#225



Biological Assessment of

Silver Springs Citrus Cooperative

Lake County

NPDES #FL0002798

Sampled February 1997

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August 1997

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Silver Springs Citrus Corporation
County: Lake County
NPDES Number: FL0002798
NPDES Permit Expiration Date: 7 November 1997

Toxics Sampling Inspection (**XSI**)

Date Sampled: 24 February 1997

Results: No organic pollutants were detected in the effluent. All metals complied with Class III Water Quality Standards.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 24 February 1997

Results: The chlorinated effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, and to the fish, *Cyprinella leedsi* (violating Rules 62-302.500(1)(d), 62-4.244(3)(a), and 62-302.530(62) FAC). The dechlorinated sample was not toxic to either organism.

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 24 February 1997

Results: Measures of macroinvertebrate health indicated that both the reference and test sites were very degraded. Since the receiving water community was already very stressed, the toxic effluent did not appear to cause much in the way of additional degradation. The EPT Index (0 at the reference site, 0 at the test site) and Florida Index (0 at the reference site, 0 or 1 at the test site, depending on sampling method) were similarly low in the Hester-Dendy and dipnet samples. The Stream Condition Index (SCI), with 15 points at the reference site and 19 points at the test site, placed both sampling stations in the "poor" category. These data, in conjunction with the habitat assessment scores and ammonia concentrations, suggest that habitat disruption is the primary problem in the stream, with stormwater inputs also having possible negative effects. Other than an increase in algal density at the test site, there was no evidence of negative changes in periphyton communities caused by the discharge.

Water Quality Inspection (**WQI**)

Date Sampled: 24 February 1997

Results: Effluent chlorine was measured to be 1.4 mg/L, violating Rule 62-304.530(19) FAC and the facility's permit limit (both of which allow a maximum of 0.01 mg/L). Effluent nutrient concentrations were generally lower than those found at the reference and test sites. Ammonia concentrations, while undetected in the effluent, were higher than the values found in 92% to 95% of other Florida streams at the reference site (0.38 mg/L) and the test site (0.59 mg/L), respectively. The elevated ammonia at the reference site suggests non-point source enrichment from the surrounding area. Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.7 mg dry wt/L) and at the test site (29.7 mg dry wt/L). The effluent AGP was only 0.2 mg dry wt/L. The elevated AGP levels in the receiving waters appear to coincide with the observed ammonia enrichment.

Introduction

Silver Springs Citrus Cooperative, a citrus processing plant, is located in Howey in the Hills, Lake County, Florida (see map in Appendix). An average of 0.475 MGD of non-process cooling water from this facility is discharged to an unnamed ditch, which flows through wetlands to the Class III Lake Harris. The effluent receives no treatment prior to discharge. Discharge occurs only during citrus harvesting period, between the months of October and February.

State permit limits are as follows: flow (0.675 MGD maximum), pH (7.5 to 8.5 SU), biochemical oxygen demand (maximum of 16.0 mg/L, or 45 lbs/day), dissolved oxygen (minimum of 6.5 mg/L), total suspended solids (maximum of 8.0 mg/L, or 22.5 lbs/day), total residual chlorine (maximum of 0.01 mg/L), (see Facility Summary in Appendix). Additionally, the facility is required to perform monthly sampling for total nitrogen, total phosphorus, chlorides, and copper.

An inspection of the facility, conducted in March, 1996, revealed that the flow meter was broken, and therefore, that flow measurements were just being estimated. No significant permit violations have been noted during the past year.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	21	27
Florida Index	0	1
SCI	15	19
EPT Index	0	0
% Contribution of Dominant Taxon	55.4	27.2
% Oligochaeta	62.2	37.4
% Diptera	26.7	44.9
% Gastropoda	5.7	4.1
% Pelecypoda	3.4	0
% Coleoptera	1.4	11.6
% Other	0.3	0.7
% Predators	3.9	12.2
% Above Surface Deposit Feeders	13.0	22.8
% Below Surface Deposit Feeders	62.2	37.4
% Suspension Feeders	3.6	4.4
% Scrapers	5.7	4.8
% Shredders	11.3	6.8
% Unknown	0.3	11.6
Macroinvertebrate Hester-Dendy		
Number of Taxa	21	14
Florida Index	0	0
Shannon-Weaver Diversity	2.6	2.1
EPT Index	0	0
% Oligochaeta	46.3	80.2
% Diptera	46.7	18.8
% Gastropoda	3.1	0.8
% Coleoptera	2.5	0.2
% Other	1.1	0.0
% Predators	6.0	0.3
% Above Surface Deposit Feeders	23.2	7.9
% Below Surface Deposit Feeders	46.1	80.1
% Suspension Feeders	0.4	0.0
% Scrapers	3.1	2.8
% Shredders	20.6	5.4
% Unknown	0.4	3.5
Periphyton Algae		
Number of Taxa	36	30
Shannon-Weaver Diversity	4.0	3.8
Algal Density (#/sq. cm)	69719.7	264081.3
Chlorophyll a (mg/sq. m)	0.88 U	0.88 U
Diatom/Diatom + B-G Abundance Ratio	0.9	0.8
% Blue-green	7.1	22.1
% Green	22.3	2.8
% Diatoms	69.5	75.0
% Other	1.1	0.0
Algal Growth Potential (mg dry wt/l)	21.8	29.7

comparison of biological community health was made between a reference site (located approximately 50 feet upstream of the discharge in an unnamed tributary of Lake Harris) and a test site (in the same unnamed ditch, downstream of the discharge approximately 100 feet). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the effluent and study sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at the study 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 (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

