

Biological Assessment of

Holly Oaks WWTP

Duval County

NPDES #FL0023621

Sampled July 1992

November 1992

Biology Section
Division of Technical Services

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger: Holly Oaks WWTP
County: Duval
NPDES Number: FL0023621
State Permit Expiration Date: 31 May 1993

Toxics Sampling Inspection (XSI)

Date Sampled: 28 July 1992

Results: Organic constituents in the effluent included low amounts of aliphatic hydrocarbons. The metals detected in the effluent above quantitation limits included aluminum (78 µg/L), iron (23 µg/L), and zinc (47 µg/L). These values are within Class III standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 28 July 1992

Results: The full strength effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, killing 85% of the water fleas within 48 hours. This is a violation of 17-302.510(3)(p) FAC, 17-302.500(1)(d) FAC, and 17-4.244(3)(a) FAC. This same sample of effluent was not toxic to the fish, *Notropis leedsi*, as only 10% mortality was observed in that test.

Impact Bioassessment Inspection (IBI)

Date Sampled: 28 July 1992

Results: Measurements of macroinvertebrate community health indicated that biota at the test site were degraded, as shown by reductions in taxa richness, Florida Index, and diversity between the reference and test sites. The dominant organism at the test site was *Limnodrilus hoffmeisteri*, an oligochaete tolerant of organic enrichment. Several of the phytoplankton community parameters examined were indicative of disturbance associated with the Holly Oaks discharge. The chlorophyll *a* measured at the test site (58.3 µg/L), was higher than 95% of other Florida estuaries and streams, suggesting severe eutrophication. This dramatic increase in algal biomass, coupled with the observation that 38.0% of the phytoplankton population was made up of a single organism (*Melosira* sp.), indicates that "imbalances in aquatic flora" are occurring in the unnamed tributary to Cowhead Creek, a violation of 17-302.560(29) FAC.

Water Quality Inspection (WQI)

Date Sampled: 28 July 1992

Results: Under the salinity regime during this sampling, dissolved oxygen at test site (4.7 mg/L), was low enough to be a violation of the Class III freshwater standard of 5.0 mg/L. Only ortho-phosphate was analyzed on the samples. The results suggest that the Holly Oaks facility is responsible for the deleterious ortho-phosphorus concentrations found in the receiving waters. Fecal and total coliforms were within Class III standards in the effluent sample and at the test and reference sites. AGP was above the problem threshold at both sites.

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

Introduction

The Holly Oaks Wastewater Treatment Plant is a 1.0 MGD (design flow) domestic wastewater treatment facility located in Duval County (see maps in Appendix). Treatment consists of aeration, digestion, clarification, mixed liqueur recycling, chlorination, and de-chlorination. The final effluent is discharged through two holding ponds to a tributary of Cowhead Creek, which flows to Mill Cove (a part of the St. Johns River) (see maps in Appendix). All receiving waters are Class III. The facility does not have a mixing zone.

State permit limits are as follows: flow (annual daily average of 1.0 MGD), BOD (maximum of 12 mg/L, annual average of 6 mg/L), TSS (maximum of 60 mg/L, annual average of 20 mg/L), TKN (maximum of 4.0 mg/L, annual average of 2.0 mg/L), pH (6 to 8.5), fecal coliform (maximum of 800 organisms/100 mL, average of 200 organisms/100 mL), and chlorine residual (minimum of 0.5 mg/L for disinfection, maximum of 0.01 mg/L at discharge). NPDES permit limits are similar (see Facility Summary in Appendix). The wasteload allocation for the Holly Oaks WWTP is 147.8 lbs/day Ultimate Oxygen Demand.

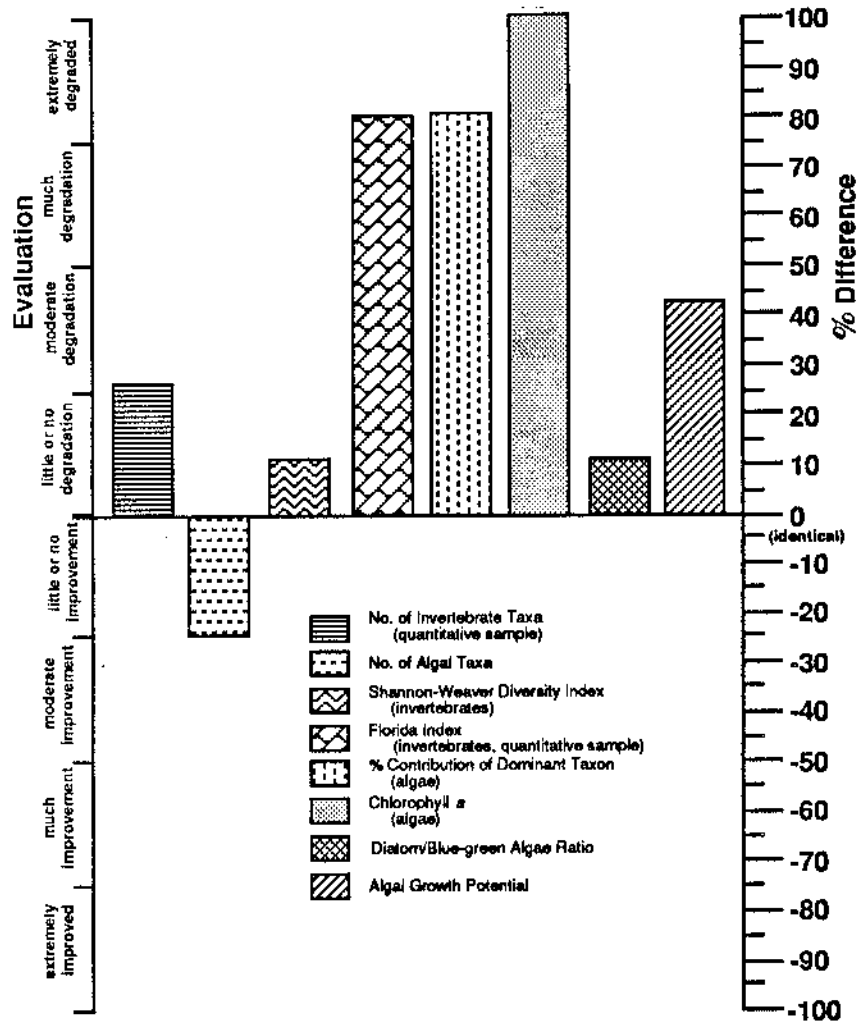
During the past few years, some problems with the plant have been documented. These include exceeding limits for BOD, TKN, pH, chlorine residual, and fecal coliform bacteria. According to the Northeast District Office, the facility staff have been prompt in their attempts to correct deficiencies.

