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Biological Assessment of

Jacksonville Heights WWTP

Duval County

NPDES #FL0023671

Sampled May 1998

February 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: Jacksonville Heights WWTP
County: Duval
NPDES Number: FL0023671
State Permit Expiration Date: 1 April 1998

Toxics Sampling Inspection (**XSI**)

Date Sampled: 18 May 1998

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

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 18 May 1998

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

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 18 May 1998

Results: Qualitative measures of macroinvertebrate taxa richness, percent contribution of dominant taxa, chironomid taxa, EPT Index, and suspension feeders indicated little or no differences between the test and control sites. The SCI scores placed both the control and the test sites in the "excellent" category. Quantitative measures of algal community health did not indicate any degradation associated with the discharge. Chlorophyll *a* was undetected at the control and test sites.

Water Quality Inspection (**WQI**)

Date Sampled: 18 May 1998

Results: Significant nutrient enrichment was observed in Fishing Creek, which was directly related to the WWTP discharge. Nutrient concentrations were elevated in the effluent and at the test site, particularly ortho-phosphate, total phosphorous, and total nitrogen. Algal growth potential results were analogous to the nutrient results. AGP greatly exceeded the 5 mg dry wt/L "problem threshold" at the test site due to the nutrient input from the effluent. Fecal and total coliforms at the control and test site exceeded Class III water quality standards (Rules 62-302.530 (6) and (7) FAC). The effluent fecal and total coliform level were <10 counts/100ml. Sources other than the facility probably caused the elevated coliform counts at the study sites.

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 Jacksonville Heights Wastewater Treatment Plant is located in Duval County, Florida (see maps in the Appendix). This facility is permitted as a 2.5 MGD conventional activated sludge wastewater treatment plant with vortex grit removal, dual 1.25 MGD Sanitaire activated sludge unit processors operated in parallel, secondary clarification, tertiary sand filtration, and an ultraviolet disinfection system. The effluent is discharged to a stormwater drainage ditch that flows into the Class III Fishing Creek. While the design flow of the wastewater system is 2.5 MGD, the actual mean flow has been 1.2 MGD.

State Permit limits for the Jacksonville Heights WWTP are listed in Table 1. According to the facility's operating reports, the plant had violations for diazinon toxicity in 1993. The Department had issued a Consent order (OGC File No. 96-1965) in November 1993 between FDEP and United Water (Jacksonville Heights WWTP) which resulted in extended effluent and ambient testing for investigation of diazinon and diazinon related effects. The Jacksonville Heights WWTP initiated a series of tests at that time to evaluate chronic whole effluent toxicity of the discharge (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 and a test site located upstream and downstream of the discharge. There were a total of six monitoring sites selected (see maps in the Appendix), consisting of two control sites and four test sites. Due to dry conditions, only results for sites 1 and 2 are presented in this report. Site 1 (control site) was located in an unnamed drainage ditch approximately 33 meters upstream of the discharge. Site 2 (test site) was located approximately 100 meters downstream of the discharge in the same unnamed drainage ditch.

A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and 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. The toxicity test specified above was to be conducted once every two months until six valid bimonthly tests had been completed, and once every 6 months thereafter for the duration of the permit.

Benthic macroinvertebrate communities were evaluated at control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, and vegetation) using discrete dip-net sweeps. Normally additional invertebrate collections would be accomplished using Hester-Dendy multiplate samplers that would be incubated for 28 days, however due to the low water level, no Hester-Dendys were deployed. Phytoplankton were sampled at both control and test sites via subsurface grabs. Periphyton are normally sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. No periphyton racks were deployed due to the presence of neighborhood children. Chlorophyll *a* was also determined for phytoplankton communities. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of 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, algal biomass, and the Stream Condition Index (SCI). For a discussion of each of these measures see *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, 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 algal density, chlorophyll *a*, algal growth potential, and % dominant taxa are measured as the test site minus control site divided by the control site.

The following personnel were involved in this investigation: Tim McKelvey, Pat O'Conner, and Kathleen Gerard (DEP Northeast District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, 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

Habitat quality was "suboptimal" due to a lack of productive habitat, narrow riparian buffer zones, and poor vegetation quality at both the control (84 points) and test (86 points) sites (see Habitat Assessment Field Data Sheets in the Appendix). The substrate at both sites consisted of aquatic vegetation and sand. Most physical/chemical measurements were comparable at the control and test sites (Table 1). Dissolved oxygen levels were 6.8 mg/L at the control site and 6.7 mg/L at the test site. The pH (7.0 SU at the control site and 7.3 SU at the test site) and temperature (27.4 °C at the control site and 27.0 °C at the test site) were similar at both sites. Conductivity was higher at the test site (462 µmhos/cm) compared to the control (266 µmhos/cm).

Zinc, iron, and lead were detected in the effluent at levels that complied with Class III water quality standards (Table 1).

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

Nutrient levels are shown in Table 1. The effluent total nitrogen concentration (12.2 mg/L) was elevated. Effluent total phosphorus (2.6 mg/L), ortho-phosphate (2.6 mg/L), and nitrate+nitrite concentrations (11 mg/L) contributed to extreme nutrient enrichment at the test site, relative to the control site. For example, ortho-phosphate increased from 0.022 mg/L at the control site to 1.7 mg/L at the test site, which is higher than 95% of other Florida streams (see *Typical Values for Selected Parameters in Florida Waters* in the Appendix). Nitrate+nitrite increased from 0.53 mg/L at the control site to 6 mg/L at the test site, also higher than 95% of other Florida streams. Total phosphorus increased from 0.069 mg/L at the control site to 1.5 mg/L at the test site, which is higher than 85% of other Florida streams. Total nitrogen increased from 1.53 mg/L at the control site to 7.2 mg/L at the test site.

AGP, which measures bioavailable nutrients via algal response, was sampled at the receiving water sites. AGP values increased from 2.58 mg dry wt/L at the control site to 137 mg dry wt/L at the test site greatly exceeding the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987). The ef-

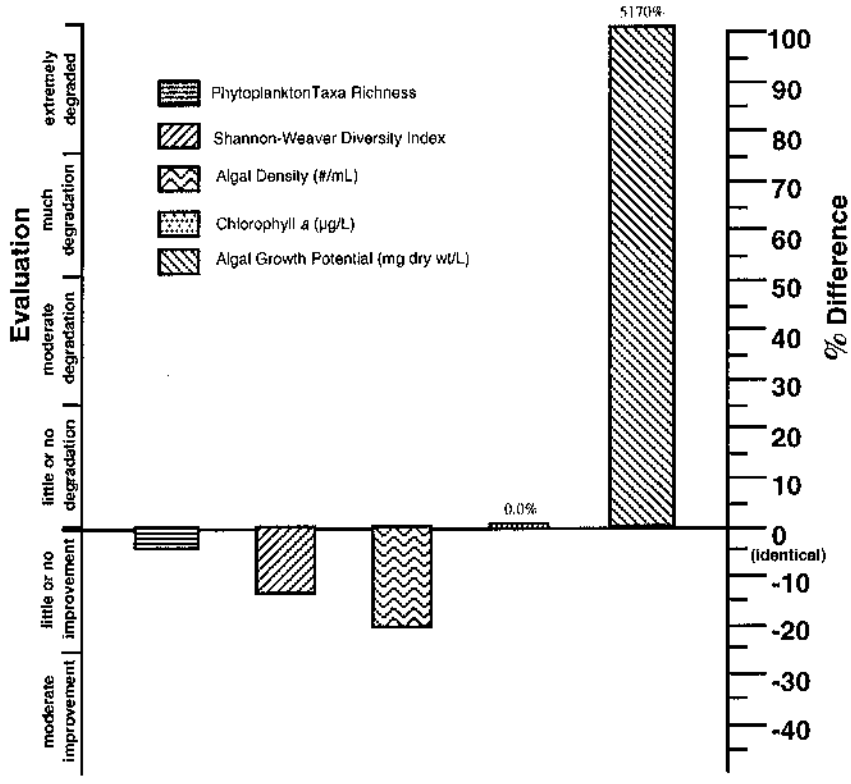


Figure 1. Effect of discharge on the phytoplankton community.

Table 1. Effluent limits and summary of chemistry data.

