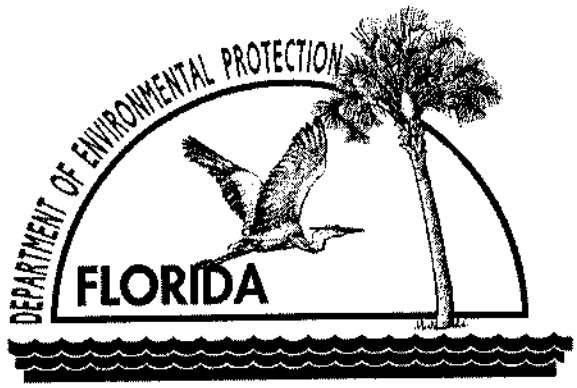


Biological Assessment of

Seminole Kraft Corporation

Duval County

NPDES #FL0000400

Sampled October 1995

March 1996

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Seminole Kraft
County: Duval
NPDES Number: FL0000400
State Permit Expiration Date: 30 April 1996

Toxics Sampling Inspection (XSI)

Date Sampled: 16 October 1995

Results: No organic priority pollutants were detected in the effluent sample. The effluent copper concentration (3.0 µg/L) marginally exceeded the Class III marine water quality standard of 2.9 µg/L.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 16 October 1995

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 16 October 1995

Results: Quantitative measures of macroinvertebrate community health indicated the benthic community was stressed throughout the study area. Shannon-Weaver diversity decreased at the test sites (by 39% at test site 1 and by 35.2% at test site 2), when compared to the reference site. While this represents a violation of the biological integrity criterion (Rule 62-302.560(11) FAC), many factors (*e.g.*, other pollution sources, sediment and depth differences between reference and test sites) suggest the low diversity may not be directly attributed to the discharge. There was good similarity between the reference and test site algal assemblages. Chlorophyll *a* levels found at all three sites were lower than the values found in 95% of other Florida estuaries. The discharge did not appear to be having any negative effect on the algal communities.

Water Quality Inspection (WQI)

Date Sampled: 16 October 1995

Results: Fecal and total coliform samples were held beyond the legally required 6 hour holding time, so no violations could be cited. Class III fecal coliform standards, however, were exceeded at test site 2 (1,000 organisms/100 mL). Total coliform levels were higher than Class III standards at test site 1 (2,600 organisms/100 mL) and test site 2 and (3,000 organisms/100 mL). Fecal and total coliform levels of the effluent and at the reference site complied with Class III standards. Although effluent concentrations of total phosphorus (1.2 mg/L), ammonia (2.6 mg/L), and TKN (6.2 mg/L) appeared elevated, test site levels of these nutrients were similar to the reference site values. TKN and nitrate-nitrite levels at all three receiving water sites were higher than those found in 95% of other Florida estuaries. Other nutrient concentrations at the three sites were normal for an estuary.

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide the basis for specific condition recommendations for permit renewal.

Introduction

The Seminole Kraft Corporation is located on Eastport Road in Jacksonville, Duval County, Florida (see maps in Appendix). This mill produces linerboard from 100% recycled fiber. Wastewater is collected from the powerhouse, the boiler and caustic area, the pulp mill, and the woodyard and paper mill. The 20 MGD industrial wastewater treatment facility consists of primary clarification and biological treatment in an aerated stabilization basin. Sludge from the primary clarifier is dewatered, then trucked to an on-site landfill. Treated wastewater is discharged through a 72 inch diameter pipe and four 36 inch diameter diffusers into the Class III St. Johns River (see maps in Appendix). The average flow for treated process water discharged for 1995 was approximately 10 MGD.

Permit limits are as follows: flow (28 MGD), temperature (100 °F maximum or 95 °F monthly average), total residual chlorine (0.01 mg/L maximum), aluminum (2.2 mg/L maximum at edge of mixing zone), chronic toxicity (NOEC must be > 13.8 %), mercury (0.025 µg/L maximum), copper (0.015 mg/L maximum), silver (0.05 µg/L maximum), pH (6.0-9.0 SU), BOD (14,282 lbs/day), and TSS (23,055 lbs/day). Mixing zones for aluminum (7,472 m^2) and for chronic toxicity (2,827 m^2), have been granted to this facility. The copper standard will be 2.9 µg/L with issuance of the new permit.

A 1992 biological assessment determined the presence of aromatic hydrocarbons and unidentifiable organics in the discharge, moderate degradation in the receiving water macroinvertebrate community, and exceedances of Class III standards for fecal and total coliform bacteria. Seminole Kraft did not agree with the sampling locations for that survey, and requested that CH2M Hill be involved with this present bioassessment study.

Recently, the facility appears to have been operating satisfactorily, except for an exceedance of the oil and grease limit, and an alum spill, both of which occurred in 1994.

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	9	7	9
Shannon-Weaver Diversity	2.64	1.61	1.71
% Polychaeta	38.5	58.8	74.5
% Diptera	12.3	0.1	0
% Amphipoda	13.6	0	18.5
% Decapoda	0	0	3.3
% Pelecypoda	0	33.3	0.5
% Thoracica	6.2	0	2.7
% Isopoda	1.5	5.9	0.5
% Predator/Carnivores	4.6	2.9	4.4
% Above-Surface Deposit Feeders	23.1	29.4	37.2
% Below Surface Deposit Feeders	27.7	0.1	0
% Scavengers	7.7	2.0	2.2
% Suspension Feeders	25.4	27.5	50.3
% Browsers	7.7	2.0	2.2
Phytoplankton Algae			
Number of Taxa	19	21	19
Shannon-Weaver Diversity	3.88	3.81	3.69
Chlorophyll a (µg/L)	0.44	0.44	0.5
Algal Density (#/mL)	785	1017	1386
% Blue-green	27.5	28.8	16.7
% Green	43.1	30.3	27.8
% Diatoms	29.4	39.4	44.4
Algal Growth Potential (mg dry wt/l)	27.9	23.1	21.9

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in the St. Johns River approximately 2 miles southwest of the discharge) and two test sites bracketing the discharge (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute

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

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from three replicate petite Ponar grabs. Phytoplankton was sampled at both reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

