

Biological Assessment of

South Green Cove Springs WWTP

Clay County

NPDES #FL0030210

Sampled October 1998

June 1999

Biology Section
Division of Administrative and Technical Services
Bureau of Laboratories

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger:	South Green Cove Springs WWTP
County:	Clay
NPDES Number:	FL0030210
Permit Expiration Date:	July 11, 1999

Toxics Sampling Inspection (XSI)

Date Sampled: 10 October 1998

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

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 10 October 1998

Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi*, or to the invertebrate, *Ceriodaphnia dubia*, during the 48-hour bioassay.

Impact Bioassessment Inspection (IBI)

Date Sampled: 10 October 1998

Results: In the macroinvertebrate Ponar samples, the contribution of the dominant taxon increased significantly at test site 2, causing the diversity to decline by 48% compared to the control site. This reduction in diversity fails to comply with Class III water quality standards (Rule 62-302.530(11) FAC). The Hester-Dendy measures of macroinvertebrate community health were similar at the control site and test site 1. The effluent did not appear to adversely affect the algal communities at the test sites. Both phytoplankton and periphyton chlorophyll *a* levels were extremely elevated at all study sites suggesting non-point sources of nutrients in this portion of the St. Johns River.

Water Quality Inspection (WQI)

Date Sampled: 10 October 1998

Results: Effluent nutrients were elevated, but did not seem to affect the receiving water nutrients, which were low with the exception of TKN. TKN levels at the test sites were higher than those found in 70%-80% of other Florida's streams. The effluent Algal Growth Potential (AGP) was 46.9 mg dry wt/L. Despite the effluent AGP, the test sites had lower AGP values than the control site. All study sites exceeded the 5 mg dry wt/L "problem threshold", indicating non-point sources of nutrients in St Johns River.

This Biological Assessment was prepared by DEP staff to provide information to be used in reviewing an NPDES permit renewal application for the subject facility. This assessment will be used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The South Green Cove Springs WWTP is located in Clay County, Florida (see maps in the Appendix). This facility is a Class I reliability, conventional activated-sludge wastewater treatment facility, providing complete nitrification (see Facility Summary in the Appendix). The chlorinated effluent is dechlorinated, post aerated, and discharged to the St. Johns River via a 20-inch diameter submerged outfall extending 40 meters offshore. The design flow of the wastewater system is 0.5 MGD. The actual mean flow during this survey was 0.3 MGD. This facility serves that portion of Green Cove Springs south of State Road 16.

State permit limits for the South Green Cove Springs WWTP are listed in Table 1. According to the facility's monthly operating reports, the plant usually maintains a good quality of effluent, with the exception of the August, 1998, toxicity test which failed the DEP whole effluent toxicity criteria (see Facility Summary in the Appendix).

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site (located at Pier 10 in the St. Johns River upstream of the discharge) and two test sites (test site 1 located at Pier 1, located in the St. Johns River below the discharge and test site 2 located at Pier 5, located in the St. Johns River above the discharge) (see map in the 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. The effluent was analyzed for nutrients, metals, and for organic constituents (base neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia*, and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample.

Benthic macroinvertebrate communities were evaluated using three replicate petite Ponar grabs at control and test sites. Additional invertebrates were collected using Hester-Dendy multiplate samplers that were incubated for 28 days.

Periphyton were collected by incubating glass microscope slides in a standard periphytometer for 28 days. Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was determined for both phytoplankton and periphyton communities. *Selenastrum capricornutum* was used as the test organism for algal growth potential tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The SOP's can be viewed on our web site at <www.dep.state.fl.us/labs/sops.htm>.

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat assessment, taxa richness, Shannon-Weaver Diversity Index, the Florida Index, Ephemeroptera/Plecoptera/Trichoptera (EPT) Index, community composition, functional feeding groups, and algal biomass. For a discussion of each of these measures, see the *Explanation of Measurements of Community Health* in the Appendix.

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

The following personnel were involved in this investigation: Kathleen Gerard and Patrick O'Connor (DEP Northeast District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, Michael Heyn, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburello, Steve Wolfe, David Whiting, and Vicki Whiting (DEP Central Biology Laboratory in Tallahassee). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, and Michael Tanski, as well as District representatives.

Results

The results for this facility are presented in Table 1, Table 2, and Table 3.

Table 1. Effluent limits and summary of chemistry data.