Jacksonville Heights WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)				
	-	None detected	-	-
Metals (µg/L)				
Aluminum	≤ 1,500 **	50 U	-	-
Arsenic	≤ 50 **	30 U	-	-
Cadmium	≤ 1.6 **c	0.05 U	-	-
Chromium	≤ 304 **c	7 U	-	-
Copper	≤ 18 **c	2 U	-	-
Iron	≤ 1,000 **	35 J	-	-
Lead	≤ 5.8 **c	0.28 I	-	-
Mercury	≤ 0.012 **	0.1 U	-	-
Nickel	≤ 234 **c	6 U	-	-
Selenium	≤ 5.0 **	40 U	-	-
Silver	≤ 0.07 **	0.5 U	-	-
Zinc	≤ 158 **c	83 A	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	2.6 A	0.022	1.7
Total phosphorus	-	2.6 A	0.069	1.5
Total Ammonia, as N	≤ 3.2 *s	0.017 I	0.038	0.031
Nitrate+Nitrite	-	11	0.53	6
TKN	-	1.2	1	1.2
Organic Nitrogen	-	1.2	0.62	1.2
Total Nitrogen	-	12.2	1.53	7.2
General Phys-Chem Parameters				
Habitat Assessment	-	-	84	86
D.O. (mg/L)	≥ 6.0 *s	6.0	6.8	6.7
pH (SU)	6.0 - 8.5 *s	7.0	7.0	7.3
Conductivity (µmhos/cm)	**	615	266	462
Temperature (°C)	-	27.8	27.4	27.0
TSS (mg/L)	60 *s	1 K	1	1
C.B.O.D., 5 day (mg/L)	16 *s	2 K	2 K	2 K
Flow (MGD)	2.5 *a	-	-	-
Hardness (mg $CaCO_3$)	-	160	-	-
AGP (mg dry wt/L)	-	29.5	2.58	137
Toxicity				
Bioassay - Fish	NOEC	No mortality	-	-
Bioassay - Invertebrate	NOEC	No mortality	-	-
Microbiology (# counts/100mL)				
Fecal Coliforms	≤ 800	< 10 K	50,400 B,J	22,200 B
Total Coliforms	-	< 10 K	> 2,700 L	> 2,700 L

A - Value reported is the mean of two or more determinations
B - Results based on colony counts outside the acceptable range
I - Value reported < the minimum quantitation limit, and ≥ the MDL
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
U - Material analyzed for but not detected; value reported is the MDL
NOEC - No Observed Effect Concentration < 100% effluent will constitute a violation of this permit

* Permit limit
** Class III water quality standard
a - Annual average
s - Single sample
c - Calculated based on hardness

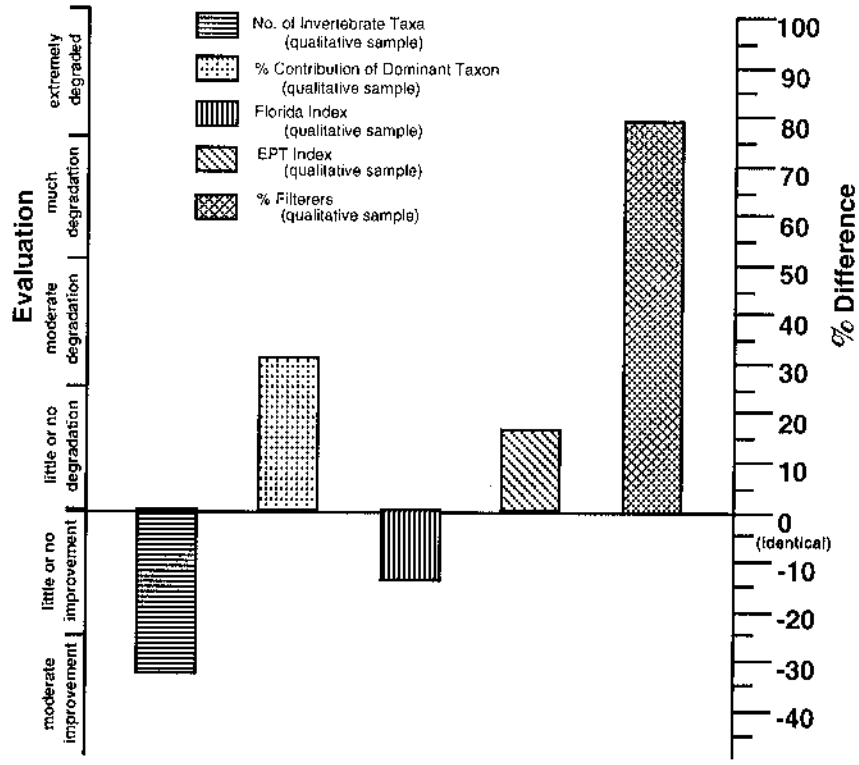


Figure 2. Effect of discharge on the benthic macroinvertebrate community.

fluent's AGP value was 29.5 mg dry wt/L.

The effluent fecal and total coliform levels were < 10 counts/100 ml (Table 1). Fecal coliform levels did not comply with Class III water quality standards at the control and test sites (50,400 and 22,200 counts/100 ml, respectively) (Rule 62-302.530 (6) FAC). Total coliform levels were > 2,700 counts/ 100 ml at the control and the test sites which also exceed Class III water quality standards (Rule 62-302.530 (7) FAC).

The number of phytoplankton taxa (25) at the control and test sites (26) were very similar (Table 2). The Shannon-Weaver diversity was higher at the test site (3.6) than at the control site (3.2). Algal density decreased slightly from 2,579 counts/ml at the control site to 2,076 counts/ml at the test site. Chlorophyll *a* was undetected at both sites.

In the macroinvertebrate qualitative samples, taxa richness increased from 30 at the control site to 40 at the test site (Table 2). The EPT Index was 6 at the control site and 5 at the test site. The percent contribution of dominant taxon increased from 32% at the control site to 42% at the test site. The Florida Index was 14 at the control and 16 at the test site. Suspension feeders decreased from 14% of the control community to 3% of the test community. The SCI score slightly decreased from 27 points at the control site to 25 points at the test site (see SCI worksheet in the Appendix).

Discussion

While the fecal and total coliforms were very low in the effluent, fecal and total coliform levels did not comply with Class III water quality standards at the control and test sites (Rule 62-302.530 (6) and (7) FAC). Sources other than the facility probably caused the elevated coliform counts at the study sites.

Nutrient concentrations were elevated in the effluent and at the test site, particularly ortho-phosphate, total phosphorus, and total nitrogen. Algal growth potential results were analogous to the nutrient results. While AGP was low at the control site, it increased dramatically at the test site, greatly exceeding the 5 mg dry wt/L "problem threshold".

In spite of the extremely elevated nutrients at the test site, the phytoplankton community health did not appear degraded. Flow characteristics may have attenuated the effects. It is possible that areas further downstream with

longer water retention times may be affected by the extreme nutrient enrichment coming from this facility.

Measures of macroinvertebrate health indicted the discharge did not negatively affect the benthic community. Dip-net taxa richness, EPT Index, and Florida Index values indicated healthy conditions at the control and test sites alike. The Stream Condition Index scores placed both sites in the "excellent" category. These results suggest healthy conditions, despite the nutrient enrichment and sub-optimal habitat. The in-stream substrate quality and water velocity may have kept the nutrient enrichment from translating into degradation of the macroinvertebrate community.

Table 2. Biological community structure of control and test sites.

Jacksonville Heights WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	30	40
Florida Index	14	16
SCI	27	25
EPT Index	6	5
% Dominant Taxon	32	42
Community Composition		
% Coleoptera	4	0
% Diptera	46	38
% Ephemeroptera	4	0
% Gastropoda	0	3
% Odonata	9	4
% Oligochaeta	1	3
% Pelecypoda	1	1
% Plecoptera	1	0
% Trichoptera	35	51
Functional Feeding Groups		
% Predators	16	14
% Burrowing Deposit Feeders	1	3
% Surface Deposit Feeders	26	24
% Suspension Feeders/Filterers	14	3
% Scrapers	1	6
% Shredders	9	8
Phytoplankton Algae		
Number of Taxa	25	26
Shannon-Weaver Diversity	3.2	3.6
Chlorophyll *a* (µg/L)	1 U	1 U
Algal Density (#/mL)	2,579	2,076
% Blue-green	55	30
% Green	24	27
% Diatoms	19	43
AGP (mg dry wt/L)	2.6	137

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

Literature Cited

Barbour, M. T., J. Gerritsen, and J. S. White. 1996. Development of the Stream Condition Index for Florida. Prepared for the Fla. Dept. Environ. Protection. 105 p.

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.

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. 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.

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).

