

Biological Assessment of

Fleming Oaks Wastewater Treatment Plant

Clay County

NPDES #FL0032875

Sampled August 1995

October 1995

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Fleming Oaks WWTP
County: Clay
NPDES Number: FL0032875
State Permit Expiration Date: 13 May 1998

Toxics Sampling Inspection (**XSI**)

Date Sampled: 7 August, 1995

Results: No organic constituents or unacceptable concentrations of metals were detected in the effluent.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 7 August, 1995

Results: The sample of 100% effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 7 August, 1995

Results: Quantitative measures of benthic macroinvertebrate community health indicated no negative effects from the discharge at test site 2, and slight degradation at test site 1. However, other data suggest this degradation was probably not attributable to the Fleming Oaks effluent. Taxa richness and diversity values at test site 2 were similar to those found at the reference site. However, these parameters at test site 1 were 46% and 37% lower than those found at the reference site, respectively. It should be noted that three other macroinvertebrate measures at both test sites, including the number of polychaete taxa, the % Pelecypoda, and the % Tubificidae, were either similar to, or better than, the reference site. The highly variable salinity regime in this area of the St. Johns River, other inputs (high TSS at test site 1 found during the incoming tide), as well as substrate differences between the reference and test sites, makes it difficult to determine the source(s) of stress on the invertebrate community. In summary, the discharge had no negative effects on test site 2, and probably was not responsible for the slight degradation at test site 1. All three study sites were similar with respect to many measures of algal community health, such as the number of algal taxa, diversity (essentially 4.5 at all three sites), algal density, and overall community composition. The discharge did not appear to be having any negative effect on algal communities.

Water Quality Inspection (**WQI**)

Date Sampled: 7 August, 1995

Results: While the Fleming Oaks effluent was relatively high in some nutrients (*e.g.*, total phosphorus was 3.7 mg/L, ortho-phosphate was 3.6 mg/L, and nitrate-nitrite was 19 mg/L), it did not appear to cause additional enrichment of the receiving waters. In fact, nutrient concentrations throughout the study area were average to below average for a typical Florida estuary. Algal growth potential at the reference site and test site 2 (6.8 and 9.7 mg dry wt/L, respectively) was below the 10 mg dry wt/L "problem threshold" for marine waters. AGP at test site 1, at 11.8 mg dry wt/L, was slightly above this threshold.

Introduction

The Fleming Oaks Wastewater Treatment Plant is located in Clay County, on Bahia Road (see map in Appendix). This 0.720 MGD municipal facility is equipped with three separate treatment trains. Currently, only the 0.49 MGD extended aeration process is used, consisting of influent volume stabilization, oxidation, clarification, sludge digestion, chlorination for disinfection, and dechlorination via sulfur dioxide addition. An average of 0.208 MGD of treated wastewater is discharged into the Class III St. Johns River. The approximate discharge volume during this survey was 0.2 MGD.

State permit limits are as follows: carbonaceous BOD (20 mg/L as an annual average, 25 mg/L as a monthly average, 40 mg/L as a weekly average, 60 mg/L maximum), TSS (20 mg/L as an annual average, 30 mg/L as a monthly average, 45 mg/L as a weekly average, 60 mg/L maximum), pH (6.0 to 8.5 SU), fecal coliforms (200 organisms/100 mL), and total residual chlorine (0.5 mg/L minimum at the exit of the chlorine contact chamber and 0.01 mg/L maximum at the discharge).

Monthly Operating Report data show no violations in the last year. Results from the required whole effluent toxicity testing did not reach the EPA office and a warning letter was sent. However, prior to that incident, no enforcement or compliance actions have been taken since 1992. During the facility inspection, it was noted that the surge tank had a visible fracture and needs repair. Otherwise, the facility is operating satisfactorily.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located far south of the discharge) and two test sites bracketing the discharge (see map in Appendix). 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 ref-

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	13	7	12
Shannon-Weaver Diversity	2.5	1.6	2.9
% Polychaeta	0	5.6	9.9
% Diptera	7.0	15.7	65.4
% Gastropoda	0	68.5	6.2
% Crustacea	40.3	0	4.9
% Pelecypoda	5.3	4.5	13.6
% Oligochaeta	43.9	5.6	0
% Amphipoda	3.5	0	0
% Predator/Carnivores	5.3	15.7	34.6
% Above-Surface Deposit Feeders	0.9	2.8	19.8
% Below Surface Deposit Feeders	36.8	5.6	3.7
% Scavengers	2.6	0	2.5
% Scrapers	0	68.5	6.2
% Shredders	0.9	0	12.4
% Suspension Feeders	43.9	7.3	18.5
% Browser-grazer	2.6	0	2.5
% Unknown feeding type	7.0	0	0
Phytoplankton Algae			
Number of Taxa	43	41	36
Shannon-Weaver Diversity	4.50	4.45	4.46
Algal Density (#/mL)	11,928	12,421	7,561
% Blue-green	45.7	46.9	32.1
% Green	28.7	32.3	23.8
% Diatoms	25.3	20.4	40.0
Algal Growth Potential (mg dry wt/l)	6.8	11.8	9.7

