09	0.093	0.086
TKN	-	2.1 c	0.27	0.28	0.3
Organic Nitrogen	-	2.18	0.31	0.33	0.34
Total Nitrogen	Report b*f	20.1	0.36	0.38	0.39
General Phys-Chem Parameters					
Habitat Assessment	-	-	65	70	64
D.O. (mg/L) - surface	5.0 d*sf	4.0	5.2	5.4	5.9
D.O. (mg/L)- mid-depth	-	-	5.1	5.5	5.9
D.O. (mg/L)- bottom	-	-	5.0	5.6	6.0
pH (SU)- surface	6.0 - 8.5 d*sf	7.1	7.9	7.3	7.7
Conductivity (µmhos/cm) - surface	-	980	7,500	8,000	8,000
Conductivity (µmhos/cm) - mid	-	-	8,500	8,500	12,000
Conductivity (µmhos/cm)- bottom	-	-	10,000	16,000	23,500
Temperature (°C)- surface	-	30.2	26.6	27.1	27.9
Temperature (°C)- mid-depth	-	-	26.7	27.3	28.1
Temperature (°C)- bottom	-	-	27.1	29.1	29.2
C.B.O.D., 5 day (mg/L)	60 cd *sf	1.5 c	-	-	-
T.S.S. (mg/L)	60 d*s	6 c	-	-	-
Total Residual Chlorine (mg/L)	0.01 d*f	≤ 0.03	-	-	-
Flow (MGD)	Report d*f	0.032	-	-	-
Hardness (mg $CaCO_3$)	report c*s	101 A	-	-	-
AGP (mg dry wt/L)	-	-	5.1	2.8	5.2
Toxicity					
Bioassay - Fish	-	Not Toxic	-	-	-
Bioassay - Invertebrate	-	Test Invalid	-	-	-
Microbiology (# counts/100mL)					
Escherichia Coli	-	25 AQ	40	32	46
Fecal Coliforms	200 a*s	53 AQ	128	62	40
Total Coliforms	≤ 1000 **	125 AQ	430	300	300

A - Value reported is the mean of two or more determinations
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection li
J - Estimated value
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the minimum detection l
* Permit Limit
** Class III water quality standard

a - Annual average
b - Monthly average
c - Composite sample
d - Daily maximum
s - State Permit Limit
f - Federal Permit Limit

Table 2. Community structure of control and test sites.

St. Marks WWTP	Control Site	Test Site 1	Test Site 2
Macroinvertebrate Quantitative			
Number of Taxa	32	43	45
Shannon-Weaver diversity	3.4	4.2	3.6
Number Polychaete Taxa	7	10	14
Community Composition			
% Amphipoda	45	28	39
% Cirripedia	2	6	0
% Decapoda	1	13	4
% Diptera	14	2	4
% Gastropoda	4	9	11
% Isopoda	4	6	4
% Pelecypoda	4	6	2
% Polychaeta	23	27	34
% Other	2	3	2
Functional Feeding Groups			
% Browsers-grazers	21	15	20
% Predators/Carnivores	10	5	6
% Scavengers	21	15	20
% Surface Deposit Feeders	25	18	30
% Suspension Feeders	17	43	21
% Other	6	5	3
Phytoplankton Algae			
Number of Taxa	5	10	13
Shannon-Weaver diversity	1.3	1.5	1.6
Chlorophyll *a* (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	223	750	1,422
% Cryptophytes	87	11	11
% Diatoms	13	86	87
% Other	0	1	1
AGP (mg dry wt/L)	5.1	2.8	5.2

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

ral, non-altered shoreline with some riprap. Substrates at all three study sites consisted of sand with some areas of mud and shell. Habitat assessment scores at the control site (65 points), test site 1 (70 points), and test site 2 (64 points) were all within the "good" catagory (see Habitat Assessment Field Data Sheets in Appendix). Dissolved oxygen levels on the bottom ranged from 5.0 mg/L at the control site, to 6.0 mg/L at test site 2 (Table 1). The pH (7.9 SU at the control site, 7.3 SU at test site 1, and 7.7 SU at test site 2) and bottom temperatures (27.1°C at the control site and 29.1°C at test site 1, and 29.2°C at test site 2) were similar among the three sites. The bottom salinity was 6 ppt at the control site (located the farthest upstream), 10 ppt at test site 1 (located upstream of the discharge), and 14.5 ppt at test site 2 (located downstream of the discharge near the mouth of the St. Marks River).

No organic constituents were detected in the effluent. Copper (16.1 mg/L) and lead (7.2 mg/L) both exceeded Class III marine water quality standards (Rules 62-302.530(24) and (40) FAC, respectively). Aluminum (213 mg/L), cadmium (0.18 mg/L), and iron (146 mg/L) were detected in the effluent, yet complied with Class III marine water quality standards. Total residual chlorine levels in the effluent sample were measured in the laboratory at ≤ 0.03 mg/L, which was at the detection limit.

The effluent sample was not toxic to the fish, *Cyprinella leedsi*, during the 48-hour bioassay. Although there was no mortality in the 100% effluent sample using the invertebrate, *Ceriodaphnia dubia*, the test was invalidated due to high control mortality (Appendix).

Effluent fecal coliform (53 counts/100 mL), total coliform (125 counts/100 mL), and *Escherichia coli* (25 counts/100 mL) samples were held beyond normal holding times.