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

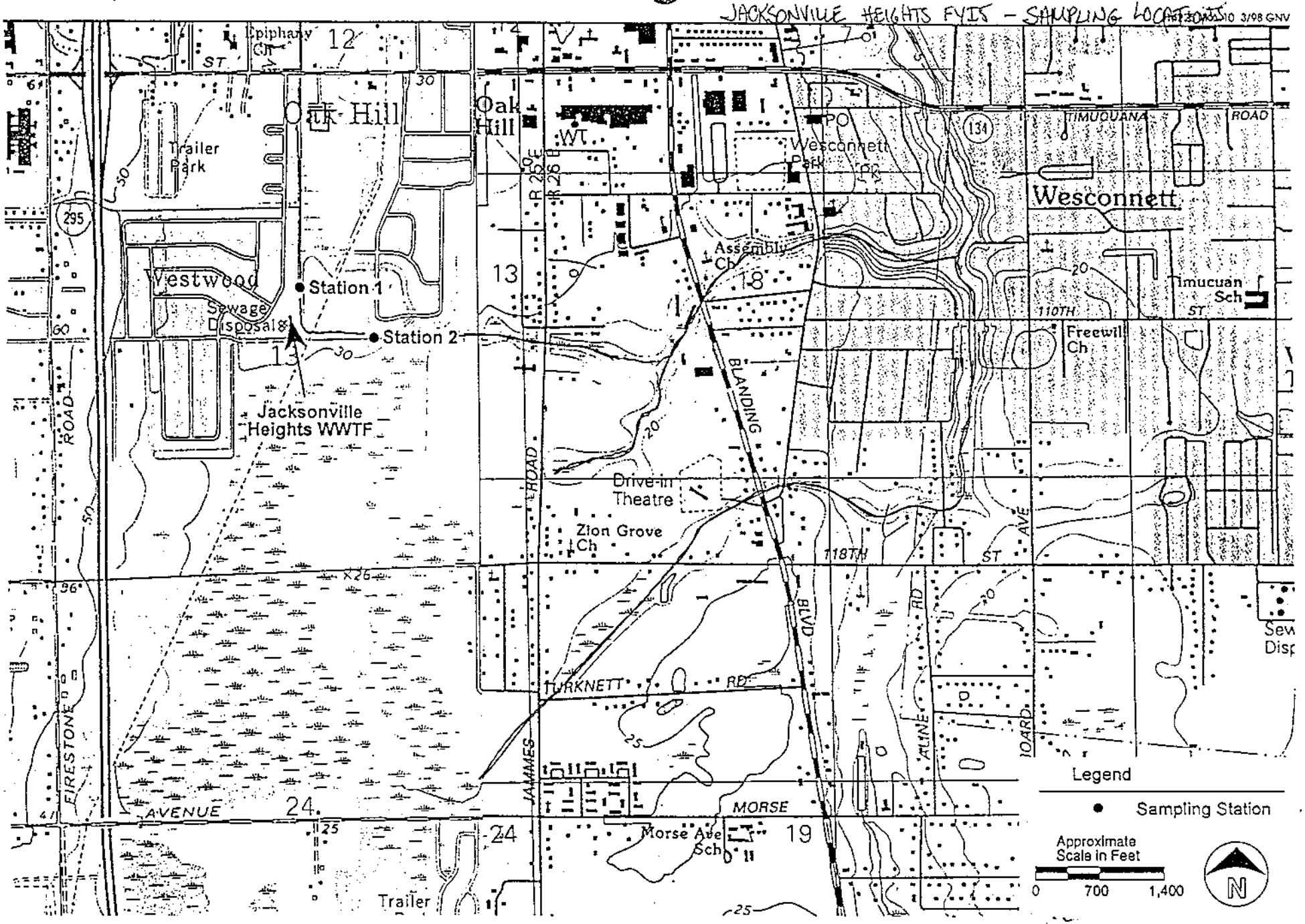


Exhibit 1. Jacksonville Heights WWTF Receiving Stream Sampling Locations.

Source: USGS Quads; Jacksonville Heights, 1978, Orange Park, 1993.

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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: JACKSONVILLE HEIGHTS WWTP	Prepared by: KATHLEEN GERARD Date: April 21, 1998	
Location (attach detailed map): 5957 Tampico Rd. Jacksonville FL. See attached map ATT. #1	County: Duval	District: Northeast District
Federal Permit # and expiration date: FL0023671 Permit application is pending.	State GMS # and State expiration date: 3116P01970 April 1, 1998	Facility Type: Industrial Municipal Federal Agricultural Other (list): Privately owned.

Function of facility:
Wastewater Treatment Facility.

Description of treatment process:
This facility is permitted as a 2.5 MGD conventional activated sludge wastewater treatment plant with vortex grit removal, dual 1.25 MGD Sanitaire activated sludge unit processes operated in parallel, secondary clarification, tertiary sand filtration, with UV disinfection system. Effluent is discharged to a storm water drainage ditch leading to Fishing Creek.

Receiving waters: Stormwater drainage ditch to Fishing Creek.	Classification: III.
Design Flow: 2.50 MGD	Actual Mean Flow: 1.2

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.):

List effluent limits:

Parameter	Limit (units) Annual	Monthly	
CBOD5	2.5		mg/L
TSS	8	8	mg/L
Total Ammonia, as N	1.6	2.0	mg/L
Dissolved Oxygen	minimum of	6.0	mg/L
pH	6.0 to	8.5	
Fecal Coliforms	200	200	No./100mL

Describe special permit conditions and permit modifications:
See attached permit conditions I.A.1 thru 11 for effluent limitations, Toxicity, Quarterly monitoring and stream monitoring requirements. Also, note attached section of Consent Order 96-1965 for ditch and stream monitoring requirements. ATT. #2.

ATT. #3.

GMST36 3116X10079 050053 080082 000530 031616 04/22/98
PARAMETER RESULT TRENDS 16:33:38

0 Y FOR 3116P01970 - JACKSONVILLE HEIGHTS SUBDIVISION
SITE NAME - S.T.P. FINAL EFFLUENT - JAX. HEIGHT

RPT DATE	FLOW,MONTH AVG 050053 MGD	BIOCHEM OXY DEM 080082 MG/L		RES SUSP 000530 MG/L		FECAL COLI MF 031616 #/100	
07/00/97	1.398	1.1		0.	L	1.0	
06/00/97	1.299	1.0		0.	L	1.0	
03/00/97	1.048	1.0		0.	L	1.0	
01/00/97	1.088	1.0		0.	L	1.0	
12/00/96	1.162	1.0		0.	L	2.0	
11/00/96	1.121	1.0		0.	L	1.0	
10/00/96	1.449	1.0		0.	L	1.0	
09/00/96	1.237	1.2		0.	L	2.0	
08/00/96	1.252	1.0		0.	L	1.0	
07/00/96	1.340	1.0	K	0.	L	2.0	
06/00/96	1.272	1.0		0.	L	1.0	
05/00/96	1.113	1.1		1.	K	1.0	K
04/00/96	1.155	1.0		0.	L	1.0	
03/00/96	1.193	1.0		1.	K	2.0	

GMST36 3116X10079 900242 000625 000612 000600 04/22/98
PARAMETER RESULT TRENDS 16:35:18

0 Y FOR 3116P01970 - JACKSONVILLE HEIGHTS SUBDIVISION
SITE NAME - S.T.P. FINAL EFFLUENT - JAX. HEIGHT

RPT DATE	PH, MAXIMUM 900242 STD UN	NITROGEN(N)KJEL 000625 MG/L		AMMONIA, UNION 000612 MG/L		NITROGEN(N)TOT 000600 MG/L	
07/00/97	7.62	NO RESULT		.009	K	NO RESULT	
06/00/97	7.71	NO RESULT		.001	K	NO RESULT	
03/00/97	7.62	NO RESULT		.001	L	NO RESULT	
01/00/97	7.59	NO RESULT		.001	K	NO RESULT	
12/00/96	7.59	.740		.002		10.61	
11/00/96	7.60	.320		.002	L	10.92	
10/00/96	7.56	.050	K	.001	K	9.13	
09/00/96	7.74	.910		.001	K	8.07	
08/00/96	7.61	.170		.001	K	7.85	
07/00/96	7.66	.650		.002		8.91	
06/00/96	7.60	.750		.001	K	11.00	
05/00/96	7.50	.670		.005	K	9.31	
04/00/96	7.44	.940		.000	L	11.09	
03/00/96	7.57	.790		.001	K	10.94	
AVERAGE:	7.37519	0.82143		0.00128		9.92143	
STD DEV:	0.28054	0.69124		0.00000		2.55706	

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GMST36 3116X14060 050053 080082 000530 031616 04/22/98
PARAMETER RESULT TRENDS 16:37:15

