#214

Biological Assessment of

City of Palatka Wastewater Treatment Plant

Putnam County

NPDES #FL0040061

Sampled September 1997

April 1998

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: City of Palatka WWTP
County: Putnam
NPDES Number: FL0040061
State Permit Expiration Date: 22 June 1998

Toxics Sampling Inspection (XSI)

Date Sampled: 22 September 1997

Results: The concentration of silver (0.23 µg/L) in the effluent sample exceeded the Class III water quality standard of 0.07 µg/L, representing a violation of Rule 62-302.530(60) FAC. All other metals detected in the effluent complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 22 September 1997

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 22 September 1997

Results: The discharge did not appear to negatively effect the macroinvertebrate communities at the test sites. In ponar samples, taxa richness, the Florida Index, the EPT Index, and percent contribution of dominant taxa at the test sites were similar to the reference site. Phytoplankton communities observed at the St. Johns River study sites were typical of eutrophic waters. Symptoms of eutrophication included phytoplankton populations consisting of over 80% blue-greens and high chlorophyll *a* concentrations at all three sites. Both test sites were similar to the reference site with respect to phytoplankton taxa richness, diversity, algal density, chlorophyll *a*, and community composition. Though adding to the already excessive nutrient concentrations in the river, the Palatka WWTP discharge did not appear to be contributing any additional stress to the algal community in the St. Johns River.

Water Quality Inspection (WQI)

Date Sampled: 22 September 1997

Results: Dissolved oxygen was below the Class III water quality standard of 5.0 mg/L at both test sites (3.8 mg/L at test site 1 and 4.6 mg/L at test site 2) (Rule 62-302.530 (31) FAC). The effluent dissolved oxygen (5.4 mg/L) was above the Class III water quality standard. The mean $CBOD_5$ of 5 mg/L, (taken from Monthly Operating Reports), did not appear to be placing a large oxygen demand on the system, in spite of elevated nutrients (total phosphorus = 2.5 mg/L and nitrate-nitrite = 19 mg/L) in the effluent. The water temperature (near 30° C), coupled with a river bottom consisting of oxygen-consuming detritus probably contributed to the low dissolved oxygen. AGP was above the "problem threshold" of 5.0 mg dry wt/L at all of the study sites, indicating eutrophic conditions were present.

Introduction

The City of Palatka Wastewater Treatment Plant is a 3.0 MGD domestic wastewater treatment facility located in Putnam County (see maps in Appendix). The conventional non-contact stabilization treatment system consists of pretreatment, chlorine disinfection, residuals stabilization, and dewatering. The final effluent is discharged through a pipeline to the St. Johns River, where it enters this Class III waterway near mid-channel (see map in Appendix).

State permit limits for the City of Palatka WWTP are listed in Table 1. The plant has been in general compliance with permit limits, although concentrations of silver and copper in previous samples have exceeded Class III water quality standards (see Facility Summary in Appendix). No enforcement actions have been brought against the Palatka WWTP.

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 in the St. Johns River, approximately two miles upstream of the discharge) and two test sites bracketing the tidally influenced flow from the discharge (test site 1 was located about 50 m upstream of the discharge, test site 2 was located about 50 m downstream of the discharge) (see maps 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 toxicity bioassays, using the water flea, *Ceriodaphnia dubia,* and the fish, *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 and samples from reference and test sites. Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected using three replicate petite Ponar grabs at each site. Phytoplankton was sampled at the reference site and at the test sites via subsurface grabs. Chlorophyll *a* was determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978). Sediment from reference and test sites was analyzed for grain size and percent organic matter (Ross 1990).

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.

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 Chang *et al.* (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

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

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

Algal biomass: High algal biomass, algal density, or chlorophyll *a* implies nutrient stress. A decreased diatom to blue-green algae

Table 1. Effluent permit limits and summary of chemistry data.

	Effluent Limits	Effluent Sample	Reference Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
None detected	-	-	-	-	-
Metals (µg/L)					
Aluminum	≤ 1,500 **	106 I	-	-	-
Arsenic	≤ 50 **	40 U	-	-	-
Cadmium	≤ 2.0 **c	0.06 I	-	-	-
Chromium	≤ 370 **c	10 U	-	-	-
Copper	≤ 21.7 **c	2.9 J	-	-	-
Iron	≤ 1,000 **	99	-	-	-
Lead	≤ 7.8 **c	0.3 I	-	-	-
Mercury	≤ 0.012 **	0.10 U	-	-	-
Nickel	≤ 287 **c	7 U	-	-	-
Selenium	≤ 5.0 **	50 U	-	-	-
Silver	≤ 0.07 **	0.23	-	-	-
Zinc	≤ 193 **c	20 I	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	2.4 Q	0.004 U	0.004 U	0.004 U
Total phosphorus	-	2.5	0.031 I	0.033 I	0.041
Ammonia	≤ 32 *	0.042	0.013 I	0.043 A	0.048
Nitrate+Nitrite	-	19	0.010	0.040	0.046
TKN	-	1.5	1.4	1.5	1.5
Organic Nitrogen	≤ 8 *	1.5	-	-	-
General Phys-Chem Parameters					
Habitat Assessment	-	-	130	125	126
D.O. (mg/L)	≥ 4.0 *	5.4	5.2	3.8	4.6
pH (SU)	6.0-8.5 *	6.6	7.1	7.2	6.9
Conductivity (µmhos/cm)	-	895	1281	1286	1255
Temperature (°C)	-	27.2	29.8	29.9	29.6
B.O.D., 5 day (mg/L)	≤ 60 *	< 2	2	< 2	< 2
Tot. Suspended Solids (mg/L)	≤ 60 *	3	8	6	5
Tot. Residual Chlorine (mg/L)	≤ 0.01 *	-	-	-	-
Flow (MGD)	≤ 3.0 *	-	-	-	-
Hardness (mg CaCO3)	-	203.2	-	-	-
AGP (mg dry wt/L)	-	95.8	7.2	9.0	8.5
Toxicity					
Bioassay Fish	-	No Mortality	-	-	-
Bioassay Invertebrate	-	No Mortality	-	-	-
Microbiology (# organisms/100 mL)					
Fecal Coliforms	≤ 800 *	-	-	-	-

* Permit limit, one time maximum

** Class III water quality standard

c - Value is calculated based on hardness

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

J - Estimated value

Q - Sample held beyond normal holding time

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

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).

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

The following personnel were involved in this investigation: Heather Hayek, Tim McKelvey, and Rob Zammataro (DEP Northeast District) and Lyn Burton-Hupp, Melva Campos, Roger Caron, Jennifer Eichelberger, Kenneth Espy, Marshall Faircloth, Russel Frydenborg, Maosen Hua, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Kellie Ralston, Johnny Richardson, Lisa Tamburello, David Whiting, Vicki Whiting, and Steve Wolfe (DEP Central Biology Laboratory in Tallahassee). 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.

