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Biological Assessment of

Jefferson Smurfit Corporation

Nassau County

NPDES #FL0001104

Sampled April 1998

February 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:	Jefferson Smurfit Corporation
County:	Nassau
NPDES Number:	FL0001104
Permit Expiration Date:	7/7/2003

Toxics Sampling Inspection (XSI)

Date Sampled: 13 April 1998

Results: No organic pollutants were detected in the effluent sample. All metals detected in the effluent complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 13 April 1998

Results: The effluent was not toxic to the fish, *Menidia beryllina*. There was 15% mortality in the 100% salinity-adjusted, dechlorinated effluent sample during the 48-hour acute screening bioassay using the invertebrate, *Americamysis bahia*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 13 April 1998

Results: The discharger did not appear to be adversely affecting the receiving water macroinvertebrate communities. Pollution-sensitive organisms were represented at all three study sites. Algal densities were low at all three study sites. Chlorophyll *a* was low at the control site and undetected at both test sites.

Water Quality Inspection (WQI)

Date Sampled: 13 April 1998

Results: Nutrient concentrations were fairly low in the effluent sample. Nutrient levels in the receiving-water sites were also low with the exception of ammonia (0.12 mg/L at test site 1 and 0.19 mg/L at test site 2). The ammonia levels were approximately 75% higher than those normally found in other Florida's estuaries. Algal growth potential did not exceed the 10 mg dry wt/L problem threshold at any of the study sites.

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 Jefferson Smurfit Corporation is located in Nassau County, Florida (see maps in Appendix). It is an industrial facility whose activities include the production of pulp and paper products. The effluent treatment process includes a grit chamber with primary clarification, a 3-cell cooling tower, unox reactor, and 2 secondary clarifiers. The final discharge is through a submerged defuser pipe into the Class III Amelia River. While the design flow of the wastewater system is 30 MGD, the actual mean flow has been 20 MGD, with a flow of 23.8 MGD during this survey.

State permit limits for Jefferson Smurfit Corporation are listed in Table 1. According to the facility's monthly operating reports, the plant has had violations of Biological Oxygen Demand (BOD), temperature, pH, flow, and dissolved oxygen (see Facility Summary in Appendix).

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site (located on the east side of Cumberland Island Sound between the St. Marys and Amelia Rivers) and two test sites bracketing the discharge approximately 400 m above and below the discharge. The habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and organic constituents (base neutral and acid extractables, and pesticide extractables). Samples were collected during an outgoing tide on April 13, 1998. Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening bioassays, using the invertebrate, *Americamysis bahia*, and the fish, *Menidia beryllina*, 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 performed 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. Sediments from control and test sites were analyzed for particle grain size.

Benthic macroinvertebrate communities were evaluated at control and test sites using three replicate petite Ponar grabs.

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

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: taxa richness, Shannon-Weaver Diversity Index, community composition, functional feeding groups, and algal biomass. For a discussion of each of these measures see the *Explanation of Measurements of Community Health* in the Appendix.

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: Tim McKelvey, John Baxter, and Patrick O'Connor (DEP Northeast District), and 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 site and test site 1 consisted mostly of natural non-altered shoreline, while test site 2 consisted mostly of riprap and vertical seawalls.

Substrates at all three study sites consisted of mud, sand, and shell, with slightly finer particles found at the control site (see Habitat Assessment Field Sheets in Appendix). Physical/chemical measurements were similar between the two test sites (Table 1). The control site had a higher dissolved oxygen (8.3 mg/L) compared to test site 1 (7.3 mg/L) and test site 2 (7.1 mg/L). The control site also had a higher BOD (3.0 mg/L) compared to test site 1 and test site 2 (2.0 mg/L at both sites). Salinity was highest at the control site (31.8 ppt) and similar between test site 1 (26.9 ppt) and test site 2 (26.2 ppt).

No organic constituents were detected in the effluent. Aluminum (455 mg/L), iron (93 mg/L), copper (2 µg/L), and zinc (19 µg/L) were detected in the effluent at concentrations that complied with Class III water quality standards.

The effluent sample was not toxic to the fish, *Menidia beryllina* during the 48-hour acute screening bioassay (Appendix). There was 15% mortality of the invertebrate, *Americamysis bahia* in the 100% salinity-adjusted dechlorinated effluent sample, which exceeds the Class III water quality standards (Rules 62-302.530(62), 62-302.500(1)(d), and 62-4.244(3)(a) FAC).

Fecal and total coliforms in the effluent at all study sites complied with Class III marine water quality standards (Table 1).

Nutrients at the study sites were fairly low with the exception of ammonia at test site 1 (0.12 mg/L) and test site 2 (0.19 mg/L). These levels exceeded those normally found in 75% of other Florida estuaries. AGP, which measures bioavailable nutrients via algal response, was below the 10 mg dry wt/L "problem threshold" (Ron Raschke, USEPA, pers. comm.) at all three study sites (Table 1).

Phytoplankton data were used to assess algal community health (Table 2). Taxa richness was high at all three study sites, with 23 taxa at test site 1, 21 taxa at test site 2, and 19 taxa at the control site. Similarly, Shannon-Weaver diversity was highest at test site 2 (3.7), and test site 1 (3.5), and lower at the control site (3.3). Algal densities were fairly low for a marine system, with the control site slightly higher than the test sites (Table 2). Chlorophyll *a* was also higher at the control site (1.2 µg/L) compared to the two test sites, where it was at the detection limit.

According to the Marine Habitat Assessment Sheets (Appendix), sediments at test sites 1 and 2 were similar and consisted of sand and shell with some areas of silt. The control site, on the other hand, was mostly silt with some sand. In the laboratory analysis, 87% of the sediments at the control site consisted of particles 0.5 mm in diameter and less, while those at the test sites were coarser, with 34% and 14% of test sites 1 and 2, respectively, consisting of particles 2.0 mm in diameter and greater.

Benthic macroinvertebrate taxa richness was high at all three study sites (Table 2). Taxa richness was highest at test site 2 (55 taxa), lowest at the control site (45 taxa), and intermediate at test site 1 (50