0 N FOR 3116P01970 - JACKSONVILLE HEIGHTS SUBDIVISION
SITE NAME - JACKSONVILLE HEIGHTS WASTEWATER FAC

RPT DATE	FLOW,MONTH AVG 050053 MGD	BIOCHEM OXY DEM 080082 MG/L	RES SUSP 000530 MG/L	FECAL COLI MF 031616 #/100
09/00/97	1.226	1.0	0. L	1.0
08/00/97	1.406	1.0	1.	1.0
07/00/97	1.398	1.1	0. L	1.0
06/00/97	NO RESULT	1.0	0. L	1.0
05/00/97	NO RESULT	1.0	0. L	1.0
04/00/97	1.188	1.0	0. L	1.0
03/00/97	NO RESULT	1.0	0. L	1.0
02/00/97	1.202	1.2	0. L	1.0
12/00/96	NO RESULT	1.0	0. L	2.0

GMST36 3116X14060 900242 900241 000612 000600 04/22/9
PARAMETER RESULT TRENDS 16:36:5

0 N FOR 3116P01970 - JACKSONVILLE HEIGHTS SUBDIVISION
SITE NAME - JACKSONVILLE HEIGHTS WASTEWATER FAC

RPT DATE	PH, MAXIMUM 900242 STD UN	PH, MINIMUM 900241 STD UN	AMMONIA, UNION 000612 MG/L	NITROGEN(N)TO 000600 MG/
09/00/97	7.50	7.10	.000	NO RESULT
08/00/97	7.50	6.90	.006 K	NO RESULT
07/00/97	7.60	7.10	.001 L	12.95
06/00/97	7.70	7.00	NO RESULT	NO RESULT
05/00/97	7.80	7.30	.002 L	3.71
04/00/97	7.60	7.20	NO RESULT	NO RESULT
03/00/97	7.60	7.20	NO RESULT	NO RESULT
02/00/97	7.50	7.20	.001	11.69
12/00/96	7.60	7.30	NO RESULT	10.61

GMST36 3116X14060 000300 000610 000612 000630 04/22/9
PARAMETER RESULT TRENDS 16:38:1

0 N FOR 3116P01970 - JACKSONVILLE HEIGHTS SUBDIVISION
SITE NAME - JACKSONVILLE HEIGHTS WASTEWATER FAC

RPT DATE	DO 000300 MG/L	NH3 N TOT 000610 MG/L	AMMONIA, UNION 000612 MG/L	NO2 + NO3 000630 MG/
09/00/97	6.0	.050	.000	NO RESULT
08/00/97	6.0	.080	.006 K	NO RESULT
07/00/97	6.1	.050	.001 L	12.900
06/00/97	6.1	.050	NO RESULT	NO RESULT
05/00/97	6.1	.060	.002 L	3.550
04/00/97	6.2	.120	NO RESULT	NO RESULT
03/00/97	6.3	.060	NO RESULT	NO RESULT
02/00/97	6.4	.050	.001	11.500
12/00/96	6.9	.050	NO RESULT	9.870

AVERAGE:	6.23333	0.06333	0.00200	9.4550
STD DEV:	0.28293	0.02345	0.00316	4.1267

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Permittee:
United Water Florida, Inc.
Jacksonville Heights WWTF

Permit Number: FL0023671
Issuance Date: November 9, 1993
Expiration Date: April 1, 1998
Revision Date: January 12, 1996

Att #2

I. Effluent Limitations and Monitoring Requirements

A. Final Surface Water Discharge Limits

1. During the period beginning on the issuance date and lasting through expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D001 to the unnamed ditch to Fishing Creek. Such discharge shall be limited and monitored by the permittee as specified below:
[62-600, 6-8-93] [62-601, 5-31-93] [62-650, 11-27-89] [62-302, 8-8-94] [62-610.860, 4-2-90]

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow	mgd	Maximum	2.5	-	-	-	Continuous	Meter or Instrument	EFF-1	See I.A.4.
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	Maximum	8	8	12	16	Weekly	8-hour flow-composite	EFF-1	
Total Suspended Solids	mg/L	Maximum	20	30	45	60	Weekly	8-hour flow-composite	EFF-1	
Fecal Coliform Bacteria	See Permit Condition I. A.5.						Weekly	Grab	EFF-1	See I. A.12.
pH	std. units	Range	-	-	-	6.0 to 8.5	Continuous	Grab	EFF-1	See I.A.3.
Total Ammonia, as N	mg/L	Maximum	1.6	2.0	2.4	3.2	Weekly	8-hour flow-composite	EFF-1	See I.A.10
Temperature	°C	Range	-	Report	-	Report	Weekly	Meter or Instrument	EFF-1	See I.A.10
Dissolved Oxygen	mg/l	Minimum	-	-	-	6.0	Daily, 7/week	Meter or Instrument	EFF-1	
Whole Effluent Toxicity	See Permit Condition I. A.6.									
Nutrient Monitoring	See Permit Condition I.A.9									
Stream Monitoring	See Permit Condition I.A.11									

2. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I. A. 1. and as described below:

Monitoring Location Site Number	Description of Monitoring Location
EFF-1	After final treatment immediately prior to discharge to the stormwater drainage ditch.

3. Hourly measurement during the period of required operator attendance may be substituted for continuous measurement for pH. *[Chapter 62-601, Figure 2, Footnote 1, 5-31-93]*

4. A recording flowmeter and totalizer shall be utilized to measure flow. *[62-601.200(17) and .500(6), 5-31-93]*

5. The arithmetic mean of the monthly fecal coliform values collected during an annual period shall not exceed 200 per 100 mL of effluent sample. The geometric mean of the fecal coliform values for a minimum of 10 samples of effluent each collected on a separate day during a period of 30 consecutive days (monthly), shall not exceed 200 per 100 mL of sample. When more than 10 samples are taken, no more than 10 percent of the samples collected during a period of 30 consecutive days shall exceed 400 fecal coliform values per 100 mL of sample. Any one sample shall not exceed 800 fecal coliform values per 100 mL of sample. *[62-600.440(4)(c), 6-8-93]*

6. The Permittee shall initiate the series of tests described below beginning in January 1994 to evaluate chronic whole effluent toxicity of the discharge from outfall D001. All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-89/001, or the most current edition. A standard reference toxicant quality assurance test shall be conducted concurrently with each species used in the toxicity tests and the results submitted with the discharge monitoring report (DMR). Alternatively, if monthly QA/QC reference toxicant tests are conducted, these results must be submitted with the DMR.

   a. The Permittee shall conduct a daphnid (Ceriodaphnia dubia) Survival and Reproduction Test and a Fathead Minnow (Pimephales promelas) Larval Survival and Growth Test. These tests shall be conducted using a control (0% effluent) and one test concentration consisting of 100% effluent (equivalent to the Receiving Water Concentration (RWC) of the effluent in the receiving water at critical conditions). The control water and effluent used will be a moderately hard water as described in EPA/600/4-89/001, Section 7 (or most current edition).Unacceptable chronic toxicity will be demonstrated if either test results in a no observable effect concentration (NOEC) less than 100% effluent. All tests results shall be statistically analyzed according to Appendix H, EPA/600/4-89/001, or the most current edition.

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

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

   d. The toxicity tests specified above shall be conducted once every two months until 6 valid bimonthly tests have been completed, and once every 6 months thereafter for the duration of the permit, unless notified otherwise by the Department. These tests are referred to as "routine" tests.

a. Nitrite nitrogen (NO2-N) and nitrate nitrogen (NO3-N).
b. Organic nitrogen.
c. Total nitrogen.
d. Orthophosphorus.
e. Total phosphorus.