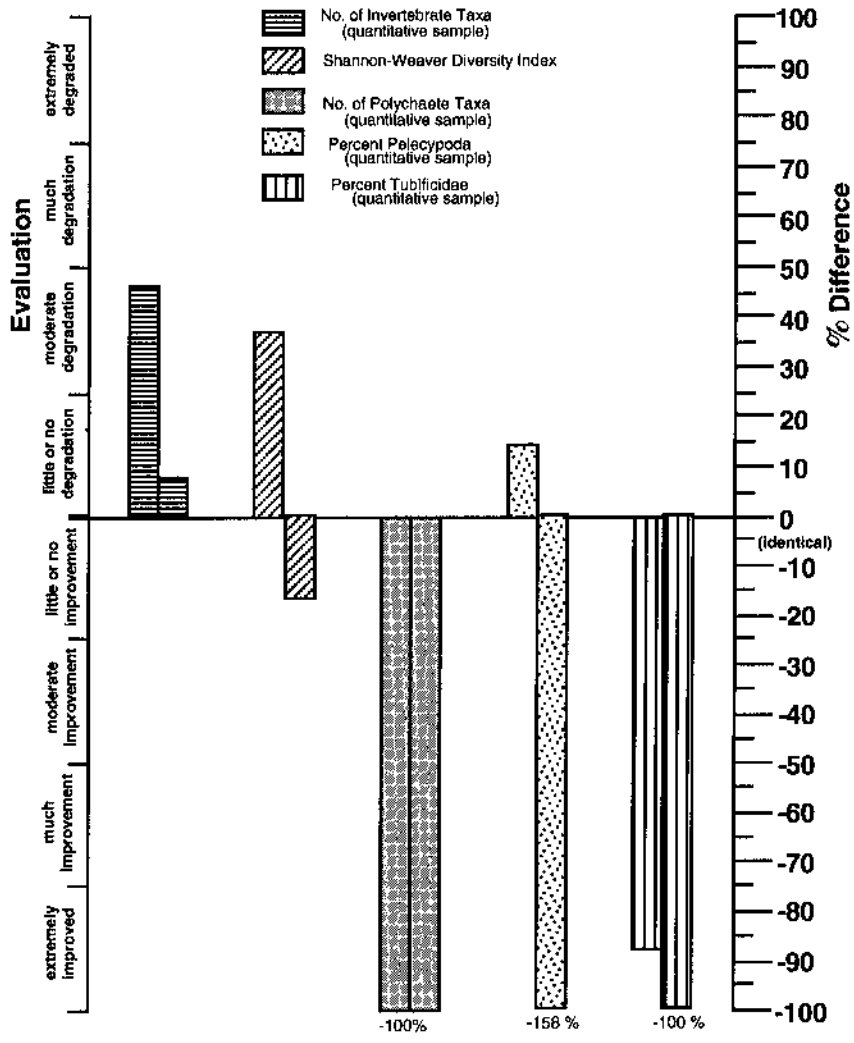
erence and test sites. Invertebrates were collected via three Ponar grabs per site (Ross 1990). Phytoplankton was sampled at reference and test sites by subsurface grabs. Chlorophyll *a* was also collected for phytoplankton communities, but the samples were lost due to a lab accident. Bacterial populations were analyzed for fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* with the freshwater effluent, and *Dunaliella tertiolecta* with saline receiving waters, followed Miller *et al.* (1978) and EPA (1974).

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.

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.



Effect of discharge on the benthic macroinvertebrate community.

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 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).

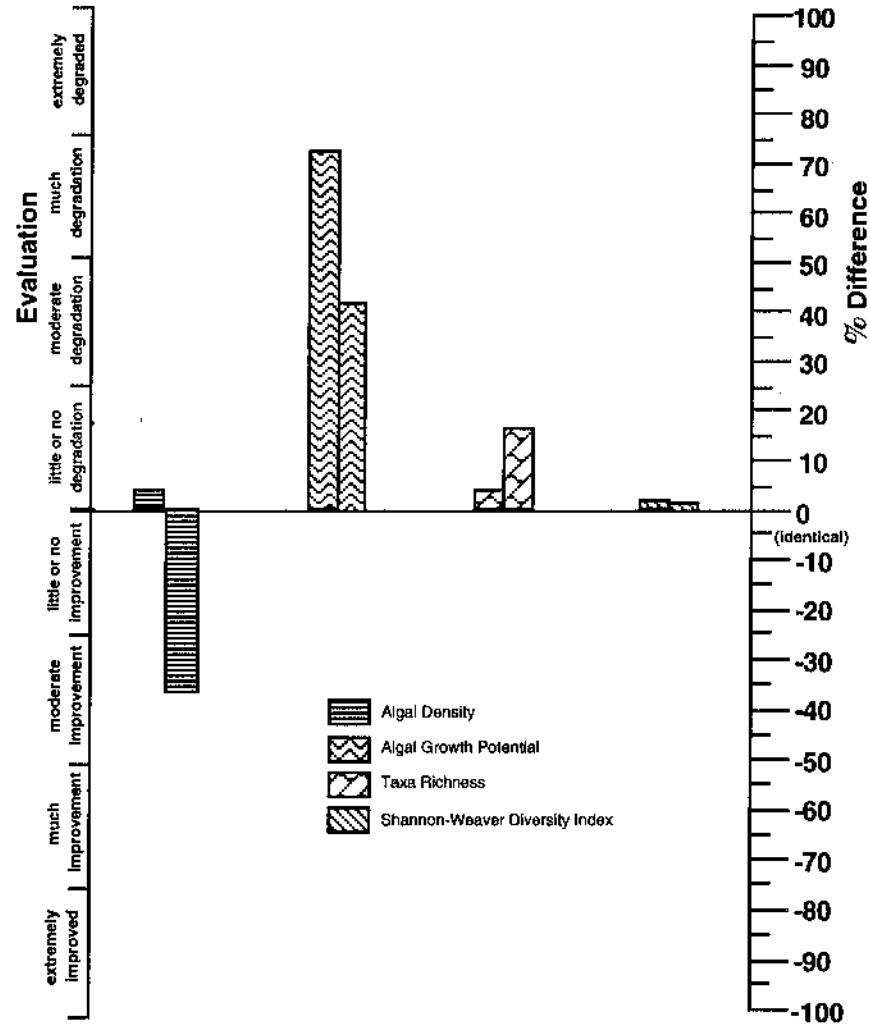
The Stream Invertebrate Index for Florida (SIIF) is a composite macroinvertebrate metric (EA Engineering 1994). The SIIF assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SIIF calculation table in Appendix).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, 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: Tim McKelvey and Ruth Bouman (DEP Northeast District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Bart Richard, Lisa Tamburello, David Whiting, Vicki Whiting, 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

The study area was situated in a low salinity portion of the St. John's River. Numerous pollution sources are present in this area, which is subject to tidally induced flow reversals. Habitat quality was better at the reference site (with 73 points) than at either test site (both sites scored 56 points). Land use near both test sites and the reference site was predominantly residential. The study sites were similar with respect to many physical/chemical parameters, such as salinity (between 0.4 and 0.5 ppt), temperature (between 29 °C and 31 °C), and pH (between 7.3 and 7.8 SU). Dissolved oxygen was slightly lower at test site 1 (6.6 mg/L) than at either test site 2 or the reference site (7.3 and 7.9 mg/L, respectively). Water clarity was similar at each site, with Secchi depth mea-



Effect of discharge on the algal community.

surements of between 0.7 m and 0.9 m. Conductivity was lower at the reference site (737 µmhos/cm) than at test sites 1 and 2 (with 986 and 1004 µmhos/cm, respectively). Substrate was markedly different between the reference and test sites. Sediment at the reference site was primarily composed of a mixture of shell rubble and sand while substrate at both test sites contained some shell rubble, but mostly consisted of anaerobic mud (Appendix).

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included copper (11 µg/L), iron (40 µg/L), and zinc (32 µg/L). None of these concentrations of metals represents a violation of Class III water quality standards for fresh waters.

The sample of 100% effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi* (Appendix).