South Green Cove WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
	-	None Detected	-	-	-
Metals (µg/L)					
Aluminum	1.5 **	50 U	-	-	-
Arsenic	50 **	20 U	-	-	-
Cadmium	1.4 **d	0.05 U	-	-	-
Chromium	259 **d	10 U	-	-	-
Copper	14.9 **d	4.0 A	-	-	-
Iron	1,000 **	40 I	-	-	-
Lead	4.5 **d	0.23 I	-	-	-
Mercury	0.012 **	0.10 U	-	-	-
Nickel	198.8 **d	6.0 U	-	-	-
Selenium	5.0 **	1.0 U	-	-	-
Silver	0.07 **	0.05 U	-	-	-
Zinc	133.8 **d	32	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	1.4 A	0.042	0.040	0.040
Total phosphorus	-	1.6	0.11	0.11	0.11
Ammonia	-	0.046 A	0.039	0.020 I	0.011 I
Nitrate+Nitrite	-	4.1	0.13	0.13	0.13
TKN	-	1.0 I	1.5	1.3	1.5
Organic Nitrogen	-	0.95	1.5	1.3	1.5
Total Nitrogen	-	5.1	1.6	1.4	1.6
General Phys-Chem Parameters					
Habitat Assessment	-	-	46	46	46
D.O. (mg/L)	≥ 5.0	6.3	6.3	6.2	7.4
pH (SU)	6.0-8.5	6.6	7.5	7.4	7.7
Conductivity (µmhos/cm)	-	497	739	737	737
Temperature (°C)	-	27.5	26.1	25.6	26.9
T.R.C. (mg/L)	0.01-0.5	0.02			
T.S.S. (NTU)	60 *c	1 K			
C.B.O.D., 5 day (mg/L)	60 *c	2	-	-	-
Flow (MGD)	0.5	0.3			
Hardness (mg $CaCO_3$)	-	131.5	-	-	-
AGP (mg dry wt/L)	-	46.9	21.1	12.4	15.4
Toxicity (48-hour static, screening bioassay)					
Bioassay - Fish	-	Not Toxic	-	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-	-
Microbiology (# counts/100 ml)					
Fecal Coliforms	200 *	10	-	-	-

a - Annual average
b - Weekly maximum
c - One time maximum
d - Value is based on hardness
* Permit limit
** Class III water quality standard
A - Value reported is the mean of two or more determinations
I - Value reported is < the practical quantitation limit, and ≥ the minimum detection limit
K - Actual value is known to be less than value given
U - Material analyzed for but not detected; value reported is the minimum detection limit

Discussion

Habitat quality was "marginal" at the control and test sites (see Habitat Assessment Data Sheets in the Appendix). This portion of the St. Johns River has little habitat, severe silt smothering, and no riparian buffer zone. Physical/chemical measurements were comparable at the control and test sites (Table 1). Effluent metals complied with Class III water quality standards and no organic pollutants were detected in the effluent.

The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay.

Effluent nutrients were elevated, but did not seem to be affecting the receiving waters (Table 1). Nutrient levels at the study sites were low with the exception of TKN where levels at both test sites were higher than those found in 70%-80% of other Florida streams (see *Typical Values of Selected Parameters in Florida Waters* in the Appendix).

Figure 1 represents changes in the phytoplankton algal community. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. The facility did not appear to have any adverse effects on the test site algal communities. Phytoplankton algal communities were similar at the control and test sites (Table 2).

Chlorophyll *a* was extremely elevated at the study sites, but was somewhat lower at the test sites compared to the control site. Chlorophyll *a* at all the study sites was higher than the values found in approximately 90% of other Flori-

Table 2. Algal community structure of study sites.

South Green Cove WWTP	Control Site	Test Site 1	Test Site 2
Phytoplankton Algae			
Number of Taxa	28	28	27
Shannon-Weaver Diversity	3.47	3.78	3.22
Chlorophyll *a* (µg/L)	40.9	34	31.1
Algal Density (#/mL)	7,218	6,760	8,305
% Blue-green	30.8	39.8	27.8
% Green	34.7	28.7	41.3
% Diatoms	34.5	30.9	29.5
Periphyton Algae			
Number of Taxa	33	35	–
Shannon-Weaver Diversity	4.36	4.28	–
Chlorophyll *a* (mg/m2)	120	40.9	–
Algal Density (#/cm2)	763,600	339,461	–
Diatom/Diatom + B-G Ratio	1.2	1.1	–
%Blue-green	14.9	8.1	–
% Diatoms	74.3	86.4	–
AGP (mg dry wt/L)	21.1	12.4	15.4

da streams (see *Typical Values for Selected Parameters In Florida Waters* in the Appendix).

In the periphyton results, test site 1 showed slightly improved conditions compared to the control site. The periphytometer was lost from test site 2. Periphyton taxa richness was slightly higher at test site 1 than at the control site (Table 2). Algal diversity was slightly lower at test site 1 than at the control site. The periphyton algal density at the control site (763,600 #/cm2) was significantly greater than test site 1 (339,461 #/cm2). Chlorophyll *a* at the control site and test site 1 was higher than those values in approximately 95% and 90% of other Florida streams, respectively (see *Typical Values for Selected Parameters In Florida Waters* in the Appendix). These results suggest sources other than the facility's effluent are responsible for nutrient enrichment in this portion of the St. Johns River.

Despite the high AGP value in the effluent, both test sites had lower AGP values than the control site (Table 2). AGP at all three study sites exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Figure 2 represents changes in the macroinvertebrate community. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. The Hester-Dendy measures of macroinvertebrate community health were similar at the control site and test site 1 (Table 3). Shannon-Weaver diversity at test site 1 decreased slightly when compared to the control site. The Hester-Dendy sampler was lost from test site 2. In the Ponar samples, the macroinvertebrate communities at all three study sites were poor, with few overall taxa and almost no pollution-sensitive organisms (see Macroinvertebrate Taxa Lists in the Appendix). The benthic communities at test site 1 and the control site were fairly similar, while that of test site 2 was somewhat worse (Table 3). For example, the diversity at test site 2 was 48% lower than the control site which does not meet the Class III water quality standard (Rule 62-302.530(11) FAC). The percent dominant taxon increased by 150%, indicating additional sources of stress at test site 2 not present at the control site or test site 1. The chemical and physical parameters were very similar among the three sites. Differences in the substrate may explain the impaired conditions at test site 2, however because a sediment analysis was not performed for this study, this can not be determined.

