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Biological Assessment of

SFE Citrus Processors

Polk County

NPDES #FL0002801

Sampled February 1998

February 1999

Biology Section
Division of Administrative and Technical Services
Bureau of Laboratories

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: SFE Citrus Processors
County: Polk
NPDES Number: FL0002801
State Permit Expiration Date: 9/28/2002

Toxics Sampling Inspection (XSI)

Date Sampled: 9 February 1998

Results: No pesticides or organic pollutants were detected in the effluent. Effluent metals complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 9 February 1998

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 9 February 1998

Results: Habitat quality was "suboptimal" at both the control and test sites with scores of 72 and 71, respectively. Dip-net samples demonstrated degradation at the test site compared with the control site. The SCI score declined somewhat from the control site (25 points) to the test site (22 points). Both sites scored in the "good" category. In the quantitative samples, Shannon-Weaver diversity decreased from 4.0 at the control site to 1.9 at the test site, a violation of the biological integrity criterion (Rule 62-302.530(11) FAC).

Water Quality Inspection (WQI)

Date Sampled: 9 February 1998

Results: Physical/chemical measurements were similar at the control and test sites. Nitrate+nitrite at the control and test sites was greater than that found in 90% of other Florida streams but was undetected in the effluent. Effluent total phosphorus (0.36 mg/L) exceeded the permit limit of 0.2 mg/L. AGP values at both the control site (46.3 mg dry wt/L) and the test site (83.2 mg dry wt/L) greatly exceeded the 5 mg dry wt/L "problem threshold". The extremely high nitrate+nitrite concentrations and AGP values at both the control and test sites suggest that factors in addition to the plant's effluent are responsible for the elevated levels of nutrients in Lake Lena Run.

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

Introduction

The SFE Citrus Processors Plant, located in Polk County, Florida (see maps in the Appendix) provides treatment for several waste streams, including a steam plant, fresh fruit area, concentrate plant, and feed mill. Treatment consists of screening, aeration, clarification, clay-lined polishing ponds, and dual-media filtration.

Wastewater is seasonally discharged (October through May) to Lake Lena Run which flows into Lake Hancock. While the design flow of the wastewater system is 2.08 MGD, the actual mean flow has been 0.52 MGD.

State Permit limits for the SFE Citrus Processors Plant are listed in Table 1. According to the facility's operating reports, a warning letter was issued August 11, 1997, for the lack of an approved COMPQAP plan to perform analyses of the effluent and for process water entering the stormwater system. The facility now uses a laboratory with an approved COMQAP plan for permit related analyses. Process waters entering the stormwater system have also been addressed. There was a break in a line from the clarifier to clarifier pond on December 8, 1997, which has since been repaired.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site (located in Lake Lena Run approximately 300 meters upstream of the discharge) and a test site (located in Lake Lena Run approximately 300 meters downstream of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and for organic constituents (base neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia*, and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample. Benthic macroinvertebrate communities 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 which 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. Chlorophyll *a* was also determined for periphyton communities. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of the SOP's can be viewed on our web site at: 'www.dep.state.fl.us/labs/sops.htm'.

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

Results and Discussion

Habitat quality was "suboptimal" at both the control (72 points) and test sites (71 points) (see Habitat Assessment Field Data Sheets in Appendix). Both the control and test sites lost points in the categories of artificial channelization, sediment deposition, bank stability, riparian buffer zone width, and riparian zone vegetation quality. Substrate at both sites consisted of aquatic vegetation and sand.

Physical/chemical measurements were similar at the control and test sites (Table 1). Dissolved oxygen levels were 9.4 mg/L at both the control and test sites. The pH (6.5 SU at the control site and 6.7 SU at the test site), temperature (13.9 °C at the control site and 14.9 °C at the test site), and conductivity (208 µmhos/cm at the control site and 243 µmhos/cm at the test site) were similar at both sites.

Copper, iron, lead, and zinc were detected in the effluent at concentrations that complied with Class III water quality standards (Table 1). No pesticides or organic compounds 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 (Appendix). The effluent CBOD was 3.0 mg/L. This sample was held beyond the normal holding time. The control and test site CBOD samples were analyzed within the holding time and were reported at the minimum detection limit (Table 1).

Nutrient levels are shown in Table 1. The effluent total nitrogen concentration was 1.1 mg/L. Total nitrogen increased from (1.86 mg/L) at the control site to (2.4 mg/L) at the test site. Nitrate+nitrite concentrations at both study sites (0.76 mg/L control site, 1.4 mg/L test site) were greater than those values found in 90% of other Florida streams (see *Typical Values for Selected Parameters in Florida Waters* in the Appendix), but were undetected in the plant effluent. Total phosphorus concentrations increased from 0.22 mg/L at the control site to 0.3 mg/L at the test site. Effluent total phosphorus (0.36 mg/L) exceeded the permit limit of 0.2 mg/L. AGP, which measures bioavailable nutrients via algal response, was sampled at the receiving water sites. The AGP value in the effluent was 4.3 mg dry wt/L. AGP values at both the control site (46.3 mg dry wt/L) and the test site (83.2 mg dry wt/L) greatly exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Periphyton data were used to assess algal community health. With respect to most parameters, such as taxa richness, diversity, and diatom/diatom + blue-green ratio, the control and test sites were similar. With respect to chlorophyll *a* and algal density, the test site appeared somewhat better than the control site. Overall, the algal community health of both sites appeared good although typical of sites with some nutrient enrichment. Diatom taxa such as *Gomphonema parvulum, Cocconeis placentula,* and *Nitzschia palea,* which are all known to be tolerant of nutrient enrichment, were found at both sites. This is consistent with the nutrient data.

In the macroinvertebrate Hester-Dendy samples, 41 taxa were found at the control site and 35 taxa were recovered from the test site. The percent of the dominant taxon increased from the control site (26%) to the test (52%) site. Shannon-Weaver diversity decreased from 4.0 at the control site to 1.9 at the test site, a 53% decrease, which is a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). The EPT index results were similar at the control (5 points) and test (6 points) sites. Both sites received 16 Florida Index points. Suspension feeders increased significantly from the control site (12%) to the test site (60%).

In the macroinvertebrate qualitative samples, taxa richness decreased from 29 at the control site to 21 at the test site. The EPT Index was 2 at the control site and 3 at the test site. The percent contribution of the dominant taxon increased from 41% at the control site to 53% at the test site. The Florida Index decreased from 11 points at the control site to 7 points at the test site. Suspension feeders made up 17% of the control site community and 3% of the test community. The Stream Condition Index (SCI) placed both sites in the "good" category (control = 25 points and test = 22 points).

Conclusions

Habitat quality was "suboptimal" at the control and test sites.

Effluent metals complied with Class III water quality standards. No organic 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 acute

Table 1. Effluent permit limits and summary of chemistry data.