While the Fleming Oaks effluent was relatively high in some nutrients (*e.g.*, total phosphorus was 3.7 mg/L, ortho-phosphate was 3.6 mg/L, and nitrate-nitrite was 19 mg/L), it did not appear to cause additional enrichment of the receiving waters (see Chemistry Summary Table). In fact, nutrient concentrations throughout the study area were average to below average for a typical Florida estuary, indicating substantial dilution of the effluent by the receiving waters.

Quantitative measures of benthic macroinvertebrate community health indicated no problems at test site 2, and slight degradation at test site 1. Other data (see below) suggest this degradation was probably not attributable to the Fleming Oaks discharge. 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 site.

The community composition varied widely among all three receiving water stations. The barnacle, *Balanus* sp., was the most numerous taxon at the reference site (with 36.8% of the total population), but was absent at both test sites. The reference site consisted mostly of oligochaetes and crustaceans, along with a small number of dipterans, pelecypods, and amphipods. Gastropods and polychaetes, which were represented at both test sites, were absent at the reference site. Test site 1 was dominated by the gastropod, *Littoridinops* sp. (68.5% of the total population). Other groups represented at test site 1 were polychaetes, dipterans, pelecypods, and oligochaetes. Crustaceans and amphipods were absent at test site 1. Test site 2 was dominated by dipterans, namely *Coelotanypus* sp. and *Polypedilum halterale* group sp. Other groups represented at test site 2 were polychaetes, gastropods, crustaceans, and pelecypods. No oligochaetes were found at test site 2. The mix of freshwater and marine taxa at all three stations suggests a constantly changing salinity regime, which produces conditions that are unfavorable for the establishment of either a strictly freshwater or marine biota.

Macroinvertebrate taxa richness was lower at test site 1 (with 7 taxa) than at the reference site (with 13 taxa), a reduction of 46%. Taxa richness at test site 2 (with 12 taxa) was reduced by only 8% compared to the reference site. Shannon-Weaver diversity was highest at test site 2 (2.9), intermediate at the reference site (2.5), and lowest at test site 1 (1.6). This 37% decrease in diversity between the reference site and test site 1 represents lack of compliance with the biological integrity criterion. However, the decrease in diversity at test site 1 was largely due to the dominance of the gastropod, *Littoridinops* sp., which is not considered to be a nuisance species or an indicator of pollution. Interestingly, test site 1 had an elevated concentration of total suspended solids (37 mg/L), which was much higher than the TSS of the effluent (6 mg/L) or test site 2 (3 mg/L). This high TSS at test site 1, which was sampled during the incoming tide, may indicate other inputs in that vicinity. It should be noted that three other macroinvertebrate measures at both test sites, including the number of polychaete taxa, the % Pelecypoda, and the % Tubificidae, were either similar to, or better than, the reference site. The highly variable salinity regime in this area of the St. Johns River, other inputs, as well as substrate differences between the reference and test sites, make it difficult to determine the source(s) of stress on the invertebrate community. In summary, the discharge had no negative effects on test site 2, and probably was not responsible for the slight degradation at test site 1.

The Figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. All three study sites were similar with respect to many

measures of algal community health, such as number of algal taxa (ranging from 36 to 43), diversity (essentially 4.5 at all three sites), and community composition. Algal density at test site 1 was similar to the reference site (12,421 organisms/mL and 11,928 organisms/mL, respectively) while density at test site 2 was 36.6% lower than the reference site. Overall the discharge did not appear to be having any negative effect on algal communities. Algal growth potential at the reference site and test site 2 (6.8 mg dry wt/L and 9.7 mg dry wt/L, respectively) was below the 10 mg dry wt/L "problem threshold" for marine waters, above which cultural eutrophication and its consequences are likely to occur (Ron Raschke, US EPA, personal communication). AGP at test site 1 was slightly above this threshold at 11.8 mg dry wt/L.

Conclusions

No organic priority pollutants were detected in the effluent sample. The concentrations of metals in the discharge complied with Class III standards for fresh waters.

The sample of 100% effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

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Chemistry summary table for

Fleming Oaks WWTP	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
None detected				
Metals (ug/L)				
Aluminum	150 I			
Arsenic	10 U			
Cadmium	0.14 I			
Copper	11 A			
Chromium	10 U			
Iron	40 A			
Lead	10 U			
Mercury	0.10 U			
Nickel	4 U			
Selenium	30 U			
Silver	0.050 U			
Zinc	32 A			
Nutrients (mg/L)				
Ortho-phosphate	3.6 A	0.034 I	0.043 I	0.038 I
Total phosphorus	3.7 A	0.084 A	0.10	0.10
Ammonia	0.040 A	0.013 I	0.012 I	0.016 I
Nitrate+Nitrite	19 A	0.020 U	0.020 U	0.020 U
TKN	1.1 A	0.97 A	1.0	1.2
General Phys-Chem Parameters				
Habitat Assessment		73	56	56
D. O. (mg/L)	6.4	7.9	6.6	7.3
pH (SU)	6.5	7.8	7.3	7.4
Specific Conductance (µmhos/cm)	492	737	986	1004
Temperature (°C)	29.3	31.1	29.4	30.0
Hardness (mg/L CaCO3)	103.5			
Total Suspended Solids (mg/L)	6	7	37	3
Biological Oxygen Demand, 5 day (mg/L)	< 2	< 2	< 2	< 2
Algal Growth Potential (mg dry wt/L)	37.6	6.8	11.8	9.7
Toxicity				
Bioassay Fish	No Mortality			
Bioassay Invertebrate	No Mortality			
Microbiological Communities (org/100 mL)				
Fecal Coliform	1 KQ	8 Q	6 AQ	8 Q