Literature Cited

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

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

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data

Table 3. Benthic community structure of study sites.

South Green Cove WWTP	Control Site	Test Site 1	Test Site 2
Macroinvertebrate Quantitative			
Number of Taxa	6	7	4
Florida Index	0	3	0
Shannon-Weaver Diversity	2.52	2.55	1.32
EPT Index	1	1	0
% Dominant Taxon	28	36	70
Community Composition			
% Amphipoda	0.0	7.0	0.0
% Diptera	29.0	79.0	80.0
% Gastropoda	14.0	0.0	5.0
% Pelecypoda	0.0	7.0	0.0
% Oligochaeta	43.0	0.0	15.0
% Trichoptera	14.0	7.0	0.0
Functional Feeding Groups			
% Predators	36.0	68.0	80.0
% Burrowing Deposit Feeders	14.0	0.0	15.0
% Surface Deposit Feeders	0.0	7.0	0.0
% Filter Feeders	7.0	18.0	0.0
% Scrapers	14.0	0.0	5.0
% Shredders	0.0	7.0	0.0
Macroinvertebrate Hester-Dendy			
Number of Taxa	14	14	–
Florida Index	3	3	–
Shannon-Weaver Diversity	3.01	2.64	–
EPT Index	3	4	–
Community Composition			
% Amphipoda	4.0	17.0	–
% Decapoda	8.0	2.0	–
% Diptera	55.0	39.0	–
% Ephemeroptera	2.0	0.3	–
% Oligochaeta	10.0	0.3	–
% Trichoptera	22.0	41.0	–
Functional Feeding Groups			
% Predators	15.0	24.0	–
% Surface Deposit Feeders	30.0	20.0	–
% Filter Feeders	27.0	35.0	–
% Shredders	7.0	0.9	–

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Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

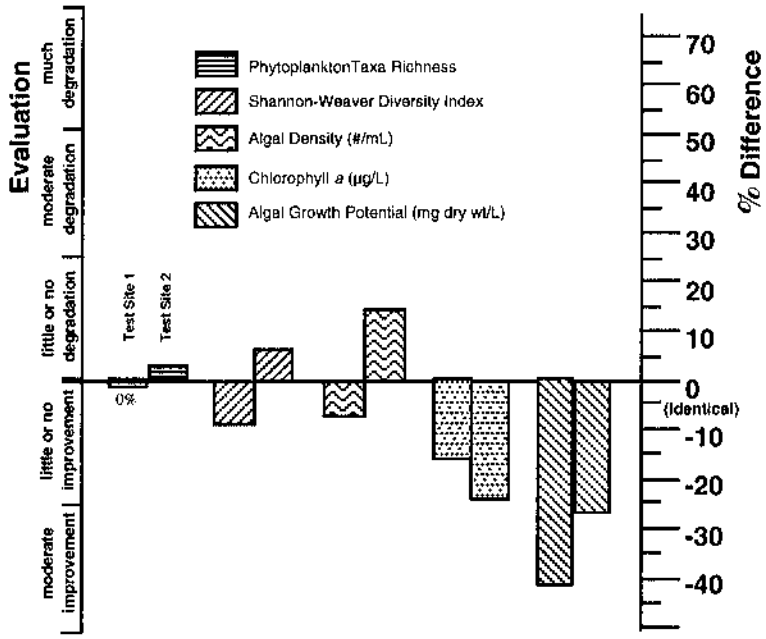


Figure 1. Effect of discharge on the phytoplankton community.

