

Biological Assessment of

Timber Energy Resources

Liberty County

NPDES #FL0039951

Sampled AUG 1999

JUN 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:	Timber Energy Resources, Inc.
County:	Liberty
NPDES Number:	FL0039951
Permit Expiration Date:	09 NOV 2002

Toxics Sampling Inspection **(XSI)**

Date Sampled: 9 AUG 1999

Results: Silver was detected in the effluent (0.303 µg/L) at a level that violated Class III water quality standards (0.07 µg/L) (Rule 62-302.530(60) FAC). Chromium, copper, iron, lead, and nickel were found in the effluent sample at levels that complied with Class III standards. No organic priority pollutants were detected in the discharge.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: 9 AUG 1999

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

Impact Bioassessment Inspection **(IBI)**

Date Sampled: 9 AUG 1999

Results: There were no major differences between control and test sites periphyton and phytoplankton communities. There may have been algal growth inhibition at the test site, however. The high effluent nutrients and test site AGP values would normally indicate a substantially greater production of algal biomass downstream of the outfall than was measured. Quantitative macroinvertebrate results were very similar at the test site compared to the control site. The qualitative macroinvertebrate results suggest degradation at the test site; habitat assessment score was 127 at the control site and 79 at the test site. Also, the control site SCI score (31 points) placed it in the 'excellent' category while the test site score (23 points) placed it in the 'good' category.

Water Quality Inspection **(WQI)**

Date Sampled: 9 AUG 1999

Results: Dissolved oxygen at both the control and test sites was below Class III water quality standards (Rule 62-302.530(31) FAC). The effluent appeared responsible for increases in pH, conductivity, and temperature at the test site. The pH elevation of 1.9 SU is a violation of Class III water quality standards (Rule 62-302.530(52) FAC).

The Timber Energy effluent appeared responsible for ortho-phophate, total phosphorus, and nitrate+nitrite enrichment at the test site in Stokes Branch. The test site AGP was 11.5 mg dry wt/L, which greatly exceeded the 5 mg dry wt/L "problem threshold". Effluent AGP was 32.8 mg dry wt/L.

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

Timber Energy Resources, Inc. operates a carbonaceous-fueled power plant that is located in Liberty County one mile south of Telogia, FL. (see map in the Appendix). The Timber Energy facility is currently under Consent Order (CO) #99-0923 effective 28 JUL 1999 due to their effluent failing to comply with Florida's freshwater thermal criteria for temperature differential of 5 degrees F from background. During the CO, Timber Energy is to seek relief from the water quality criteria by applying for a thermal mixing zone for the effluent, which is the blowdown from a recirculating cooling tower.

The facility burns various paper products, polyethylene, peanut hulls, and wood chips to generate 14 megawatts of electricity. The facility is currently permitted to discharge wastewater at a rate of 0.10 MGD (see Facility Summary in Appendix). The wastewater effluent discharged by the facility consists primarily of cooling tower blow-down water, condenser steam water and neutralized demineralizer backwash water but, also includes contact and non-contact cooling water such as water for temperature reduction of blowdown water and stormwater runoff from ash piles. Water from the flash tank or from the boiler blow-down is not directly discharged into the wastewater treatment system but is used as make-up water for a 50K gallon lined cooling basin. Effluent is discharged through a weir box into a tributary of Stokes Branch, which flows into Telogia Creek. The design flow of the wastewater system is 0.10 MGD, mean flow was 0.025 MGD and flow during this survey was 0.077 MGD.

State permit limits for the Timber Energy Resources effluent are listed in Table 1. A review of the facility's monthly operating reports by DEP showed that the Timber Energy plant had seven permit violations within the past year; there were three pH violations and four temperature violations (see Facility Summary in Appendix).

An impact bioassessment conducted in February 1993 found that the concentrations of copper and un-ionized ammonia exceeded the facility's permit limit and Florida water quality standards for Class III receiving water. Discharge from the facility was found to have an adverse effect on macroinvertebrate communities in the receiving water. Additional problems with dissolved oxygen, fecal coliform counts, total coliform counts and AGP from both the test site and the effluent were also noted in the 1993 bioassessment report.

Methods

The purpose of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site and a test site. The control site was in Big Cypress Branch, a tributary of Stokes Branch, approximately one kilometer east of Highway 6. The test site was in Stokes Branch approximately 300 meters downstream from the discharge and upstream of its confluence with Big Cypress Branch (see map in Appendix). This sampling scheme was chosen because the discharge point is within roughly 300 meters of the headwaters of Stokes Branch and does not allow for the establishment of an upstream control site. A habitat assessment was performed in situ along a 100 meter stream reach at each sampling location establishing comparability between sites. Supplemental physical and chemical data were also collected from the effluent and study sites. Data for this report were collected on August 9, 1999. The effluent was analyzed for nutrients, metals, and organic constituents (base neutral and acid extractables, and pesticide extractables).

Acute screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia*, and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample.

Benthic macroinvertebrates were evaluated at control and test sites. Invertebrates were collected from multiple substrates (e.g., snags, leaf packs, vegetation) using discrete dip-net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers that were incubated for 28 days.

Periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. Phytoplankton were sampled

Table 1. Effluent limits and summary of chemistry data.

Timber Energy Resources	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
None Detected	-	-	-	-
Metals (µg/L)				
Aluminum	1,500 **	50 U	-	-
Arsenic	50 **	4.0 U	-	-
Cadmium	4.52 **c	0.0400 U	-	-
Chromium	875 **c	2.2 I	-	-
Copper	53.2 **c	20.20	-	-
Iron	1,000 **	456 A	-	-
Lead	29.93 **c	0.550 I	-	-
Mercury	0.012 **	0.10 U	-	-
Nickel	699 **c	8.4 A	-	-
Selenium	5.0 **	1.20 U	-	-
Silver	0.07 **	0.303 I	-	-
Zinc	471 **c	30 U	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	0.31	0.0004 U	0.38
Total phosphorus	-	0.61	0.036	0.49
Total Ammonia	-	0.12	0.028	0.04 A
Un-ionized Ammonia	0.02 *b	0.002	-	-
Nitrate+Nitrite	-	0.56	0.028 I	0.17
TKN	-	2.2	0.69 J	0.64
Organic Nitrogen	-	2.08	0.662	0.603
Total Nitrogen	-	2.76	0.718	0.81
General Phys-Chem Parameters				
Habitat Assessment	-	-	127	79
DO (mg/L)	≥ 5.0	5.3	2.1	1.9
pH (SU)	6.0-8.5 *	7.2	5.4	7.3
Conductivity (µmhos/cm)	**	1,400	40	172
Temperature (°C)	25.5 *d	28.0	24.3	27.1
Flow (MGD)	0.10 Design	-	-	-
Hardness (mg $CaCO_3$)	-	582	-	-
AGP (mg dry wt/L)	-	32.8	0.1	11.5
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	-	Not Toxic	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-

a - Single sample
b - Daily maximum
c - Value is based on hardness
d - Temperature shall not be increased by more than 2.5°C above background
A - Value is the mean of two or more determinations
I - Value is < the minimum quantitation limit, and ≥ the minimum detection limit
J - Estimated value
U - Analyzed for but not detected; value is the minimum detection limit
* Permit limit
** Class III water quality standard

at both control and test sites via subsurface grabs. Chlorophyll *a* was determined for both phytoplankton and periphyton communities. *Selenastrum capricornutum* was used as the test organism for algal growth potential tests. All field and laboratory methods were carried out following the Bureau's Standard Operating Procedures (SOP's) and can be viewed on our web site at www.floridadep.org/labs/sops.htm.