Table 2. ***Major characteristics of community structure of control and test sites.***

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	18	24	22
Shannon-Weaver Diversity	2.2	2.4	2.8
Florida Index	6	4	7
EPT Index	2	2	2
% Dominant Taxon	64	55	51
Community Composition			
% Diptera	91	91	83
% Ephemeroptera	1	1	0.3
% Isopoda	2	0.3	6
% Oligochaeta	1	4	4
% Trichoptera	4	3	2
% Other	1	1	4
Functional Feeding Groups			
% Predator/Carnivores	13	11	17
% Surface Deposit Feeders	42	40	33
% Scavengers	1	0.1	5
% Shredders	35	30	27
% Suspension Feeders	6	5	4
% Browser-grazers	1	0.1	5
Phytoplankton Algae			
Number of Taxa	21	25	17
Shannon-Weaver Diversity	3.2	3.3	3.0
Chlorophyll a (µg/L)	24.5	19.4 A	16.6
Algal Density (#/mL)	17,013	8,954	15,081
% Blue-green	85	86	85
% Green	6	7	7
% Diatoms	9	6	8
AGP (mg dry wt/L)	7.2	9.0	8.5

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

Results and Discussion

The study area (St. Johns River) is an unusual river system in that it originated as a coast-parallel lagoon, is low gradient, very wide (2,000–3,000 m), and flows from south to north (Appendix). Note that although the St. Johns River is a predominantly freshwater system where this study took place, the flow of the river is affected by tides up to Lake George and the river bottom is sufficiently influenced by saline water that blue crabs (*Calinectes sapidus*) and toredo worms (*Toredo* sp.) are found in the area (personal communication, FDEP District staff). Although some of the watershed is used for residential and agricultural purposes, the majority of the land cover consists of hydric hammocks, hardwood swamps, and pine flatwoods. All study sites were similar in terms of habitat-quality scores (with 130 points at the reference site, 125 points at test site 1, and 126 points at test site 2) (see Habi-

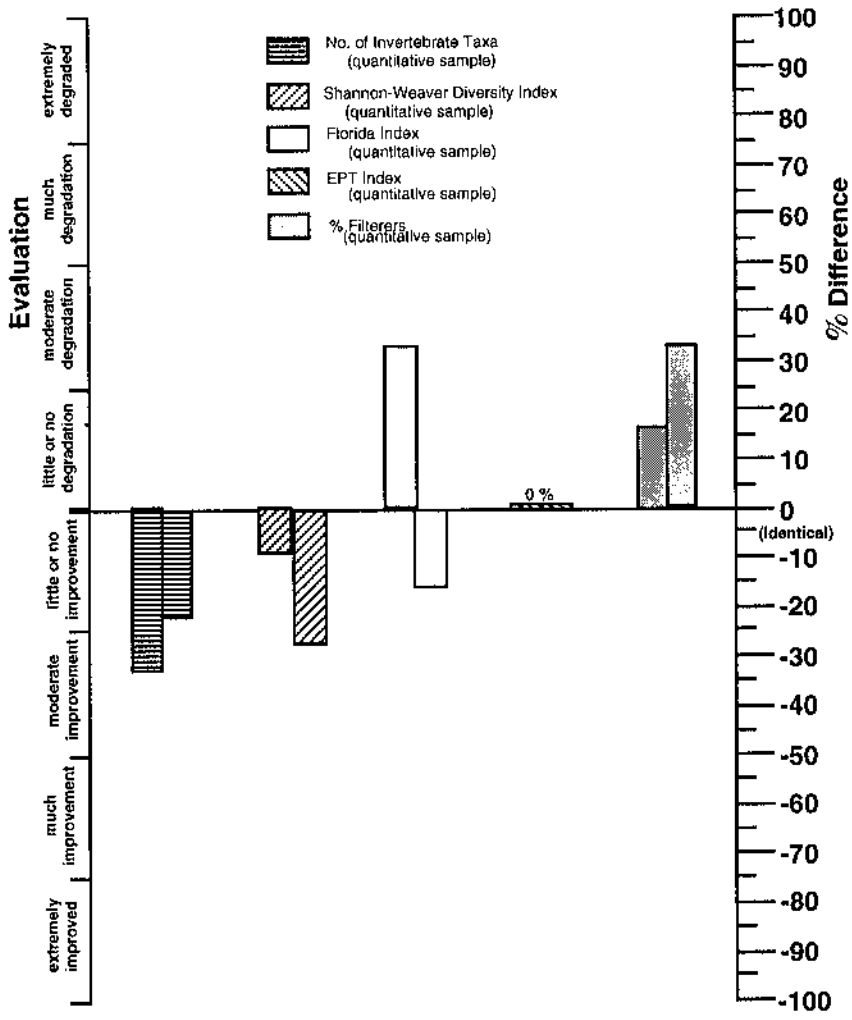


Figure 1. Effect of discharge on the benthic macroinvertebrate community. The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

tat Assessment Field Data Sheets in Appendix).

Most field parameters were similar at the reference and test sites (Table 1). Dissolved oxygen was below the Class III water quality standard of 5.0 mg/L at both test sites (3.8 mg/L at test site 1 and 4.6 mg/L at test site 2) (Rule 62-302.530(31) FAC). Dissolved oxygen at the reference site was 5.2 mg/L. The effluent pH and dissolved oxygen complied with permit limits (Table 1).

No organic constituents were detected in the effluent. Some of the metals standards are calculated based on hardness, as indicated in Table 1. Effluent hardness was determined to be 203.2 mg $CaCO_3$ / L based on the calcium (52.7 mg/L) and magnesium (17.4 mg/L) concentrations in the effluent sample. The following metals were detected in the effluent at levels that complied with Class III water quality standards: aluminum, cadmium, iron, copper, lead, and zinc (Table 1). The concentration of silver (0.23 µg/L) in the effluent sample exceeded the Class III water quality standard of 0.07 µg/L, representing a violation of Rule 62-302.530(60) FAC.

The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during the 48-hour bioassay (Appendix).

Elevated concentrations of total phosphorus (2.5 mg/L) and nitrate-nitrite (19 mg/L) were detected in the effluent (Table 1). The concentration of TKN was 1.5 mg/L in the effluent and at both test sites, and 1.4 mg/L at the reference site. TKN levels at all three sites were higher than those found in 80% of other Florida streams (see *Typical Values for Selected Parameters* in Appendix). Ammonia concentrations were not elevated at the reference and test sites or in the effluent sample.

Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at the reference site (7.2 mg dry wt/L), test site 1 (9.0 mg dry wt/L), and test site 2 (8.5 mg dry wt/L) (Raschke and Schultz 1987). The high AGP of the effluent sample (95.8 mg dry wt/L) corresponded with the elevated nutrient levels found in the discharge.

Measurements of macroinvertebrate community health suggested that biota at the test sites were similar to those at the reference site. Figure 1 indicates the degree of degradation at the test sites when compared to the reference site. Larger differences (that is, higher percentages) correspond with greater degrees of degradation at the test sites while negative values indicate the test sites were healthier than the reference site community.

Macroinvertebrate taxa richness in the ponar samples was fairly low at all three sites, with slightly higher values at test site 1 (24 taxa) and test site 2 (22 taxa) than at the reference site (18 taxa) (Table 2). Shannon-Weaver diversity was also slightly higher at test site 1 (2.4) and test site 2 (2.8) than at the reference site (2.2). The EPT Index was the same at all three sites, with only 2 EPT taxa observed. Florida Index values were also similar with values of 6, 4, and 7 at the reference site, test site 1, and test site 2, respectively. The percent of filter-feeding organisms, an indicator of good community health, was low at all three sites, ranging from 4% to 6%. *Glyptotendipes paripes,* a pollution-tolerant midge, was the dominant taxon at all three sites (Table 2).