Nutrient levels are shown in Table 1. The effluent total nitrogen concentration (20.1 mg/L), total phosphorus (2.6 mg/L composite sample), ortho-phosphate (6.0 mg/L), and nitrate+nitrite concentrations (18 mg/L) all appeared elevated. Nutrient levels at the study sites were low with the exception of nitrate+nitrite (control site and test site 1 both were 0.093 mg/L and test site 2 was 0.086 mg/L). AGP, which measures bioavailable nutrients via algal response, was 5.1 mg dry wt/L at the control site, 2.8 mg dry wt/L at test site 1, and 5.2 mg dry wt/L at test site 2.

Phytoplankton data were used to assess algal community health (Table 2). There were 5 taxa at the control site, 10 taxa at test site 1, and 13 taxa at test site 2. Shannon-Weaver diversity was 1.3 at the control site, 1.5 at test site 1, and

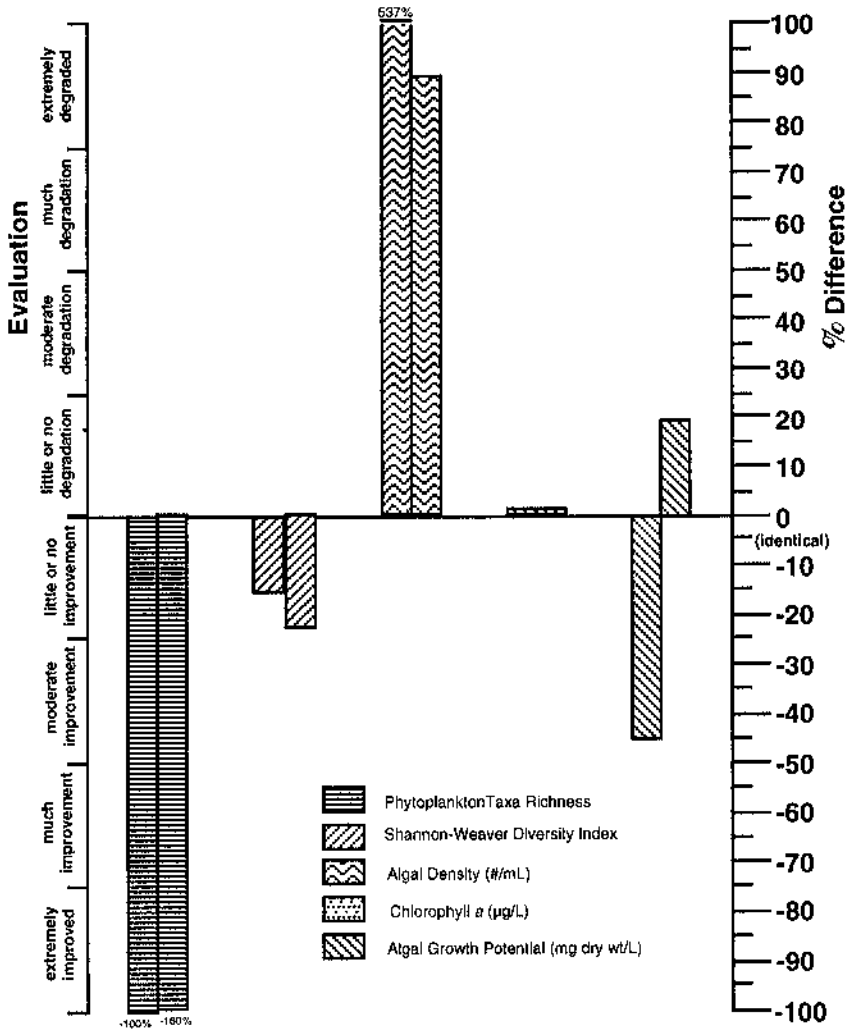


Figure 1. Effect of discharge on the phytoplankton community.

1.6 at test site 2). Algal densities were 223 #/ml, 750 #/ml, and 1,422 #/ml at the control site, test site 1, and test site 2, respectively.

Laboratory analysis of the sediments showed that 74% of the control site and test site 1 and 58% of test site 2, were made up of silt/clay and fine sand (particles 0.25 mm in diameter and smaller). Organic material made up 4% of the control site and test site 1 and 9% of test site 2.

In the macroinvertebrate samples, there were 32, 43, and 45 total taxa at the control site, test site 1, and test site 2, respectively. Shannon-Weaver diversity was 3.4 at the control site, 4.2 at test site 1, and 3.6 at test site 2. There were 7 polychaete taxa at the control site, 10 at test site 1, and 14 at test site 2. Pelecypods made up 4% of the total community at the control site, 6% of test site 1, and 2% of test site 2.

Discussion

Copper (16.1 mg/L) was detected in the effluent sample at a level which exceeded Class III marine water quality standards (≤ 2.9 mg/L) (Rule 62-302.530(24) FAC). Lead (7.2 mg/L) also exceeded the Class III standard of 5.6 mg/L (Rule 62-302.530(40) FAC).

Effluent nutrients were somewhat elevated, yet did not seem to be affecting the receiving waters. Nutrient levels at the study sites were low with the exception of nitrate+nitrite, where levels were higher than those typically found in 85% of Florida's estuaries (see *Typical Values of Selected Parameters in Florida Waters* in the Appendix). AGP values at all study sites were below the 10 mg dry wt/L "problem threshold" (Ron Raschke, U.S. EPA, pers. comm.).

Phytoplankton taxa richness was low at all three study sites. Examining the phytoplankton community data in conjunction with the AGP values, it appears that the effluent was not adversely affecting the algal communities. Algal densities at all three study sites were low for a marine system.