SFE Citrus Processors	Effluent Limits	Effluent Sample	Control Site	TestSite
Organic Constituents (µg/L)				
	-	None detected	-	-
Metals (µg/L)				
Aluminum	≤ 1500 **	40 U	-	-
Arsenic	≤ 50 **	40 U	-	-
Cadmium	≤ 0.97 **c	0.02 U	-	-
Chromium	≤ 176.7 **c	10 U	-	-
Copper	≤ 10.0 **c	5.7 J	-	-
Iron	≤ 1,000 **	608	-	-
Lead	≤ 2.5 **c	0.2 I	-	-
Mercury	≤ 0.012 **	0.1 U	-	-
Nickel	≤ 133.9 **c	7 U	-	-
Selenium	≤ 5.0 **	50 U	-	-
Silver	≤ 0.07 **	0.05 U	-	-
Zinc	≤ 90.0 **c	33 J	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	0.14 Q	0.12 Q	0.2 Q
Total phosphorus	0.5 *b	0.36	0.22	0.3
Unionized Ammonia	0.02 *d	0.0 U	0.0 U	0.0 U
Nitrate+Nitrite	-	0.004 U	0.76	1.4
TKN	3.0 *b	1.1	1.1	1.0
Total Ammonia Nitrogen	report	0.02 I	0.08	0.96
Total Nitrogen	3.0 *b	1.1	1.86	2.4
General Phys-Chem Parameters				
HabitatAssessment	-	-	72	71
D.O. (mg/L)	≥ 6.0	8.4	9.4	9.4
pH (SU)	6.0 - 8.5	7.0	6.5	6.7
Conductivity (µmhos/cm)	f	535	208	243
Temperature (°C)	33.0 *d,e	15.1	13.9	14.9
Carbonaceous B.O.D., 5day (mg/L)	15.0 b	3.0 Q	2.0 U	2.0 U
TSS (mg/L)	20 *	3	14	13
Turbidity (NTU)	-	2	4.8	8.9
Tot. Residual Chlorine (mg/L)	0.01 *d	0.06	-	-
Flow (MGD)	2.08 *d	0.52	0.8	1.0
Hardness (mg $CaCO_3$)	-	82.4	-	-
Total Suspended Solids (mg/L)	10.0 *b	-	-	-
AGP (mg dry wt/L)	-	4.3	46.3	83.2
Toxicity				
Bioassay Fish	NOEC	No Mortality	-	-
Bioassay Invertebrate	NOEC	No Mortality	-	-

* Permitlimit
** Class III water quality standard
b - Monthly average
c - Value is calculated based on hardness
d - Maximum
e - ≤ -15 °C (5 °F) above natural background and not exceed a maximum temp of 33 °C (92 °F)
f - shall not be increased more than 50% above background or 1275 µmhos/cm, whichever is greater.
NOEC - A no observed effect concentration < 100% effluent will constitute a violation of this permit.
A - Value reported is the mean of two or more determinations
I - Value reported is less than the minimum quantitation limit, ≥ to the minimum detection limit
J - Estimated value
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the minimum detection limit

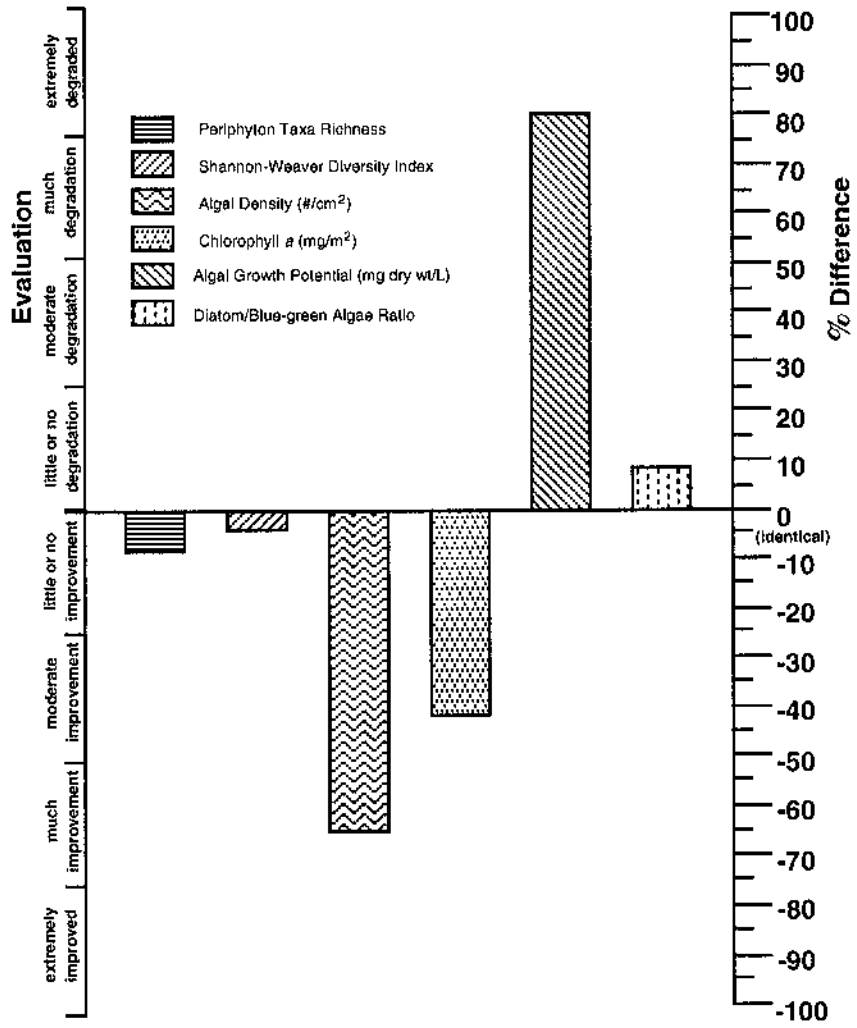


Figure 1. Effect of discharge on the periphyton community.

screening bioassay. Although the effluent CBOD was held beyond the normal holding time, it complied with the facility's permit limit (12 mg/L). CBOD was below the minimum quantitation limit at both the control and test sites.

The effluent total nitrogen concentration measured 1.1 mg/L. Total nitrogen increased from 1.86 mg/L at the control site to 2.4 mg/L at the test site. Nitrate+nitrite concentrations at the control and test site were greater than those found in 90% of other Florida streams but were undetected in the plant effluent. Effluent total phosphorus (0.36 mg/L) exceeded the permit limit of 0.2 mg/L. AGP values at both the control site (46.3 mg dry wt/L) and the test site (83.2 mg dry wt/L) greatly exceeded the 5 mg dry wt/L "problem threshold". The extremely high nitrate+ nitrite concentrations and AGP values at both the control and test sites suggest that factors other than the plant's effluent are at least partially responsible for the elevated levels of nutrients in Lake Lena Run.