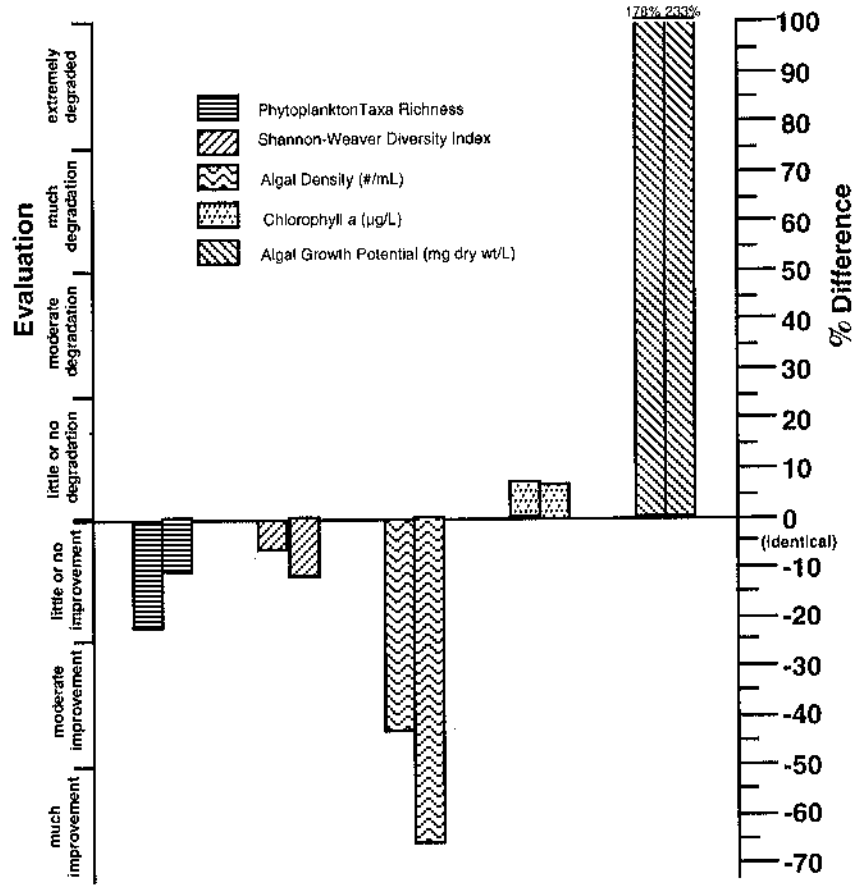


Figure 1. Effect of discharge on the phytoplankton community.

Table 1. Effluent limits and summary of chemistry data.

Jefferson Smurfit Corp	Effluent Limits	Effluent Samples	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
	-	None Detected	-	-	-
Metals (µg/L)					
Aluminum	1500 **	455 A	-	-	-
Arsenic	≤ 50 **	30 U	-	-	-
Cadmium	≤ 9.3 **	0.25 U	-	-	-
Chromium	≤ 50 **	7 U	-	-	-
Copper	≤ 2.9 **	2 I	-	-	-
Iron	≤ 300 **	93 A	-	-	-
Lead	≤ 5.6 **	0.5 U	-	-	-
Mercury	≤ 0.025 **	0.1 U	-	-	-
Nickel	≤ 8.3 **	6 U	-	-	-
Selenium	≤ 71 **	40 U	-	-	-
Silver	≤ 2.3 **	0.25 U	-	-	-
Zinc	≤ 86 **	19 I	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	0.019	0.009 I	0.012	0.014
Total phosphorus	-	0.28	0.052 A	0.057	0.06
Ammonia	-	0.063	0.043 I	0.12	0.19 A
Nitrate+Nitrite	-	0.02	0.04 U	0.04 U	0.044 I
TKN	-	1.9	0.47 A	0.54	0.64
Organic Nitrogen	-	1.84	0.43	0.42	0.45
Total Nitrogen	-	1.92	0.5	0.58	0.68
General Phys-Chem Parameters					
Habitat Assessment	-	-	85	80	26
D.O. (mg/L)	5.0 min	6.5	8.3	7.3	7.1
pH (SU)	6.0 - 8.5	6.3	7.7	7.4	7.4
B.O.D.5 (lbs/day)	23,120 max *	1,192	3 (mg/L)	2 (mg/L)	2 (mg/L)
Conductivity (µmhos/cm)	-	2,270	47,271	41,964	40,855
T.S.S (lbs/day)	42,500 max *	3,178	3,774	3,575	3,774
Temperature (°C)	100 max	35.2	18.3	19.2	19.5
Flow (MGD)	30 max	23.8	-	-	-
AGP (mg dry wt/L)	-	0.588 I	1.8	5	6
Toxicity					
Bioassay - Fish	Quarterly	Not Toxic	-	-	-
Bioassay - Invertebrate	Quarterly	Toxic	-	-	-
Microbiology (# counts/100mL)					
Fecal Coliforms	200 **b	560	52	120	87
Total Coliforms	≤ 1,000 **b	670	145	230	380

a - Annual average
b - Monthly average
c - Value is calculated based on hardness
A - Value reported is the mean of two or more determinations
I - Value reported < the minimum quantitation limit, and ≥ the minimum detection limit
U - Material analyzed but not detected; value reported is the minimum detection limit

* Permit Limit
** Class III water quality standard

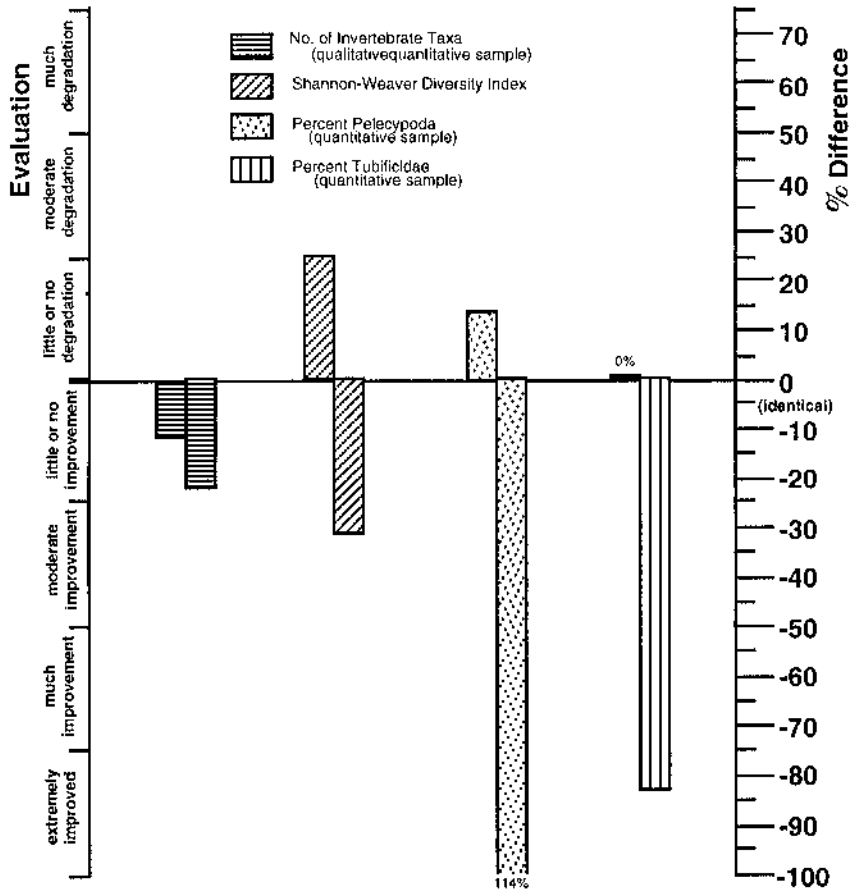


Figure 2. Effect of discharge on the macroinvertebrate community.

