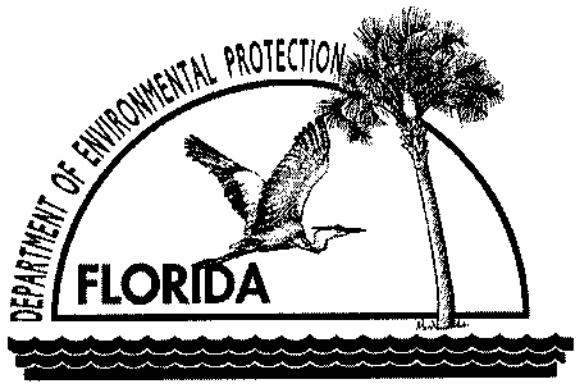


Biological Assessment of

Wekiva Hunt Club Sewage Treatment Plant

Seminole County

NPDES #FL0036251

Sampled April 1996

September 1996

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: Wekiva Hunt Club STP
County: Seminole
NPDES Number: FL0036251
State Permit Expiration Date: 27 June 1997

Toxics Sampling Inspection (XSI)

Date Sampled: 15 April 96

Results: All metals and organic compounds detected in the effluent complied with Class III Water Quality Standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 15 April 96

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 15 April 96

Results: The dip net and Hester-Dendy macroinvertebrate results demonstrated that both sites in Sweetwater Creek were biologically healthy. Test site measures, such as taxa richness, the Florida Index, and the EPT Index were similar to, or better than, the reference site values. The Stream Condition Index (SCI), with scores of 29 points at the reference site and 31 points at the test site, placed both stations in the "excellent" category. Chlorophyll *a* decreased from 9.1 µg/L at the reference site (a value higher than approximately 68% of other Florida streams) to below detection limit at the test site. Apparently, factors such as riparian shading, tannin-stained waters, or water flow may have discouraged phytoplankton blooms from occurring near the discharge. The nutrient and AGP results suggest the discharge may contribute to such problems farther downstream, where water velocity is diminished and retention times are greater.

Water Quality Inspection (WQI)

Date Sampled: 15 April 96

Results: Elevated effluent concentrations of ammonia (0.82 mg/L) and nitrate-nitrite (5.0 mg/L) led to the enrichment of these compounds at the test site. Ammonia increased from 0.1 mg/L at the reference site to 0.43 mg/L at the test site. Concurrently, at these same locations, nitrate-nitrite increased from 0.25 mg/L to 3.6 mg/L. These test site levels of ammonia and nitrate-nitrite are higher than those found in 90% and 95%, respectively, of other Florida streams. Other nutrient values at the test site were normal. Algal Growth Potential (AGP) results demonstrated nutrient enrichment from the facility exacerbated the already elevated AGP levels in Sweetwater Creek. AGP increased from 22.1 mg dry wt/L at the reference site to 75.7 mg dry wt/L at the test site. Note while water at both sites exceeded the 5.0 mg dry wt/L "problem threshold" for AGP, the test site value was extremely elevated. AGP of the effluent was 44.0 mg dry wt/L.

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

Introduction

The Wekiva Hunt Club Sewage Treatment Plant is located in Seminole County, Florida (see maps in Appendix). Wastewater treatment at this 2.9 MGD facility includes three parallel activated sludge package plants, sodium aluminate addition for phosphorus control, disinfection by chlorination, tertiary filtration, and dechlorination. The effluent is discharged via an outfall pipe into the Class III Sweetwater Creek, which flows into the Wekiva River. Average flow from the facility during the permit cycle was 2.25 MGD, which is similar to the flow during this survey (2.14 MGD). State permit limits are as follows: flow (2.9 MGD as an annual average), $CBOD_5$ (5.0 mg/L as a monthly average), total suspended solids (5.0 mg/L as a monthly average), ammonia (2.5 mg/L as a monthly average), total phosphorus (0.40 mg/L as a monthly average), and dissolved oxygen (6.0 mg/L as a daily minimum) (see Facility Summary in Appendix).

The permit was modified in 1995 to allow the use of on-site percolation ponds when the outfall structures are being cleaned. The Department will require the facility to meet all regulatory standards for distributing reclaimed water for golf course irrigation by December 31, 1996, and to install distribution lines by December 31, 1997. It is anticipated that the current mixing zone for dissolved oxygen in Sweetwater Creek (1000 ft from outfall) will be eliminated in the new permit.

The facility generally complies with permit limits. In the past year, however, the effluent has been inadequately disinfected (on four occasions) and inadequately dechlorinated (on one occasion). These violations appear to be the result of abnormal events such as pump and flow meter failures. A backup power supply and alarm were installed to prevent future occurrences. Additionally, lift stations have overflowed on three separate times,

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	31	33
Florida Index	15	14
SCI	29	31
EPT Index	3	3
% Contribution of Dominant Taxon	18.1	23.8
% Oligochaeta	2.3	10.9
% Diptera	65.5	44.9
% Trichoptera	8.8	5.4
% Coleoptera	8.2	3.4
% Pelecypoda	0.6	7.5
% Gastropoda	1.8	12.9
% Rhynchocoela	3.5	12.2
% Other	9.3	2.8
% Predators	8.8	18.7
% Above Surface Deposit Feeders	26.3	10.9
% Below Surface Deposit Feeders	2.3	9.5
% Suspension Feeders	37.4	40.1
% Scrapers	11.1	17.7
% Shredders	14.0	1.7
% Other	0.1	1.4
Macroinvertebrate Hester-Dendy		
Number of Taxa	27	32
Florida Index	13	18
Shannon-Weaver Diversity	3.2	2.5
EPT Index	2	5
% Diptera	64.7	86.5
% Trichoptera	13.5	11.2
% Trombidiformes	1.1	1.3
% Coleoptera	17.3	0.4
% Other	3.4	0.6
% Predators	12.8	12.2
% Above Surface Deposit Feeders	14.4	6.0
% Suspension Feeders	61.1	78.9
% Scrapers	9.8	0.8
% Other	1.9	2.1
Phytoplankton Algae		
Chlorophyll a (ug/L)	9.14	0.50 U
Algal Growth Potential (mg dry wt/l)	22.1	75.7

resulting in the discharge of approximately 7,000 gallons of untreated wastewater to surface waters.

