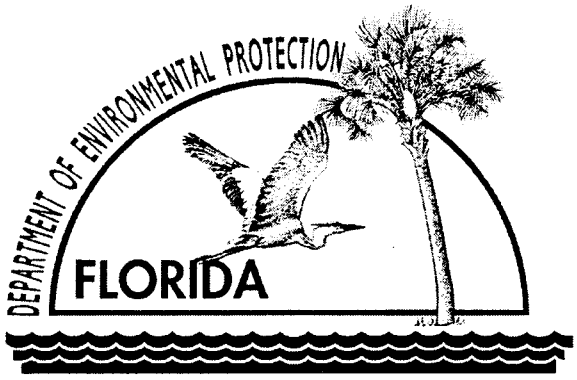


Biological Assessment of

Florida Distillers—Lake Alfred

Polk County

NPDES #FL0029017

Sampled November 1 & 16, 1999

September 2000

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection

Fifth Year Inspection Summary

Discharger: Florida Distillers – Lake Alfred Plant
County: Polk
NPDES Number: FL0029017
Permit Expiration: January 31 2000

Toxics Sampling Inspection (**XSI**)
Date Sampled: November 1 & 16, 1999
Results: Copper, iron and nickel were detected in the effluent at levels that complied with Class III water quality standards. No organic compounds were detected in the effluent sample.

Compliance Biomonitoring Inspection (**CBI**)
Date Sampled: November 1 & 16, 1999
Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour acute bioassay.

Impact Bioassessment Inspection (**IBI**)
Date Sampled: November 1 & 16, 1999
Results: The biological communities at the control and test sites were comparable throughout the study area. The test site algal and invertebrate communities did not appear to be impaired due to the addition of the effluent .

Water Quality Inspection (**WQI**)
Date Sampled: November 1 & 16, 1999
Results: Test site nutrients were fairly typical compared to other Florida streams and were comparable to levels measured at the control site. The effluent AGP was 3.37 mg dry wt/L. The AGP value at the control site (6.92 mg dry wt/L) exceeded the 5 mg dry wt/L "problem threshold" while the test site (4.23 mg dry wt/L) was below this threshold.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Florida Distillers—Lake Alfred Plant located in Polk County, Florida, is an industrial facility producing ethyl alcohol by fermentation and distillation of cane sugar. Activities at this facility include vaporizing fermented cane or citrus molasses then condensing the vapor with non-contact cooling water to produce alcoholic liquors. The outfall is located in the northeast corner of the Florida Distillers' property and is adjacent to a spray field. The effluent is intermittently discharged on a seasonal basis into an unnamed canal that flows into a wetland and eventually into Class III Lake Haines (see map in the Appendix). The design flow of the wastewater system for Florida Distillers is 2 MGD; mean flow during this survey was approximately 0.8 MGD.

State permit limits for the effluent are listed in Table 1. Florida Department of Environmental Protection (FDEP) review of the past three years monthly operating reports from Florida Distillers indicate that they have maintained compliance with their permit limits (see Facility Summary in Appendix).

Methods

The purpose of this inspection was to determine the effects of the Florida Distillers' effluent on the receiving waters, it was last inspected on June 16, 1999. Florida Distillers' effluent is discharged into a channelized system with connectivity to an adjacent wetland. The effluent travels east for roughly 30 meters before flowing south into Class III Lake Haines. The control and test sites for this study were located in the adjacent wetland. The control site was approximately 125 meters northeast of the outfall; and the test site, 25 meters east of the outfall (see map in the Appendix).

A habitat assessment was performed in situ establishing comparability between the study sites. Supplemental physical and chemical samples were collected from the effluent and field sites. The Florida Distillers effluent sample was analyzed for nutrients, metals, semi-volatile organics, organonitrogen, and phosphorus pesticides. There were two data collection dates for this report: November 1, 1999 for the phytoplankton and chemistry samples and November 16, 1999 for the benthic invertebrates and periphyton assemblages.

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

Benthic macroinvertebrate communities from all field sites were evaluated via quantitative and qualitative methods. Quantitative invertebrate collections were done using Hester-Dendy multiplate samplers incubated for 36 days, instead of a standard 28-day incubation period. According to District, conflicts in workload scheduling precluded district biologists from retrieving the sampling gear in the SOP–specified time period. For qualitative measurements, invertebrates were collected from different substrates using discrete dipnet sweeps. Sampling for periphyton was conducted at the study sites by incubating glass microscope slides in a standard periphytometer for 36 days – again, instead of the standard 28–day incubation period. Phytoplankton were sampled by subsurface grabs. Chlorophyll *a* was determined using laboratory spectrophotometer analyses for both phytoplankton and periphyton communities. Algal Growth Potential (AGP) was measured via growth response of the test organism, *Selenastrum capricornutum*. All laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's), and may be reviewed at www.floridadep.org/labs/sops.htm.