taxa). Shannon-Weaver diversity was highest at test site 2 (4.2), lowest at test site 1 (2.4), and intermediate at the control site (3.2). Polychaete taxa richness was similar among the three study sites, with the greatest number of taxa at test site 2 (29), least at the control site (20 taxa), and intermediate at test site 1 (21 taxa). All three study sites contained pollution-sensitive groups such as amphipods and pelecypods (see Taxa Lists in the Appendix). The control site and test site 2 were dominated by the pollution-tolerant polychaete, *Streblospio benedicti,* while test site 1 was dominated by the somewhat pollution-sensitive terebellid polychaetes. Pollution-sensitive amphipods (*Metharpinia floridana* at the control site and *Lembos* sp. at the two test sites) were found throughout the study area. Only test site 2 contained pollution-sensitive cumaceans. Pollution-tolerant polychaete species were found at all three study areas, with some moderately-sensitive species found at the control site. Pelecypods, normally considered "good water quality indicators", were found at all three study areas, where they made up 7% of the control site community, 6% of test site 1, and 15% of test site 2.

Discussion

The effluent nutrient levels were fairly typical of the treatment process and did not seem to be having an adverse effect on the study areas. AGP values at all study sites were below the 10 mg dry wt/L "problem threshold".

The 100% salinity adjusted effluent sample was toxic to the invertebrate, *Americamysis bahia,* which is a violation of Class III water quality standards (Rules 62-302.530(62), 62-302.500(1)(d), and 62-4.244(3)(a) FAC).

After examining the phytoplankton community data in conjunction with the AGP values, it appears that the effluent was not adversely affecting the algal communities.

Quantitative measures of macroinvertebrate community health showed no adverse affects on the benthic community. All three study sites compared favorably to other marine systems in Florida.

Literature Cited

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

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

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

Table 2. Biological community structure of control and test sites.

Jefferson Smurfit Corp.	Control Site	Test Site 1	Test Site 2
Macroinvertebrate Quantitative			
Number of Taxa	45	50	55
Shannon-Weaver Diversity	3.2	2.4	4.2
Number of Polychaete Taxa	20	21	29
Community Composition			
% Amphipoda	6	5	10
% Cumacea	0	0	7
% Decapoda	1	0	0
% Gastropoda	1	0	0
% Isopoda	1	1	0
% Nemertea	5	0	6
% Pelecypoda	7	6	15
% Polychaeta	73	86	58
% Tubificidae	6	0	1
% Other	0	2	3
Functional Feeding Groups			
% Browsers-grazers	2	3	4
% Burrowing Deposit Feeders	26	3	14
% Predators/Carnivores	8	4	16
% Scavengers	3	3	5
% Surface Deposit Feeders	27	42	21
% Suspension Feeders	34	41	36
% Unknown	0	4	4
Phytoplankton Algae			
Number of Taxa	19	23	21
Shannon-Weaver Diversity	3.3	3.5	3.7
Chlorophyll *a* (ug/L)	1.2 I	1.12 U	1.12 U
Algal Density (#/mL)	2,485	1,413	1,145
% Blue-green	1	1	0
% Cryptophytes	2	6	7
% Diatoms	95	89	83
% Dinoflagellates	0	2	1
% Green	0	0	1
AGP (mg dry wt/L)	1.8	5	6

I - Value reported < the minimum quantitation limit, and ≥ the minimum detection limit
U - Material analyzed for but not detected; value reported is the minimum detection limit

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

Weber, C. I. 1993. 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 pp.

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

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.

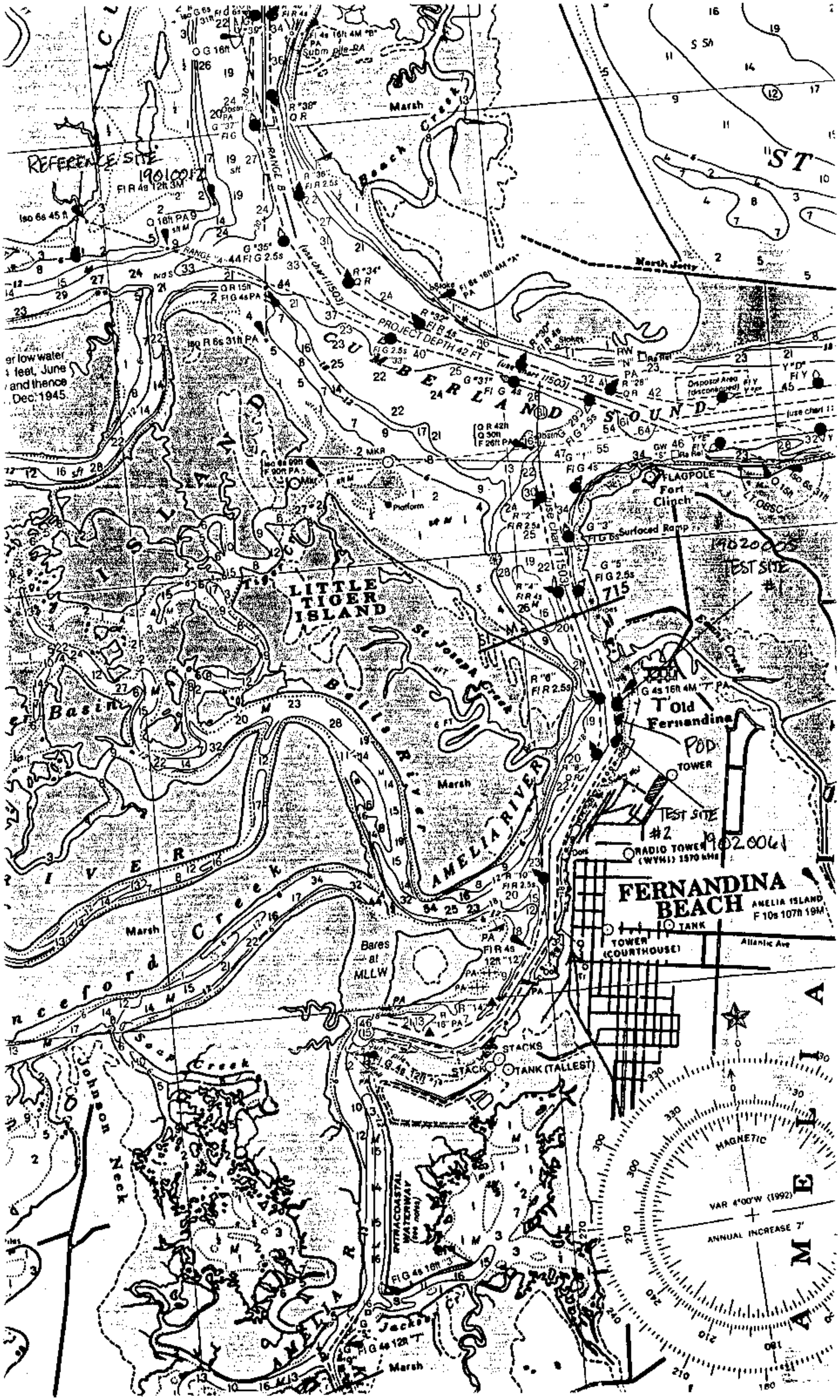
Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single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