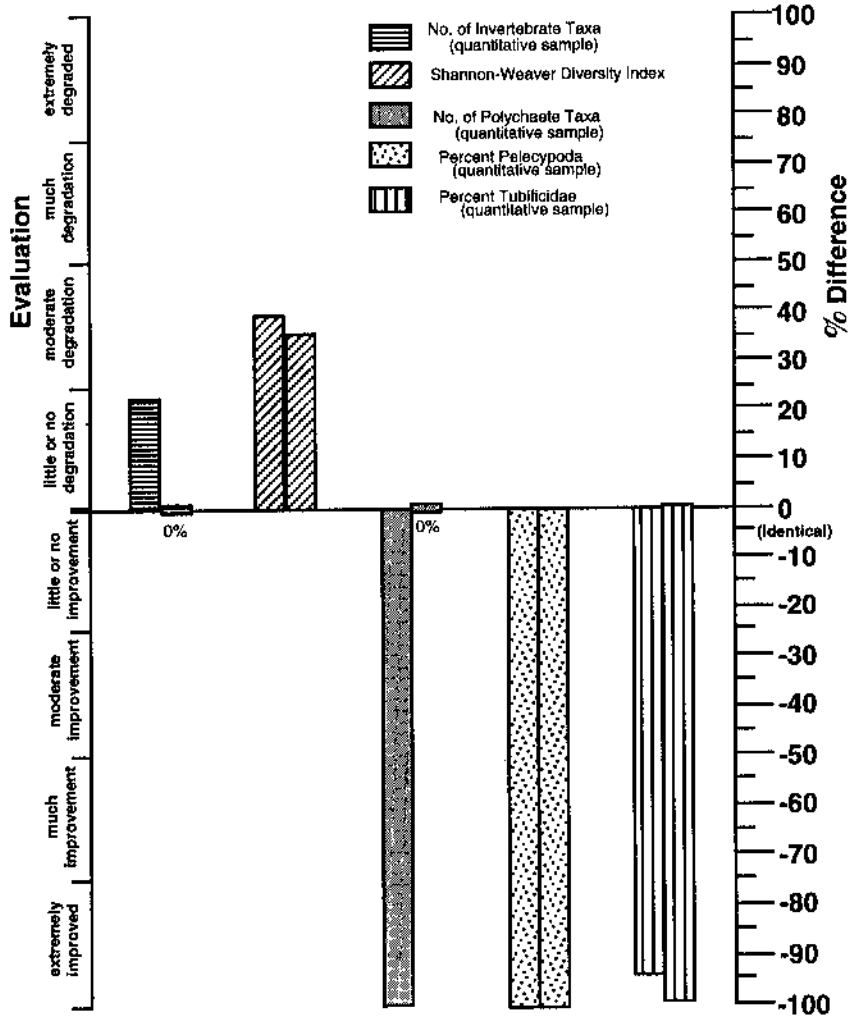
Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed 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. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell



Effect of discharge on the benthic macroinvertebrate community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

(1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

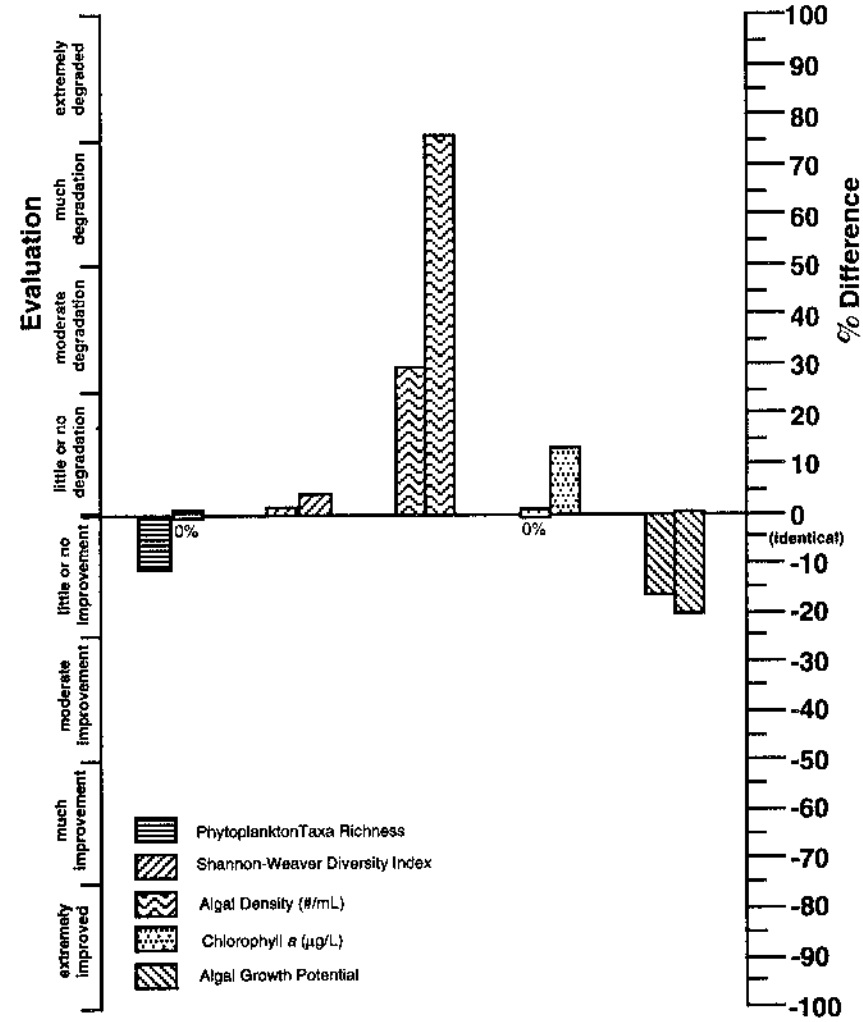
Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered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

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

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).

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

The following personnel were involved in this investigation: Tim



Effect of discharge on the algal community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

McKelvey, Ruth Bouman, Amy Kalmbacher, Pat O'Connor, and Daniel Hull (DEP Northeast District) and Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Bart Richard, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

The study area is situated in a portion of the St. Johns River with fluctuating salinities. Numerous pollution sources are present in the area, which is also subject to tidally induced flow reversals. In the weeks prior to sampling for this study, extreme weather (a hurricane and associated heavy rainfall) resulted in an abnormal salinity regime, with waters being predominantly fresh. Historical data indi-

cates that marine conditions (greater than 1,500 mg/L chlorides) generally prevail (more than 90% of the time) in this area of the St. Johns River. Between the period of August, 1991, and December, 1995, the median chloride and salinity levels were approximately 6,625 mg/L and 11 ppt, respectively.

Habitat quality was very similar at each site, ranging from 65 to 66 points. Land use near the test sites was predominantly industrial or commercial. The reference site was surrounded by residential and industrial land uses, interspersed with some native *Spartina* salt marsh. The study sites were similar with respect to many physical/chemical parameters, such as salinity (between 0.29 ppt and 0.33 ppt), temperature (near 26 °C), pH (between 7.2 and 7.4 SU), and dissolved oxygen (6.9 mg/L). Substrate composition at all three sites consisted of sand, mud, and shell rubble. Clay was an additional substrate available at the test sites that was not present at the reference site. The test sites were located in deeper water (approximately 12 m) than was the reference site (approximately 8 m).