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat assessment, taxa richness, Shannon-Weaver Diversity Index, the Florida Index, Ephemeroptera-Plecoptera-Trichoptera (EPT) Index, community composition, functional feeding groups, algal biomass, and the 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 differences between the control and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the control site minus test site divided by the control site. The percent differences between sites involving the % tubificids, % contribution, algal density, chlorophyll a, and algal growth potential are measured as the test site minus control site divided by the control site.

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

Results

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

Discussion

There were differences in the habitat assessment scores between the study sites (see Freshwater Benthic Habitat Assessment Field Data Sheets in the Appendix). The control site, in Big Cypress Branch, was rated as "optimal" with 127 points and the test site, in Stokes Branch, was placed in the upper "marginal" category with 79 points. The control site lost points for a low water velocity value (< 0.05 m/sec) and the amount of productive habitats available (11%). The test site had increased water velocity (0.08 m/sec) but nearly every other category received a lower score. The major difference between the two sites was the degree of artificial channelization present at each site. The control site received 20 points placing it in the "optimal" category while the test site received only one point, placing it in the "poor" category.

Table 2. Algal community structure of study sites.

Timber Energy Resources	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	6	16
Shannon-Weaver Diversity Index	0.62	3.03
Chlorophyll *a* (µg/L)	1.00 U	1.00 U
Algal Density (#/mL)	142	248
% Dominant Taxon	91.4	40.2
% Blue-green	1.1	6.8
% Green	91.4	22.8
% Diatoms	2.2	56.8
Periphyton Algae		
Number of Taxa	16	22
Shannon-Weaver Diversity Index	3.3	3.27
Chlorophyll *a* (mg/m2)	0.21 U	0.21 U
Algal Density (#/cm2)	10,691	4,856
% Dominant Taxon	20.5	40.6
Diatom/Diatom + B-G Ratio	0.97	0.98
%Blue-green	3.1	1.7
% Diatoms	95.7	94
AGP (mg dry wt/L)	0.1	11.5

The effluent appeared responsible for several of the physical and chemical differences measured at the study sites. For example, the pH at the test site (7.3 SU) was significantly higher than pH at the control site (5.4 SU), an increase of 1.9 SU. The effluent pH (7.2 SU) appeared responsible for this increase and is a violation of Class III water quality standards (Rule 62-302.530(52) FAC). The effluent conductivity was elevated (1,400 µhmos/cm) and it appeared to have caused the increase at the test site (172 µhmos/cm) compared to the control site (40 µhmos/cm). The test site temperature of 27.1°C was also elevated compared to the control site temperature (24.3 °C), the increase was likely due to the thermal input from the effluent (28.0°C). The dissolved oxygen concentrations at the control (2.1 mg/L) and test site (1.9 mg/L) failed to meet Class III water quality standards (Rule 62-302.530(31) FAC).

The concentration of silver in the effluent (0.303 µg/L) exceeded the Class III water quality standard of 0.07 µg/L and is a violation of Rule 62-302.530(60) FAC.

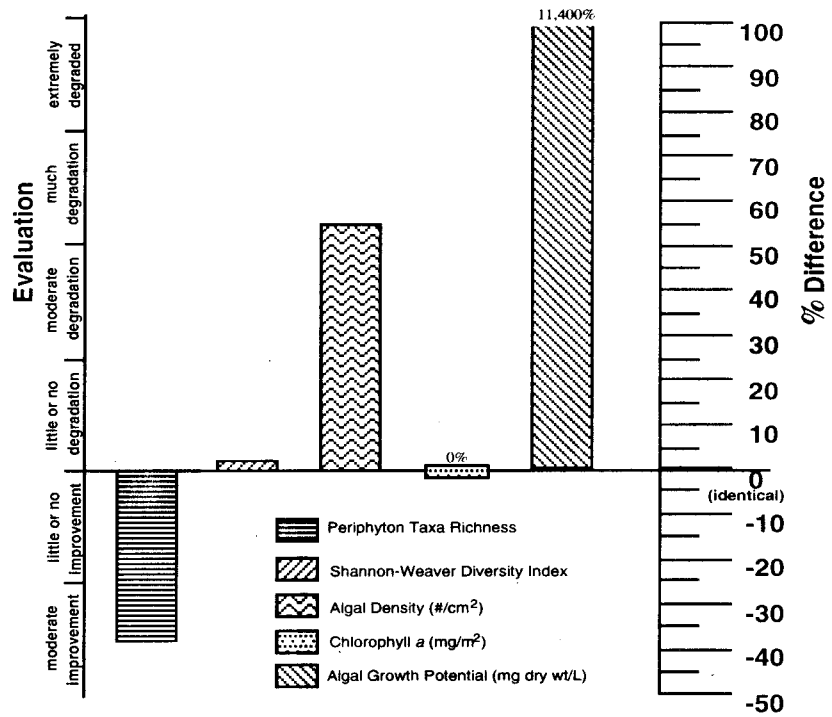


Figure 1. Effect of discharge on the periphyton community.

Chromium, copper, iron, lead, and nickel were detected in the effluent at concentrations that complied with Class III water quality standards (Table 1). No organic priority pollutants were detected in the effluent.

The effluent sample was not toxic to the fish, *Cyprinella leedsi*, or to the invertebrate, *Ceriodaphnia dubia*, during the 48-hour bioassay.

Timber Energy Resources appeared responsible for orthophosphate, total phosphorus, and nitrate+nitrite enrichment in Stokes Branch (Table 1). The control site ortho-phosphate was below the detection limit and increased to 0.38 mg/L at the test site. Total phosphorus increasedfrom 0.036 mg/L at the control site to 0.49 mg/L at the test site. The effluent concentration of total phosphorus was 0.61 mg/L. The test site levels of orthophosphate and total phosphorus were higher than values found in 80% of Florida Streams (see *Typical Values for Selected Parameters in Florida Waters* in the Appendix). Nitrate+nitrite also increased at the test site (0.17 mg/L) compared to the control site (0.028 mg/L). The control site concentration of nitrate+nitrite was in the 10-20 percentile of Florida streams compared to the 60-70 percentile at the test site. AGP at the control site was 0.1 mg dry wt/L. The test site AGP (11.5 mg dry wt/L) greatly exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Shultz 1987), a further indication of nutrient enrichment in Stokes Branch due to the discharge. The AGP value of the effluent was 32.8 mg dry wt/L.

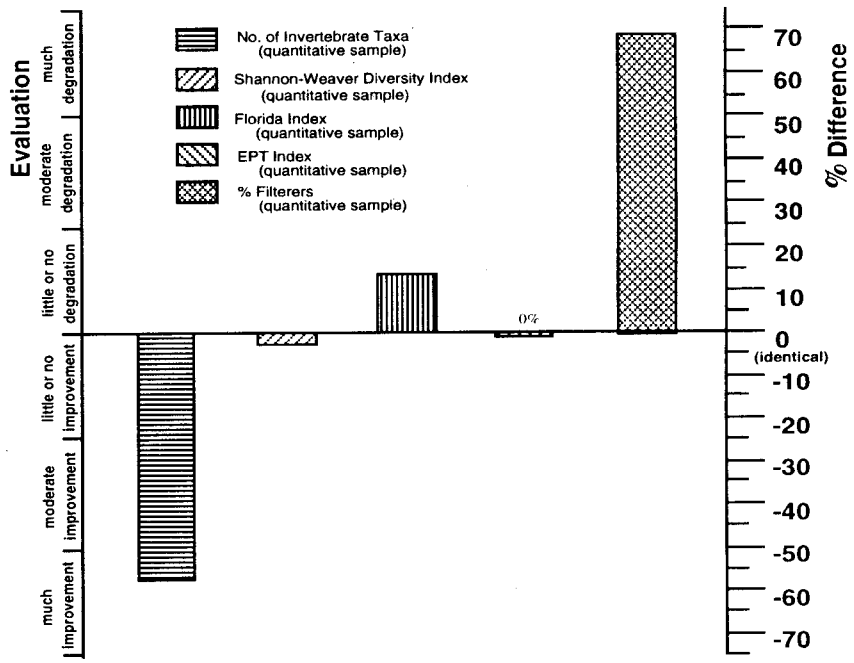


Figure 2. Effect of discharge on the macroinvertebrate community.