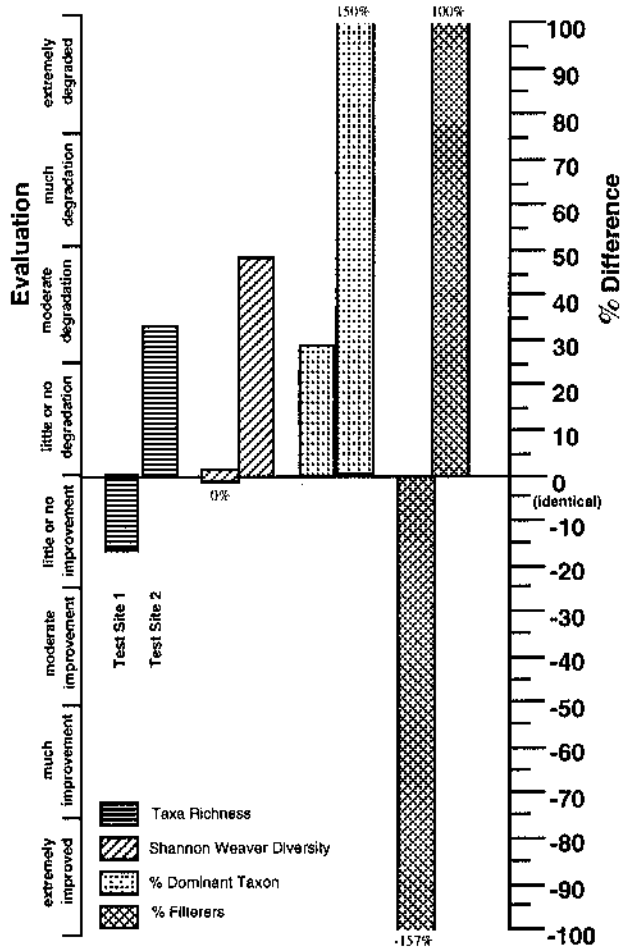


Figure 2. Effect of the discharge on the benthic community.

Typical Values for Selected Parameters in Florida Waters

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

Parameter	Percentile Distribution										
	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30

Units:

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

Explanation of Measurements of Community Health

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

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa.

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. The Florida Index, assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy.

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

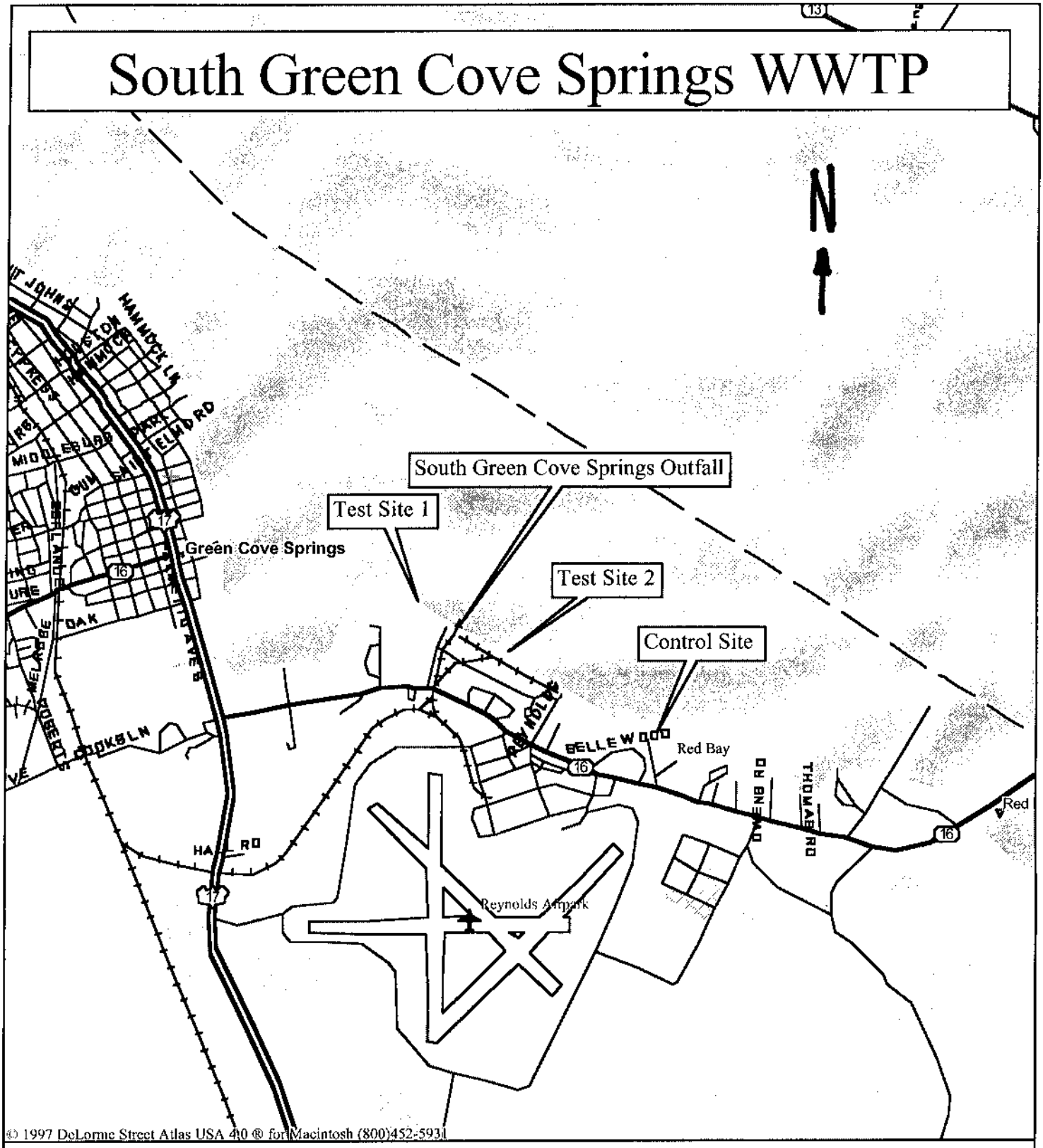
Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation.

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

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

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996) developed for Florida. The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).