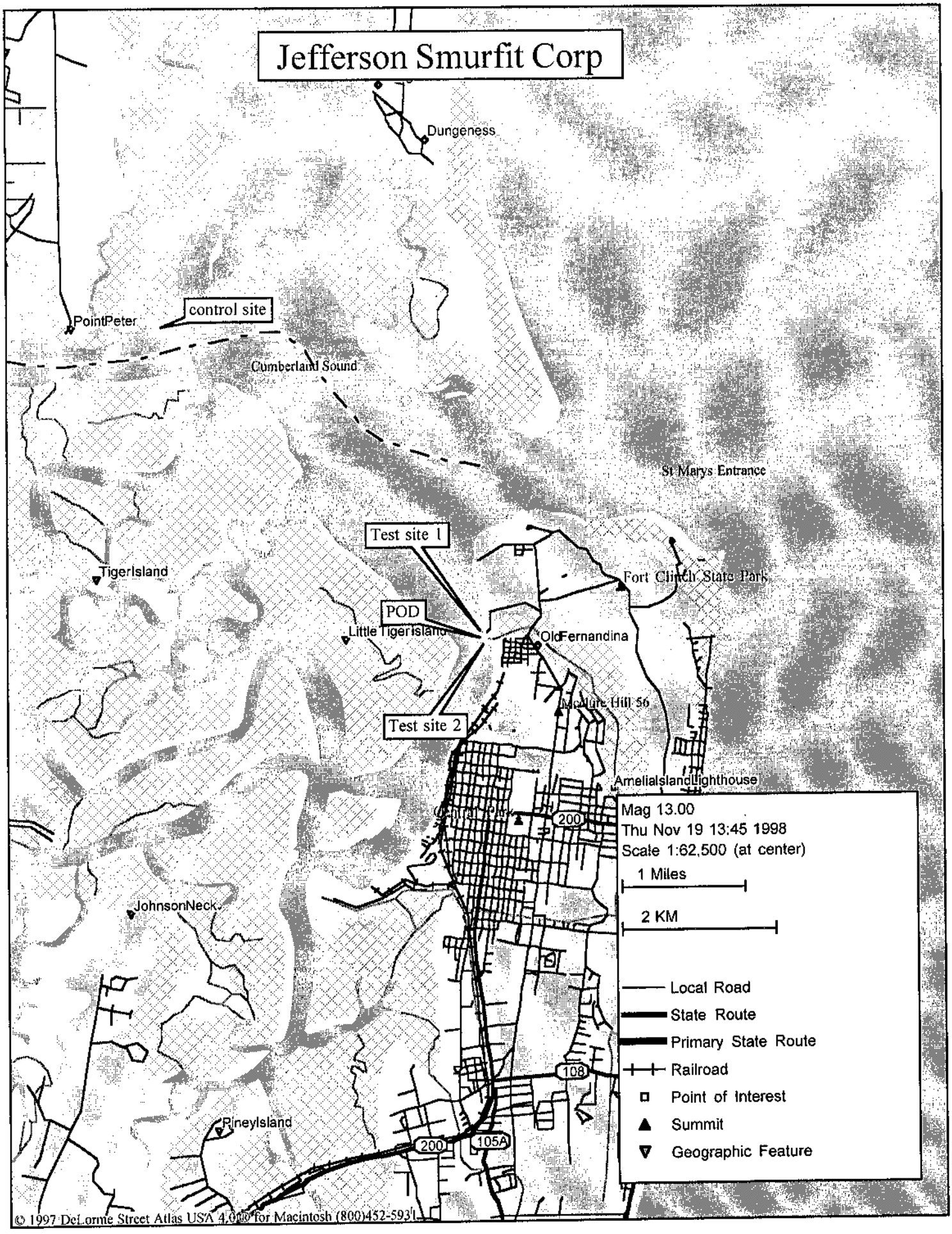
Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used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


REFERENCE SITE
19010012
TEST SITE #1
19020005
TEST SITE #2
19020061
POD
CUMBERLAND SOUND
LITTLE TIGER ISLAND
Bells River
AMELIA RIVER
St Joseph Creek
FERNANDINA BEACH
AMELIA ISLAND
Old Fernandina
Fort Clinch
FLAGPOLE
RADIO TOWER
TOWER (COURTHOUSE)
TANK (TALLEST)
STACKS
North Jetty
PROJECT DEPTH 42 FT
Marsh
Johnson Neck
Jackson Cr
Beach Creek
Atlantic Ave
MAGNETIC
VAR 4°00'W (1992)
ANNUAL INCREASE 7'
INTRACOASTAL WATERWAY
Bares at MLLW


Jefferson Smurfit Corp
Dungeness
PointPeter
control site
Cumberland Sound
St Marys Entrance
Test site 1
TigerIsland
Fort Clinch State Park
POD
Little TigerIsland
OldFernandina
Test site 2
AmeliaIslandLighthouse
Mag 13.00
Thu Nov 19 13:45 1998
Scale 1:62,500 (at center)
1 Miles
2 KM
Local Road
State Route
Primary State Route
Railroad
Point of Interest
Summit
Geographic Feature
JohnsonNeck
PineyIsland
200
105A
108
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: (FERNANDINA MILL) JEFFERSON SMURFIT CORPORATION		**Date Summary Prepared:** 4/17/98
Location (attach detailed map): NORTH 8TH Street, FERNANDINA BEACH, NASSAU CO., FL.	**County** NASSAU	**District** NED
Federal Permit # FL0001104 **and expiration date:** 1/31/99	**State GMS # and** 1045-157142 **State expiration date:** 4/20/94	**Facility Type:** (Industrial) Municipal Federal Agricultural Other (list):

Function of facility:
PULP + PAPER MILL

Description of treatment process:
GRIT CHAMBERS, PRIMARY CLARIFIER, 3-CELL COOLING TOWER, SLUDGE DEWATERING EQUIPMENT, UNOX REACTOR, 2 SECONDARY CLARIFIERS

Receiving waters: AMELIA RIVER	**Classification:** I II (III) MARINE	
Design Flow: 30 MGD	**Mean Flow:** 20-21 MGD	**Flow during survey:** 23.75 MGD

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

therefore, the best time to sample is: NA

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

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

Parameter	Limit (units)	
~~EXCESS~~	AVERAGE	MAX
FLOW	REPORT	30 MGD
BOD_5	11560 #/day	23120 #/day
TSS	21250 #/day	42500 #/day
Temp.	—	100 °F
pH	6 - 8.5	
D.O.	24hr Avg - 5.0	min - 4.0
Bioassay	Quarterly	

Describe special permit conditions and permit modifications:
NA

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

JEFFERSON SMURFIT
(Facility)

Description of permitted outfall(s):