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

For graphical purposes, the percent difference for number of taxa, diversity index, Florida Index, EPT Index, diatom to blue-green algae

Table 1. Effluent limits and summary of chemistry data.

Florida Distillers-Lake Alfred	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
None Detected	-	-	-	-
Metals, Water (µg/L)				
Aluminum	-	50 U	50 U	50 U
Arsenic	≤ 50 **	6.0 U	6.0 U	6.0 U
Cadmium	≤ 1.32 **b	0.04 U	-	-
Chromium	≤ 242.98 **b	3.0 U	3.0 U	3.0 U
Copper	≤ 13.98 **b	0.9 I	1.4	1.8 I
Iron	≤ 1000 **	47.0 I	27 I	62
Lead	≤ 4.08 **b	0.25 U	-	-
Mercury	≤ 0.012 **	0.10 U	-	-
Nickel	≤186.07 **b	4.2 I	4.0 U	4.6 I
Selenium	≤5.0 **	1.2 U	-	-
Silver	≤ 0.07 **	0.03 U	0.03 U	0.03 U
Zinc	≤ 125.12 **b	10.0 U	10 U	10.0 U
Metals, Sediment (mg/L)				
Aluminum	-	-	2,250 AJ	1,050 J
Arsenic	-	-	1.7 U	1.4 U
Cadmium	-	-	0.055 U	0.046 U
Chromium	-	-	5.4 AJ	6.1 J
Copper	-	-	15.0 AJ	17.7 J
Iron	-	-	746 A	1,870
Lead	-	-	5.0 AJ	29.5 J
Nickel	-	-	2.5 I	1.4 I
Selenium	-	-	1.7 U	1.4 U
Silver	-	-	0.041 U	0.035 U
Zinc	-	-	42 I	47 I
Nutrients (mg/L)				
Ortho-phosphate (mgP/L)	-	0.04	0.05	0.05
Total phosphorus	-	0.03 I	0.05 J	0.05 J
Ammonia	-	0.12	0.02 I	0.10
Nitrate+Nitrite	-	0.04 U	0.12	0.10
TKN	-	0.22 J	0.19 I	0.29 J
TOC	-	2.1 I	3.6 I	3.6 I
General Phys-Chem Parameters				
Habitat Assessment	-	-	114	107
D.O. (mg/L)	≥ 5.0 *	7.26	4.36	6.51
Chloride (mg/L)	-	-	9.4	9.1
pH (SU)	6.0 -8.5 *	8.07	7.32	7.75
Conductivity (µmhos/cm)	≤ 1275 *a	266	272	267
T.S.S. (mg/L)	-	1.0	2.0	3.0
Temperature (°C)	≤ 33.3 *	25.25	24.3	25.2
B.O.D., 5 day (mg/L)	≤ 5.0 *a	2.0 U	2.0 U	2.0 U
Sulfate (mg/l)	-	-	3.7	3.7
Oil and Grease (mg/L)	≤ 5.0 *	5.0	-	-
Turbidity (mg/L)	-	0.8	0.2	1.8
AGP (mg dry wt/L)	-	3.37	6.92	4.23
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	-	Not Toxic	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-

* Permit limit
** Class III water quality standard
a - Monthly maximum
b - Value is calculated based on hardness
A - Value reported is the mean of two or more determinations
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit
J - Estimated value
U - Material analyzed for but not detected; value reported is the minimum detection limit

ratio, and % filter-feeders is calculated as the control site minus the test site divided by the control site. The percent difference for algal density, chlorophyll *a*, and AGP is calculated as the test site minus the control site divided by the control site.

The Florida Department of Environmental Protection personnel involved in this investigation were Andrea Grainger and Charles Kovach from the Southwest District, and, from the Central Biology Laboratory in Tallahassee; Ken Espy, Marshall Faircloth, Russell Frydenborg, Michael Heyn, Joy Jackson, Edwin Loschi, Elizabeth Miller, Urania Quintana, Johnny Richardson, Julie Riley, and Steve Wolfe. This report was reviewed by the Point Source Studies Review Committee: Wayne Magley, Michael Tanski, Chuck Ziegmont, and District representatives.

