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Biological Assessment of

Georgia Pacific Corporation
Palatka Plant

Putnam County

NPDES #FL0002763

Sampled MAY 1999

JUNE 2000

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Georgia Pacific Corporation
County: Putnam
NPDES Number: FL0002763
Permit Expiration Date: 09/30/95

Toxics Sampling Inspection (XSI)

Date Sampled: 10 May 1999

Results: Aluminum, cadmium, copper, iron, lead, nickel, silver, and zinc were all detected in the effluent at acceptable levels. Aluminum (4870 µg/L), however, was detected at a level that violated the Class III water quality standard (Rule 62-302.530(2) FAC) (Table 1) and silver was detected at a level greater than the method quantification limit. Chloroform was detected in the effluent at a level less than the minimum quantitation limit and greater than the minimum detection limit.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 10 May 1999

Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour acute and chronic bioassays.

Impact Bioassessment Inspection (IBI)

Date Sampled: 10 May 1999

Results: Quantitative measures showed moderate degradation in the invertebrate communities at the test site compared to control site 1. The EPT and Florida Indices declined by 62% and 73%, respectively, from the control site to the test site and, Shannon-Weaver diversity declined by 22%. Based on qualitative macroinvertebrate data, the control site 1 and the test site received 23 SCI points placing them in the "good" category and control site 2 received 25 SCI points and was considered in "excellent" condition. The periphyton data indicated a shift from a community dominated by diatoms at the control site to one shared by blue-green algae and diatoms at the test site. There are probably other nutrient sources in the watershed adding to the effluent effects; this is indicated by the extremely high chlorophyll *a* and algal density values at control site 1 and control site 2.

Water Quality Inspection (WQI)

Date Sampled: 10 May 1999

Results: All nutrient concentrations were higher at the test site compared to the control sites. Test site levels of total phosphorus, TKN, and ammonia were higher than 90% of other typical Florida streams. Effluent un-ionized ammonia (0.03 mg/L) violated Class III water quality standards (0.02 mg/L) (Rule 62-302.530(3) FAC). The effluent conductivity (2,685 µmhos/cm) was elevated and appeared to have caused a significant increase at the test site (2,420 µmhos/cm) compared to control site 1 (267 µmhos/cm) which is a violation of Rule 62-302.530(23) FAC. The BOD value at the test site (20 mg/L) was significantly greater than that of the control site (< 2 mg/L). The AGP value at the test site (7.8 mg dry wt/L) exceeded the "problem threshold."

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 Georgia-Pacific Corporation–Palatka Plant is in Putnam County, Florida, and is located about three miles north of Palatka on State Road 216 (see map in the Appendix). The Palatka Plant is an industrial pulp and paper mill facility. Activities at the plant include treatment of industrial wastewater with primary clarification followed by secondary treatment using approximately 900 acres of anaerobic, facultative, and aerobic lagoons. The effluent is continuously discharged into Rice Creek, a Class III tributary of the St. Johns River. Liquid pure oxygen (LPO) is injected into Rice Creek at mile-point 3.4 which is upstream of the effluent discharge and also injected at mile-point 2.4 which is downstream of the effluent discharge. These two effluent side streams of LPO are injected at a rate designed to counteract BOD concentration of the effluent and to maintain the dissolved oxygen concentration of the receiving water at 4.0 mg/L (JUN-NOV) and 5.0 mg/L (DEC-MAY). The design flow of the wastewater system for the Palatka plant is 40 MGD; mean flow during this survey was approximately 26 MGD.

The Palatka Plant has two mixing zones. One is for total dissolved gases (TDG) of the injected liquid pure oxygen side streams; the second is for zinc concentrations. At mile-point 2.4 the TDG mixing zone extends a cumulative upstream-plus-downstream distance of 725 meters and the zinc mixing zone extends to 100 longitudinal feet about the mile-point. At mile-point 3.4 the TDG mixing zone extends a cumulative upstream-plus-downstream distance of 225 meters and the zinc mixing zone extends to 600 longitudinal feet about the mile-point.

In addition to the mixing zones for TDG and zinc the Palatka Plant is permitted to draw up to 50 MGD of water from Etonia Creek via Artesian wells which free-flows into Rice Creek to be used as make-up water in plant processes.

State permit limits for the effluent are listed in Table 1. Florida Department of Environmental Protection (FDEP) review of the monthly operating reports from the Palatka plant indicates that the discharger has complied with the permit limits (see Facility Summary in Appendix).

Methods

The purpose of this investigation was to determine the effects of the Palatka plant wastewater discharge on the Class III Rice Creek. The last sampling inspection for this purpose was in July 1991. To establish discharge effects, a comparison of biological community health was made between three sites. Control site 1, located in Rice Creek approximately 2,500 meters upstream of the discharge; control site 2, in Etonia Creek about 250 meters above Bardin Road bridge; and the test site, located in Rice Creek approximately 100 meters downstream of the discharge (see map in the Appendix). Habitat assessments were performed *in situ* establishing comparability between sites.

Supplemental physical and chemical data were also collected from the effluent and the in-stream study sites. Effluent from the Palatka plant was analyzed for nutrients, metals, volatile organics, semi-volatile organics, organonitrogen and phosphorus pesticides, and organochlorine. Data for this report were collected on May 10 and 11, 1999.

Using the invertebrate, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi,* as test organisms, acute and chronic screening toxicity bioassays were conducted on an effluent sample. Also, bacterial populations were analyzed for total and fecal coliforms.

Benthic macroinvertebrate communities from all three study sites were evaluated using both quantitative and qualitative sampling techniques. Quantitative invertebrate collections were made using Hester-Dendy multiplate samplers incubated for 28 days. For qualitative measurements, invertebrates were collected from different substrate types such as snags, leaf packs, and aquatic vegetation using discrete dip-net sweeps.

Sampling for periphyton was conducted at all three study sites by incubating glass microscope

Table 1. Effluent limits and summary of chemistry data.

Georgia Pacific - Palatka	Effluent Limits	Effluent Sample	Control Site 1 (Rice Creek)	Control Site 2 (Etonia Creek)	Test Site (Rice Creek)
Organic Constituents (µg/L)					
Chloroform	-	0.26 I	-	-	-
Metals (µg/L)					
Aluminum	≤ 1500 **	4870	-	-	-
Arsenic	≤ 50 **	20 U	-	-	-
Cadmium	≤ 1.97 **a	0.23 I	-	-	-
Chromium	≤ 367 **a	10 U	-	-	-
Copper	≤ 21.5 **a	5.6	-	-	-
Iron	≤ 1000 **	510	-	-	-
Lead	7.76 **a	1.28 J	-	-	-
Mercury	≤ 0.012 **	0.10 U	-	-	-
Nickel	285 **a	15 I	-	-	-
Selenium	≤ 5.0 **	35 U	-	-	-
Silver	≤ 0.07 **	0.095 I	-	-	-
Zinc	192 **a	53 I	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	0.30	0.061	0.086	0.14
Total phosphorus	-	0.79	0.069	0.084 A	0.77
Ammonia	-	1.2	0.022	0.047	0.62
Un-ionized Ammonia	≤ 0.02	0.03	-	-	-
Nitrate+Nitrite	-	0.004 U	0.004 U	0.14	0.20
TKN	-	3.3	0.18 I	0.18	2.5 J
Organic Nitrogen	-	2.1	0.158	0.133	1.88
Total Nitrogen	-	3.3	0.18	0.32	2.7
General Phys-Chem Parameters					
Habitat Assessment	-	-	127	137	111
DO (mg/L)	5.0 *	5.6	5.9	6.6	9.2
pH (SU)	6.5 - 8.5 *	7.6	6.8	7.3	7.4
Conductivity (µmhos/cm)	**	2685	267	210	2420
Temperature (°C)	c	26.2	21.0	21.9	25.7
TSS (mg/L)	10000 *	5	1	3	7
BOD, 5 day (mg/L)	7170 *	26	2 K	-	20
Flow (MGD)	-	26	-	-	-
Hardness (mg $CaCO_3$)	-	201	-	-	-
AGP (mg dry wt/L)	-	5.1	4.9	2 K	7.8
Toxicity (chronic and 48-hour static, screening bioassay)					
Bioassay - Fish	NOEC*	Not Toxic	-	-	-
Bioassay - Invertebrate	NOEC*	Not Toxic	-	-	-
Microbiology (# counts/100ml)					
Fecal Coliforms	-	10 K	50 B	49 B	63 B
Total Coliforms	-	450	160 B	480	770

A - Value is the mean of two or more determinations
B - Colony counts outside the acceptable range
I - Value is < the MQL, and ≥ the MDL
J - Estimated value
K - Actual value less than value given
U - Not detected; value reported is the MDL
NOEC - No observed effect concentration

* Permit Limit
** Class III standard
a - Based on hardness
b - Evidence of toxicity
c - Increase in receiving water temp shall not cause substantial damage to aquatic life

Georgia Pacific Corporation Palatka Plant	Control Site 1 (Rice Creek)	Control Site 2 (Etonia Creek)	Test Site (Rice Creek)
Phytoplankton Algae			
Number of Taxa	11.0	10.0	8.0
Shannon-Weaver Diversity	3.4	2.9	2.0
Chlorophyll a (µg/L)	1.00 U	1.00 U	1.00 U
Algal Density (#/mL)	27.5	52.7	518.0
% Blue-green	11.1	11.1	89.0
% Green	0.0	14.8	2.4
% Diatoms	77.8	74.1	4.9
Periphyton Algae			
Number of Taxa	17.0	10.0	17.0
Shannon-Weaver Diversity	1.4	2.1	3.8
Chlorophyll a (mg/m2)	37.0	41.4	0.3
Algal Density (#/cm2)	297046.0	2293643.5	10629.0
Diatom/Diatom + B-G Ratio	0.99	0.99	0.50
%Blue-green	1.0	0.7	46.7
% Diatoms	99.1	99.3	46.7
AGP (mg dry wt/L)	4.9	-	7.8

Table 2. Algal community Structure of study sites.

slides in a standard periphytometer for 28 days. Phytoplankton were sampled at the three study sites using subsurface grabs. Chlorophyll *a* was determined using laboratory spectrophotometer analyses for both phytoplankton and periphyton communities. The test organism *Selenastrum capricornutum* was used for algal growth potential. All field and laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's). The SOP's can be viewed on the FDEP web site at www.dep.state.fl.us/labs/sops.htm.