Several benthic community parameters at the test sites were similar to or better than the control site. Taxa richness was high at all three study sites. Polychaete taxa richness was 43% and 100% higher at test site 1 and 2, respectively, compared to the control site. The higher number of polychaete taxa at the test sites was probably due to the differences in bottom salinities (Table 1). Shannon-Weaver diversity was highest at test site 1, lowest at the control site, and intermediate at test site 2.

All three study sites were dominated by the somewhat pollution-tolerant aorid amphipod, *Grandidierella bonnieroides*. Pollution-sensitive amphipods such as, *Cerapus tubularis,* and the dipteran, *Rheotanytarsus exiguus* group sp., were found at test site 2. Similarly, test site 1 contained such sensi-

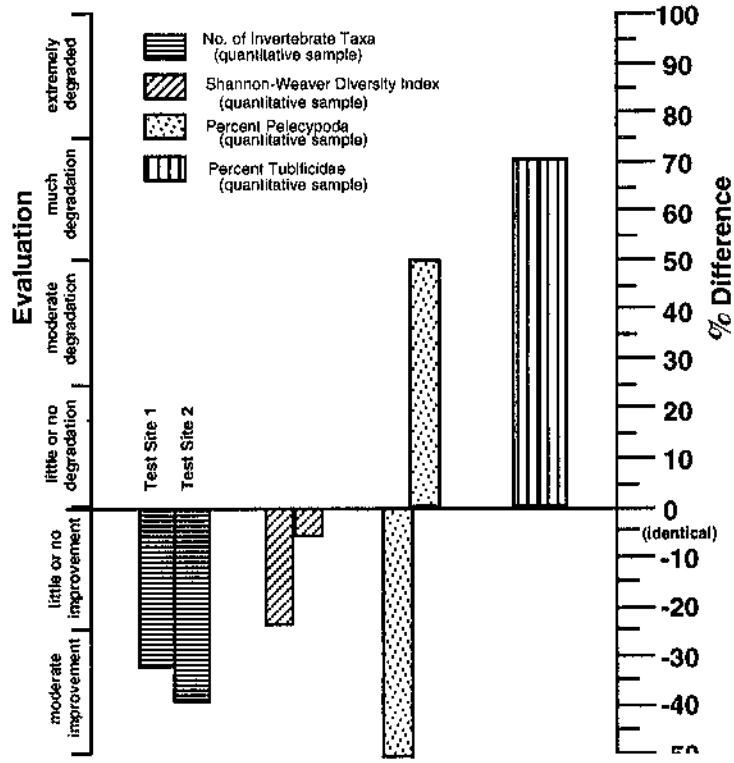


Figure 2. Effect of discharge on the macroinvertebrate community.

tive isopods as *Cassidinidea ovalis, Sphaeroma quadridentatum,* and *Uromunna* sp. The control site contained fewer pollution-sensitive organisms than either test site. Pelecypods normally considered "good water quality indicators", were found at all three study sites in low numbers. *Mactra fragilis,* considered a very sensitive pelecypod, was found only at the test sites. These results suggest that the discharge was not adversely affecting the receiving-water benthic communities.

Literature Cited

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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.

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Explanation of Measurements of Community Health

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

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

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

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

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress.

Typical Values for Selected Parameters in Florida Waters

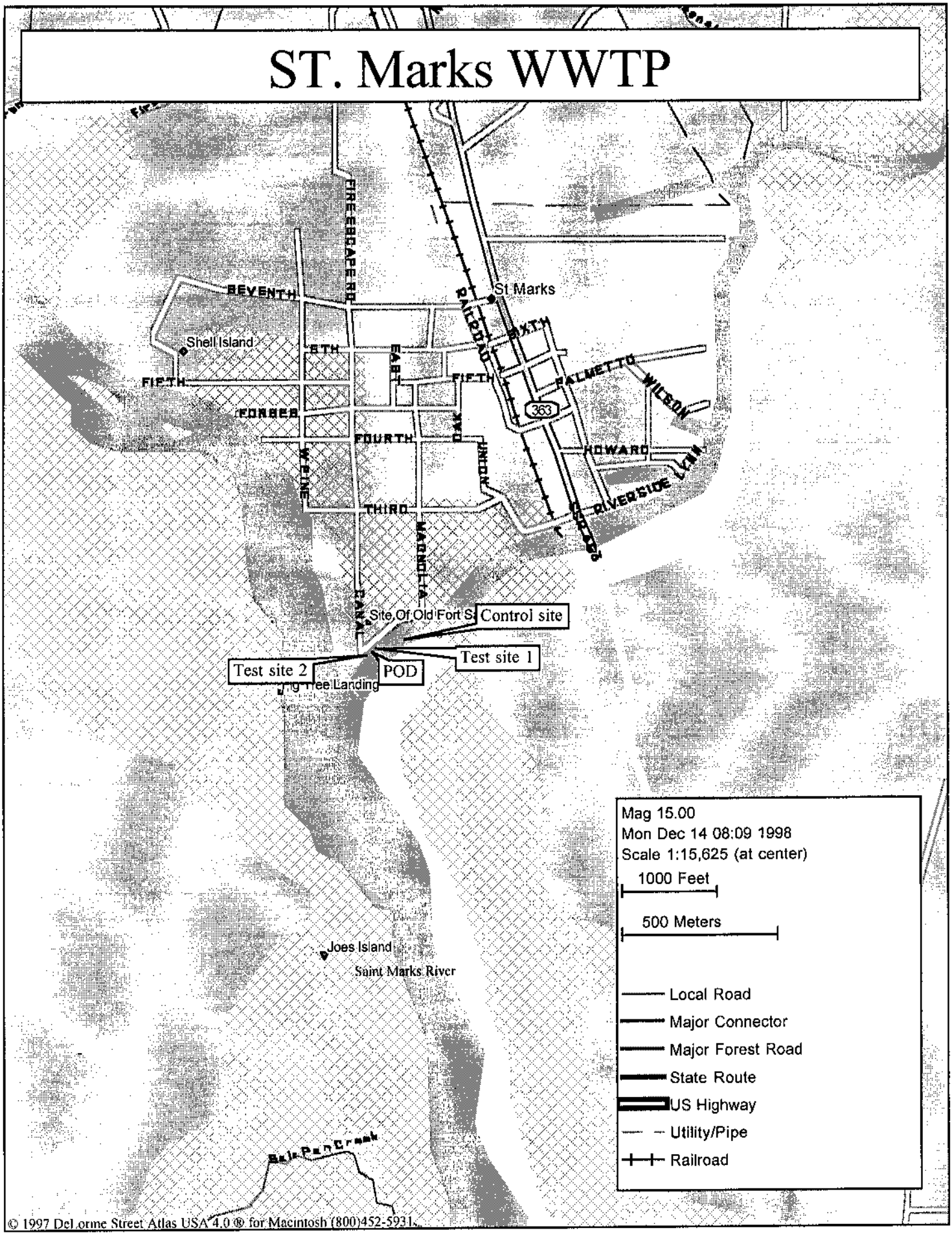
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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 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

