

Biological Assessment of

Ortega Utility Company Airport System Wastewater Treatment Plant

Duval County

NPDES #FL0042013

Sampled January 1992

July 1992

Biology Section
Division of Technical Services

Department of Environmental Regulation
Results of Fifth Year Inspections

Discharger: Ortega Utility Company Airport System
County: Duval
NPDES Number: FL0042013
State Permit Expiration Date: 10 March 1992

Toxics Sampling Inspection (XSI)

Date Sampled: 13 January 1992

Results: Copper (12 µg/L), iron (25 µg/L), and zinc (21 µg/L) detected in the effluent at levels within Class III standards. Aliphatics (36 µg/L) and aromatics (15 µg/L) also found, but concentrations were low.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 13 January 1992

Results: Not toxic to *Ceriodaphnia dubia* or *Notropis leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 13 January 1992

Results: Benthic macroinvertebrate communities were moderately degraded below the discharge, as shown by the decrease in Florida Index (in both quantitative and qualitative samples) and the reduction or elimination of sensitive groups such as trichopterans and ephemeropterans. Periphyton community at the test site shifted to an assemblage with a higher proportion of blue-green algae and fewer diatoms, but with a greater number of taxa. Periphyton biomass (density and chlorophyll *a*) were very low, suggesting that there were other factors operating at the test site which inhibited algal growth, such as sporadic inputs detrimental to algae.

Water Quality Inspection (WQI)

Date Sampled: 13 January 1992

Results: Nutrients were elevated in the effluent and test site. Compounds of concern downstream of the discharge include total phosphorus (3.2 mg/L), ortho-phosphate (3.1 mg/L), and nitrate-nitrite (2.0 mg/L). Algal growth potential was approximately double the problem threshold of 5.0 mg dry wt/L, at 10.9 mg dry wt/L. Total coliform bacterial populations exceeded Class III standards at the test site, but were low in the effluent. Fecal coliforms were very low in both effluent and test site waters.

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

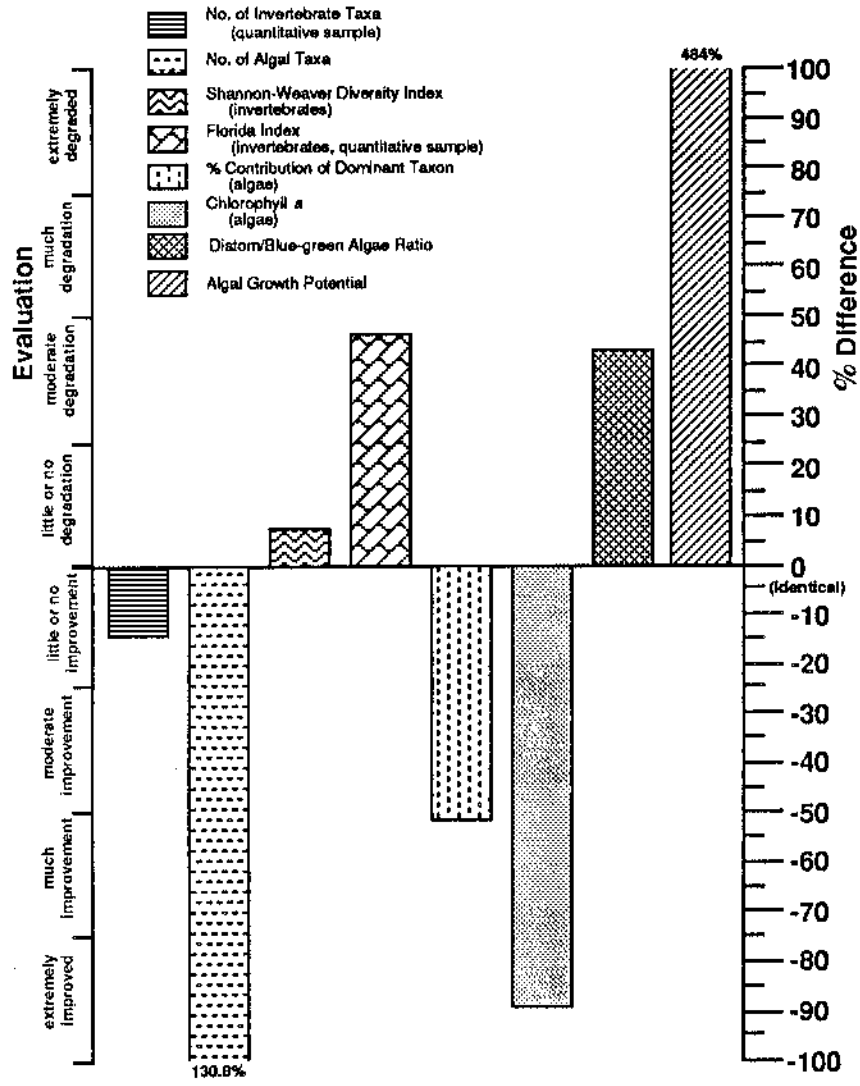
The Ortega Utility Company Airport System Wastewater Treatment Plant serves the international airport and surrounding commercial area in northern Duval County (see map in Appendix). The 0.175 MGD extended aeration facility consists of an aeration tank, digester, grit chamber, clarifier, and chlorine contact chamber. Dechlorinated effluent is discharged via an unnamed drainage ditch to Little Cedar Creek, and ultimately to the Broward River. Permit violations during the past year include three occasions when the TKN concentrations exceeded the single sample maximum of 3.7 mg/L. The plant was to be connected to the regional sewage utility by March of 1992, but Ortega is currently seeking a variance from Duval County (B.E.S.D.) on this issue. The company also applied for a general permit to construct an effluent outfall pipeline to Little Cedar Creek, but this project was denied.