SUBMERGED DIFFUSER PIPE

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

BOD_5 DAILY MAX, TEMPERATURE, pH, FLOW, DO

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

NA

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

NO TRENDS

Additional information:

NA

Staff contributing to this review (signature):

TIM McKELVEY	(Biologist)
JOHN BAXTER	(Inspector)
11 11	(Engineer)
PAT O'CONNOR	(Biologist)
	( )
	( )

FYDS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 19010012	DATE (M/D/Y): 4/31/98	TIME: 1230	RECEIVING BODY OF WATER: CUMBERLAND SOUND @ ST. MARYS RIVER

REMARKS: JEFFERSON SMURFIT FERNANDINA BCH. MILL	COUNTY: NASSAU	LOCATION: EAST SIDE OF CUMBERLAND SOUND BETWEEN ST. MARY'S RIVER AND AMELIA RIVER.	FIELD ID/NAME: REFERENCE SITE

channel is dredged for boats

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category): tidal marsh & barrier island

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						10 *	90

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

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

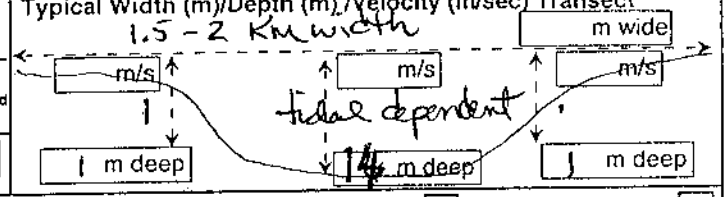
Width of riparian vegetation (m) on least buffered side: 18+ | *List & map dominant vegetation on back*

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

Artificially Impounded [ ] yes

High Water Mark: [ ] (m above present water level) + [tidal] (present depth in m) = [ ] (m above bod)

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	25	2	ponar
Leaf Packs or Mats				Mud/Muck/Silt	25	2	ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble	50	2	ponar	Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth ~~(m)~~ FT:	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	(ppt) SALINITY		Secchi (m):
Top								0.7
Mid-depth	5'	18.25	7.64	8.28	47271	30.8		
Bottom	10'							

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: [X] Turbid: [ ] Opaque: [ ]

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

Weather Conditions/Notes: Sunny, Cool 70°F's
Windy 20-25 SE

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

SAMPLING TEAM: Tim McKelvey & Patrick O'Connor

SIGNATURE: Tim McKelvey

DATE: 4/13/98

FYI5

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 19010012	DATE (MO/YR): 4/31/98	RECEIVING BODY OF WATER: CUMBERLAND SOUND @ ST. MARY'S RIVER

REMARKS: JEFFERSON SMURFIT FERNANDINA RCH. MILL FYI5	LOCATION: EAST SIDE OF CUMBERLAND SOUND BETWEEN ST. MARY'S RIVER AND AMELIA RIVER	FIELD ID NAME: REFERENCE SITE

Habitat Parameter / SCORE	Excellent	Good	Fair	Poor
Littoral Alterations — 10	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 — 40	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 — 5	>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 — 10	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 — 10	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. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE: 85

COMMENTS: Two penar drops per rep (3 reps) at this site due to hard bottom to sample with penar, needed to get enough sample so needed two drops of penar/rep.

ANALYSIS DATE: 4/13/98	ANALYST: Tim McKelvey / Pat O'Connor	SIGNATURE: Tim McKelvey

FYI'S

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 1902005	DATE (M/D/Y): 4/13/98	TIME: 1420	RECEIVING BODY OF WATER: AMELIA RIVER

REMARKS: JEFFERSON SMURFIT, FERN. BCH. MILL, FYI'S	COUNTY: NASSAU	LOCATION: EASTERN SHORELINE NEAR MARKER #7, APPROX. 400 METERS NORTH OF OUTFALL	FIELD ID/NAME: TEST SITE #1

* dredged for shipping traffic to Port

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category): salt marsh, tidal creeks

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				10	20	50	20

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

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

Width of riparian vegetation (m) on least buffered side: <1 m

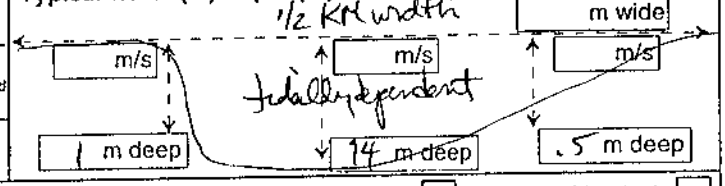
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

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

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



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

* typical transect for Nassau River

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	10	2	ponar
Leaf Packs or Mats				Mud/Muck/Silt	10	2	ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble	90	2	ponar	Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth ~~(m)~~ Ft:	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Sal (ppt)		Secchi (m):
Top								
Mid-depth	4.5	19.15	7.92	7.25	41964	26.9		0.6
Bottom								

System Type : Stream: ☐ (1st - 2nd order ☐ 3rd - 4th order ☐ 5th - 6th order ☐ 7th order or greater ☐) Lake: ☐ Wetland: ☐ Estuary: ☒ Other: ☐ ____

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

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

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

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

Weather Conditions/Notes: Sunny & Cool (70's F.)
Wind @ 20-25 SE.
Falling Tide

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

SAMPLING TEAM: Tim McKelvey / Patrick O'Connor

SIGNATURE: Tim McKelvey

DATE:

FMIS

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

SUBMITTING AGENCY CODE: 1031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 1902005	DATE (M/D/Y): 4/13/98	RECEIVING BODY OF WATER: AMELIA RIVER
REMARKS: FALLING TIDE JEFFERSON SMURFIT FMIS	LOCATION: EASTERN SHORELINE, NEAR MARKER "7", APPROX. 400 METERS NORTH OF OUTFALL.		FIELD NAME: TEST SITE #1

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 34	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 tidal creek & some natural "beach" & saltmarsh	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation 5	>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. 8-10 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	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 80

COMMENTS: two grab drops per rep. - 3 reps at this site

ANALYSIS DATE: 4/13/98	ANALYST: Tim McKelvey / Pat O'Connor	SIGNATURE: Tim McKelvey

FYI'S

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 831 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 19020861	DATE (M/D/Y): 4/14/98	TIME: 1500	RECEIVING BODY OF WATER: AMELIA RIVER

REMARKS: JEFFERSON SMURFIT FERNANDINA BCH MILL FYI'S	COUNTY: NASSAU	LOCATION: APPROX 400 meters S.W. of P.O.D, eastern shoreline	FIELD ID/NAME: TEST SITE #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)
						100	

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

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

Width of riparian vegetation (m) on least buffered side: <1

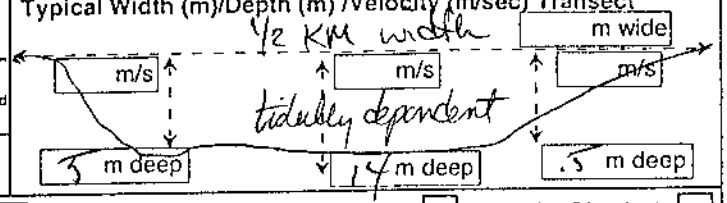
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