South Green Cove Springs WWTP



© 1997 DeLorme Street Atlas USA 4.0 ® for Macintosh (800)452-5931

Mag 14.00
Tue Mar 30 16:10 1999
Scale 1:31,250 (at center)

2000 Feet

1000 Meters

- Local Road
- State Route
- Primary State Route
- US Highway
- Railroad
- County Seat
- Airfield
- Geographic Feature
- Private Airport
- Cemetery

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: South Green Cove Springs WWTP	Prepared by: KATHLEEN GERARD Date: October 15, 1998	
Location (attach detailed map): 0.3 miles east of Intersection of U.S. 17 & SR 16	County: CLAY	District: Northeast District
Federal Permit # FL0030210 and expiration date: (State) July 11, 1999	State GMS # and 31HOM04233 State expiration date: July 11, 1999	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility:
WASTEWATER TREATMENT FACILITY

Description of treatment process:

0.500 MGD Class I reliability conventional activated sludge (complete mix) wastewater treatment facility providing complete nitrification with the chlorinated effluent dechlorinated post aerated and discharged to the St. Johns River via a 20-inch diameter submerged outfall extending 120 feet offshore. This facility serves that portion of Green Cove Springs south of S.R. 16.

Receiving waters: St. JOHNS	Classification: III.
Design Flow: 0.500 MGD	Actual Mean Flow: 0.3 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.):
NO MIXING ZONE.

List effluent limits:

Parameter	Limit (units) Annual	Monthly	weekly	
CBOD5	20	30	45	mg/L
TSS	20	30	45	mg/L
Fecal Coliforms	200	200		no./100 ml
Dissolved Oxygen	– 5.0 mg/L minimum –			
pH	6.0 minimum to 8.5 maximum.			

Describe special permit conditions and permit modifications:
See attached permit Conditions 17, 18, 19, 20, 21, 23 and 25 for effluent limitations, quarterly monitoring requirements, stream monitoring and reuse requirement conditions

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

(Facility)

Description of permitted outfall(s):

The 20-inch diameter submerged outfall pipe extends 120 Feet off shore.

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

The facility usually maintains a good quality of effluent, with the exception of the August 1998 toxicity test.

A summary of data from MORs/DMRs that were submitted during the last year is attached.

DMRs/MORs for May through August 1998 are still being received and put into the computer.

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

See attached information regarding Toxicity data. Toxicity tests taken for the following dates passed! Sept. 94, 4th Quarter 94, 1st Quater 95, 2nd Quarter 95 (routine), 1st annual 96, June, 2nd annual Sept. 97. The Test initiated for August 1998 failed the DEP whole effluent toxicity criteria.

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

Data submitted on DMRs/MORs is consistent with DEP sampling results.

Additional information:

Wastewater treatment facility is Class I. reliability.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/19/98	1510	St. Johns River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Clay	Saint Johns River @ Port of Green Cove Springs	TEST SITE 2 Site 3 Pier 5

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
		5		5	40	50	

Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☐ Heavy ☒ PROP WASH

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

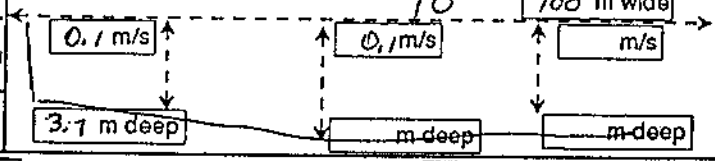
Width of riparian vegetation (m) on least buffered side: 0 — *List & map dominant vegetation on back*

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect: TO 100 m wide

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

Artificially Impounded ☐ yes

High Water Mark: 0.2 (m above present water level) + 3.7 (present depth in m) = 3.9 (m above bed)



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	100	3	P. Ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.85	26.9	7.71	7.39	737			0.6
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:
OUTGOING TIDE
SUNNY WARM
WIND VARIABLE 0-5

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JUN - 4 1998

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

SAMPLING TEAM:	SIGNATURE:	DATE:
DEPT. OF ENV. PROTECTION NORTHEAST DISTRICT - JAX		

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/19/98	SAINT JOHNS RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	SAINT JOHNS RIVER @ PORT OF GREEN COVE SPRINGS	TEST SITE 2 SITE 3 PIER 5

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity [3]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 (3) 2 1
Substrate Availability [3]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 (3) 2 1
Water Velocity [10]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [3]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score [19]				
Secondary Habitat Components Artificial Channelization [3]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [10] Left Bank [10]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [1] Left Bank [1]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [1] Left Bank [1]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1
Secondary Score [27]				

[46] TOTAL SCORE

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DEPT. OF ENV. PROTECTION
NORTHEAST DISTRICT - JAX

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/19/98	PATRICK W O'CONNOR	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/21/98		St. Johns River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Clay	Saint Johns River @ Port of Green Cove Springs	TEST SITE 1 Site 1 Pier 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
		5		5	40	50	

Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☐ Heavy ☒ PROP WASH

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

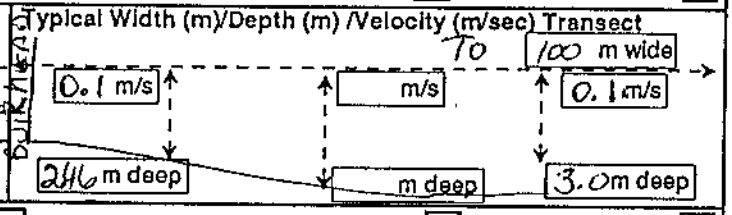
Width of riparian vegetation (m) on least buffered side: 0 — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 0.3 (m above present water level) + 2.46 (present depth in m) = 2.76 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	100	3	P. Ponar
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.2	25.6	7.36	6.19	737			0.6
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: Incoming tide, Sunny Warm, 85° Wind Variable 0-5

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JUN - 4 1998

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

SAMPLING TEAM:		SIGNATURE:	DATE:
Wright, O'Connor	DEPT. OF ENV. PROTECTION NORTHEAST DISTRICT - JAX		10/19/98

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/19/98	SAINT JOHNS RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	SAINT JOHNS RIVER @ PORT OF GREEN COVE SPRINGS	TEST SITE 1 SITE 1 PIER 1

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components				
Substrate Diversity [3]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 (3) 2 1
Substrate Availability [3]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 (3) 2 1
Water Velocity [10]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec (10) 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [3]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score [19]	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Secondary Habitat Components				
Artificial Channelization [3]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 (3) 2 1
Bank Stability: Right Bank [10]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Bank Stability: Left Bank [10]				
Riparian Buffer Zone Width: Right Bank [1]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Buffer Zone Width: Left Bank [1]				
Riparian Zone Vegetation Quality: Right Bank [1]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1
Riparian Zone Vegetation Quality: Left Bank [1]				
Secondary Score [27]				

[46] **TOTAL SCORE**

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JUN - 4 1998
DEPT. OF ENV. PROTECTION
NORTHEAST DISTRICT - JAX

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/19/98	PATRICK W O'CONNOR	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		10/19/98	1230	SAINT JOHNS RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	SAINT JOHNS RIVER @ PORT of GREEN COVE SPRINGS	CONTROL SITE SITE 2 PIER 10

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
		5		5	4	50	

Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☐ Heavy ☒ PROP WASH

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

Width of riparian vegetation (m) on least buffered side: 0

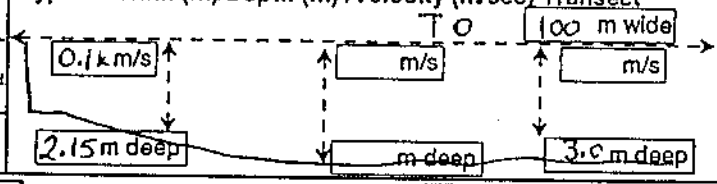
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 0.2 (m above present water level) + 2.15 (present depth in m) = 2.35 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	100	3	P. PONAR
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.1	26.1	7.45	6.28	739			0.7
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:
HIGH TIDE SLACK
SUNNY WARM, 85°
WIND VARIABLE 0-5

RECEIVED
JUN - 4 1998

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

SAMPLING TEAM: WRight O'CONNOR, DEPT. OF ENV. PROTECTION, NORTHEAST DISTRICT - JAX

SIGNATURE: [signature]

DATE: 10/19/98

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		10/19/98	SAINT JOHNS RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	SAINT JOHNS RIVER @ Port of GREEN COVE SPRINGS	CONTROL SITE SITE 2 PIER 10

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity [3]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 (3) 2 1
Substrate Availability [3]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 (3) 2 1
Water Velocity [10]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec (10) 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering [3]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score [19]				
Secondary Habitat Components Artificial Channelization [3]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 (3) 2 1
Bank Stability Right Bank [10] Left Bank [10]	Stable. No evidence of erosion or bank failure. Little potential for future problems. (10) 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [1] Left Bank [1]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [1] Left Bank [1]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1
Secondary Score [27]				

[46] TOTAL SCORE

RECEIVED
JUN - 4 1998
DEPT. OF ENV. PROTECTION
NORTHEAST DISTRICT - JAX

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/19/98	PATRICK W O'CONNOR	Patrick W O'Connor

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: South Green Cove Springs WWTP
County: CLAY
Contact / District: Pat O'Connor / Northern
NPDES Permit #: FL0030210
LIMS Sample #: 352338 **LIMS Job #:** TLH-1998-10-20-10.01
sample log 10/26/98 DW
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 10/19/98 Time 14:00
Test Beginning: Date 10/20/98 Time 1430
Test Ending: Date 10/22/98 Time 14:00
Organism Batch #: 80 **Diluent Batch #:** Well
Organism Age: 11 days **SRT toxicant batch #:** —
Test organism: Cyprinella leedsi

Remarks: Temperature Range Incubator #3: 24.8 – 25.2°C.
Temperature Range Culture Room: 24.7 – 25.0°C.