Results

The receiving waters for the Florida Distillers effluent is the Class III Lake Haines. Habitat quality was slightly better at the control site (with 114 points) compared to the test site (with 107 points), however, both sites were considered "optimal" (see Habitat Assessment Field Data Sheets in the Appendix). Most of the physical and chemical field parameters were similar with the exception of dissolved oxygen. The control site level of dissolved oxygen (4.4 mg/L) was less than the test site level (6.5 mg/L) and lower than the Class III water quality standard of 5.0 mg/L. The conductivity was 267 µmhos/cm and 272 µmhos/cm at the test site and control site, respectively.

The concentration of lead in the control site sediment sample was 5.0 mg/kg, while the test site level was

Table 2. Community structure of control and test sites.

Florida Distillers-Lake Alfred	Control Site	Test Site
Macroinvertebrate Qualitative		
% Dominant Taxon	29.2	13.8
EPT Index	2	2
Florida Index	9	10
Number of Taxa	24	20
SCI	23	23
Community Composition		
% Diptera	39.3	59.6
% Ephemeroptera	29.2	11.7
% Gastropoda	14.6	13.8
% Nemertea	1.1	1.1
% Odonata	4.5	1.1
% Oligochaeta	5.6	7.5
% Pelecypoda	1.1	0.0
% Trichoptera	3.4	1.1
% Other	1.2	4.1
Functional Feeding Groups		
% Burrowing Deposit Feeders	4.5	7.5
% Predators	20.8	16.5
% Scrapers	29.2	19.7
% Shredders	12.4	12.8
% Surface Deposit Feeders	30.9	35.1
% Suspension Feeders/Filterers	2.3	2.1
Macroinvertebrate Quantitative		
EPT Index	2	1
Florida Index	7	5
Number of Taxa	15	12
Shannon-Weaver Diversity	2.84	3.19
Community Composition		
% Diptera	78.1	85.4
% Ephemeroptera	16.5	0.0
% Gastropoda	4.6	13.9
% Trichoptera	0.4	0.7
% Other	0.4	0.0
Functional Feeding Groups		
% Predators	11.4	4.9
% Scrapers	12.9	13.9
% Shredders	25.7	10.8
% Surface Deposit Feeders	44.0	53.8
% Suspension Feeders	5.5	50.6

Table 2, continued. Community structure of control and test sites.

Florida Distillers-Lake Alfred	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	15	13
Shannon-Weaver diversity	2.62	2.69
Chlorophyll a (µg/L)	1.00 U	1.00 U
Algal Density (#/cm2)	649.46	504.61
% Blue-green	72.6	72.1
% Green	22.9	22.8
% Diatoms	2.8	3.7
Periphyton Algae		
Number of Taxa	20	27
Shannon-Weaver diversity	3.04	3.9
Algal Density (#/cm2)	462,337	369,121
Diatom/Diatom + B-G Ratio	1.1	2
%Blue-green	11.5	44.5
% Diatoms	84.0	42.5
AGP (mg dry wt/L)	6.9	4.2

estimated to be 29.5 mg/kg. Remaining chemical and biological results are presented in Tables 1 and 2.

Discussion

Dissolved oxygen at the control site did not comply with Class III water quality standards (Rule 62-302.530(31) FAC). All other field parameters were similar between the control and test sites.

The metals copper, iron, and nickel were detected in the effluent sample at levels that complied with Class III water quality standards (Table 1). No organic constituents were detected in the effluent sample. There was no toxicity evident from either the 48-hour acute toxicity test or the chronic bioassay toxicity test conducted on the effluent sample.

Several metals in the sediment sample were found in greater concentrations at the test site than concentrations measured at the control site. Note that chromium, copper, iron, lead, and zinc all increasd,, but that aluminim decreased. If there was no impact, as the aluminum decreased, so should the other metals. Since this did not occur, this is the reason to suspect long-term metals buildup at the test site. The test site lead content (29.5 mg/L) was nearly six times the value measured at the control site (5.0 mg/L). These data indicate limited contamination with metals at this time (Thomas Seal, pers. comm.).

Nutrient concentrations at the test site were less than or equal to 60% of those levels found in other typical Florida streams and did not appear to have been elevated due to the addition of the effluent (see Typical Values for Selected Parameters in Florida Waters in the Appendix). The control site AGP (6.92 mg dry wt/L) exceeded the 5 mg dry wt/L "problem threshold" for freshwater systems (Raschke and Shultz 1987).

Indicators of algal community health were better at the test site compared to the control site (Table 2). For example, in the periphyton communities there was a 35% increase in the number of taxa at the test site compared to the control site, diversity was 28% higher at the test site and algal density was 20% lower at the test site compared to the control. Diatoms were abundant at both sites but a larger proportion was found at the control site (84.0% contribution) compared to the test site (42.5% contribution).