Some algal growth inhibition at the test site may be indicated by the algal community data in conjunction with the AGP values. The high effluent and test site AGP values normally result in a substantially greater production of algal biomass downstream of the outfall. This was not reflected in the periphyton or phytoplankton communities (Table 2). The periphyton community at the test site was dominated by *Eunotia lunaris* (20% contribution) while the periphyton community at the control site was dominated by *Nitzschia amphibia* (41% contribution).

Quantitative observations showed slight improvements in invertebrate community structure at the test site compared to the control site. These observations may be the result of differences due to stream flow. The lack of water movement at the control site may limit recruitment onto the Hester-Dendy samplers indicating a more depauperate community at this site. The qualitative results, however, suggest macroinvertebrate community degradation at the test site due to the discharge. Suspension-feeders were reduced by 50% between the control and test sites. They made up 20% of the control site community and only 10% of the test site community. Finally, the composite SCI scores reflected these and other differences between the two study sites. difThe control site SCI score (31 points) placed it in the "excellent" category while the test site score of 19 points placed it in the "poor" category. The qualitative results certainly suggest some degradation at the test site, which appears to be due to the influence of the Timber Energy effluent.

Literature Cited

Barbour, M. T., J. Gerritsen, and J. S. White. 1996. Development of the Stream Condition Index for Florida. Prepared for the Fla. Dept. Environ. Protection. 105 p.

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

FDEP. 1994. Lake bioassessments for the determination of nonpoint source impairment in Florida. Fla. Dept. Environ. Prot. Biology Section, Tallahassee, Fla. 73 p.

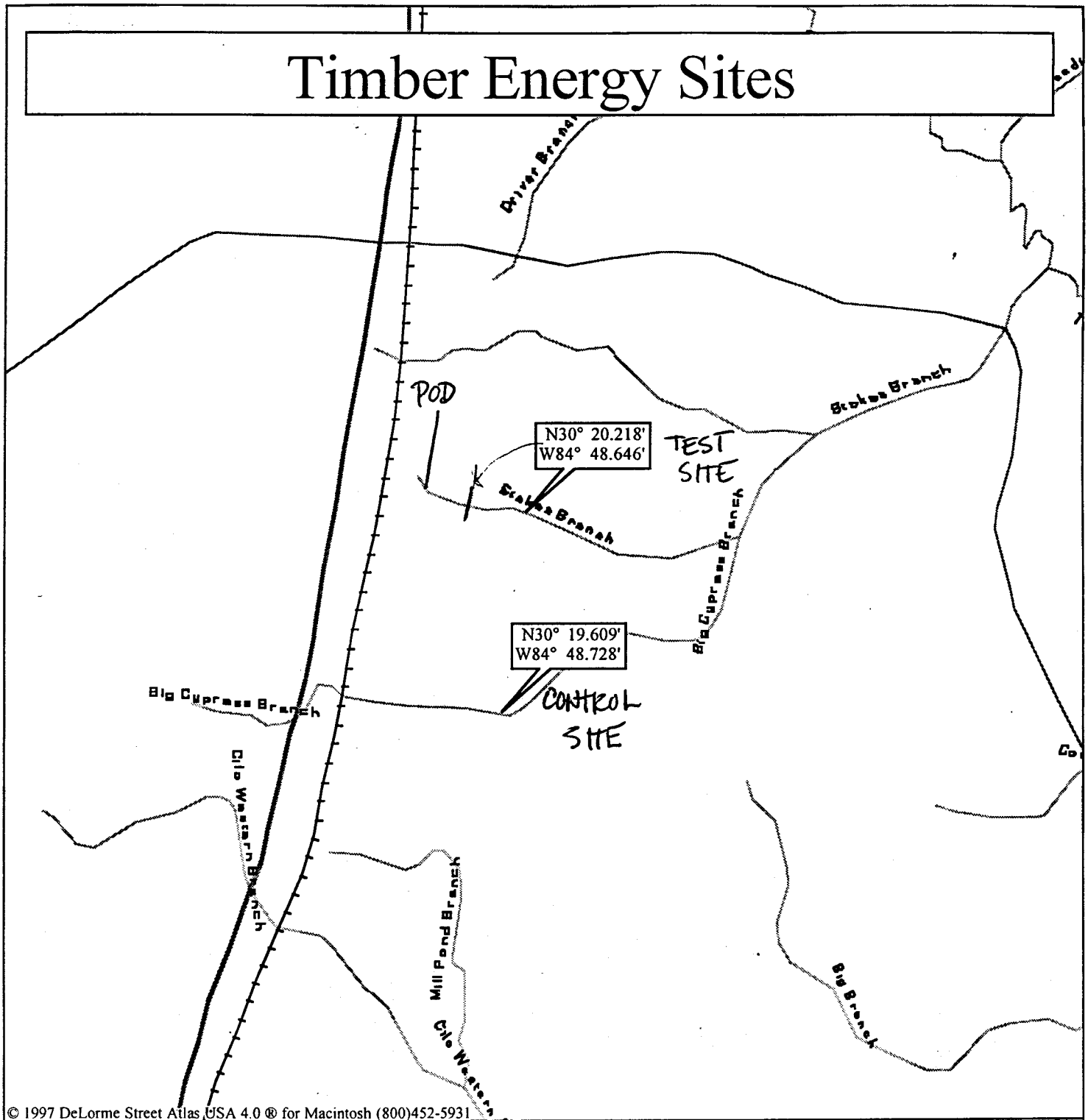
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Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

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

Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Timber Energy Sites



Mag 14.00
Tue Oct 26 13:57 1999
Scale 1:31,250 (at center)

2000 Feet

1000 Meters

Major Connector
State Route
Railroad
River/Canal

POD = Point of Discharge

Facility Summary

Facility Name: Timber Energy Resources, Inc. **Date Summary Prepared:** 8/26/99

Location map: County: Liberty **District:** Northwest /10

Permit # FL0039951-001-IW7C **Facility Type:** Ind
expiration date: 11/9/02

Federal and State permits combined under federal permit number

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Function of facility: To operate a 14 MW carbonaceous fueled power plant, (currently permitted to burn paper, polyethylene, peanut hulls and wood) with a designed monthly average daily flow of 0.10 MGD.

Description of treatment process:

Treatment Facilities

Timber Energy Resources, Inc. operates a 14 MW carbonaceous-fueled power plant, (currently permitted to burn paper, polyethylene, peanut hulls and wood) with a designed monthly average daily flow of 0.10 MGD. This intermittent discharge consists of cooling tower blowdown, condenser steam, neutralized demineralizer backwash water, contact and non-contact cooling water, water for temperature reduction of blowdown water and stormwater runoff from the ash piles. The flash tank and boiler blowdown water do not directly discharge to the wastewater treatment system. This water is used as makeup water for the 50,000 gallon concrete lined cooling basin. Sedimentation basins will be used, upon completion of construction, to treat stormwater runoff from the ash piles.