The periphyton data showed similarity between the control and test sites with respect to taxa richness, diversity, and diatom/diatom + blue-green ratio. Test site levels of chlorophyll *a* and algal density, on the other hand, appeared somewhat better than the control site. Overall, the algal community health of both sites appeared good although typical of sites with some nutrient enrichment.

In the Hester-Dendy samples, the Shannon-Weaver diversity decreased by 53% from the control (4.0) to the test (1.9) site, a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). This decrease is due to the dominance of two taxa at the test site, *Cheumatopsyche* sp. with 4,482 individuals, and *Polypedilum convictum* group with 2,812 individuals. For comparison, there were 401 individuals of the control site's most dominant taxon, *Polypedilum illinoense* group.

Results of the dip-net samples also demonstrated some degradation at the test site compared to the control site. Taxa richness, Florida Index, and % suspension filters were all lower at the test site. However, the EPT index, % contribution of dominant taxa and % diptera were higher at the test site. The SCI score declined slightly from the control (25 points) to the test site (22 points). However, these scores place both sites in the "good" category.

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.

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

SFE Citrus Processors	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	29	21
Florida Index	11	7
SCI	25	22
EPT Index	2	3
% Dominant Taxon	41	53
Community Composition		
% Diptera	73	80
% Ephemeroptera	1	2
% Gastropoda	1	2
% Odonata	3	1
% Oligochaeta	14	12
% Pelecypoda	1	1
% Trichoptera	2	2
% Other	5	0
Functional Feeding Groups		
% Predators	11	11
% Burrowing Deposit Feeders	11	11
% Surface Deposit Feeders	33	38
% Suspension Feeders	17	3
% Scrapers	1	2
% Shredders	26	35
Macroinvertebrate Hester-Dendy		
Number of Taxa	41	35
Florida Index	16	16
Shannon-Weaver Diversity	4.0	1.9
EPT Index	5	6
Community Composition		
% Diptera	89	37
% Ephemeroptera	2	1
% Oligochaeta	5	1
% Trichoptera	1	60
% Other	3	1
Functional Feeding Groups		
% Predators	18	4
% Surface Deposit Feeders	44	18
% Suspension Feeders	12	60
% Scrapers	2	1
% Shredders	20	16
Periphyton Algae		
Number of Taxa	37	40
Shannon-Weaver Diversity	3.8	3.9
Algal Density (#/cm^2)	159,962	56,379
Chlorophyll a (mg/m^2)	6.2	3.6 A
Diatom/Diatom + B-G Ratio	0.75	0.1 A
% Blue-green	14	29
% Diatoms	43	63
AGP (mg dry wt/L)	46.3	83.2

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

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

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

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

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

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.

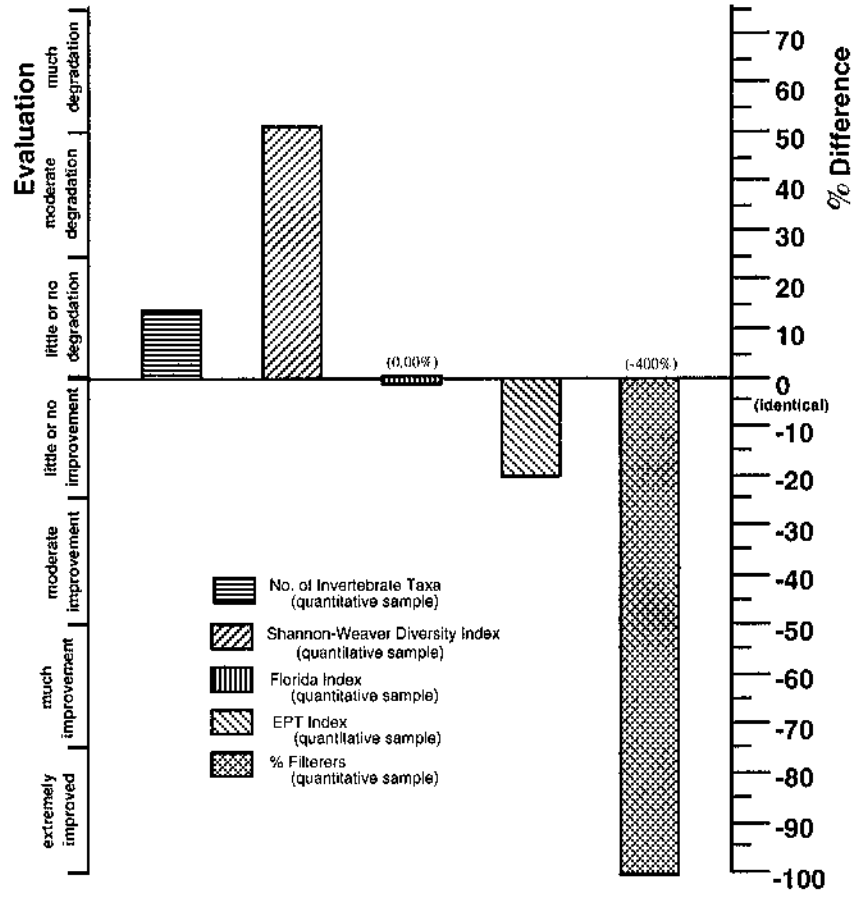


Figure 2. Effect of discharge on the benthic macroinvertebrate community.

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).