ST. Marks WWTP



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Facility Summary

Facility Name: St. Marks WWTF
Date Summary Prepared: 8/24/98

Location map: City of St. Marks Northwest/10
County: Wakulla
District:

P.O. Box 296
St. Marks, Florida 32355-296

NPDES Permit # FL0040835
expiration date: 4/1/99

State Permit # D065-238214
expiration date: 4/1/99

Facility Type: Dom.

Function of facility: To operate a 0.050 MGD WWTF with final effluent discharge to St. Marks River.

Description of treatment process: An existing 0.050 mgd maximum annual average daily flow (AADF) permitted capacity extended aeration wastewater treatment plant. The treatment facility will operate in the activated sludge mode. The treatment facility has provisions for pretreatment, flow equalization, nitrification, secondary clarification, disinfection, digestion, and recirculation. Digested sludge is hauled by licensed transport company to the Wakulla County Sanitary Landfill or another site approved by the Department.

This permitting action is a minor modification. The minor modification includes the reduction of the recoverable cadmium monitoring requirements from monthly to quarterly testing and reduction of the bioassay quarterly testing requirements from quarterly to biannually.

Receiving waters: St. Marks River
Classification: III

Design Flow: 0.050 MGD
Mean Flow: 0.032 MGD
Flow during survey: 0.032

Discharge is: Continuous

Best time to sample is: N/A

If facility has a mixing zone, give details (size, parameters, etc.) N/A

List effluent limits (attach relevant paperwork):

Federal Permit Effluent Limits

Parameter	Frequency	Sample Type	Limit (units)
Oxygen, Dissolved mg/L (daily min.)	Daily, 6/week	Grab.	5.0
pH (min) to 8.5 (max)	Daily, 6/week	Grab	6.0
TSS	1/2 weeks	8 Hr. Composite	30.0 mg/L (mo. avg.) 45.0 mg/L (wkly. avg.) 60.0 mg/L (daily max.)
			20.0 mg/L (annl. avg.)
Nitrogen, Ammonia	1/month	Grab	2.0 mg/L (annl. avg.) Report mg/L (mo. avg.)
Nitrogen, Nitrate	1/month	Grab	Report mg/L (mo. avg.)
Phosphorus, Total	1/month	Grab	Report mg/L (mo. avg.)
Flow	Continuous	----------	Report MGD (mo. avg) Report MGD (wkly avg.) Report MGD (daily max.)
Chlorine, Total Residual	6/week	Grab	0.01 mg/L (daily max.)
Coliform, Fecal	1/2 weeks	Grab	200/100 ml (annl avg.) 800/100 ml (daily max.)
BOD, Carbonaceous 5-day	1/2 weeks	8 Hr. Composite	25.0 mg/L (mo. avg.) 40.0 mg/L (wkly avg.)

60.0 mg/L (daily max.)

20.0 mg/L (annl. avg.)

State Permit Effluent Limits

Parameter	Frequency	Sample Type	Limit (units)
Flow, In Conduit or Thru Treatment Plant	5 days/week	flow meter	0.05 MGD (mo. avg.)
BOD, Carbonaceous 5 day, 20C	1/month	8 Hr. Composite	20.0 mg/L (annl. avg.) 30.0 mg/L (mo. avg.) 45.0 mg/L (wkly. avg.) 60.0 mg/L (daily max.)
Nitrogen, Nitrate, Total (as N)	1/month	8 Hr. Composite	Report mg/L (mo. avg.)
Nitrogen, Ammonia	1/month	Grab	2.0 mg/L (annl. avg.) 2.5 mg/L (mo. avg.) 3.0 mg/L (wkly. avg.) 4.0 mg/L (daily max.)
Phosphorus, Total (as P) Report mg/L (mo. avg.)	1/month	8 Hr. Composite	
Solids, Total Suspended	1/month	Grab	20.0 mg/L (annl. avg.) 30.0 mg/L (mo. avg.) 45.0 mg/L (wkly. avg.) 60.0 mg/L (daily max.)
Oxygen, Dissolved	5 days/week	Grab	5.0 mg/L (daily min.)