Effluent Disposal

Surface Water Discharge: D001: A 0.10 MGD permitted intermittent discharge to an unnamed ditch of Stokes Branch Class III fresh waterbody. The point of discharge is located approximately at latitude 30^0 20 30 N, longitude 84^0 49 20 W.

Receiving waters: From Outfall D001 to an unnamed ditch of Stokes Branch **Classification** III

Design Flow: 0.10 MGD **Mean Flow:** 0.0025 MGD **Flow during survey:** 0.077 MGD

Discharge is: Continuous **Best time to sample is:** N/A

If facility has a mixing zone, give details (size, parameters, etc.)
A thermal mixing zone will be established upon completion and approval by the Department of a Plan of Study (POS) on the biological impact of the thermal mixing zone.

List effluent limits (attach relevant paperwork):

Federal/State Effluent Limits

Outfall D001

Parameter	Frequency	Sample Type	Limit (units)
–			
Temperature, Water Effluent	Daily	in-situ	$\leq$ 5°F over ambient
Temperature, Ambient	Weekly	in-situ	Report °F
Flow	Continuous	Recorder/ Totalizer	0.10 (monthly daily avg.) Report Daily Max.
Cu, Total Recoverable max.) Hardness based limit	Weekly	Grab	$e^{(.8545[lnH]-1.465)}$ mg/l (daily
Hardness as $CaCO_3$	Weekly	Grab	Report mg/l
Total Ammonia as N	Weekly	Grab	Report mg/l
Un-ionized Ammonia as NH_3	Weekly	Calculated	0.02 mg/l (daily max.)
Chlorine, Total Residual	Weekly	Grab	0.01 mg/l (daily max.)
pH	Once/12 hrs	Grab	$\geq$ 6.0 std. units $\leq$ 8.5 std. units
*Toxicity Testing	----------	----------	----------

*The permittee shall be required to evaluate whole effluent toxicity of the discharge from outfall D001. All test species, procedures and quality assurance criteria used shall be in accordance with Methods for Measuring Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-90/027F, or the most current edition. The control water and the effluent used will be moderately hard as described in EPA/600/4-90/027F, Table 6, or the most current edition. A standard reference toxicant quality assurance acute toxicity test shall be conducted concurrently or no greater than 30 days before the date of the routine test, with each species used in the toxicity tests. Routine tests are to be conducted once every year. The results of all toxicity tests shall be submitted with the discharge monitoring report. Any deviation from the bioassay procedure outlined herein shall be submitted in writing to the Department for review and approval prior to use.

Outfall D002

Parameter	Frequency	Sample Type	Limit (units)
Rainfall	Monthly	Gauge	Report total inches/month
pH	Weekly	Grab	≥ 6.0 std. units ≤ 8.5 std. units
TSS	Weekly	Grab	60.0 mg/l (daily max.) 30.0 mg/l (monthly avg.) 20.0 mg/l (annl. avg.)
Cu, Total Recoverable	Monthly	Calculation	$e^{(.8545[\ln H]-1.465)}$ mg/l (report Hardness based limit max)
Cu, Compliance Calculation	Monthly	Calculation	***see below***
Hardness as $CaCO_3$	Weekly	Grab	Report max. mg/l

***Total recoverable copper minus the calculated hardness based copper criteria ***

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

11/4/98 pH 0.01 std. units above max. of 8.5 std. units with a value of 8.6 std. units
Mr. Harry George stated that the possible cause was most likely due to minimal flow at Outfall D002 (28 days without rainfall)

12/98 pH 0.26 std. units above maximum of 8.5 std. units at Outfall D002 with a value of 8.76 std. units

2/99 28°F over ambient water temperature of 51°F at Outfall D001 with a value of 79°F

3/99 21°F over ambient water temperature of 60°F at Outfall D001 with a value of 81°F

4/99 pH of 0.03 std. units above maximum of 8.5 std units with a value of 8.53 std. units

4/99 14°F over ambient water temperature of 72°F at Outfall D001 with a value of 86°F

5/99 13°F over ambient water temperature of 73°F at Outfall D01 with a value of 86°F

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

Previous Fifth Year Survey

Toxics Sampling Inspection **(XSI)**

Date Sampled: 5 October 1993

Results: No organic pollutants were detected in the discharge. Iron (756 g/L), zinc (15 g/L), nickel (31 g/L), and copper (92 g/L), were found in the effluent sample. Since the effluent hardness value was 885 mg/L, the concentration of copper represents a violation of both the facility's permit limit (32 g/L) and the Class III water quality standard (which allows a maximum copper concentration of 38.7 g/L, based upon a hardness of 400 mg/L) (Rule 17-302.530(24) FAC).

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: 5 October 1993

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

Impact Bioassessment Inspection **(IBI)**

Date Sampled: 5 October 1993

Results: Macroinvertebrate taxa richness was above average at both the test and reference sites. Shannon-Weaver diversity, however, decreased from 3.5 at the reference site to 2.6 at the test site, predominantly due to the high proportions of the ephemeropteran, *Caenis* sp. This 25.7% decrease in diversity is a violation of Rule 17-302.530(11) FAC. The Florida Index was lower than expected for a perennially flowing system at both sites, but was lower at the test site. Even when one considers the hydrological factors that complicated this assessment, the data indicate that the facility is having a moderate negative effect on receiving water macroinvertebrate populations.

Water Quality Inspection **(WQI)**

Date Sampled: 5 October 1993

Results: Dissolved oxygen at the test site was below Class III water quality standards (Rule 17-302.530(31) FAC). The fecal coliform levels in the effluent (1150 organisms/100 mL) and at the test site (6000 organisms/100 mL) violated Class III water quality standards (Rule 17-302.530(6) FAC). The total coliform levels at test site (26,000 organisms/100 mL) also were in violation of Class III water quality standards (Rule 17-302.530 (7)FAC). Total ammonia was elevated in the effluent (5.7 g/L), while effluent unionized ammonia was calculated to be 0.03 mg/L. This is a violation of the facility's permit limits and of Class III water quality standards (Rule 17-302.530(3) FAC). Effluent TKN was 6.0 mg/L, while effluent total phosphorus was 0.5 mg/L. However, most nutrient concentrations at the test site were typical of Florida streams, although total phosphorus was slightly higher than expected. Algal growth potential at the test site (12.6-mg dry wt/L) and in the effluent (5.7-mg dry wt/L) exceeded the 5-mg dry wt/L "problem threshold".

The Facility is currently under a Consent Order effective July 28, 1999. On March 9, 1999, Department representatives met with Respondent s representatives at Respondent s request to discuss issues regarding the five degrees Fahrenheit temperature differential (ΔT) water quality criteria and permit monitoring requirements. A file review conducted prior to the meeting revealed no reported temperature exceedances, but the review revealed that the reported ΔT was consistently 5°F. The Respondent indicated at the meeting that during a recent voluntary environmental due diligence self audit, it was revealed that the Facility was incorrectly reporting the discharge monitoring report (DMR) background and ΔT vales and has taken appropriate steps to avoid similar reporting issues in the future. On March 30, 1999, counsel for the Department and Respondent entered into a letter agreement. The purpose of which was to identify a process which the Respondent would commit to follow in order to resolve the ΔT issue at the Facility and establish permit conditions that would be consistent with the Department s regulations and achievable by the Facility. The Facility was required to submit a Plan of Study (POS) to be approved by the Department. Upon approval from the Department, the Respondent shall collect data for the period approved in the POS, approximately a 12-month period, for the assessment of the biological impact of a thermal mixing zone. Within 30 days of receiving notification that the POS results have been approved by the Department, the Respondent shall, pursuant to Sections 403.087 and 403.088, F.S., and Chapters 62 620 and 62 4, F.A.C., submit an application for a permit revision for a thermal mixing zone or to other revision as determined by the Department s review of the POS results, along with the appropriated fee to the Department. The purpose of the application and fee shall be to obtain a revision to the wastewater permit.