Typical Values for Selected Parameters in Florida Waters

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

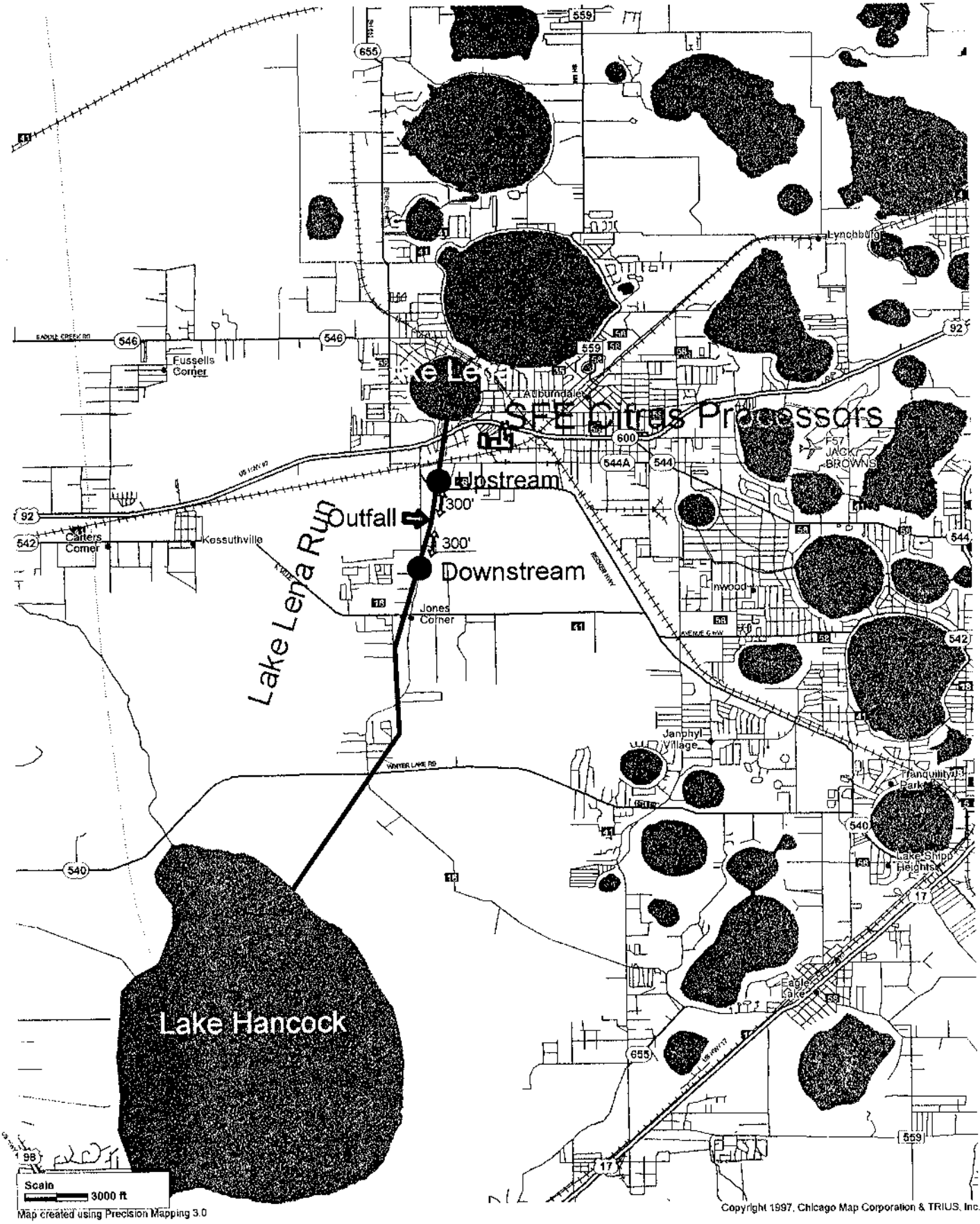
Percentile Distribution

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

LOCATION MAP



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: SFE CITRUS PROCESSORS		Date Summary Prepared: 02/11/98
Location (attach detailed map): 625 BRIDGERS AVE. AUBURNDALE, FL	County: POLK	District: SOUTHWEST
Federal Permit # and expiration date: FL0002801	State GMS # and 4053P20000 State expiration date: 9/28/02.	Facility Type: (Industrial) Municipal Federal Agricultural Other (list):

Function of facility: CITRUS PROCESSING

Description of treatment process:
WASTE STREAMS FROM THE STEAM PLANT, FRESH FRUIT AREA, CONCENTRATE PLANT & FEED MILL ARE COLLECTED & PUMPED TO THE TREATMENT PLANT. TREATMENT CONSISTS OF SCREENING, AERATION, CLARIFICATION, POLISHING PONDS (CLAY-LINED) & DUAL-MEDIA FILTRATION.

Receiving waters: LAKE LENA RUN	Classification: I II (III)	
Design Flow: 2.03 MGD	Mean Flow: 0.52 MGD	Flow during survey:

Discharge is: Continuous Intermittent (Seasonal) Rainfall dependent
Other (describe) OCTOBER THROUGH MAY
therefore, the best time to sample is: END OF OCTOBER THROUGH APRIL

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

NO MIXING ZONE.

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

Parameter	Limit (units)
SEE ATTACHMENT 1.	SEE ATTACHMENT 1. (NOTE INTERIM LIMITS)

Describe special permit conditions and permit modifications:

- FACILITY MUST MEASURE T° & SPECIFIC COND. OF LAKE LENA RUN AT A POINT APPROVED BY THE DEPT. & UPSTREAM OF THE FRD.
- AMMONIA N: EPA 350.2; MDL=1 mg/l; PQL=2 mg/l.
- TOTAL RESIDUAL CHLORINE: EPA 330.1; MDL = 0.01 mg/l; PQL = 0.1 mg/l.

Page 2 of 2 (PLUS ATTACHMENT 1).

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

SFE CITRUS PROC.
(Facility)

Description of permitted outfall(s): 002: STRONG WASTEWATER OUTFALL TO LAKE LEATHA

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

NO MOR DATA RECEIVED TO SND OFFICE AS YET SINCE ISSUANCE OF NEW PERMIT ON SEPTEMBER 29, 1997 (STILL IN TALLAHASSEE FOR ENTRY).

BREAK IN LINE FROM THE CLARIFIER TO CLARIFIER POND. THE LINE HAS BEEN REPAIRED. THE BREAK OCCURED ON DECEMBER 8, 1997.

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

FACILITY IS CURRENTLY UNDER ENFORCEMENT WITH IW. A WARNING LETTER WAS ISSUED AUGUST 11, 1997 (WN97-0023IW53SND) FOR THE LACK OF AN APPROVED COMPQAP TO PERFORM ANALYSES OF THE EFFLUENT & FOR PROCESS WATER ENTERING THE STORMWATER SYSTEM. FACILITY NOW USES A LABORATORY WITH AN APPROVED COMPQAP FOR PERMIT-RELATED ANALYSES. PROCESS WATERS ENTERING STORMWATER SYSTEM HAVE BEEN ADDRESSED ALSO.