pH	5 days/week	Grab	6.0 min. to 8.5 max.
Coliform, Fecal	1/month	Grab	200/100 ml (annl. avg.) Report #/100 ml (Mo. Geo. Mean) 800/100 ml (daily max.)
Total Residual Chlorine (After Dechlorination)	5 days/week	Grab	0.01 mg/L (daily max.)
Total Residual Chlorine (Before Dechlorination)	5 days/week	Grab	0.5 mg/L (daily min.)
Cadmium, Total Recoverable	Quarterly	24 Hr. Composite	Report ug/L (daily (max.)
Hardness, Total (as CaCO3)	Quarterly	24 Hr. Composite	Report mg/L (daily max)

List permit violations (from MOR data or other source) and plant upsets within past year: (1) In September 97, the facility exceeded their permitted limitation of 0.01 mg/L daily max. for the total chlorine residual for dechlorination with a daily max. of 2.2 mg/L.

Describe previous impact bioassessments, WQBEL's and previous or current enforcement actions: The facility is required to perform bioassays in March, June, September and December. Since 1997, the facility has passed 4 out of the 5 bioassays performed. The failure occurred in June 1997 with 30% mortality occurring in the Ceriodaphnia dubia. All 3 follow-up tests performed as a result of the failure passed with 0% mortality. The most recent report available, performed during March 1998, passed with 10% mortality occurring in the Ceriodaphnia dubia and 5% mortality occurring in the Cyprinella leedsi.

Discuss comparability of MOR results to past FDEP results and whether there are trends (improving, declining) in the data set: No definite trends can be identified within the data set.

Additional information:
N/A
Staff contributing to this review (signature)

Glenn Butts

Biologist

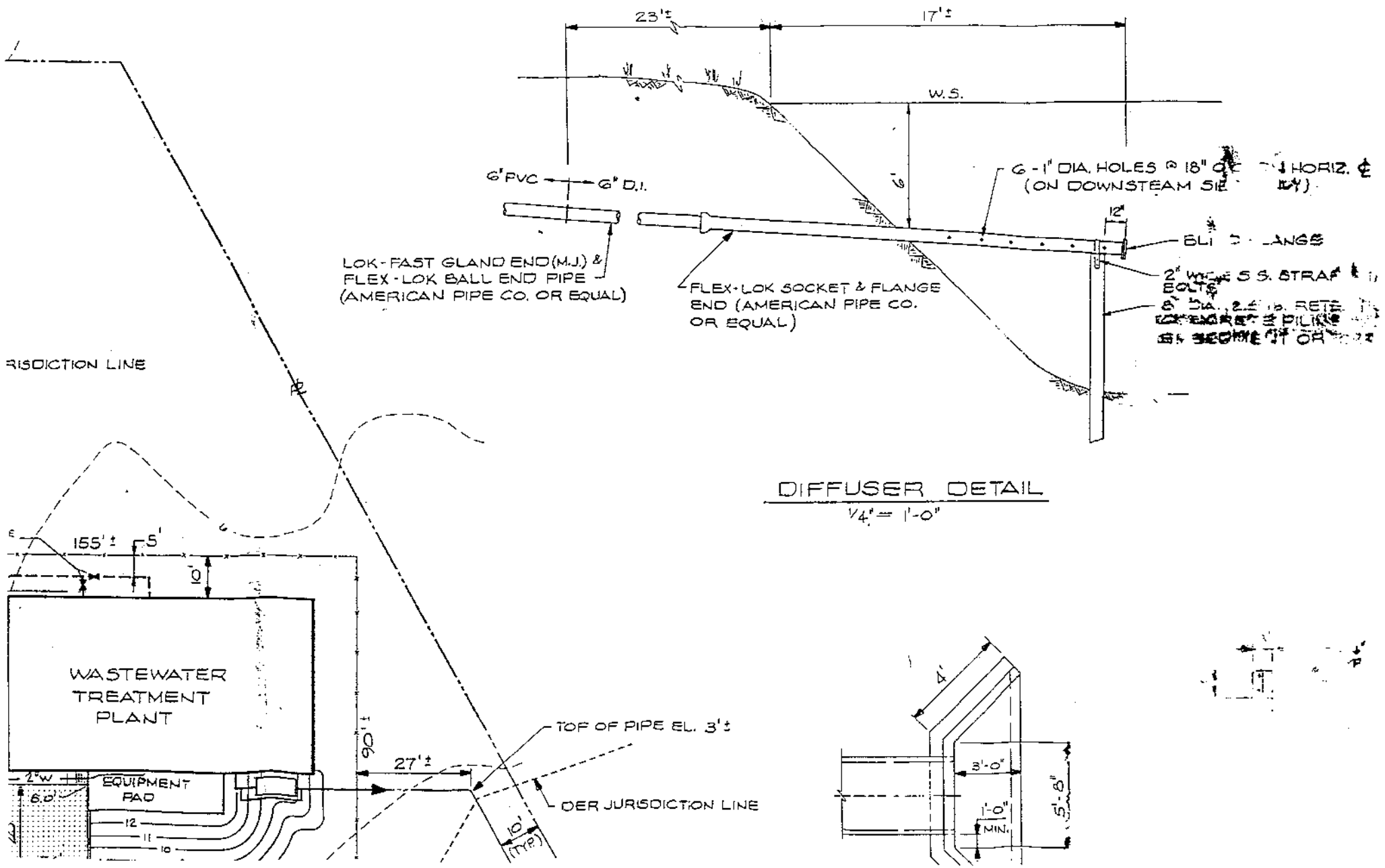
Inspector

Engineer

Other

Kenny Ferguson

Other



DIFFUSER DETAIL

1/4" = 1'-0"