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

K - Actual value is known to be less than value given

Q - Sample held beyond normal holding time

T - Value reported is less than the criterion of detection

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

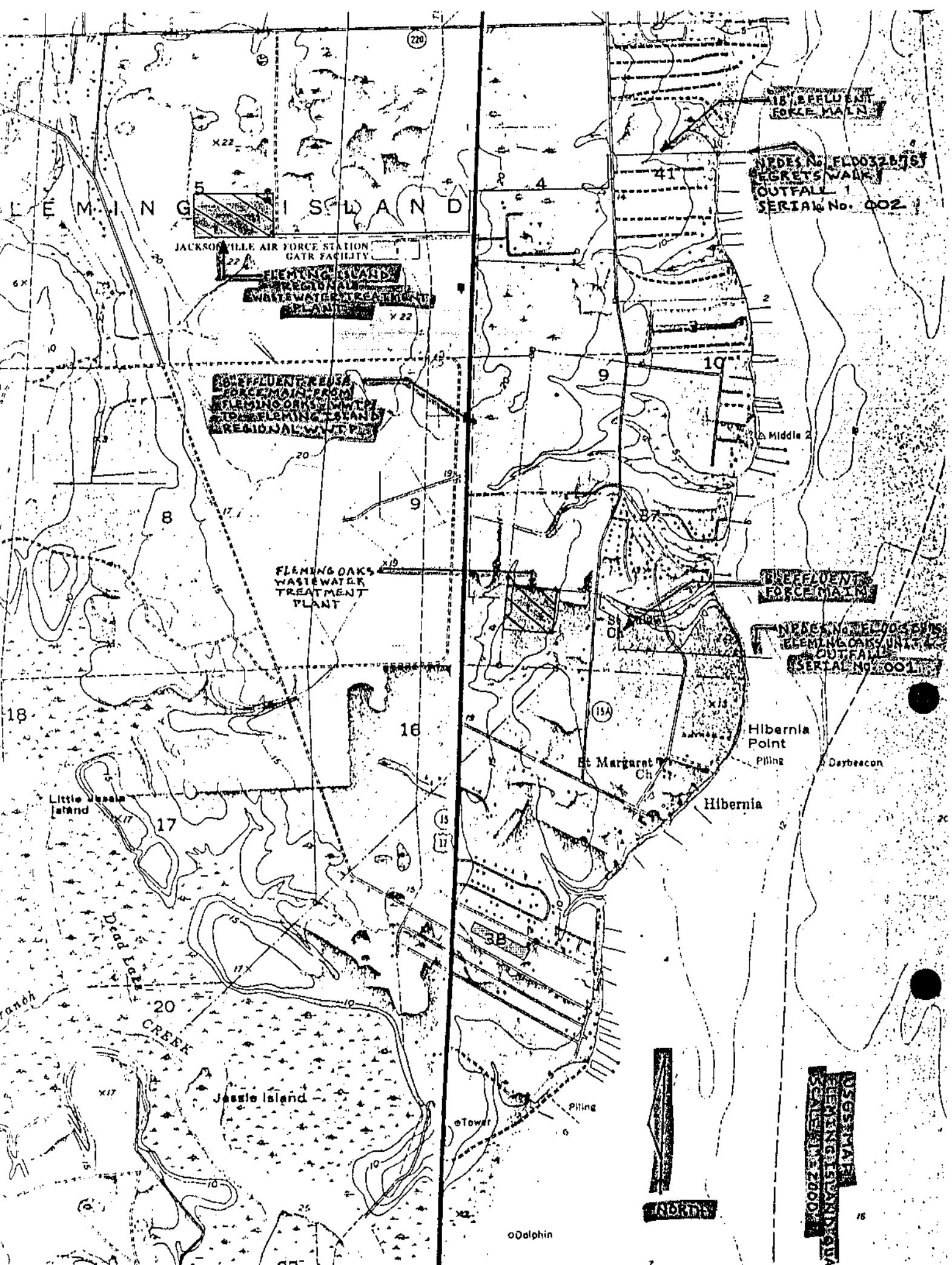
Typical Values for Selected Parameters in Florida Waters

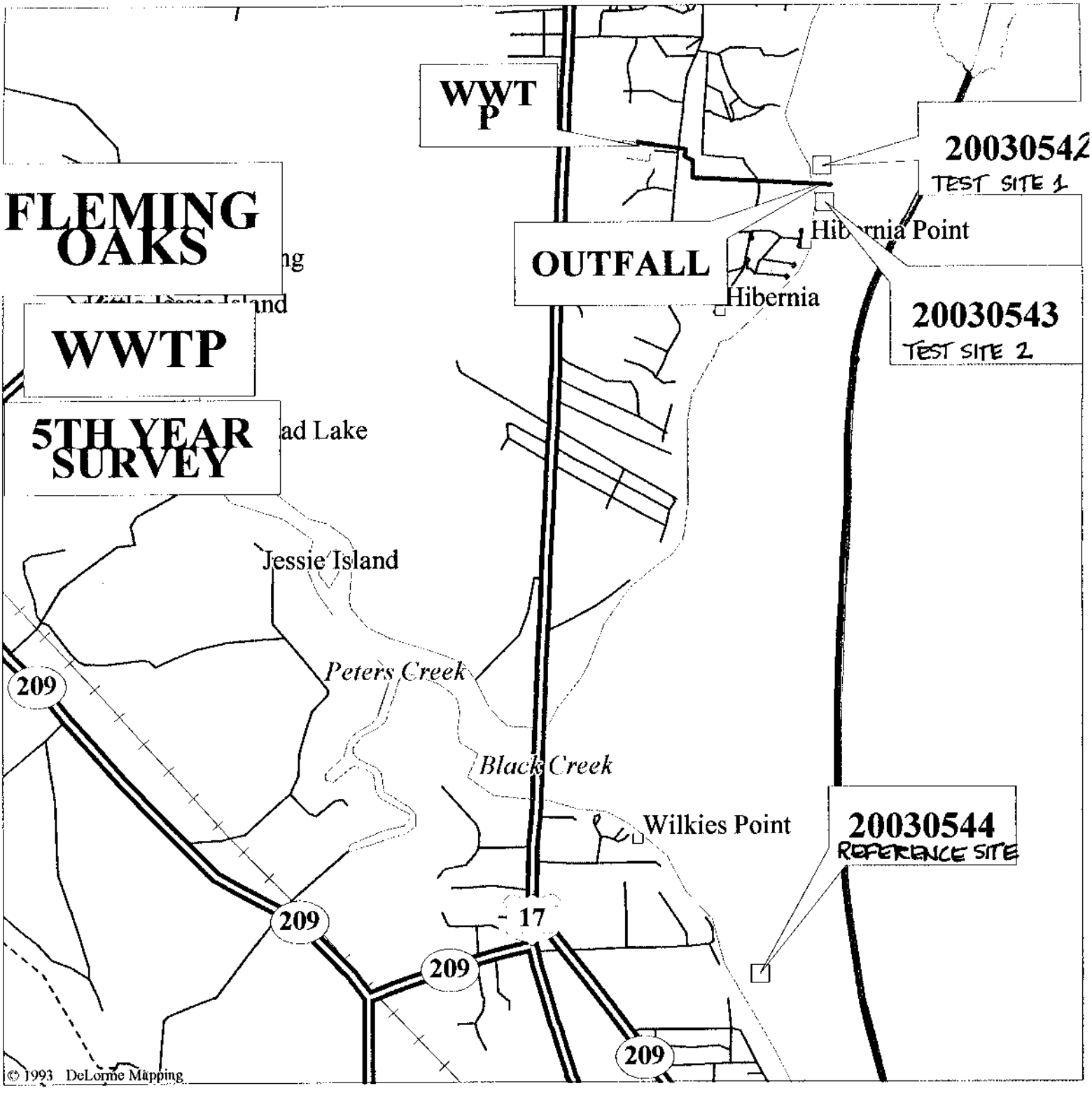
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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 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