Nine measurements of macroinvertebrate community health have been used to determine the effect of the discharge on the receiving waters. These measurements are habitat assessment; taxa richness; Shannon-Weaver Diversity Index; Florida Index; Ephemeroptera-Plecoptera-Trichoptera (EPT) Index; community composition; functional feeding groups; algal biomass; and Stream Condition Index (SCI). For a discussion of each of these measures, see *Explanation of Measurements of Community Health* in the Appendix.

For graphical purposes, the percent difference for: number of taxa, diversity index, Florida Index, EPT Index, diatom to blue-green algae ratio and % filter-feeders is calculated as the control site minus the test site divided by the control site. The percent difference for algal density, chlorophyll *a*, and algal growth potential is calculated as the test site minus the control site divided by the control site.

The Florida Department of Environmental Protection personnel involved in this investigation were, from the Northeast District: Pat O'Connor and Jim Wright. From the Central Biology Laboratory in Tallahassee: Ken Espy, Marshall Faircloth, Russell Frydenborg, Michael Heyn, Joy Jackson, Edwin Loschi, Vicki McGee, Elizabeth Miller, Urania Quintana, Johnny Richardson, Julie Riley, Lisa Homann, Amy Weaver, David Whiting, and Steve Wolfe. This inspection report has been reviewed by the Point Source Studies Review Committee: Wayne Magley, Michael Tanski, Chuck Ziegmont, and district representatives.

Results

Chemical and biological results for this report are presented in Tables 1–3.

Discussion

The metals cadmium, copper, lead, iron, nickel, silver, and zinc were detected in the effluent at levels that complied with Class III

Table 3. Benthic Community stucture of study sites.

Georgia Pacific Corporation Palatka Plant	Control Site 1 (Rice Creek)	Control Site 2 (Etonia Creek)	Test Site (Rice Creek)
Macroinvertebrate Qualitative			
% Dominant Taxon	24.2	18.4	54.0
EPT Index	3	8	2
Florida Index	7	13	6
Number of Taxa	23	29	30
SCI	23	25	23
Community Composition			
% Amphipoda	0.0	0.0	54.0
% Coleoptera	35.6	26.4	3.7
% Diptera	11.4	21.6	15.3
% Ephemeroptera	2.3	14.4	1.5
% Gastropoda	20.5	7.2	4.4
% Odonata	1.5	0.0	8.0
% Oligochaeta	4.6	2.4	5.1
% Pelecypoda	15.9	14.4	0.0
% Trichoptera	6.1	7.2	2.9
% Other	2.1	6.4	5.8
Functional Feeding Groups			
% Burrowing Deposit Feeders	3.0	2.4	4.4
% Predators	6.8	14.0	24.8
% Surface Deposit Feeders	26.1	32.0	32.9
% Suspension Feeders	18.6	20.4	1.1
% Scrapers	39.4	25.6	5.5
% Shredders	3.8	4.8	29.9
Macroinvertebrate Hester-Dendy			
Number of Taxa	42	41	32
Florida Index	26	28	7
Shannon-Weaver Diversity	4.09	3.58	3.17
EPT Index	13	12	5
Community Composition			
% Amphipoda	0.7	0.2	5.2
% Coleoptera	12.6	5.7	0.0
% Diptera	24.2	44.9	45.5
% Ephemeroptera	38.2	13.5	1.6
% Gastropoda	5.1	1.1	6.8
% Trichoptera	16.4	32.7	37.4
% Other	2.8	1.9	3.5
Functional Feeding Groups			
% Predators	15.5	10.0	6.8
% Surface Deposit Feeders	33.6	25.7	32.7
% Suspension Feeders	16.7	41.4	48.1
% Scrapers	30.9	11.0	6.0
% Shredders	2.1	10.2	2.6

water quality standards (Table 1). Aluminum (4,870 µg/L), however, was detected at a level that violated Class III water quality standards (Rule 62-302.530(2) FAC). Chloroform was detected in the effluent at a level less than the minimum quantitation limit (Table 1).

Effluent conductivity (2,685 mmhos/cm) was elevated and appeared responsible for the elevated level at the test site. The test site conductivity (2,420 mmhos/cm) was significantly greater than the conductivity at control site 1 (267 mmhos/cm) or control site 2 (210 mmhos/cm). The conductivity at the test site exceeded the Class III standard of 1,275 mmhos/cm, or not greater than 50% above background levels, and therefore violated Class III water quality standards (Rule 62-302.530(23) FAC). The water temperature at the test site (25.7°C) was approximately 5°C warmer than control site 1 or 2 (21.0°C and 21.9°C, respectively), an effect apparently due to the effluent (26.2°C). The dissolved oxygen increased from 5.9 mg/L at control site 1 to 9.2 mg/L at the test site (see Phys/Chem Characterization Field Data Sheets in the Appendix). Dissolved oxygen at control site 2 was 6.6 mg/L.

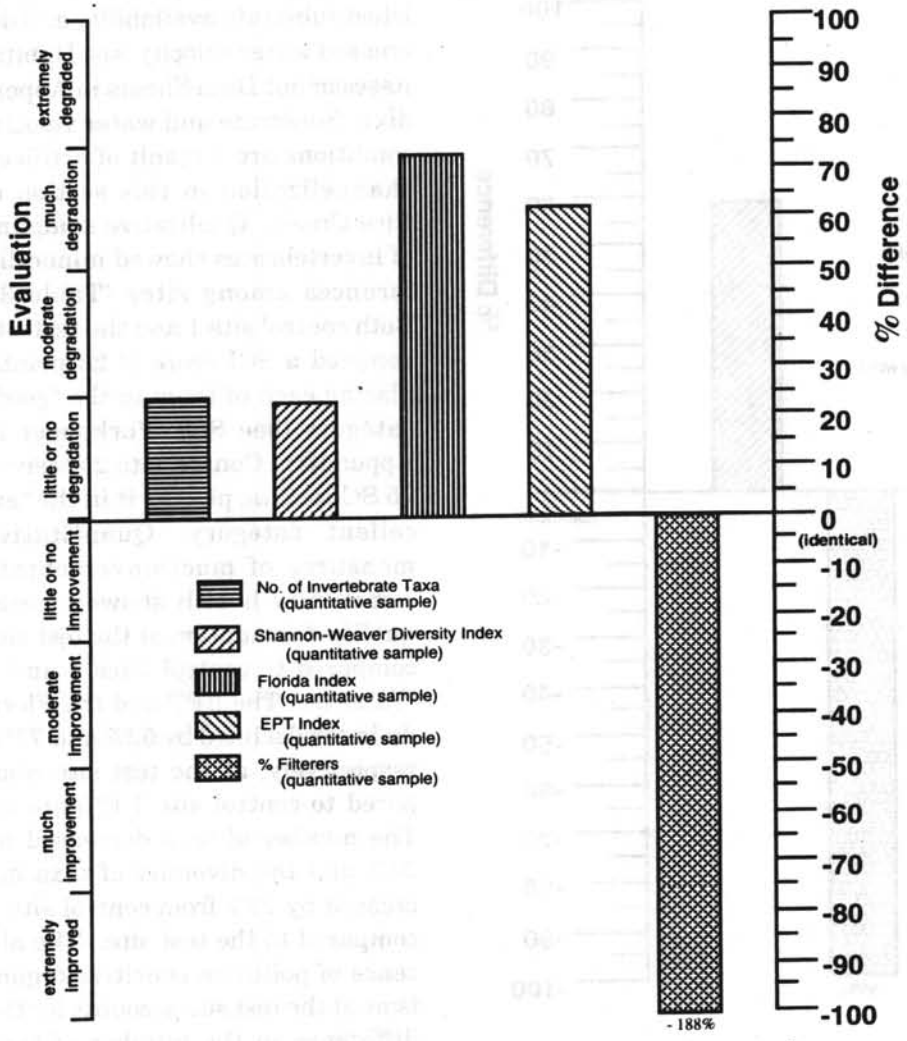


Figure 1. Effect of discharge on the macroinvertebrate community.

At 5% sample volume, the effluent BOD value was 20 mg/L, and at a 20% sample volume the BOD value was 10 mg/L. A trend in which increasing sample volumes exhibit decreasing BOD values can indicate toxicity. BOD is a measure of waste loading and is useful in determining BOD removal efficiency of treatment systems. The Georgia–Pacific Palatka Plant effluent appears to be interfering with the natural assimilative capacities of the receiving–waters and may be inhibiting or preventing the oxidation of nitrogen. However, no toxicity was observed in the acute or chronic bioassay tests using the fish, *Cyprinella leedsi,* and the invertebrate, *Ceriodaphnia dubia,* (Appendix).

All nutrient concentrations from the test site were greater than those at either control site 1 or at control site 2 (Table 1). Several of the test site nutrient concentrations were greater than 90% of other Florida streams (see *Typical Values for Selected Parameters in Florida Waters*). For example, total phosphorus and TKN were greater than 90% while ammonia was greater than 95% of other typical streams in Florida. Effluent total phosphorus (0.79 mg/L), TKN (3.3 mg/L), and ammonia concentrations (1.2 mg/L) were probably the cause of the increases in nutrient concentrations at the test site (Table 1). Un-ionized ammonia was calculated as 0.03 mg/L, which exceeds the Class III water quality standard (0.02 mg/L) (Rule 62-302.530(3) FAC). AGP was below the 5 mg dry wt/L "problem threshold" (Raschke and Shultz 1987) at

control site 1 (4.9 mg dry wt/L) and control site 2 (2 mg dry wt/L). However, AGP was above the "problem threshold" level at the test site (7.8 mg dry wt/L). A further indication that this portion of Rice Creek is undergoing nutrient enrichment from the effluent.