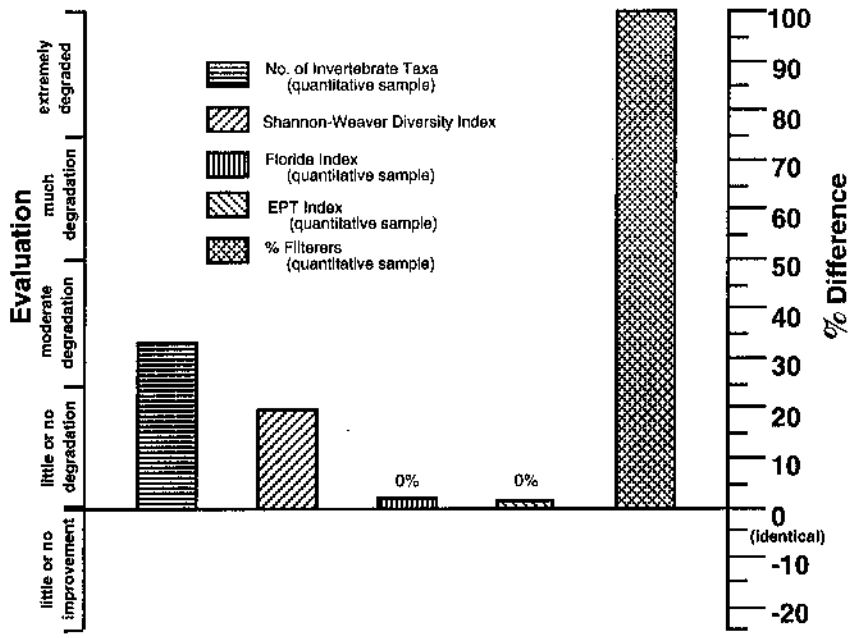
Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 points possible for each factor. Based on the sum of these individual scores, overall habitat quality for freshwater systems is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); or Poor (0-34 points). For marine systems, the habitat assessment scores fall into these categories: Optimal (75-100 points); Suboptimal (50-74 points); Marginal (25-49 points); or Poor (0-24 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. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. For



Effect of discharge on the benthic macroinvertebrate community.

example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

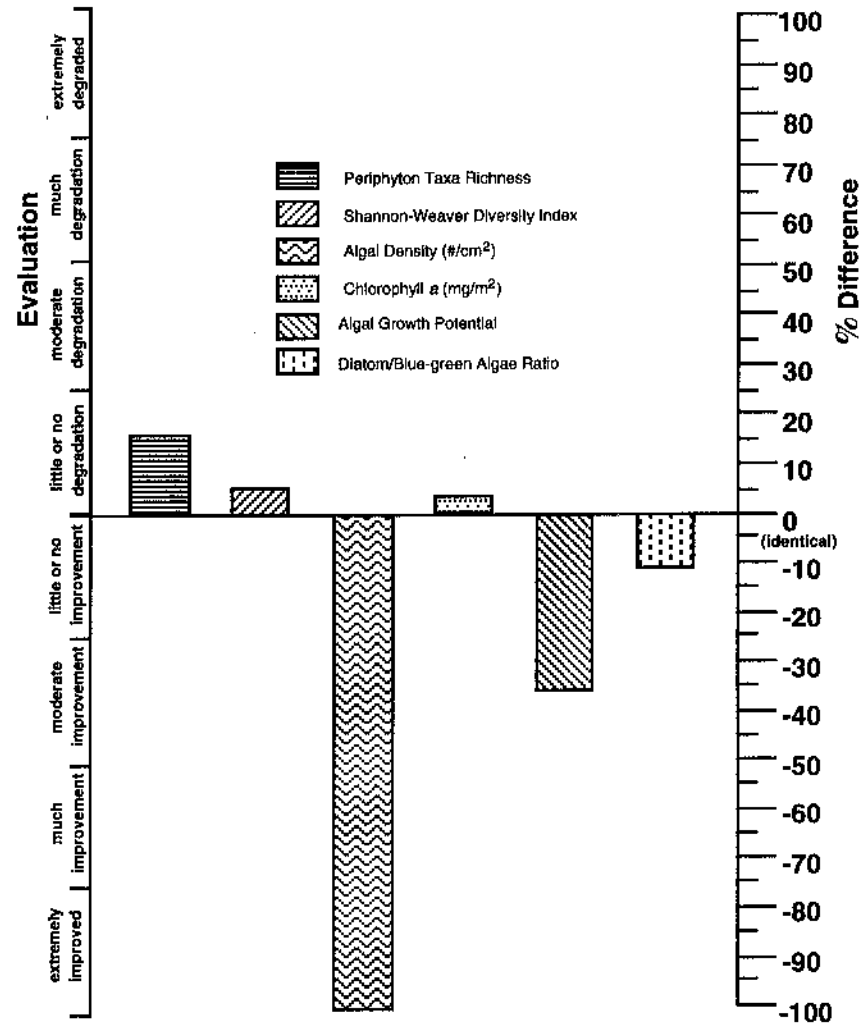
Ephemeroptera/Plecoptera/Trichoptera Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

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

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

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream condition Index for Florida (SCI) is a composite macroinvertebrate metric (Barbour *et al.* 1996). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition.



Effect of discharge on the algal community.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, and the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Phil Kane, Eric Pluchino, Clayton Smith, and Eugene Elliott (DEP Central District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

As expected from a channelized ditch, habitat quality at the reference site (with 41 points) and the test site (with 45 points) were both classified as "marginal". Both sites received low scores in the categories of substrate types, artificial channelization, water velocity, sediment deposition, and riparian buffer zone vegetation quality. This unnamed ditch was obviously affected by stormwater runoff from the surrounding area, most of which consisted of industrial and residential land uses. Physical/chemical measurements were mostly the same at the two sites. Dissolved oxygen levels were very low at the reference site (2.3 mg/L) and the test site (2.6 mg/L), both below Class III water quality standards. The temperature (23.5°C at the reference site and 23.7°C at the test site), pH (6.9 SU at both sites), and specific conductance (from 295 µmhos/cm to 310 µmhos/cm) were similar or unchanged between the two study sites.

The chlorinated effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, and to the fish, *Cyprinella leedsi*. Complete mortality occurred in the full strength chlorinated effluent sample during the two 48 hour acute bioassays (Appendix). This toxicity represents violations of Rules 62-302.500(1)(d), 62-4.244(3)(a), and 62-302.530(62) FAC. Effluent chlorine was measured to be 1.4 mg/L, violating Rule 62-304.530(19) FAC and the facility's permit limit (both of which allow a maximum of 0.01 mg/L). The dechlorinated sample was not toxic to either organism.

No organic pollutants were detected in the effluent. All metals complied with Class III Water Quality Standards.

In general, effluent nutrient concentrations were lower than those found at the reference and test sites. For example, total phosphorus at the reference site (0.066 mg/L) and at the test site (0.097 mg/L) were both higher than the total phosphorus concentration found in effluent (0.029 mg/L). Note that the total phosphorus values in the receiving waters were fairly average for Florida stream systems (see Table of Typical Water Quality Parameters in Appendix). Ammonia concentrations, while undetected in the effluent, were higher than the values found in 92% to 95% of other Florida streams at the reference site (0.38 mg/L) and the test site (0.59 mg/L), respectively. The elevated ammonia at the reference site suggests non-point source enrichment from the surrounding area.

Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.7 mg dry wt/L) and at the test site (29.7 mg dry wt/L) (Raschke and Schultz 1987). The effluent AGP was only 0.2 mg dry wt/L. The elevated AGP levels in the receiving waters appear to coincide with the observed ammonia enrichment.

Measures of macroinvertebrate health indicated that both the reference and test sites were degraded, predominantly due to poor habitat. Since the receiving waters were already very stressed, the toxic effluent did not appear to cause much additional degradation. The figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference.

In the Hester-Dendy samples, moderate declines in taxa richness (21 taxa at the reference site, 14 at the test site) and Shannon-Weaver diversity (2.6 at the reference site, 2.1 at the test site), were observed between the upstream and downstream stations. There was no change in the Florida Index (0 at the reference site and 0 at the test site) and the EPT Index (0 at both sites) due to the discharge. Note that the extremely low scores for these indices attest to the disturbed nature of this channelized system. Lack of suspension feeders (0.4% at the reference site and 0% at the test site) further demonstrate the degraded character of the ditch.

The dip net results also showed the receiving waters to be degraded at both stations. In the dip net samples, taxa richness at the reference site (21 taxa) was was slightly lower than at the test site (27 taxa). The EPT Index (0 at the reference site, 0 at the test site) and Florida Index (0 points at the reference site, 1 point at the test site) were equally low using either sampling method. The Stream Condition Index (SCI), with 15 points at the reference site and 19 points at the test site, placed both sampling stations in the "poor" category. These data, in conjunction with the habitat assessment scores and ammonia concentrations, suggest that habitat disruption is the primary problem in the stream, with stormwater inputs also having possible negative effects.

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

degradation. Periphyton taxa richness (36 taxa at the reference site, 30 taxa at the test site) and diversity (4.0 at the reference site, 3.8 at the test site) were fairly similar between the two study stations. While algal density increased from 69,720 cells/cm^2 at the reference site to 264,081 cells/cm^2 at the test site, chlorophyll *a* was undetected at both stations. Other than the increase in algal density at the test site, there was no evidence of negative changes in periphyton communities caused by the discharge.

Conclusions

The effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, and to the fish, *Cyprinella leedsi*. This toxicity represents violations of Rules 62-302.500(1)(d), 62-4.244(3)(a), and 62-302.530(62) FAC. Effluent chlorine was measured to be 1.4 mg/L, violating Rule 62-304.530(19) FAC and the facility's permit limit (both of which allow a maximum of 0.01 mg/L).

No organic pollutants were detected in the effluent. All metals complied with Class III Water Quality Standards.

Effluent nutrient concentrations were generally lower than the reference and test site values. Ammonia concentrations, while undetected in the effluent, were higher than the values found in 92% to 95% of other Florida streams at the reference site (0.38 mg/L) and the test site (0.59 mg/L), respectively. The elevated ammonia at the reference site suggests non-point source enrichment from the surrounding area.

Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.7 mg dry wt/L) and at the test site (29.7 mg dry wt/L) (Raschke and Schultz 1987). The effluent AGP was only 0.2 mg dry wt/L. The elevated AGP levels in the receiving waters appear to coincide with the observed ammonia enrichment.

Measures of macroinvertebrate health indicated that both the reference and test sites were very degraded. Since the receiving water community was already very stressed, the toxic effluent did not appear to cause much additional degradation. The EPT Index (0 at the reference site, 0 at the test site) and Florida Index (0 at the reference site, 0 or 1 at the test site, depending on sampling method) were similarly low in the Hester-Dendy and dipnet samples. The Stream Condition Index (SCI), with 15 points at the reference site and 19 points at the test site, placed both sampling stations in the "poor" category. These data, in conjunction with the habitat assessment scores and ammonia concentrations, suggest that habitat disruption is the primary problem in the stream, with stormwater inputs also having possible negative effects.

Other than an increase in algal density at the test site, there was no evidence of negative changes in periphyton communities caused by the discharge.

Literature Cited

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Chemistry Summary Table for Silver Springs Citrus Cooperative.

	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
None Detected			
Metals (ug/L)			
Aluminum	200 U		
Arsenic	10 U		
Cadmium	5 U		
Copper	25 U		
Chromium	10 U		
Iron	58		
Lead	5 U		
Mercury	0.10 U		
Nickel	5.0 U		
Selenium	10 U		
Silver	5.0 U		
Zinc	20 U		
Nutrients (mg/L)			
Ortho-phosphate	0.032 A	0.046 A	0.052
Total phosphorus	0.029 I	0.066	0.097
Ammonia	0.020 U	0.38	0.59 A
Nitrate+Nitrite	0.020 U	0.016 U	0.016 U
TKN	0.27	1.1	1.8
General Phys-Chem Parameters			
Habitat Assessment		41	45
D.O. (mg/L)		2.3	2.6
pH (SU)		6.9	6.9
Conductivity (µmhos/cm)		295	310
Temperature (°C)		23.5	23.7
TSS (mg/L)	0.6 U	2.7	2.6
BOD (mg/L)	1.0 U	1.3 I	3.2 I
Hardness (mg CaCO3)	127.0		
Algal Growth Potential (mg dry wt/L)	0.2	21.7	29.7
Toxicity			
Bioassay Fish-Chlorinated	100% Mortality		
Bioassay Fish-Dechlorinated	No Mortality		
Bioassay Invertebrate-Chlorinated	100%Mortality		
Bioassay Invertebrate-Dechlorinated	No Mortality		