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included aluminum (324 µg/L) and iron (132 µg/L). Copper was detected at 3 µg/L, which was less than the minimum quantitation limit, but greater than the minimum detection limit. Under the present conditions, none of these metal values were in excess of Class III freshwater standards. However, the effluent copper concentration did marginally exceed the Class III marine standard of 2.9 µg/L.

Specific conductance of the effluent (1,431 µmhos/cm) exceeded the Class III freshwater standard of 1,275 µmhos/cm. However, during the typical marine condition, the specific conductance standard would not be applicable.

The effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or the fish, *Cyprinella leedsi* (Appendix).

Although the fecal and total coliform samples were held beyond the legally required 6 hour holding time, the tests were performed within 24 hours. This 24 hour time limit is considered to be acceptable for scientific information purposes, although no violations may be cited. Fecal coliform levels increased from 575 organisms/100 mL at the reference site, to 730 organisms/100 mL at test site 1 and 1,000 organisms/100 mL at test site 2. The value found at test site 2 exceeded Class III standards. Total coliform levels also increased from the reference site (950 organisms/100 mL), to test sites 1 and 2 (2,600 organisms/100 mL and 3,000 organisms/100 mL, respectively). Measurements at both test sites exceeded Class III standards.

Although effluent concentrations of total phosphorus (1.2 mg/L), ammonia (2.6 mg/L), and TKN (6.2 mg/L) appeared elevated, test site levels of these nutrients were similar to the reference site values. TKN and nitrate-nitrite levels at all three receiving water sites were higher than those found in 95% of other Florida estuaries (see Table of Typical Water Quality Values in Appendix). The median nitrate-nitrite concentration in this area of the St. Johns River is 0.22 mg/L. Other nutrient concentrations at the three sites were normal for an estuary. Ammonia did increase from the reference site (0.02 mg/L) to the test sites (0.05 mg/L at site 1 and 0.04 mg/L at site 2), but the values found at the test sites were normal for an estuary. Given the numerous sources of nutrient enrichment found in this area (*i.e.*, urban, industrial, and agricultural runoff), the elevated nitrate-nitrite and TKN levels at the receiving water sites were probably due to sources other than Seminole Kraft.

Algal growth potential (AGP) of the effluent was 100.3 mg dry wt/L. Study site values were 27.9 mg dry wt/L at the reference site, 23.1 mg dry wt/L at test site 1, and 21.9 mg dry wt/L at test site 2. These levels are well above the "problem threshold" of 5 mg dry wt/L for fresh waters, above which cultural eutrophication and its consequences are likely to occur (Raschke and Schultz 1987).

Quantitative measures of benthic macroinvertebrate community health indicated the benthic community was stressed throughout the study area, and conditions at the test sites could not be directly attributed to the facility. The figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference.

Macroinvertebrate taxa richness at the reference site was depressed (with 9 taxa) and was similar to that of test site 2 (also with 9 taxa) and test site 1 (with 7 taxa). Shannon-Weaver diversity decreased at the test sites (by 39% at test site 1 and by 35.2% at test site 2), when compared to the reference site. While this represents a violation of the biological integrity criterion (Rule 62-302.560(11) FAC), many factors (*e.g.*, other pollution sources, sediment and depth differences between reference and test sites) suggest the low diver-

sity may not be directly attributed to the discharge.

The polychaete, *Boccardia* sp., was the dominant organism at both test sites, while the reference site was co-dominated by *Boccardia* sp. and the oligochaete, *Tubificoides* sp. Some species of *Boccardia* are tolerant of very low salinities (Light 1978). *Tubificoides* sp. is also common in areas of low salinity (Mike Milligan, personal communication). While this oligochaete was relatively abundant at the reference site, it was rare at test site 1 and absent from test site 2. There were similar numbers of polychaete taxa at all three sites, with 2 to 4 taxa present. Pelecypods, which were absent from the reference site and poorly represented at test site 2, comprised 33% of the community at test site 1. The percent filter feeders increased from 25% at the reference site to 27.5% and 50% at test sites 1 and 2, respectively. Note that the absolute differences between the reference and test sites with respect to the % Polychaeta, the % Pelecypoda and the % Tubificidae parameters are not as striking as they appear on the graph. Although pollution sensitive taxa were rare throughout the study area, some, such as *Corophium* sp. and *Gitanopsis* sp. (Farrell 1992) were found at test site 2. In summary, while the biota appeared stressed (low taxa richness, few sensitive taxa represented) at all St. Johns River study sites, factors other than the facility's effluent may have been responsible for the low diversity at the test sites.

The figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation.

The phytoplankton assemblage found in this portion of the St. Johns River was composed of chlorophytes, diatoms, and cyanophytes. All three sites were similar with respect to many measures of algal community health, such as taxa richness (ranging from 19 to 21), diversity (ranging from 3.7 to 3.9) and chlorophyll *a* concentrations (from 0.44 µg/L to 0.5 µg/L). While algal density was somewhat higher at the test sites than at the reference site, the actual densities at the test sites (less than 1,400 organisms/mL) are not considered troublesome. It also should be noted that the chlorophyll *a* levels found at all three sites were lower than the values found in 95% of other Florida estuaries. The discharge did not appear to be having any negative effect on the algal communities.

Conclusions

No organic priority pollutants were detected in the effluent sample. The effluent copper concentration (3.0 µg/L) marginally exceeded the Class III marine standard of 2.9 µg/L.

Specific conductance of the effluent (1,431 µmhos/cm) exceeded the Class III freshwater standard of 1,275 µmhos/cm. However, during the typical, marine condition, the specific conductance standard would not be applicable.

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

Fecal and total coliform samples were held beyond the legally required 6 hour holding time, so no violations may be cited. Class III fecal coliform standards, however, were exceeded at test site 2 (1,000 organisms/100 mL). Total coliform levels were higher than Class III standards at test site 1 (2,600 organisms/100 mL) and test site 2 and (3,000 organisms/100 mL). Fecal and total coliform levels of the effluent and at the reference site complied with Class III standards.

Although effluent concentrations of total phosphorus (1.3 mg/L), ammonia (2.6 mg/L), and TKN (6.2 mg/L) appeared elevated, test site levels of these nutrients were similar to the reference site values. TKN and nitrate-nitrite levels at all three receiving water sites were higher than those found in 95% of other Florida estuaries. Other nutrient concentrations at the three sites were normal for an estuary.