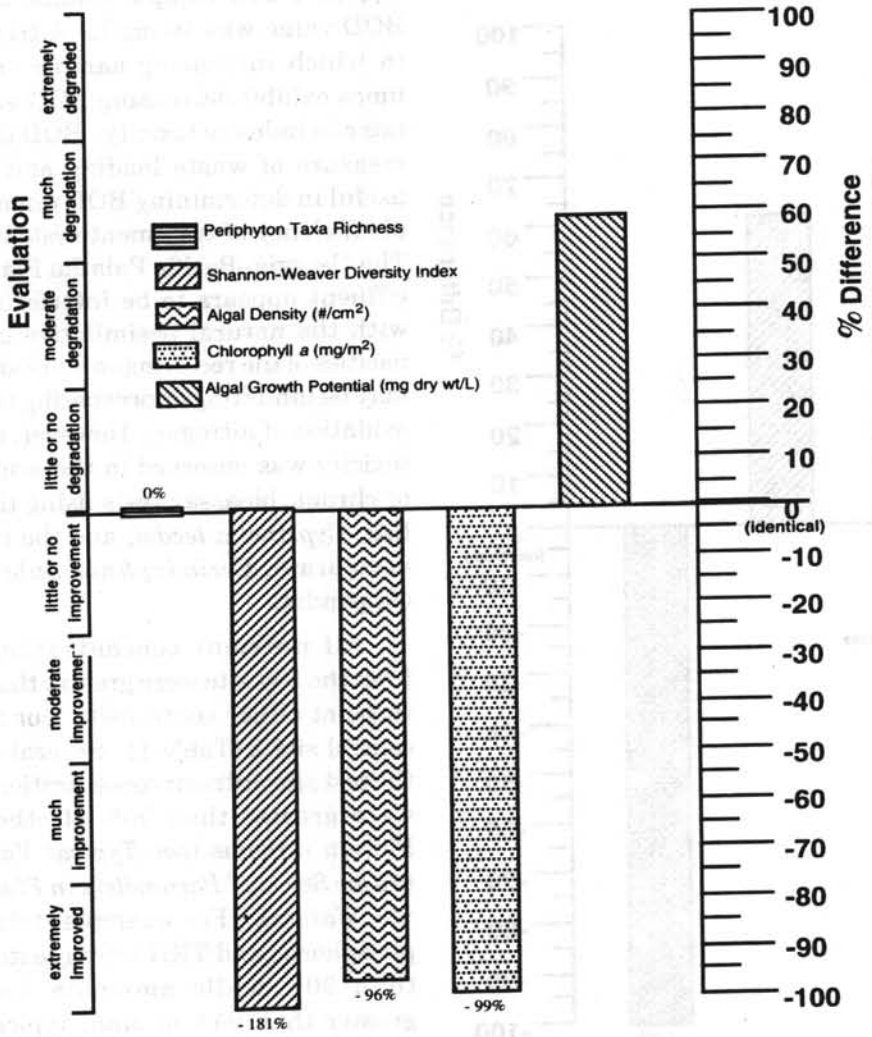


Figure 2. Effect of discharge on the periphyton community.

Algal communities at control site 1 and at control site 2 were dominated by diatoms, a characteristic of natural conditions in flowing streams. At the test site the diatom community was substantially displaced by blue-green algae, reducing the ratio of diatom to blue-green algae by nearly 50% (Table 2). The observed increase of blue-green algae is indicative of point-source pollution from the effluent. The decrease of overall algal density and of chlorophyll *a* at the test site results from the effects of light limiting, nutrient rich effluent. The shift in community assemblage produces diversity index results showing an increase at the test site as compared to the control site (Figure 1). The increase in diversity at the test site is directly attributable to the proportional increases of blue-green algae.

Habitat assessment scores placed control site 1 and control site 2 in the optimal category. The test site lost points because of diminished substrate availability and decreased water velocity (see Habitat Assessment Data Sheets in Appendix). Substrate and water velocity conditions are a result of artificial channelization in this section of Rice Creek. Qualitative sampling of invertebrates showed minor differences among sites (Table 3). Both control site 1 and the test site received a SCI score of 23 points, placing each of them in the "good" category (see SCI Worksheet in Appendix). Control site 2 received 25 SCI points, placing it in the "excellent" category. Quantitative measures of macroinvertebrate community health showed water quality degradation at the test site compared to control sites 1 and 2 (Table 3). The EPT and the Florida Index declined by 62% and 73%, respectively, at the test site compared to control site 1 (Figure 2). The number of taxa decreased by 24% and the diversity of taxa decreased by 22% from control site 1 compared to the test site. The absence of pollution sensitive organisms at the test site accounts for the difference in the number of taxa (see Macroinvertebrate Taxa Lists in Appendix). The altered composition of the macroinvertebrate communities observed during this inspection is similar to the results in the July 1991 inspection report. The biological communities in Rice Creek appeared to have been altered by the Georgia-Pacific–Palatka plant effluent in 1991, and continue to be effected at the time of this inspection.

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Typical Values for Selected Parameters in Florida Waters

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

	Percentile Distribution										
Parameter	**5 %**	**10 %**	**20 %**	**30 %**	**40 %**	**50 %**	**60 %**	**70 %**	**80 %**	**90 %**	**95 %**
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30

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 may have been employed to determine the effects of a discharge. These are briefly discussed here.

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

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.

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. 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.

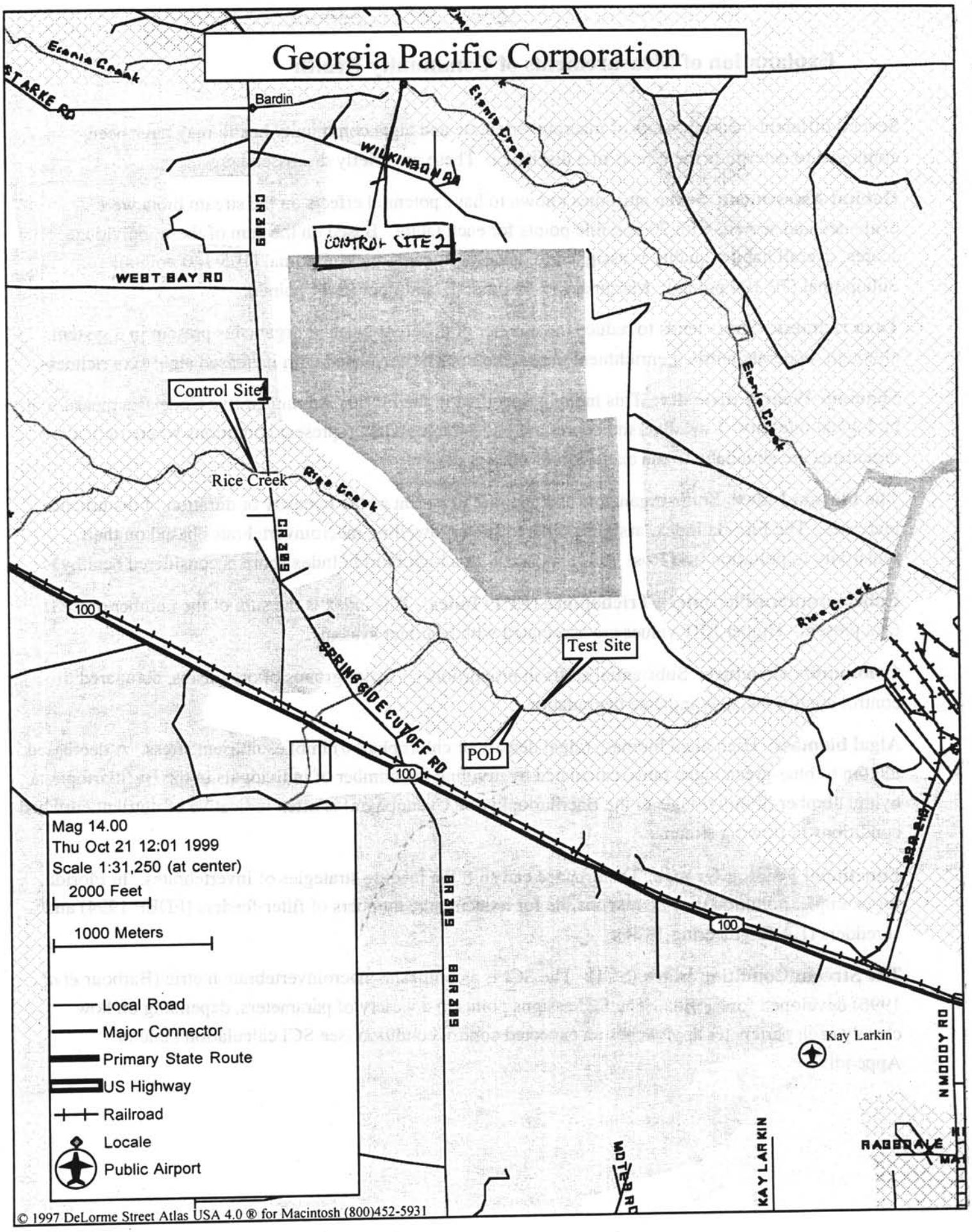
Ephemeroptera/Plecoptera/Trichoptera (EPT) Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation.

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.

Functional Feeding Groups: 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).

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996) developed for Florida. The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).