Methods

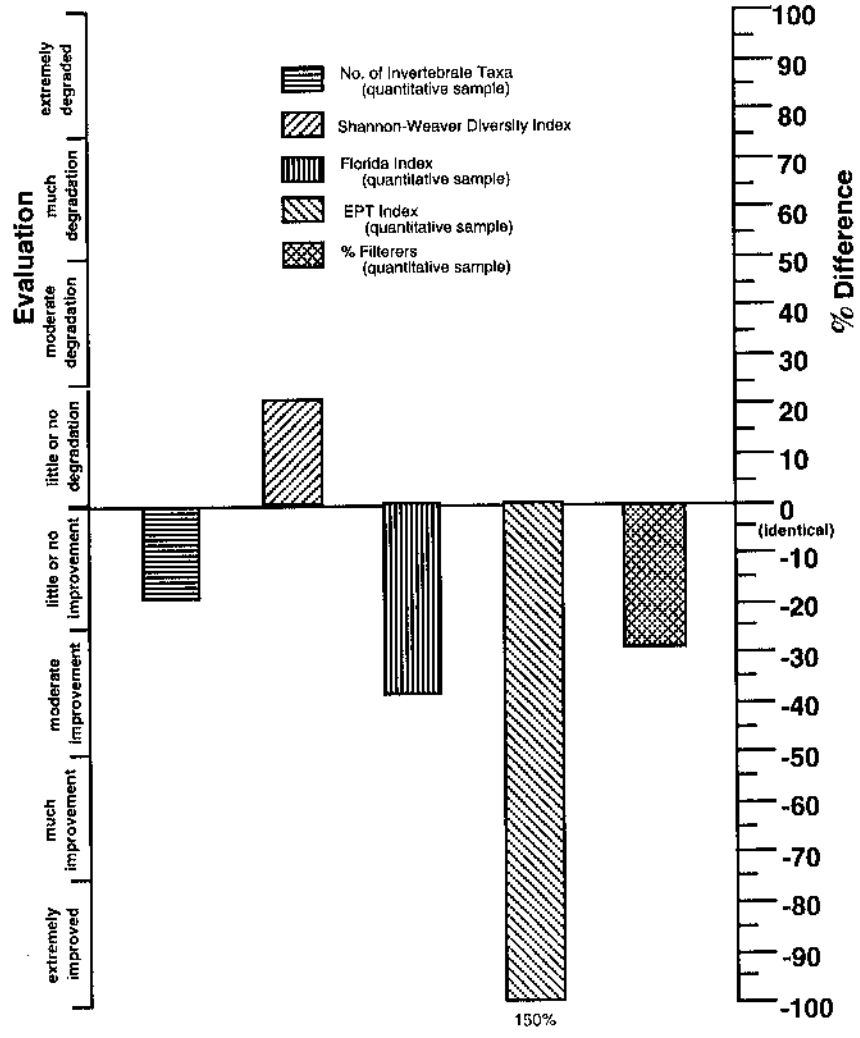
The focus of this investigation was to determine the discharger's effects on Sweetwater Creek. A comparison of biological community health was made between a reference site (located in Sweetwater Creek approximately 100 m upstream of the discharge) and a test site (located approximately 100 m downstream of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. 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 effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Periphyton communities could not be evaluated because the diatometers were lost. Samples for phytoplankton identification, mislabeled as chlorophyll *a* samples, were subsequently filtered, rendering the taxonomic data unrecoverable. Chlorophyll *a* was determined for phytoplankton 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.



Effect of discharge on the benthic macroinvertebrate community.

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); or 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. 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 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 Hudson *et al.* (1990), Lenat (1993), and Chang *et al.* (1992) 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 proportions of major groups of organisms, compared to reference 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.

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 (see SCI calculation table in Appendix).

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 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, Karen Gottwald, and Valerie Meis (DEP Central District) and Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Lisa Tamburello, Todd Space, and David Whiting (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

The habitat quality at the reference site was classified as "suboptimal" (with 99 points) while the test site (with 130 points) was classified as "optimal". The reference site received lower scores in the categories of substrate availability, bank stability, and riparian buffer zone width.

There was little difference in the physical/chemical measures between the reference and test sites. Dissolved oxygen levels complied with Class III standards at the reference (8.3 mg/L) and test site (7.6 mg/L). The pH (ranging from 6.8 SU to 6.7 SU) and temperature (22.4 °C and 22.6 °C) were virtually unchanged between the two study sites. The conductivity was somewhat higher at the reference site (201 µmhos/cm) than at the test site (161 µmhos/cm). Water at the test site was more tannic, and the canopy cover was greater (more than 80% shading) than that of the reference site.

The effluent sample was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*. No mortality occurred during the 48 hour acute bioassays (Appendix).

The herbicide, atrazine, was detected in the effluent (0.17 µg/L) at a concentration below chronically toxic levels (AQUIRE 1991). Metals detected in the effluent included aluminum (126 µg/L), cadmium (0.083 µg/L), copper (11 µg/L), and zinc (31 µg/L). At an effluent hardness of 117.2 mg $CaCO_3$/L, all these metals met Class III water quality standards.[3]

The effluent Total Suspended Solids (less than 0.6 mg/L) and BOD (1.2 mg/L) complied with respectve monthly maximum permit limits (5.0 mg/L for each).

Elevated effluent concentrations of ammonia (0.82 mg/L) and nitrate-nitrite (5.0 mg/L) led to the enrichment of these compounds at the test site. For example, ammonia increased from 0.1 mg/L at the reference site to 0.43 mg/L at the test site. Concurrently, at these same locations, nitrate-nitrite increased from 0.25 mg/L to 3.6 mg/L. These test site levels of ammonia and nitrate-nitrite are higher than those found in 90% and 95%, respectively, of other Florida streams (see Table of Typical Water Quality Values in Appendix). Other nutrient values at the test site were normal.

Algal Growth Potential (AGP) results demonstrate that nutrient enrichment from the facility exacerbated the already elevated AGP levels in Sweetwater Creek. AGP increased from 22.1 mg dry wt/L at the reference site to 75.7 mg dry wt/L at the test site. Note while water at both sites exceeded the 5.0 mg dry wt/L "problem threshold" for AGP (Raschke and Schultz 1987), the test site value was extremely elevated. AGP of the effluent was 44.0 mg dry wt/L.

Measures of macroinvertebrate community health indicated that both the reference and test sites were healthy. The discharge did not appear to have any adverse affect on the existing biological community. 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 the test site is better than the reference site.

In the Hester-Dendy samples, improvements in taxa richness (27 taxa at the reference site, 32 at the test site), the Florida Index (13 at the reference site, 18 at the test site), and the EPT Index (2 at the reference site, 5 at the test site) were observed between the upstream and downstream stations. There was a moderate decline in the Shannon-Weaver diversity index between the reference site (3.2) and the test site (2.5), due to the large numbers (3,471 organisms/m^2) of pollution sensitive *Rheotanytarsus* spp. found downstream of the discharge.

The dip net results also showed both sites in Sweetwater Creek to be biologically healthy. Taxa richness at the reference site (31) was slightly less than the test site (33). The Florida Index was slightly higher at the reference site (15) when compared to the test site (14). The EPT index was the same at both sites (3). The Stream Condition Index, with scores of 29 points at the reference site and 31 points at the test site, placed both stations in the excellent category (Appendix).

Chlorophyll *a* decreased from 9.1 µg/L at the reference site (a value higher than approximately 68% of other Florida streams) to less than 0.5 µg/L at the test site. Apparently, factors such as heavy shading, tannin-stained waters, or water flow may have discouraged phytoplankton blooms from occurring near the discharge. The nutrient and AGP results suggest the discharge may contribute to such problems farther downstream, where water velocity is diminished and retention times are greater.