FLEMING ISLAND
JACKSONVILLE AIR FORCE STATION
GATR FACILITY
FLEMING ISLAND REGIONAL WASTEWATER TREATMENT PLANT
18" EFFLUENT REUSE FORCE MAIN FROM FLEMING OAKS WWTP TO FLEMING ISLAND REGIONAL WWTP
FLEMING OAKS WASTEWATER TREATMENT PLANT
18" EFFLUENT FORCE MAIN
NPDES No. FL0032875 EGRETS WALK OUTFALL SERIAL No. 002
NPDES No. FL0035394 FLEMING OAKS UNIT 2 OUTFALL SERIAL No. 001
Middle 2
St. Johns Ch.
Hibernia Point
Piling
Daybeacon
St Margaret's Ch.
Hibernia
Little Jessie Island
Dead Lake
CREEK
Jessie Island
Tower
Piling
Dolphin
NORTH
USGS MAP FLEMING ISLAND QUADRANGLE SCALE 1:24000
41
4
5
10
9
8
7
18
16
17
20
3B
15A
13
11



LEGEND

- State Route
- Geo Feature
- Town, Small City
- US Highway
- County Boundary
- Population Center
- Street, Road
- Major Street/Road
- State Route
- US Highway
- Railroad
- River
- Intermittent River
- Utility (powerline)
- Land Mass
- Open Water

Scale 1:31,250 (at center)

2000 Feet

1000 Meters

Mag 13.00
Thu Aug 03 16:06:14 1995

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Fleming Oaks WWTP		Date Summary Prepared: August 16, 1995
Location (attach detailed map): (see attached) Clay County, Basin Road (off US17)	County: Clay	District: Northeast
Federal Permit # FL0033875 and expiration date:	State GMS # and 31100628? State expiration date: June 1, 1997	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Treatment of domestic wastewater from Fleming Island.

Description of treatment process: The plant is permitted for a combined discharge of 0.72 mgd, with treatment occurring in three separate processes. The only process currently being used is the 0.441 mgd extended aeration plant/process; the treatment of this process includes: surge tank (1), oxidation ditch (1), clarifier (1), chlorine contact chamber (1), and digester (1). For the schematic, see attached.

Receiving waters: St. Johns River	Classification: (I) II III

Design Flow: 0.720 mgd	Mean Flow: ~ 0.208 mgd	Flow during survey: ~0.20 mgd

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

therefore, the best time to sample is: anytime

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

Not applicable.

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

Parameter	Limit (units)
*$CBOD_5$	See attached tables for effluent limits for both the NPDES and state (now consolidated) permit
TSS	
pH	
Chlorine residual	
Fecal coliform	

Describe special permit conditions and permit modifications:

Fleming Oaks WWTP
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

See attached map and excerpt from NPDES permit application. The outfall(s) are 500 feet offshore and are approximately 5 +/- feet deep.

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

No violations occurred in the last year, according to MOR review and GMS review.

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

There have not been any enforcement actions in the past year and a half. The results from the required WET testing did not reach the EPA office and a warning letter was sent. Prior to that, no enforcement/compliance actions have been taken since 1992.

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

No recognizable patterns in the monitoring results and no recurring inspection comments were observed. The effluent data from Fleming Oaks is very consistent/steady.

Additional information:

Staff contributing to this review (signature):

Tim McKibery (Biologist)

David G. Baker (Inspector)

David G. Baker (Engineer)

Ruth Bowman (biologist)

( )

( )

12. The monitoring requirements and effluent limitations for this plant are as follows:

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow (mgd)	0.720	Daily, 5/week	See A.	Influent or Effluent
$CBOD_5$ (mg/l)	(G)	Weekly	8-hour composite. See B	Influent & Effluent
TSS (mg/l)	(G)	Weekly	8-hour composite. See B	Influent & Effluent
pH Units	6.0 Minimum 8.5 Maximum	Daily, 5/week	Grab	Effluent
Chlorine Residual(mg/l)	See C & D	See E & F	Grab	Effluent
Fecal Coliform no./100 (ml)	200	Monthly	Grab	Effluent

(A) Recording flow meter and totalizer required.

(B) Composite samples shall be flow proportioned composite samples.

(C) The total residual chlorine at the exit of the chlorine contact chamber shall at all times not be less than 0.5 mg/l.

(D) The total residual chlorine content after dechlorination shall not exceed 0.01 mg/l.

(E) The minimum schedule for sampling and testing at the exit of the chlorine contact chamber is daily, 5 days per week.

(F) The minimum schedule for sampling and testing after dechlorination is weekly.

(G)

	ANNUAL	MONTHLY	WEEKLY	ONE TIME MAXIMUM
$CBOD_5$	20	30**	45**	60**
TSS	20	30**	45**	60**

** Rule 17-600.740, FAC

13. Beginning 30 days after permit issuance, the permittee shall perform quarterly effluent nutrient monitoring for organic nitrogen, ammonia nitrogen, TKN, nitrite and nitrate nitrogen, total nitrogen, ortho phosphorus, and total phosphorus. The results of the analyses shall be submitted with the monthly operation report.

PART I

. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - FINAL

. These effluent limitations are to be achieved by the effective date of the permit, and shall remain in effect until permit expiration for outfall Serial Number 001 - Sanitary Wastewater.