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

Additional information:

Staff contributing to this review (signature):

(Biologist)

(Inspector)

(Engineer)

( )

( )

( )

I. Effluent Limitations and Monitoring Requirements:

A. Surface Water Discharge:

1. During the period beginning on the effective date of this permit and lasting through November 30, 1998, the effluent from Outfall 002 (see Attachment A) shall not exceed the effluent limitations and shall be monitored by the permittee as specified below. (INTERIM LIMITS)

Parameters (units)	Discharge Limitations			Monitoring Requirements	
GMS Test Site #4053X13408 WAFR Test Site #15297	Minimum	30-Day Average	Maximum	Sampling Frequency	Sample Type
Flow (MGD)	N/A	Report	2.08	Continuous	Recorder
Total Suspended Solids (TSS) (mg/l)	N/A	20.0	30.0	1/Week	24-hour Composite
pH (standard units)	6.0	N/A	8.5	4/Week	Grab
Dissolved Oxygen (mg/l)	6.0	N/A	N/A	4/Week	In-situ
Total Nitrogen (as N) (mg/l)	N/A	3.0	4.0	1/Week	24-hour Composite
Unionized Ammonia (as NH3) (mg/l)	N/A	Report	0.02	1/Week	Calculate
Total Ammonia Nitrogen (as N) (mg/l)	N/A	Report	Report	1/Week	Grab
Total Kjeldahl Nitrogen (TKN) (as N) (mg/l)	N/A	3.0	4.0	1/Week	24-hour Composite
Carbonaceous 5-Day BOD (mg/l) **Nov. 1 - March 31**	N/A	15.0	20.0	1/Week	24-hour Composite
Carbonaceous 5-Day BOD (mg/l) **April 1 - Oct 31**	N/A	12.0	24.0	1/Week	24-hour Composite
Total Phosphorus (as P) (mg/l)	N/A	0.5	1.0	1/Week	24-hour Composite
Total Residual Chlorine (mg/l)	N/A	N/A	0.01	2/Week	Grab
Temperature (°F)	N/A	N/A	92.0 See Specific Condition I.A.7.	2/Week	In-Situ
Specific Conductance (umhos/cm)	See Specific Condition I.A.8.			2/Week	Grab
Whole Effluent Toxicity	See Specific Condition I.A.9.				

2. During the period beginning on December 1, 1998 and lasting through the expiration date of this permit, the effluent from Outfall 002 (see Attachment A) shall not exceed the effluent limitations and shall be monitored by the permittee as specified below.

Parameters (units)	Discharge Limitations			Monitoring Requirements	
GMS Test Site #4053X13408 WAFR Test Site #15297	Minimum	30-Day Average	Maximum	Sampling Frequency	Sample Type
Flow (MGD)	N/A	Report	2.08	Continuous	Recorder
Total Suspended Solids (TSS) (mg/l)	N/A	10.0	20.0	1/Week	24-hour Composite
pH (standard units)	6.0	N/A	8.5	4/Week	Grab
Dissolved Oxygen (mg/l)	6.0	N/A	N/A	4/Week	In-situ
Total Nitrogen (as N) (mg/l)	N/A	3.0	4.0	1/Week	24-hour Composite
Unionized Ammonia (as NH3) (mg/l)	N/A	Report	0.02	1/Week	Calculate
Total Ammonia Nitrogen (as N) (mg/l)	N/A	Report	Report	1/Week	Grab
Total Kjeldahl Nitrogen (TKN) (as N) (mg/l)	N/A	3.0	4.0	1/Week	24-hour Composite
Carbonaceous 5-Day BOD (mg/l)	N/A	5.0	10.0	1/Week	24-hour Composite
Total Phosphorus (as P) (mg/l)	N/A	0.2	0.4	1/Week	24-hour Composite
Total Residual Chlorine (mg/l)	N/A	N/A	0.01	2/Week	Grab
Temperature (°F)	N/A	N/A	92.0 See Specific Condition I.A.7.	2/Week	In-Situ
Specific Conductance (umhos/cm)	See Specific Condition I.A.8.			2/Week	Grab
Whole Effluent Toxicity	See Specific Condition I.A.9.				

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. The discharge shall not cause a visible sheen on the receiving waters.

5. Unless specified elsewhere in this permit, samples taken in compliance with the monitoring requirements specified in I.A.1. shall be taken at the nearest accessible point after final treatment but prior to actual discharge into the receiving waters.

6. Unionized ammonia shall be calculated from measurements of pH and temperature made simultaneously with the total ammonia sampling.

7. Heated water with a temperature at the point of discharge (POD) more than 5° higher than the ambient (natural) temperature of Lake Lena Run, measured upstream from the POD at a point approved by the Department, shall not be discharged. The maximum temperature shall not exceed 92° F. (Rule 62-302.520(4)(a), F.A.C.)

8. Specific Conductance in the receiving stream (Lake Lena Run) shall not be increased more than 50% above background, or to 1275 umhos/cm, whichever is greater. Background levels for Specific Conductance shall also be reported. Sampling location for the upstream (background) level for this parameter shall be pre-approved by the Department.

9. Toxicity Monitoring:

As required by Part I.A.1. and I.A.2. of this permit, the permittee shall initiate a series of tests as described below beginning within 60 days of permit issuance to evaluate whole effluent toxicity of the discharge from Outfall 002. All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, EPA/600/4-91/002, or the most current edition. The control and dilution water shall be moderately hard water as described in EPA/600/4-91/002, Table 3. A standard reference toxicant quality assurance chronic toxicity test shall be conducted concurrently with each species used in the toxicity tests and the results submitted with the bioassay report. Additionally, monthly QA/QC reference toxicant tests results must be submitted. Any deviation from the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use.

i. a. The permittee shall conduct a daphnia, Ceriodaphnia dubia, Survival and Reproduction test and a fathead minnow, **Pimephales promelas,** Larval Survival and Growth Test. These tests shall be conducted using a control (0% effluent) and one concentration of 100% effluent. A no observed effect concentration (NOEC) less than 100% effluent will constitute a violation of this permit and Chapter 62-302.530(62), F.A.C. All test results shall be statistically analyzed according to Appendix H in EPA/600/4-91/002, or the most current edition. Also, failure of either a routine test or the additional chronic whole effluent toxicity test is a violation of this permit.

b. For each set of tests conducted, a **24-hour** composite sample of final effluent shall be collected and used per the sampling schedule discussed in EPA/600/4-91/002, Section 8. Two additional composite samples shall be collected according to the protocol on day two and day four of the test and used as renewal solutions on Day 3 and Day 5 of the test.

c. If control mortality exceeds 20% of either species in any test, the tests(s) for that species (including the control) shall be repeated. A test will be considered valid only if control mortality does not exceed 20% for either species. If, in any test, 100% mortality occurs prior to the end of the test, and control mortality is less than 20% at that time, that test (including the control) shall be terminated with the conclusion that the sample demonstrates unacceptable chronic toxicity. Additionally, the test must meet the acceptability criteria for each species as defined in EPA/600/4-91/002 Section 13.11 and Section 11.11, respectively.

ii. a. The toxicity tests specified above shall be conducted once every six months for the duration of this permit, unless notified otherwise by the Department. These tests are referred to as "routine" tests.

b. Results from "routine" tests shall be reported according to EPA/600/4-91/002, Section 10, Report Preparation (or the most current edition), and shall be submitted to the below-listed addresses:

Florida Department of Environmental Protection
Southwest District Office
Industrial Wastewater Program
Compliance/Enforcement Section
3804 Coconut Palm Drive
Tampa, FL 33619