Conclusions

Effluent from the Wekiva Hunt Club Sewage Treatment Plant was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

All metals and organic compounds detected in the effluent complied with Class III water quality standards.

Effluent TSS and BOD complied with monthly maximum[5] permit limits.

Elevated effluent concentrations of ammonia (0.82 mg/L) and nitrate-nitrite (5.0 mg/L) led to the enrichment of these compounds at the test site. Ammonia increased from 0.1 mg/L at the reference site to 0.43 mg/L at the test site. Concurrently, at these same locations, nitrate-nitrite increased from 0.25 mg/L to 3.6 mg/L. These test site levels of ammonia and nitrate-nitrite are higher than those found in 90% and 95%, respectively, of other Florida streams. Other nutrient values at the test site were normal.

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Chemistry Summary Table: Wekiva Hunt Club STP, collected 15 April, 1996.	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
Atrazine	0.17 I		
Metals (ug/L)			
Aluminum	126 I		
Arsenic	10 U		
Cadmium	0.083 I		
Copper	11 A		
Chromium	10 U		
Iron	10 U		
Lead	10 U		
Mercury	0.10 U		
Nickel	4 U		
Selenium	30 U		
Silver	0.05 U		
Zinc	31 A		
Nutrients (mg/L)			
Ortho-phosphate	0.18 A	0.039 I	0.091 A
Total phosphorus	0.21	0.067	0.13
Ammonia	0.82 A	0.10 A	0.43
Unionized Ammonia	0.016		
Nitrate+Nitrite	5.0 A	0.25 A	3.6
TKN	1.5A	0.61	0.79
General Phys-Chem Parameters			
Habitat Assessment		99	130
Dissolved oxygen (mg/L)	7.9	8.3	7.6
pH (SU)	7.5	6.8	6.7
Conductivity (µmhos/cm)	525	201	161
Temperature (°C)	23.9	22.4	22.6
5 Day Biological Oxygen Demand (mg/L)	1.2 I	1.0 I	1.1 A
Total Suspended Solids (mg/L)	0.6 U	1.7 A	2.9
Hardness (mg CaCO3)	117.2		
Algal Growth Potential (mg dry wt/L)	44.0	22.1	75.7
Toxicity			
Bioassay Fish-Dechlorinated	Not toxic		
Bioassay Invertebrate-Dechlorinated	Not toxic		

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

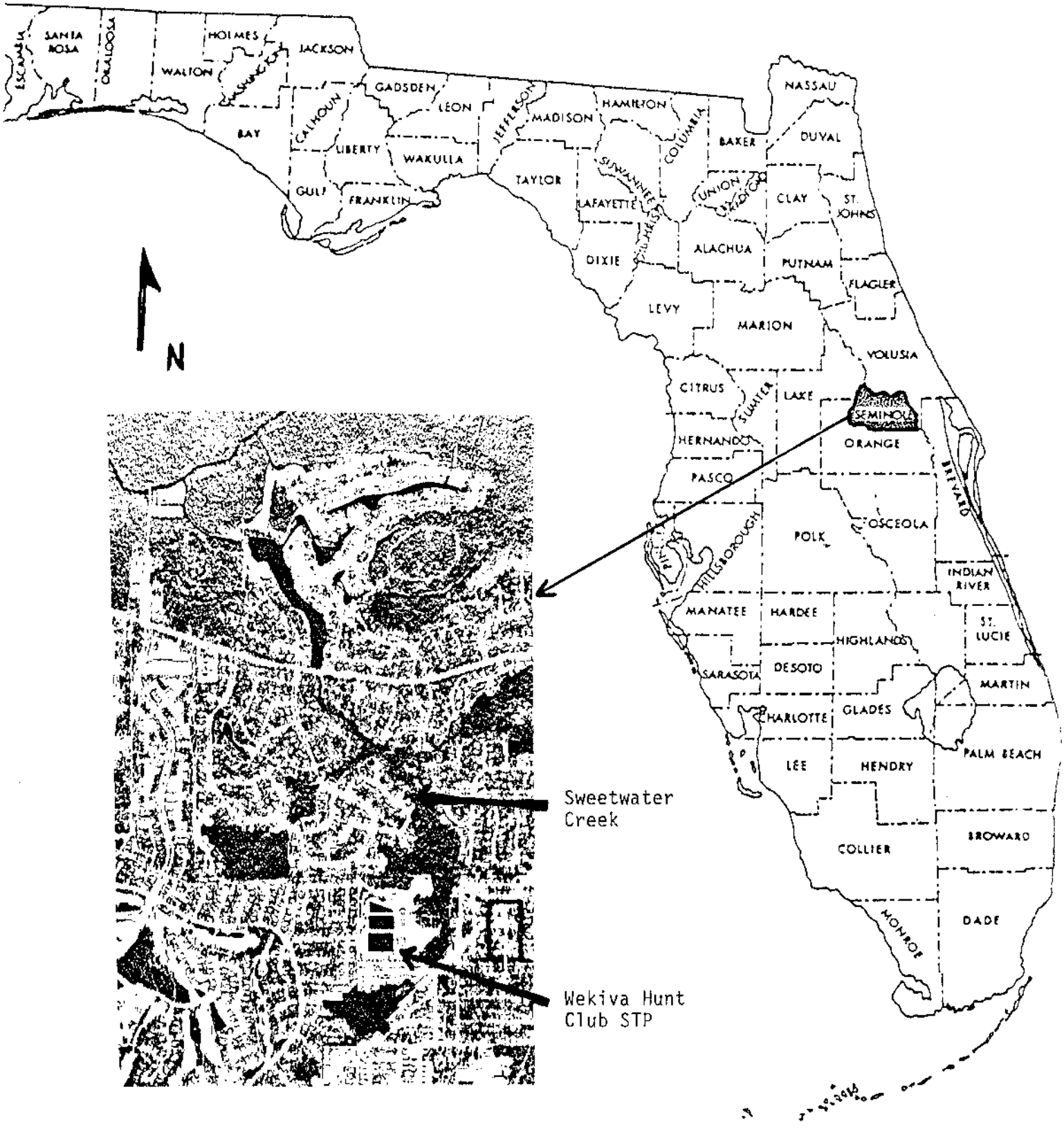
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(data was collected between 1980 and 1989)