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 Cowhead Creek) and a test site (located downstream of the discharge in a tributary of Cowhead Creek) (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 *Ceriodaphnia dubia* and *Notropis leedsi* as the test organisms, were performed on an effluent sample (EPA 1988). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Due to a scheduling problem, limited analyses for nutrients (ortho-phosphate only) were performed on effluent, reference, and test sites. Additionally, effluent was analyzed for TKN. Methods used for

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Ponar		
Number of Taxa	15	11
Florida Index	5	1
Shannon-Weaver Diversity	2.8	2.5
% Oligochaeta	6.4	33.0
% Diptera	17.3	9.0
% Malacostraca	50.0	46.6
% Polychaeta	22.7	11.4
% Pelecypoda	1.8	0
% Coleoptera	0.9	0
% Other	0.9	0
% Predators	27.9	25.9
% Collector-Gatherers	64.5	72.7
% Collector-Filterers	2.7	0.7
% Scrapers	0.4	0
% Shredders	4.7	0.7
% Parasites	0	0
Phytoplankton Algae		
Number of Taxa	8	10
% Contribution of Dominant Taxon	21.1	38.0
Chlorophyll a (µg/L)	0.00	58.3
Diatom/Diatom + B-G Abundance Ratio	0.87	0.78
% Blue-green	10.5	16.4
% Green	15.8	24.0
% Diatoms	68.4	59.6
% Chrysophyta	5.3	0
Algal Growth Potential (mg dry wt/l)	5.2	7.4



Effect of discharge on receiving stream
(measured as difference between control and test sites).

all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at the reference site and test site. Collection methods consisted of 3 Ponar grabs per site (Ross 1990). Phytoplankton was sampled at the reference site and at the test site via subsurface grabs (Ross 1990). Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum*, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa, Shannon-Weaver Diversity Index, and chlorophyll *a* are well known. Others are briefly explained here. Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. 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. The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups).

For graphical purposes, the percent differences between the reference and test site involving the number of taxa, the diversity index, and the diatom to blue-green algae ratio are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the percent contribution of dominant taxon, 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: Scott Bulgrin (DER Northeast District), and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Kim Pearce, and Sandy McClure (Tallahassee Biology Laboratory).

Results and Discussion

The study area consists of two branches of the tidally influenced Cowhead Creek, which flows through a heavily vegetated, marshy swamp (Appendix). The test site (with 72 points) and the reference site (with 77 points) were very similar regarding habitat quality scores. Surrounding land use was predominantly residential. Specific conductance at the test site (1200 µmhos/cm), was higher than that of the reference site (400 µmhos/cm). At low tide (during sampling), it is expected that the test site is dominated by input of the freshwater effluent. Dissolved oxygen at the test site (4.7 mg/L), was lower than that of the reference site (5.4 mg/L), and was low enough to be a violation of the Class III standard of 5.0 mg/L for freshwater. While pH was similar at the two study sites (7.3 to 7.5), water temperature at the test site (29.6 °C) was higher than the control (24.6 °C).

The full strength effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, killing 85% of the water fleas within 48 hours. This is a violation of 17-302.510(3)(p) FAC, 17-302.500(1)(d) FAC, and 17-4.244(3)(a) FAC. This same sample of effluent was not toxic to the fish, *Notropis leedsi*, as only 10% mortality was observed in that test.

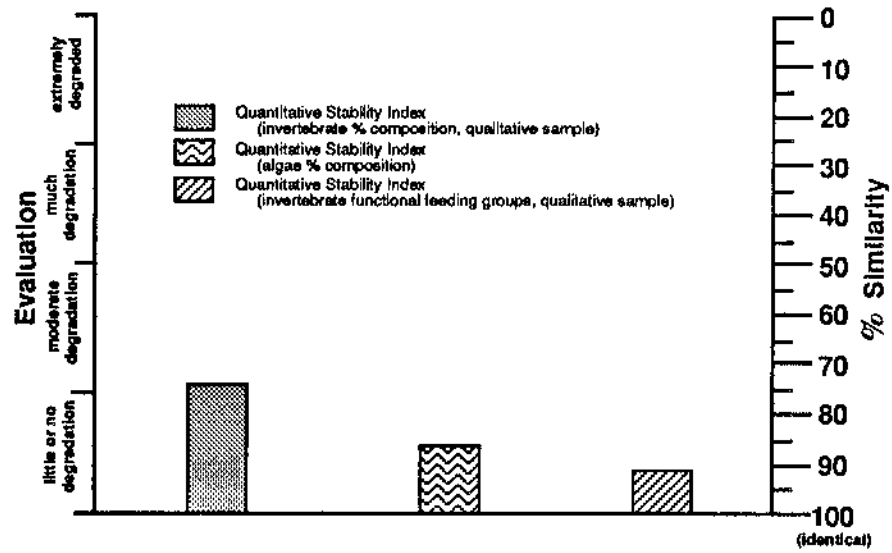
Organic constituents in the effluent included aliphatic hydrocarbons at 72 µg/L. Metals detected in the effluent above quantitation limits included aluminum (78 µg/L), iron (23 µg/L), and zinc (47 µg/L). These values are within Class III standards.

Due to a scheduling problem, limited analyses for nutrients (ortho-phosphate only) were performed on effluent, reference, and test sites. The concentration of ortho-phosphate at the test site (1.3 mg/L) was virtually the same as the concentration found in the effluent (1.4 mg/L), while it was below quantitation limits at the reference site (0.03 mg/L). The ortho-phosphorus level at the test site is higher than that found in 95% of all other Florida estuaries and streams (see Appendix). STORET data from 700 estuary stations and 1617 stream stations, for the period of 1980 to 1989, have been compiled into a percentile distribution (Joe Hand, personal communication). Data from this present investigation were evaluated against this table (in Appendix). The results clearly indicate the Holly Oaks facility is responsible for the observed ortho-phosphorus concentrations found in the receiving waters. The effluent TKN result (1.2 mg/L) was not noteworthy.

Results of algal growth potential tests indicate that waters at both the test site and the reference site may be subject to eutrophication effects. The AGP's measured (7.4 mg dry wt/L at the test site; 5.2 mg dry wt/L at the reference site) were higher than the 5 mg dry wt/L, "problem threshold". It has been found that the negative consequences associated with nutrient enrichment (D.O. depletion, algal blooms, fish kills) are probable when the AGP exceeds this 5 mg dry wt/L level (Raschke and Schultz 1987).

Fecal coliforms were 70 organisms/100 mL in the effluent sample, 220 organisms/100 mL at the test site, and 500 organisms/100 mL at the reference site. Total coliform bacteria were 800 organisms/100 mL in the effluent sample, 2300 organisms/100 mL at the test site, and 2300 organisms/100 mL at the reference site. All these values are within Class III standards for a single grab sample.