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

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	20	1	ponar
Leaf Packs or Mats				Mud/Muck/Silt	70	1	ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble	10	1	ponar	Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (Ft. (m)):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Sal (ppt)		Secchi (m):
Top								
Mid-depth	5'	19.51	7.36	7.09	40855	26.2		0.6
Bottom	10'							

System Type : Stream: ☒ 1st - 2nd order ☐ 3rd - 4th order ☐ 5th - 6th order ☐ 7th order or greater Lake: ☐ Wetland: ☐ Estuary: ☒ Other: ☐ ____

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

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

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

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

Weather Conditions/Notes: Sunny & Cool 70's+
Windy 20-25 SE
Falling tide

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

SAMPLING TEAM: Tim McKelvey Pat O'Connor

SIGNATURE: Tim McKelvey

DATE:

* channel dredged

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

SUBMITTING AGENCY CODE: 8021 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 1902061	DATE (MO/DY): 4/13/98	RECEIVING BODY OF WATER: AMELIA RIVER
REMARKS: JEFFERSON SMURFIT FYI'S FERNANDINA BCH MILL.	LOCATION: APPROX 400 Meters S.W of Pogeadern shoreline		FIELD DNAME: TEST SITE #2

Habitat Parameter / SCORE	Excellent	Good	Fair	Poor
Littoral Alterations — 3	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 — 0	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 — 5	>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 — 5	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 — 3	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. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE: 26

COMMENTS: FALLING TIDE

ANALYSIS DATE: 4/13/98 | ANALYST: Tim McKelvey / Pat O'Connor | SIGNATURE: Tim McKelvey

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Jefferson Smurfit
County: Nassau
Contact / District: NE-DIST
NPDES Permit #: FL0001104
LIMS Sample #: 31911 LIMS Job #: TLH 1998-04-14-15
sample log: 4/14/98 10

Sample Collection: Date 4-13-1998 Time 13:30
Test Beginning: Date 4-14-98 Time 15:00
Test Ending: Date 4-16-98 Time 15:00
Organism Batch #: 13 Diluent Batch #: NSW
Organism Age: 13 days
Test Organism: Menidia beryllina

Test Type: (Screening) Definitive
Static | Static Renewal | Flow-through
Temperature range: room _____ incubator _____
Test Number: 1 of 2

Remarks: D = dead, M = missing
Control is NSW diluted with well H_2O to 1.1‰ salinity
Sample dechlorinated with 1.68 mg/L of 0.025N Sodium thiosulfate
TRC of Dechlorinated sample = 0.1 mg/L. 1.68 mg/L was 3X calculated amount of Sodium thiosulfate needed.

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.4	8.2 @ 25.3 °C	103.5 @ 97.6 991 @ 1005 @ 24.8 °C (990 @ 1010)
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.6	8.2 @ 24.9 °C	100.7 @ 97.6 1002 @ 1005 @ 25.5 °C (990 @ 1010)
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.4 @ 23.5	8.2 @ 25.2 °C	104.4 @ 97.6 1003 @ 1005 @ 25.5 °C (990 @ 1010)

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	E1	5	5	5	7.8	8.0	8.1	24.4	25.4	25.2	7.3	7.5	7.9	2.12	2.56	2.63
Control	E2	5	5	5	7.8	8.1	8.2	24.4	25.4	25.8	7.3	7.6	7.7	2.12	2.37	2.41
Control	E3	5	5	5	7.8	8.1	8.2	24.4	25.5	25.6	7.4	7.6	7.7	2.12	2.58	2.59
Control	E4	5	5	5	7.8	8.2	8.2	24.4	25.4	25.5	7.4	7.8	7.7	2.13	2.55	2.57
100% Decl	E5	4	4	4	6.9	7.8	8.2	25.3	25.4	25.3	7.2	7.0	7.2	2.28	2.41	2.41
100% Decl	E6	5	5	5	6.9	7.6	8.1	25.3	25.5	25.6	7.2	6.9	7.0	2.28	2.98	3.11
100% Decl	E7	5	5	5	6.9	7.6	8.0	25.3	25.3	25.7	7.2	6.7	6.7	2.28	3.02	3.21
100% Decl	E8	5	5	5	6.9	7.7	8.1	25.3	25.2	25.6	7.1	6.7	6.7	2.28	2.78	2.87
100%	E9	5	5	5	6.8	7.0	8.0	25.2	25.3	25.8	6.9	6.4	6.5	2.27	2.86	2.94
100%	E10	5	5	5	6.4	7.3	8.0	25.2	25.5	25.6	6.9	6.6	6.5	2.27	2.85	2.88
100%	E11	5	5	5	6.8	7.4	8.1	25.2	25.4	25.6	6.9	6.4	6.6	2.27	2.57	2.58
100%	E12	5	5	4 in	6.8	7.5	8.1	25.2	25.4	26.3	6.8	6.6	6.5	2.27	2.83	2.88
Measured/Loaded by:		MF	FW	DAW	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW
Recorded by:		MF	FW	DAW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW

Investigators' Signatures
Dan Wendel
Dan Washington
Marshall Faircloth

Water Quality Parameters verified by MF

	(Salt Water) (NSW not 7.1) Well Water	(Salt Water 7.1) 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03		0.125	HACH	DAW
Alkalinity (mg/L as $CaCO_3$):	116		219	HACH	DAW
Hardness (mg/L as $CaCO_3$):			368	HACH	DAW
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	ORION	FW

Ammonia Meter #98136 Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 7.1 ppt Sample Salinity: 7.1 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Jefferson Smurfit
County: Nassau
Contact / District: NE-DIST
NPDES Permit #: FL0001104
LIMS Sample #: 318911 **LIMS Job #:** 1998-04-14-15
sample log: 4/14/98 AM
Test Type: (Screening) | Definitive
Static | Static Renewal | Flow-through
Temperature range: room _____ incubator _____
Test Number: 2 of 2

Sample Collection: Date 4-13-98 Time 13:30
Test Beginning: Date 4-14-98 Time 15:00
Test Ending: Date 4-16-98 Time 15:00
Organism Batch #: 100 **Diluent Batch #:** NSW
Organism Age: 3 days
Test Organism: *Americamysis bahia*

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 / 9.0 @ 9.0	23.3 @ 23.4	8.2 @ 25.3°C	18035 (FW) @ 97.6 / 991 @ 1005 @ 24.8°C / 9880 @ 10107
24 hr	7.0 @ 7.0 / 9.0 @ 9.0	23.6 @ 23.6	8.2 @ 24.9°C	100.7 @ 97.6 / 1002 @ 1005 @ 25.5°C / 9990 @ 10107
48 hr	7.0 @ 7.0 / 9.0 @ 9.0	23.4 @ 23.5	8.2 @ 25.2°C	104.4 @ 97.6 / 1003 @ 1005 @ 25.5 °C / 9980 @ 10107