Quantitative measures of benthic macroinvertebrate community health indicated that the benthic community was stressed throughout the study area. Shannon-Weaver diversity decreased at the test sites (by 39% at test site 1 and by 35.2% at test site 2), when compared to the reference site. While this represents a violation of the biological integrity criterion (Rule 62-302.560(11) FAC), many factors (*e.g.*, other pollution sources, sediment and depth differences between reference and test sites) suggest the low diversity may not be directly attributed to the discharge.

There was good similarity between the reference and test site algal assemblages. Chlorophyll *a* levels found at all three sites were lower than the values found in 95% of other Florida estuaries. The discharge did not appear to be having any negative effect on the algal communities.

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Chemistry summary table for

Seminole Kraft	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
None Detected				
Metals (ug/L)				
Aluminum	324 A			
Arsenic	10 U			
Cadmium	0.08 U			
Calcium	141 A			
Copper	3 I			
Chromium	10 U			
Iron	132 A			
Lead	10 U			
Magnesium	20.8 A			
Mercury	0.10 U			
Nickel	4 U			
Selenium	30 U			
Silver	0.05 U			
Zinc	10 U			
Nutrients (mg/L)				
Ortho-phosphate	0.86 A	0.082	0.087 A	0.086
Total phosphorus	1.2	0.12	0.13	0.13
Ammonia	2.6 A	0.021	0.046	0.039
Nitrate+Nitrite	0.085	0.23	0.24 A	0.23
TKN	6.2	1.4	1.5	1.6
General Phys-Chem Parameters				
Habitat Assessment		65	66	66
D. O. (mg/L)	5.9	6.9	6.9	6.9
pH (SU)	8.0	7.2	7.4	7.2
Salinity (ppt)	0.8	0.29	0.33	0.32
Specific Conductance(µmhos/cm)	1431	604	684	657
Temperature (°C)	23.5	25.2	25.7	25.7
Total Suspended Solids (mg/L)	12	6	18	9
Biological Oxygen Demand, 5 day (mg/L)	5	< 2	< 2	< 2
Hardness (mg CaCO3)	437.7			
Algal Growth Potential (mg dry wt/L)	100.3	27.9	23.1	21.9
Toxicity				
Bioassay Fish	Not Toxic			
Bioassay Invertebrate	Not Toxic			
Microbiological Communities (org/100 mL)				
Fecal Coliform	100 Q	575 AQ	730 Q	1000 Q
Total Coliform	180 Q	950 AQ	2600 Q	3000 Q

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

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

Q - Sample held beyond normal holding time

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

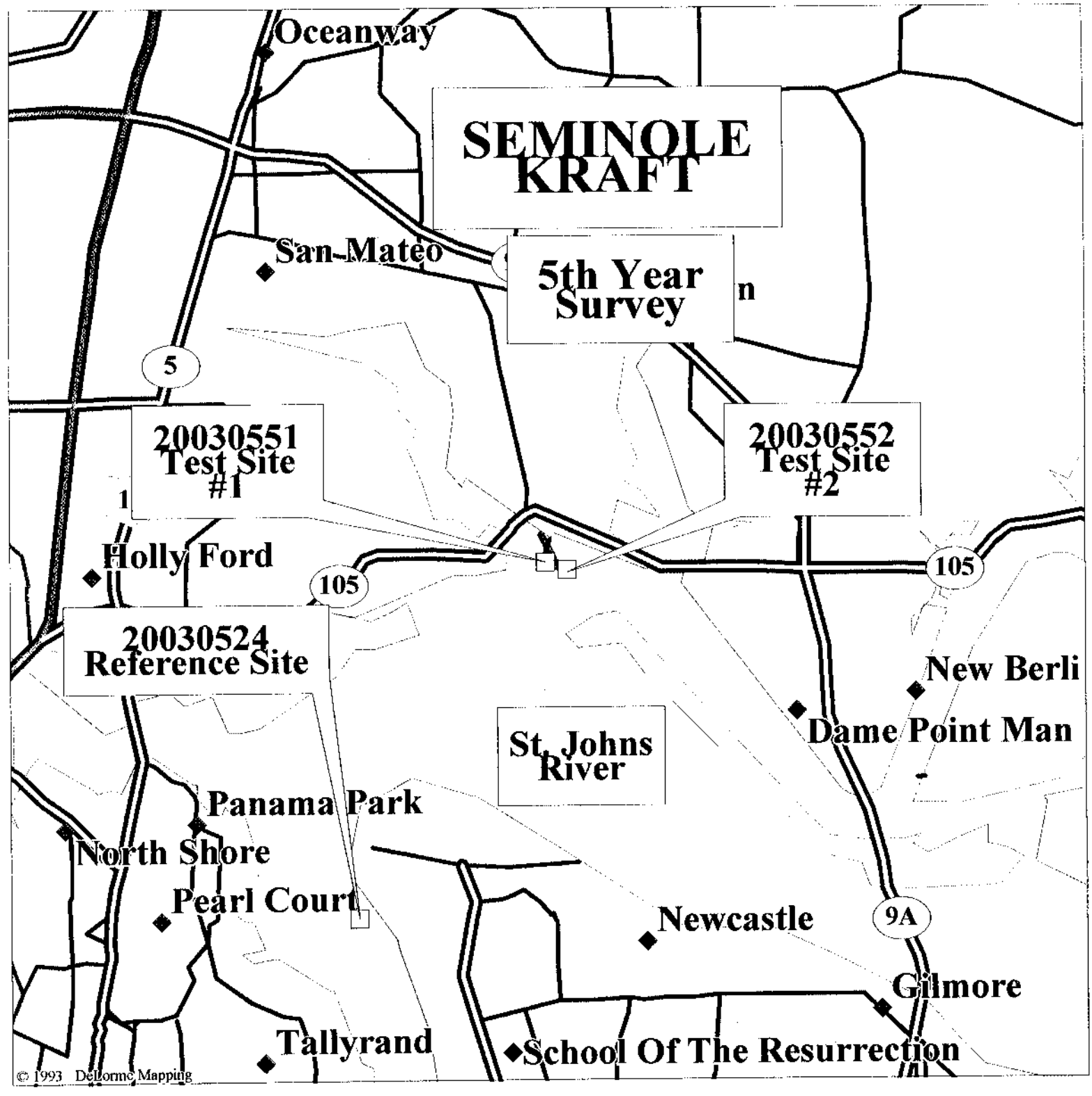
Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates