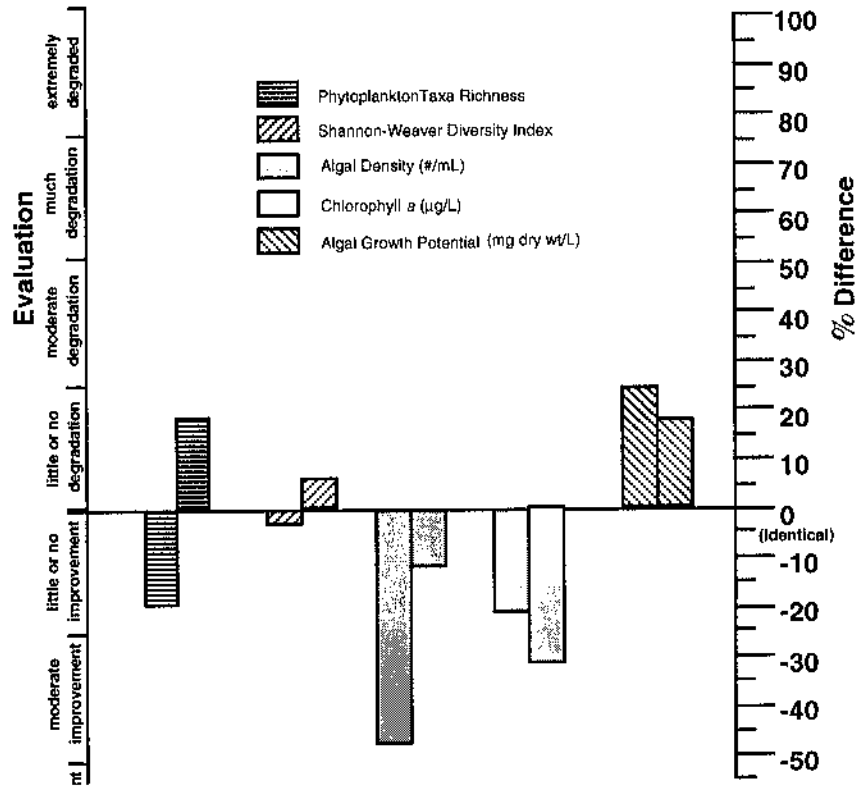


Figure 2. Effect of discharge on the phytoplankton community. The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

Figure 2 represents changes in the phytoplankton communities at the test sites when compared to the reference site. As was noted with the macroinvertebrate results, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Measures of algal community health, such as taxa richness, algal diversity, algal density, chlorophyll *a*, and AGP, suggested that the test sites were very similar to the reference site (Table 2, Figure 2). Phytoplankton communities at all three of the St. Johns River study sites were typical of eutrophic waters. Symptoms of eutrophication included phytoplankton populations consisting of over 80% blue-greens and elevated chlorophyll *a* levels at all three sites. Chlorophyll *a* concentrations of 16.6 µg/L at the reference site, 19.4 µg/L at test site 1, and 24.5 µg/L at test site 2, were greater than those found in 80 to 90% of other Florida streams (see *Typical Values for Selected Parameters* in Appendix).

Conclusions

Dissolved oxygen was below the Class III water quality standard of 5.0 mg/L at both test sites (3.8 mg/L at test site 1 and 4.6 mg/L at test site 2) (Rule 62-302.530 (31) FAC). The effluent dissolved oxygen (5.4 mg/L) was above Class III water quality standards. Neither the $CBOD_5$ of the effluent sample taken during this study (<2 mg/L), or the mean $CBOD_5$ of approximately 5 mg/L, (taken from Monthly Operating Reports), appear to have placed a large oxygen demand on the system, in spite of elevated nutrients in the effluent. The explanation for the low dissolved-oxygen levels may be the decomposition of the substantial layer of organic detritus covering the bottom of the river in this area.

The concentration of silver (0.23 µg/L) in the effluent sample exceeded the Class III water quality standard of 0.07 µg/L, representing a violation of Rule 62-302.530(60) FAC and may have contributed to the low $CBOD_5$ (<2 mg/L) of the effluent sample by inhibiting microbial activity. All other metals detected in the effluent complied with Class III water quality standards.

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

Elevated nutrients were detected in the effluent and at the test sites. AGP was above the "problem threshold" of 5.0 mg dry wt/L at all of the study sites, indicating eutrophic conditions were present throughout the system. Nutrient concentrations were, in general, much higher during the current study than in a previous bioassessment performed in 1992 (FDER 1992). For example, the effluent AGP in 1992 was 49.0 mg dry wt/L compared to 95.8 mg dry wt/L measured in the present study. Similar increases were seen at the reference and test sites.

Phytoplankton communities observed at the St. Johns River study sites were typical of eutrophic waters. Symptoms of eutrophication included phytoplankton populations consisting of over 80% bluegreens and high chlorophyll *a* concentrations at all three sites. Both test sites were similar to the reference site with respect to taxa richness, diversity, algal density, chlorophyll *a*, and community composition. While adding to the already excessive nutrient load in the St. Johns River, the Palatka WWTP discharge did not appear to be contributing any additional stress to the algal community.

Measurements of macroinvertebrate community health did not indicate degradation attributable to the discharge. In ponar samples, taxa richness, the Florida Index, the EPT Index and percent contribution of dominant taxa at the test sites were similar to the reference site. This is in contrast to the bioassessment performed in 1992 where the taxa richness and Florida Index were reduced by more than 25% at the two test sites compared to the reference site (FDER 1992). These results suggest an improvement in the Palatka WWTP's effect on the macroinvertebrate community in the St. Johns River.

Literature Cited

Chang, S., F. W. Steimle, R. N. Reid, S. A. Fromm, V. S. Zdanowicz, and R. A. Pikanowski. 1992. Association of benthic macrofauna with habitat types and quality in the New York Bight. Mar. Ecol. Prog. Ser. 89: 237-251.

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

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

FDER. 1992. Biological Assesment of City of Palatka Sewage Treatment Plant. Fla. Dept. Environ. Reg. Biology Section, Tallahassee, Fla. 5 p.

Hudson, P. L., D. R. Lenat, B. A. Caldwell, and D. Smith. 1990. Chironomidae of the Southeastern United States: A checklist of species and notes on biology, distribution, and habitat. U. S. Fish Wildl. Serv., Fish. Wildl. Res. 7. 46 pp.

Hulbert, J. L. 1990. A proposed lake condition index for Florida. North Amer. Benth. Soc. 38th Ann. Mtg., Blacksburg, VA, 11 p.

Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. J. N. Am. Benthol. Soc. 12(3): 270-290.