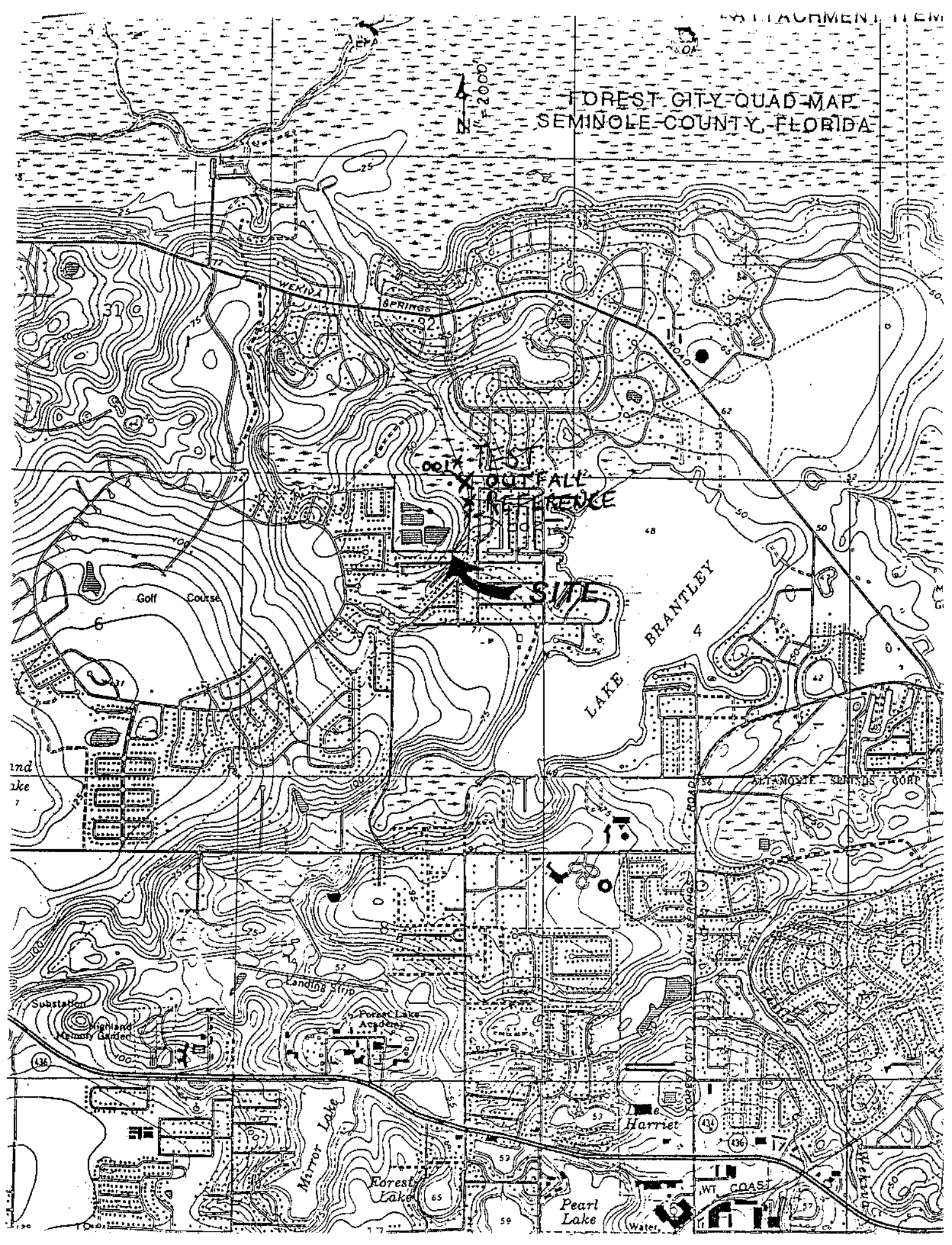
Percentile Distribution

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
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-Phosphate	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-Phosphate	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

Study Area and Wekiva Hunt Club STP with Sweetwater Creek.




ATTACHMENT ITEM
FOREST CITY QUAD MAP
SEMINOLE COUNTY, FLORIDA
1" = 2000'
N
WEKIVA SPRINGS ROAD
001 TEST OUTFALL
SITE
LAKE BRANTLEY
Golf Course
ALTAMONTE SPRINGS QUAD
PALMS SPRINGS ROAD
FOREST CITY
Landing Strip
Substation
Highland Memory Garden
Forest Lake Academy
Mirror Lake
Forest Lake
Pearl Lake
Lake Harriet
WT COAST
Water

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Wekiva Hunt Club		Date Summary Prepared: 4/9/96
Location (attach detailed map): See map attached.	County: Seminole	District: Central
Federal Permit # FL0036251 and expiration date: 2/29/96	State GMS # and 3059P03243 State expiration date: 6/27/97	Facility Type: Industrial Municipal Federal Agricultural Other (list): Private Domestic

Function of facility: Domestic Wastewater Treatment Plant

Description of treatment process: See diagram attached.
a 2.9 MGD design capacity wastewater treatment facility consisting of three parallel activated sludge package plants with sodium aluminate facilities for phosphorus control, disinfection by chlorination, tertiary filtration, dechlorination. The effluent is discharged to surface water via outfall pipe to Sweetwater Creek at the existing north outfall structure (D001). four on-site percolation ponds are used only when cleaning the outfall structure.

Receiving waters: Sweetwater Creek	Classification: I II III OFW Freshwater	
Design Flow: 2.9 MGD	Mean Flow: approx 2.25 MGD	Flow during survey: 2.14 MGD

Discharge is: (Continuous) Intermittent Seasonal Rainfall dependent
Other (describe)
therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):
A mixing zone for dissolved oxygen extends from the upstream outfall (east) to a point approximately 1,000 feet downstream from the outfall at the foot bridge off Wild Oak Circle. During the current wastewater permit application (review) process, the permittee requested that this mixing zone be deleted/eliminated in the new wastewater permit. The Department plans to grant this request.

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

Parameter (STATE)	Limit (units)
FLOW	2.9 MGD AADF
$CBOD_5$	5.0 mg/L mon. avg.
TSS	5.0 mg/L mon. avg.
NH_3 as N	2.5 mg/L mon. avg.
TP as P	.40 mg/L mon. avg.
DO	6.0 mg/L daily min.

Describe special permit conditions and permit modifications:
THE STATE PERMIT WAS MODIFIED ON 4/19/95 TO ALLOW THE USE OF THE ON-SITE PERC. PONDS WHEN THE EFFLUENT STRUCTURE IS BEING CLEANED. THE USE OF PERC. PONDS FOR THIS PURPOSE WILL ALSO BE AUTHORIZED IN THE NEW WASTEWATER PERMIT WHICH IS IN THE PROCESS OF ISSUANCE. THE PERMITEE IS NOT AUTHORIZED TO USE OUTFALL D002, WHICH HAS BEEN SEALED BY THE PERMITEE.

SEE ATTACHED SHEETS FOR NPDES EFFLUENT LIMITS

Wekiva Hunt Club
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s): Outfall Structure D001.
Final effluent is discharged from the dechlorination chamber via approx 100 ft of 16" PVC pipe to a junction box and then to Sweetwater Creek via 18" concrete pipe.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: Chlorine-disinfection violations: 1/2/96 Cl_2 = 0.3 mg/L due to lightning
3/7/95 Cl_2 = 0.1 mg/L due to flow meter malfunction
7/9/95 Cl_2 = 0.0 mg/L due to flow meter malfunction
9/17/95 Cl_2 = 0.05 mg/L

Chlorine-dechlorination violations: 8/16/95 Cl_2 > 0.01 mg/L due to sulfur dioxide pump failure.