A fine of $130,000 was waged against the facility for the ΔT violations along with a $1000 fee for Department expenses for dealing with this issue. The Department received the remittance in full from the facility on July 29, 1999.
The Facility also failed to properly report copper levels to the thousandth of a mg/L. This was due to their instrument for the measurement of copper only reading to the hundredth of a mg/L. A DEP representative explained that the method being used does not support the detection limits required by the permit and required the facility to purchase an acceptable instrument.

Toxicity Tests Results From Past Five Years

Timber Energy is required to perform 96-hr acute static renewal toxicity tests using Ceriodaphnia dubia and Cyprinella leedsi once/year. Prior to the renewal issued in 11/97, the facility was required to test twice/year. Following are the results for the past 5 years:

Environ. Fate & Ecotoxicology 7-13 thru 7-15-94			PASS	
Trac Lab. 7-12 thru 7-16-95			PASS	
Trac Lab. 7-21 thru 7-25-95			FAIL	
Trac Lab. 6-12 thru 6-16-96			PASS	
Trac Lab. 9-24 thru 9-28-96			PASS	
Trac Lab. 7-8 thru 7-12-97			PASS	5CD/5CL % mort
Trac Lab 12/98	LIB	Dec-98	PASS	

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

The Facility is now properly reporting ΔT and Total Recoverable Copper levels.

Staff contributing to this review (signature)

Glenn Butts	**Biologist**
	Inspector
	Engineer
Kenny Ferguson	**Other**
Kim Allen	**Other**

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	22020051	8/9/99	8:35	Telogia creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Liberty	Stokes Branch	Test site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40%	57%			2%		1%	

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

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

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

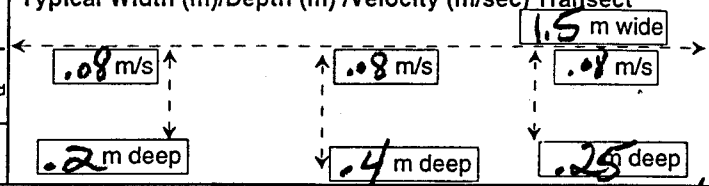
List & map dominant vegetation on back

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

Artificially Impounded [ ] yes [ ] more sinuous

High Water Mark: .5 (m above present water level) + .4 (present depth in m) = .9 (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: [X]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [ ] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [X] Other: [ ]

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposition: Sludge: [ ] Sand smothering: (none) slight moderate severe Silt smothering: (none) slight moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	2	9		Sand	70	2	
Leaf Packs or Mats				Mud/Muck/Silt	2.1		
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	4	9		*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	surface	27.1	7.30	1.80	172			
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: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

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

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

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

Weather Conditions/Notes:

Hot, Humid, cloudy!

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Espy, Hays, Schwabrosa		8/9/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	2200051	8/9/99	Telogia Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Liberty	STOKES BLANCH	Test Site

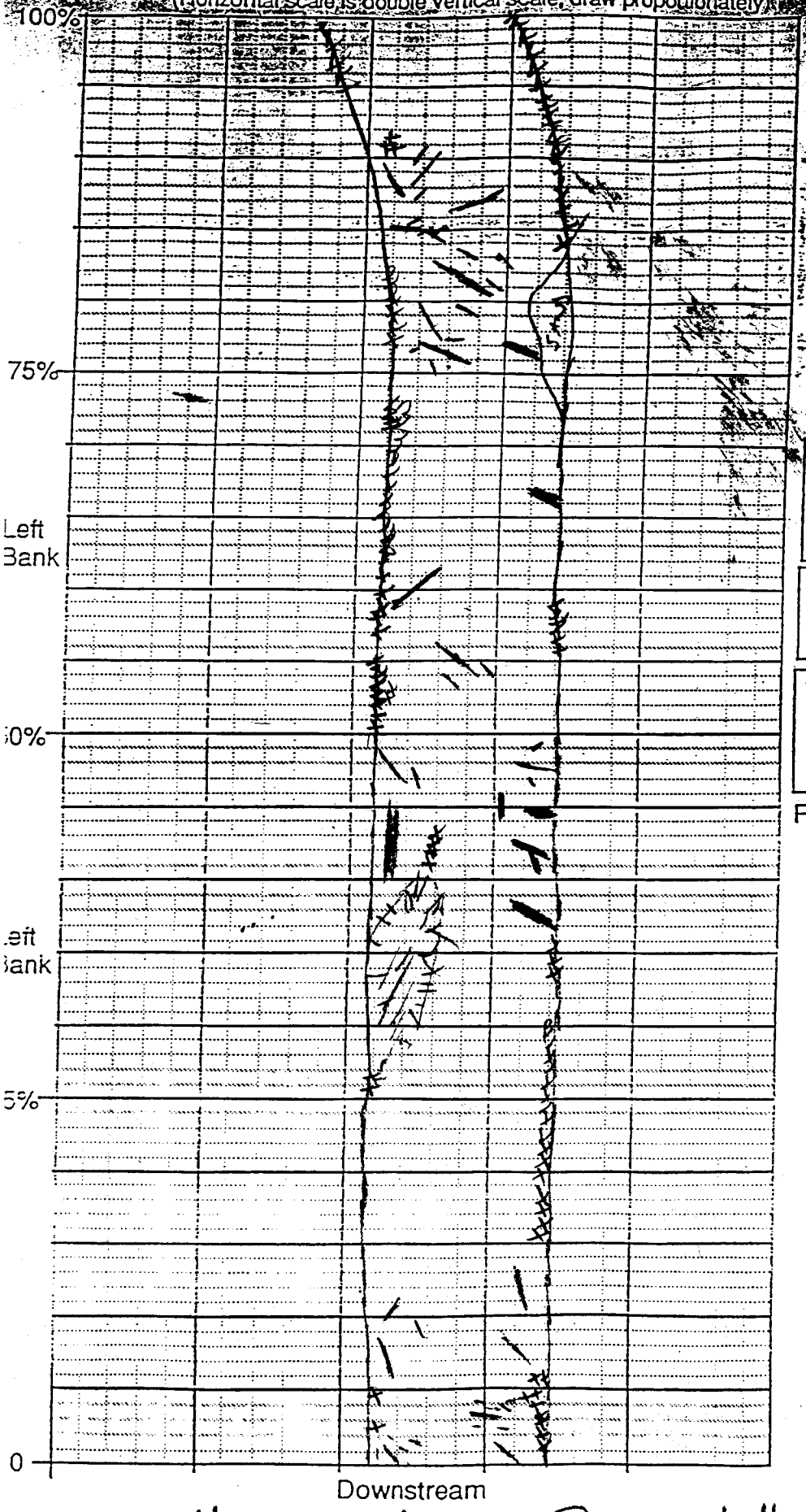
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components				
Substrate Diversity: 10	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate 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 habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability: 10	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: 10	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: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering: 15	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt 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: 35				
Secondary Habitat Components				
Artificial Channelization: 1	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 9 / Left Bank 9	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%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width: Right Bank 3 / Left Bank 0	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality: Right Bank 0 / Left Bank 0	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: 44				

79 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/9/99		ESPY, Hayo, Schaefer

Site Map/ Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately)



Substrates: Code key, draw in proportionate habitat abundance.