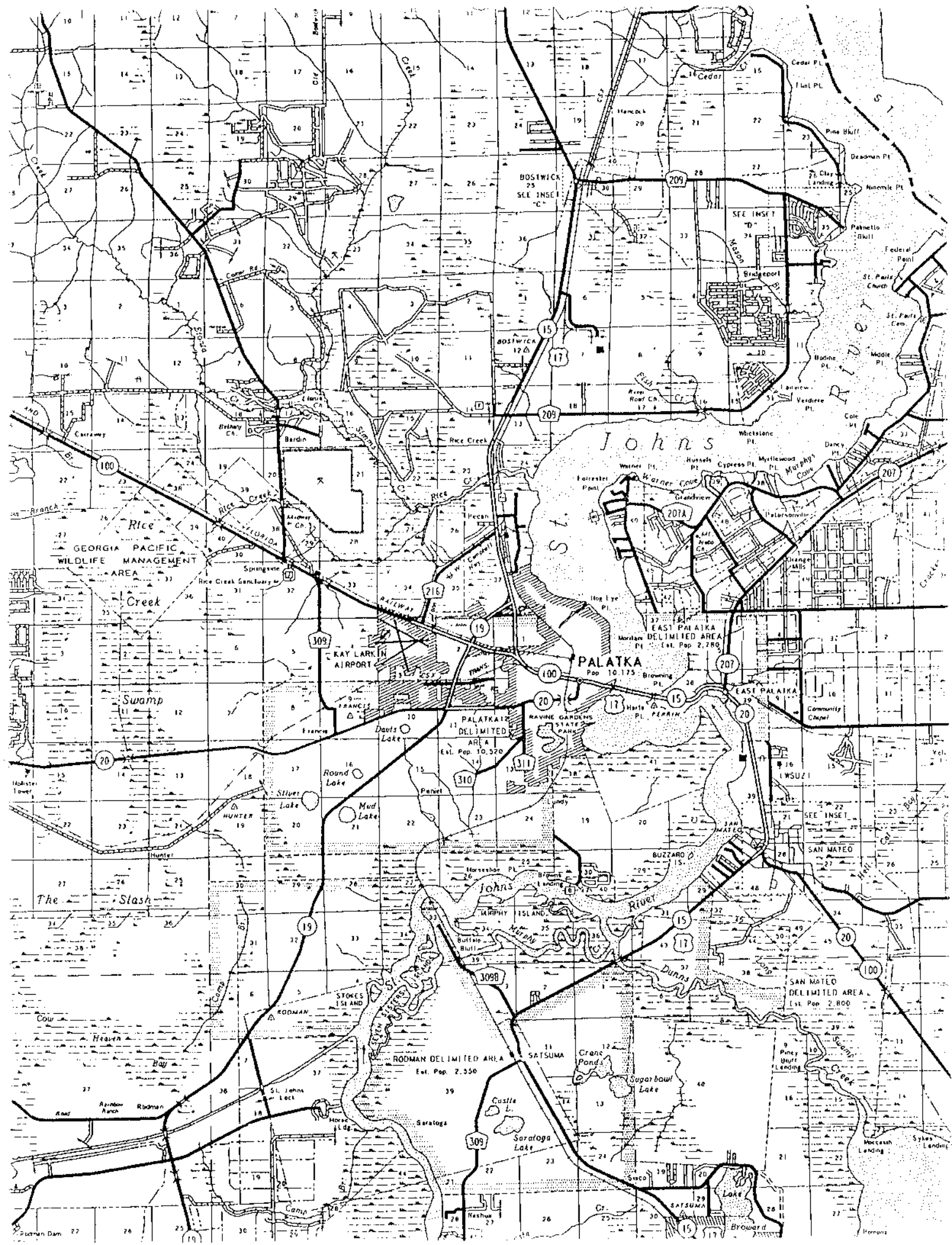
Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. U. S. Environ. Prot. Agency, EPA-600/9-78-018. 126 p.

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

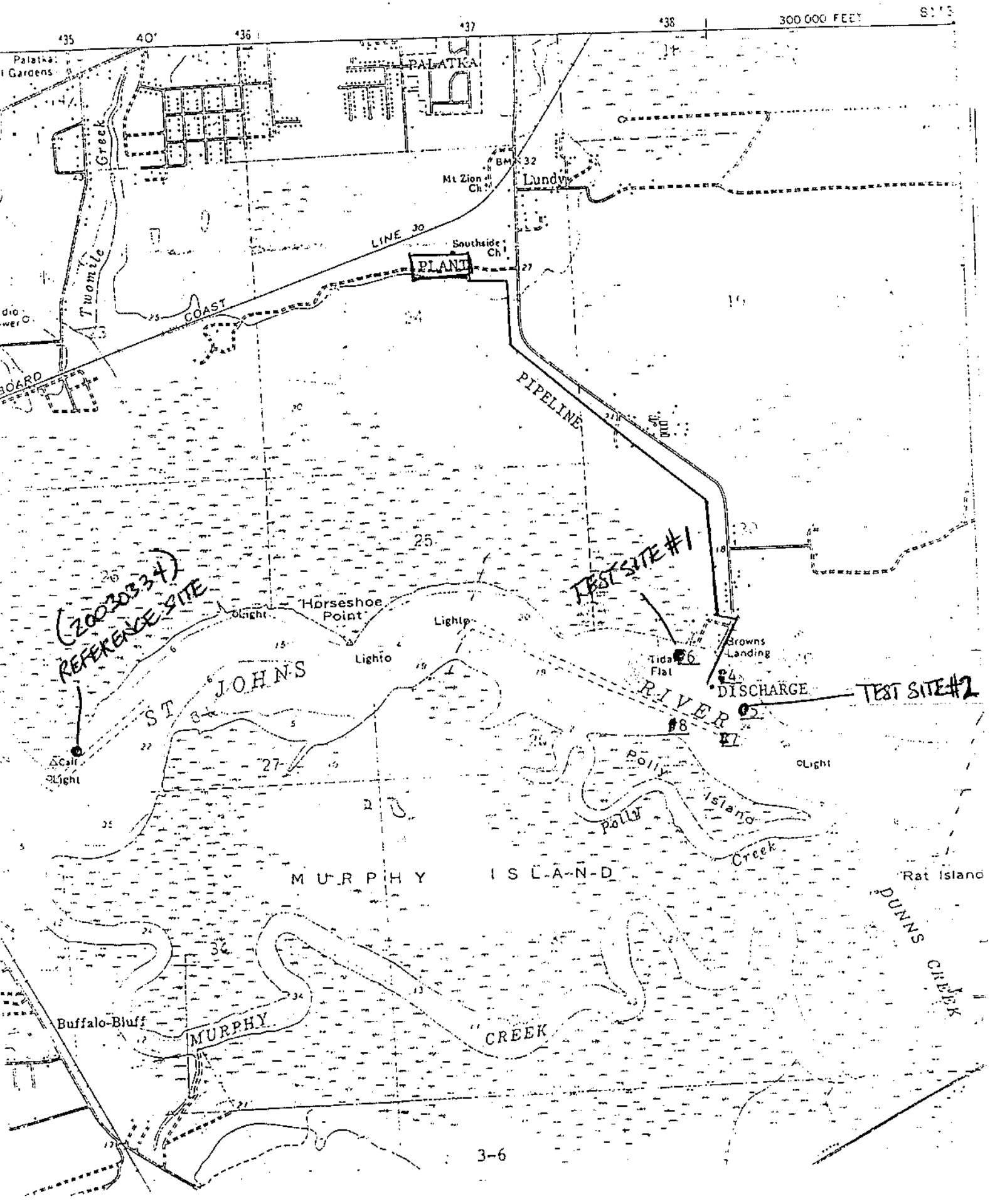
Weber, C. I. 1991. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 p.