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):	TIME	RECEIVING BODY OF WATER:
		7/8/98	9:30	St. Mark's River Lower

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Wakulla	300m up from POD across River	Control 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)
85				5	5	5	

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

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

Width of riparian vegetation (m) on least buffered side: 15m

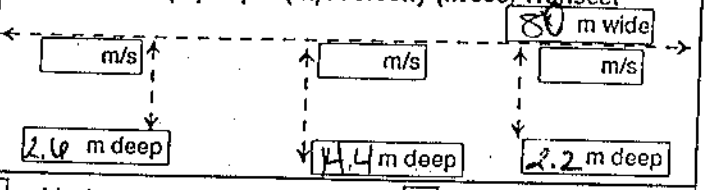
List & map dominant vegetation on back

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

Artificially Impounded [ ] yes [ ] more sinuous

High Water Mark: 1 (m above present water level) + 2.2 (present depth in m) = 3.2 (m above bed)

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



Canopy Cover %: Open: [X] Lightly Shaded (11-45%): [ ] 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)				(Sand)			
Leaf Packs or Mats				(Mud/Muck/Silt)		3/rep	PONAR
Aquatic Vegetation				Other: (Shell)			
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	.2	26.6	7.93	5.20	9,500			
Mid-depth	1	26.7		5.05	8,500			2m
Bottom	2.6	27.1		5.04	10,000			

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

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

Weather Conditions/Notes: DO Calibration 99.9 mg/L
pH calibration 9.98 SUs

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

SAMPLING TEAM: KE, VW

SIGNATURE: Vicki Whitney

DATE: 7/8/98

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7/9/98	St. Marks River

REMARKS:	LOCATION:	FIELD ID/NAME:
up	300 m above POO	Control Site

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations 9	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points** Dropped Benthic	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 28	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points** Grass beds + Natural rock Bottom	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 9	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points** Shell	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 65

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/9/98	KE, PW	Vicki Whitney

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):	TIME	RECEIVING BODY OF WATER:
		7/8/98	10:40	St. Marks River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
		4 from POO Same Bank	Test Site 1

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)
50				5	30	20	

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

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

Width of riparian vegetation (m) on least buffered side: 3-5m

List & map dominant vegetation on back

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

Artificially Impounded [ ] yes more sinuous

High Water Mark: 1 (m above present water level) + ____ (present depth in m) = ____ (m above bed)

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

80 m wide

m/s	m/s	m/s
2 m deep	14.8 m deep	2 m deep

Canopy Cover % : Open : [X] 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	5%	3 rep	Hom
Leaf Packs or Mats				Mud/Muck/Silt	50%		
Aquatic Vegetation				Other: Live St.	90%		
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	.1	27.1	7.32	5.36	8,000			
Mid-depth	1	27.3		5.45	8,500			2
Bottom	2 m	29.1		5.60	16,000			

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

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

Weather Conditions/Notes:

Juncus, Cattail, Willow, Pontadaria

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

SAMPLING TEAM: KE, VW

SIGNATURE: Vicki Whitney

DATE: 7/8/98

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7/8/98	St. Mark's River

REMARKS:	LOCATION:	FIELD ID/NAME:
	50m above below POD	Test Site #1

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations (9)	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed (28)	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation (3)	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations (8)	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action (10)	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type (12)	Combination of sand, gravel, and shell. **12-15 points** Limestone	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 70

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/8/98	VW, ME	Vicki Whiting

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):	TIME	RECEIVING BODY OF WATER:
		7/8/98	11:17	St. Mark River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Wakulla	50 m below POD	Test Stn 2

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)
				10	30		60 Estuary Sandy

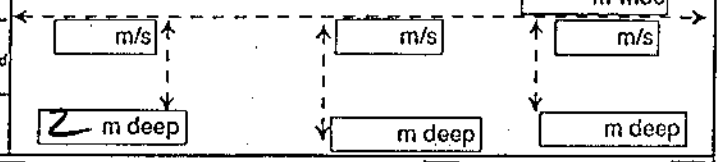
Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]

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

Width of riparian vegetation (m) on least buffered side: 15 m

List & map dominant vegetation on back

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



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

Artificially Impounded [ ] yes more sinuous

High Water Mark: .5 (m above present water level) + ____ (present depth in m) = ____ (m above bed)

Canopy Cover % : Open : [X] Lightly Shaded (11-45%): [ ] 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)				Sand	10	3/rep	Ponar
Leaf Packs or Mats				Mud/Muck/Silt	90		
Aquatic Vegetation				Other: Rock			
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	.1	29.9	7.71	5.92	8,000			2
Mid-depth	1	28.1		5.92	12,000			
Bottom	2 m	29.2		6.04	23,500			

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: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

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

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

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

Weather Conditions/Notes: salt wedge, tide coming in

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

SAMPLING TEAM:	SIGNATURE:	DATE:
VW, KE	Vicki Whatley	7/8/98

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7/8/98	St. Marks River

REMARKS:	LOCATION: 4nov. 50m below POD Same Bank	FIELD ID/NAME:
		Test Site 2

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Littoral Alterations (8)	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed (28)	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation (3)	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations (8)	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action (10)	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type (7)	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. CPOM **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 64