The qualitative macroinvertebrate data showed minor differences between the control and test site invertebrate communities (Table 2). The Florida Index and taxa richness values were in the 'good' category for a comparative stream in peninsular Florida. The dominant taxon at the control site was the ephemeropteran, *Caenis* sp., which contributed 29% to the macroinvertebrate community. The dominant taxon at the test site, *Chironomus* sp., made up only 14% of the community (see Macroinvertebrate Taxa List in the Appendix). Both of these organisms, especially *Chironomus* sp., are pollution-tolerant. The EPT Index was low at both sites with only two taxa identified at each site. Both sites received an SCI score of 23 points, placing them in the "good" category (see SCI worksheet in Appendix).

In the quantitative samples, the dominant taxon at the control site was the pollution-sensitive dipteran, *Stenochironomus* sp., which made up 34.5% of the macroinvertebrate community (See Macorinvertebrate Taxa List in the Appendix). The dominant taxon at the test site was the pollution-tolerant dipteran, *Polypedilum illinoense* grp., which made up 17% of the total community.

The Shannon-Weaver Diversity Index was 12% higher at the test site compared to the control site. Most other measures were slightly higher at the control site compared to the test site.

Two circumstances occurred during this study that mitigate conclusions about the Florida Distillers effluent effects on the receiving water. First, the test site was located in a discharge canal contiguous with a wetland, the control site was located in the wetland. Natural topography at the study area may produce seepage from the adjacent wetlands, complicating field selection for the sampling sites. Site reconnaissance by field biologists indicated that there could be a significant hydrological connection between the wetland and the canal, possibly impacting the control site. Because the control site was located in a wetland, generalized stream metrics may be inadequate for comparative analyses of the conditions described in this study.

The second complicating factor that influenced the results of this study was that two separate sampling events were undertaken to gather data for the study. Water chemistry and periphyton samples were collected 15 days before the macroinvertebrate and phytoplankton samples were collected. This lag between sampling events and data collection further confounds interpretations about the possible effects of the effluent discharge on the biota.

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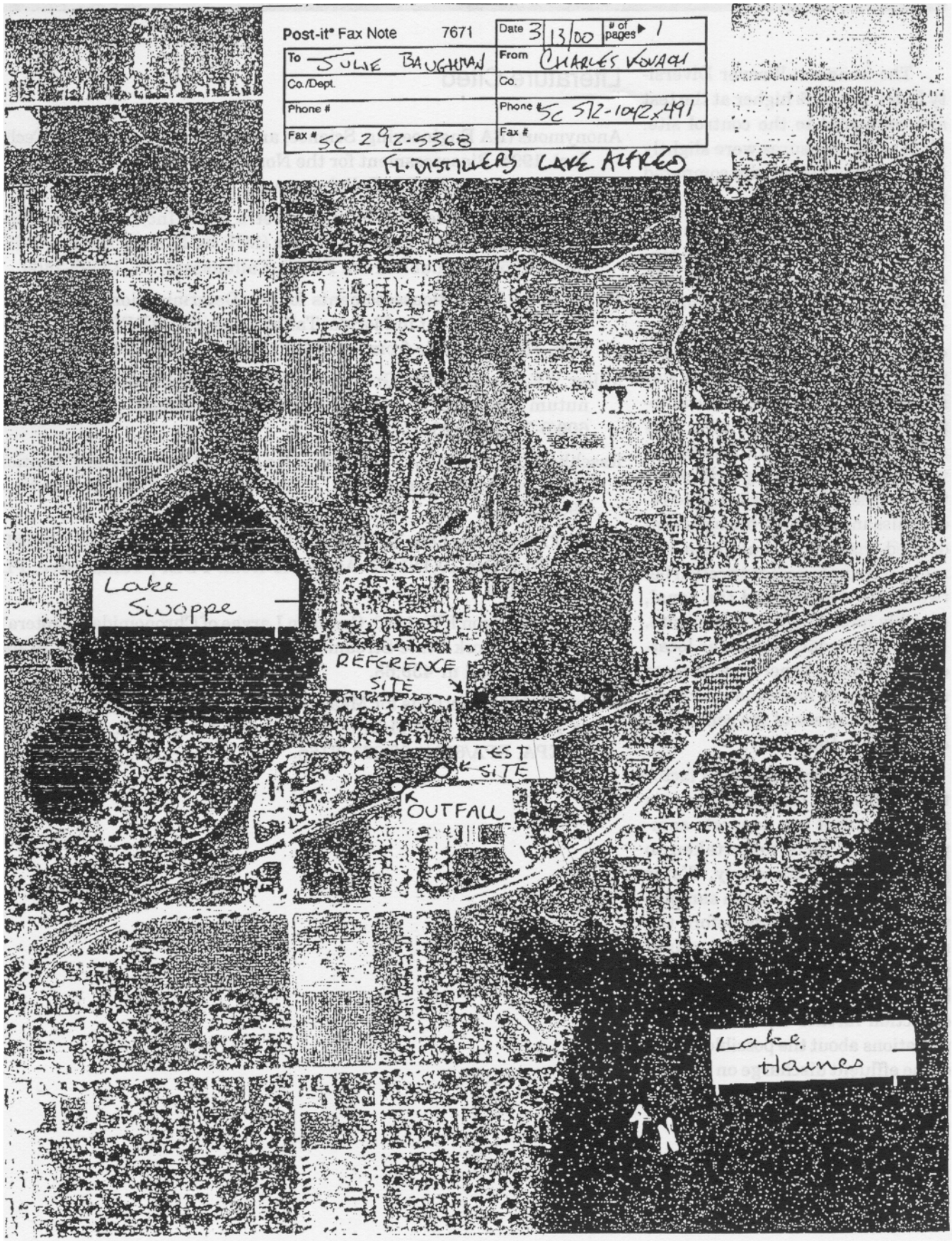
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Co./Dept.
Co.
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Phone # SC 572-1042x491
Fax # SC 292-5368
Fax #
FL. DISTILLERS LAKE ALFRED
Lake Swoppe
REFERENCE SITE
TEST SITE
OUTFALL
Lake Haines
N