Remarks: D = dead, M = missing
Salt control was made by the addition of 40 fathoms bioassay laboratory grade ocean salts to NSW diluted with well H2O to 1.1 ppt to yield a salinity of 2.1 ppt NSW control was made by diluting NSW with well H2O to a salinity of 2.1 ppt. Sea salts were added to both the dechlorinated and 100% sample aliquots to bring salinity up to 2.1‰

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
2.1‰ NSW	Control A	E13	5	5	5	7.8	8.0	8.2	24.5	26.0	25.5	6.6	6.7	7.2	12.16	12.62	11.82
	Control B	E14	5	5	5	7.8	8.0	8.2	24.5	25.9	25.7	6.6	6.9	7.4	12.18	12.60	12.61
	Control C	E15	5	5	4	7.8	8.0	8.2	24.5	25.8	26.8	6.9	6.8	7.3	12.18	12.56	12.83
	Control D	E16	5	5	5	7.8	8.0	8.2	24.4	26.0	25.6	7.0	7.0	7.3	12.16	12.60	12.61
NSW to Salinity	Control A	E17	5	5	5	8.2	8.2	8.3	24.4	25.6	26.0	7.1	7.0	7.3	12.18	12.55	12.90
	Control B	E18	5	5	5	8.3	8.3	8.3	24.4	26.2	25.3	7.1	7.0	7.3	12.20	12.66	12.62
Adjust	Control C	E19	5	5	5	8.3	8.3	8.3	24.4	26.3	27.0	7.2	6.7	7.3	12.19	12.77	13.07
	Control D	E20	5	5	5	8.3	8.3	8.3	24.3	25.9	25.6	7.2	6.9	7.2	12.16	12.63	13.69
Dechlorinated 1‰ Salinity	A 100% Dech	E21	5	5	4 10D	7.1	7.9	8.2	25.2	25.8	27.4	7.0	6.6	6.0	12.38	12.58	13.05
	100% Dech B	E22	5	5	5	7.1	7.8	8.2	25.3	25.8	25.7	7.0	6.7	6.2	12.39	12.60	12.74
	100% Dech C	E23	5	4 10D	4	7.1	7.8	8.2	25.3	25.9	26.0	7.0	6.1	5.9	12.38	12.63	12.77
	100% Dech D	E24	5	4 8D 10D	4	7.1	7.8	8.3	25.2	26.5	25.3	7.0	6.2	6.2	12.36	12.75	12.66
100% Sample Salinity Adjusted	100% A	A1	5	5	5	6.9	7.8	8.2	25.0	26.4	25.9	6.8	5.9	6.0	12.13	12.57	12.62
	100% B	A2	5	3 5D 30D	2	6.9	7.7	8.2	25.0	26.0	25.2	6.8	6.0	6.1	12.23	12.48	12.36
	100% C	A3	5	3 5D 20D	2 10D	6.9	7.6	8.2	25.0	26.1	25.0	6.8	5.7	6.1	12.23	12.57	12.19
	100% D	A4	5	0 5D	—	6.9	7.7	—	25.1	26.4	—	6.8	5.9	—	12.24	12.64	—
	100% mf																
	Measured/Loaded by:		MF FW	FW/DAW FW	DAW FW	MF FW	DAW FW	DAW FW	MF FW	DAW FW	DAW FW	MF FW	DAW FW	DAW FW	MF FW	DAW FW	DAW FW
	Recorded by:																

Investigators' Signatures

Ⓐ = Number Live for controls written in Area for 100%'s. (FW)

Water Quality Parameters verified by MF

	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			Not measured		
Lab Total Residual Cl2 (mg/L):			0.125	HACH	DAW
Alkalinity (mg/L as $CaCO_3$):			219	HACH	DAW
Hardness (mg/L as $CaCO_3$):			368	HACH	DAW
Total ammonia (mg/L as N):			<0.017	ORION	FW

Ammonia Meter #98136 Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 1.1 ppt Sample Salinity: 1.1 ppt

Phytoplankton taxa list and densities (#/mL) for Jefferson Smurfit Corporation, collected via subsurface grabs in the Amelia River on 14 April, 1998.

	Control Site	Test Site 1	Test Site 2
Bacillariophyceae			
Anomoeneis sp.	-	-	15
Asterionella sp.	247	77	66
Biddulphia sp.	69	18	22
Chaetoceros sp.	39	24	-
Corethron sp.	8	12	7
Coscinodiscus sp.	62	6	66
Cyclotella sp.	46	24	52
Cylindrotheca sp.	224	124	126
Diploneis sp.	-	-	15
Fragilaria sp.	-	-	7
Gomphonema sp.	-	-	7
Leptocylindrus sp.	347	153	103
Melosira sp.	31	82	-
Navicula sp.	15	6	-
Nitzschia sp.	247	153	170
Pennales sp.	69	94	118
Rhaphoneis sp.	15	-	-
Rhizosolenia sp.	193	71	22
Skeletonema sp.	702	365	118
Thalassiosira sp.	39	-	15
Thalassiothrix sp.	-	47	15
Chlorophyceae			
Undetermined Chlorophyceae	-	6	7
Tetraselmis sp.	69	24	103
Chrysophyceae			
Dictyocha sp.	-	6	-
Cyanophyceae			
Chroococcus sp.	-	6	-
Microcystis sp.	15	-	-
Oscillatoria sp.	-	12	-
Cryptophyceae			
Chroomonas sp.	39	71	66
Cryptomonas sp.	-	12	7
Dinophyceae			
Prorocentrum sp.	8	18	15
Peridinium sp.	-	6	-

Phytoplankton taxa list and densities (#/mL) for Jefferson Smurfit Corporation, collected via subsurface grabs in the Amelia River on 14 April, 1998.

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Corethron sp.	8	12	7
Coscinodiscus sp.	62	6	66
Cyclotella sp.	46	24	52
Cylindrotheca sp.	224	124	126
Diploneis sp.	-	-	15
Fragilaria sp.	-	-	7
Gomphonema sp.	-	-	7
Leptocylindrus sp.	347	153	103
Melosira sp.	31	82	-
Navicula sp.	15	6	-
Nitzschia sp.	247	153	170
Pennales sp.	69	94	118
Rhaphoneis sp.	15	-	-
Rhizosolenia sp.	193	71	22
Skeletonema sp.	702	365	118
Thalassiosira sp.	39	-	15
Thalassiothrix sp.	-	47	15
Chlorophyceae			
Undetermined Chlorophyceae	-	6	7
Tetraselmis sp.	69	24	103
Chrysophyceae			
Dictyocha sp.	-	6	-
Cyanophyceae			
Chroococcus sp.	-	6	-
Microcystis sp.	15	-	-
Oscillatoria sp.	-	12	-
Cryptophyceae			
Chroomonas sp.	39	71	66
Cryptomonas sp.	-	12	7
Dinophyceae			
Prorocentrum sp.	8	18	15
Peridinium sp.	-	6	-

Benthic macroinvertebrate taxa list for Jefferson Smurfit Corporation, collected via Ponar grab samples in the Amelia River, on 14 April, 1998. Densities, in number/m^2, represent the mean of three replicates.