An 8-hour flow proportioned composite sample shall be taken at least once every ninety (90) days until further notice is received from the Department. Test results (showing parameters and corresponding concentrations in mg/L) shall be submitted to the Department with the discharge monitoring report corresponding to the month in which the samples were taken. *[62-302.530(48), 8-8-94]*

10. The effluent unionized ammonia content shall be determined from standard reference tables (using total ammoinia, pH, and temperature) and reported on the Discharge Monitoring Report. The effluent temperature shall also be recorded and reported in degrees centrigrade (°C). *[62-302.530(3) FAC, 8-8-94]*

11. The Permittee shall continue regular monitoring of the segment of the Fishing Creek near the confluence of the stormwater drainage ditch outfall for maintaining data on the impact of the discharge to the water quality of the surface water body. Monitoring shall be on a quarterly basis and shall coincide with the quarterly nutrient monitoring of the facility effluent discharge. The monitoring sites are described as follows:

#1	approximately 50 meters upstream of the confluence, mid point of creek
#2	approximately 0.25 miles downstream of the confluence, mid point of creek
#3	Fishing creek at intersection with Wesconnett Boulevard, mid point of creek

The parameters to be measured shall include the following:

DO, pH, temperature, conductivity, salinity, Secchi Disk, $CBOD_5$, NH_3-N, TKN, TP, tide stage, alkalinity,

Metered parameters (DO, pH, temperature, conductivity, salinity) shall be sampled at the surface, mid-depth and at the bottom. Grab samples at mid depth for the other parameters is adequate. The results of the benthic monitoring shall be submitted to the Northeast District Office. *[62-4.240(3)(c), 4-30-95]*

12. This facility utilizes an ultraviolet disinfection system . This UV system shall be monitored on a daily basis and the intensity and unit operation shall be verified. The operation and maintenance shall be performed on a regular basis in accordance with the manufacturer recommended factor of safety. Routine cleaning and bulb replacement practices shall be maintained. *[62-600.440(4)(b), 6-8-93]*

There is conclusive evidence that the Respondent's discharge is chronically toxic to Ceriodaphnia dubia as a result of its diazoxon content and that this toxicity occurs during wet weather months. The presence of diazoxon is not due to the facility's operation but appears to be related to the public's use of the pesticide diazinon, a federally authorized chemical. (See CH2M Hill's January 22, 1996 report showing 100% mortality of C. dubia following rainfall events on June 29, 1994, August 9, 1994, September 9, 1994, September 13, 1994, and October 11, 1994). There is uncertainty whether there is sufficient evidence to be suspicious that an additional toxicant(s) is present which results in unacceptable acute toxicity during dry weather months. (See CH2M Hill's January 22, 1996 report showing 100% mortality of C. dubia following no rainfall events on March 22, 1994).

Instream biological surveys do not indicate a correlation between C. dubia toxicity test results and adverse impacts on biota. This is likely due to the nature of the Ditch and the intermittent nature of the flow which limits biological diversity. The Department has established a chronic toxicity effluent limit pursuant to Rule 62-4.244(3)(a), FAC. However, in light of available information, the Department is requiring reconfirmation of the source of the toxicity and the relationship of effluent toxicity tests to instream impacts.

5. Having reached a resolution of the matter the Department and the Respondent mutually agree and it is

6. Respondent shall comply with the following actions within the stated time periods:

1. During the effective period of this Consent Order and as provided in paragraph 6.2, below, the Respondent shall conduct additional monitoring of the facility's effluent and receiving waters to determine whether

a. acute toxicity, if present, is related to diazinon;

b. dilution is available when toxicity events occur; and

c. chronic toxicity results are correlated with instream impacts.

2. The following testing and other requirements shall be initiated within 60 days of this order.

The Respondent shall initiate the series of tests described below beginning in May 1997 to evaluate chronic whole effluent toxicity of the discharge from outfall D001. All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-91/002, or the most current edition. A standard reference toxicant quality assurance test shall be conducted concurrently, or no greater than 30 days prior to the test date of the chronic toxicity test, with each species used in the toxicity tests and the results submitted with the discharge monitoring report (DMR).

a. The Respondent shall conduct a daphnid (Ceriodaphnia dubia) Survival and Reproduction Test and a Fathead Minnow (Pimephales promelas) Larval Survival and Growth Test. These tests shall be conducted using a control (0% effluent) , one test concentration consisting of 33% effluent, and one test at 100% effluent. The control water and effluent used will be a moderately hard water as described in EPA/600/4-91/002, Section 8 (or most current edition). All tests results shall be statistically analyzed according to Appendix H, EPA/600/4-91/002, or the most current edition. Samples for chronic toxicity testing shall be collected to coincide with testing for the presence of diazinon.

b. For each set of effluent tests conducted, a minimum of three different 24-hour composite samples of final effluent shall be collected and used per the sampling schedule of Section 8.3.2, EPA/600/4-91/002 (or the most current edition). In stream samples shall consist of grab samples collected at each site for a minimum of three nonconsecutive days and used per the sampling schedule in Section 8.3.2, EPA/600/4-91/002. All test solutions shall be

renewed daily. If test results do not meet the acceptability criteria of either Section 13, paragraph 13.11 or Section 11, paragraph 11.11, EPA/600/4-91/002 (or the most current edition), that test shall be repeated. A chronic test will be considered valid only if the acceptability criteria referenced herein are met.

c. The effluent toxicity tests specified above shall be conducted once every two months for the duration of the Permit, unless notified otherwise by the Department. These tests are referred to as "chronic routine" tests. The effluent toxicity tests shall be conducted to coincide with the instream bioassays in 9. below.

d. Results from "chronic routine" tests shall be reported according to EPA/600/4-91/002, Section 10, Report Preparation (or the most current edition), and shall be submitted as an attachment to the discharge monitoring report.

e. For all tests conducted, a final effluent sample must be used.

f. Diazinon Testing shall be conducted in accordance with EPA Method 614 or other Department approved method. The method detection limit shall not be greater than 0.05 micrograms per liter and the practical quanitative limit shall not be greater than 0.25 micrograms per liter.

g. If diazinon is demonstrated to be present when the NOEC is less than 33%, that test shall not constitute a violation of the Permit or this Order.

This Consent Order does not act as State of Florida Department of Environmental Protection Wastewater Permit, nor does it authorize or otherwise justify violation of the Florida Air and Water Pollution Control Act ("Act"), Part I, Chapter 403, F.S., during the pendency of this Consent Order.

7. Analyses required by paragraph 6., above shall be reported bi-monthly on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10). These reports shall be mailed or hand delivered to the Department of Environmental Protection, Florida Department of Environmental Protection Wastewater Facilities Regulation Section, Mail Station 3551, Twin Towers

Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 bi-monthly and must be received by the Department no later than the 28th day following the end of the reporting period (e.g., the August report would be due not later than September 28th.)

8. The Respondent shall prepare a plan for conducting in stream flow monitoring within the Ditch at the outfall location for Department approval and submit the plan by June 1, 1997. Respondent shall have 45 days after Departmental approval to initiate and complete any construction required by the plan. The plan for stream monitoring shall provide for accurately measuring and recording daily stream flow and rainfall. During the interim period prior to completion of the stream monitoring facilities, the permittee shall conduct measurements of stream velocity and report the estimated stream flow on days during which samples are collected for the bioassays required by this Consent Order.

9. The Respondent shall implement an instream biomonitoring program for the purpose of identifying whether effluent toxicity is adversely impacting uses in the Ditch and Fishing Creek. The biomonitoring program shall include the following elements:

a. Respondent shall perform in the Ditch and in Fishing Creek. There shall be a total of six monitoring sites in the ditch and in Fishing Creek and these sites shall be located as shown on Exhibit 1 and as follows: (#1) one station in the ditch, upstream of the facility discharge point; (#2, #3, and #4) three biomonitoring stations in the ditch, downstream of the facility discharge point, prior to where

the ditch meets Fishing Creek; (#5) one biomonitoring station in Fishing Creek, upstream of where the creek meets the ditch, mid-point of creek; and (#6) one biomonitoring station in Fishing Creek, downstream of where the ditch meets the creek, mid-point of creek.

b. Monitoring shall be conducted three times per year and at least twice during the wet or rainy season (March through October) and once during the dry season. Sampling events shall be separated by a minimum of 30 days. The monitoring shall include diazinon analysis, priority pollutant scans and invertebrate sampling at each site, for each sampling event. The Respondent shall provide estimates of flow at each bioassay site in the Ditch and chronic bioassays for daphnids and fathead minnow at biomonitoring stations #1, #2, #4, and #6. All chronic bioassays shall be conducted in accordance with the sampling and testing procedures described in 6.2. above.

c. The biomonitoring plan shall be initiated by the second quarter of 1997.

10. The Respondent shall investigate the potential for eliminating toxics from entering the wastewater collection system through a public education program. The Respondent shall develop a plan for a public education program and submit this plan to the Department for approval within 45 days of the effective date of the Consent Order. The plan shall be designed to inform the public about the proper use and disposal of diazinon and other toxics for the purpose of reducing the presence of diazinon and other toxics within the Respondent's service area. Respondent shall have 45 days after Departmental approval to initiate the plan.

11. Every calendar quarter after the effective date of this Consent Order, Respondent shall submit in writing to the Department a report containing information concerning the

JACKSONVILLE HEIGHTS WWTP - TOXICITY HISTORY

FDEP PERMIT # DO16-222480 - issued Nov. 9, 1993 - expires Apr. 1, 1998, routine freshwater 96 hr. acute screen, 20% trigger, 3 additional definitives, bi-monthly / semi-annually, beginning November, 1993.