Georgia Pacific Corporation
Bardin
WILKINSON RD
CR 225
CONTROL SITE 2
WEST BAY RD
Control Site 1
Rice Creek
Rice Creek
Rice Creek
Rice Creek
Rice Creek
CR 225
100
SPRINGSIDE CUTOFF RD
Test Site
POD
100
100
CR 225
CR 225
Kay Larkin
N MOODY RD
KAY LARKIN
MOLER RD
RAGEDALE
Mag 14.00
Thu Oct 21 12:01 1999
Scale 1:31,250 (at center)
2000 Feet
1000 Meters
Local Road
Major Connector
Primary State Route
US Highway
Railroad
Locale
Public Airport
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

CNTL #1

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	20030254	5/11/99	1030	CONTROL SITE 1

REMARKS:	COUNTY:	LOCATION:	FIELD NAME:
	PUTNAM	RICE CREEK 150 YDS ABOVE BARDIN RD BRIDGE	~~REF SITE~~

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify)
10	70	2	15	2	1		

Local Watershed Erosion: None: ☐ Slight: ☒ Moderate: ☐ Heavy: ☐

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☒ Moderate potential: ☐ Obvious sources: ☐

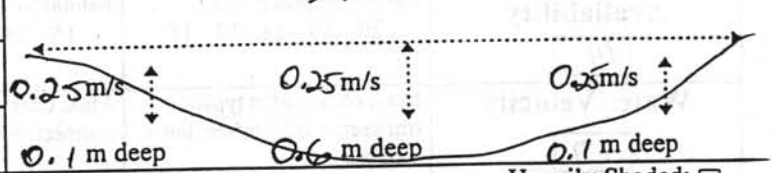
Width of riparian vegetation (m) on least buffered side: >18 m

List & map dominant vegetation on back

Artificially Channelized ☒ NO none
Artificially Impounded ☐ YES

High Water Mark: 1.5 (m above present water level) + 0.6 (present depth in m) = 2.1 (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 Silt smothering: mod Other: ☐ none

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	5	D N	Sand	80	5	D N
Leaf Packs or Mats	5	5	D N	Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	5	5	D N	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):	Time		Secchi (m):
Top								
Mid-depth	0.3	20.96	6.83	5.89	267	0800		0.6
Bottom								

System Type: Stream: ☒ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☑ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☐

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

Weather Conditions/Notes: WARM 80-85° CLEAR

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

Sampling Team: Wright O'Connor

Signature: Patrick W O'Connor

Date: 5/11/99

CNTL 1

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030254	DATE: (M/D/Y) 5/11/99	RECIEVING BODY OF WATER: CONTROL SITE 1
REMARKS:	COUNTY: PUTNAM	LOCATION: Rice Creek 150 YDS DOWN BARDIN RD BRIDG	FIELD ID/NAME: ~~Ref Site~~

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [14]	Four or more productive habitats present (snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitats present. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [14]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat by aerial extent. 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity [17]	Max. observed at typical transect: > 0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: > 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.1 to 0.5 m/sec 10 9 8 7 6	Max. observed at typical transect: < 0.05 m/sec., or spate occuring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [11]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20% - 50% of habitats affected by sand or silts accumulation 15 14 13 12 11	Smothering of 50% - 80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of > 80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
PRIMARY SCORE [56]				
Secondary Habitat Components **Artificial Channelization** [15]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [8] Left Bank [8]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% - 100% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [10] Left Bank [10]	Width of native vegetation (least buffered side) greater than 18m 10 9	Width of native vegetation (least buffered side) 12m to 18m 8 7 6	Width of native vegetation 6 to 12m, human activities still close to system 5 4	Less than 6m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [10] Left Bank [10]	Over 80% of riparian surfaces consist of native plants,, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. vegetation removed to stubble height of 2 inches or less. 3 2 1
SECONDARY SCORE [71]	**TOTAL SCORE** [127]			

ANALYSIS DATE:	ANALYST:	SIGNATURE:
5/11/99	O'Connor Patrick W	Patrick W O'Conn

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	21FLA0030253	5/11/99	0900	

REMARKS:	COUNTY:	LOCATION:	FIELD NAME:
	PUTNAM	ETONIA CREEK 250 YD ABOVE BALDIN RD BRIDGE	~~REF SITE~~ CONTROL SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify
25	50		15	5		5	

Local Watershed Erosion: None: ☐ Slight: ☒ Moderate: ☐ Heavy: ☐

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☒ Moderate potential: ☐ Obvious sources: ☐

Width of riparian vegetation (m) on least buffered side: > 18m

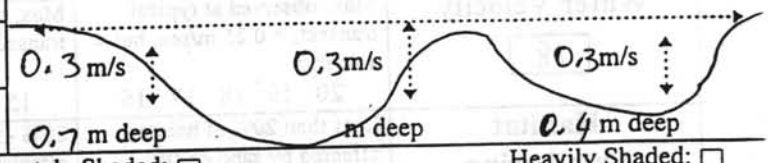
List & map dominant vegetation on back

Artificially Channelized ☐ NO Artificially Impounded ☐ YES none

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

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

6-8 m wide



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: (mod) Silt smothering: none Other: ☐ none

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	5	DN	Sand	75	5	DN
Leaf Packs or Mats	5	5	DN	Mud/Muck/Silt			
Aquatic Vegetation	~~+~~ 10			Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	10	5	DN	**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):	Time		Secchi (m)
Top								
Mid-depth	0.35	21.92	7.25	6.62	210	0900		1.6 L
Bottom								

System Type: Stream: ☒ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☒ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☐

Color: Tannic: ☐ Green (algae): ☐ Clear: ☒ Other: ☐

Weather Conditions/Notes: WARM 80-85° CLEAR

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

Sampling Team: Wright O'CONNOR

Signature: [signature]

Date: 5/11

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030253	DATE: (M/D/Y) 5/11/99	RECIEVING BODY OF WATER: CONTROL SITE 2
REMARKS:	COUNTY: Putnam	LOCATION: ETONIA CREEK 250 YDS ABOVE GARDIN RD BRIDGE	FIELD ID/NAME: ~~Ref. Site~~

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [15]	Four or more productive habitats present (snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitats present. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [14]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat by aerial extent. 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity [18]	Max. observed at typical transect: > 0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: > 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.1 to 0.5 m/sec 10 9 8 7 6	Max. observed at typical transect: < 0.05 m/sec., or spate occuring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [14]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20% - 50% of habitats affected by sand or silts accumulation 15 14 13 12 11	Smothering of 50% - 80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of > 80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
PRIMARY SCORE [61]				
Secondary Habitat Components **Artificial Channelization** [20]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [8] Left Bank [8]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% - 100% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [10] Left Bank [10]	Width of native vegetation (least buffered side) greater than 18m 10 9	Width of native vegetation (least buffered side) 12m to 18m 8 7 6	Width of native vegetation 6 to 12m, human activities still close to system 5 4	Less than 6m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [10] Left Bank [10]	Over 80% of riparian surfaces consist of native plants,, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. vegetation removed to stubble height of 2 inches or less. 3 2 1
SECONDARY SCORE [76]		TOTAL SCORE [137]		

ANALYSIS DATE:	ANALYST:	SIGNATURE:
5/11/99	O'Connor, Patrick W.	Patrick W O'Connor

Test # 2

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	20030721	5/11/99	1530	

REMARKS:	COUNTY:	LOCATION:	FIELD NAME:
FIELD MEASUREMENTS MADE 5/10/99	PUTNAM	RICE CREEK 100YD BELOW GA. PACIFIC PRIMARY OUT FALL	TEST SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify)
20 %	50 %			5 %		25 %	

Local Watershed Erosion: None: ☐ Slight: ☒ Moderate: ☐ Heavy: ☐

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☒ Moderate potential: ☐ Obvious sources: ☐

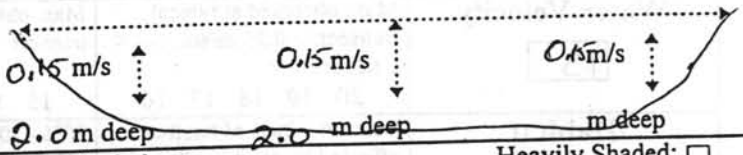
Width of riparian vegetation (m) on least buffered side: >18m

List & map dominant vegetation on back

Artificially Channelized ☐ NO none ☐ YES
Artificially Impounded

High Water Mark: 0.6 + 2.0 = 2.6
(m above present water level) (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: ☒ Pulp Mill Effluent

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

Sediment Deposition: Sludge: ☐ Sand smothering: none Silt smothering: none Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	5	5	DN	Sand			
Leaf Packs or Mats	5	5	DN	Mud/Muck/Silt	50 80%	5	DN
Aquatic Vegetation	1	5	DN	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				Draw aerial view sketch of habitats found in 100 m section.			

Water Quality	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Time		Secchi (m):
Top								0.1
Mid-depth	1.0	25.7	7.36	9.16	2420	1510	5/10/99	
Bottom								

System Type: Stream: ☒ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☒ EA

Water Surface Oils: None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☐ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☒

Color: Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes: WARM 80°-85° BRIEF SHOWERS 0.1 SECCHI WOULD NOT PERMIT VISUAL HABITAT % TEST NET SWEEPS WERE CONDUCTED TO ESTABLISH HABITAT TYPES

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

Sampling Team: Jim Wright Pat O'Connor

Signature: Patricia O'Connor

Date: 5/11

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98) TST2

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 21003072	DATE: (M/D/Y) 5/11/99	RECIEVING BODY OF WATER:

REMARKS:	COUNTY: PUTNAM	LOCATION: RICE CREEK 1004 OS BELOW GA PACIFIC PRIMARY OUTFALL	FIELD ID/NAME: TEST SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [13]	Four or more productive habitats present (snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 (13) 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitats present. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [8]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat by aerial extent. 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity [13]	Max. observed at typical transect: > 0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: > 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.1 to 0.5 m/sec 10 9 8 7 6	Max. observed at typical transect: < 0.05 m/sec., or spate occuring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [13]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20% - 50% of habitats affected by sand or silts accumulation 15 14 (13) 12 11	Smothering of 50% - 80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of > 80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
PRIMARY SCORE [47]				
Secondary Habitat Components **Artificial Channelization** [8]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized somewhat recovered, but > 80% of area affected 10 9 (8) 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [8] Left Bank [8]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% - 100% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [10] Left Bank [10]	Width of native vegetation (least buffered side) greater than 18m 10 9	Width of native vegetation (least buffered side) 12m to 18m 8 7 6	Width of native vegetation 6 to 12m, human activities still close to system 5 4	Less than 6m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [10] Left Bank [10]	Over 80% of riparian surfaces consist of native plants,, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. vegetation removed to stubble height of 2 inches or less. 3 2 1
SECONDARY SCORE [64]		TOTAL SCORE	[111]	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
5/11/99	O'CONNOR PATRICK W	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Georgia Pacific Corporation
Date Summary Prepared: May 6, 1999