LEGEND

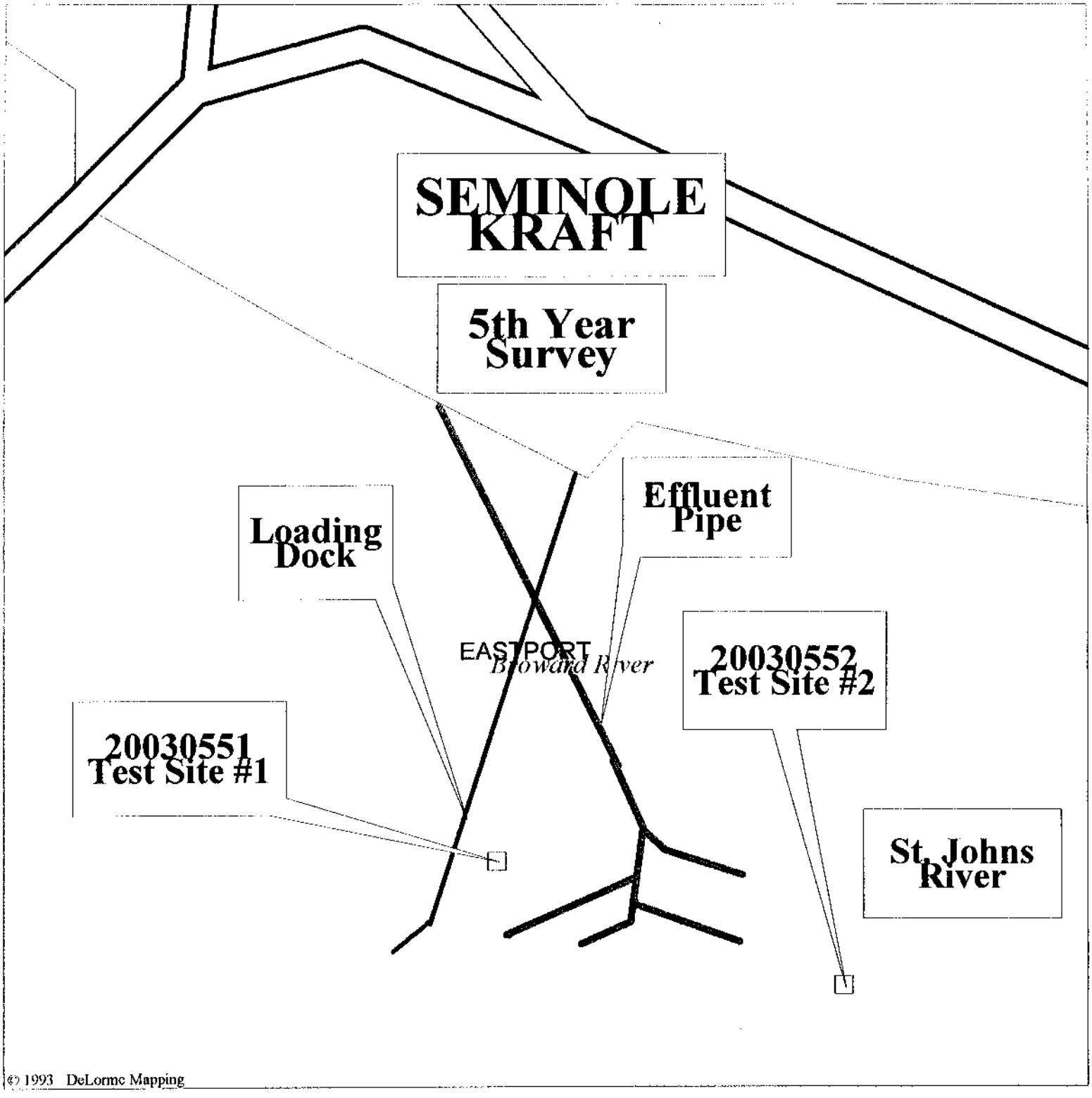
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- Town, Small City
- Interstate, Turnpike
- US Highway
- Population Center
- Major Street/Road
- Interstate Highway
- State Route
- US Highway
- Land Mass
- Open Water

Scale 1:62,500 (at center)

1 Miles

2 KM

Mag 12.00
Thu Oct 26 10:45:50 1995



LEGEND

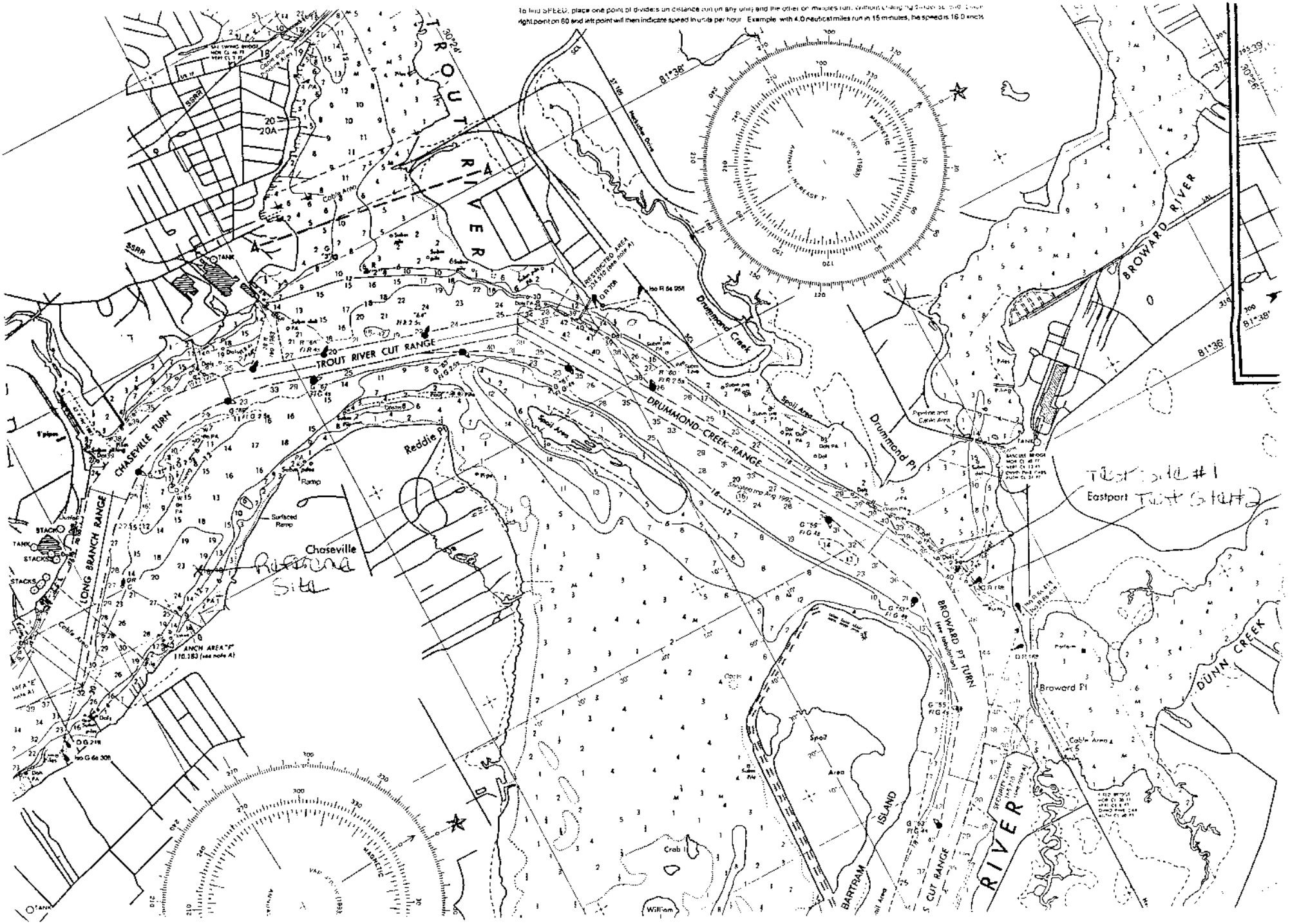
- Geo Feature
- Population Center
- Street, Road
- Major Street/Road
- State Route
- Open Water