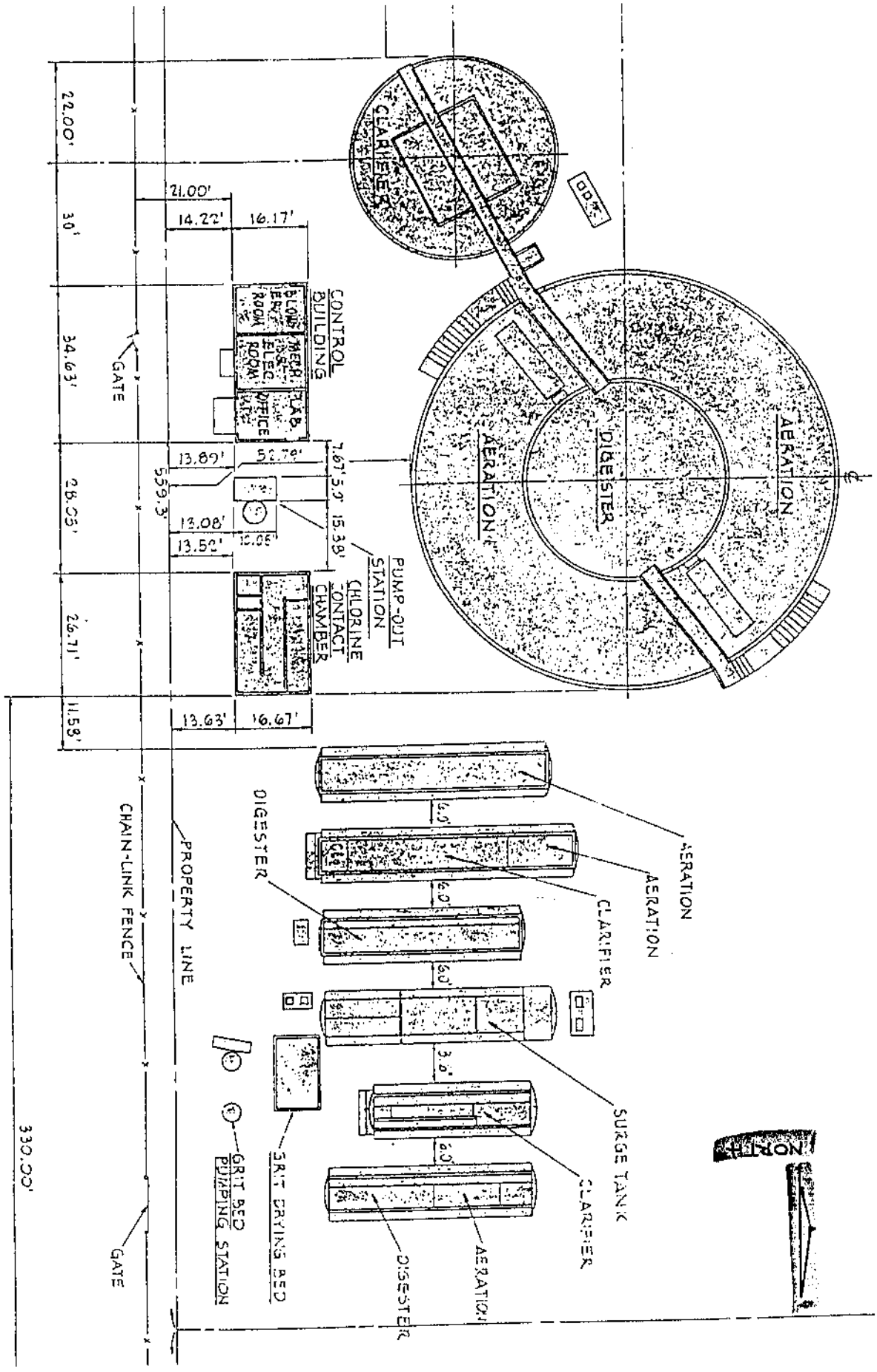
Such discharges shall be limited and monitored by the permittee as specified below:

ARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS		
	Annual Average	Monthly Average	Weekly Average	Daily Maximum	Measurement Frequency	Sample Type	Sampling Point
low, MGD	---	report	report	report	5/week	Representative*	Effluent
arbonaceous Biochemical Oxygen Demand (5-day), mg/l**	20.0	25.0	40.0	60.0	5/week	8-hr comp	Effluent
arbonaceous Biochemical Oxygen Demand (5-day), mg/l	---	report	---	---	5/week	8-hr comp	Influent
otal Suspended Solids, mg/l**	20.0	30.0	45.0	60.0	5/week	8-hr comp	Effluent
otal Suspended Solids, mg/l	---	report	---	---	5/week	8-hr comp	Influent
ecal Coliform Bacteria, N/100 ml	see page 2, item 3				Monthly	Grab	Effluent
H, std. units	not less than 6.0 nor greater than 8.5				5/week	Grab	Effluent
otal Residual Chlorine (TRC), mg/l	---	---	---	0.01	5/week	Grab	Effluent
cute Whole Effluent Toxicity	see page 2, item 5				see Part IV	see Part IV	Effluent

Flow values obtained in accordance with the methods specified in Chapter 17-601.500(2) of the Florida Administrative Code.

* In addition to the specified limits, the monthly average Carbonanaceous Biochemical Demand (5-day) and Total Suspended Solids concentration shall not exceed 15% of the respective influent values (85% removal)

FLEMING CREEK WASTEWATER TREATMENT PLANT



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP-NED JAX	STORET STATION NUMBER: 20030544	DATE (M/D/Y): 08-07-95	TIME: 1215	RECEIVING BODY OF WATER: ST. JOHN'S RIVER

REMARKS:	LOCATION: Flemings Oaks WWTP	FIELD ID/NAME: Reference Site, St. Johns R.

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: 5m

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): .5m 2bare surface

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

tidal - no velocity
width 1.5 - 2 miles
depth. 5 - 6 ft.

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: none slight moderate severe Sand smothering: none slight moderate severe Silt smothering: none slight moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	50	3	grab
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble	20			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):	Salinity		Secchi (m):
Top								
Mid-depth	2.5	31.09	7.77	7.91	737	0.36		0.9
Bottom	5.0							

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

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:
Sunny Hot Humid
90-95°F
Breeze 5 from N.E.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Bowman / McKelvey	Dorothy R. McKelvey	8/7/95

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 803 / SUBMITTING AGENCY NAME: FDEP-NED JAX	STORET STATION NUMBER: 20030544	DATE (M/D/Y): 8-7-95	RECEIVING BODY OF WATER: St. John's River

REMARKS:	LOCATION: Fleming Oaks WWTP	FIELD ID/NAME: Reference site (St. John's)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 8	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6(8) points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 37	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26(37) points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6(8) points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 7	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 73

COMMENTS: Samples taken approx. 800' from shoreline.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8-7-95	McKelvey/Berman	Tina McKelvey

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP-NED JAX	STORET STATION NUMBER: 20030542	DATE (M/D/Y): 08/07/05	TIME: 1110	RECEIVING BODY OF WATER: St. John's River

REMARKS:	LOCATION: Flaming Oaks WWTP	FIELD ID/NAME: TIST Site #1, N of POD

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: 218M

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)

tidal, no velocity
2.5 miles width
6 ft depth

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

Artificially Impounded ☐ yes

High Water Mark (m above ~~bed~~ surface): .5

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	95%		
Aquatic Vegetation				Other:			
Rock or Shell Rubble	5%			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):	Salinity		Secchi (m):
Top								
Mid-depth	2.4	29.42	7.34	6.55	986	0.48		0.7
Bottom								

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

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: Sunny, hot humid
90-95°F
breeze 5-10 from N.E.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Bowman / McKelvey	Timothy C McKelvey	8/9/05

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP-NEP JAX	STORET STATION NUMBER: 20030542	DATE (M/D/Y): 8-07-95	RECEIVING BODY OF WATER: St. Johns R.