Whitmore, T. J. 1989. Florida diatom assemblages as indicators of trophic state and pH. Limnol. Oceanogr. 34(5): 882-895


PALATKA
Pop. 10,175
EAST PALATKA
Est. Pop. 2,780
PALATKA DELIMITED AREA
Est. Pop. 10,520
SAN MATEO
SAN MATEO DELIMITED AREA
Est. Pop. 2,800
RODMAN DELIMITED AREA
Est. Pop. 2,550
SATSUMA
BOSTWICK
SEE INSET "C"
SEE INSET "D"
KAY LARKIN AIRPORT
GEORGIA PACIFIC WILDLIFE MANAGEMENT AREA
Rice Creek Sanctuary
RAVINE GARDENS STATE PARK
MURPHY ISLAND
BUZZARD ISLAND
STOKES ISLAND
Johns River
St. Johns River
Rice Creek
Deep Creek
Dunns Creek
Crane Ponds
Sugarbowl Lake
Saratoga Lake
Castle L.
Round Lake
Silver Lake
Mud Lake
Davis Lake
Swamp
The Slash
Hunter Creek
Cow Heaven Bay
Rodman Reservoir
Orange Mills
Federal Point
Pine Bluff
Deadman Pt.
Palmetto Bluff
Bridgeport
Cedar Pt.
Flint Pt.
Hancock
Clay Landing
Nunnelie Pt.
St. Pauls Church
St. Pauls Cem.
Middle Pt.
Lakeview
Verdiere Pt.
Cole Pt.
Dancy Pt.
Wachstone Pt.
Warner Pt.
Warner Cove
Hussels Pt.
Cypress Pt.
Myrtlewood Pt.
Murphys Cove
Fairchild Point
Grandview
Peterson ville
Hog Eye Pt.
Meridian Pt.
Browning Pt.
Harts Pt.
Perrin
Community Chapel
Lwsuzi
Horseshoe Pt.
Browns Landing
Buffalo Bluff
Dunns Creek
Piney Bluff Landing
Sugarbowl Lake
Sisco
Lake Broward
Mocassin Landing
Sykes Landing
Bardin
Conway
Bethany Ch.
Stamps
Rice Creek
Pecan
Meadow Ch.
Springvale
Hollister Tower
Francis
Panel
Lundy
Camp
Horse Ldg.
St. Johns Lock
Rainbow Ranch
Rodman
Nashua
Putnam Dam
Old Kings Rd.
Cow Ford Rd.
Conway Rd.
Bethany Ch.
Lennie Ch.
Meadow Ch.
Hog Eye Pt.
Old Dixie Hwy.
Seminole Trail
Florida Northern Railway
Trans.
Ft. Gates Ferry Rd.
Old Kings Rd.
Cow Ford Rd.
Conway Rd.
100
207
207A
209
216
309
309B
310
311
15
17
19
20

SECTION NUMBER 3
REVISION NUMBER Original
DATE November 2, 1989
PAGE 6 OF 6

SATSUMA QUADRANGLE
FLORIDA–PUTNAM CO.
7.5 MINUTE SERIES (TOPOGRAPHIC



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: City of Palatka WWTP		Date Summary Prepared: 9/22/97
Location (attach detailed map):	County: Putnam	District: Northeast
Federal Permit # and expiration date: FL0040061 6/30/98	State GMS # and 3154401836 State expiration date: 6/22/98	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility:

Treat domestic wastewater to secondary standards prior to discharge to St. Johns River.

Description of treatment process:

A 3.0 mgd conventional activated sludge WWTP that provides pretreatment, chlorine disinfection, residuals stabilization and dewatering with dechlorinated effluent discharge to the St. Johns River.

Receiving waters: St. Johns River.		Classification: I II (III)
Design Flow: 3.0 mgd	Mean Flow: 2.7 mgd.	Flow during survey:

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.):

N/A.

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

Parameter	Limit (units)		
	One time	Monthly	Annual
CBODS (mg/L)	40	30	20
TSS (mg/L)	"	"	"
NH_3-N (mg/L)	32	20	20
ON (mg/l)	8	5	5
DO (mg/l)	4.0	4.0	4.0
fecal (col/100 mL)	800		200
TRC (mg/l)	0.01 max		
chlorine residual (mg/l)	0.5 min		
Quarterly nutrients			
Quarterly stream monitoring			

Describe special permit conditions and permit modifications:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

City of Palatka
(Facility)

Description of permitted outfall(s):

3.0 mgd permitted outfall at Browns Landing, with discharge to the St. Johns River.

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

No permit violations or plant upsets occurred during the past year.

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

Impact bioassessment: (B12A192) effluent sample not acutely toxic to Notropis ludibundus. The Ceriodaphnia dubia bioassay was invalid due to excessive control mortality. Macroinvertebrate communities were moderately degraded at both test sites. No nutrient enrichment was observed at the test sites. Silver and copper samples did exceed Class 3 water standards.

No enforcement actions have been brought against the Palatka WWTP.

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

No trend noted. Facility has been in general compliance.

Additional information:

The City has conducted an infiltration and inflow study. The study found large portions of the collection system in need of repair. Currently, portions of the collection system are being repaired and reworked.

Staff contributing to this review (signature):

Timothy R. McKelvey (Biologist)
Heather Hayek (Inspector)
Heather Hayek (Engineer)
( )
( )
( )

Florida Department of Environmental Regulation

Northeast District • Suite B200, 7825 Baymeadows Way • Jacksonville, Florida 32256-7577

Lawton Chiles, Governor

Virginia B. Wetherell, Secretary

PERMITTEE:

Allen R. Bush, City Manager
City of Palatka
201 North 2nd Street
Palatka, Florida 32077

I.D. Number: 3154M01836
Permit/Cert Number: DO54-229847
Date of Issue: June 22, 1993
Expiration Date: June 22, 1998
County: Putnam
Lat/Long: 29°36'35"N/81°39'02"W
Section/Township/Range: 10 24 26
Project: City of Palatka WWTP

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-301, 17-302, 17-4, 17-600, 17-601, 17-602, 17-610, 17-640, and 17-7. The above named Permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

To operate a 3.0 MGD conventional activated sludge wastewater treatment plant that provides pretreatment, chlorine disinfection, residuals stabilization and dewatering with the final treated effluent dechlorinated and discharged to the St. Johns River.

This facility serves the City of Palatka and is located on Lundy Road, Palatka, Putnam County, Florida.

In accordance with application received April 20, 1993 and additional information provided through June 2, 1993.

Administration 448-4300
Air 448-4310
Waste Management 448-4320

Water Facilities 448-4330
Water Management 448-4340
FAX 448-4366

Recycled Paper

PERMITTEE:

Allen R. Bush, City Manager
City of Palatka WWTP

I.D. Number: 3154M01836
Permit Number: DO54-229847
Date of Issue: June 22, 1993
Expiration Date: June 22, 1998

17. In accordance with Chapter 17-601 FAC, the monitoring requirements and effluent limitations for this plant are as follows:

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow (mgd)	3.00 Annual Average	Continuous	A	Influent or Effluent
$CBOD_5$ (mg/l)	(a)	Weekly	(b)	Influent (c) & Effluent (d)
TSS (mg/l)	(a)	Weekly	(b)	Influent (c) & Effluent (d)
NH_3-N (mg/l)	(a)	Weekly	(b)	Effluent (d)
ON (mg/l)	(a)	Weekly	(b)	Effluent (d)
DO (mg/l)	4.0 Minimum	Daily, 7/week	Instrument	Effluent (d)
pH Units	Minimum 6.0 Maximum 8.5	Continuous	Instrument	Effluent (d)
Chlorine Residual(mg/l)	0.5 Minimum (e) 0.01 Maximum	Continuous Daily, 7/week	Meter or Instrument	ccc Dechlor. Effluent
Fecal Coliform no./100 (ml)	200 (i)	Weekly	Grab	Effluent (d)
Toxicity	See Specific Condition Number 18			
Nutrient Monitoring	See Specific Condition Number 19			
Stream Monitoring	See Specific Condition Number 20			
Testing Methods	See Specific Condition Number 21			

(a)

	ANNUAL	MONTHLY	WEEKLY	ONE TIME MAXIMUM
$CBOD_5$	20	30*	45*	60*
TSS	20	30*	45*	60*
NH_3-N	20	20	24	32
ON	5.0	5.0	6.0	8.0

* Rule 17-600.740, FAC
A. Recording flowmeter and totalizer required.