COMMENTS: Incoming tide

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/8/98	VW, LE	Vicki Whiting

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of St. Marks WWTP
County: Wakulla
Contact / District: Vicki Whiting / Tallahassee
NPDES Permit #: FL00
LIMS Sample #: 334155 LIMS Job #: TLH-1998-07-09-09
sample log 7/15/98 ow
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 7/8/98 Time 12:45
Test Beginning: Date 7/8/98 Time 15:20
Test Ending: Date 7/10/98 Time 15:15
Organism Batch #: 30 Diluent Batch #: 31
Organism Age: 24hours SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

Remarks: Test invalidated due to excessive Control mortality. DW

Temperature range
room: 25.0 – 26.7°C
Incubator #1: 23.6 – 24.7°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) (µmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control A	A	5	5	4 10	8.1		8.3	25.7		25.0	8.2		7.8	175		180
Control B	B	5	5	3 20			8.3			25.0			7.9			195
Control C	C	5	5	5			8.3			24.5			7.8			190
Control D	D	5	5	4 10			8.3			24.8			7.9			190
100% A	A	5	5	5	7.6		8.6	26.0		24.5	7.4		8.0	850		890
100% B	B	5	5	5			8.6			24.5			8.0			910
100% C	C	5	5	5			8.3			24.5			8.0			910
100% D	D	5	5	5			8.6			24.5			8.0			930
measured by:		MF	MW	FW	DW		FW	DW		FW	DW		FW	DW		FW
recorded by:		MF	MW	FW	DW		FW	DW		FW	DW		FW	DW		FW

(A) = wrong measurement written. (FW) 7/8/98.

Investigators' Signatures

Marshall Faircloth
Courtney Head
Pam Wright

reviewer form updated 5/22/98

	Salt Water / Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NOT measured			
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	—	75	207	Hach	CH	FW
Hardness (mg/L as $CaCO_3$):	—	(FW) 40 101 (A)	290	Hach	CH	FW
Total ammonia (mg/L as N):	—	<0.017	<0.017	Hach	CH	FW
Salinity:	—	0	0	YCT	FW	FW

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of St. Marks WWTP
County: Wakulla
Contact / District: Vicki Whiting / Tallahassee
NPDES Permit #: FL00
LIMS Sample #: 334155 LIMS Job #: TLH-1998-07-09-09
sample log 7/15/98 DW
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 2

Sample Collection: Date 7/8/98 Time 12:45
Test Beginning: Date 7/8/98 Time ~~15:30~~ 16:00 (B)
Test Ending: Date 7/10/98 Time 16:00
Organism Batch #: 51 Diluent Batch #: Well
Organism Age: 10 days SRT toxicant batch #: NA
Test organism: Cyprinella leedsi
Remarks:

Temperature Range
Room: 25.0 – 26.7°C
Incubator #3: 25.0 – 26.0°C

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	H9	5	5	5	7.9	8.4	8.4	25.1	26.0	25.9	8.1	7.3	7.6	260	265	265
Control	H10	5	5	5	7.9	8.4	8.5	25.6	25.9	25.9	8.2	7.3	7.6	260	260	265
Control	H11	5	5	5	7.9	8.4	8.4	25.6	25.8	25.9	8.2	7.5	7.7	260	260	265
Control	H12	5	5	5	7.9	8.4	8.4	25.6	25.7	25.8	8.2	7.5	7.6	260	260	260
100%	H13	5	5	5	7.6	8.3	8.5	~~26.6~~	25.6	25.8	7.5	7.5	7.4	900	885	900
100%	H14	5	5	5	7.6	8.3	8.5	26.4	25.5	25.8	7.5	7.3	7.4	900	885	895
100%	H15	5	5	5	7.6	8.3	8.5	26.4	25.6	25.9	7.5	7.0	7.4	900	885	890
100%	H16	5	5	5	7.6	8.2	8.5	26.4	25.8	25.7	7.5	7.1	7.4	900	890	890
								(A) 26.3 Did not acclimate long enough. DW 7/8								
measured by:		FW	CH	FW	DW	DW	FW	DW	DW	FW	DW	DW	FW	DW	DW	FW
recorded by:		CH	CH	FW	CH	CH	FW	CH	CH	FW	CH	CH	FW	CH	CH	FW

(B) = wrong start time written. (FW) 7/8/98.

Investigators' Signatures
Marshall Faircloth
Courtney Head
Ryan Warnhold
Dave Whitington

reviewer form updated 5/22/98

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	OR100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	129	—	201	Hach	CH	FW
Hardness (mg/L as $CaCO_3$):	142	—	290	Hach	CH	FW
Total ammonia (mg/L as N):	<0.017	—	<0.017	Hach	CH	FW
Salinity:	0	—	0	YCT	FW	FW

Phytoplankton taxa list and densities (#/mL) for St. Marks WWTP, collected via subsurface grabs in St. Marks River on 8 July, 1998.