NPDES PERMIT # FL0023671 - issued Jan. 1, 1994 - expires Sep. 30, 1998, routine freshwater 7 day chronic screen, NOEC <100% trigger, 2 additional definitives, bi-monthly / semi-annually, beginning January 1994.

1993

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
AO #93-016 Jan.19 '93 / EPA	**survival - <100%** **repro - <100%**	NT	NT	**failed NOEC**
AO # 93-016 Feb.9 '93 / EPA	**survival - <100%** **repro - <100%**	NT	NT	**failed NOEC**
AO # 93-016 Feb.20 '93 / EPA	survival >100% repro - >100%	NT	NT	TIE /TRE passed NOEC
AO # 93-016 Mar. '93 / EPA	NT	NT	NT	delayed till April weather problems
AO # 93-016 Apr.1'93 /EPA	survival >100% repro - >100%	NT	NT	passed NOEC
AO # 93-016 Apr.13'93 /EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 May11'93 / EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 Jun.15'93 /EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 Jul.27'93 / EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 Aug.10'93 / EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 Sep.14'93 / EPA	survival >100% repro >100%	NT	NT	passed NOEC
AO # 93-016 Oct.5'93 / EPA	survival >100% **repro <100%**	NT	NT	**failed NOEC**
AO 3 93-016 Oct.19'93 / EPA	**survival <100%**	NT	NT	**failed NOEC**
acute test Oct.27'93	survival >100%	NT	NT	3 comp. samples LC 50 >100%
AO # 93-016 Nov.9'93	**survival <100%**	NT	NT	**failed NOEC**
AO # 93-016 Nov.23'93 / EPA	survival >100% repro >100%	NT	NT	TIE / TRE same sample
AO # 93-016 Dec.7'93 / EPA	**survival <100%**	NT	NT	final AO test **failed NOEC**

JACKSONVILLE HEIGHTS WWTP - TOXICITY HISTORY

1994

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
DEP routine Jan 13'94 Harris # 460	LC50 >100%	NT	LC50 >100%	passed LC50
EPA routine Feb.21'94 Harris #481	**survival <100%** **repro <100%**	survival >100% growth >100%	NT	**failed NOEC**
EPA additional Mar.8'94 Harris # 484	**survival 25%** **repro 25%**	NT	NT	**failed NOEC**
EPA additional Mar.22'94 Harria #484	**survival 50%** **repro 50%**	NT	NT	**failed NOEC**
DEP routine Mar.10'94 Harris # 488	**LC50 < 100%**	NT	LC50 >100%	**failed LC50**
DEP additional Mar23'94 Harris #497	LC50 >100%	NT	**LC50 <100%**	**failed Lc50**
DEP additional Apr14'94 Harris #509	LC50 >100%	NT	LC50>100%	passed LC50
DEP additional Apr21'94 Harris #509	LC50 >100%	NT	LC50>100%	passed LC50
DEP additional Apr28'94 Harris #509	LC50 >100%	NT	LC50>100%	passed LC50
DEP routine May 19 '94 Harris # 530	LC50 >100%	NT	LC50 >100%	passed LC50
EPA routine May 24 '94 CH2M Hill	survival >100% **repro <100%**	survival >100% growth >100%	NT	**invalid test** **failed NOEC**
EPA routine Jun 21 '94 CH2M Hill	**survival <100%**	survival >100% growth >100%	NT	**failed NOEC**
EPA additional Jun 28 '94 CH2M Hill	**survival 50%** **repro 12.5%**	NT	NT	**failed NOEC**

Jacksonville Heights WWTP - 1994 continued

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
EPA additional Jul 12 '94 CH2M Hill	**survival 50%** **repro < 6.25%**	NT	NT	**failed NOEC**
EPA additional Jul 5 '94 Ch2M Hill	survival >100% **repro 50%**	NT	NT	**failed NOEC**
EPA additional Jul 19 '94 CH2M Hill	survival >100% **repro 25%**			**failed NOEC**
EPA routine Aug 9 '94 Harris # 565	**survival <100%** **repro <100%**	survival >100% growth >100%	NT	**failed NOEC**
EPA additional Aug. 25 '94 Harris # 572	**survival 50%** **repro 50%**	NT	NT	**failed NOEC**
EPA additional Sep. 6 '94 Harris # 572	**survival 12.5%** **repro 25%**	NT	NT	**failed NOEC**
EPA routine Aug 25. '94 CH2M Hill	survival >100% repro >100%	survival >100% growth >100%	NT	passed NOEC
EPA routine Sep. 13 '94 Harris # 577	**survival <100%** **repro <100%**	survival >100% growth >100%	NT	**failed NOEC**
EPA additional Sep. 27 '94 Harris #580	**survival 25%** **repro 25%**	NT	NT	**failed NOEC**
EPA additional Oct. 11 '94 Harris #580	**survival 12.5%** **repro 25%**	NT	NT	**failed NOEC**
EPA routine Oct. 25 '94 CH2M Hill	survival >100% repro >100%	survival >100% growth >100%	NT	passed NOEC
EPA routine Nov. 8 '94 Harris #595	**survival <100%** **repro <100%**	survival >100% growth >100%	NT	**failed NOEC**
EPA additional Nov. 29 '94 Harris #600	**survival 25%** **repro 25%**	NT	NT	**failed NOEC**
EPA additional Dec. 13 '94 Harris #600	**survival 50%** **repro 50%**	NT	NT	**failed NOEC**
EPA routine Dec.13 '94	survival >100% **repro <100%**	**survival <100%** **growth n/a**	NT	**failed NOEC** Ch2M Hill

JACKSONVILLE HEIGHTS WWTP - TOXICITY HISTORY

1995

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
EPA additional Jan. 14 '95 CH2M Hill#95583	survival 100% repro 100%	survival 100% growth 100%	NT	passed NOEC
EPA additional Jan. 24 '95 CH2M Hill#95592	survival 100% **repro 50%**	survival 100% growth 100%	NT	**failed NOEC**
EPA routine Feb. 14 '95 Ch2M Hill#95603	survival > 100% **repro < 100%**	survival > 100% growth > 100%	NT	**failed NOEC**
EPA additional Mar. 14 '95 CH2M Hill#95626	survival 100% repro 100%	NT	NT	passed NOEC
EPA additional Mar. 28 '95 CH2M Hill#95645	survival 100% repro 100%	NT	NT	passed NOEC
EPA routine May 16 '95 Harris #670	**survival < 100%** **repro < 100%**	survival > 100% growth > 100%	NT	**failed NOEC**
EPA additional Jun. 6 '95 Harris # 681	**survival 50%** **repro 12.5%**	NT	NT	**failed NOEC**
EPA additional Jun. 20 '95 Harris #681	**survival 50%** **repro 50%**	NT	NT	**failed NOEC**
EPA routine Nov. 7 '95 Harris #749	**survival < 100%** **repro < 100%**	survival > 100% growth > 100%	NT	**failed NOEC**
EPA additional Nov. 28 '95 Harris #759	survival>100% repro > 100%	NT	NT	passed NOEC
EPA additional Dec. 12 '95 Harris #759	survival > 100% **repro 50%**	NT	NT	**failed NOEC**

JACKSONVILLE HEIGHTS WWTP - TOXICITY HISTORY

1996

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
EPA routine May 14, '96 Harris # 812	survival>100% repro > 100%	survival>100% growth > 100%	NT	passed NOEC
EPA AO#94-077 test #1 of AO Oct. 22, '96 Harris # 839	survival>100% repro > 100%	NT	NT	passed 1st AO test
EPA routine Nov. 12, '96 Harris #845	survival>100% repro > 100%	survival>100% growth > 100%	NT	passed NOEC
EPA AO#94-077 test #2 of AO Nov. 12, '96 Harris # 844	survival>100% repro > 100%	NT	NT	passed 2nd. AO test
EPA AO#94-077 test #3 of AO Dec. 10, '96 Harris # 849	survival>100% repro > 100%	NT	NT	passed 3rd. AO test