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

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

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

Typical Values for Selected Parameters in Florida Waters

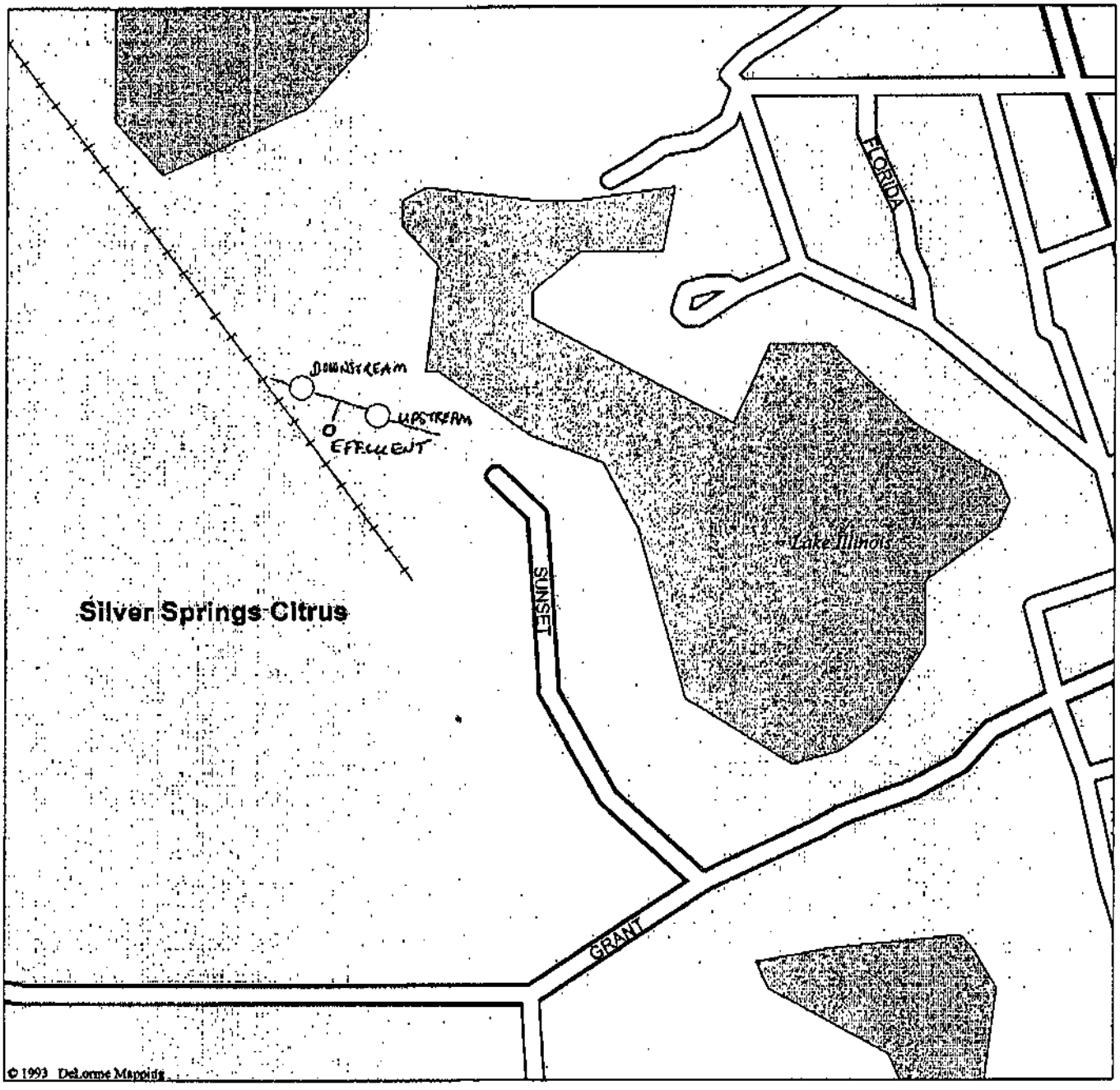
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

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

Units:

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



LEGEND

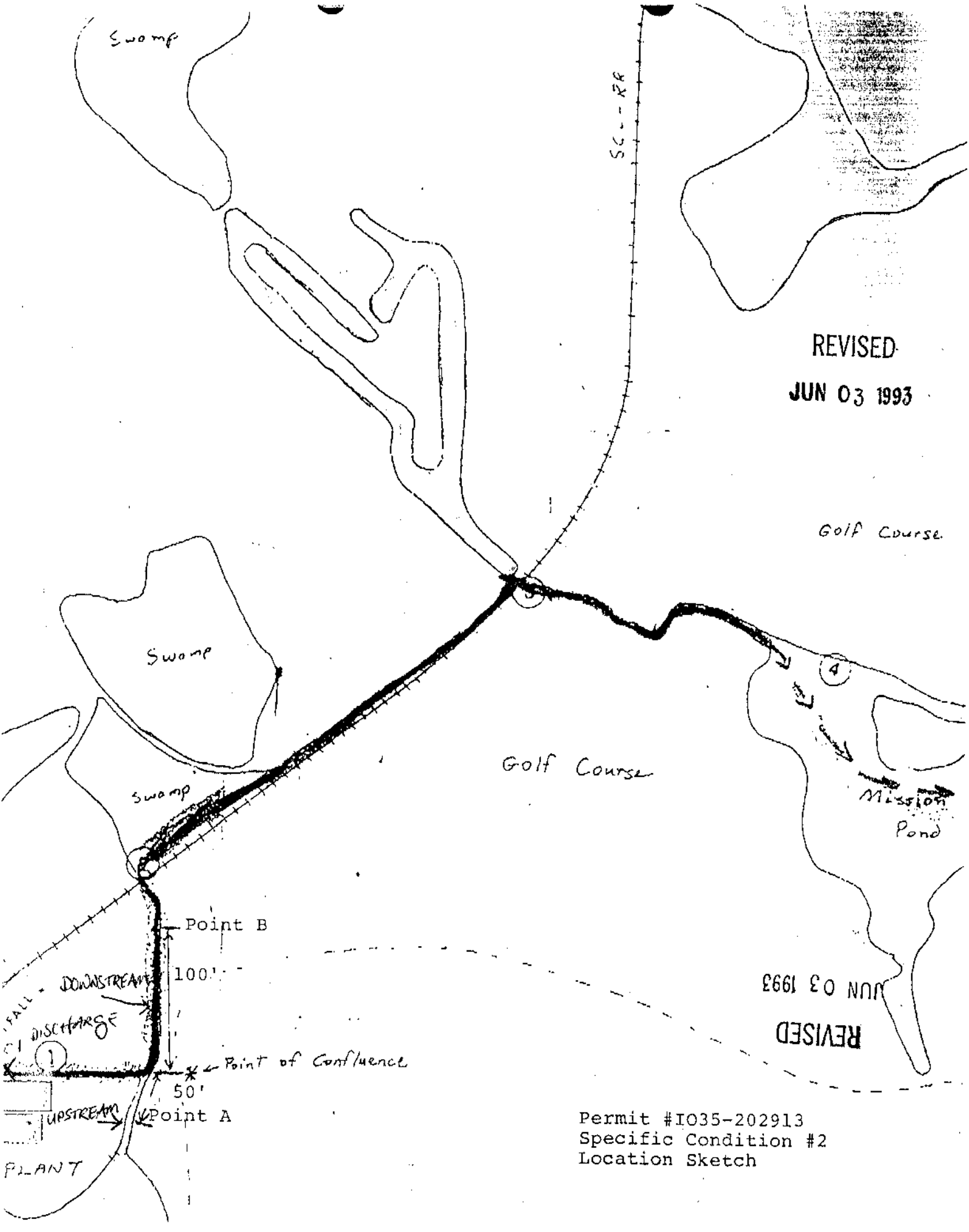
- Population Center
- Street, Road
- Major Street/Road
- State Route
- Railroad
- Open Water