Florida Department of Environmental Protection
Wastewater Facilities Regulation Section, Mail Station 3550
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Additionally, all results shall be recorded and submitted on the Discharge Monitoring Report (DMR) in the following manner:

1. For the chronic test results, if the NOEC of a test species is less than 100% effluent, "≤100%" shall be entered on the DMR for that species. If the NOEC of a test species is greater than or equal to 100% effluent, "100%" shall be entered.

iii. a. An NOEC of less than 100% effluent in any "rountine" sample will be a violation of these permit conditions and Rule 62-302.530(62), F.A.C.

b. If unacceptable chronic toxicity (an NOEC of less than 100% effluent) is found in a "routine" test, the permittee shall conduct three additional tests on the specie(s) indicating unacceptable toxicity.

c. The first additional test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent. The dilution series may be modified in the second and third test to more accurately identify the toxicity, such that at least two dilutions above (not to exceed 100% effluent) and two dilutions below the target toxicity and a control (0% effluent) are run.

d. For each additional test, the sample collection requirements and the test acceptability criteria specified in Section 1 above must be met for the test to be considered valid. The first test shall begin within two weeks of the end of the "routine" tests, and testing shall be conducted weekly thereafter until three additional, valid tests are completed. The additional tests will be used to determine if the toxicity found in the "routine" test is still present.

e. Results from additional tests, required due to unacceptable acute toxicity in the "routine" tests, shall be submitted in a single report prepared according to EPA/600/4-91/002, Section 10, or the most current edition and submitted within 45 days of completion of the additional, valid test. Upon completion of the additional tests, the permittee shall meet with the Department within 30 days of report submittal to identify corrective actions necessary to remedy the observed chronic toxicity.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: SWIO	STORET STATION NUMBER:	DATE (M/D/Y): 2/9/98	TIME: 1122	RECEIVING BODY OF WATER: Lake Cena Run

REMARKS:	COUNTY: Polk	LOCATION: SFE Citrus Processors upstream	FIELD ID/NAME:

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)
30						70	

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, nuisance

Artificially Impounded ☐ yes

High Water Mark: 2.5 (m above present water level) + 1 (present depth in m) = 3.5 (m above bed)

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

.25 m/s — 1.0 m deep; .75 m/s — 1.0 m deep; 1 m/s — 1. m deep

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	40	4	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	60	16		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	.2	13.87	6.48	9.28	203			
Mid-depth	.5	13.90	6.53	9.41	203			
Bottom	1	14.07	6.51	9.65	217			Vod

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:

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

SAMPLING TEAM: Jamer Fine

SIGNATURE:

DATE: 2/9/98

WASTE MGT TAMPA SWDIST TEL:813-744-6125 Mar 10 98 10:39 No.001 P.02

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		2/9/98	Lake Cane Run

REMARKS:	LOCATION: SE Citrus processors Upstream	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [15]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). (15) 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [19]	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [18]	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
Deposition [9]	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
Bank Stability [4]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 (4) 3 2 1
Riparian Buffer Zone Width [5]	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities (5) 4 3 2 1
Riparian Zone Vegetation Quality [10]	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. (10) 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

[72] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/9/98	James Fine	

WASTE MGT TAMPA SUDIST TEL:813-744-6125 Mar 10 98 10:40 No.001 P.03

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-06)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		2/9/18	1235	Lake Cena Run

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Polk	SFE Citrus Processors Downstream	

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)
30							70

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: 2.5 (m above present water level) + 1 (present depth in m) = 3.5 (m above bed)

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

.75 m/s — 1 m deep; 1 m/s — 1 m deep; .75 m/s — 1 m deep

Canopy Cover % : Open : ☒ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-60%): ☐ 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	30	3	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	70	17		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	.25	14.90	6.75	9.43	239			
Mid-depth	.5	14.88	6.74	9.43	243			
Bottom	1	14.88	6.71	9.48	247			VOB

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:

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

SAMPLING TEAM: J. Fine | SIGNATURE: [signature] | DATE:

WASTE MGT TAMPA SUDIST TEL:813-744-6125 Mar 10 98 10:40 No.001 P.04

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		2/9/18	Lake Lena Run

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Pol K	SFC Citrus processor Downstream	

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability [15]	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). (15) 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 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: 0.05 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
Artificial Channelization [10]	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
Habitat Smothering [9]	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
Bank Stability [3]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 (3) 2 1
Riparian Buffer Zone Width [6]	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 (6)	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality [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. 20 19 18 17 16	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. 15 14 13 12 11	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. (10) 9 8 7 6	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. 5 4 3 2 1

[ ] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

[71] **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/9/18	James Fine	

WASTE MGT TAMPA SUDIST TEL:813-744-6125 Mar 10 98 10:41 No.001 P.05

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: SFE citrus Processors
County: Polk
Contact / District: James Fine / Southwest
NPDES Permit #: FL0002801
LIMS Sample #: 306615 LIMS Job #: TLH 1998-02-11-41
sample log: 2/11/98 dw
Test Type: ~~Screening~~ | Definitive
~~Static~~ | Static Renewal | Flow-through
Temperature range: room 23.0-24.8°C
incubator 23.9-25.0°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 2/9/98 Time 0945
Test Beginning: Date 2/10/98 Time 1545
Test Ending: Date 2/12/98 Time 1500
Organism Batch #: 7 Diluent Batch #: 5
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	21.5 @ 21.5	8.2 @ 25.3 °C	998 @ 963 989 @ 1005 @ 25.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.3 @ 22.4	8.1 @ 25.5 °C	1015 @ 963 978 @ 1005 @ 25.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.5	8.2 @ 24.9 °C	986 @ 963 990 @ 1005 @ 24.5 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 0 hr	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 24 h	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 48 h
Control	A	5	5	5	8.1		8.3	22.6		24.0	8.2		7.6	170		175
Control	B	5	5	5			8.3			24.1			7.7			175
Control	C	5	5	5			8.3			24.2			7.7			175
Control	D	5	5	5			8.3			24.2			7.7			185
100 %	A	5	5	5	7.9		8.4	23.1		24.1	8.2		7.7	525		515
100 %	B	5	5	5			8.4			24.2			7.7			535
100 %	C	5	5	5			8.4			24.2			7.7			510
100 %	D	5	5	5			8.4			24.1			7.8			575
Measured/Loaded by:		MF	MF	MF	DW		MF	DW		MF	DW		MF	DW		MF
Recorded by:		MF	FW	MF	MF		FW	MF		FW	MF		FW	MF		FW

Investigators' Signatures

Marshall Faircloth
Tina Marshall
Taylor Keeney

Water Quality Parameters (Salt Water | Well Water | 20% Min Water)