Location (attach detailed map): Palatka, Florida
County: Putnam
District: Northeast

Federal Permit # FL0002763 and expiration date: 9/30/95
State GMS # and IT 54-220788
State expiration date: 6/22/97
Facility Type: (Industrial) Municipal Federal Agricultural Other (list):

Function of facility: Pulp + Paper Mill

Description of treatment process:
Treatment process for a 40 mgd average industrial-wastewater includes primary clarification followed by secondary treatment consisting of 900± acres of anaerobic, facultative + aerobic lagoons. Liquid pure oxygen is injected into two effluent side streams at a rate which counteracts the BOD concentration of the effluent in order to maintain a dissolved oxygen concentration of 4.0 mg/L from June through November and 5.0 mg/L from December through May

Receiving waters: Rice Creek
Classification: I II (III)

Design Flow: 40 mgd.
Mean Flow: ~26 mgd.
Flow during survey:

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

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):
1) Mixing zone for total dissolved gases (TDG) for side stream discharges into Rice Creek. 110% saturation value for gases at existing atmosphere & hydrostatic pressures outside the boundaries of the mixing zone must not be exceeded. Mixing zone extends a cumulative upstream + downstream distance of 725 meters at milepoint 2.4 + a cumulative upstream + downstream distance of 225 meters at milepoint 3.4.
2) Zinc concentrations must not exceed its hardness based limit outside an area of 100 longitudinal ft. about the discharge at milepoint 2.4 + ~~600~~ outside an area of 600 longitudinal ft. about the discharge at milepoint 3.1.

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

Parameter	Limit (units)
See attached sheet.	

Describe special permit conditions and permit modifications:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Georgia Pacific
(Facility)

Description of permitted outfall(s): Milepoints measured from mouth of Rice Creek upstream.
001 A – Effluent discharge prior to mixing with receiving stream (Rice Creek)
001 B – oxygen injection into Rice Creek (milepoint 3.4) upstream of effluent.
002 C – oxygen injection into Rice Creek (milepoint 2.4) downstream of effluent
003 R – in stream monitoring point at milepoint 1.9 in Rice Creek

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

None.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
1) A WQBEL was conducted from 1994 to 1997 and was approved by the EPA in January 1998. However, the WQBEL was conducted for the proposed pipeline to transfer the effluent to the St. Johns River. Currently, the construction of pipeline has not been approved or permitted and both Georgia Pacific and the EPA have been in negotiations regarding the pipeline project.
2) No current enforcement projects are open.
3.) Previous impact bioassessment conducted 1992, prior to the state permit issuance in June 1994.

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

Facility has been in compliance with the permitted limits and with the freshwater criteria established in Rule 62-302.

Additional information:

Staff contributing to this review (signature):

(Biologist

Heather Wehry (Inspector

(Engineer

(

(

(

Effluent Limits

State Permit Requirements

Parameter	Frequency	Limit (Average)	Limit (Min or Max)
Flow (mgd)	Continuous	Report (daily)	Report (daily min / max)
BOD5 (mg/l)	3/week	3500 (June - Nov)	7000 (June - Nov)
		7170 (Dec - May)	14340 (Dec - May)
TSS (mg/l)	3/week	5000 (Jun - Nov)	10000 (June - Nov)
		10000 (Dec - May)	17500 (Dec - May)
TKN (mg/l)	quarterly	Report	
Unionized ammonia (mg/l)	quarterly	Report	
Total coliform (# col/100 ml)	monthly	Report	
Fecal coliform (# col/100 ml)	monthly	Report	
Settleable solids (ml/l)	monthly	0.1	
Temperature (C)	3/week		32 (max)
pH (s.u.)	3/week		6.5 - 8.5
Iron (ug/l)	quarterly	Report	
Zinc (ug/l)	quarterly	Report	
Hardness (mg/l)	monthly	Report	
Specific Conductance (mhos/cm)	monthly	Report	
Dissolved Oxygen (at R3) (mg/l)	5/week		4.0 min (June - Nov) 5.0 min (Dec - May)
Dioxin (pg/l)	quarterly	0.025	
Acute toxicity	semi-annual	Trigger at 20% mortality in 97% effluent	
Chronic toxicity	semi-annual	Trigger of NOEC <100 for 97% effluent	

FDEP Biology Section—Chronic Bioassay Bench Sheet
Survival

Facility: Georgia Pacific | Sample Collection: Date 5/10/99 Time 14:00
County: Putnam | Test Beginning: Date 5/11/99 Time 15:00
Contact/District: / Northeast | Test Ending: Date 5/18/99 Time 14:00
NPDES #: FL0002763 | Organism Batch#: 37 Diluent Batch #: Well
LIMS Sample #: 385083 385084 385085 | LIMS Job #: TLH 1999-05-11-18 TLH 1999-05-13-30 TLH 1999-05-17-01 | Organism age: 24 hrs
sample log: | Test organism: Cyprinella leedsi
Test Type: Screening / (Definitive) | Comments:
Temperature range: room 24°C
incubator #3
Test Number: 1
D=Dead M=Missing

Concentration	Replicate/ Chamber #	Day 1	2	3	4	5	6	7	Test Termination
CTL A	A1	10	10	10	10	10	10	10	10
B	A2	10	10	10	10	9 10	9	9	9
C	A3	10	10	10	10	10	10	10	10
D	A4	10	10	10	10	10	10	10	10
6.25 A	A5	10	10	10	10	10	10	10	9 10
B	A6	10	10	10	10	M 10	10	10	10
C	A7	10	10	10	10	10	10	10	10
D	A8	10	10	10	10	10	10	10	10
12.5 A	A9	10	10	10	10	10	10	10	10
B	A10	10	10	10	10	10	10	10	10
C	A11	10	10	10	10	9 10	9	9	9
D	A12	10	10	10	10	10	10	10	10
25 A	A13	10	10	10	10	10	10	10	10
B	A14	10	10	10	10	9 10	9	9	9
C	A15	10	10	10	10	10	10	10	10
D	A16	10	10	10	9 10	9	9	9	9
50 A	A17	10	10	10	10	10	10	10	10
B	A18	10	10	10	10	10	10	10	10
C	A19	10	10	10	9 10	9	9	9	9
D	A20	10	10	10	10	10	10	10	10
100 A	A21	10	10	10	10	10	10	10	10
B	A22	10	10	10	10	10	10	10	10
C	A23	10	9 10	9	9	9	9	9	9
D	A24	10	10	10	9 M	9	9	9	9
Loaded by: FW Renewed by:		MF/10	CH	CH	MF	MF	DW	CH	
Concentrations Prepared by:		MF/10	CH	CH	CH	MF	DW	FW	

Investigators' signatures
Laurie Courtney FW
Marshall Faircloth

A H Wolfe
reviewer (sign above)

Water Quality Parameters
Verified by:

	Diluent	Sample	Method	Measured by
Field total residual Cl_2:	NA	—	—	—
Lab total residual Cl_2:	<0.03 <0.03 <0.03	<0.03 <0.03 <0.03	DR100	CH CH CH
Alkalinity (mg/L as $CaCO_3$):	135 133 135	352 375 275	Hach	CH CH CH
Hardness (mg/L as $CaCO_3$):	125 120 135	230 227 285 Sf 212	Hach	CH CH CH
Ammonia (mg/L as N):	<0.017 <0.017 <0.017	0.629 0.780 0.553	Orion	MF MF MF

Ammonia blank: <0.017 TRC blank: <0.03 Salinity: Control 0 Sample 1.3

Weight Data for the *Cyprinella leedsi* , larval survival and growth test.

Discharge: GA Pacific
Location: Palatka, Putnam Co.
NPDES #: FL 0002763
Test Date(s): 5/11/99 – 5/18/99
Weighing Date: 5/20/99
Drying Temperature (°C): Tare: 105°C larvae: 105°C
Drying Time (h): Tare: 8 hrs, larvae: 8 hrs

Concentration	Rep #	A Wgt. of Tare	B Dry Wgt. tare and larve	B-A Total Dry Wgt. of larve	C Number of larve	(B-A)/C Mean Dry Wgt. of Larve	Comments	
Control	A A_1	0.01822	0.02152	0.00330	10	0.000330		
	B A_2	0.01860	0.02291	0.00431	9	0.000479		
C+L	C A_3	0.01940	0.02328	0.00388	10	0.000388	QA check of tare	QA/QC check of fish (dried)
	D A_4	0.01789	0.02204	0.00415	10	0.000415		
Concentration	A A_5	0.01711	0.02052	0.00341	9	0.000379	0.01819	A, after 5 | 0.02152
	B A_6	0.01809	0.02260	0.00451	10	0.000451		
6.25	C A_7	0.01899	0.02324	0.00425	10	0.000425		
	D A_8	0.01846	0.02327	0.00481	10	0.000481		
Concentration	A A_9	0.01807	0.02176	0.00369	10	0.000369		
	B A_{10}	0.01750	0.02159	0.00409	10	0.000409	0.01813	A, after 10 | 0.02154
12.5	C A_{11}	0.01834	0.02227	0.00393	9	0.000437		
	D A_{12}	0.01684	0.02152	0.00468	10	0.000468		
Concentration	A A_{13}	0.01901	0.02299	0.00398	10	0.000398		
	B A_{14}	0.01913	0.02317	0.00404	9	0.000449		
25	C A_{15}	0.01989	0.02436	0.00447	10	0.000447	0.01814	A, after 15 | 0.02157
	D A_{16}	0.01596	0.01927	0.00331	9	0.000368		
Concentration	A A_{17}	0.01955	0.02364	0.00409	10	0.000409		
	B A_{18}	0.01893	0.02367	0.00474	10	0.000474		
50	C A_{19}	0.01753	0.02132	0.00379	9	0.000421		
	D A_{20}	0.01969	0.02460	0.00491	10	0.000491	0.01815	A, after 20 | 0.02157
Concentration	A A_{21}	0.01793	0.02300	0.00507	10	0.000507		
	B A_{22}	0.01906	0.02397	0.00491	10	0.000491		
100	C A_{23}	0.01874	0.02276	0.00402	9	0.000447		
	D A_{24}	0.01773	0.02175	0.00402	9	0.000447		
Concentration								
Weighed by:		FW | SG	FW	FW	FW	FW		