Scale 1:5,468 (at center)

500 Feet

200 Meters

Mag 16.00
Thu Jun 19 07:28:40 1997



Permit #IO35-202913
Specific Condition #2
Location Sketch

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: SILVER SPRINGS CITRUS COOP		Date Summary Prepared: 2/18/97
Location (attach detailed map): Attached	County: LAKE	District: CENTRAL
Federal Permit #FL0002798 (consolidated) and expiration date: 11-7-97	State GMS # and 3035P00932 State expiration date: (consolidated) 11-7-97	Facility Type: 2 (Industrial) Municipal Federal Agricultural Other (list):

Function of facility: Operation of an industrial wastewater treatment and disposal system for non-process cooling water generated @ the citrus processing plant

Description of treatment process:
non-process cooling water is discharged to an unnamed ditch and wetlands thence to Lake Harris, a class III surface water of the STATE. The effluent receives NO treatment prior to discharge.

Receiving waters: LAKE HARRIS + Unnamed Wetlands	Classification: I II (III)	
Design Flow: 0.475 MGD	Mean Flow: 0.475 MGD	Flow during survey:

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

therefore, the best time to sample is: OCTOBER — FEBRUARY

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

No Mixing Zone.

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

Describe special permit conditions and permit modifications:

Parameter	Units	Daily Average	Daily Maximum	Sample Type	Frequenc
Flow	MGD	Report	0.675**	Metered	Continuous
BOD_5	mg/l	8.0	16.0**	24 hr. Comp.	Weekly
BOD_5	lbs/d	Report	45.0*	Calculate	Weekly
TSS	mg/l	4.0	8.0**	24 hr. Comp.	Weekly
TSS	lbs/d	Report	22.5*	Calculate	Weekly
pH	SU	7.5	8.5	Grab	Monthly
DO	mg/l	Report	≥6.5	Insitu	Monthly
Total N	mg/l	Report	Report	Grab	Monthly
Total P	mg/l	Report	Report	Grab	Monthly
Copper (Total)	mg/l	***	***	Grab	Monthly
Chlorides	mg/l	****	****	Grab	Monthly
Total Residual Chlorine	mg/l	0.01	0.01	Grab	Monthly

Silver Springs Citrus
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

The NPDES permitted outfall is a 3" metal pipe that discharges into a Ditch along the north side of the plant approx. 30' away. The Ditch runs easterly for approx. 300' until it leaves the property and intersects another stormwater Drainage Ditch at a right angle – the Drainage Ditch runs north thru wetlands to Lake Harris approx 2 miles away.

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

An Inspection done by DEP and EPA on 3/21/96 revealed that the flow mtr was Broken and the plant was estimating flow. No significant permit violations have been noted during the past Year.

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

A record search revealed that no previous bioassessments have been performed at the facility. The facility is currently operating in compliance with the Industrial waste permit.

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

No significant trends were noted in the MOR Data.

Additional information:

The facility is planing on eliminating the surface water discharge by 10/24/99.

Staff contributing to this review (signature):

Phil Kam, Ed.D	(Biologist)
Clayton L. Smith ESII	(Inspector)
Eugene Elliott	(Engineer)
	( )
	( )
	( )

UPSTREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 02/24/97	TIME 11:15	RECEIVING BODY OF WATER: LAKE HARRIS

REMARKS:	COUNTY:	LOCATION: SILVER SPRINGS CITRUS 25411 MARE AVE. HOWEY IN THE HILLS, FL	FIELD ID/NAME:
UPSTREAM	LAKE		SSCC

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)
		20		20	20	40	

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: 0

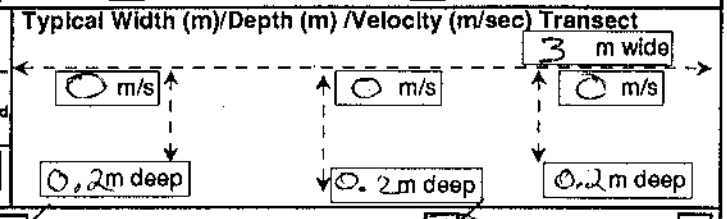
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes NO

High Water Mark: 0.2 (m above present water level) + 0.2 (present depth in m) = 0.4 (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: ☑ Slight H2S

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)	0			Sand 0	0		
Leaf Packs or Mats 30	30	8	NET	Mud/Muck/Silt	50	4	NET
Aquatic Vegetation 20	20	8	NET	Other:			
Rock or Shell Rubble 0	0			Other:			
Undercut banks/Roots 0	0			*Draw aerial view sketch of habitats found in 100 m sectio*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								TO Bottom
Mid-depth	0.2	23.5	6.93	2.33	295			
Bottom								

System Type : Stream: ☑ (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☐ Sheen: ☑ Globs: ☐ Stick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

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

Weather Conditions/Notes:

Sun / clouds

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

SAMPLING TEAM:	SIGNATURE:	DATE:
KANE, PLUCHINO	Phil Kane	02/24/97

DOWNSTREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 02/24/97	TIME 0950	RECEIVING BODY OF WATER: LAKE HARRIS

REMARKS: DOWNSTREAM	COUNTY: LAKE	LOCATION: SILVER SPRINGS CITRUS 2541 MARE AVE. HOLEY IN THE HILLS, FL.	FIELD ID/NAME: SSCC

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)
		20		20	20	40	

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: ØM

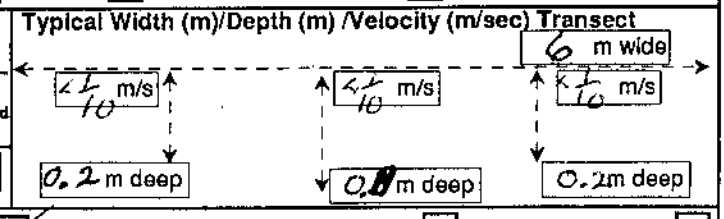
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes NO

High Water Mark: 0.2 (m above present water level) + 0.2 (present depth in m) = 0.4 (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: ☑ Slight H2S