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

Facility Summary Sheet for FYI-5

Facility Name: Florida Distillers-Lake Alfred Date Summary Prepared: November 2, 1999

Location: 530 Dakota Street in Lake Alfred County: Polk District: SW District

Federal Permit Data: FL00229017 expires 1/31/2000 DEP Permit Data: 53-244156 expires 5/1/1999

Facility Type: Industrial

Function of Facility: Operation of a cane and citrus molasses fermentation and distillation process to produce ethyl alcohol.

Description of Treatment Process: The process comprises of vaporizing fermented cane or citrus molasses then condensing the vapor with non-contact cooling water to produce alcoholic liquors.

Receiving Waters: Lake Haines Water Classification: Class III Freshwater

Design Flow: 2.0 mgd Mean Flow: 0.8 mgd (May '98 to '99) Discharge Type: Seasonal

Mixing zone: None

List Effluent Limits:

Parameter	Monthly Min	30-day Ave	Monthly Max	Sample Type/Frequency
Flow (mgd)	n/a	Report	Report	Continuous/Recorder
pH (SU)	6.0	Report	8.5	Weekly/In-situ
Dissolved oxygen (mg/L)	5.0	Report	n/a	Weekly/Grab
Temperature (°F)*	n/a	Report	92	Weekly /In-situ
BOD_5 (mg/L)	n/a	n/a	5.0	Monthly/Grab
Oil and Grease (mg/L)	n/a	n/a	5.0	Monthly/Grab
Specific conductance (µmh/cm) **	n/a	n/a	1275	Monthly/Grab

* denotes that the permittee shall monitor temperature to assure compliance with Rule 62-302.520, F.A.C.
** demotes that specific conductance shall not be increased more than 50% above background or to 1275 microhos per centimeter, whichever is greater per Rule 62-302.530(23), F.A.C.

Description of permitted outfall: The outfall is located in the northeast corner of Florida Distillers's property and is adjacent to the sprayfield . It discharges into a wetland that flows into Lake Haines.

List permit violations and plant upsets that occurred within past 3 years: None.

Describe previous impact bioassessments, WQBEls, and previous and current enforcement actions: FYI-3 was conducted at this facility in 1993 and the water quality results indicated that the facility was in compliance with its permit limits.