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- _____
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

15 meters wide

600 blocks

SNAGS = $\frac{25}{600} = \frac{1}{20} = 2\%$

ROOTS = $\frac{20}{600} = \frac{1}{30}$

LP — 9

6

$\frac{1}{84}$

20 1

"STOKES BRANCH"

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		8/9/99	07:47	Stokes Branch

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Liberty	T.E.R.I at weir Effluent	

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40%	57%			2%		1%	

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

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

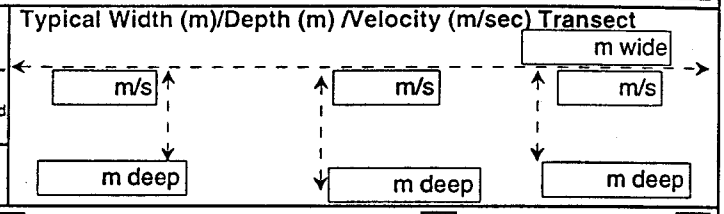
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

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

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



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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐ _____

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				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):			Secchi (m):
Top	Surface	28	7.29	5.28	1400			
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:
cloudy 80° humid

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

SAMPLING TEAM:	SIGNATURE:	DATE:
ESby, Hoyt, Schuster	ESby	

1145 at Telogia Cr. Bridge

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	22020070	8/9/99	10:30 AM	Telogia Creek

Temp: 85.5 conduct.: 3C

D.O. 5.78

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Liberty	BIG CYPRESS Branch	Control site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
70%	27%			2%		1%	

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

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

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

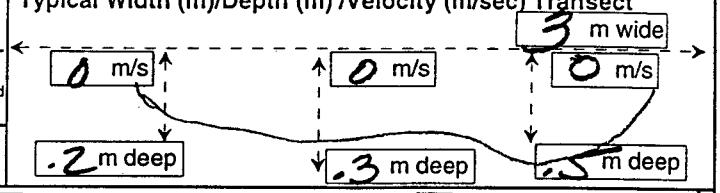
List & map dominant vegetation on back

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

Artificially Impounded [ ] yes

High Water Mark: 1.0 (m above present water level) + .3 (present depth in m) = 1.3 (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: [X]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposition: Sludge: [ ] Sand smothering: none (slight) moderate severe Silt smothering: none (slight) moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	5.5	4		Sand			
Leaf Packs or Mats	<1	2		Mud/Muck/Silt			
Aquatic Vegetation	2.5	6		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	5	6		*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	Surface	24.3	5.35	2.10	40			
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: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

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

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

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

Weather Conditions/Notes: overcast, slight breeze, NOT Too hot :) but humid

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

SAMPLING TEAM:	SIGNATURE:	DATE:
FSDM, Heyn, Schatzmeier		8/9/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	22020070	8/9/99	Telogia Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Liberty	Blk Cypress Branch	Control site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components				
Substrate Diversity [18]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 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 habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [9]	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 [2]	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: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring >1 m/sec 5 4 3 2 1
Habitat Smothering [18]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt 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 [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 [10]	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%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Left Bank [10]				
Riparian Buffer Zone Width				
Right Bank [10]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Left Bank [10]				
Riparian Zone Vegetation Quality				
Right Bank [ ]	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
Left Bank [ ]				
Secondary Score [80]				

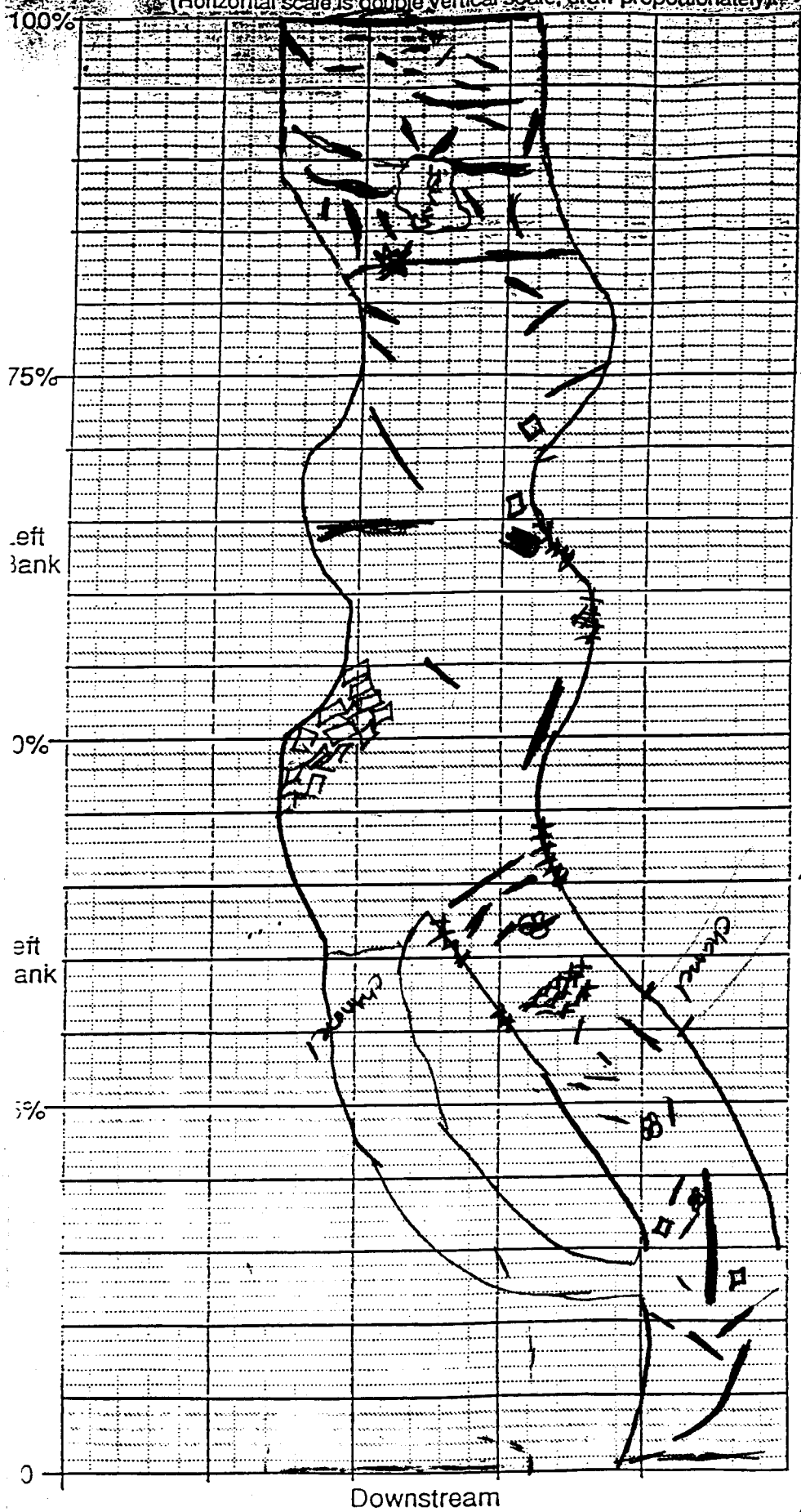
TOTAL SCORE [127]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/9/99	K.E	

* LOTS of pine needles ferns, H2O Oak Maple

Site Map/Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw propotionately)