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)	0			Sand	10	3	NET
Leaf Packs or Mats	10	3	NET	Mud/Muck/Silt	10	2	NET
Aquatic Vegetation (Q)	0	6 ✓	NET	Other:			
Rock or Shell Rubble	0			Other:			
Undercut banks/Roots	10	6 ✓	NET	*Draw aerial view sketch of habitats found in 100 m sectio*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	Surface	23.68	6.93	2.63	310	(3)		TO BOTTOM
Mid-depth	0.1	23.68	6.93	2.63	310			
Bottom								

System Type : Stream: ☑ (1st - 2nd order 3rd - 4th order 5th - 6th order 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☐ Sheen: ☑ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

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

Weather Conditions/Notes:

SUN/CLOUDS

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

SAMPLING TEAM: KANE, PLUCHINO	SIGNATURE: Phil Kane	DATE: 02/24/97

UPSTREAM

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/DY): 02/24/97	RECEIVING BODY OF WATER: LAKE HARRIS

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
UPSTREAM	LAKE	SILVER SPRINGS CITRUS 25411 MARE AVE. HOWEY IN THE HILLS, FL.	SSCC

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability [5]	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 [1]	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 [5]	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 [5]	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 [10]	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 [5]	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

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

[41] **TOTAL SCORE**

Comments

NOTE: UPSTREAM HAS INCLINATION TO FLOW UPSTREAM DUE TO DRY CONDITIONS

ANALYSIS DATE:	ANALYST:	SIGNATURE:
02/24/97	KANE, PLUCHINO	Phil Kane

DOWNSTREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 02/24/97	TIME 0950	RECEIVING BODY OF WATER: LAKE HARRIS

REMARKS: DOWNSTREAM	COUNTY: LAKE	LOCATION: SILVER SPRINGS CITRUS 2541 MARE AVE. HOLEY IN THE HILLS, FL.	FIELD ID/NAME: SSCC

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)
		20		20	20	40	

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: ØM

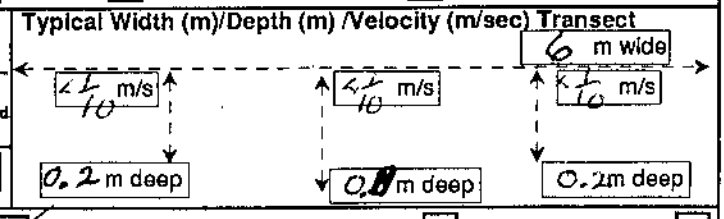
List & map dominant vegetation on back

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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: ☑ Slight H2S

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)	0			Sand	10	3	NET
Leaf Packs or Mats	10	3	NET	Mud/Muck/Silt	10	2	NET
Aquatic Vegetation (Q)	0	6 ✓	NET	Other:			
Rock or Shell Rubble	0			Other:			
Undercut banks/Roots	10	6 ✓	NET	*Draw aerial view sketch of habitats found in 100 m sectio*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
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System Type : Stream: ☑ (1st - 2nd order 3rd - 4th order 5th - 6th order 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

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SUN/CLOUDS

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

SAMPLING TEAM: KANE, PLUCHINO	SIGNATURE: Phil Kane	DATE: 02/24/97

DOWNSTREAM

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 02/24/97	RECEIVING BODY OF WATER: LAKE HARRIS

REMARKS: DOWNSTREAM	COUNTY: LAKE	LOCATION: SILVER SPRINGS CITRUS 25411 MARE AVE. HOWEY IN HILLS, FL.	FIELD ID/NAME: SSCC

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability [8]	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 [2]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
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[5] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

[45] **TOTAL SCORE**

Comments

ANALYSIS DATE: 02/24/97	ANALYST: KANE, PLUCHINO	SIGNATURE: Phil Kane

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Silver Springs Citrus Processor
County: Lake
Contact / District: Dr. Phil Kane / Central
NPDES Permit #: FL0002798
LIMS Sample #: 169365 **LIMS Job #:** 97-FEB-25-43
sample log: 2-27-97

Sample Collection: Date 02-24-97 Time 0900
Test Beginning: Date 2-25-97 Time 1420
Test Ending: Date 2-27-97 Time 1420
Organism Batch #: 12 **Diluent Batch #:** well
Organism Age: 10 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.8-25.8°C
incubator 24.4-25.6°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Samples dechlorinated with 0.9mL of 0.025 N Sodium thiosulfate added per liter of sample

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	23.3 @ 23.3	8.2 @ 25.0 °C	102.8 @ 101.8 980 @ 1001 @ 24.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.2 @ 25.3 °C	103.8 @ 101.8 996 @ 1001 @ 25.2 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.2 @ 25.1 °C	103.4 @ 101.8 981 @ 1001 @ 25.0 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	D1	5	5	5	7.9	8.2	8.3	23.5	24.1	24.2	7.8	8.1	7.9	245	250	250
Control B	D2	5	5	5	7.9	8.2	8.3	23.4	24.0	24.1	7.8	8.1	7.8	245	250	250
Control C	D3	5	5	5	7.9	8.2	8.4	23.4	24.0	24.0	8.0	8.1	7.8	245	250	250
Control D	D4	5	5	5	7.9	8.2	8.4	23.4	24.2	24.0	7.9	8.0	7.8	245	250	250
100% A	D5	5	OB	—	8.3	8.2	—	23.4	23.3	—	7.6	7.8	—	285	285	—
100% B	D6	5	OB	—	8.3	8.2	—	23.3	23.1	—	7.6	7.8	—	285	285	—
100% C	D7	5	OB	—	8.3	8.2	—	23.3	23.1	—	7.6	7.8	—	285	285	—
100% D	D8	5	OB	—	8.3	8.2	—	23.3	23.3	—	7.6	7.8	—	285	285	—
100% A dup	D9	5	5	5	8.3	8.3	8.3	23.3	24.1	24.0	7.6	7.8	6.8	285	295	295
100% B dup	D10	5	5	5	8.3	8.3	8.3	23.2	23.9	23.9	7.6	7.7	6.8	285	295	295
100% C dup	D11	5	5	5	8.3	8.3	8.3	23.2	23.9	23.9	7.5	7.7	6.8	285	295	295
100% D dup	D12	5	5	5	8.3	8.3	8.3	23.2	23.9	23.9	7.6	7.7	6.8	290	295	295
Measured/Loaded by:		MF	ND	ND	MF	ND	KR	MF	ND	MF	MF	ND	MF	MF	ND	MF
Recorded by:		JS	ND	MF	KR	KR	JS	KR	KR	JS	KR	KR	JS	KR	KR	JS