JACKSONVILLE HEIGHTS WWTP - TOXICITY HISTORY

1997

TEST DATE	C. dubia	P. promelas	N. leedsi	PASS / FAIL
EPA AO# 94-077 test #4 of AO Jan. 7, '97 Harris # 851	survival>100% repro > 100%	NT	NT	passed 4th. AO test
EPA AO# 94-077 test #5 of AO Feb. 4, '97 Harris # 860	survival>100% repro > 100%	NT	NT	passed 5th. AO test
A new consent order, issued by the DEP, requires 6 bi-monthly tests, concentations of 33% and 100% effluent, NOEC reporting. There are also instream sampling stations (#'s 1,2,5, & 6) that will be tested for toxicity.				
DEP CO test #1 May 27, '97 Harris # 876	survival 100% repro 100%	survival 100% growth 100%	NT	effluent exhibited no toxicity.
DEP CO test #2 Jul. 22, '97 Harris # 884	survival 100% repro 100%	survival 100% growth 100%	NT	effluent exhibited no toxicity.
DEP CO test #3 Sep. 23, '97 Harris # 891	**survival 33%** **repro 33%**	survival 100% growth 100%		effluent exhibited toxicity, **failed** NOEC for CD
1st additional Oct. 7, '97	survival 100% **repro 50%**	NT		**failed** NOEC for CD reproduction
2nd addiitonal Oct. 21, '97	survival 100% growth 100%	NT		effluent exhibited no toxicity.
DEP CO test #4 Nov. 11, '97 Harris #906	survival 100% repro 100%	survival 100% growth 100%		effluent exhibited no toxicity.
DEP CO test #5 DUE (jan '98)				

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030331	DATE (M/D/Y): 5/18/98	TIME: 1115	RECEIVING BODY OF WATER: drainage ditch

REMARKS: CONTROL	COUNTY: DUVAL	LOCATION: 100 FT UPSTREAM POD Control Site	FIELD ID/NAME: Site #1 Control 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)
10				~~10~~ 90			

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

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

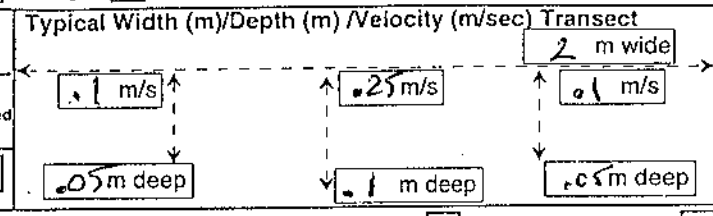
Width of riparian vegetation (m) on least buffered side: 2.1 | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 3 (m above present water level) + .1 (present depth in m) = 3.1 (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	50	10	net
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	50	10	net	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (ft) (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	salinity		Secchi (m):
Top	0							
Mid-depth	3"	27.4	6.98	6.8	260	0.1		
Bottom	6"							

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

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:
Hot, Humid, Sunny, recent light rain previous 24 hrs

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Tim McKelvey / Pat O'Connor	Tim McKelvey	

JAX HEIGHTS - RQ - FY98 - 05 - 18 - 13

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (experimental 10-15-97)

time 11:15

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030331	DATE (M/D/Y): 5/18/98	RECEIVING BODY OF WATER: drainage ditch
REMARKS: CONTROL	COUNTY: DUVAL	LOCATION: UPSTREAM POD, 100FT control site	FIELD ID/NAME: control site Site #1

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity [10]	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 [16]	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 [15]	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 [16]	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 [57]				
Secondary Habitat Components Artificial Channelization [10]	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 [11]	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 [1]	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 (1)
Riparian Zone Vegetation Quality [5]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. (5) 4 3 2 1
Secondary Score [27]				

[84] TOTAL SCORE

ANALYSIS DATE: 5/18/98	ANALYST: Tim McKelvey / Pat O'Connor	SIGNATURE: Tim McKelvey

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8051 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030332	DATE (M/D/Y): 5/18/98	TIME: 1045	RECEIVING BODY OF WATER: drainage ditch

REMARKS: TEST	COUNTY: DUVAL	LOCATION: 100 YARDS DOWNSTREAM OF POD	FIELD ID/NAME: SITE #2, TEST 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)
10%				90%			

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

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

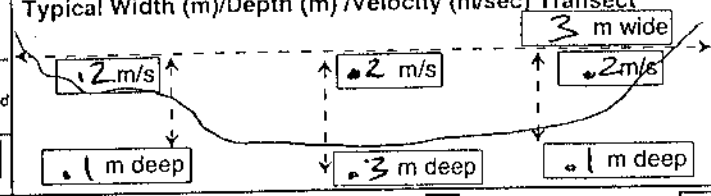
Width of riparian vegetation (m) on least buffered side: *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 3m (m above present water level) + .3 (present depth in m) = 3.3 (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	20		dipnet
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	80	20	dipnet	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (FT/m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	SAL.		Secchi (m):
Top								
Mid-depth	6"	24.96	7.3	6.68	462	0.2		TIK
Bottom	12"							

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

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: HOT Humid, Sunny
recent light rain previous 24 hrs.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
TIM McKELVEY / PAT O'CONNOR	Tim McKelvey	

RC* JAX HEIGHTS-RQ-1998-05-18-13

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (experimental 10-15-97)

time: 1045

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 20030332	DATE (M/D/Y): 5/18/98	RECEIVING BODY OF WATER: drainage ditch

REMARKS: TEST	COUNTY: DUVAL	LOCATION: SITE #2, 100 yards downstream of P.O.D.	FIELD ID/NAME: SITE #2, TEST SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components				
Substrate Diversity [10]	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 [20]	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 [20]	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 [16]	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 [166]				
Secondary Habitat Components				
Artificial Channelization [10]	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 [5]	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 [3]	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 [2]	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
Secondary Score [20]				

TOTAL SCORE [86]

ANALYSIS DATE: 5/18/98	ANALYST: Jim McKelvey / Pat O'Connor	SIGNATURE: Jim McKelvey

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Jacksonville Heights
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0023671
LIMS Sample #: 325137 LIMS Job #: 1998-05-19-14
sample log: 6/1/98 DW

Sample Collection: Date 5-18-98 Time 1000
Test Beginning: Date 5-19-98 Time 1510
Test Ending: Date 5-22-98 Time 1450
Organism Batch #: 3L Diluent Batch #: well H2O
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
(Static / Static Renewal / Flow-through
Temperature range: room 24.0-25.8°C
incubator 25.0-26.0°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

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	8.2 @ 25.2 °C 8.1 FW 25.8	1034 @ 97.6 992 @ 999 @ 25.3 °C 1022 97.6 FW
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.5 @ 24.4	7.6 @ 7.7 °C	7.6 @ 7.7 945 @ 999 @ 25.6 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.7	8.1 @ 26.0 °C	1024 @ 97.6 990 @ 999 @ 25.7 °C 1020 1010

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
Control	F1	5	5	5	7.9	8.2	8.4	25.0	24.7	24.0	7.6	7.9	7.8	250	240	260
Control	F2	5	5	5	7.9	8.2	8.4	24.9	24.0	24.0	7.7	7.8	7.9	255	255	270
Control	F3	5	5	5	7.9	8.2	8.4	24.9	24.5	24.0	7.7	8.1	7.9	255	260	265
Control	F4	5	5	5	7.9	8.2	8.4	24.9	24.4	24.0	7.8	8.0	8.0	255	265	280
100%	F5	5	5	5	7.6	8.1	8.3	25.6	24.3	23.9	6.9	8.0	8.0	600	585	630
100%	F6	5	5	5	7.6	8.1	8.3	25.6	24.0	23.9	7.0	7.9	7.9	600	590	620
100%	F7	5	5	5	7.6	8.1	8.3	25.6	24.0	23.9	7.1	8.0	8.0	605	615	630
100%	F8	5	5	5	7.6	8.1	8.3	25.6	24.0	24.0	7.0	8.0	8.1	600	605	615
Measured/Loaded by:		MF	FW	DHW	CH	DHW	FW	CH	DHW	FW	CH	DHW		CH	DHW	DHW
Recorded by:		FW	FW	DHW	DW	FW	DW	DW	FW	DW	DW	FW		DW	FW	DW

Investigators' Signatures

Water Quality Parameters (Salt Water: Well Water / 20% Min Water; Unit Read by MF)

	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	0.0	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L): <0.03	<0.03	DR-100	CH
Alkalinity (mg/L as $CaCO_3$): 115	110	Hach	CH
Hardness (mg/L as $CaCO_3$): 130	178	Hach	CH
Total ammonia (mg/L as N): <0.017	<0.017	Orion	FW

Ammonia Ammonia Ammonia Control Sample
Salinity: 0 ppt Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Jacksonville Heights
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0023671
LIMS Sample #: 325137 LIMS Job #: TLH 1998-05-19-14
sample log: 5/19/98 DW

Sample Collection: Date 5-18-98 Time 1000
Test Beginning: Date 5-19-98 Time 1450
Test Ending: Date 5-21-98 Time 1450
Organism Batch #: #23 Diluent Batch #: 24
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 24.0 - 25.8°C
incubator 23.9 - ~~24.5~~ 25.6°C
MF 5/21/98
Test Number: 1 of 2
Remarks: D = dead, M = missing
Transposed #'s