Weigh Boats prepared by: FW

Cyprinella leedsi Chronic Bioassay Bench Sheet

Physical-Chemistry Parameters

Toxicant: GA Pacific	Test Organism: C. leedsi			Organism Batch # 37
Test Number: 1	Date: 5/11/99	Hour of test: 0hr		Dilution H20 Batch # Well
	Before Renewal	Time: 14:10		After Renewal Time:

Concentrations	Rep	pH	Temp.C	D.O.	Cond. mm	Rep	pH	Temp.C	D.O.	Cond.
C+L	A	7.6	25.9	7.5	290					
6.25	A	7.6	25.2	7.7	390					
12.50	A	7.7	25.2	7.7	530					
25.00	A	7.8	25.2	7.6	820					
50.00	A	7.9	25.1	7.4	1340					
100.00	A	7.9	25.0	7.5	2370					
Measured by:		CH	CH	CH	CH					
Recorded by:		FW	FW	FW	FW					

Investigators' signatures

Comments:

Tom Winfield
Chemistry Head

Cyprinella leedsi Chronic Bioassay Bench Sheet

Physical-Chemistry Parameters

Toxicant: Ga. Pacific	Test Organism: C. leedsi					Organism Batch # 37				
Test Number:	Date: 5/12/99		Hour of test: 24			Dilution H20 Batch # WELL				
	Before Renewal		Time: 10:10			After Renewal			Time: 11:00am	
Concentrations	Rep	pH	Temp.C	D.O.	Cond.	Rep	pH	Temp.C	D.O.	Cond.
~~100~~ Control	B	7.8	25.2	6.6	270	B	7.8	24.0	7.6	245
~~50~~ 6.25	B	7.8	25.4	6.8	400	B	7.7	24.3	7.7	375
12.50	B	7.8	25.0	6.7	535	B	7.7	24.3	7.7	510
25.00	B	7.8	25.8	6.8	840	B	7.7	24.3	7.7	785
50.00	B	7.9	26.9	5.8	1420	B	7.8	24.5	7.7	1320
100.00	B	8.0	25.6	6.0	2400	B	7.8	24.6	7.5	2340
Measured by:		CH	CH	CH	CH		CH	CH	CH	CH
Recorded by:		CO	CO	CO	CO		CO	CO	CO	CO

Investigators' signatures

Courtney Head

Comments:

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Cyprinella leedsi Chronic Bioassay Bench Sheet

Physical-Chemistry Parameters

Toxicant: Ga. Pacific	Test Organism: C. leeds.			Organism Batch # 37
Test Number:	Date: 5/13/99	Hour of test: 48		Dilution H20 Batch # well
	Before Renewal	Time: 1310	After Renewal	Time: 13:50

Concentrations	Rep	pH	Temp.C	D.O.	Cond.	Rep	pH	Temp.C	D.O.	Cond.
Control	C	7.6	24.2	6.3	225	C	7.4	24.4	7.2	215
6.25	C	7.6	24.9	6.0	390	C	7.4	24.7	7.2	375
12.50	C	7.6	24.6	5.9	520	C	7.5	24.7	7.2	530
25.00	C	7.6	24.6	5.4	795	C	7.6	24.6	7.1	785
50.00	C	7.7	26.6	5.4	1335	C	7.7	24.7	7.1	1275
100.00	C	7.9	25.1	4.9	2350	C	7.7	24.8	7.0	2400
Measured by:		CH	CH	CH	CH		CH	CH	CH	CH
Recorded by:		MF	MF	MF	MF		FW	FW	FW	FW

Investigators' signatures

Marshall Faircloth

Tiffany Woodard

Courtney Head

Comments:

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Cyprinella leedsi Chronic Bioassay Bench Sheet

Facility

Physical-Chemistry Parameters

~~Toxicant:~~ GaPacific	Test Organism: Cyprinella leedsi				Organism Batch # 37				
Test Number:	Date: 5/14/99		Hour of test: 72		Dilution H20 Batch # well				
	Before Renewal		Time: 0940		After Renewal		Time: 1015		
Concentrations	Rep	pH	Temp.C	D.O.	Cond.	Rep	pH	Temp.C	D.O.	Cond.
Control	D	7.6	24.4	6.0	250	D	7.6	24.0	7.7	230
6.25%	D	7.6	24.4	5.7	395	D	7.6	24.0	7.7	390
12.5%	D	7.7	24.3	5.7	558	D	7.7	23.9	7.5	535
25%	D	7.9	24.0	5.7	850	D	7.8	24.0	7.5	810
50%	D	7.9	24.0	5.8	1413	D	7.9	24.0	7.4	1360
100%	D	8.0	24.1	4.9	2550	D	7.9	24.1	7.0	2350
Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
Recorded by:		MF	MF	MF	MF		SG	SG	SG	SG

Investigators' signatures

Marshall Faircloth

Shannon Gerardi

Comments:

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QC 1st

Cyprinella leedsi Chronic Bioassay Bench Sheet

Facility

Physical-Chemistry Parameters

Toxicant: Georgia Pacific	Test Organism: Cyprinella leedsi				Organism Batch # 37				
Test Number:	Date: 5/15/99		Hour of test: 96		Dilution H20 Batch # well H2O				
	Before Renewal		Time: 1015		After Renewal		Time: 1150		
Concentrations	Rep	pH	Temp.C	D.O.	Cond.	Rep	pH	Temp.C	D.O.	Cond.
Control	A	DO in pH strips 6.4 7.6	24.0	6.4	245	A	7.6	24.0	7.8	245
6.25%	A	MF 5/15/99 5.5 7.6	24.7	5.5	405	A	7.6	24.9	7.6	405
12.5%	A	6.0 7.7	23.9	6.0	dish ground 550 MF 5-15-99	A	7.7	24.7	7.5	550
25.%	A	7.8	23.8	6.1	835	A	7.8	24.4	7.6	855
50%	A	7.9	23.9	5.5	1425	A	7.9	24.1	7.5	1405
100%	A	8.0	24.1	5.6	2480	A	7.9	24.3	7.5	2510
Measured by:	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF

Investigators' signatures

Comments:

Room temp @ 23.5°C MF 5/15/99

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Cyprinella leedsi Chronic Bioassay Bench Sheet

Facility

Physical-Chemistry Parameters

Toxicant: Georgia Pacific	Test Organism: Cyprinella leedsi		Organism Batch # 37
Test Number:	Date: 5/16/99	Hour of test: 120	Dilution H20 Batch # well H_2O
	Before Renewal	Time: 10:30	After Renewal Time:

Concentrations	Rep	pH	Temp.C	D.O.	Cond. (umhos)	Rep	pH	Temp.C	D.O.	Cond. (umhos)
Control	B	7.7	24.3	5.2	250	B	7.6	24.5	6.9	245
6.25%	B	7.5	24.8	5.1	405	B	7.6	24.9	7.1	395
12.5%	B	7.5	24.5	4.2	555	B	7.6	24.9	6.8	535
25%	B	7.5	24.9	4.3	855	B	7.7	24.8	6.8	805
50%	B	7.7	24.2	4.1	1416	B	7.8	24.6	6.9	1230
100%	B	8.0	24.1	4.3	3550	B	7.9	24.5	6.9	3320
Measured by:		DW	DW	DW	DW		DW	DW	DW	DW
Recorded by:		DW	DW	DW	DW		DW	DW	DW	DW

Investigators' signatures

Comments:

Cyprinella leedsi Chronic Bioassay Bench Sheet

Physical-Chemistry Parameters

Toxicant: GA Pacific	Test Organism: C. leedsi						Organism Batch # 37			
Test Number:	Date: 5/17/99		Hour of test: 144				Dilution H20 Batch # Well			
	Before Renewal		Time: 9:30			After Renewal			Time:	
Concentrations	Rep	pH	Temp.C	D.O.	Cond.	Rep	pH	Temp.C	D.O.	Cond.
CTL	C	7.9	24.1	7.0	235	C	7.6	24.2	8.1	245
6.25%	C	7.9	25.1	7.2	385	C	7.8	24.5	8.1	365
12.50%	C	7.9	24.6	7.0	515	C	7.8	24.6	8.1	530
25.00%	C	7.9	24.9	7.0	815	C	7.9	24.6	8.1	785
50.00%	C	8.1	25.0	6.7	1355	C	7.9	24.4	8.0	1270
100.00%	C	8.2	24.6	5.9	2400	C	8.0	24.2	7.5	2340
Measured by:		CH	CH	CH	CH		CH	CH	CH	CH
Recorded by:		FW	FW	FW	FW		CH	CH	CH	CH

Investigators' signatures

Comments:

Counting Head

Cyprinella leedsi Chronic Bioassay Bench Sheet

Physical-Chemistry Parameters

Toxicant: GA Pacific	Test Organism: C. leedsi			Organism Batch # 37					
Test Number:	Date: 5/18/99		Hour of test: 168	Dilution H20 Batch # Well					
	Before Renewal		Time: 13:30	After Renewal			Time: ~~13:30~~		
Concentrations	Rep	pH	Temp.C	D.O.	Cond. mm	Rep	pH	Temp.C	D.O.	Cond.
C+L	D	7.8	26.1	6.2	.260					
6.25%	D	7.8	25.2	6.3	.400					
12.50%	D	7.7	25.6	6.3	.570					
25.00%	D	7.8	25.1	5.5	.855					
50.00%	D	7.8	24.9	5.3	1.360					
100.00%	D	8.2	25.2	5.3	2.46					
Measured by:	CH	CH	CH	CH	CH					
Recorded by:	SG	SG	SG	SG	SG					

Investigators' signatures

Shannon Gerardi

Cambrian Hall

Comments:

ch1 8

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Georgia Pacific
County: Putnam
Contact / District: H. Welsh / Northeast
NPDES Permit #: FL0002763
LIMS Sample #: 385089 LIMS Job #: ILH-1999-05-11-18
sample log
Test Type: (Screening) Definitive
(Static) Static Renewal | Flow-through
Test Number: 1 of 3
Temp. Range Incubation #2: 25.5 - 26.5°C.
Temp. Range Culture Lab: 24.7-26.7°C

Sample Collection: Date 5/10/99 Time 14:00
Test Beginning: Date 5/11/99 Time 1450
Test Ending: Date 5/13/99 Time 14:30
Organism Batch #: 26 Diluent Batch #: 20
Organism Age: <24hrs SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

Remarks:
Initial D.O. was 4.8 mg/L. After aerating for 30 minutes D.O. was 7.1. FW 5/11/99.

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctl	A	5	5	5	7.7		7.4	25.2		23.7	7.7		7.1	165		210
Ctl	B	5	5	5			7.9			23.8			7.4			220
Ctl	C	5	5	5			8.0			23.8			7.6			200
Ctl	D	5	5	5			8.0			24.2			7.7			200
100%	A	5	5	5	8.0		8.6	26.0		24.8	7.1		7.4	2530		2510
100%	B	5	5	5			8.6			24.3			7.2			2570
100%	C	5	5	5			8.7			24.3			7.4			3020
100%	D	5	5	5			8.7			24.6			7.4			2510
measured by:		MF	FW	MF	FW		CH	FW		CH	FW		CH	FW		CH
recorded by:		CO	CO	FW	FW		FW	FW		FW	FW		FW	FW		FW

Investigators' Signatures
Marshall Faircloth
Francis Wentzel
Courtney Head
C. O.

DH Wolfe
reviewer

form updated 5/22/98

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			FW
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	—	80	352	Hach	CH	FW
Hardness (mg/L as $CaCO_3$):	—	75	230	Hach	CH	FW
Total ammonia (mg/L as N):	—	<0.017	0.781	Denver	MF	FW
Salinity:	—	~~<0.017~~ FW 0	0	YSI	MF	FW

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Georgia Pacific
County: Putnam
Contact / District: H. Welch / Northeast
NPDES Permit #: FL0002763
LIMS Sample #: 385089 LIMS Job #: ILH 1999-05-11-18

Sample Collection: Date 5/10/99 Time 14:00
Test Beginning: Date 5/11/99 Time 15:35
Test Ending: Date 5/13/99 Time 14:30
Organism Batch #: 34 Diluent Batch #: well H2O
Organism Age: 12 Days SRT toxicant batch #: NA
Test organism: Cyprinella leedsi

sample log
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 3
Temp Range Incubator: 24.5-25.0°C
Temp. Range Culture Lab: 24.7-26.1°C

Remarks: Initial D.O. was 4.8 mg/L. After aerating for 30 minutes D.O. was 7.1 mg/L. FW 5/11/99

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctl A	D9	5	5	5	7.6	8.0	8.1	25.2	24.3	25.4	8.5	7.2	7.3	240	295	270
Ctl B	D10	5	5	5	7.6	8.0	8.1	25.1	24.2	24.6	8.6	7.4	7.3	250	260	270
Ctl C	D11	5	5	5	7.6	8.0	8.1	25.1	24.9	24.7	8.7	7.4	7.6	255	265	270
Ctl D	D12	5	5	5	7.6	8.0	8.1	25.1	24.9	23.8	8.8	7.4	7.8	255	265	270
100% A	D21	5	5	5	8.0	8.2	8.3	26.0	24.5	24.3	7.1	6.6	6.5	2470	2320	2540
100% B	D22	5	5	5	8.0	8.2	8.3	26.0	24.2	25.0	7.1	6.2	6.6	2600	2500	2700
100% C	D23	5	5	5	8.0	8.2	8.3	26.0	24.6	24.5	7.1	6.4	6.5	2640	2570	2670
100% D	D24	5	5	5	8.0	8.2	8.1	26.0	25.3	23.7	7.1	6.2	6.5	2610	2590	2650
measured by:		MF	CH	MF	FW	CH	CH	FW	CH	CH	FW	CH	CH	FW	CH	CH
recorded by:		CO	CH	FW	CO	CO	FW	CO	CO	FW	CO	CO	FW	CO	CO	FW

Investigators' Signatures

Marshall Faircloth
Courtney Hayes
Amy Wentland
C. Q. Jones
Kathy Welch

form updated 5/22/98

Water Quality Parameters	Salt Water / (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			FW
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR 460 / DR-700	CH	FW
Alkalinity (mg/L as $CaCO_3$):	135	—	352	352 Hach	CH	FW
Hardness (mg/L as $CaCO_3$):	125	—	230	230 Hach	CH	FW
Total ammonia (mg/L as N):	<0.017	—	0.781	Orion	MF	FW
Salinity:	0	—	0	YSI	MF	FW

Georgia Pacific Corporation - Control Site 1

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	23	≥22	21-12	<12	5
EPT Index	3	-	≥2	<2	3
# Chironomid Taxa	2	≥7	6-4	<4	1
% Contribution of Dominant Taxon	24	≤31	32-66	>66	5
% Diptera	11	-	≤47	>47	3
Florida Index	7	≥8	7-4	<5	3
% Suspension feeders/Filterers	19	-	≥7	<7	3
Total Score		Northeast			23
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

Georgia Pacific Corporation - Control Site 2

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	29	≥22	21-12	<12	5
EPT Index	8	-	≥2	<2	3
# Chironomid Taxa	2	≥7	6-4	<4	1
% Contribution of Dominant Taxon	18	≤31	32-66	>66	5
% Diptera	22	-	≤47	>47	3
Florida Index	13	≥8	7-4	<5	5
% Suspension feeders/Filterers	20	-	≥7	<7	3
Total Score		Northeast			25
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

Georgia Pacific Corporation - Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	30	≥22	21-12	<12	5
EPT Index	2	-	≥2	<2	3
# Chironomid Taxa	10	≥7	6-4	<4	5
% Contribution of Dominant Taxon	54	≤31	32-66	>66	3
% Diptera	15	-	≤47	>47	3
Florida Index	6	≥8	7-4	<5	3
% Suspension feeders/Filterers	1.1	-	≥7	<7	1
Total Score		Northeast			23
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

Periphyton taxa list and densities (#/cm^2) for Georgia-Pacific—Palatka Plant collected using glass microscope slides in Rice Creek, on 11 May 1999.

	Control Site 1	Test Site	Control Site 2
Bacillariophyceae			
Achnanthes exigua	1685	177	85706
Achnanthes hungarica	—	177	—
Achnanthes hustedii	—	—	44812
Achnanthes lanceolata	6458	—	85706
Achnanthes sp.	562	177	8163
Bacillaria paradoxa	—	177	—
Cocconeis fluviatilis	115393	—	59178
Cocconeis placentula	—	—	420366
Cocconeis sp.	—	177	—
Cyclotella sp.	—	177	—
Diatoma sp.	—	177	—
Epithemia sp.	562	—	—
Eunotia sp.	8985	—	18366
Fragilaria construens	—	—	4081
Gomphonema parvulum	1685	177	—
Gomphonema sp.	—	177	—
Gyrosigma sp.	562	—	—
Melosira varians	3089	—	—
Navicula capitata	1123	—	—
Navicula clementis	562	—	—
Navicula minima	562	—	14285
Navicula sp.	—	177	—
Navicula tripunctata	562	—	—
Nitzschia frustulum	—	177	—
Nitzschia palea	—	177	—
Nitzschia sp.	—	177	—
Pennales	3650	—	—
Synedra sp.	—	177	—
Synedra ulna	562	—	—
Terpsinoe sp.	1123	—	—
Chlorophyceae			
Undetermined Chlorophyceae	—	355	—
Cyanophyceae			
Anabaena sp.	843	177	—
Chroococcus sp.	281	177	6122
Dactylococcopsis sp.	—	1063	—
Lyngbya contorta	—	355	—
Lyngbya sp.	—	355	—
Merismopedia sp.	—	355	2041
Oscillatoria sp.	281	—	—

Phytoplankton taxa list and densities (#/mL) for Georgia-Pacific—Palatka Plant, collected using subsurface grabs from Rice Creek, on 11 May 1999.

	Control Site 1	Test Site	Control Site 2
Bacillariophyceae			
Achnanthes exigua	—	—	3
Achnanthes lanceolata	—	—	6
Achnanthes sp.	1	—	2
Bacillaria paradoxa	2	—	—
Capartogramma crucicula	—	—	1
Diploneis sp.	2	—	—
Fragilaria sp.	—	—	1
Gomphonema sp.	—	—	1
Gyrosigma sp.	2	—	—
Melosira sp.	1	—	3
Navicula capitata	1	—	—
Navicula pupula	1	—	1
Navicula sp.	2	—	—
Nitzschia sp.	1	—	—
Pennales	1	13	1
Terpsinoe sp.	—	—	1
Chlorophyceae			
Chlorophyceae	—	7	4
Cryptophyceae			
Chroomonas sp.	2	10	—
Cyanophyceae			
Dactylococcopsis sp.	—	126	—
Lyngbya contorta	—	3	—
Lyngbya sp.	1	—	—
Merismopedia sp.	—	73	—
Oscillatoria sp.	—	25	3
Rhabdoderma sp.	—	3	—
Synechococcus sp.	1	—	—

Benthic macroinvertebrate taxa list for Georgia-Pacific—Palatka Plant, collected using 20 discrete dip net sweeps from Rice Creek, on 11 May 1999.