Measurements of macroinvertebrate community health indicated that biota at the test site were degraded. The figure on p. 2 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. The figure on p. 3



Effect of discharge on receiving stream
(measured as similarity between control and test sites).

summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Taxa richness and Shannon-Weaver diversity were reduced (by 26.6% and 10.7%, respectively) at the test site, compared to the reference site. A substantial reduction in Florida Index (by 80%) was observed at the test site when compared to the control. The dominant organism at the test site was *Limnodrilus hoffmeisteri*, an oligochaete tolerant of organic enrichment. Corroborating data, such as the toxicity of the effluent and low dissolved oxygen at the test site, suggest that the facility is largely responsible for the poor conditions of the receiving waters.

Several of the phytoplankton community parameters examined were indicative of disturbance associated with the Holly Oaks discharge. Chlorophyll *a*, the percent contribution of the dominant taxon, and AGP were increased by >100%, 80.1%, and 42.3%, respectively, between the reference and the test sites. The chlorophyll *a* measured at the test site (58.3 µg/L), is higher than 95% of other Florida estuaries and streams, suggesting severe eutrophication. This dramatic increase in algal biomass, coupled with the observation that 38.0% of the phytoplankton population was made up of a single kind of organism (*Melosira* sp.), indicates that "imbalances in aquatic flora" are occurring in the unnamed tributary to Cowhead Creek, a violation of 17-302.560(29) FAC. Based upon correlations between the Trophic State Index and diatom assemblages in Florida aquatic systems, *Melosira* sp. has been categorized as an indicator of eutrophic conditions (Whitmore 1989). The high dominance of an alga which is known to be characteristic of nutrient polluted waters supports the interpretation that the test site suffered from nutrient induced imbalances.

Conclusions

The full strength effluent sample was acutely toxic to the water flea, *Ceriodaphnia dubia*, killing 85% of the water fleas within 48 hours. This is a violation of 17-302.510(3)(p) FAC, 17-302.500(1)(d) FAC, and 17-4.244(3)(a) FAC. This same sample of effluent was not toxic to the fish, *Notropis leedsi*, as only 10% mortality was observed in that test.

Organic constituents in the effluent included low amounts of aliphatic hydrocarbons. The metals detected in the effluent above quantitation limits included aluminum (78 µg/L), iron (23 µg/L), and zinc (47 µg/L). These values are within Class III standards.

Dissolved oxygen at the test site (4.7 mg/L), was low enough to be a violation of the Class III standard of 5.0 mg/L for freshwater.

Due to a scheduling problem, only ortho-phosphate was analyzed on the samples. The ortho-phosphorus level at the test site (1.3 mg/L) was higher than that found in 95% of all other Florida estuaries and streams. These results suggest that the Holly Oaks facility is responsible for the deleterious ortho-phosphorus concentrations found in the receiving waters.

Results of algal growth potential tests indicate that waters at both the test site and the reference site may be subject to eutrophication effects. The AGP's measured were higher than the 5 mg dry wt/L, "problem threshold". It has been found that the negative consequences associated with nutrient enrichment (D.O. depletion, algal blooms, fish kills) are probable when the AGP exceeds this 5 mg dry wt/L level (Raschke and Schultz 1987).

Fecal and total coliforms were within Class III standards in the effluent sample and at the test and reference sites.

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Literature Cited

American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th ed. New York, N.Y. 1268 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. 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.

Chemistry summary table for Holly Oaks WWTP.

	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
Aliphatics	72 J		
Metals (ug/L)			
Aluminum	78 A		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	7 T		
Chromium	10 U		
Iron	23 A		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Silver	0.07 U		
Zinc	47 A		
Nutrients (mg/L)			
Ortho-phosphorus	1.4 A	0.028 T	1.3 A
Total phosphorus	NR	NR	NR
Ammonia	NR	NR	NR
Nitrate+Nitrite	NR	NR	NR
TKN	1.2	NR	NR
Other Parameters			
Habitat Assessment		77	72
D.O. (mg/L)		5.4	4.7
pH (SU's)	8.0	7.3	7.5
Conductivity (µmhos/cm)	1049	400	1200
Temperature (°C)	28.8	24.6	29.6
Turbidity (NTU)	5	0.5	5
TSS (mg/L)	12	1	18
BOD (mg/L)	4	1.2	3.8
Bioassay Fish-Chlorinated	Not Toxic		
Bioassay Invertebrate-Chlorinated	Toxic		
Fecal coliform (org/100 ml)	70	500	220
Total coliform (org/100 ml)	800	2300	2300

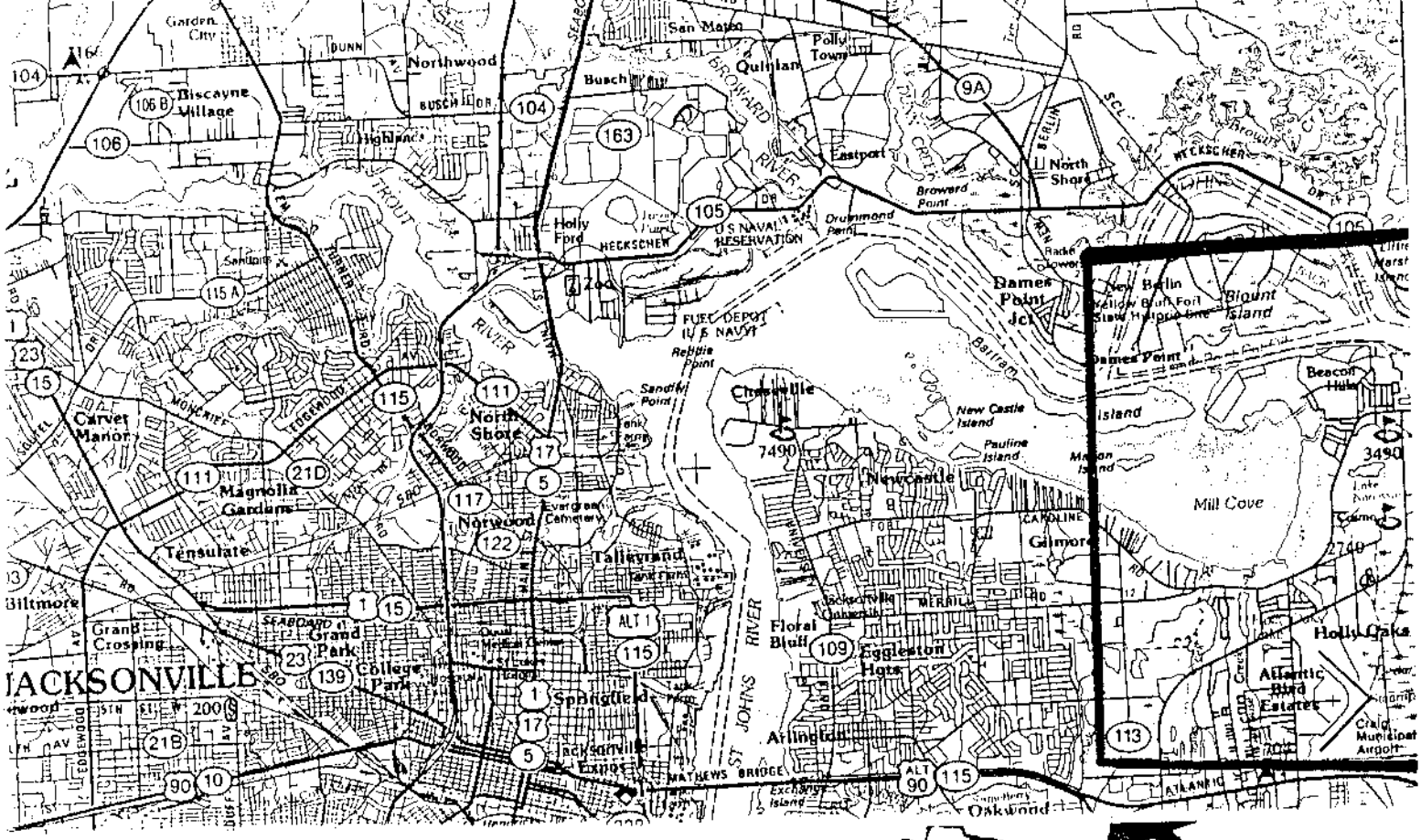
A - Value reported is the mean of two or more determinations