(b) 16-hour minimum flow-proportioned composite sample.

(c) Influent samples shall be collected so that they do not contain digester supernatant or returned activated sludge, or any other plant process waters.

19. Monitoring on a quarterly basis shall be performed on the effluent with analysis by a certified laboratory and reported to the Jacksonville DER office for the following parameters:

Hardness	TKN
Nitrite and nitrate nitrogen	temperature (average of sample time period)
Total Nitrogen	Unionized ammonia (calculated)
Total Ammonia	Total Phosphorus
Ortho Phosphorus	

A 16-hour minimum flow proportioned composite sample is required. Sampling shall be performed on the same day as the normal plant effluent and river monitoring sampling.

20. In accordance with the approved river sampling program of June 3, 1991, monitoring on a quarterly basis shall be performed on the receiving water body (St. Johns River). The monitoring sites are described as follows:

#5 - 50 yards upstream from discharge, north bank (upstream test site #1)
#7 - 50 yards upstream from discharge, south bank
#6 - 50 yards downstream from discharge, north bank (downstream test site #2)
#8 - 50 yards downstream from discharge, south bank

The parameters to be measured shall include the following:

DO, pH, temperature, conductivity, $CBOD_5$, TSS, NH_3-N, TP, Organic Nitrogen, Chlorophyll A.

Metered parameters (DO, pH, temperature, conductivity) shall be sampled at the surface, mid depth and at the bottom. Grab samples at mid depth for the other parameters is adequate.

21. Field testing, sample collection and preservation, laboratory testing, including quality control procedures, and all record keeping shall comply with Chapter 17-160, FAC. Compliance of reported results shall be in accordance with Rule 17-4.246, FAC. Each parameter has an applicable method detection limit (MDL) and a practical quantitative limit (PQL) as follows:

ANALYTE	RECOMMENDED MDL	TARGETS PQL	EPA METHOD
Copper	5	25	200.7
Lead	1	5	239.2
Nickel	10	50	200.7
Zinc	5	50	200.7 or
	5	25	289.1
D.O.	100	500	360.1 or 360.2
Total Chlorine Residual	10	10	330.1 or
	50	50	330.5

Units are microgram per liter
Equivalent methods are subject to approval by the Department

Palatka FYI5 - September 22, 1997

Plant Inspection and Facility Summary by Heather Hayek, Engineer II, Domestic Waste Section.
All sampling and Field Assesment Data by Tim McKelvey, ES III, Domestic Waste Biologist, assisted by Rob Zammataro, Engineer I, Domestic Waste Section.

FIELD NOTES and OBSERVATIONS:

REFERENCE SITE: The reference site (20030334) is as close to the same reference site as used by Scott Bulgrin and Lindy Payne for the last FYI5 (8/24/92). It is located on the west bank of the river, approximately 50 yards east (or downstream) of the marker and is located 100 feet or less from the bank. This site has a stronger velocity to the current than either the test sites. This is due to the fact that there is a point of land at the site versus a bay or cove location, as in the test sites, the water is deeper across the channel, and the width of the river is slightly less. This site was located just outside the main flow of the current to more closely mimic the flow at the test sites. The bottom appeared to be covered with more detritus and some small pieces of shell mixed in with the "peat" substrate found at the test sites.

TEST SITE #1: This site #1 (20030322) is located approximately in the same location as the #6 in-stream monitoring site as required in specific condition #20 of the permit. Located approximately 50 yards upstream (south) of the POD and is 100 feet or less from the west bank of the river. There is located near this site several residences with canals and what appears to be a few houseboats with "liveaboards" in the canals. There is also what appears to be a commercial fishermen's and crabber's marina on a canal closest to the test site #1. Between the shoreline and the mid-channel the is a deep slough that parallels the shoreline. All plume models indicate that the effluent will flow toward and parallel the shoreline. The test site locations for both were chosen for this reason, to look for the area of greatest impact from the POD. This sites ponar drops brought up a heavy peat/detritus with some silt.

TEST SITE #2: This site (20030323) is located approximately in the same location as the #5 in-stream monitoring site as required by specific condition #20 of the permit. Located approximately 50 yards downstream (north) of the POD and is 100 feet or less from the west bank. There are no canals or residences located as close to this site as in the #1 test site, but there is not any great distance between the two, approximately 300 yards. The deep slough mentioned above continues into this area also. The ponar drops at this site yielded about the same peat/detritus mixture as the #1 test site.

The riparian zone in all three sites was a natural forested area as to be expected in a wetland with occasional bluffs bordering this river.
The areas of erosion noted were from trees blown down by high winds and erosion from the wakes from boats.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 803 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030334	DATE (M/D/Y): 9-22-97	TIME: 1430	RECEIVING BODY OF WATER: St. Johns River

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
FALLING TIDE	PUTNAM	CHANNEL MARKER #25, 50 YARDS EAST OF MARKER, 100' FEET FROM WEST BANK.	REFERENCE SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
70				10			wetlands 20

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

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

Width of riparian vegetation (m) on least buffered side: 718m

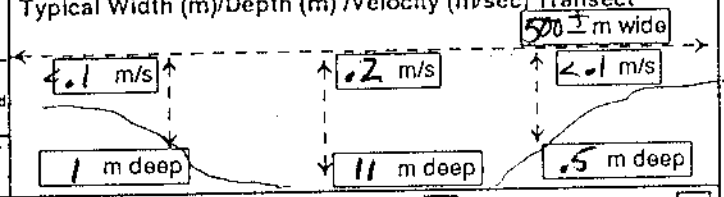
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: .25 (m above present water level) + 2 - 10 (present depth in m) = 2.25 - 10.25 (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			
Aquatic Vegetation				Other: PEAT	100	3	ponar
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):	SALINITY		Secchi (m):
Top		29.84						.7
Mid-depth	1.5	~~29.45~~	7.14	5.24	1281	0.7		
Bottom	3							

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:
Sunny & warm, slight breeze from NE @ 10. Tide outgoing, current to the N.

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

SAMPLING TEAM: Tim McKelvey / Rob Zammataro

SIGNATURE: Tim McKelvey

DATE:

PALATKA FYI5

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030334	DATE (M/D/Y): 9-22-97	RECEIVING BODY OF WATER: ST JOHNS RIVER

REMARKS: FALLING TIDE	COUNTY: PUTNAM	LOCATION: CHANNEL MARKER #25, 50 YARDS EAST OF MARKER, 100 FEET FROM WEST BANK, Ref	FIELD ID/NAME: REFERENCE SITE.

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

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

130 TOTAL SCORE

Comments: Water moves a little faster at this site than at ref site due to point of land.