Staff contributing to this review: Andrea Grainger (Biologist)

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:
	NONSTORET250	11/16/99	1200	wetlands that flows into Lake Hamer

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Cool, Sunny	Polk.	Florida Distillers - Lake Alfred	Reference 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)
60		10	10	10		5	5 Golf courses

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

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

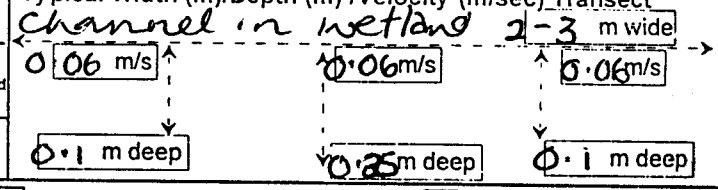
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 0.25 (present depth in m) = 0.75 (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: wooded wetland dec

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	4	Net	Sand	20	3	Net
Leaf Packs or Mats	30	4	" "	Mud/Muck/Silt	5	1	" "
Aquatic Vegetation	20	4	" "	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	15	4	" "	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.1	24.3	7.32	4.36	272			VOB
Mid-depth								
Bottom	0.25	24.19	7.16	4.38	271			

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: This is not a creek but a channel flowing into a wetland. The bottom is wetland debris. CSXT - track located on left bank looking upstream

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Kovach / Granger		11/26/99

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:
		11/16/99	Wetlands to Lake Hamco

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Sunny, cool	Polk	Florida Distillers - Lake Alfred	Reference 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 [20]	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 [7]	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 [16]	Less than 20% of habitats affected by sand or silt accumulation	20%-50% of habitats affected by sand or silt accumulation	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent
Primary Score [61]	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Secondary Habitat Components				
Artificial Channelization [15]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern (15) 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability: Right Bank [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
Bank Stability: Left Bank [4]				
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
Riparian Buffer Zone Width: Left Bank [4]				
Riparian Zone Vegetation Quality: Right Bank [6]	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
Riparian Zone Vegetation Quality: Left Bank [4]				
Secondary Score [53]				

[114] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
11/16/99	Kovach/Grainger	Andrea Grainger

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:
	NONSTORET251	11/16/99	1030	Wetlands into Lake Haines

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
cool, sunny	Polk	Florida Distillers - Lake Alfred	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)
60		10	10	10		5	Golf Course 5

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

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

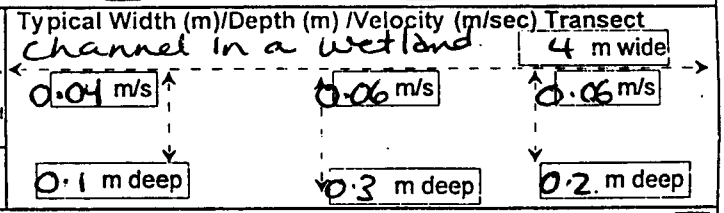
Width of riparian vegetation (m) on least buffered side: 7 | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 0.6 (m above present water level) + 0.3 (present depth in m) = 0.9 (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: ☐

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: wetland debris

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	20	4	Neo	Sand			
Leaf Packs or Mats	~~40~~ 20	4	" "	Mud/Muck/Silt	5	2	" "
Aquatic Vegetation	15	4	" "	Other: wetland debris	25	2	" "
Rock or Shell Rubble				Other:			
Undercut banks/Roots	15	4	" "	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.1	25.20	7.75	6.51	267			VOB.
Mid-depth								
Bottom	0.3	25.07	7.47	6.12	270.			

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: This is not a creek but a channelized flow thru a wetlands. The bottom is full of leafy/twig debris (2 ft deep). CSXT-track located on left bank looking upstream

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Kovach / Granger	Andrea Granger	11/26/99

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:
		11/16/99	Wetlands to Lake Haines

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
sunny, cool	Polk.	Florida Distillers – Lake Alfred	Test Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [16]	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 [20]	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 [7]	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 [16]	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 [59]				
Secondary Habitat Components **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
Bank Stability Right Bank [10] Left Bank [4]	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 [10] Left Bank [4]	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 [6] Left Bank [4]	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 [48]				

[107] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
11/16/99	Kovach/Granger	

Periphyton taxa list and densities (#/cm^2) for Florida Distillers-Lake Alfred, collected via glass microscope slides in an unnamed canal, on 16 NOV 1999.