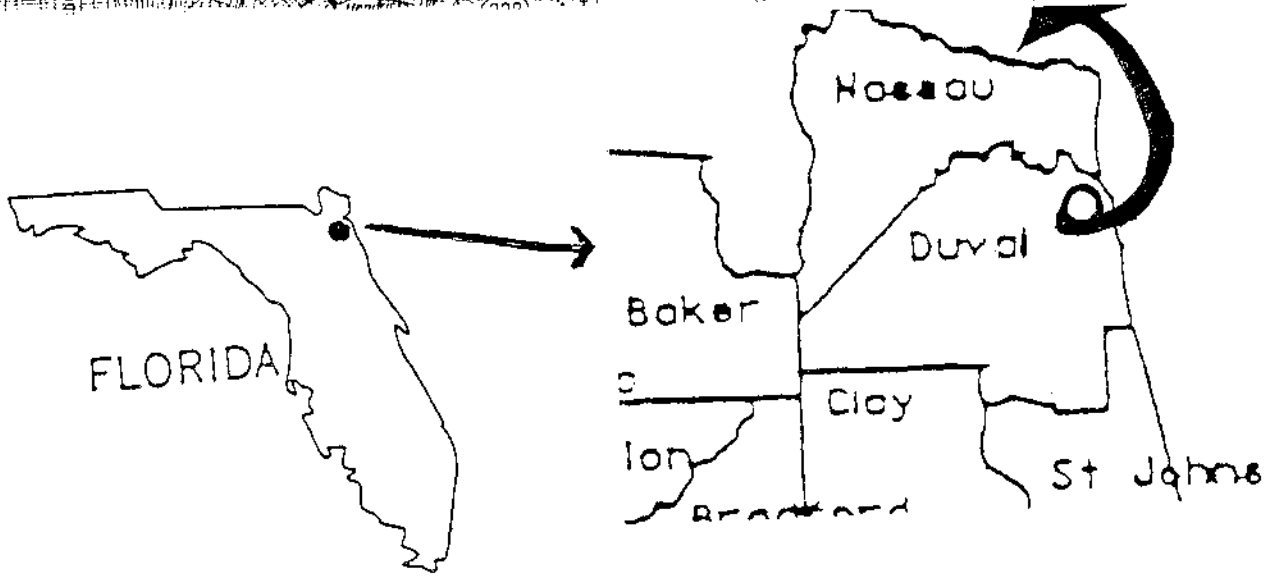
J - Estimated value

T - Value reported is less than the practical quantitation limit

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

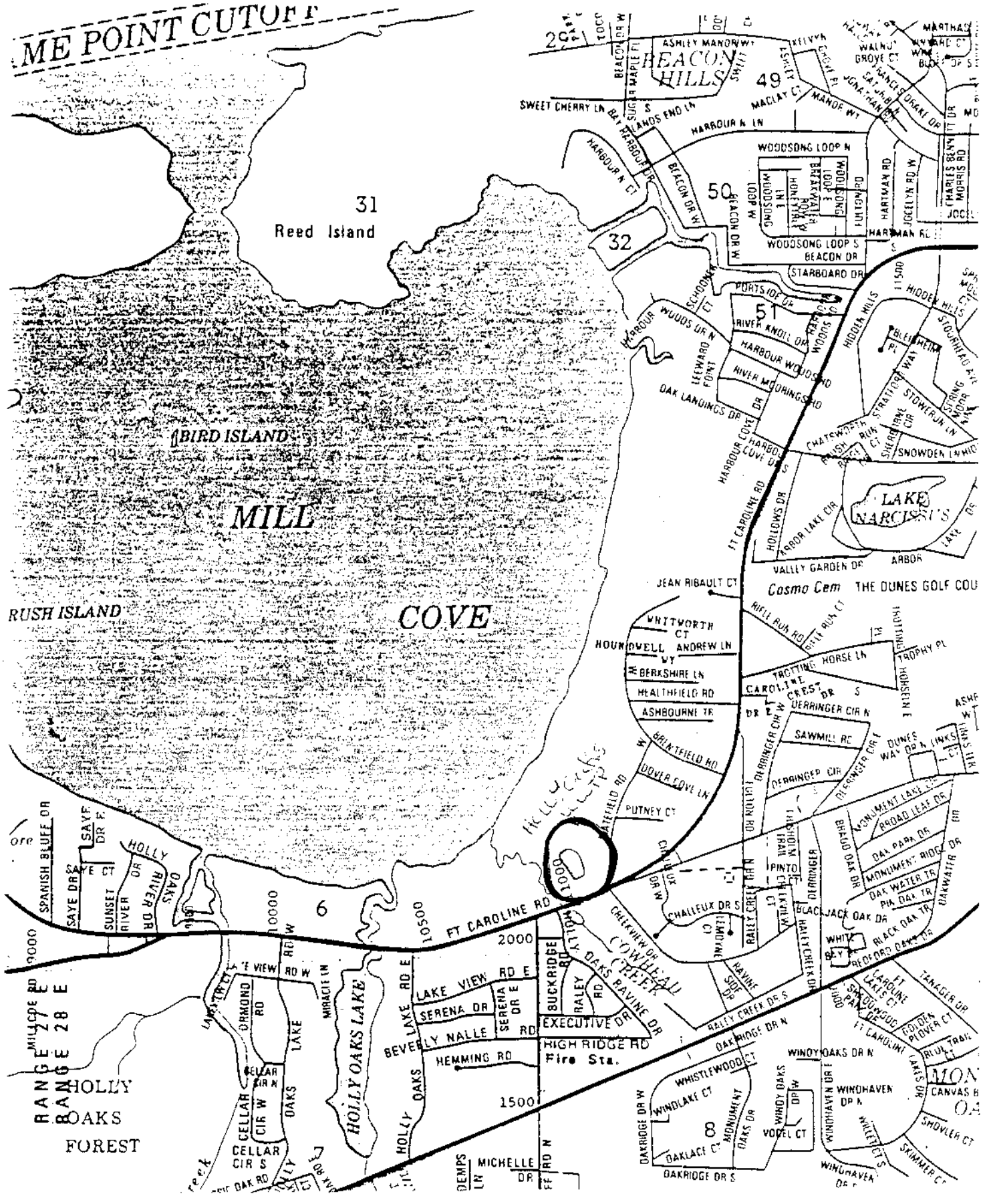
NR - Not requested

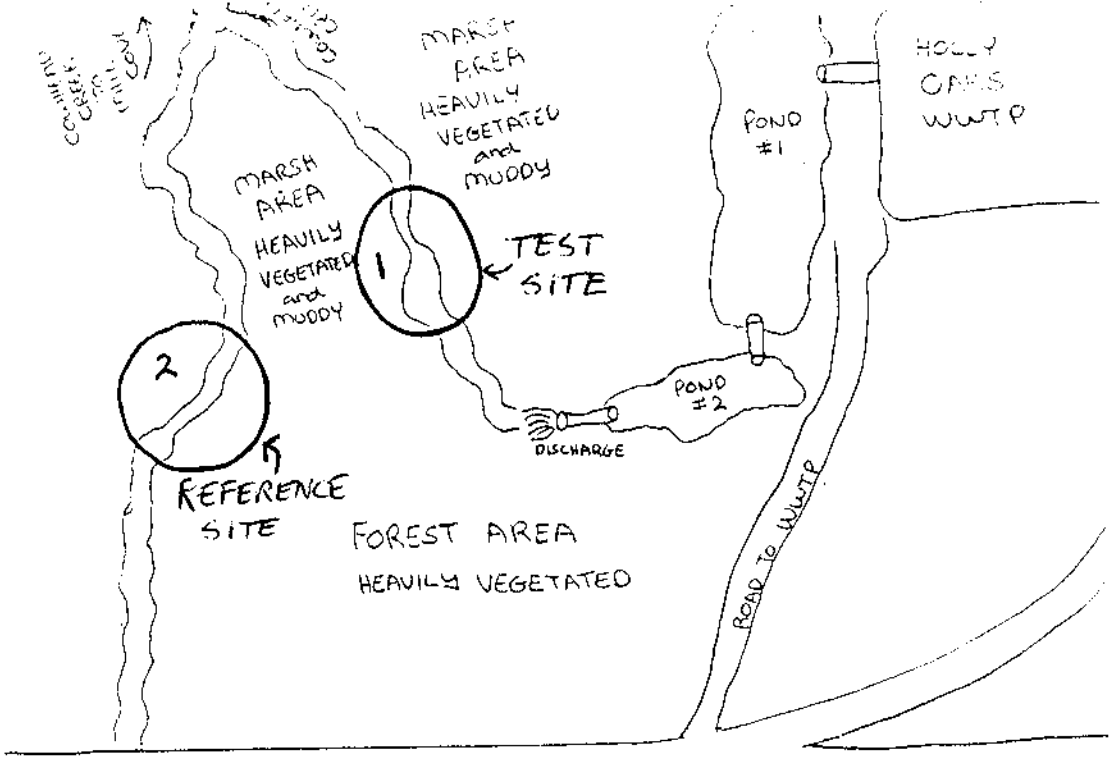




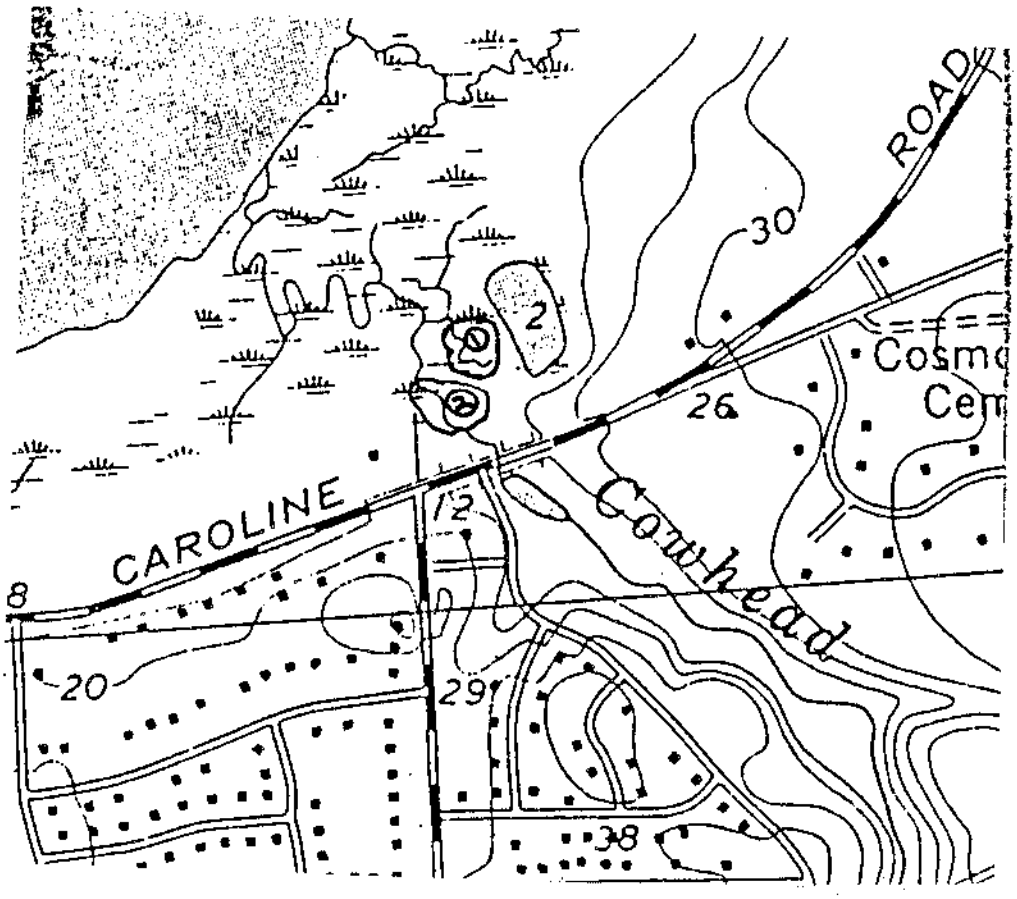
QUADRANGLE LOCATION

Map of General Location of Holly Oaks WWTP
Fifth YEAR STUDY


ME POINT CUTOFF
BEACON HILLS
ASHLEY MANOR WY
SWEET CHERRY LN
BAY HARBOUR DR
HARBOUR N LN
HARBOUR N CT
BEACON DR W
WOODSONG LOOP N
WOODSONG LOOP S
BEACON DR
HARTMAN RD
JOCELYN RD W
STARBOARD DR
PORTS OF DR
SCHOONER CT
HARBOUR WOODS DR N
RIVER KNOLL DR
HARBOUR WOODS RD
RIVER MEADOWS RD
LEEWARD POINT
OAK LANDINGS DR
HARBOR COVE DR
HIDDEN HILLS
BLENHEIM PL
STRATFORD WAY
STOWERJN LN
SNOWDEN LN
CHATSWORTH PARISH RUN CT
SHERBORNE CIR
FT CAROLINE RD
HOLLOWS DR
ARBOR LAKE CIR
LAKE NARCISSUS
VALLEY GARDEN DR
ARBOR
JEAN RIBAULT CT
Cosmo Cem
THE DUNES GOLF COU
RIFLE RUN RD
RIFLE RUN CT
WHITWORTH CT
HOUNDWELL
ANDREW LN
BERKSHIRE LN
HEALTHFIELD RD
ASHBOURNE TR
BRANTFIELD RD
DOVER COVE LN
PUTNEY CT
TROTTING HORSE LN
TROPHY PL
HORSELN E
CAROLINE CREST DR S
DERRINGER CIR N
DERRINGER CIR W
DERRINGER CIR
SAWMILL RD
DUNES WAY
MONUMENT LAKE DR
BROAD LEAF DR
OAK PARK DR
MONUMENT RIDGE DR
OAK WATER TR
PIN OAK TR
OAKWATER DR
BLACKJACK OAK DR
BLACK OAK TR
RED OAK DR
PINTO CT
CHALLEUX DR S
RALEY CREEK DR N
RALEY CREEK DR S
RAVINE SIDE DR
CREEKVIEW DR
OAKS RAVINE DR
BUCKRIDGE RD
RALEY RD
EXECUTIVE DR
HIGH RIDGE RD
Fire Sta.
HEMMING RD
LAKE VIEW RD E
LAKE VIEW RD W
SERENA DR
SERENA DR E
BEVERLY NALLE RD
HOLLY OAKS LAKE RD E
HOLLY OAKS LAKE
HOLLY OAKS
LAKE
MIRACLE LN
ORMOND RD
CELLAR CIR N