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

~3M wide 60/860

ROOTS 10/860 = 2%

AQ VEG 24/860 = 2.5

SNAGS 40/800 = 5.5

LP 2/860 = <1%

11%

2.6/60

"R.C. Cypress Branch

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Timber Energy Resources, Inc.
County:
Contact / District:
NPDES Permit #: FL0039951-001-IW7C
LIMS Sample #: 4100499 LIMS Job #: TLH-1999-08-10-02
sample log 8/11/99 DWM F
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 8/9/99 Time 0835
Test Beginning: Date 8/10/99 Time 1430
Test Ending: Date 8/12/99 Time 1440
Organism Batch #: 39 Diluent Batch #: 33
Organism Age: <24 hr SRT toxicant batch #: —
Test organism: Ceriodaphnia dubia

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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
ctl	A	5	5	5	8.0		7.9	24.5	24.1	24.9	7.1		8.1	165		185
ctl	B	5	5	5			7.9			24.7			8.2			180
ctl	C	5	5	5			8.0			24.6			8.2			185
ctl	D	5	5				8.0			24.6			8.2			190
100%	A	5	5	5	7.7		8.3	24.7		24.8	7.2		8.2	125.5		1435
100%	B	5	5	4			8.3			25.1			8.3			1440
100%	C	5	5	5			8.3			25.0			8.2			1430
100%	D	5	5	3			8.3			25.1			8.2			1485
measured by:		MF	MF	SG	CH		MF	CH		MF	CH		MF	CH		MF
recorded by:		MF	MF	SG	MF		SG	MF		SG	MF		SG	MF		SG

Investigators Signatures

Marshall Faircloth

Courtney Heard

Shanna Gerardi

reviewer

form updated 3/3/99

Temperature Range °C
Incubator # 2 24.5 - 26.0°C
Room 24.5 - 27.0°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			not	Measured		
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	AA100	CH	MF
Alkalinity (mg/L as $CaCO_3$):		75	160	Hach	MF CH	MF
Hardness (mg/L as $CaCO_3$):		85	641	Hach	MF CH	MF
Total ammonia (mg/L as N):		<0.017	<0.017	Denver Instrument	MF	
Salinity:		0	<1	YCT	CH	MF

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Timber Energy Resources, Inc
County:
Contact / District:
NPDES Permit #: FL00 39951 - 001 - IW7C
LIMS Sample #: 400499 **LIMS Job #:** TLH-1998-08-10-02
sample log 8/18/98 DW MF
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 8/7/98 Time 0835
Test Beginning: Date 8/12/98 Time 1430
Test Ending: Date 8/12/98 Time 1450
Organism Batch #: 60 **Diluent Batch #:** well
Organism Age: 11 days SRT toxicant batch #: —
Test organism: Cyprinella leedsi

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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
ctr A	A1	5	5	5	7.6	8.2	8.3	24.8	25.6	26.2	7.9	7.4	7.4	245	245	280
ctr B	A2	5	5	5	7.6	8.2	8.3	24.8	25.3	25.6	7.9	7.4	7.4	250	250	265
ctr C	A3	5	5	5	7.6	8.2	8.3	24.8	25.0	24.9	7.9	7.5	7.7	250	250	260
ctr D	A4	5	5	5	7.6	8.2	8.2	24.8	24.5	25.8	7.9	7.5	7.7	250	250	270
100% A	A5	5	5	5	7.4	8.1	8.2	25.0	24.5	25.0	6.7	7.5	7.6	1350	1340	1430
100% B	A6	5	5	5	7.4	8.1	8.2	24.9	24.5	25.3	6.7	7.5	7.6	1380	1360	1445
100% C	A7	5	5	5	7.4	8.1	8.2	24.9	24.5	25.2	6.7	7.5	7.4	1380	1380	1440
100% D	A8	5	5	5	7.4	8.1	8.2	24.9	24.7	25.8	6.6	7.4	7.5	1380	1390	1460
measured by:		DW	CH	CH	MF	CH	CH	MF	CH	CH	MF	CH	CH	MF	CH	CH
recorded by:		CH	CH	CH	MF	SG	CH	CH	SG	CH	CH	SG	CH	CH	SG	CH

1340* 24 hr

Investigators' Signatures

Temperature Range °C Incubator # 3 25.0 - 25.5°C
Room 24.5 - 27.0°C
was in incubator # W1 thru 8/12/98 MF

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			not measured			
Lab Total Residual Cl2 (mg/L):			<0.03	Orion	CH	MF
Alkalinity (mg/L as $CaCO_3$):			16.0	Hach	~~MF~~ CH	MF
Hardness (mg/L as $CaCO_3$):			6.41	Hach	~~MF~~ CH	MF
Total ammonia (mg/L as N):			<0.017	Orion	MF	
Salinity:			<1	YCT	CH	MF

reviewer form updated 3/3/99

Timber Energy Resources - Control Site (Big Cypress Branch)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	35	≥31	30-16	<16	5
EPT Index	4	≥7	6-4	<4	3
# Chironomid Taxa	9	≥9	8-5	<5	5
% Contribution of Dominant Taxon	9.6	≤22	23-61	>61	5
% Diptera	26	-	≤50	>50	3
Florida Index	19	≥16	15-8	<8	5
% Suspension feeders/Filterers	20	≥12	11-6	<6	5
Total Score		**Panhandle**			**31**
Interpretation of Scores		**Excellent**			27-33
		Good			21-26
		Poor			14-20
		Severely Degraded			7-13

Summer Index Period: Stream Condition Index (SCI) for Florida Panhandle (April1996)

Timber Energy Resources - Test Site (Stokes Branch)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	22	≥31	30-16	<16	3
EPT Index	3	≥7	6-4	<4	1
# Chironomid Taxa	9	≥9	8-5	<5	5
% Contribution of Dominant Taxon	29	≤22	23-61	>61	3
% Diptera	31	-	≤50	>50	3
Florida Index	6	≥16	15-8	<8	1
% Suspension feeders/Filterers	10	≥12	11-6	<6	3
Total Score		**Panhandle**			**19**
Interpretation of Scores		**Excellent**			27-33
		Good			21-26
		Poor			14-20
		Severely Degraded			7-13

Summer Index Period: Stream Condition Index (SCI) for Florida Panhandle (April1996)

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

Periphyton taxa list and densities (#/cm^2) for Timber Energy Resources, collected via glass microscope slides in Big Cypress Branch and Stokes Branch, on 09 August, 1999.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes exigua	–	42
Achnanthes inflata	–	42
Achnanthes linearis	–	42
Achnanthes sp.	–	42
Cyclotella sp.	–	42
Cymbella sp.	–	42
Eunotia curvata	199	–
Eunotia exigua	133	–
Eunotia lunaris	66	–
Eunotia naegelii	133	–
Eunotia pectinalis minor	66	–
Eunotia sudetica	133	–
Eunotia tautoniensis	266	–
Eunotia tenella	66	–
Eunotia sp.	3320	83
Frustulia rhomboides crassinerva	66	–
Frustulia rhomboides rhomboides	133	–
Frustulia rhomboides saxonica	133	–
Frustulia rhomboides	66	–
Gomphonema gracile	–	42
Gomphonema sp.	–	42
Hantzschia sp.	–	42
Navicula capitata	–	42
Navicula confervacea	–	166
Navicula cryptocephala	–	42
Navicula disputans	–	42
Navicula minima	–	42
Navicula sp.	–	42
Nitzschia amphibia	–	540
Nitzschia frustulum	–	166
Nitzschia palea	199	42
Nitzschia sp.	66	540
Pinnularia sp.	66	–
Rhopalodia gibberula	–	42
Undetermined Pennales	66	332
Chlorophyceae		
Characium sp.	66	–
Staurastrum sp.	66	–
Stigeoclonium sp.	–	83
Undetermined Chlorophyceae	–	42
Cryptophyceae		
Chroomonas sp.	–	42

Cyanophyceae		
Aphanothece sp.	66	–
Dermocarpa sp.	–	42
Microcystis sp.	66	–
Oscillatoria sp.	133	42
Undetermined Cyanophyceae	66	–
Euglenophyceae		
Phacus sp.	–	42
Bacillariophyceae	5047	2075

Phytoplankton taxa list and densities (#/cm^2) for Timber Energy Resources, collected via glass microscope slides in Big Cypress Branch and Stokes Branch, on 09 August, 1999.