	Control Site	Test Site
Bacillariophyceae (Diatoms)		
Achnanthes exigua	16883	53523
Achnanthes lanceolata	176623	2768
Achnanthes linearis	–	15688
Achnanthes minutissima	3896	–
Achnanthes sp.	3896	6460
Cocconeis fluviatilis	88312	–
Eunotia arcus	3896	1846
Eunotia sp.	35065	19379
Gomphonema affine	10390	923
Gomphonema intricatum	1299	–
Gomphonema parvulum	3896	6460
Gomphonema sp.	12987	923
Navicula decussis	10390	2768
Navicula minima	–	22147
Navicula radiosa tenella	–	1846
Navicula sp.	–	923
Nitzschia amphibia	–	7382
Nitzschia amphibioides	3896	–
Nitzschia palea	–	1846
Nitzschia sp.	11688	9228
Synedra sp.	5195	2768
Chlorophyceae		
Characium sp.	–	21224
Chlamydomonas sp.	–	1846
Chlorella sp.	–	923
Scenedesmus incrassatulus	–	1846
Scenedesmus sp.	–	4614
Selenastrum sp.	11688	7382
Stigeoclonium sp.	1299	923
Tetraedron minimum	2597	3691
Ulothrix sp.	–	3691
Undetermined Chlorophyceae sp.	3896	1846
Cyanophyceae		
Anabaena sp.	–	923
Chamaesiphon sp.	7792	59982
Dactylococcopsis sp.	2597	–
Lyngbya sp.	–	24916
Oscillatoria sp.	23377	28607
Rhabdoderma sp.	2597	13842
Romeria sp.	–	923
Synechococcus sp.	16883	35067
Euglenophyceae		
Lepocinclis sp.	1299	–

Florida Distillers-Lake Alfred Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	24	≥26	25-14	<14	3
EPT Index	2	≥4	3-2	<2	3
# Chironomid Taxa	10	≥7	6-4	<4	5
% Contribution of Dominant Taxon	29	≤29	30-64	>64	5
% Diptera	39	-	≤37	>37	1
Florida Index	9	≥7	6-4	<4	5
% Suspension feeders/Filterers	2	-	≥7	<7	1
Total Score		**Peninsula**			**23**
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 (APR1996)

Florida Distillers-Lake Alfred Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	20	≥26	25-14	<14	3
EPT Index	2	≥4	3-2	<2	3
# Chironomid Taxa	12	≥7	6-4	<4	5
% Contribution of Dominant Taxon	14	≤29	30-64	>64	5
% Diptera	60	-	≤37	>37	1
Florida Index	10	≥7	6-4	<4	5
% Suspension feeders/Filterers	2	-	≥7	<7	1
Total Score		**Peninsula**			**23**
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 (APR1996)

Periphyton taxa list and densities (#/cm^2) for Florida Distillers-Lake Alfred, collected via glass microscope slides in an unnamed canal, on 16 NOV 1999.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes exigua	16883	53523
Achnanthes lanceolata	176623	2768
Achnanthes linearis	–	15688
Achnanthes minutissima	3896	–
Achnanthes sp.	3896	6460
Cocconeis fluviatilis	88312	–
Eunotia arcus	3896	1846
Eunotia sp.	35065	19379
Gomphonema affine	10390	923
Gomphonema intricatum	1299	–
Gomphonema parvulum	3896	6460
Gomphonema sp.	12987	923
Navicula decussis	10390	2768
Navicula minima	–	22147
Navicula radiosa tenella	–	1846
Navicula sp.	–	923
Nitzschia amphibia	–	7382
Nitzschia amphibioides	3896	–
Nitzschia palea	–	1846
Nitzschia sp.	11688	9228
Synedra sp.	5195	2768
Chlorophyceae		
Characium sp.	–	21224
Chlamydomonas sp.	–	1846
Chlorella sp.	–	923
Scenedesmus incrassatulus	–	1846
Scenedesmus sp.	–	4614
Selenastrum sp.	11688	7382
Stigeoclonium sp.	1299	923
Tetraedron minimum	2597	3691
Ulothrix sp.	–	3691
Undetermined Chlorophyceae sp.	3896	1846
Cyanophyceae		
Anabaena sp.	–	923
Chamaesiphon sp.	7792	59982
Dactylococcopsis sp.	2597	–
Lyngbya sp.	–	24916
Oscillatoria sp.	23377	28607
Rhabdoderma sp.	2597	13842
Romeria sp.	–	923
Synechococcus sp.	16883	35067
Euglenophyceae		
Lepocinclis sp.	1299	–

Phytoplankton taxa list and for Florida Distillers-Lake Alfred facility, collected via glass microscope slides in an unnamed canal, on November 16, 1999. Densities in number/ cm^2.