REMARKS:	LOCATION: Flaming Oaks WWTP	FIELD ID/NAME: TAST Site #1, N of POD

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 8	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 26	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points** (residential area)	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	— (some docks, not many.)	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 2	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 56

COMMENTS: sample taken from northside of dock, approx 800' from shoreline.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8-7-95	McNulty/Bauer	Ruth Bauer

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP-TLH	STORET STATION NUMBER: 20030543	DATE (M/D/Y): 08-07-95	TIME: 1145	RECEIVING BODY OF WATER: St. Johns River

REMARKS:	LOCATION: Fleming Oaks Loop	FIELD ID/NAME: Test Sta #2, S of PCD

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: 418

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)

tidal no velocity
width - 2.5 miles
depth - 4 ft.

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 1.5M above surface

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	95	3	ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble	5			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)~~:	salinity		Secchi (m):
Top								
Mid-depth	3.0	30.01	7.40	7.31	1004	0.49		0.7
Bottom	6.0							

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

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:
Sunny & Hazy & Humid
Hot - 90-95°F
breeze 5-10 from N.E.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Bowman / McKelvey	Timothy R. McKelvey	8/9/95

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP-NERD JAX	STORET STATION NUMBER: 20030543	DATE (M/D/Y): 8-7-95	RECEIVING BODY OF WATER: ST. JOHNS RIVER

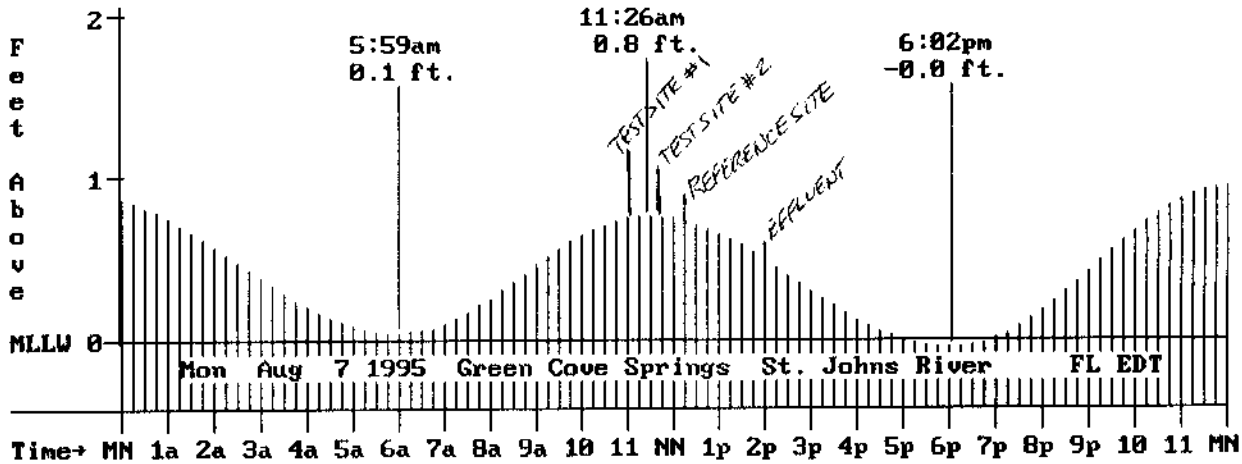
REMARKS:	LOCATION: Flemming Oaks WWTP	FIELD ID/NAME: TEST SITE #2, S of POD

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 8	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 26	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 2	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 2	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 56

COMMENTS: sample taken from southside @ end of 800' dock

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8-7-95	McKelvey / Bowman	Tim McKelvey



12:00MN	0.9ft.	5:00am	0.1ft.	10:00am	0.7ft.	3:00pm	0.3ft.	8:00pm	0.2ft.
1:00am	0.8ft.	6:00am	0.1ft.	11:00am	0.8ft.	4:00pm	0.1ft.	9:00pm	0.4ft.
2:00am	0.6ft.	7:00am	0.1ft.	12:00 N	0.8ft.	5:00pm	0.0ft.	10:00pm	0.7ft.
3:00am	0.4ft.	8:00am	0.3ft.	1:00pm	0.7ft.	6:00pm	-0.0ft.	11:00pm	0.9ft.
4:00am	0.2ft.	9:00am	0.5ft.	2:00pm	0.5ft.	7:00pm	0.0ft.	12:00MN	1.0ft.

(C) 1986-1993 Coastal Computer Company - Press <P> to print graph
-Press <ESC> to return or use the <→> & <←> key to page other 16 days on record

Sampling times -

note: not much difference between high & low tides.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Fleming Oaks WWTP
County: Clay
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL00 43834
LIMS Sample #: 112514 (sample log 8/10/95) **LIMS Job #:** 95-AUG-08-27

Sample Collection: Date 8-7-95 Time 1400
Test Beginning: Date 8-8-95 Time 1400
Test Ending: Date 8-10-95 Time 1430
Organism Batch #: 38 **Diluent Batch #:** 33
Organism Age: Ceriodaphnia dubia <24hours
Test Organism: Ceriodaphnia dubia

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Test Number: 1 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	23.4 @ 23.5	8.2 @ 25.2 °C	102.6 @ 102.1 1412 @ 1412 @ 24.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.4 @ 24.2 °C	1029 @ 102.1 1412 @ 1412 @ 24.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.1 @ 25.4 °C	1018 @ 102.1 1403 @ 1412 @ 24.2 °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	UNCORRECTED 24 h	UNCORRECTED 48 h
Control A	A	5	5	5	8.1		8.3	24.1		23.4	8.0		8.3	180		200
Control B	B	5	5	5			8.3			23.4			8.3			195
Control C	C	5	5	5			8.3			23.4			8.3			190
Control D	D	5	5	5			8.3			23.4			8.3			190
Control A	A	5	5	5	8.7		8.0	24.2		23.5	7.0		8.3	460		525
Control B	B	5	5	5			8.0			23.6			8.2			525
Control C	C	5	5	5			8.0			23.6			8.2			520
Control D	D	5	5	5			8.0			23.7			8.2			515
Measured/Loaded by:		MF	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		MF	MF	TM	LM		TM	LM		JM	LM		TM	LM		TM

Investigators' Signatures

Tina Mikulski
Jo Moyd
Rachel Sanchez
Joseph Morris

reviewer

form updated 5/05/95

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0	—	Ruth Bowman
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	JN
Alkalinity (mg/L as $CaCO_3$):	—	70	50	HACH	JN
Hardness (mg/L as $CaCO_3$):	—	80	160	HACH	JN
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Meter Slope: -58.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Fleming Oaks WWTP
County: Clay
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0043834
LIMS Sample #: 112514 **LIMS Job #:** 95-AUG-08-27