	Control Site	Test Site
Bacillariophyeae		
Achnanthes sp.	–	8
Centrales sp.	–	3
Cyclotella sp.	3	–
Diploneis sp.	–	6
Eunotia sp.	–	5
Gomphonema sp.	–	3
Navicula capitata	–	2
Navicula sp.	–	9
Nitzschia sp.	–	84
Undetermined Pennales	–	21
Chlorophyceae		
Chlamydomonas sp.	6	21
Dunaliella sp.	–	5
Scenedesmus sp.	–	5
Undetermined Chlorophyceae	124	26
Chrysophyeaea		
Synura sp.	2	–
Cryptophyceae		
Chroomonas sp.	–	11
Cryptomonas sp.	3	20
Cyanophyceae		
Anabaena sp.	–	5
Dactylococcopsis sp.	2	–
Oscillatoria sp.	–	12
Dinophyceae		
Undetermined Dinophyceae	3	2
Euglenophyceae		
Lepocinclis sp.	–	2

Benthic macroinvertebrate taxa list for Timber Energy Resources, collected via 20 discrete dip net sweeps in Big Cypress Branch and Stokes Branch, on 09 August, 1999.

	Control Site	Test Site
Acari		
Limnochares sp.	1	–
Undetermined Oribatei	1	–
Amphipoda		
Crangonyx sp.	5	–
Undetermined Amphipoda	3	–
Coleoptera		
Berosus sp.	8	–
Dineutus sp.	1	–
Dubiraphia vittata	9	32
Scirtes sp.	1	–
Stenelmis sp.	1	3
Decapoda		
Undetermined Cambaridae	–	1
Diptera		
Ablabesmyia mallochi	1	–
Asheum beckae	–	1
Chironomus sp.	–	5
Conchapelopia	3	–
Dasyhelea sp.	1	–
Hemerodromia sp.	1	–
Kiefferulus sp.	2	–
Labrundinia becki	1	–
Labrundinia sp. 4 Epler	–	1
Labrundinia sp.	–	1
Natarsia sp.	–	2
Palpomyia/Bezzia grp.	1	–
Paratanytarsus sp. C Epler	–	7
Polypedilum halterale grp.	–	9
Polypedilum illinoense grp.	–	3
Rheotanytarsus exiguus grp.	10	–
Stenochironomus sp.	3	–
Tanytarsus sp. G Epler	–	1
Tanytarsus sp. L Epler	3	4
Tanytarsus sp. O Epler	1	–
Undetermined Ceratopogonidae	2	–
Undetermined Chironomidae	1	1

Tribelos jucundum	2	–
Ephemeroptera		
Caenis sp.	–	4
Stenonema smithae	1	–
Stenonema sp.	3	–
Undetermined Heptageniidae	2	–
Isopoda		
Caecidotea sp.	7	–
Megaloptera		
Corydalus cornutus	3	–
Gastropoda		
Undetermined Ancylidae	6	1
Odonata		
Argia sp.	1	4
Calopteryx sp.	7	3
Enallagma sp.	7	–
Undetermined Libellulidae	2	3
Pachydiplax longipennis	1	–
Undetermined Odonata	–	1
Undetermined Zygoptera	3	1
Oligochaeta		
Dero digitata complex	–	16
Eclipidrilus palustris	1	–
Eclipidrilus sp.	1	–
Haber speciosus	–	1
Limnodrilus hoffmeisteri	–	3
Pristina leidyi	1	–
Slavina appendiculata	1	–
Trichoptera		
Cheumatopsyche sp.	12	–
Chimarra sp.	1	–
Lype diversa	2	–
Triaenodes sp.	–	–
Undetermined Hydropsychidae	–	2
Turbellaria		
Undetermined Turbellaria	1	–

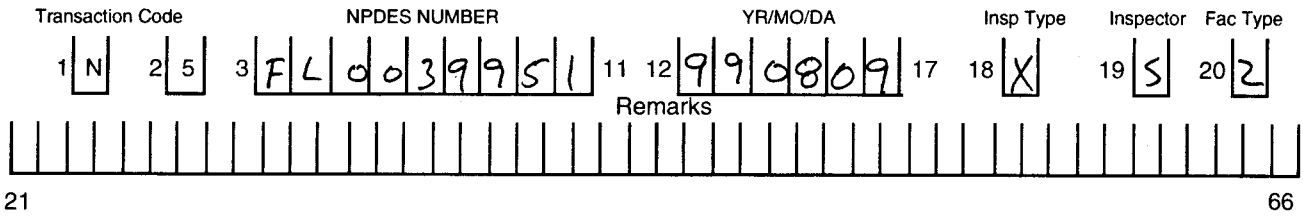
Benthic macroinvertebrate taxa list for Timber Energy Resources facility, collected via Hester-Dendy artificial substrates in Big Cypress Branch and Stokes Branch, on 09 August, 1999. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Coleoptera		
Dubiraphia sp.	–	3
Stenelmis sp.	3	3
Undetermined Dytiscidae	3	–
Diptera		
Ablabesmyia mallochi	13	3
Asheum beckae	–	69
Chironomus sp.	–	29
Cryptochironomus sp.	–	3
Kiefferulus sp.	8	–
Labrundinia sp. 4 Epler	–	3
Parachironomus directus	–	3
Paratanytarsus sp. C Epler	–	5
Polypedilum halterale grp.	–	3
Polypedilum illinoense grp.	–	8
Polypedilum scalaenum grp.	–	3
Tanytarsus sp. L Epler	66	19
Tanytarsus sp. M Epler	–	5
Tanytarsus sp. O Epler	40	–
Tanytarsus sp. T Epler	–	3
Tanytarsus sp.	–	11
Tribelos jucundum	3	–
Tribelos sp.	8	–
Undetermined Chironomidae	–	26
Ephemeroptera		
Caenis sp.	–	58
Callibaetis floridanus	–	3
Stenacron floridense	13	–
Stenacron sp.	61	–
Stenonema sp.	19	–
Undetermined Heptageniidae	3	–
Isopoda		
Caecidotea sp.	11	–
Gastropoda		
Ferrissia sp.	8	–
Physella sp.	–	3
Undetermined Ancylidae	61	172
Odonata		
Argia sp.	8	–
Argia tibialis	–	3
Calopteryx sp.	3	–
Undetermined Coenagrionidae	3	3

Benthic macroinvertebrate taxa list for Timber Energy Resources facility, collected via Hester-Dendy artificial substrates in Big Cypress Branch and Stokes Branch, on 09 August, 1999. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Oligochaeta		
Dero digitata complex	–	32
Nais communis complex	–	3
Slavina appendiculata	3	–
Undetermined Naididae	–	3

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)