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (µmhos/cm) 0 hr	Cond. 24 h	Cond. 48 h
Ctr A	A1	5	5	5	7.9	8.0	8.3	25.4	24.9	25.1	7.4	7.0	6.9	250	265	265
Ctr B	A2	5	5	5	7.9	8.1	8.3	25.3	24.9	25.9	7.4	7.0	7.0	250	275	275
Ctr C	A3	5	5	5	7.9	8.1	8.4	25.3	25.1	26.0	7.4	6.9	7.0	250	285	300
Ctr D	A4	5	5	5	7.9	8.1	8.4	25.2	25.1	24.9	7.5	6.9	7.1	255	280	290
100% A	A5	5	5	5	6.9	7.6	8.0	25.1	25.1	25.1	7.1	6.7	7.1	470	505	530
100% B	A6	5	5	5	6.9	7.6	8.0	25.1	25.4	25.5	7.0	6.7	7.1	480	515	540
100% C	A7	5	5	5	6.9	7.5	7.9	25.1	25.0	25.4	7.0	6.7	7.0	475	515	540
100% D	A8	5	5	5	6.8	7.5	8.0	25.2	24.8	24.8	7.0	6.2	7.1	485	510	535
measured by:		MF	DAW	CH	DAW	DAW	CH	DAW	DAW	CH	DAW	DAW	CH	DAW	DAW	CH
recorded by:		CH	CH	CH	DW	CH	FW	DW	CH	FW	DW	CH	FW	DW	CH	FW

Investigators' Signatures

Courtney Hearn

Marshall Faircloth

reviewer

form updated 5/22/98

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			prior to use <0.02	—	Jim Wright	MF
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR-100	CH	MF
Alkalinity (mg/L as $CaCO_3$):	128	—	80	Hach	CH	MF
Hardness (mg/L as $CaCO_3$):	126	—	126	Hach	CH	MF
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	FW	MF
Salinity:	0	—	0.4	YCT	DAW	MF

field salinity by Jim Wright

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: South Green Cove Springs WWTP
County: CLAY
Contact / District: PAT O'Connor / Northeast
NPDES Permit #: FL0030210
LIMS Sample #: 352338 LIMS Job #: TLH-1998-10-20-10-01
sample log 10/26/98 DW
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 10/19/98 Time 14:00 EST
Test Beginning: Date 10/20/98 Time 1745 EST
Test Ending: Date 10/22/98 Time 1415
Organism Batch #: 46 Diluent Batch #: 49
Organism Age: <24 hrs SRT toxicant batch #: —
Test organism: Ceriodaphnia dubia

Remarks: Temperature Range Incubator #2: 25.7 – 26.7°C.
Temperature Range Culture Room: 24.7 – 25.0°C.

(A) wrote C. laedi CTLA on C. dubia page 10/26/98 DW

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	24 h	48 h
Ctl	A	5	5	5	~~7.9~~ (A) DW		8.1	24.6		24.7	7.5		7.0	160		190
Ctl	B	5	5	5	8.3		8.2			24.5			7.0			180
Ctl	C	5	5	4 (D)			8.2			24.5			7.3			180
Ctl	D	5	5	5			8.2			24.2			7.4			190
100%	A	5	5	5	7.0		8.2	24.7		24.8	7.6		7.2	465		445
100%	B	5	5	5			8.2			24.7			7.4			435
100%	C	5	5	5			8.2			24.5			7.5			435
100%	D	5	5	5			8.2			24.3			7.5			480
measured by:		MF	MF	FW	DAW		CH	DAW		CH	DAW		CH	DAW		CH
recorded by:		DW	CH	FW	DW		FW	DW		FW	DW		FW	DW		FW

Investigators' Signatures

David R. Wainright (DAW)
(DW)
Courtney Hunt
Marshall Faircloth
Tammy Welch

reviewer form updated 5/22/98

	Salt Water / Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.02	—	Jim Wright	MF
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	CH	MF
Alkalinity (mg/L as $CaCO_3$):	—	75	80	Hach	CH	MF
Hardness (mg/L as $CaCO_3$):	—	84 <0.03 (B)	~~<0.03~~ 136	Hach	CH	MF
Total ammonia (mg/L as N):	—	<0.017	<0.017	orion	FW	MF
Salinity:	—	0	0.4	YKT	DAW	MF

Residual Cl2 in Hardness space MF 10-21-98 Field salinity by Jim Wright

Phytoplankton taxa list and densities (#/mL) for South Green Cove Springs WWTP, collected via subsurface grabs in St. Johns River on 21 October, 1998.

	Control Site	Test Site 1	Test Site 2
Bacillariophyceae			
Coscinodiscus sp.	16	–	–
Cyclotella sp.	495	439	367
Fragilaria sp.	–	13	–
Leptocylindrus sp.	16	–	–
Melosira sp.	1853	1357	2041
Navicula sp.	–	13	–
Nitzschia sp.	80	120	20
Rhizosolenia sp.	–	13	20
Tabellaria sp.	32	133	–
Chlorophyceae			
Actinastrum sp.	–	–	20
Ankistrodesmus sp.	–	67	20
Chlamydomonas sp.	1102	772	2163
Chlorogonium sp.	–	–	41
Coelastrum sp.	–	27	20
Crucigenia sp.	16	–	20
Dictyosphaerium sp.	16	53	20
Elakatothrix sp.	–	13	–
Euastrum sp.	16	–	–
Gloeocystis sp.	16	40	20
Micractinium sp.	16	–	–
Oocystis sp.	48	–	–
Pediastrum sp.	16	–	–
Pteromonas sp.	32	–	–
Scenedesmus sp.	910	679	918
Schroederia sp.	16	13	–
Selenastrum sp.	16	67	20
Staurastrum sp.	–	13	20
Tetradesmus sp.	48	–	41
Tetraedron sp.	176	80	82
Tetrastrum sp.	64	106	20
Undetermined Chlorophyceae	–	13	–
Cyanophyceae			
Aphanocapsa sp.	–	27	61
Aphanothece sp.	–	–	20
Chroococcus sp.	96	133	61
Dactylococcopsis sp.	383	426	245
Lyngbya contorta sp.	256	253	306
Lyngbya sp.	16	53	20
Marssoniella sp.	32	93	–
Merismopedia sp.	655	812	735
Microcystis sp.	271	426	306