CELLAR CIR W
CELLAR CIR S
OAKS
FT CAROLINE RD
10000
10500
2000
1500
6
7
8
31
Reed Island
32
49
50
51
BIRD ISLAND
MILL
COVE
RUSH ISLAND
HOLLY OAKS FOREST
RANGE 28 E
RANGE 27 E
SPANISH BLUFF DR
SAYE DR E
SAYE CT
SAYE DR
SUNSET
RIVER DR
HOLLY OAKS
WINDLAKE CT
WHISTLEWOOD CT
OAKRIDGE DR W
OAKRIDGE DR S
OAKRIDGE DR N
OAKLACE CT
MONUMENT
OAKS DR
WINDY OAKS DR W
WINDY OAKS DR N
VOGEL CT
WINDHAVEN DR E
WINDHAVEN DR N
WINDHAVEN CT
WILLETT CT
SHOVLER CT
SKIMMER CT
CANVAS B
FT CAROLINE LAKES CT
FT CAROLINE LAKES RD
GOLDEN PLOVER CT
RUFF TRAIL
TANAGER DR
MICHELLE DR
DEMPS LN



1. Cowhead Creek 20 yds Downstream of Holly Oaks WWTP Discharge (Downstream Site) * TEST SITE
2. Cowhead Creek 50 yds Downstream of Fort Caroline Rd. (upstream Site) * Reference Site



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name:	Date Summary Prepared :	
Location (attach detailed map):	County	District
Federal Permit # and expiration date: July 09 1995	State GMS # and State expiration date:	Facility Type: Industrial Municipal Federal Agricultural Other (list):
Function of facility:		
Description of treatment process: The influent enter the treatment plant consisting of aeration, digester, aerated lagoon, [illegible] and clarifier. From the Sanitaire plant the water goes to a chlorine contact chamber to the 1st pond then to 2nd pond before discharging to Cantonment creek. The sludge remains in the ponds at one particular time.		
Receiving waters:	Classification: I II III	
Design Flow:	Mean Flow:	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.):		

List effluent limits (if necessary, attach relevant paperwork):		Describe special permit conditions and permit modifications:
Parameter	Limit (units)	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

(Facility)

Description of permitted outfall(s):

enters the 1st of 2 ponds. From this 1st pond, the water flows to a 2nd pond which discharges from a weir to treatment plant. The 2 ponds provide dechlorination and stabilization

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

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

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

Additional information:

Staff contributing to this review (signature):

(Biologist)

(Engineer)

( )

( )

( )

Permittee:

Philip Heil, Vice President
Holly Oak WWTF

I. D. Number: 3116P00901
Permit/Certification: DO16-148356
Date of Issue: August 31, 1988
Expiration Date: May 31, 1993

SPECIFIC CONDITIONS:

15. The monitoring requirements and effluent limitations for this facility are as follows:

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow	1.0 MGD (b)	Continuous	Recording Flow Meter	Influent
BOD_5	(a) mg/l	Weekly	16-hour composite	Influent/ Effluent
TSS	(a) mg/l	Weekly	16-hour composite	Effluent/ Influent
TKN	(a) mg/l	Weekly	16-hour composite	Effluent
pH units	6.0 to 8.5	Continuous	Recording pH meter	Effluent
Chlorine Residual	Min. 0.5 mg/l Max. (d)	Continuous	Recording Cl_2	Effluent
Fecal Coliform	Avg ≤ 200/100 ml Max. 800/100 ml	Weekly	Grab(c)	Effluent

(a) Limits, Maximum (mg/l)

	annual	monthly	weekly	one time grab max	
BOD_5	6	7.5	9	12	
TSS	20	30	45	60	
TKN	2	2.5	3	4	

(b) Annual average daily flow shall not exceed value shown.

(c) Grab samples will be collected during periods of minimal treatment facility pollutant removal efficiencies, or maximum organic loading in the effluent.