	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	0.01 mf A	—	D. Kreider, J. Fine
Lab Total Residual Cl2 (mg/L): <0.03	0.06	DR-100	TL / DW
Alkalinity (mg/L as $CaCO_3$): 61	230	Hach	FW
Hardness (mg/L as $CaCO_3$): 81	83	Hach	FW
Total ammonia (mg/L as N) <0.017	<0.017	Orion	MF

A = ~~8~~ reported mf 2-13-98 B. Ewing Name mf 2/12/98
verified by MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: SFE Citrus Processors
County: POLK
Contact / District: James Fine / Southwest
NPDES Permit #: FL0002801
LIMS Sample #: 306615 **LIMS Job #:** 1998-02-11-41 TLH
sample log: 2/17/98 DW

Sample Collection: Date 2/9/98 Time 0945
Test Beginning: Date 2/10/98 Time 1605
Test Ending: Date 2/12/98 Time 1500
Organism Batch #: 8 **Diluent Batch #:** well #6
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 23.0 - 24.8 °C
incubator 26.0 - 26.5 °C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	21.5 @ 21.5	8.2 @ 25.3 °C	99.8 @ 963
	9.0 @ 9.0			989 @ 1005 @ 25.7 °C
24 hr	7.0 @ 7.0	22.3 @ 22.4	8.1 @ 25.5 °C	101.5 @ 96.3
	9.0 @ 9.0			978 @ 1005 @ 25.9 °C
48 hr	7.0 @ 7.0	23.5 @ 23.5	8.2 @ 24.9 °C	98.6 @ 96.3
	9.0 @ 9.0			990 @ 1005 @ 24.5 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control A	E9	5	5	5	8.0	8.2	8.2	24.7	24.4	24.9	8.0	8.2	7.0	255	260	265
Control B	E10	5	5	5	8.0	8.2	8.2	24.8	25.1	25.1	8.1	8.4	7.0	255	255	265
Control C	E11	5	5	5	8.0	8.2	8.2	24.8	24.4	25.2	8.1	8.3	6.9	255	265	265
Control D	E12	5	5	5	8.0	8.2	8.2	24.9	24.3	24.9	8.0	8.3	7.0	255	260	265
100 % A	E13	5	5	5	7.8	8.3	8.5	25.0	24.7	25.4	8.1	8.1	6.7	550	550	565
100 % B	E14	5	5	5	7.8	8.3	8.5	25.0	24.8	25.1	8.1	8.1	6.7	550	555	560
100 % C	E15	5	5	5	7.8	8.3	8.5	25.0	24.4	24.8	8.1	8.1	6.8	550	545	555
100 % D	E16	5	5	5	7.8	8.3	8.5	25.0	24.3	24.5	8.1	8.1	6.8	550	550	560
Measured/Loaded by:		MF	FW	FW	DW	MF	MF	DW	MF	MF	DW	MF	MF	DW	MF	MF
Recorded by:		MF	FW	FW	MF	FW	FW	MF	FW	FW	MF	FW	FW	MF	FW	FW

Investigators' Signatures

Marshall Faircloth

Tamara Lecroy

Salt Water / (Well Water)

Water Quality Parameters

	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		0.24 MF A	—	~~Rob~~ MF B J. Fine
Lab Total Residual Cl2 (mg/L):	< 0.03	0.06	DR-100	TL/DW
Alkalinity (mg/L as $CaCO_3$):	107	230	Hach	FW
Hardness (mg/L as $CaCO_3$):	121	83	Hach	FW
Total ammonia (mg/L as N):	< 0.017	< 0.017	orion	MF

A- Ø reported 2/11/98 per MF
B. wrong name MF-2-12-98

Ammonia	Ammonia	Ammonia	Control	Sample
				ppt

Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	29	≥26	25-14	<14	5
EPT Index	2	≥4	3-2	<2	3
# Chironomid Taxa	11	≥7	6-4	<4	5
% Contribution of Dominant Taxon	41	≤29	30-64	>64	3
% Diptera	73	-	≤37	>37	1
Florida Index	11	≥7	6-4	<4	5
% Suspension feeders/Filterers	17	-	≥7	<7	3
Total Score		**Peninsula**			**25**
Interpretation of Scores		**Excellent**			26-32
		Good			**20-25**
		Poor			13-19
		Severely Degraded			7-12

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

Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	21	≥26	25-14	<14	3
EPT Index	3	≥4	3-2	<2	3
# Chironomid Taxa	9	≥7	6-4	<4	5
% Contribution of Dominant Taxon	53	≤29	30-64	>64	3
% Diptera	81	-	≤37	>37	1
Florida Index	7	≥7	6-4	<4	5
% Suspension feeders/Filterers	3	-	≥7	<7	1
Total Score		**Peninsula**			**22**
Interpretation of Scores		**Excellent**			26-32
		Good			**20-25**
		Poor			13-19
		Severely Degraded			7-12

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

Benthic macroinvertebrate taxa list for SFE Citrus Processors, collected via Hester-Dendy artificial substrates in Lake Lena Run, on 9 February, 1998. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	28	38
Chironomidae		
Ablabesmyia mallochi	40	-
Ablabesmyia rhamphe grp.	16	*8*
Asheum beckae	44	32
Corynoneura sp.	4	-
Corynoneura taris	12	-
Cryptochironomus sp.	-	10
Endochironomus nigricans	4	-
Glyptotendipes sp.	91	143
Goeldichironomus sp.	8	-
Labrundinia sp.	8	-
Nanocladius sp.	123	32
Parachironomus sp.	4	-
Pentaneura inconspicua	56	145
Polypedilum sp.	-	8
Polypedilum convictum grp.	87	2812
Polypedilum illinoense grp.	401	14
Polypedilum scalaenum grp.	4	*14*
Polypedilum tritum	4	-
Rheotanytarsus sp.	14	-
Rheotanytarsus distinctissimus grp.	91	-
Rheotanytarsus exiguus grp.	18	10
Tanytarsus sp.	14	-
Tanytarsus sp. A Epler	71	-
Tanytarsus sp. L Epler	8	-
Tanytarsus sp. S Epler	4	-
Thienemanniella sp.	8	4
Thienemanniella xena	28	-
Thienemannimyia grp.	4	-
Undetermined Chironomidae	200	192
Coleoptera		
Dineutus sp.	2	8
Diptera		
Atherix sp.	2	-
Hemerodromia sp.	-	4
Palpomyia / Bezzia grp.	-	6
Simulium sp.	-	4
Ephemeroptera		
Caenis sp.	20	71
Stenacron floridense	4	36
Stenonema sp.	-	2