Oscillatoria sp.	511	466	551
Dinophyceae			
Peridinium sp.	–	40	122

Periphyton taxa list and densities (#/cm^2) for South Green Cove Springs WWTP, collected via glass microscope slides in St. Johns River, on 21 October, 1998.

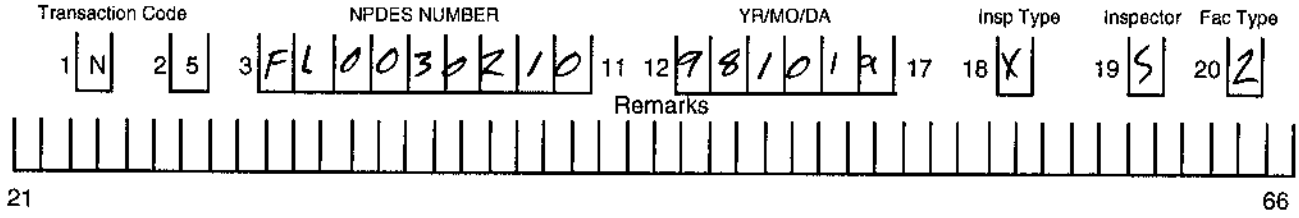
	Control Site	Test Site
Bacillariophyceae		
Achnanthes exigua	–	2345
Achnanthes lanceolata	2839	9381
Achnanthes sp.	–	1173
Amphora coffaeiformis	11355	5863
Amphora veneta	–	2345
Cocconeis placentula	22709	42213
Cocconeis sp.	–	2345
Coscinodiscus	62451	4690
Cyclotella sp.	79483	29315
Cymbella sp.	–	1173
Diploneis sp.	11355	8208
Fragilaria construens	2839	–
Fragilaria pinnata	2839	–
Fragilaria sp.	14193	–
Gomphonema angustatum	2839	2345
Gomphonema gracile	5677	12898
Gomphonema parvulum	22709	17589
Gomphonema sp.	5677	12898
Melosira granulata	82321	17589
Melosira sp.	42580	11726
Navicula capitata	2839	–
Navicula cryptocephala	25548	15244
Navicula minima	–	4690
Navicula sp.	2839	8208
Nitzschia amphibia	5677	1173
Nitzschia filiformis	2839	1173
Nitzschia fonticola	–	4690
Nitzschia frustulum	–	7035
Nitzschia gracilis	5677	–
Nitzschia palea	8516	3518
Nitzschia tryblionella	2839	3518
Nitzschia sp.	36903	17589
Pennales	65289	42213
Synedra fasciculata	22709	–
Synedra sp.	14193	–
Chlorophyceae		
Characium sp.	–	1173
Chlamydomonas sp.	19871	1173
Chlorococcum sp.	–	586
Mougeotia sp.	–	1173
Oocystis sp.	5677	–
Scenedesmus sp.	45419	14657

Tetrastrum sp.	5677	–
Cyanophyceae		
Anabaena sp.	2839	1759
Aphanocapsa sp.	–	1759
Aphanothece sp.	–	586
Chroococcus sp.	36903	2931
Cylindrospermopsis sp.	2839	–
Dactylococcopsis sp.	25548	586
Lyngbya contorta	19871	3518
Lyngbya sp.	–	2931
Merismopedia sp.	2839	1759
Microcystis sp.	–	1173
Oscillatoria sp.	19871	10553
Synechococcus sp.	2839	–
Dinophyceae		
Peridinium sp.	5677	–

Benthic macroinvertebrate taxa list for South Green Cove Springs WWTP, collected via Ponar grabs in St. Johns River on 21 October, 1998. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Amphipoda			
Corophium sp.	–	42	–
Diptera			
Chaoborus punctipennis	42	–	–
Chaoborus sp.	–	–	83
Chironomus crassicaudatus	–	83	–
Coelotanypus concinnus	–	83	–
Coelotanypus tricolor	42	208	292
Coelotanypus sp.	–	–	292
Procladius sp.	–	83	–
Gastropoda			
Micromenetus sp.	42	–	–
Undetermined Gastropoda	–	–	42
Oligochaeta			
Haber speciosus	83	–	–
Limnodrilus hoffmeisteri	42	–	125
Pelecypoda			
Sphenia antillensis	–	42	–
Trichoptera			
Neureclipsis sp.	42	–	–
Polycentropus sp.	–	42	–

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)