ANALYSIS DATE: 9-22-97	ANALYST: TIM McKelvey	SIGNATURE: Timothy L. McKelvey

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED - JAX	STORET STATION NUMBER: 20030322	DATE (M/D/Y): 9/12/97	TIME: 1400	RECEIVING BODY OF WATER: ST. JOHNS RIVER
REMARKS: PALATKA FLTS	COUNTY: PUTNAM	LOCATION: 100 ft off west bank @ 800 ft South (upstream) POD		FIELD ID/NAME: TEST SITE #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)
60			10	30			

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

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

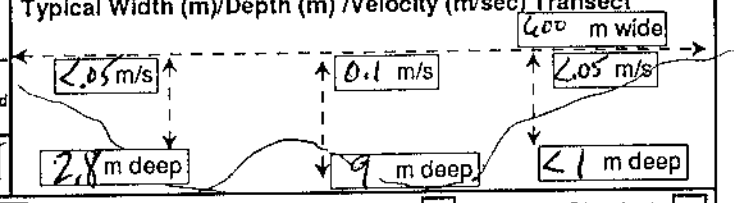
Width of riparian vegetation (m) on least buffered side: ***List & map dominant vegetation on back***

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

Artificially Impounded ☐ yes

High Water Mark: .25 (m above present water level) + 3.9 (present depth in m) = 3.25 4.25 (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/Peat	100	3	BNAK
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):	SALINITY		Secchi (m):
Top								0.7
Mid-depth	1.5	29.93	7.17	3.76	1256	0.7		
Bottom	3							

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:
tide outgoing (falling), had just started turning and flowing north.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
TIM McKELVEY / ROB ZAMMATARO	Timothy R McKelvey	9-22-97

PALATKA FY15

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED JAX	STORET STATION NUMBER: 20030322	DATE (M/D/Y): 9/22/97	RECEIVING BODY OF WATER: ST. JOHN'S RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
FALLING TIDE	PUTNAM	50 YARDS UPSTREAM OF POD, 100 FEET FROM WEST BANK	TEST SITE #1

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

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

Comments

[125] **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
9-22-97	TIM McKELVEY	Timothy R. McKelvey

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED - JAX	STORET STATION NUMBER: 20030323	DATE (M/D/Y): 9-22-97	TIME: 1315	RECEIVING BODY OF WATER: ST. JOHNS. RIVER

REMARKS: FALLING TIDE	COUNTY: PUTNAM	LOCATION: 50 YARDS DOWNSTREAM OF POD 100 FEET FROM WEST BANK	FIELD ID/NAME: TEST SITE #2

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)
100							wetlands

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

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

Width of riparian vegetation (m) on least buffered side: >18m

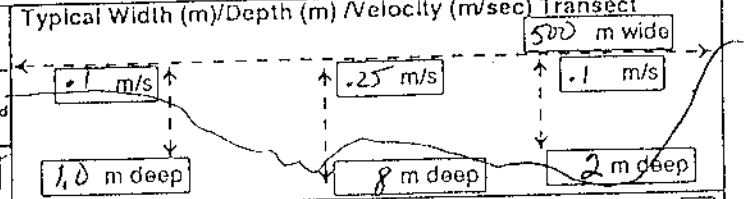
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: .25 (m above present water level) + 1 - 8 (present depth in m) = 1.25 - 8.25 (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			
Aquatic Vegetation				Other: Peat	100	3	ponar
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):	Salinity		Secchi (m):
Top								.9
Mid-depth	1.5	29.55	6.91	4.56	1255	0.9		
Bottom	3							

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: Sunny, Warm

test site #2 in effluent plume at time of sampling due to falling tide.

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

SAMPLING TEAM: Tim McKelvey / Rob Zahnatabo

SIGNATURE: Timothy R. McKelvey

DATE: 9/22/97

PALATKA FY15

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED-JAX	STORET STATION NUMBER: 20030323	DATE (M/DY): 9-22-97	RECEIVING BODY OF WATER: ST. JOHNS RIVER

REMARKS: FALLING TIDE downstream of POD.	COUNTY: PUTNAM	LOCATION: 50 YARDS DOWNSTREAM OF POD 100 FEET FROM WEST BANK.	FIELD ID/NAME: TEST SITE #2

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

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

126 TOTAL SCORE

Comments: in the effluent plume at time of sampling.

ANALYSIS DATE: 9-22-97	ANALYST: Tim McKelvey	SIGNATURE: Timothy R. McKelvey

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Palatka
County: Putnam
Contact / District: Tim McKelvey/northeast Dstrict
NPDES Permit #: FL0040061
LIMS Sample #: 192327 LIMS Job #: 97-SEP-23-13
sample log: 7/30/97 DW
Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Temperature range: room NA
incubator 25.5-26.5°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 9/22/97 Time 1100
Test Beginning: Date 9/23/97 Time 1330
Test Ending: Date 9/25/97 Time 1400
Organism Batch #: 72 Diluent Batch #: well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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	24.6 @ 24.7	8.16 @ 25.5 °C	105.1 @ 101.6 999 @ 1005 @ 25.2°C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.6 @ 24.7	8.2 @ 25.5 °C	103.1 @ 101.6 1005 @ 1005 @ 25.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.2	8.1 @ 25.9 °C	104.2 @ 101.6 1006 @ 1005 @ 25.5 °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
Ctl A	C1	5	5	5	8.3	8.4	8.3	25.6	25.5	26.3	7.1	6.8	6.8	245	255	265
Ctl B	C2	5	5	5	8.3	8.4	8.3	25.6	25.2	25.0	7.1	6.7	6.8	250	255	260
Ctl C	C3	5	5	5	8.3	8.4	8.3	25.6	25.2	25.9	7.1	6.8	6.8	250	255	265
Ctl D	C4	5	5	5	8.3	8.4	8.3	25.6	25.0	25.3	7.1	6.7	6.8	255	255	260
100%A	C5	5	5	5	7.0	7.7	7.9	25.2	24.9	26.5	6.3	6.8	6.8	905	925	975
100%B	C6	5	5	5	7.0	7.7	7.9	25.1	25.1	25.2	6.3	6.8	6.8	920	935	950
100%C	C7	5	5	5	6.9	7.7	7.9	25.1	25.0	25.3	6.3	6.7	6.8	925	930	955
100%D	C8	5	5	5	7.0	7.7	7.9	25.1	25.5	25.4	6.2	6.8	6.8	925	955	965
Measured/Loaded by:		KR	ND	MF	ND	KR	MF	ND	KR	MF	ND	KR	MF	ND	KR	MF
Recorded by:		DW	MF	MF	ND	ND	KR	KR	ND	KR	KR	ND	KR	KR	ND	KR

Investigators' Signatures
Kellie Ralston
Marshall Faircloth
Tina Kesler
reviewer

Water Quality Parameters (verified by MF)

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.09	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR100	KR
Alkalinity (mg/L as $CaCO_3$):	125		55	Hach	KR
Hardness (mg/L as $CaCO_3$):	130		210	Hach	KR
Total ammonia (mg/L as N):	<0.017		<0.017	Orion	ND