Stenonema exiguum	-	2
Gastropoda		
Ancylidae	10	12
Physella sp.	2	-
Undetermined Gastropoda	2	-
Hirudinea		
Glossiphoniidae	-	2
Helobdella stagnalis	-	4
Isopoda		
Caecidotea sp.	2	-
Oligochaeta		
Dero digitata	4	4
Eclipidrilus sp.	-	4
Enchytraeidae	-	2
Limnodrilus hoffmeisteri	2	2
Lumbriculus variegatus	-	2
Nais communis	14	60
Pristinella osborni	-	2
Slavina appendiculata	36	4
Stylaria lacustris	10	-
Odonata		
Coenagrionidae	6	2
Enallagma sp.	8	2
Enallagma basidens	-	2
Ischnura sp.	-	2
Ischnura ramburi	4	-
Trichoptera		
Cheumatopsyche sp.	8	4482
Hydropsyche sp.	-	627
Hydropsychidae	-	387
Mayatrichia ayama	2	-
Oecetis sp.	2	8
Oecetis persimilis	2	2
Undetermined Trichoptera	2	4
Trombidiformes		
Oribatei sp.	-	4
Turbellaria		
Dugesia sp.	2	-

Benthic macroinvertebrate taxa list for SFE Citrus Processors, collected via 20 discrete dip net sweeps in Lake Lena Run, on 9 February, 1998.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	-	4
Collembola		
Undetermined Collembola	1	-
Decapoda		
Palaemonetes paludosus	1	-
Chironomidae		
Chironomus sp.	1	-
Cricotopus bicinctus grp.	1	1
Cricotopus or *orthocladius* sp.	-	1
Glyptotendipes sp.	-	4
Labrundinia pilosella	2	-
Larsia decolorata	1	-
Nanocladius sp.	1	-
Nanocladius distinctus	1	-
Parachironomus carinatus	-	1
Paracladopelma nereis sp.	-	1
Parametriocnemus sp.	1	-
Pentaneura inconspicua	-	3
Polypedilum sp.	1	-
Polypedilum convictum grp.	10	14
Polypedilum illinoense grp.	45	84
Rheotanytarsus sp.	1	-
Rheotanytarsus distinctissimus grp.	4	1
Rheotanytarsus exiguus grp.	4	-
Thienemanniella sp.	1	-
Thienemanniella xena	1	1
Undetermined Chironomidae	4	17
Diptera		
Culicoides sp.	1	-
Palpomyia/Bezzia grp.	1	-
Ephemeroptera		
Baetidae	-	2
Caenis sp.	1	2
Gastropoda		
Ancylidae	1	-
Pseudosuccinea columella	-	1
Hirudinea		
Helobdella stagnalis	1	-
Odonata		
Coenagrionidae	1	-
Enallagma sp.	1	-
Ischnura sp.	-	1
Libellula sp.	1	-

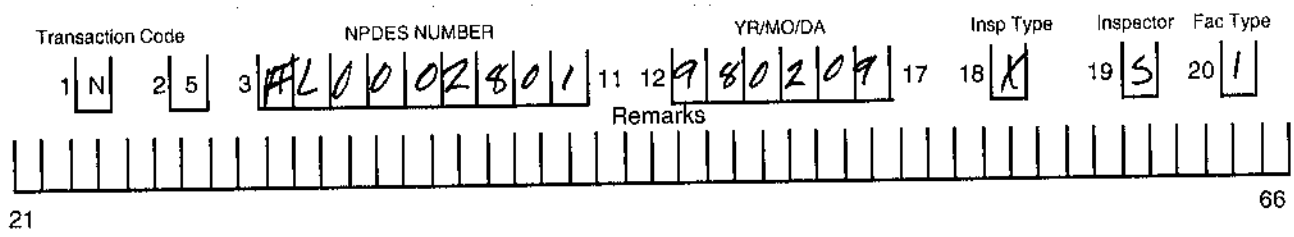
Oligochaeta		
Dero vaga	1	-
Eclipidrilus sp.	1	1
Enchytraeidae	1	-
Limnodrilus hoffmeisteri	-	4
Lumbriculus variegatus	1	-
Nais communis	-	6
Nais pardalis	1	-
Slavina appendiculata	2	4
Stylaria lacustris	5	3
Pelecypoda		
Sphaeriidae	8	-
Trichoptera		
Cheumatopsyche sp.	2	3

Periphyton taxa list and densities (#/cm^2) for SFE Citrus Processors, collected via glass microscope slides in receiving water, on 9 February, 1998.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	3276	617
Achnanthes exigua	6005	2058
Achnanthes gibberula	-	206
Achnanthes hauckiana	546	412
Achnanthes hungarica	546	-
Achnanthes lanceolata	546	206
Achnanthes lanceolata dubia	-	412
Achnanthes linearis	546	-
Achnanthes microcephala	-	1235
Achnanthes minutissima	1638	-
Anomoeneis serians brachysira	-	206
Biddulphia sp.	-	206
Cocconeis fluviatilis	-	206
Cocconeis placentula	7643	17284
Cyclotella sp.	3822	617
Cymbella sp.	1092	-
Cymbella microcephala	546	617
Cymbella minuta	3822	206
Cymbella minuta silesiaca	-	206
Eunotia sp.	4914	412
Eunotia pectinalis	546	-
Fragilaria construens	546	206
Fragilaria crotonensis	-	*617*
Gomphonema parvulum	3276	1029
Melosira sp.	4368	206
Melosira granulata	-	1029
Navicula sp.	1092	-
Navicula capitata	546	-
Navicula confervacea	1092	-
Navicula elginensis	2184	206
Navicula minima	-	1029
Navicula pupula	546	-
Navicula radiosa	-	1440
Navicula rhynchocephala	2730	-
Nitzschia sp.	1638	-
Nitzschia amphibia	546	412
Nitzschia fonticola	-	206
Nitzschia microcephala	-	617
Nitzschia palea	8189	617
Nitzschia sublinearis	546	-
Pennales sp.	2730	1029

Pinnularia sp.	546	-
Surirella linearis	546	-
Synedra sp.	2184	*1235*
Synedra rumpens	546	-
Synedra ulna	-	412
Chlorophyceae		
Characium sp.	1092	-
Chodatella sp.	-	206
Cosmarium sp.	-	206
Desmidium sp.	546	-
Dictyosphaerium sp.	-	206
Scenedesmus sp.	9827	3498
Stigeoclonium sp.	54595	-
Tetraedron sp.	546	206
Tetrastrum sp.	-	206
Undetermined Chlorophyceae	-	206
Cryptophyceae		
Chroomonas sp.	1092	-
Cyanophyceae		
Anabaena sp.	2184	412
Aphanocapsa sp.	1638	412
Dactylococcopsis sp.	12011	2263
Gloeocapsa sp.	-	617
Lyngbya sp.	1092	2881
Lyngbya contorta	-	1646
Merismopedia sp.	4914	4527
Microcystis sp.	-	206
Oscillatoria sp.	1092	2469
Synechococcus sp.	-	823

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)