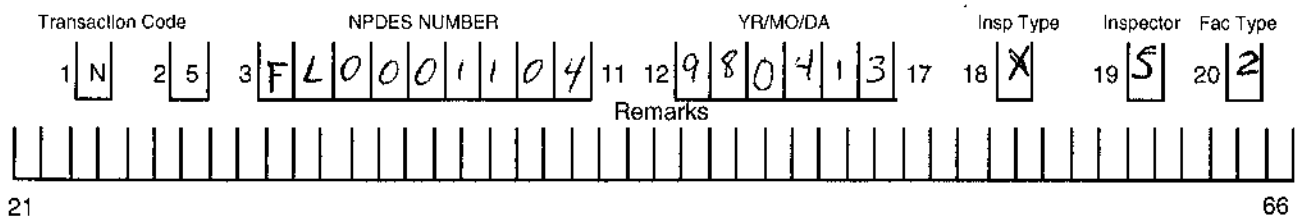
	Control Site	Test Site 1	Test Site 2
Amphipoda			
Ampelisca abdita	-	139	56
Ampelisca sp.	42	153	56
Caprella sp.	-	-	111
Cerapus sp.	14	-	-
Corophium simile	-	28	-
Corophium sp.	181	-	28
Ericthonius brasiliensis	-	-	56
Ericthonius sp.	28	-	-
Grandidierella bonnieroides	14	69	-
Lembos sp.	-	42	14
Melita sp.	-	83	139
Metharpinia floridana	14	-	-
Paraphoxus sp.	-	-	69
Undetermined Ampeliscidae	-	-	69
Undetermined Amphilochidae	14	42	-
Undetermined Amphipoda	42	-	153
Undetermined Aoridae	-	125	111
Undetermined Bateidae	-	83	-
Undetermined Caprellidae	-	125	69
Undetermined Corophiidae	-	42	-
Undetermined Gammaridea	-	69	-
Undetermined Haustoriidae	14	-	-
Undetermined Lysianassidae	14	-	-
Undetermined Oedicerotidae	14	-	28
Undetermined Phoxocephalidae	14	-	-
Anthozoa			
Undetermined Actiniaria	-	14	14
Cirripedia			
Balanus sp.	-	181	-
Undetermined Thoracica	-	-	56
Cumacea			
Cyclaspis sp.	-	-	167
Cyclaspis varians	-	-	236
Leucon americanus	-	-	139
Undetermined Cumacea	-	-	56
Decapoda			
Rhithropanopeus harrisii	-	28	-
Undetermined Alpheidae	-	-	14
Undetermined Decapoda	28	28	-
Undetermined Diogenidae	28	-	-

Undetermined Paguridae	-	14	-
Undetermined Xanthidae	-	14	14
Echinodermata			
Undetermined Amphiuridae	42	-	125
Undetermined Ophiuroidea	42	28	-
Gastropoda			
Cerithium sp.	14	-	-
Crepidula fornicata	14	-	-
Polinices sp.	14	-	-
Undetermined Crepidulidae	-	-	14
Undetermined Gastropoda	-	-	14
Hydrozoa			
Undetermined Hydrozoa	-	-	14
Isopoda			
Cyathura polita	-	83	-
Edotea montosa	28	14	-
Erichsonella filiformis	14	-	-
Nemertea			
Undetermined Nemertea	361	14	583
Pelecypoda			
Corbula contracta	14	-	-
Corbula swiftiana	-	14	-
Crassinella sp.	-	42	-
Dosinia discus	14	-	28
Lucina radians	-	-	42
Lucina sp.	28	28	-
Martesia sp.	-	14	-
Mulinia lateralis	-	-	42
Nucula aegeensis	-	69	-
Nucula crenulata	-	14	-
Nucula sp.	-	-	42
Tellina sp.	-	42	472
Tellina versicolor	403	-	14
Undetermined Gastrochaenidae	-	736	-
Undetermined Mactridae	69	56	708
Undetermined Myidae	-	139	-
Undetermined Mytilidae(mollusca)	-	28	14
Polychaeta			
Brania sp.	-	-	56
Capitella sp.	1444	472	125
Diopatra cuprea	28	-	-
Diopatra sp.	-	-	28
Eteone heteropoda	-	83	-
Eteone sp.	-	28	28
Eulalia sanguinea	-	250	125
Eulalia sp.	-	-	14
Glycera americana	-	14	-
Glycera robusta	14	-	-
Glycera sp.	14	-	56

Goniadides carolinae	-	14	-
Hobsonia florida	-	69	250
Hydroides sp.	-	14	-
Laeonereis culveri	42	-	-
Lumbrineris sp.	28	-	125
Lysidice ninetta	-	-	14
Magelona sp.	2-8	-	14
Malmgrenia sp.	-	-	14
Malmgreniella sp.	28	14	42
Megalomma sp.	111	-	-
Melinna maculata	-	-	14
Minuspio longibranchiata	-	111	69
Minuspio sp.	28	28	347
Nereis falsa	-	56	-
Nereis micromma	-	-	69
Nereis sp.	-	28	-
Nereis succinea	-	28	-
Odontosyllis sp.	-	28	-
Paraprionospio pinnata	-	-	14
Pectinaria gouldi	-	-	14
Phyllodoce sp.	-	-	28
Polydora socialis	56	-	-
Polydora sp.	-	194	-
Prionospio sp.	14	-	14
Prionospio steenstrupi	14	-	-
Sabellaria sp.	-	28	14
Sigambra sp.	28	-	-
Sigambra tentaculata	-	-	97
Spiophanes bombyx	56	-	14
Stenoninereis martini	-	69	-
Sthenelais sp.	-	-	42
Streblospio benedicti	2903	1222	2292
Tharyx sp.	-	-	14
Undetermined Ampharetidae	28	-	181
Undetermined Capitellidae	-	-	1042
Undetermined Chrysopetalidae	-	28	-
Undetermined Cirratulidae	69	139	42
Undetermined Dorvilleidae	-	-	14
Undetermined Glyceridae	14	-	-
Undetermined Hesionidae	-	56	-
Undetermined Nephtyidae	14	-	-
Undetermined Oweniidae	14	-	-
Undetermined Phyllodocidae	14	-	42
Undetermined Polychaeta	-	14	-
Undetermined Polynoidae	-	-	14
Undetermined Sabellariidae	-	14	-
Undetermined Sabellidae	-	42	-
Undetermined Serpulidae	-	14	14
Undetermined Spionidae	14	236	14

Undetermined Syllidae	14	528	28
Undetermined Terebellidae	-	12639	28
Tubificidae			
Undetermined Tubificidae	389	69	69
Turbellaria			
Undetermined Turbellaria	-	-	14

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



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