Scale 1:3,906 (at center)

200 Feet

100 Meters

Mag 16.00
Thu Oct 26 10:39:42 1995


TROUT RIVER
TROUT RIVER CUT RANGE
CHASEVILLE TURN
LONG BRANCH RANGE
DRUMMOND CREEK RANGE
Drummond Creek
Drummond Pt
Reddie Pt
Spoil Area
Surfaced Ramp
Choseville
Returning Site
BROWARD RIVER
BROWARD PT TURN
Broward Pt
DUNN CREEK
BARTRAM ISLAND
S CUT RANGE
RIVER
Crab
Eastport
Test Site #1
Test Site #2
Sample Kraft Cafe
Sampling Sites on St. Johns River

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: Seminole Kraft	**Prepared By:** Daniel Hull **Date:** 10/24/95

Location: (See Attached Map)	**County:** 16- Duval	**District:** Northeast

Federal Permit No.: FL0000400 **Expiration Date:** 4/30/96	**State GMS #:** 3116P06063 **State Expiration Date:** 4/3/96	**Facility Type:** Industrial

Function of Facility:
The Seminole Kraft Paper Mill produces linerboard from 100% recycle fiber.

Description of treatment process:
The components of the industrial WWTF include four main mill sewers that collect wastewater from the powerhouse, boiler and caustic area, pulp mill, woodyard and paper mill; a diversion pit, traveling bar screen, grit chambers, four lift pumps, back-up power generator, primary clarifier, a CO_2 / Sulfuric acid injection system for pH control, two 3.5 acre unlined holding ponds (one dedicated for emergency storage), a 60 acre unlined aerated stabilization basin with fifteen surface splash aerators and a peripheral sprinkler system for foam control, and a Parshall flume.
The primary clarifier sludge is pumped to a blend tank in the dewatering facility that feeds two vacuum coil dewatering filters with filtrate return to the clarifier and waste sludge trucked to a landfill on site. Lime wastewater from the causticizing area is placed in a series of concrete basins for settling and pumping of clarified liquid back to the stabilization basin.

Receiving Waters: St. Johns River	Classification: Class III
Design Flow: 20 MGD	Actual Mean Flow: past year ~10MGD

Discharge is: (Continuous) Intermittent Seasonal Rainfall Dependent Other

Facility Mixing Zone Details:
Mixing zones in the St. Johns River have been granted for Aluminum and chronic toxicity, for each of the four 0.9 meter diameter outfall diffusers. The total area of the combined mixing zones for Aluminum is 7,472m^2. The total area of the combined mixing zones for chronic toxicity is 2,827m^2.

List effluent limits:

PARAMETER	LIMIT (unit)	Describe special permit conditions and permit modifications
Flow	Total=71.5,Proc=28.0	The present conditions at the facility only treat and discharge the process wastewaters. The non-contact cooling water is no longer a wastestream at the Seminole Kraft facility. As discussed in other areas of this summary a mixing zone is available for chronic and an Aluminum.
Temperature	62-302	
TRC	0.01mg/l	
Aluminum	2.2mg/l max-see mix	
Mercury	0.025ug/l	
Chronic Toxicity	If NOEC<13.8%	
Copper	<=0.015mg/l	
Silver	<=0.05ug/l	
pH	6.0 - 9.0	
BOD_5	14,282 #/day	
TSS	23,055#/day	

Description of permitted outfall:
The outfall is an underground 72" reinforced concrete pipe that branches into four 36" diameter diffusers in the St. Johns River.

List permit violations (MOR data) and plant upsets that occurred at the plant within the past year:
The review of the past year in MOR/DMR shows only an exceedance of Oil & Grease in July of 1994, all other parameters appear to be below permitted limits. A review of the Abnormal Event Log Book at the IW office in the Northeast district reveals no abnormal events were called in for the past 4 months. However an alum spill occurred at the facility on August 18, 1994. Soil samples were taken at various locations around the spill and the contaminated soil disposed of.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
On July 19, 1994 a sampling inspection was performed at the Seminole Kraft facility and no exceedances were noted. A biological assessment was performed on October 1992 at the facility. It was found that aromatic hydrocarbons and unidentifiable organics were detected in the discharge. The acute test was not toxic to the c. dubia and n. leedsi. The macroinvertebrate community seemed to be moderately degraded. The water quality inspection revealed an exceedance in the fecal and total coliform bacteria's, that exceeded the class III levels.

The Seminole Kraft facility did not agree with the sampling locations during the fifth year inspection. It was requested for the next fifth year to be performed along with the consultant CH2M Hill company; the consultant will perform the study at more test sites in the river, trying to show the other influences contributing to the problems.

Discuss MOR trends to prior data; is the trend improving or declining:
The trend of MOR/DMR data submitted to the regulatory agencies showed a consistent permitted levels of concentration for temperature, pH, Aluminum, Copper, Mercury and Silver. Since the modification to recycle paper at the facility the Parameter Flow, BOD5, and TSS are much less than the initial permitted levels.