B - all dead at 1530 2/25/97 MF

Investigators' Signatures
Marshall Faircloth
Julie Harper
Kellie Kalston
Mark Smith
A H Wolfe
reviewer form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			1.4	–	Dr. Phil Kane
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	JS
Alkalinity (mg/L as $CaCO_3$):		125	70	130	hard	KR/ND
Hardness (mg/L as $CaCO_3$):		130	90	140	hard	KR/ND
Total ammonia (mg/L as N):		<0.017	<0.017	<0.017	orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -54.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

A entry error 2/25/97 MF

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Silver Springs Citrus Processor
County: Lake
Contact / District: Dr. Phil Kane / Central
NPDES Permit #: FL0002798
LIMS Sample #: 169365 LIMS Job #: 97-FEB-25-43
sample log: 2-27-97
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Temperature range: room 24.8-25.8°C
incubator 24.4-25.6°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

100% sample - all organisms dead at 1505.
Dechlorinated aliquot dechlorinated with 0.9 mL of 0.025 N sodium thiosulfate added per liter of sample

Sample Collection: Date 2-24-97 Time 0910
Test Beginning: Date 2-25-97 Time 1405
Test Ending: Date 2-27-97 Time 1405
Organism Batch #: 6 Diluent Batch #: 6
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	23.3 @ 23.3	8.2 @ 25.0 °C	1028 @ 101.8 980 @ 1001 @ 24.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.2 @ 25.3 °C	1038 @ 101.8 996 @ 1001 @ 25.2 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.2 @ 23.3	8.2 @ 25.1 °C	1034 @ 101.8 981 @ 1001 @ 25.0 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.2		8.2	23.7		25.1	8.0		7.8	155		175
Control	B	5	5	5			8.2			24.5			7.9			170
Control	C	5	5	5			8.3			24.8			7.9			175
Control	D	5	5	5			8.3			24.7			7.9			175
100% A	A	5	0[A]		8.3	8.2		23.5	~~24.4~~[BB]	24.9	8.0	~~7.7~~[BB]	7.7	270	290	~~275~~
100% B	B	5	0[A]			8.2			~~25.0~~[BB]	25.0		~~7.7~~[BB]	7.7		290	
100% C	C	5	0[A]			8.3			~~24.5~~[BB]	24.5		~~7.8~~[BB]	7.8		285	
100% D	D	5	0[A]			8.3			~~24.4~~[BB]	24.4		~~7.7~~[BB]	7.7		285	
100% A dcd	A	5	5	5	8.3		8.6	23.5	~~24.7~~[B]	24.7	7.8	~~7.6~~[B]	7.6	280		275
100% B dcd	B	5	5	5			8.6		~~24.7~~[B]	24.7		~~7.9~~[B]	7.9			300
100% C dcd	C	5	5	5			8.6		~~24.6~~[B]	24.6		~~7.8~~[B]	7.9			305
100% D dcd	D	5	5	5			8.6		~~24.5~~[B]	24.5		~~7.8~~[B]	7.9			310
Measured/Loaded by:		MF	KR	JS	MF			MF			MF		KR	MF		KR
Recorded by:		MF	KR	ND	KR			KR			KR		JS	KR		JS

[BB] values at 48h for ~~dcd~~ 100% should be in 24h column 2-27-97 JS

[B] entered values in wrong column (48h) 2-28-97 JS

Investigators' Signatures

Marshall Faircloth
Kellie Kalston
Julie Shespa
Tina Lloyd
A H Wolfe

[A] dead at 1505 2/25/97 shortly after loading into test vessels mf-2/25/97

Water Quality Parameters	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			1.4	—	Dr. Phil Kane AA entry error 0.80
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	~~3.08~~	DR100	JS
Alkalinity (mg/L as $CaCO_3$)	125	70	130	hach	KR/ND
Hardness (mg/L as $CaCO_3$)	130	90	140	hach	KR/ND
Total ammonia (mg/L as N)	<0.017	<0.017	<0.017	orion	MF

Ammonia Meter #98136 Meter Slope: -54.0 Ammonia Blank <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

SILVER SPRINGS CITRUS REFERENCE SITE

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

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	21	≥27	26-14	<14		≥ 27	26-14	<14	3	≥18	17-9	<9	
EPT Index	0	≥6	5-3	<3		≥ 4	3-2	<2	1	-	≥3	<3	
# Chironomid Taxa	5	≥9	8-5	<5		≥9	8-5	<5	3	≥4	3-2	<2	
% Contribution of Dominant Taxon	55.4	≤25	26-62	>62		≤30	31-65	>65	3	≤37	38-69	>69	
% Diptera	26.7	-	≤60	>60		-	≤52	>52	3	-	≤67	>67	
Florida Index	0	≥ 13	12-7	<7		≥10	9-5	<5	1	≥ 6	5-3	<3	
% Suspension feeders/Filterers	3.6	≥ 13	12-7	<7		≥15	14-8	<8	1	≥ 25	25-13	<13	
Total Score		Panhandle				Peninsula			15	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			27-33	Excellent			26-31
		Good			21-26	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

SILVER SPRINGS CITRUS TEST SITE

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

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	27	≥27	26-14	<14		≥ 27	26-14	<14	5	≥18	17-9	<9	
EPT Index	0	≥6	5-3	<3		≥ 4	3-2	<2	1	-	≥3	<3	
# Chironomid Taxa	7	≥9	8-5	<5		≥9	8-5	<5	3	≥4	3-2	<2	
% Contribution of Dominant Taxon	27.2	≤25	26-62	>62		≤30	31-65	>65	5	≤37	38-69	>69	
% Diptera	44.9	-	≤60	>60		-	≤52	>52	3	-	≤67	>67	
Florida Index	1	≥ 13	12-7	<7		≥10	9-5	<5	1	≥ 6	5-3	<3	
% Suspension feeders/Filterers	4.4	≥ 13	12-7	<7		≥15	14-8	<8	1	≥ 25	25-13	<13	
Total Score		Panhandle				Peninsula			19	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			27-33	Excellent			26-31
		Good			21-26	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