A backup power supply & alarm system was installed.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
① No current enforcement actions.
② Stipulated Settlement dated 1/21/92 requires this plant to meet all Regulatory standards for distributing reclaimed water for golf course irrigation by 12/31/96 and to install distribution lines by 12/31/97. A "Petition of Sanlando Utilities Corporation for a Limited Proceeding to implement water conservation in Seminole County" was filed with the Public Service Commission. This document commits the permittee to place in operation a reuse system by July 2000.
③ No bioassessments have been conducted. Current NPDES toxicity results are satisfactory (passed).
④ The WQBELs for CBOD5, TSS, NH_3 and TP were established by the Dept. on May 3, 1989 based on information provided by the permittee.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
This facility has rarely had MOR results violations in the past. Chlorine violations have increased in occurrence, but appear to be the result of abnormal events experienced.

Additional information:
Lift station overflows occurred:
(1) 3/5/96 - 500-700 gallons overflowed to surface waters due to open bypass valve.
(2) 12/15/95 About 500 gallons overflowed to drainage swale because operator forgot to turn the L/S pumps on after checking it.
(3) 12/10/95 - 6000 gal. overflowed L/S to pond

Staff contributing to this review (signature):
Philip N. Kane, EdD (Biologist)
Karen Gottwald (Inspector)
Roberto Coello (Engineer)
Al Castro ( )
( )
( )

Additional Specific Permit Conditions:

S.C. #15

The permittee shall provide to the Dept. of least 180 days prior to expiration of this permit a "Surface Water Impact Summary Report" (SWISR).

The SWISR was submitted as part of the renewal application package. The document was reviewed by the Dept's Point Source Evaluation Section in Tallahassee and comments provided by Tallahassee were satisfactorily addressed by the permittee.

S.C #16

The permittee is required to harvest the created wetland system south of Welkin Springs road when the removal efficiency of the plants becomes less than 25% when measured on a yearly basis. The facility has complied with this requirement.

S.C # 17

The permittee is required to periodically monitor the Sweetwater Creek/Cove Lake system for nuisance plants. They have complied with this requirement.

Attention: Hubert J..ques,
Executive Vice President

SPECIFIC CONDITIONS:

1. The required compliance sampling for the treatment plant effluent (at the meter box) prior to discharge to Sweetwater Creek shall be as follows:

Parameter	Recording or sampling Frequency
Total Suspended Solids (TSS)*	weekly
$CBOD_5$*	weekly
pH	continuous
Chlorine residual	continuous
Flow	continuous
Fecal coliform	weekly
Nitrate Nitrogen as N	weekly
Total Nitrogen as N	weekly
Ammonia Nitrogen as N	weekly
Total Phosphorus as P	weekly
Dissolved Oxygen	daily
Chlorine Residual following dechlorination (at outfall)	daily

* Influent and effluent

The sampling and analysis required above shall be in accordance with Chapter 17-601, F.A.C. and approved standard methods. Properly executed reports shall be submitted monthly to this office, by the 28th day of the following month.

2. Water quality monitoring shall be performed in Sweetwater Creek/Cove Lake for the six (6) sampling stations identified in Section 4-4 of the Wekiva Hunt Club, S.T.P. Phase III Expansion and Improvement Engineering Report dated March 1989 and an additional station in the Wekiva River where Miami Springs Road bridge is located as follows:

Parameter	Frequency
$CBOD_5$	monthly
Chloride	monthly
TOC	monthly
Nitrate Nitrogen as N	monthly
Ammonia Nitrogen as N	monthly
Total Kjeldahl Nitrogen as N	monthly
Total Phosphorus as P	monthly
Ortho Phosphorus as P	monthly
Total Suspended Solids	monthly
Chlorophyll-a	monthly
Alkalinity	monthly
Dissolved Oxygen	monthly
pH	monthly
Temperature	monthly
Sediment Oxygen Demand	annually

Attention: Hubert Jacques,
Executive Vice President

SPECIFIC CONDITIONS:

6. A mixing zone for Dissolved Oxygen (DO) is granted for this facility. The zone shall extend from the upstream outfall (East) to a point approximately 1,000 feet downstream from the outfall at the foot bridge off Wild Oak Circle.

7. The facility shall be operated to provide compliance with the following effluent limits at the meter box:

Flow	2.9 MGD annual average
$CBOD_5$	5.0 mg/L monthly average
TSS	5.0 mg/L monthly average
NH_3 as N	2.5 mg/L monthly average
TP as P	0.40 mg/L monthly average
DO	6.0 mg/L daily minimum

8. Monitoring of the existing ground water monitoring wells shall be continued as established in the previously approved Ground Water Monitoring Plan through December 1991.

9. The maintenance and operation log required pursuant to Rule 17-602.360(e), F.A.C., shall be stored on-site in a weather resistant structure.

10. Operational difficulties, which may cause or result in non-compliance with the requirements of this permit, shall be immediately reported to both the local pollution control program and to the Department.

11. The permittee shall submit the prescribed application and supporting data for an operation permit no later than sixty (60) days prior to the expiration date of this permit.

12. Domestic residual (sludge) disposal shall be in accordance with Rule 17-640, F.A.C. Residuals shall be analyzed quarterly and the information submitted to the Department. Agricultural land use plans shall be submitted annually on forms approved by the Department. In accordance with this rule, the permittee is responsible for compliance with the requirements of Department rules as they relate to land application of residuals.

13. The treatment plant effluent shall be adequately chlorinated at all times so as to maintain a minimum 0.5 mg/L total chlorine residual after a minimum contact period of 15 minutes (based on peak hourly flow) or as required to achieve the basic disinfection criteria of Rule 17-600.440(4), F.A.C. Effluent shall be dechlorinated to reduce chlorine residual to not more than 0.01 mg/L prior to discharge to Sweetwater Creek.