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	24.6 @ 24.7	8.2 @ 25.2 °C	103.4 @ 97.6
	7.0 @ 9.0			992 @ 999 @ 25.3 °C
24 hr	7.0 @ 7.0	24.5 @ 24.4	8.1 @ 25.8 °C	102.2 @ 97.6
	9.0 @ 9.0			995 @ 999 @ 25.6 °C
48 hr	7.0 @ 7.0	24.8 @ 24.7	8.1 @ 26.0 °C	102.4 @ 97.6
	9.0 @ 9.0			990 @ 999 @ 25.7 °C
				100% @ 101.7

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 24 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 48 h
Control	A	5	5	5	8.1		8.0	24.9		24.5	7.5		8.0	155		190
Control	B	5	5	5			8.2			24.4			8.0			185
Control	C	5	5	5			8.3			24.3			8.0			190
Control	D	5	5	5			8.3			24.2			8.0			200
100%	A	5	5	4[10]	7.6		8.4	25.3		24.2	7.0		8.1	555		610
100%	B	5	5	5			8.4			24.3			8.0			630
100%	C	5	5	5			8.5			24.1			8.0			670
100%	D	5	5	5			8.5			24.0			8.0			680
Measured/Loaded by:		MF	FW	FW	CH		FW	CH		FW	CH		FW	CH		FW
Recorded by:		FW	FW	FW	DW		DW	DW		DW	DW		DW	DW		DW

Investigators' Signatures

Marshall Faircloth
Dan Hall
Courtney Hess
Frank Winchell
Dan Willoughby
Dan Hall
reviewer

form updated 4/01/96

Salt Water / Well Water

Water Quality Parameters Verified by MF

	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		0.0	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	DR-100	CH
Alkalinity (mg/L as $CaCO_3$):	66	110	Hach	CH
Hardness (mg/L as $CaCO_3$):	86	178	Hach	CH
Total ammonia (mg/L as N):	<0.017	<0.017	Orion	FW

Ammonia Meter #98136 Ammonia Meter Slope: −57.8 Ammonia Blank: <0.017

Control Salinity: 0 ppt

Sample Salinity: 0 ppt

Jacksonville Heights WWTP - Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	30	≥22	21-12	<12	5
EPT Index	6	-	≥2	<2	3
# Chironomid Taxa	14	≥7	6-4	<4	5
% Contribution of Dominant Taxon	32	≤31	32-66	>66	3
% Diptera	46	-	≤47	>47	3
Florida Index	14	≥8	7-4	<5	5
% Suspension feeders/Filterers	14	-	≥7	<7	3
Total Score		**Northeast**			**27**
Interpretation of Scores		**Excellent**			**25-29**
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

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

Jacksonville Heights WWTP - Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	40	≥22	21-12	<12	5
EPT Index	5	-	≥2	<2	3
# Chironomid Taxa	13	≥7	6-4	<4	5
% Contribution of Dominant Taxon	42	≤31	32-66	>66	3
% Diptera	38	-	≤47	>47	3
Florida Index	14	≥8	7-4	<5	5
% Suspension feeders/Filterers	3	-	≥7	<7	1
Total Score		**Northeast**			**25**
Interpretation of Scores		**Excellent**			**25-29**
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

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

Phytoplankton taxa list and densities (#/mL) for Jacksonville Heights WWTP, collected via subsurface grabs in unnamed ditch, on 18 May, 1998

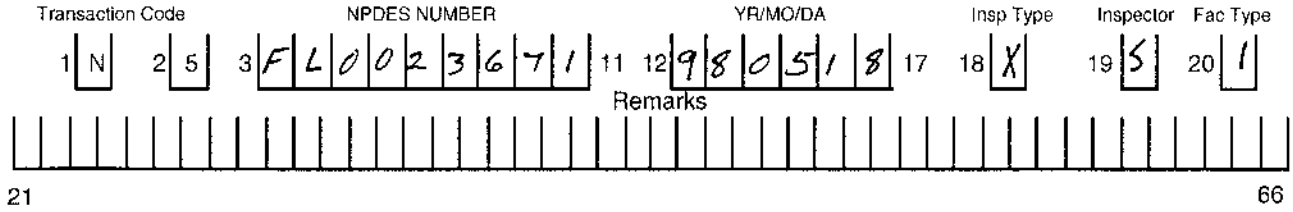
	Control Site	Test Site
Bacillariophyceae		
Achnanthes exigua	55	–
Achnanthes sp.	33	196
Cocconeis sp.	22	8
Cyclotella sp.	–	15
Gomphonema parvulum	–	8
Gomphonema sp.	66	15
Melosira sp.	11	–
Navicula minima	55	91
Navicula sp.	33	*15*
Nitzschia sp.	176	121
Pennales sp.	44	377
Pinnularia sp.	–	30
Synedra ulna	–	8
Chlorophyceae		
Ankistrodesmus sp.	–	45
Characium sp.	209	60
Chlamydomonas sp.	55	211
Chlorella sp.	–	38
Chlorococcum sp.	11	8
Chlorogonium sp.	–	15
Chlorophyceae	–	30
Cosmarium sp.	–	8
Dictyosphaerium sp.	11	–
Gloeocystis sp.	11	–
Oocystis sp.	22	–
Pteromonas sp.	22	–
Scenedesmus sp.	110	75
Selenastrum sp.	165	45
Tetraedron sp.	11	30
Cryptophyceae		
Cryptomonas sp.	–	8
Cyanophyceae		
Anabaena sp.	55	8
Chroococcus sp.	11	23
Dactylococcopsis sp.	132	83
Dermocarpa sp.	–	8
Microcystis sp.	–	8
Oscillatoria sp.	1113	476
Raphidiopsis sp.	11	15
Spirulina sp.	88	–
Synechococcus sp.	11	–
Euglenophyceae		
Lepocinclis sp.	11	–
Trachelomonas sp.	22	–

Benthic macroinvertebrate taxa list for Jacksonville Heights WWTP collected via 20 discrete dip net sweeps in unnamed ditch, on 18 May, 1998.

	Control Site	Test Site
Coleoptera		
Hydrophilidae	–	3
Microcylloepus pusillus	–	1
Peltodytes sp.	14	2
Collembola		
Collembola sp.	–	2
Diptera		
Ablabesmyia mallochi	20	96
Ablabesmyia rhamphe grp.	–	4
Atrichopogon sp.	–	1
Ceratopogonidae	–	7
Chironomidae	16	37
Chironomus sp.	–	4
Corynoneura sp.	–	4
Cricotopus bicinctus grp.	7	148
Culicoides sp.	1	–
Dasyhelea sp.	2	68
Dicrotendipes modestus	2	16
Dicrotendipes neomodestus	–	4
Dicrotendipes	–	4
Ephydridae	–	2
Hemerodromia sp.	1	1
Labrundinia neopilosella	–	4
Labrundinia sp.	2	4
Larsia decolorata	2	–
Orthocladiinae	2	4
Paracladopelma sp.	2	–
Paratanytarsus sp. C Epler	3	–
Paratanytarsus sp.	3	–
Polypedilum illinoense grp.	19	56
Polypedilum scalaenum grp.	20	–
Polypedilum sp.	3	–
Rheotanytarsus distinctissimus grp.	3	4
Tanytarsus sp. C Epler	39	20
Tanytarsus sp. L Epler	3	4
Tanytarsus sp. T Epler	2	–
Tanytarsus sp. U Epler	24	4
Tanytarsus sp.	9	12
Ephemeroptera		
Caenis sp.	2	1
Callibaetis floridanus	11	–
Callibaetis	–	1
Ephemeroptera	2	–

Gastropoda		
Ancylidae	–	17
Gastropoda	–	14
Physella sp.	–	7
Planorbella sp.	–	1
Sphaeriidae	3	9
Hemiptera		
Hemiptera	–	7
Hirudinea		
Gloiobdella elongata	–	1
Lepidoptera		
Lepidoptera	1	–
Odonata		
Argia sp.	1	3
Coenagrionidae	33	27
Odonata	–	7
Zygoptera	–	4
Oligochaeta		
Dero digitata	–	5
*Limnodrilus hoffmeister*i	3	28
Nais communis	2	5
Stylaria lacustris	–	1
Plecoptera		
Leuctra sp.	3	–
Trichoptera		
Cheumatopsyche	3	–
Hydropsychidae	2	–
Hydroptila	103	460
Hydroptilidae	26	9
Oecetis sp.	–	2
Oxyethira sp.	5	92
Trichoptera	–	117
Trombidiformes		
Hygrobates sp.	1	–
Oribatei sp.	–	2
Turbellaria		
Turbellaria	–	3

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



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