Additional Information:
No further information to list.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

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

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
20				30	10	40	

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

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

Width of riparian vegetation (m) on least buffered side: 20

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 4

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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☑ Other: ☐ slight

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	2x3	grab
Leaf Packs or Mats				Mud/Muck/Silt	60	2x3	grab
Aquatic Vegetation				Other:			
Rock or Shell Rubble	30	3x3	grab	Other:			
Shorezone (Roots/Veg.)				*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	0.35	25.37	7.24	6.41	1.09			0.8
Mid-depth								
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 breezy

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Brunson / O'Connor	Ruth Peterson	10-16-9

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
[illegible]	[illegible]	10-16-95	St. [illegible] River

REMARKS:	LOCATION:	FIELD ID/NAME:
[illegible]	St. Johns River	RA-Transect 3 S. of Lions Club Ramp

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 5	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: 37	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 bed, Natural beach, Marsh)	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: 4	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: 9	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: 5	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: 65

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10-16-95	Ruth Burrow	Ruth Burrow

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 865 / SUBMITTING AGENCY NAME: FDEP-NED	STORET STATION NUMBER: 20030351	DATE (M/D/Y): 10-16-03	TIME: 1150	RECEIVING BODY OF WATER: St. Johns River

REMARKS:	LOCATION:	FIELD ID/NAME:
Sampled in Middle of Lake	St. Johns River West of POD	TQST Site #1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
20					20	60	

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

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

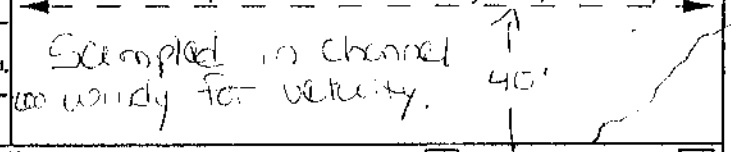
Width of riparian vegetation (m) on least buffered side: 20

List & map dominant vegetation on back

Artificially Channelized ☐ no ☑ ☐ ☐ Artificially Impounded ☐ yes (recent, severe / some recovery / mostly recovered, more sinuous)

High Water Mark (m above bed): 13

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)



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	10	3x3	Ponar
Leaf Packs or Mats				Mud/Muck/Silt	60	3x3	Ponar
Aquatic Vegetation				Other: Clay	20	3x3	Ponar
Rock or Shell Rubble	10	3x3	Ponar	Other:			
Shorezone (Roots/Veg.)				***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	0.9	25.66	7.25	6.87	668			0.6
Mid-depth								
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, light clouds cool, Breezy

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Bourra / O'Connor	Patti Bourra	10/16/03

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDER-NED	STORET STATION NUMBER: 30C 305.5	DATE (M/D/Y): 10-16-95	RECEIVING BODY OF WATER: St. Johns River

REMARKS:	LOCATION:	FIELD ID/NAME:
Same as Bicen Corp	St. Johns River West of Pad	Test Site #1

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations — 7	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 — 37	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 bed. Natural Beach Marsh	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 — 2	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 — 9	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 — 6	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 69

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10-16-95	Ruth Bowman	Ruth Bowman

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 2021 / SUBMITTING AGENCY NAME: DEP-NED	STORET STATION NUMBER:	DATE (M/D/Y):	TIME: 1315	RECEIVING BODY OF WATER: St. Johns River

REMARKS: Sampling Water Column	LOCATION: St. Johns River	FIELD ID/NAME: East of POD Test Site #2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
20					20	60	

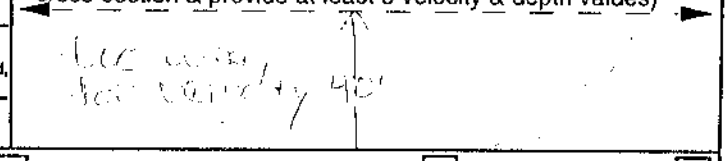
Local Watershed Erosion (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

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

Width of riparian vegetation (m) on least buffered side: 25

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)



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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 1.2

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	15	3x3	Petite
Leaf Packs or Mats				Mud/Muck/Silt	60	3x3	Ponar
Aquatic Vegetation				Other:	25	3x3	Ponar
Rock or Shell Rubble	10	3x3	Ponar	Other:			
Shorezone (Roots/Veg.)				*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	1.5	25.70	7.16	6.94	6657			0.7
Mid-depth								
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, light clouds cool, breezy

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

SAMPLING TEAM: Barbara Jarrard	SIGNATURE: Barbara Jarrard	DATE: 10-16-95

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

SUBMITTING AGENCY CODE: 8021 SUBMITTING AGENCY NAME: FDEP	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:
Seagrass Monitoring	St. Johns River Seg. #1811	EAST of POD TRT SITE #2

Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 7	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 7	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 3	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 4	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 6	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:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10-16-95	Ruth Bamford	Ruth Bamford

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seminole Kraft
County: Duval
Contact / District: T McKelvey / Northeast
NPDES Permit #: FL0000400
LIMS Sample #: 20280 (sample log 10/20/95) **LIMS Job #:** 95-OCT-17-14

Sample Collection: Date 10/16/95 Time 1150
Test Beginning: Date 10/17/95 Time 1100
Test Ending: Date 10/19/95 Time 1125
Organism Batch #: 49 **Diluent Batch #:** 42
Organism Age: <24 hrs
Test Organism: Ceriodaphnia dubia

Test Type: ~~Screening~~ / Definitive
Static / Static Renewal / Flow-through
Test Number: 1 of 2
Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
	meter # 7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	~~8.2~~ 22.9 @ 22.9 *	8.3 @ 24.7 °C	111.1 @ 1023 979 @ 1013 @ 23.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.2	8.4 @ 23.8 °C	1085 @ 1023 991 @ 1013 @ 23.8 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.1	8.2 @ 25.1 °C	108.7 @ 102.3 997 @ 1013 @ 23.8 °C

* D.O. w/ titration instead of Dynamics on 10/17/95

		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
CTLA	A	5	5	5	8.0		8.3	23.7		23.5	8.1		7.7	185		200
CTLB	B	5	5	5	~~8.0~~ 8.1		8.3			23.6			7.8			200
CTLC	C	5	5	5			8.3			23.6			7.9			200
CTLD	D	5	5	5			8.3			23.9			7.9			200
100% A	A	5	5	5	8.2		9.0	24.0		23.7	6.7		7.8	1690		1775
100% B	B	5	5	5			9.0			23.6			7.9			1805
100% C	C	5	5	5			9.1			23.6			8.0			1815
100% D	D	5	5	5			9.1			23.8			8.0			1870
Measured/Loaded by:		MF	JM	JM	TM		DR	TM		DR	TM		DR	TM		DR
Recorded by:		MF	JM	JM	RBS		TR	RBS		TR	RBS		TR	RBS		TR

Investigators' Signatures

Tony D. Kuhlski
J Courtney
Mark Hufstetler
Richard T. Ross
Robin G. Rader
Jennifer Nesbitt

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			—	—	—
Lab Total Residual Cl2 (mg/L):	—	<0.05	0.08	DR 18	JM
Alkalinity (mg/L as $CaCO_3$):	—	20	4555	Hach	RS
Hardness (mg/L as $CaCO_3$):	—	85	335	Hach	RS
Total ammonia (mg/L as N):	—	<0.017	2.93	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0.8 ppt

data from effluent

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seminole Kraft
County: Duval
Contact / District: T. McKelvey / Northeast
NPDES Permit #: FL0000400
LIMS Sample #: 120280 LIMS Job #: 95-Oct-17-14-01
sample log 10/20/95