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 Alligator Creek in Bradford County) and a test site (the area down gradient of the discharge) (see map in Appendix). Because no suitable reference site was available in the Little Cedar Creek system, we used data from a stream within the same ecoregion (Sea Island Flatwoods) which possessed similar characteristics (origin, size, surrounding land use, etc.) for reference purposes. A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms, were

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	41	17
Florida Index	22	3
% Contribution of Dominant Taxon	22.3	35.4
% Oligochaeta	0.2	37.5
% Odonata	6.3	33.3
% Diptera	82.6	10.4
% Coleoptera	7.0	3.1
% Other	3.8	15.7
% Predators	26.3	51.1
% Collector-Gatherers	27.8	40.7
% Collector-Filterers	23.8	1.6
% Scrapers	8.5	0
% Shredders	13.6	6.8
Macroinvertebrate Hester-Dendy		
Number of Taxa	27	31
Florida Index	15	8
Shannon-Weaver Diversity	4.07	3.78
% Diptera	86.1	66.3
% Trichoptera	2.8	0
% Oligochaeta	6.9	15.7
% Ephemeroptera	2.8	0
% Gastropoda	0	10.7
% Other	1.4	7.3
% Predators	34.6	20.4
% Collector-Gatherers	35.2	49.3
% Collector-Filterers	13.2	5.6
% Scrapers	6.5	11.5
% Shredders	10.0	13.6
Periphyton Algae		
Number of Taxa	13	30
% Contribution of Dominant Taxon	70.5	34.0
Chlorophyll a (mg/sq. m)	2.8	0.29
Diatom/Diatom + B-G Abundance Ratio	0.84	0.48
% Blue-green	15.5	50.3
% Green	0.7	3.1
% Diatoms	83.8	45.6
% Chrysophyta	0	1.0
Algal Growth Potential (mg dry wt/l)	1.865	10.9



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

performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton 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* as the test organism, 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. 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 (*i.e.*, many clean-water organisms are present). 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 (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

For graphical purposes, the percent differences between the refer-

ence and test sites involving the number of taxa, the diversity index, Florida 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, Russel Frydenborg, Kathleen Lurding, and Sandy McClure (Tallahassee Biology Laboratory).