14. The permittee will promptly notify the Department upon sale or legal transfer of the permitted facility. In accordance with General Condition #11 of this permit, this permit is transferable only upon Department approval. The new owner must apply, by letter, for a transfer of permit within thirty (30) days.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Final

1. These limitations are to be achieved by the effective date of the permit, and shall remain in effect until permit expiration for outfall Serial Numbers 001 and 002, treated sanitary wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETERS	MONITORING REQUIREMENTS				
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sampling Point
Flow, MGD	Report	Report	Continuous	Recording flow meter & totalizer	Effluent
Biochemical Oxygen Demand (5 Day)	5.0 mg/l	6.0 mg/l	1/week	16-hr. comp.	Effluent
Suspended Solids	5.0 mg/l	6.0 mg/l	1/week	16-hr. comp.	Effluent
Ammonia Nitrogen as N	2.50 mg/l	3.0 mg/l	1/week	16-hr. comp.	Effluent
Total Phosphorus as P	0.40 mg/l	0.50 mg/l	1/week	16-hr. comp.	Effluent
Fecal Coliform Bacteria, N/100 ml	See Item 2 on Page I-2		1/week	Grab	Effluent
pH	See Item 3 on Page I-2		Continuous or hourly grab	Grab	Effluent
Total Residual Chlorine	See Item 7 on Page I-2		Daily	Grab	Effluent
Dissolved Oxygen shall not be less than 6.0 mg/l.			1/week	Grab	Effluent
Chronic Whole Effluent Toxicity	See Item 8 on Page I-3		See Part IV	24-hr. comp.	Effluent

Whole Effluent Toxicity Testing Program

As required by Part I of this permit, the permittee shall initiate the series of tests described below beginning in July, 1991, to evaluate whole effluent toxicity of the discharge from outfalls 001 and 002 (each outfall tested separately). All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-89/001, or the most current edition(s). The dilution/control water used will be a moderately hard water as described in EPA/600/4-89/001, Section 7 (or the most current edition). A standard reference toxicant quality assurance test shall be conducted concurrently with each species used in the toxicity tests and the results submitted with the discharge monitoring report (DMR). Alternatively, if monthly QA/QC reference toxicant tests are conducted, these results must be submitted with the DMR.

1. a. The permittee shall conduct a daphnid (Ceriodaphnia dubia) Survival and Reproduction Test and a short-term Fathead Minnow (Pimephales promelas) Larval Survival and Growth Test. These tests shall be conducted using a control (0% effluent) and one test concentration consisting of 100% effluent (equivalent to the Receiving Water Concentration (RWC) of the effluent in the receiving water at critical conditions). Unacceptable chronic toxicity will be demonstrated if either test results in a no observable effect concentration (NOEC) less than 100% effluent. All test results shall be statistically analyzed according to Appendix H, EPA/600/4-89/001, or the most current edition.

   b. For each set of tests conducted, a minimum of three different 24-hour composite samples of final effluent shall be collected and used per the sampling schedule of Section 8.1.4.2, EPA/600/4-89/001 (or the most current edition). All test solutions shall be renewed daily. If test results do not meet the acceptability criteria of either Section 12, paragraph 12.10 or Section 10, paragraph 11.11, EPA/600/4-89/001 (or the most current edition), that test shall be repeated. A chronic test will be considered valid only if the acceptability criteria referenced above are met.

   c. If 100% mortality occurs in the RWC test concentration prior to the end of the test and control mortality is acceptable at that time, that test (including the control) shall be terminated with the conclusion that the sample demonstrates unacceptable chronic toxicity.

2. a. The toxicity tests specified above shall be conducted once every 6 months for the duration of the permit, unless notified otherwise by EPA. These tests are referred to as "routine" tests.

   b. Results from "routine" tests shall be reported according to EPA/600/4-89/001, Section 9, Report Preparation (or the most current edition), and shall be submitted as an attachment to the DMR. Such results are to be entered on the DMR in the following manner:

      For the chronic test results, if the NOEC of a test species is less than 100% effluent, '<100%' should be entered on the DMR for that species. If the NOEC of a test species is greater than or equal to 100% effluent, '>100%' should be entered.

3. a. If unacceptable chronic toxicity (a NOEC less than 100% effluent in either test) is found in a "routine" test, the permittee shall conduct two additional toxicity tests based on the specie(s) indicating unacceptable toxicity. For each additional test, the sample collection requirements and test acceptability criteria specified in Section 1(b) must be met for the test to be considered valid. The first test shall begin within two weeks of the end of the "routine" test and the second test shall be conducted two weeks later. If either or both of these tests are invalid, additional test(s) are to be conducted every two weeks until two valid tests are completed (e.g., if the first test is valid and the second test is not, the permittee shall continue to conduct tests until one more test is valid). The additional tests will be used to determine if the toxicity found in the "routine" test is still present.

1. For "routine" tests with unacceptable chronic toxicity, the permittee shall conduct additional daphnid (Ceriodaphnia dubia) Survival and Reproduction and/or short-term fathead minnow (Pimephales promelas) Survival and Growth multi-concentration tests, as appropriate. The tests will be conducted on a control, 100% effluent, and the following % effluent concentrations: 0.25 x the RWC, 0.5 x the RWC, the RWC, and [the RWC + 100]/2. The sample collection requirements specified in Section 1(b) above shall be met.

b. Results from additional tests, required due to unacceptable chronic toxicity in the "routine" test, shall be submitted in a single report prepared according to EPA/600/4-89/001, Section 9, Report Preparation (or the most current edition) and submitted within 45 days of completion of the second additional, valid test.

4. For all tests conducted prior to the effective date of the final total residual chlorine limit, the final effluent sample must be artificially dechlorinated before test initiation. For all tests conducted after this date, a final effluent sample must be used.

UPSTREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 04/15/96	TIME: 1045	RECEIVING BODY OF WATER: SWEETWATER CREEK

REMARKS:	LOCATION: WEKIVA HUNT CLUB STP 144 CEDBURY DRIVE LONGWOOD, FL.	FIELD ID/NAME: REFERENCE SITE WEKIVA
UPSTREAM		

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
50				50			

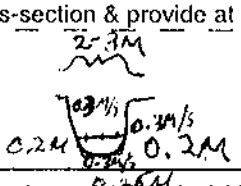
Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

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

Width of riparian vegetation (m) on least buffered side: 8M

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)



Artificially Channelized ☑ no ☐ ☐ ☐

Artificially Impounded ☐ yes (recent, severe / some recovery / mostly recovered, more sinuous)

High Water Mark (m above bed): 1.0M

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	20	5	NET	Sand III	40	3	NET
Leaf Packs or Mats	10	5	NET	Mud/Muck/Silt II	5	2	NET
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)	25 PN	5	NET	*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								TO BOTTOM
Mid-depth	0.2M	22.38	6.81	8.26	201			
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

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

SAMPLING TEAM: KANE, MEIS	SIGNATURE: Phil Kane	DATE: 04/15/96

UPSTREAM

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 04/15/96	RECEIVING BODY OF WATER: SWEETWATER CREEK

REMARKS: UPSTREAM	LOCATION: WEKIVA HUNT CLUB SP 144 LEDBURY DRIVE LONGWOOD, FL	FIELD ID/NAME: REFERENCE SITE WEKIVA

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 8	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity 19	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization 19	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition 14	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or 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 10	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 19	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, but 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, but 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. 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

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

99 **TOTAL SCORE**

Comments

ANALYSIS DATE: 04/15/96	ANALYST: KANE	SIGNATURE: Phil Kane

DOWNSTREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 04/15/96	TIME 0930	RECEIVING BODY OF WATER: SWEETWATER CREEK