(d) By August 22, 1990 the permittee shall complete and have in operation dechlorination facilities which reduce the total residual chlorine (TRC) content of the effluent to 0.01 mg/l or less, as required by FAC Rule 17-3.121(10). This limit which is necessary to prevent toxic effects from chlorine in the receiving waters does not provide for a zone of mixing for TRC in the receiving waters. The permittee may apply for a mixing zone for TRC if the permittee determines such to be a benefit. If a mixing zone is granted by the Department, the permitttee may request a modification of the above effluent limit for TRC. The Department's mixing zones regulations are contained in FAC Rule 17-4.244. The permittee shall also comply with all TRC effluent limits and dechlorination requirements contained in any EPA National Pollutant Discharge Elimination system (NPDES) permit for the facility.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Final

1. During the period beginning on the effective date and lasting through the expiration date of th permit, the permittee is authorized to discharge from outfall 001, sanitary wastewater.

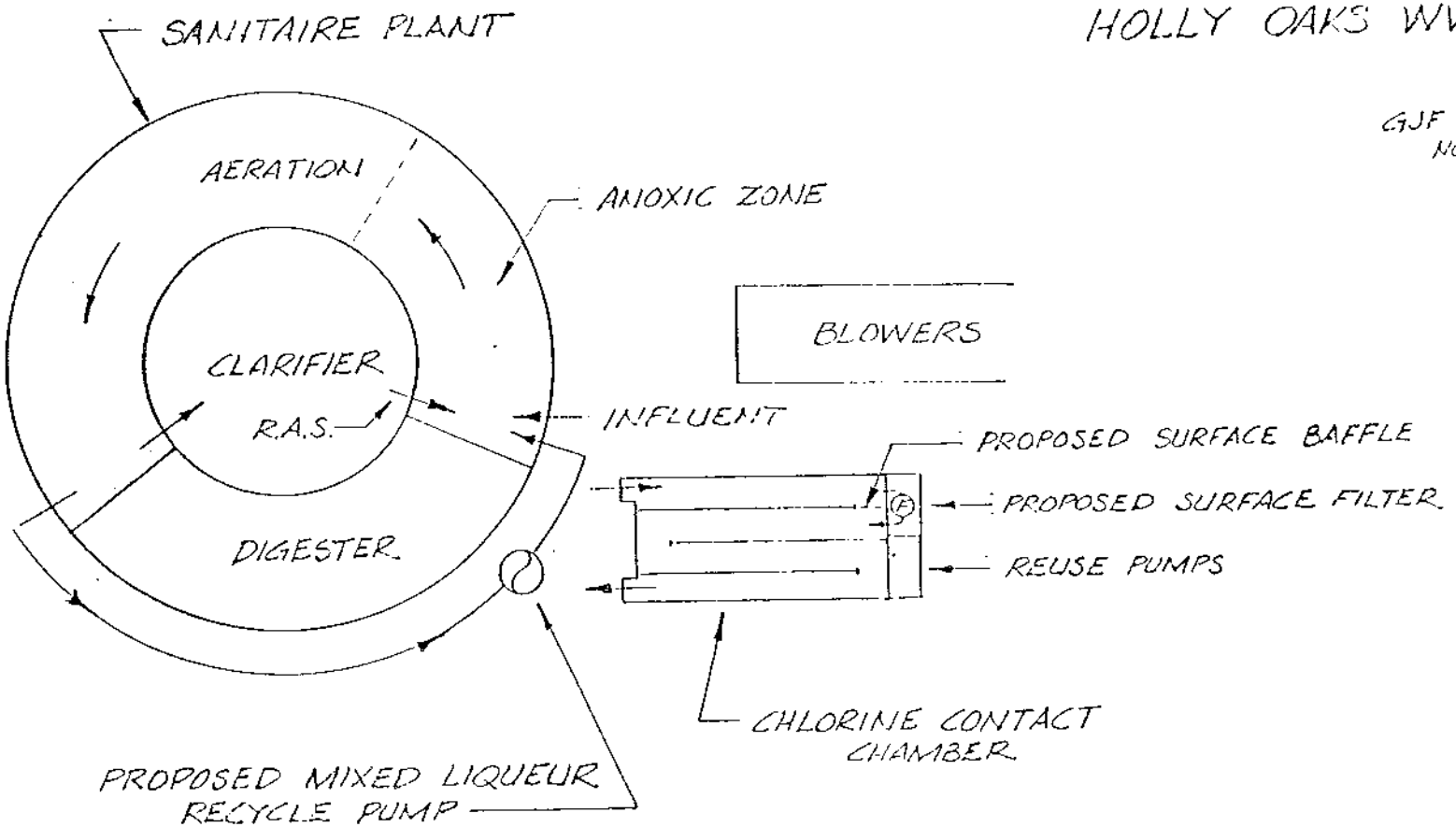
   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETERS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	Annual Average	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Samplin Point
Flow, MGD	Report	Report	Report	Continuous	Flow Meter	Effluen
Biochemical Oxygen Demand (5 Day), mg/l	6.0	7.5	12.0	1/Week	16-Hour Composite	Effluen
Total Suspended Solids, mg/l	20.0	30.0	40.0	1/Week	16-Hour Composite	Effluen
Total Kjeldahl Nitrogen, as N, mg/l	2.0	2.5	4.0	1/Month	16-Hour Composite	Effluen
Fecal Coliform Bacteria, N/100 ml	See page I-3, item 9			1/Week	Grab	Effluen
Total Residual Chlorine, mg/l	--	--	0.01	Daily 7/Week	Grab	Effluen
pH, standard units	See page I-2, item 2			Continuous	Recording Meter	Effluen
Ultimate Oxygen Demand	147.8 lbs/day (See page I-3, items 10 & 11)			1/Month	Calculated	---
Chronic Whole Effluent Toxicity	See page I-3, item 8 and Part IV			--	24-Hour Composite	Effluen

JACKSONVILLE SUBURBAN UTILITIES CORP.

HOLLY OAKS WWTP

GJF 10-18-90
NO SCALE



12-10-90

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
			70			

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

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

Point-Source Pollution (list location and describe):

Estimated System Width (range, m): 3 - 4 | Estimated System Depth (range, m): | yes — Impounded ☐ Channelized ☐

High Water Mark (m above bank): 2 - 3 | Velocity (range, m/s):

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 Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☒ Sand: ☒ Shell: ☐ Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	25	7		Rock or Shell Rubble			
Leaf Packs	5	1		Sand			
Aquatic Vegetation				Mud/Muck	5	1	
Submerged Roots	5	3		Other:			
Undercut Banks	15	7		Other:			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):			Secchi (m):
Top							
Mid-depth							
Bottom							

Stream Type: sand bottom / sand w/spring inf / swamp & bog / alluvial / calcareous / misc. / unknown — Stream Size

Water Odors (check box): Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): Slick: ☐ Sheen: ☐ Globs: ☐ None: ☒

Clarity (check box): Clear: ☒ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☐ Clear: ☒ Other: ☐

Weather Conditions:

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 15	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 25	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 15	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 9	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 8	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DER	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
10			70			

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

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

Point-Source Pollution (list location and describe):