Sample Collection: Date 10-16-95 Time 1150
Test Beginning: Date 10-17-95 Time 1130
Test Ending: Date 10-19-95 Time 1130
Organism Batch #: 53 Diluent Batch #: 53 well TM 10/20/95
Organism Age: 11 days old
Test Organism: Cyprinella leedsi

Test Type: ~~Screening~~ | Definitive
Static | Static Renewal | Flow-through

Test Number: 2 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	22.9 @ 22.9	8.3 @ 24.7 °C	1111 @ 102.3
	9.0 @ 9.0			979 @ 1013 @ 23.3 °C
24 hr	7.0 @ 7.0	24.2 @ 24.2	8.4 @ 23.8 °C	1087 @ 102.3
	9.0 @ 9.0			991 @ 1013 @ 23.8 °C
48 hr	7.0 @ 7.0	24.1 @ 24.1	8.2 @ 25.1 °C	1087 @ 102.3
	9.0 @ 9.0			997 @ 1013 @ 23.8 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CTL A	506	5	5	5	7.8	8.2	8.3	24.7	23.5	23.6	8.0	8.0	8.0	250	250	250
CTL B	350	5	5	5	7.8	8.2	8.4	24.7	23.5	23.5	8.0	8.0	8.0	250	255	260
CTL C	307	5	5	5	7.8	8.2	8.4	24.7	23.3	23.5	7.9	7.9	8.0	250	245	250
CTL D	607	5	5	5	7.8	8.2	8.4	24.7	23.3	23.6	7.9	7.9	8.1	250	250	250
100% A	79	5	5	5	8.2	8.5	8.7	24.7	23.6	23.7	6.2	7.6	~~8.1~~	1280	1730	1730
100% B	41	5	5	5	8.2	8.5	8.7	24.6	23.6	23.7	6.1	7.4	7.6	1280	1735	1740
100% C	309	5	5	5	8.2	8.5	8.7	24.6	23.5	23.5	6.2	7.4	7.5	1280	1735	1745
100% D	610	5	5	5	8.2	8.5	8.7	24.4	23.4	23.6	6.2	7.4	7.3	1280	1740	1745
												*	7.2			
Measured/Loaded by:		MF	TM	JN	TM	TM	DR	TM	TM	DR	TM	TM	DR	TM	TM	DR
Recorded by:		MF	TM	TR	BS	DR	TR	BS	DR	TR	BS	DR	TR	BS	DR	TR

* Wrong meter TR

Investigators' Signatures

Tina M. McKelvey
BS Sanders
Randall Garbett
David J. Rod
John L. Riddle
Jay Mauth

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			—	—	—
Lab Total Residual Cl2 (mg/L):	<0.03	—	0.05	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	120	—	4/35	Hach	BS
Hardness (mg/L as $CaCO_3$):	125	—	355	Hach	BS
Total ammonia (mg/L as N):	<0.017	—	2.93	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0.8 ppt Salinity from Flow Stat

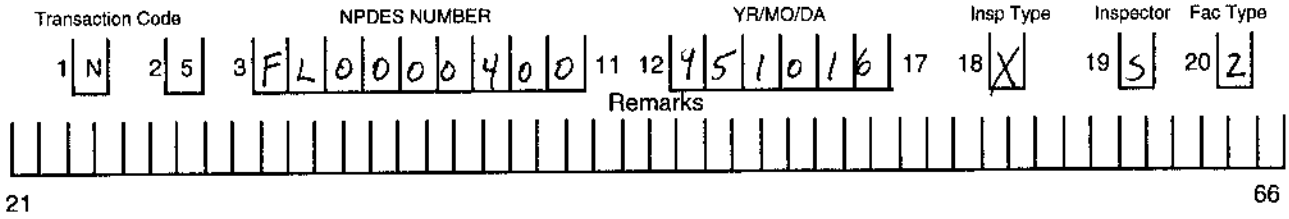
Benthic macroinvertebrate taxa list for Seminole Kraft, collected via dredge in the St. Johns River, on 16 October, 1995. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Polychaeta			
Boccardia sp.	17	53	121
Neanthes succinea	–	1	–
Nereidae	–	–	1
Nereis succinea	–	3	15
Spionidae	1	3	–
Streblospio benedicti	7	–	–
Oligochaeta			
Tubificoides sp.	18	1	–
Pelecypoda			
Mytilidae	–	34	1
Thoracica			
Balanus sp.	4	–	5
Isopoda			
Chiridotea sp.	–	1	1
Chiridotea stenops	–	1	–
Edotea montosa	1	4	–
Amphipoda			
Corophium sp.	–	–	1
Corophium lacustre	–	–	26
Gitanopsis sp.	–	–	4
Grandidierella bonnieroides	–	–	3
Monoculodes edwardsi	9	–	–
Decapoda			
Rhithropanopeus harrisii	–	–	6
Diptera			
Chaoborus punctipennis	1	1	–
Coelotanypus sp.	2	–	–
Polypedilum scalaenum grp.	5	–	–

Phytoplankton taxa list and densities (#/mL) for Seminole Kraft, collected via subsurface grabs in the St. Johns River, on 16 October, 1995.

	Reference Site	Test Site 1	Test Site 2
Cyanophyceae			
Chroococcus	6	7	3
Dactylococcopsis	–	3	2
Gloeocapsa	–	1	–
Lyngbya	2	–	–
Lyngbya contorta	–	2	–
Merismopedia	1	2	2
Microcystis	5	3	5
Oscillatoria	–	–	2
Synechococcus	–	1	1
Bacillariophyceae			
Amphora	1	–	–
Coscinodiscus	–	1	5
Cyclotella	6	12	17
Melosira	3	1	4
Navicula	2	5	2
Nitzschia	2	6	4
Pennales	–	1	8
Tabellaria	1	–	–
Chlorophyceae			
Ankistrodesmus	1	–	–
Chlamydomonas	3	1	2
Chlorella	2	2	–
Chlorophyceae	1	2	8
Closteriopsis	5	–	9
Closterium	1	1	–
Gloeocystis	1	–	–
Kirchneriella	–	1	–
Oocystis	1	–	–
Pediastrum	–	1	1
Scenedesmus	6	8	10
Tetradesmus	–	1	1
Tetrastrum	1	3	1
Ulothrix	–	–	2
Euglenophyceae			
Euglenophyceae	–	–	1
Dinophyceae			
Gymnodinium	–	1	–

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)