	Control Site	Test Site 1	Test Site 2
Bacillariophyceae			
Achnanthes sp.	-	-	10
Bacillaria sp.	-	-	10
Centrales sp.	-	5	-
Cocconeis sp.	-	15	20
Coscinodiscus sp.	6	10	-
Cyclotella sp.	14	539	1050
Cymbella sp.	-	-	10
Gomphonema sp.	-	5	10
Melosira sp.	-	-	20
Navicula sp.	-	10	20
Nitzschia sp.	-	49	88
Undetermined Pennales	9	15	-
Chlorphyceae			
Chlamydomonas sp.	-	-	20
Cryptophyceae			
Chroomonas sp.	52	20	29
Cryptomonas sp.	9	-	10
Pyramimonas sp.	-	10	-
Tetraselmis sp.	-	5	10
Undetermined Cryptophyceae	133	59	118
Dinophyceae			
Undetermined Dinophyceae sp.	-	10	-

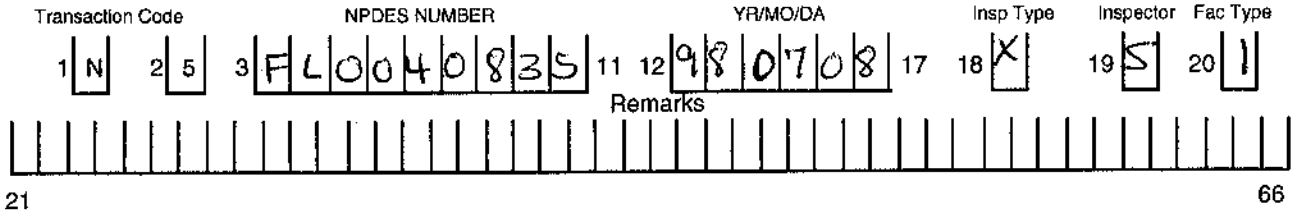
Benthic macroinvertebrate taxa list for St. Marks WWTP, collected via Ponar grab samples in St. Marks River, on 8 July, 1998. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Amphipoda			
Ampelisca abdita	-	-	14
Amphilochidae	-	97	-
Aoridae	-	2569	1847
Cerapus sp.	28	306	708
Cerapus tubularis	-	-	333
Corophium ellisi	-	14	-
Corophium simile	-	-	153
Corophium sp.	361	42	500
Corophium volutator	528	347	111
Grandidierella bonnieroides	5417	1417	10153
Oedicerotidae	-	-	14
Cumacea			
Almyracuma proximoculi	167	153	167
Decapoda			
Stomatopoda sp.	222	-	56
Undetermined Decapoda	14	-	-
Xanthidae	-	97	28
Diptera			
Chironomidae	-	14	-
Cladotanytarsus sp.	-	-	14
Cryptochironomus sp.	139	28	319
Dicrotendipes modestus	-	69	69
Dicrotendipes neomodestus	-	14	-
Dicrotendipes sp.	-	-	83
Djalmabatista pulcher	-	14	-
Palpomyia / Bezzia grp.	153	-	56
Polypedilum halterale grp.	14	-	14
Polypedilum scalaenum grp.	1347	125	28
Polypedilum scalaenum	-	-	250
Polypedilum sp.	-	-	56
Rheotanytarsus exiguus grp.	-	-	28
Tanytarsus sp. g Epler	222	56	292
Tanytarsus sp. m Epler	14	-	-
Tanytarsus sp.	28	14	28
Gastropoda			
Hydrobiidae	556	1486	3750
Neritidae	-	-	14
Neritina reclivata	-	139	-
Odostomia sp.	42	-	-
Hirudinea			
Undetermined Hirudinea	-	42	-

Isopoda			
Cassidinidea ovalis	-	56	-
Cyathura polita	236	69	306
Edotea montosa	194	278	1250
Edotea sp.	-	333	-
Sphaeroma destructor	28	-	-
Sphaeroma quadridentatum	-	28	-
Sphaeroma sp.	14	-	-
Sphaeromatidae	-	181	-
Undetermined Isopoda	-	14	-
Uromunna sp.	-	56	-
Nemertea			
Undetermined Nemertea	-	28	69
Oligochaeta			
Limnodrilus hoffmeisteri	-	-	14
Tubificidae	42	97	472
Pelecypoda			
Corbula sp.	347	-	-
Corbula swiftiana	42	-	-
Dreissenidae	-	-	14
Mactra fragilis	-	236	250
Mactridae	-	56	111
Mulinia lateralis	111	333	-
Mytilidae	-	97	-
Mytilopsis leucophaeata	-	222	-
Tagelus sp.	56	-	-
Tellina sp.	56	-	125
Tellina versicolor	-	14	14
Semelidae	-	-	278
Polychaeta			
Ampharetidae	167	28	-
Apomatus sp.	-	-	28
Armandia sp.	-	-	14
Boccardia sp.	-	167	6292
Capitellidae	-	14	-
Fabricia sp.	-	-	14
Hobsonia florida	722	236	931
Laeonereis culveri	1736	611	3097
Loandalia americana	69	69	83
Nereidae	-	264	111
Nereis succinea	-	14	-
Phyllodoce mucosa	-	-	14
Phyllodocidae	14	-	-
Polydora ligni	-	-	14
Polydora socialis	-	-	431
Polydora sp.	111	292	403
Prionospio fallax	-	-	14
Pseudopolydora sp.	14	-	417
Salmacina sp.	-	500	-

Serpulidae	-	1361	28
Sigambra tentaculata	-	-	14
Spionidae	-	931	111
Streblospio benedicti	458	83	236
Terebellidae	-	14	-
Tanaidacea			
Hargeria rapax	97	2278	1444
Turbellaria			
Stylochidae	-	-	69
Stylochus sp.	-	167	-
Undetermined Turbellaria	42	-	97
Thoracica			
Balanus sp.	264	1028	-
Trichoptera			
Oecetis sp.	-	14	-

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)