Benthic macroinvertebrate taxa list for Silver Springs Citrus Corporation, collected via Hester-Dendy artificial substrates in an unnamed tributary of Lake Harris, on 24 February, 1997. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Coleoptera		
Neoporus sp.	1	–
Peltodytes sp.	4	–
Scirtes sp.	–	1
Tropisternus sp.	8	–
Undetermined Curculionidae	1	–
Diptera		
Chironomus sp.	223	67
Dasyhelea sp.	–	26
Glyptotendipes sp.	–	2
Goeldichironomus holoprasinus	1	10
Goeldichironomus sp.	–	13
Kiefferulus sp.	11	3
Labrundinia sp.	1	–
Monopelopia boliekae	4	–
Tanypus carinatus	–	1
Tanytarsus sp. F Epler	4	–
Undetermined Chironomidae	15	1
Gastropoda		
Hebetancylus excentricus	14	–
Micromenetus sp.	–	4
Physella sp.	2	1
Planorbella duryi	1	–
Hemiptera		
Undetermined Belostomatidae	1	–
Hirudinea		
Mooreobdella sp.	–	1
Odonata		
Enallagma sp.	1	–
Pachydiplax longipennis	5	–
Undetermined Coenagrionidae	1	–
Oligochaeta		
Dero lodeni	12	211
Dero pectinata	86	160
Dero sp.	18	140
Dero trifida	122	11
Haber speciosus	1	–
Haemonais waldvogeli	18	–
Pristina aequiseta	–	1

Benthic macroinvertebrate taxa list for Silver Springs Citrus Corporation, collected via 20 discrete dip net sweeps in an unnamed tributary of Lake Harris, on 24 February, 1997.

	Reference Site	Test Site
Coleoptera		
Celina sp.	1	–
Derallus sp.	1	–
Hydrobiomorpha sp.	–	4
Suphisellus sp.	–	8
Tropisternus sp.	2	–
Undetermined Coleoptera	–	1
Undetermined Curculionidae	–	1
Undetermined Noteridae	–	3
Collembola		
Isotomurus tricolor	1	–
Diptera		
Antocha sp.	–	1
Atrichopogon sp.	–	2
Chironomus sp.	65	15
Dasyhelea sp.	–	2
Goeldichironomus holoprasinus	–	6
Goeldichironomus sp.	–	7
Kiefferulus sp.	2	–
Labrundinia maculata	1	–
Limnophila sp.	–	1
Monopelopia boliekae	4	–
Odontomyia sp.	–	1
Palpomyia/bezzia grp.	3	10
Polypedilum illinoense grp.	–	3
Psychoda sp.	1	–
Tanypus carinatus	1	–
Tanytarsus sp.	–	4
Tanytarsus sp. F Epler	1	–
Tanytarsus sp. G Epler	–	5
Tanytarsus sp. L Epler	–	2
Undetermined Chironomidae	1	4
Undetermined Culicidae	–	1
Undetermined Tipulidae	–	1
Gastropoda		
Micromenetus sp.	1	–
Physella sp.	1	3
Planorbella duryi	2	–
Pseudosuccinea columella	–	3
Undetermined Ancylidae	12	–

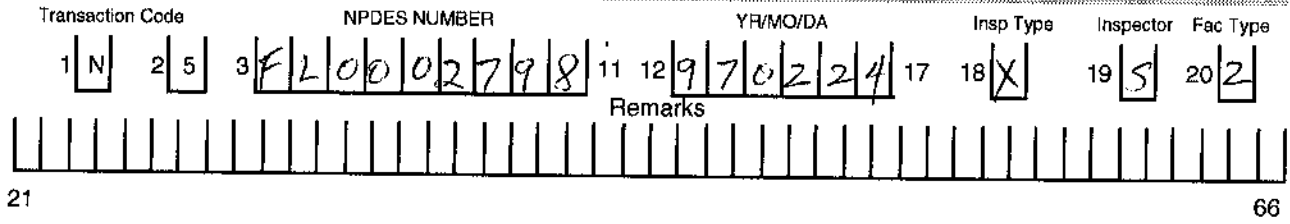
Undetermined Gastropoda	1	–
Hemiptera		
Belostoma sp.	–	1
Nemertea		
Prostoma rubrum	–	1
Odonata		
Undetermined Coenagrionidae	1	–
Undetermined Zygoptera	–	1
Oligochaeta		
Bratislavia unidentata	–	1
Dero lodeni	6	5
Dero pectinata	128	26
Dero sp.	38	15
Eclipidrilus sp.	–	5
Haemonais waldvogeli	12	–
Pristina aequiseta	–	2
Undetermined Naididae	–	1
Pelecypoda		
Undetermined Pelecypoda	3	–
Undetermined Pisidiidae	7	–

Periphyton taxa list and densities (#/mm^2) for Silver Springs Citrus Corporation, collected via glass microscope slides in an unnamed tributary of Lake Harris, on 24 February, 1997.

	Reference Site	Test Site
Bacillariophyceae		
Achnanthes exigua	9106	16088
Achnanthes hungarica	379	3139
Achnanthes hustedtii	190	–
Achnanthes sp.	759	–
Centrales	2751	23936
Cyclotella sp.	569	1570
Eunotia pectinalis	190	–
Eunotia sp.	379	–
Gomphonema affine	379	–
Gomphonema parvulum	6355	7063
Navicula cryptocephala	3320	55720
Navicula cuspidata	–	785
Navicula lanceolata	949	10202
Navicula minima	5597	3924
Navicula pupula	1328	6278
Navicula radiosa	190	3139
Navicula rhynchocephala	379	5494
Nitzschia amphibia	2941	8633
Nitzschia obtusa	–	785
Nitzschia palea	5597	37277
Nitzschia sp.	190	3139
Nitzschia sublinearis	190	4709
Pennales	6735	3139
Pinnularia acrosphaeria	–	1570
Stauroneis anceps	–	1570
Chlorophyceae		
Characium sp.	5312	–
Chlamydomonas sp.	379	785
Chlorococcum sp.	95	–
Coelastrum sp.	95	–
Gloeocystis sp.	95	–
Oedogonium sp.	6735	–
Scenedesmus sp.	1043	4709
Stigeoclonium sp.	1613	–
Tetraedron sp.	–	1177
Tetrallantos sp.	95	–
Trochiscia sp.	95	785
Cryptophyceae		

Cryptomonas sp.	474	–
Cyanophyceae		
Anabaena sp.	–	6671
Aphanocapsa sp.	474	3532
Aphanothece sp.	95	392
Chroococcus sp.	949	–
Dactylococcopsis sp.	–	785
Lyngbya sp.	95	1177
Merismopedia sp.	2182	11772
Microcystis sp.	–	392
Oscillatoria sp.	664	31392
Raphidiopsis sp.	95	–
Synechococcus sp.	379	2354
Euglenophyceae		
Euglena sp.	285	–

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)