Estimated System Width (range, m): 2 - 3 | Estimated System Depth (range, m): | yes — Impounded ☐ Channelized ☐

High Water Mark (m above bank): 0.5 | Velocity (range, m/s):

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 Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☒ Sand: ☒ Shell: ☐ Other: ☒

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	25	7		Rock or Shell Rubble			
Leaf Packs	5	1		Sand			
Aquatic Vegetation				Mud/Muck			
Submerged Roots	10	5		Other:			
Undercut Banks	10	5		Other:			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):				Secchi (m):
Top			7.1	2.0				
Mid-depth			7.01					
Bottom			7.51					

Stream Type: (sand bottom) swamp & bog calcareous ; sand w/spring inf alluvial misc. unknown (Stream Size

Water Odors (check box): Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): Slick: ☐ Sheen: ☐ Globs: ☐ None: ☒

Clarity (check box): Clear: ☒ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☐ Green (algae): ☐ Clear: ☒ Other: ☐

Weather Conditions:

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover [ ]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity [ ]	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration [ ]	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability [9]	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality [6]	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments [5]	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	TOTAL SCORE [72]

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Holly Oaks WWTP
Address/City:
County:
Contact/District: SCOTT BULGRIN / NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 7-28-92 Time 1050
Test Beginning: Date 7/29/92 Time 1300
Test Ending: Date 7/31/92 Time 1925
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hrs

92-JUL-29-19 # 38249

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

Remarks:

* wrote 100% in control spec 7/29/92 MF

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.7, 10, 10	8.5 @ 24°C	24.0 @ 24.0	984 @ 1k, 2.39 / 9850 @ 10k
24 hr	7.7, 10, 10	8.5 @ 24°C	24.2 @ 24.2°C	992 / 9920 @ 24.4 °C
48 hr	7.7, 10, 10	8.4 @ 25°C	24.2 @ 24.2°C	994 / 9940

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	A	5	5	5	8.1		8.0	22.3		25.0	~~6.5~~ *		8.1	156		167
Control	B	5	5	5			8.0				8.5 MF		8.0			
Control	C	5	5	5			8.1						8.0			
Control	D	5	5	5			8.1						8.1			
100%	A	5	5	2	7.8		9.0	22.3		25.0	6.9		9.1	1018		1061
100%	B	5	5	0			9.0						9.2			
100%	C	5	5	1			9.0						9.2			
100%	D	5	5	0			9.1						9.3			
Measured/Loaded by:		MF	MF	MF	MF		KP	MF		KP	MF		KP	MF		KP
Recorded by:		MF	MF	MF	KP		KP	MF		KP	MF		KP	MF		KP

Investigators' Signatures
Marshall Faircloth
Kim Pearce

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			<0.1	Hach	SB
Lab Tot. Resid. Cl2:	0.0	0.0	0.02	DPD	MF
Alkalinity:	112	65	130	Hach	MF
Hardness:	130	78	280	Hach	MF
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Meter Slope: -57.2
Ammonia Blank: 0.0
Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Holly Oaks WWTP
Address/City:
County: DUVAL
Contact/District: SCOTT BULGRIN / NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 7-28-92 Time 1050
Test Beginning: Date 7/29/92 Time 1300
Test Ending: Date 7/31/92 Time 1925
Test Organism: A. tonsa
Life Stage/Age: 10 days

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

92 Jul 29 19 38249

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.0; 10.10	8.5 @ 24°C	24.0 @ 24.0	984 @ 1K 9850 @ 10K @ 22.9
24 hr	7.0; 10.10	8.5 @ 24°C	24.2 @ 24.2	992 9920 @ 24.4
48 hr	7.0; 10.10	8.4 @ 25°C	24.2 @ 24.2	984 9820 @ 24.5°C

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	7	5	5	5	7.8	8.1	8.5	24.1	23.8	24.0	8.4	8.8	8.4			
control	8	5	5	5	7.8	8.1	8.4				8.8	8.8	8.3	247	245	249
100%	87	5	5	5 3	7.6	8.1	8.1	22.0	23.9	24.0	7.4	8.5	8.3			
100%	39	5	5	5	7.6	8.1	8.1				7.4	8.5	8.3	1043	1097	1111
		recorded wrong jar 7/31/92 7:25pm														
Measured/Loaded by:		MF	MF	MF	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		MF	MF	MF	KP	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP

Investigators' Signatures
Marshall Faircloth
Kim Pearce
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			<0.1	Hach	SB
Lab Tot. Resid. Cl2:	0.0	0.0	0.02	DP100	MF
Alkalinity:	112	65	130	Hach	MF
Hardness:	130	78	280	Hach	MF
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Meter Slope: -57.2
Ammonia Blank: 0.0
Salinity Sample: ____ ppt

Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

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

Macroinvertebrate taxa list for Holly Oaks WWTP, Duval County, collected above and below the discharge via 3 Ponar grabs per station on 26 August 1992.

	Reference Site	Test Site
Coleoptera		
Ancyronyx variegata	12	0
Decapoda		
Rhithropanopeus harrisii	12	0
Diptera		
Chironomus sp.	25	0
Cricotopus bicinctus	12	0
Cryptochironomus sp.	12	0
Glyptotendipes meridionalis	0	12
Glyptotendipes sp.	0	12
Goeldichironomus carus	0	50
Goeldichironomus pictus	0	12
Polypedilum halterale grp.	12	0
Polypedilum illinoense	75	0
Polypedilum tritum	50	0
Rheotanytarsus distinctissimus grp.	12	0
Undetermined dipteran species	0	12
Tribelos jucundum	37	0
Malacostraca		
Cassidinidea ovalis	399	150
Cyathura polita	274	25
Gammarus sp.	12	0
Hyalella azteca	0	25
Palaemonetes paludosus	0	312
Oligochaeta		
Limnodrilus hoffmeisteri	87	362
Pelecypoda		
Undetermined Pelecypoda	25	0
Polychaeta		
Laeonereis culveri	312	125

Phytoplankton taxa list for Holly Oaks Subdivision, collected via surface grab samples in Cowhead Creek, Duval County, Florida, 28 July, 1992.

	Reference Site	Test Site
Diatoms		
Achnanthes sp.	76	–
Cocconeis sp.	76	–
Melosira sp.	101	18,701
Navicula sp.	25	–
Nitzschia sp.	–	10,614
Synedra sp.	51	–
Chlorophyta		
Ankistrodesmus sp.	–	4,549
Characium sp.	–	168
Chlorococcum sp.	–	168
Coelastrum sp.	–	367
Kirchneriella sp.	–	1,011
Scenedesmus sp.	76	5,391
Tetraedron sp.	–	168
Chrysophyta		
Synura sp.	25	–
Cyanophyta		
Chroococcus sp.	51	8,087

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0023621		920728		B	S	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0023621		920728		X	S	1

Remarks

21 66