	Control Site	Test Site
Bacillariophyceae		
Navicula sp.	7	–
Pennales sp.	7	15
Synedra sp.	–	4
Chlorophyceae		
Ankistrodesmus falcatus	7	–
Ankistrodesmus sp.	4	4
Chlamydomonas sp.	36	26
Chlorella sp.	4	4
Chlorococcum sp.	4	–
Selenastrum sp.	25	15
Tetraedron minimum	7	26
Undetermined Chlorophyceae	62	41
Cryptophyceae		
Cryptomonas sp.	11	7
Cyanophyceae		
Anabaena sp.	15	–
Cyclotella sp.	4	–
Dactylococcopsis sp.	18	19
Lyngbya sp.	15	22
Oscillatoria limnetica	36	19
Oscillatoria sp.	279	204
Raphidiopsis sp.	7	4
Spirulina sp.	–	7
Synechococcus sp.	102	89

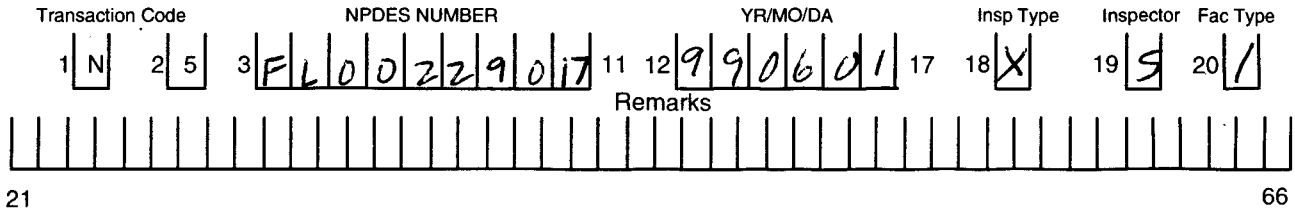
Benthic macroinvertebrate taxa list for Florida Distillers—Lake Alfred, collected via 20 discrete Dipnet sweeps in receiving water, on November 16, 1999.

	Control Site	Test Site
Diptera		
Ablabesmyia mallochi	4	7
Ablabesmyia rhamphe grp.	2	—
Asheum beckae	—	2
Chironomus sp.	—	12
Clinotanypus sp.	—	1
Cryptochironomus sp.	1	1
Goeldichironomus natans	—	1
Goeldichironomus sp.	—	2
Labrundinia becki	3	—
Labrundinia neopilosella	—	6
Labrundinia pilosella	1	—
Odontomyia sp.	1	—
Paramerina sp.	1	—
Polypedilum halterale grp.	6	2
Polypedilum illinoense grp.	—	9
Polypedilum tritum	5	—
Stenochironomus sp.	6	4
Tanytarsus sp. A Epler	—	1
Tanytarsus sp. T Epler	2	—
Tanytarsus sp.	—	3
Undetermined Ceratopogonidae	1	—
Undetermined Chironomidae	2	2
Zavreliella marmorata	—	3
Ephemeroptera		
Caenis sp.	26	11
Gastropoda		
Melanoides tuberculata	10	—
Physella sp.	2	—
Sphaerium sp.	1	—
Undetermined Ancylidae	1	5
Undetermined Gastropoda	—	8
Lepidoptera		
Paraponyx sp.	1	—
Undetermined Lepidoptera	—	1
Undetermined Pyralidae	—	3
Odonata		
Libellula sp.	3	—
Undetermined Coenagrionidae	1	—
Undetermined Odonata	—	1
Oligochaeta		
Bratislavia unidentata	4	6
Eclipidrilus sp.	—	1
Mooreobdella sp.	1	—
Prostoma rubrum	—	1
Prostoma sp.	1	—
Trichoptera		
Oecetis sp.	3	1

Benthic macroinvertebrate taxa list for Florida Distillers-Lake Alfred, collected via Hester-Dendy artificial substrates in an unnamed canal, on November 16, 1999. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Diptera		
Ablabesmyia mallochi	26	–
Ablabesmyia rhamphe grp.	–	3
Asheum beckae	–	32
Chironomus sp.	3	48
Goeldichironomus holoprasinus	–	58
Goeldichironomus natans	–	42
Larsia decolorata	–	3
Pentaneura inconspicua	19	–
Polypedilum illinoense grp.	13	66
Polypedilum scalaenum grp.	93	–
Rheotanytarsus distinctissimus grp.	3	–
Stenochironomus sp.	217	16
Tanytarsus sp. A Epler	3	–
Tanytarsus sp. L Epler	8	–
Tanytarsus sp. T Epler	53	8
Tanytarsus sp.	–	34
Undetermined Chironomidae	53	16
Ephemeroptera		
Caenis sp.	103	–
Gastopoda		
Hebetancylus excentricus	–	26
Laevapex sp.	5	–
Melanoides tuberculata	5	–
Physella sp.	–	3
Undetermined Ancylidae	13	24
Undetermined Gastropoda	5	–
Odonata		
Enallagma sp.	3	–
Trichoptera		
Cernotina sp.	–	3
Undetermined Hydroptilidae	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)