Sample Collection: Date 8-7-95 Time 8:1900 (with permit intake of mf 8/8/95)
Test Beginning: Date 8-8-95 Time 1400
Test Ending: Date 8-10-95 Time 1430
Organism Batch #: 31 **Diluent Batch #:** Well
Organism Age: 12 days
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	23.4 @ 23.5	8.2 @ 25.2 °C	102.6 @ 102.1 1412 @ 1412 @ 24.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.4 @ 24.2 °C	102.9 @ 102.1 1412 @ 1412 @ 24.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.1 @ 25.4 °C	101.8 @ 102.1 1403 @ 1412 @ 24.2 °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	D9	5	5	5	7.8	8.3	8.4	24.0	23.6	23.7	8.3	8.2	7.9	250	245	250
Control B	D10	5	5	5	7.8	8.3	8.4	23.9		23.7	8.3	8.3	7.9	250	245	250
Control C	D11	5	5	5	7.8	8.3	8.4	23.9		23.7	8.2	8.2	8.0	250	245	250
Control D	D12	5	5	5	7.8	8.3	8.4	23.9		23.7	8.2	8.2	8.0	250	245	250
100 % A	D13	5	5	5	6.5	7.4	7.6	24.2	23.6	23.7	6.7	7.7	7.7	475	480	480
100 % B	D14	5	5	5	6.5	7.4	7.6	24.1		23.6	6.6	7.8	7.6	475	475	480
100 % C	D15	5	5	5	6.5	7.4	7.6	24.1		23.6	6.7	7.8	7.6	475	475	480
100 % D	D16	5	5	5	6.5	7.4	7.6	24.1		23.6	6.7	7.9	7.6	475	475	480
Measured/Loaded by:		MF	MF	TM	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM	MF	MF
Recorded by:		MF	MF	TM	LM	JN	JM	LM	JN	JM	LM	JN	JM	LM	JN	TM

Investigators' Signatures

Tina Mikulsky
M. Mink
Marshall Faircloth
Jonathan Smith

reviewer

form updated 5/05/95

Salt Water / Well Water

Water Quality Parameters	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		0	—	Ruth Bowman
Lab Total Residual Cl2 (mg/L):	—	<0.03	DR-100	JN
Alkalinity (mg/L as $CaCO_3$):	—	50	hach	JN
Hardness (mg/L as $CaCO_3$):	—	160	hach	JN
Total ammonia (mg/L as N):	—	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: −58.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Benthic macroinvertebrate taxa list for Fleming Oaks WWTP, collected via Ponar grab samples in the St. Johns River, on 7 August, 1995. For each site the three ponar grabs were combined.

	Reference Site	Test Site 1	Test Site 2
Polychaeta			
Capitella capitata	–	–	42
Scolecolepides viridis	–	–	28
Streblospio benedicti	–	69	42
Oligochaeta			
Haber speciosus	56	–	–
Ilyodrilus templetoni	14	–	–
Limnodrilus hoffmeisteri	278	69	–
Gastropoda			
Littoridinops sp.	–	847	56
Hydrobiidae	–	–	14
Pelecypoda			
Corbicula fluminea	14	–	–
Mytilopsis leucophaeata	14	14	69
Rangia cuneata	14	42	83
Thoracica			
Balanus sp.	292	–	–
Mysidacea			
Mysidopsis bahia	14	–	–
Isopoda			
Cyathura polita	14	–	56
Amphipoda			
Oedicerotidae	28	–	–
Diptera			
Coelotanypus sp.	14	181	361
Cryptochironomus sp.	14	–	14
Djalmabatista sp.	–	14	–
Polypedilum halterale grp.	14	–	278
Procladius sp.	–	–	14
Tanytarsus sp. L (Epler)	–	–	69
Chironomidae	14	–	–

Phytoplankton taxa list and densities (#/mL) for Fleming Oaks WWTP, collected via subsurface grabs in the St. Johns River, on 7 August, 1995.

	Reference Site	Test Site 1	Test Site 2
Cyanophyceae			
Anabaena sp.	31	–	–
Aphanocapsa sp.	709	740	252
Aphanothece sp.	185	92	–
Chroococcus sp.	616	1233	284
Cylindrospermum sp.	154	–	–
Dactylococcopsis sp.	370	771	189
Gloeocapsa sp.	92	185	–
Gloeothece sp.	–	–	63
Gomphosphaeria sp.	216	247	–
Lyngbya contorta	524	277	158
Lyngbya sp.	247	62	95
Marssoniella sp.	92	277	63
Merismopedia sp.	401	616	410
Microcystis sp.	1695	1140	693
Oscillatoria sp.	31	–	–
Rhabdoderma sp.	–	31	–
Romeria sp.	62	154	189
Synechococcus sp.	31	–	–
Scytonemataceae	–	–	32
Bacillariophyceae			
Achnanthes sp.	31	–	32
Bacillaria paradoxa	31	31	–
Coscinodiscus sp.	62	62	63
Cyclotella sp.	925	678	693
Detonula sp.	586	616	1134
Leptocylindrus sp.	401	308	599
Mastogloia sp.	–	31	–
Melosira sp.	370	401	284
Navicula sp.	62	92	63
Nitzschia sp.	339	185	126
Rhizosolenia sp.	31	–	–
Surirella sp.	–	–	32
Synedra sp.	62	–	–
Pennales	123	123	–
Chlorophyceae			
Chlamydomonas sp.	308	308	252
Chlorella sp.	154	123	63
Chlorococcum sp.	–	31	–
Chlorogonium sp.	31	–	–
Chodatella sp.	–	62	–
Closterium sp.	–	–	32

Coelastrum sp.	92	31	95
Cosmarium sp.	92	–	63
Crucigenia sp.	31	216	126
Dictyosphaerium sp.	31	31	63
Euastrum sp.	31	–	–
Gloeocystis sp.	801	401	284
Golenkinia sp.	–	31	–
Kirchneriella sp.	92	–	–
Micractinium sp.	–	31	–
Oocystis sp.	92	185	63
Pediastrum sp.	92	31	–
Polyedriopsis sp.	–	–	32
Scenedesmus sp.	1264	2003	441
Schroederia sp.	–	62	–
Selenastrum sp.	–	185	–
Staurastrum sp.	62	–	32
Tetradesmus sp.	–	31	–
Tetraedron sp.	123	123	189
Tetrastrum sp.	123	92	63
Treubaria sp.	–	31	–
Euglenophyceae			
Euglenophyceae	–	–	32
Dinophyceae			
Gymnodinium sp.	–	62	158
Peridinium sp.	31	–	126

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0032875 11	12 950807 17	18 B	19 S	20 1

Remarks

21 66

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0032875 11	12 950807 17	18 X	19 S	20 1

Remarks

21 66