Ammonia Meter #98136 Meter Slope: -59.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 21 ppt

form updated 4/01/96

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Citrgot Palatka
County: Putnam
Contact / District: Tim McKelvey / NE
NPDES Permit #: FL00 40061
LIMS Sample #: 192327 **LIMS Job #:** 97-SEP-23-13
sample log: 9/30/97 DW
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Temperature range: room N/A
incubator 25.5-26.5°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 9/22/97 Time 1100
Test Beginning: Date 9/23/97 Time 1330
Test Ending: Date 9/25/97 Time 1400
Organism Batch #: 38 **Diluent Batch #:** 41
Organism Age: <24hrs
Test Organism: Ceriodaphia dubia

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.6 @ 24.7	8.6 @ 25.5°C	1051 @ 1016 999 @ 1005 @ 25.2°C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.6 @ 24.7	8.2 @ 25.5°C	103.7 @ 101.6 1005 @ 1005 @ 25.1°C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.2	8.1 @ 25.9°C	104.2 @ 101.6 1006 @ 1005 @ 25.5°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) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Ctl	A	5	5	5	8.2		8.1	24.2		24.9	7.0		6.8	165		180
Ctl	B	5	5	5			8.1			24.6			6.8			185
Ctl	C	5	5	5			8.1			24.6			6.9			185
Ctl	D	5	5	5			8.1			24.5			6.9			185
100%	A	5	5	5	7.0		8.0	24.7		24.9	6.4		6.9	850		880
100%	B	5	5	5			8.0			24.8			6.9			925
100%	C	5	5	5			8.0			24.7			7.0			920
100%	D	5	5	5			8.0			24.5			6.9			955
Measured/Loaded by:		KR	ND	MF	ND		MF	ND		MF	ND		MF	ND		MF
Recorded by:		DW	MF	MF	ND		KR	ND		KR	ND		KR	ND		KR

Investigators' Signatures
Kellie Ralston
Marshall Fairbrother
Tina Kesler
reviewer

form updated 4/01/96

Water Quality Parameters verified by MF

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.01	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	CR100	KS
Alkalinity (mg/L as $CaCO_3$):		70	85	Hach	KR
Hardness (mg/L as $CaCO_3$):		80	210	Hach	KR
Total ammonia (mg/L as N):		<0.017	<0.017	Orion	ND

Ammonia Meter #98136 Meter Slope: -59.6 Ammonia Blank: 40.017 Control Salinity: 0 ppt Sample Salinity: 21 ppt

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
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

Benthic macroinvertebrate taxa list for the City of Palatka WWTP, collected via Ponar grab samples in the St. John's River, on 22 September, 1997. Densities, in number/m^2, represent the mean of three replicates.

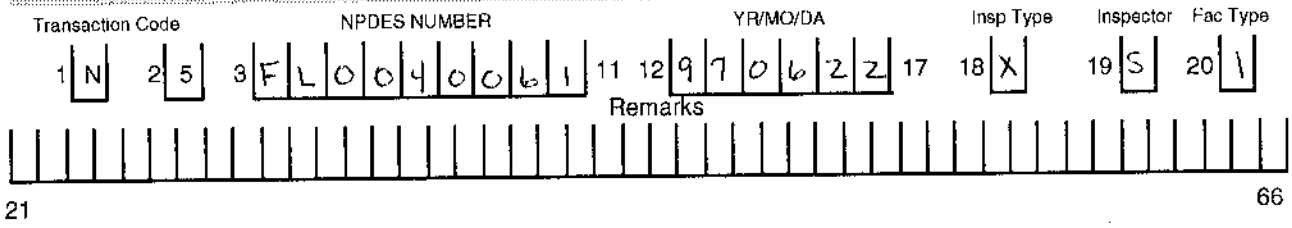
	Reference Site	Test Site 1	Test Site 2
Acarina			
Piona sp.	14	42	250
Unionicola sp.	–	42	–
Amphipoda			
Gammarus mucronatus	–	–	500
Gammarus sp.	69	–	1083
Diptera			
Ablabesmyia mallochi	–	–	250
Ablabesmyia rhamphe grp.	278	1569	1569
Ablabesmyia sp.	–	–	111
Cladotanytarsus sp.	194	83	500
Coelotanypus sp.	264	167	1153
Dicrotendipes modestus	–	–	250
Dicrotendipes simpsoni	–	–	250
Glyptotendipes paripes	9931	9236	24569
Glyptotendipes sp.	194	125	1333
Goeldichironomus holoprasinus	–	83	111
Goeldichironomus natans	–	1056	1625
Goeldichironomus sp.	14	500	1472
Palpomyia/Bezzia grp.	42	42	–
Polypedilum halterale grp.	417	208	222
Polypedilum scalaenum grp.	–	42	–
Procladius sp.	583	167	3139
Tanytarsus sp.	125	42	444
Tanytarsus sp. G Epler	347	125	250
Tanytarsus sp. L Epler	1306	1431	1958
Tanytarsus sp. T Epler	–	42	–
Undetermined Chironomidae	833	458	3250
Zavreliella marmorata	–	42	–
Ephemeroptera			
Caenis sp.	222	167	167
Gastropoda			
Undetermined Gastropoda	97	–	–
Undetermined Hydrobiidae	–	42	250
Hirudinea			
Gloiobdella elongata	–	–	83
Isopoda			
Corophium lacustre	–	–	167
Cyathura polita	319	42	3167

Oligochaeta			
Aulodrilus pigueti	–	42	–
Bratislavia unidentata	111	500	1917
Haber speciosus	–	42	–
Limnodrilus hoffmeisteri	–	42	–
Undetermined Oligochaeta	–	–	83
Trichoptera			
Oecetis inconspicua cmplx.	431	375	583
Oecetis sp.	14	125	250
Undetermined Leptoceridae	125	83	83
Undetermined Trichoptera	–	–	83

Phytoplankton taxa list and densities (#/mL) for the City of Palatka WWTP, collected via subsurface grabs in the St. John's River, on 22 September, 1997.

	Reference Site	Test Site 1	Test Site 2
Bacillariophyceae			
Coscinodiscus sp.	42	–	–
Cyclotella sp.	–	96	84
Fragilaria sp.	672	264	504
Melosira sp.	504	–	252
Nitzschia sp.	252	168	294
Undetermined Pennales	–	48	84
Chlorophyceae			
Ankistrodesmus sp.	84	24	84
Chodatella sp.	–	24	–
Coelastrum sp.	42	24	–
Cosmarium sp.	42	–	42
Crucigenia sp.	84	48	–
Dictyosphaerium sp.	42	–	–
Elakatothrix sp.	–	24	–
Kirchneriella sp.	–	48	–
Oocystis sp.	42	48	84
Pediastrum sp.	–	–	42
Scenedesmus sp.	546	312	798
Schroederia sp.	–	–	42
Tetraedron sp.	–	24	–
Tetrastrum sp.	126	–	–
Undetermined Chlorophyceae	42	72	–
Cryptophyceae			
Chroomonas sp.	42	–	–
Cryptomonas sp.	–	24	–
Cyanophyceae			
Anabaenopsis sp.	–	24	–
Aphanocapsa sp.	630	72	378
Aphanothece sp.	–	96	–
Chroococcus sp.	–	48	–
Cylindrospermopsis sp.	3151	840	2394
Dactylococcopsis sp.	4579	2472	5251
Gloeocapsa sp.	378	264	294
Gloeothece sp.	42	24	–
Lyngbya sp.	1008	648	672
Lyngbya contorta	1680	1080	1176
Merismopedia sp.	1932	936	1764
Microcystis sp.	1050	936	840
Oscillatoria sp.	–	264	–

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)