	Control Site 1	Test Site	Control Site 2
Acariformes			
Arrenurus sp.	2	—	—
Hygrobates sp.	—	—	3
Lebertia sp.	—	—	1
Piona sp.	—	—	1
Sperchon sp.	—	—	1
Amphipoda			
Hyalella azteca	—	74	—
Coleoptera			
Ancyronyx variegatus	1	—	—
Anodocheilus exiguus	—	1	—
Bidessonotus sp.	—	1	—
Dubiraphia vittata	28	—	1
Elmidae	5	—	2
Hydrovatus sp.	—	1	—
Macronychus glabratus	11	—	—
Microcylloepus pusillus	—	—	22
Stenelmis sp.	2	—	8
Suphisellus sp.	—	1	—
Undetermined Coleoptera	—	1	—
Decapoda			
Cambaridae	—	—	2
Palaemonetes paludosus	1	—	—
Diptera			
Ablabesmyia mallochi	—	—	2
Ablabesmyia rhamphe grp.	—	1	3
Ceratopogonidae	—	—	1
Chironomidae	1	—	—
Chironomus sp.	—	1	—
Dicrotendipes simpsoni	—	3	—
Goeldichironomus fluctuans	—	1	—
Hemerodromia sp.	1	—	10
Labrundinia sp.	—	1	—
Monopelopia boliekae	—	2	—
Odontomyia sp.	—	1	—
Palpomyia/Bezzia grp.	7	—	—
Phaenopsectra punctipes grp.	—	1	—
Polypedilum convictum grp.	—	—	5
Polypedilum illinoense grp.	—	3	—
Procladius sp.	—	6	—
Rheotanytarsus exiguus grp.	—	—	2
Simulium sp.	—	—	1
Stenochironomus sp.	5	1	2
Stichtochironomus devinctus	—	—	1
Tanytarsus sp.	1	—	—
Ephemeroptera			

Baetidae	—	—	4
Caenis sp.	3	2	—
Heptangeniidae	—	—	1
Labiobaetis sp.	—	—	3
Leptophlebiidae	—	—	4
Stenacron floridense	—	—	1
Tricorythidae	—	—	5
Gastropoda			
Amnicola dalli	6	—	—
Ancylidae	6	2	9
Planorbidae	—	2	—
Undetermined Gastropoda	15	2	—
Hemiptera			
Ambrysus sp.	—	1	—
Gerridae	—	1	—
Neoplea sp.	—	2	—
Hirudinea			
Gloiobdella elongata	1	—	—
Helobdella triserialis	1	—	—
Megaloptera			
Chauliodes sp.	—	1	—
Sialis sp.	—	1	—
Nemertea			
Prostoma rubrum	—	1	—
Odonata			
Argia sp.	2	—	—
Coenagrionidae	—	10	—
Ischnura sp.	—	1	—
Oligochaeta			
Eclipidrilus palustris	1	—	—
Eclipidrilus sp.	—	—	1
Haber speciosus	—	1	—
Haemonais waldvogeli	—	2	—
Limnodrilus hoffmeisteri	3	3	2
Tubificidae	—	1	—
Pelecypoda			
Corbicula fluminea	3	—	—
Sphaeriidae	4	—	18
Undetermined Pelecypoda	14	—	—
Trichoptera			
Cheumatopsyche sp.	2	—	2
Hydropsychidae	—	—	1
Leptoceridae	3	—	—
Nectopsyche pavida	1	—	—
Oecetis georgia	—	—	1
Oecetis inconspicua complex	—	4	—
Oecetis sp.	—	—	3
Phylocentropus sp.	—	—	1
Polycentropodidae	—	—	1
Undetermined Trichoptera	2	—	—

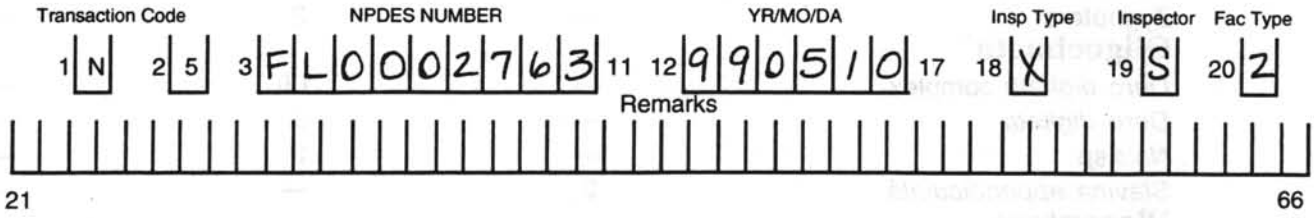
Benthic macroinvertebrate taxa list for Georgia-Pacific—Palatka Plant collected using Hester-Dendy artificial substrates in Rice Creek, on 11 May 1999. Densities, in number/m^2, represent the mean of three replicates.

	Control Site 1	Test Site	Control Site 2
Acariformes			
Atractides sp.	—	—	2
Hydrodroma sp.	—	—	2
Hygrobates sp.	—	—	3
Lebertia sp.	—	—	2
Sperchon sp.	—	—	3
Amphipoda			
Gammarus sp.	3	2	—
Hyalella azteca	—	45	—
Undetermined Amphipoda	—	—	2
Coleoptera			
Ancyronyx variegatus	4	—	7
Dineutus sp.	2	—	8
Dubiraphia vittata	4	—	—
Elmidae	—	—	2
Macronychus glabratus	39	—	—
Microcylloepus pusillus	2	—	28
Stenelmis sp.	—	—	4
Diptera			
Ablabesmyia mallochi	2	—	—
Ablabesmyia rhamphe grp.	2	86	—
Chironomidae	3	19	11
Chironomus sp.	—	84	—
Cladotanytarsus sp.	—	—	3
Cricotopus bicinctus	3	—	—
Cryptochironomus sp.	—	—	2
Culicoides	—	2	—
Dasyhelea sp.	—	—	2
Dicrotendipes modestus	—	61	—
Dicrotendipes simpsoni	—	127	—
Dicrotendipes sp.	—	3	—
Hemerodromia sp.	17	—	82
Kiefferulus sp.	—	7	—
Nanocladius sp.	—	8	—
Palpomyia/bezzia grp.	8	2	2
Pentaneura inconspicua	23	—	3
Polypedilum convictum grp.	4	—	142
Polypedilum fallax	2	—	7
Polypedilum scalaenum grp.	2	2	7
Polypedilum sp.	3	—	2
Procladius sp.	—	3	—
Rheocricotopus robacki	2	—	4

Rheotanytarsus distinctissimus grp.	3	—	—
Rheotanytarsus exiguus grp.	4	—	86
Rheotanytarsus sp.	—	—	6
Stempellinella sp.	2	—	—
Tanytarsus sp. A Epler	7	—	3
Tanytarsus sp. C Epler	3	—	3
Tanytarsus sp. L Epler	2	—	—
Tanytarsus sp. M Epler	7	—	8
Tanytarsus sp.	3	2	—
Thienemanniella sp. A Epler	—	—	4
Thienemanniella sp. B Epler	—	—	4
Tribelos fuscicornis	—	3	—
Tribelos sp.	—	4	—
Ephemeroptera			
Acerpenna pygmaeus	8	3	4
Baetis sp.	—	—	28
Caenidae	4	—	—
Caenis sp.	4	6	—
Ephemerellidae	—	—	2
Heptageniidae	17	—	7
Leptophlebiidae	2	—	—
Stenacron floridense	12	6	6
Stenacron interpunctatum	3	—	—
Stenacron sp.	7	2	—
Stenonema exiguum	52	—	54
Stenonema sp.	41	—	13
Gastropoda			
Amnicola dalli	8	—	—
Amnicola sp.	11	—	—
Ancylidae	—	10	10
Hydrobiidae	—	8	—
Micromenetus dilatatus avus	—	4	—
Micromenetus dilatatus	2	—	—
Micromenetus floridensis	—	10	—
Micromenetus sp.	—	4	—
Physella sp.	—	16	—
Planorbella sp.	—	7	—
Undetermined Gastropoda	—	4	—
Hemiptera			
Undetermined Hemiptera	—	2	—
Hirudinea			
Helobdella triserialis	—	2	—
Isopoda			
Caecidotea sp.	—	7	—
Megaloptera			
Corydalus cornutus	—	—	3
Odonata			
Argia fumipennis	2	—	—
Argia moesta	—	—	3

Argia sp.	2	—	—
Argia tibialis	6	2	—
Zygoptera	—	2	—
Oligochaeta			
Dero digitata complex	—	16	—
Dero digitata	—	3	—
Nais sp.	—	2	—
Slavina appendiculata	2	—	—
Plecoptera			
Neoperla sp.	—	—	2
Trichoptera			
Cheumatopsyche sp.	23	2	126
Chimarra sp.	—	—	11
Cyrnellus fraternus	—	265	—
Hydropsychidae	15	—	105
Hydroptila sp.	—	—	10
Hydroptilidae	2	—	—
Lype diversa	—	—	6
Neotrichia sp.	2	—	—
Neureclipsis crepuscularis	3	—	—
Neureclipsis sp.	2	—	—
Oecetis georgia	2	—	8
Oecetis sp.	2	—	2
Oxyethira sp.	2	—	—
Paranyctiophylax sp.	3	—	3
Polycentropodidae	4	43	2
Polycentropus sp.	7	—	2
Undetermined Trichoptera	3	27	3
Turbellaria			
Undetermined Turbellaria	2	—	—

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)