REMARKS:	LOCATION: WEKIVA HUNT CLUB STP 144 LEDBURY DRIVE LONGWOOD, FL	FIELD ID/NAME: TEST SITE WEKIVA
DOWNSTREAM		

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
100							

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

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

Width of riparian vegetation (m) on least buffered side: 150

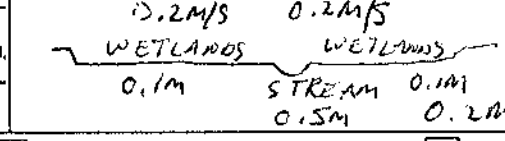
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 1.0m

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)



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: MUCK + SAND

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	20	5	NET	Sand /	5	1	NET
Leaf Packs or Mats	10	5	NET	Mud/Muck/Silt ///	5	4	NET
Aquatic Vegetation	60	5	NET	Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)				***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								TO
Mid-depth	0.25	22.58	6.68	7.58	161			BOTTOM
Bottom	0.50							

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

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

SAMPLING TEAM:	SIGNATURE:	DATE:
KANE, MEIS	Phil Kane	04/15/96

DOWNSTREAM

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDEP CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 04/15/96	RECEIVING BODY OF WATER: SWEETWATER CREEK

REMARKS: DOWNSTREAM	LOCATION: WEKIVA HUNT CLUB SR 144 LEOBURY DRIVE LONGWOOD, FL	FIELD ID/NAME: TEST SITE WEKIVA

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 19	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity 13	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization 19	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition 18	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability 18	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 19	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 19	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, but 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, but 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. 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.

130 TOTAL SCORE

Comments STREAM GOES THROUGH WETLANDS

ANALYSIS DATE: 04/15/96	ANALYST: KANE	SIGNATURE: Phil. Kane

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Wekiva Hunt Club
County: Seminole County
Contact / District: Dr. Phil Rand / Central
NPDES Permit #: FL00 36251
LIMS Sample #: 135980 LIMS Job #: 96-APR-16-15

Sample Collection: Date 4-15-96 Time 1150
Test Beginning: Date 4-16-96 Time 1400
Test Ending: Date 4-18-96 Time 1400
Organism Batch #: 18 Diluent Batch #: 18
Organism Age: <24hrs
Test Organism: Ceriodaphnia dubia

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 1 of 2

Remarks:
Control A vial was spilled, loosing 4 test animals, All animals were healthy prior to this. DW 4/18/96

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	22.6 @ 22.6	8.2 @ 25.5 °C	108.1 @ 106.2 1410 @ 1409 @ 25.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.7	8.1 @ 25.7 °C	1047 @ 106.2 1394 @ 1409 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.1	8.2 @ 25.2 °C	1022 @ 1025 9760 @ 9869 @ 25.2 °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	1 4hr	8.2		8.0	23.5	)	24.2	7.9		8.1	180		195
Control	B	5	5	5			8.0			24.2			8.1			190
Control	C	5	5	5			8.0			24.3			8.1			185
Control	D	5	5	5			8.0			24.3			8.1			190
100%	A	5	5	5	7.5		8.3	23.9		24.4	7.9		8.0	525		545
100%	B	5	5	5			8.3			24.5			8.1			550
100%	C	5	5	5			8.3			24.5			8.0			550
100%	D	5	5	5			8.3			24.5			8.0			550
Measured/Loaded by:		MF	JN	OW	JN		JLS	JN		JLS	JN		JLS	JN		JLS
Recorded by:		TR	JN	OW	JR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures
Robin A. Reden
Jennifer Spurgeon
Tina Mikulski
Marshall Fairbotb
reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):		70	140	Hach	DB
Hardness (mg/L as $CaCO_3$):		80	120	Hach	DB
Total ammonia (mg/L as N):		<0.017	~~<0.017~~	Orion	JN

Ammonia Meter #98136 Meter Slope: -54.7 Ammonia Blank: <0.017 Control Salinity: 0 ppt
Ammonia .362 wrong place JN 4/16-96 Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Wekiva Hunt Club
County: Seminole
Contact / District: Dr. Phil Kane / Central
NPDES Permit #: FL00 36251
LIMS Sample #: 135980 LIMS Job #: 96-APR-16-15

Sample Collection: Date 4-15-96 Time 1150
Test Beginning: Date 4-16-96 Time 1500
Test Ending: Date 4-18-96 Time 1500
Organism Batch #: 24 Diluent Batch #: well
Organism Age: 12 days old
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2
Remarks:

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	22.6 @ 22.6	8.2 @ 25.5 °C	108.1 @ 106.2 1410 @ 1409 @ 25.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.7	8.1 @ 25.7 °C	104.7 @ 106.2 1394 @ 1409 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.1	8.2 @ 25.5 °C	1022 @ 1025 (48 hr ending avg 1023.5) 9760 @ 9868 @ 25.2 °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	A-1	5	5	5	8.0	8.3	8.2	24.4	23.5	23.8	~~7.5~~	7.7	8.3	250	250	255
Control B	A-2	5	5	5	8.0	8.3	8.2	24.3	23.5	23.8	~~6.7~~	7.7	8.1	250	250	255
Control C	A-3	5	5	5	8.0	8.3	8.2	24.3	23.5	23.8	7.9	7.8	8.1	250	250	250
Control D	A-4	5	5	5	8.0	8.4	8.2	24.2	23.5	23.9	7.9	7.8	8.2	250	250	255
100% A	A-5	5	5	5	7.5	8.2	8.1	24.2	23.6	23.9	7.8	7.9	8.2	555	540	550
100% B	A-6	5	5	5	7.5	8.1	8.1	24.4	23.6	23.9	7.8	7.8	8.2	555	545	550
100% C	A-7	5	5	5	7.5	8.1	8.1	24.4	23.5	23.9	7.8	7.8	8.2	555	545	550
100% D	A-8	5	5	5	7.5	8.1	8.1	24.3	23.6	23.9	7.7	7.7	8.2	550	550	555
Measured/Loaded by:		MF	JN	DW	JN	JN	JLS	JN	JN	JLS	JN	JN	JLS	JN	JN	JLS
Recorded by:		TR	JN	DW	DR	LM	TR	DR	LM	TR	TR	LM	TR	TR	CM	TR

TR Wrong # 8.0 7.9

Investigators' Signatures

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			Not Measured		
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):	120		140	Hach	DB
Hardness (mg/L as $CaCO_3$):	140		120	Hach	DB
Total ammonia (mg/L as N):	<0.017		.362	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -54.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

WEKIVA HUNT CLUB SITE
STREAM CONDITION INDEX RESULTS

REFERENCE SITE

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	31	≥27	26-14	<14		≥ 27	26-14	<14	5	≥18	17-9	<9	
EPT Index	3	≥6	5-3	<3		≥ 4	3-2	<2	3	-	≥3	<3	
# Chironomid Taxa	15	≥9	8-5	<5		≥9	8-5	<5	5	≥4	3-2	<2	
% Contribution of Dominant Taxon	18	≤25	26-62	>62		≤30	31-65	>65	5	≤37	38-69	>69	
% Diptera	66	-	≤60	>60		-	≤52	>52	1	-	≤67	>67	
Florida Index	15	≥ 13	12-7	<7		≥10	9-5	<5	5	≥ 6	5-3	<3	
% Suspension feeders/Filterers	37	≥ 13	12-7	<7		≥15	14-8	<8	5	≥ 25	25-13	<13	
Total Score		Panhandle				Peninsula			29	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

TEST SITE

Winter Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	33	≥27	26-14	<14		≥ 27	26-14	<14	5	≥18	17-9	<9	
EPT Index	3	≥6	5-3	<3		≥ 4	3-2	<2	3	-	≥3	<3	
# Chironomid Taxa	12	≥9	8-5	<5		≥9	8-5	<5	5	≥4	3-2	<2	
% Contribution of Dominant Taxon	24	≤25	26-62	>62		≤30	31-65	>65	5	≤37	38-69	>69	
% Diptera	45	-	≤60	>60		-	≤52	>52	3	-	≤67	>67	
Florida Index	14	≥ 13	12-7	<7		≥10	9-5	<5	5	≥ 6	5-3	<3	
% Suspension feeders/Filterers	40	≥ 13	12-7	<7		≥15	14-8	<8	5	≥ 25	25-13	<13	
Total Score		Panhandle				Peninsula			31	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 Wekiva Hunt Club STP, collected via Hester-Dendy artificial substrates in Sweetwater Creek, on 15 April, 1996. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Acarina		
Clathrosperchon sp.	–	1
Hygrobates sp.	2	44
Sperchonopsis sp.	3	30
Oribatei	–	2
Amphipoda		
Hyalella azteca	6	1
Coleoptera		
Dineutus sp.	–	1
Microcylloepus sp.	56	3
Microcylloepus pusillus	11	9
Stenelmis sp.	13	5
Elmidae	2	5
Diptera		
Ablabesmyia rhamphe grp.	1	–
Corynoneura sp.	2	21
Hemerodromia sp.	12	303
Nanocladius sp.	1	–
Paratanytarsus sp.	2	–
Paratanytarsus sp. B Epler	–	5
Paratanytarsus sp. C Epler	3	–
Pentaneura inconspicua	17	293
Polypedilum convictum grp.	6	67
Polypedilum illinoense grp.	1	–
Rheocricotopus robacki	1	103
Rheotanytarsus sp.	25	49
Rheotanytarsus distinctissimus grp.	69	2077
Rheotanytarsus exiguus grp.	118	1345
Simulium sp.	–	4
Stenochironomus sp.	–	42
Tanytarsus sp.	–	5
Tanytarsus sp. A Epler	1	–
Tanytarsus sp. C Epler	3	5
Tanytarsus sp. G Epler	1	–
Tanytarsus sp. L Epler	11	5
Tanytarsus sp. T Epler	–	5
Thienemanniella xena	–	27
Chironomidae	32	152
Ephemeroptera		
Caenis sp.	3	3

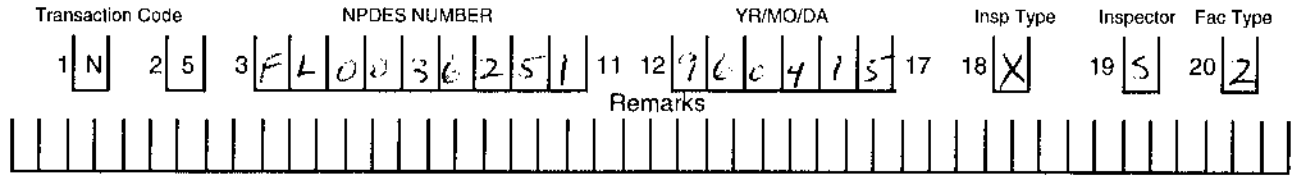
Odonata		
Argia moesta	1	–
Enallagma sp.	–	1
Coenagrionidae	–	1
Zygoptera	–	1
Gastropoda		
Ferrissia hendersoni	1	–
Micromenetus sp.	1	1
Ancylidae	–	15
Gastropoda	2	–
Isopoda		
Caecidotea sp.	1	–
Lirceus sp.	1	–
Oligochaeta		
Enchytraeidae	–	1
Pelecypoda		
Pisidiidae	–	4
Trichoptera		
Cheumatopsyche sp.	40	472
Neotrichia sp.	–	16
Oecetis sp.	–	13
Oxyethira sp.	–	1
Hydropsychidae	17	83
Trichoptera	7	39

Benthic macroinvertebrate taxa list for Wekiva Hunt Club STP, collected via 20 dipnet sweeps in Sweetwater Creek on April 15, 1996.

	Reference Site	Test Site
Acarina		
Hygrobates sp.	2	–
Oribatei	2	–
Amphipoda		
Hyalella azteca	6	–
Coleoptera		
Elmidae	–	1
Microcylloepus pusillus	14	–
Microcylloepus sp.	–	2
Stenelmis sp.	–	2
Collembola		
Collembola	1	–
Diptera		
Ablabesmyia rhamphe grp.	–	1
Atrichopogon sp.	3	–
Chironomus sp.	3	–
Cricotopus bicinctus grp.	1	2
Cricotopus or *orthocladius* sp.	5	–
Dicrotendipes modestus	2	1
Hemerodromia sp.	–	1
Palpomyia/Bezzia grp.	–	1
Paralauterborniella nigrohalterale	1	–
Paratanytarsus sp. A Epler	1	–
Paratanytarsus sp. C Epler	–	1
Pentaneura inconspicua	1	1
Polypedilum illinoense grp.	14	2
Rheotanytarsus sp.	8	6
Rheotanytarsus distinctissimus grp.	26	29
Rheotanytarsus exiguus grp.	17	1
Stenochironomus sp.	3	1
Tanytarsus sp.	1	2
Tanytarsus sp. A Epler	–	1
Tanytarsus sp. L Epler	4	10
Tanytarsus sp. P Epler	1	–
Tanytarsus sp. T Epler	1	–
Thienemanniella xena	1	1
Tipulidae	1	–
Chironomidae	18	5
Ephemeroptera		
Acerpenna pygmaeus	–	1
Caenis sp.	1	–
Ephemeroptera	1	–
Gastropoda		
Elimia floridensis	1	–

Ancylidae	–	18
Gastropoda	2	1
Odonata		
Argia sp.	1	1
Ischnura sp.	1	1
Coenagrionidae	1	–
Oligochaeta		
Dero pectinata	–	1
Dero trifida	–	2
Eclipidrilus sp.	–	1
Haber speciosus	–	1
Limnodrilus hoffmeisteri	–	4
Slavina appendiculata	4	2
Spirosperma ferox	–	1
Enchytraeidae	–	4
Pelecypoda		
Pisidiidae	1	11
Rhynchocoela		
Prostoma rubrum	6	18
Trichoptera		
Cheumatopsyche sp.	2	3
Neotrichia sp.	7	1
Hydropsychidae	5	1
Hydroptilidae	1	3
Turbellaria		
Dugesia sp.	–	1

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)