Results and Discussion

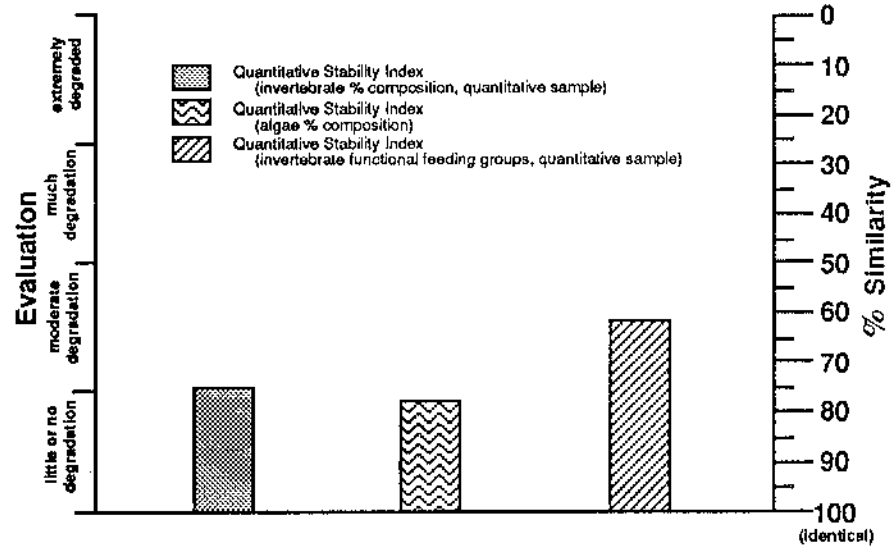
Habitat quality at the reference site was 14% higher than that at the test site, with scores of 78 and 67 points, respectively. The reference site had slightly faster flowing water, better bank stability, and a somewhat greater flow. The test site had a higher proportion of available cover and better riparian zone vegetation quality. Both sites were amply oxygenated (8.1 and 7.2 mg/L at reference and test sites, respectively). Water at the reference site was slightly below neutral (pH = 6.4), while pH at the test site was 7.2. The increase in conductivity observed at the test site (1000 µmhos/cm, compared to 300 µmhos/cm measured at the reference site) was probably due to the influence of the treatment plant. It is important to note that land use characteristics at both sites were 50-60% commercial, and therefore both areas had similar potential for non-point source runoff from highways and businesses (Appendix).

The effluent sample was not toxic to the bannerfin shiner, *Notropis leedsi*, in the 48 hour static bioassay. Although some mortality occurred in the *Ceriodaphnia dubia* test, the effluent was considered non-toxic.

No organic priority pollutants or chlorinated pesticides were detected in the effluent sample. Tentatively identified aliphatic and aromatic hydrocarbons were detected at estimated concentrations of 36 and 15 µg/L, respectively. The following metals were found above quantitation limits in the discharge sample: copper (12 µg/L), iron (25 µg/L), and zinc (21 µg/L). None of these levels is above ambient standards for Class III freshwaters.

Nutrients were elevated in the effluent, and at the test site (see chemistry summary table in Appendix). STORET data from 1617 Florida stream stations, for the period of 1980 to 1989, have been compiled into a percent distribution, found in the Appendix (Joe Hand, personal communication). Data from this present investigation were evaluated against these values. Concentrations of total phosphorus, ortho-phosphate, and nitrate-nitrite at the test site (3.2, 3.1, and 2.0 mg/L, respectively) were all higher than 95% of typical Florida streams. Each of these measurements was approximately double the statewide 95% levels. Nutrient levels at the reference site were either undetected or very low (50th percentile or below). Algal growth potential (AGP) corresponded to nutrient concentrations, 1.87 mg dry wt/L at the reference site and 10.9 mg dry wt/L downstream of the discharge. At AGP levels above 5 mg dry wt/L, the undesirable consequences of nutrient enrichment, such as excess macrophyte or algal growth, D.O. sags, and fish kills, are likely to occur (Raschke and Schultz 1987). Effluent AGP was also above this problem threshold, at 16.8 mg dry wt/L.

Fewer than 20 fecal coliforms/100 ml were found in the effluent and at the downstream station. Total coliform bacteria were <20 organisms/100 ml in the effluent, but 8000



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

organisms/100 ml at the test site. The test site value was well above the 2400 organism/100 ml standard for Class III waters. Since total coliform levels were lower in the effluent at the time of sampling, this suggests that the bacterial contamination may be intermittent (perhaps due to variable chlorination, etc.) or may not be attributable to this effluent. Runoff from a nearby Interstate 95 interchange also affects the test site.

Measures of benthic macroinvertebrate community health indicated moderate degradation downstream of the discharge. 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. Negative values mean that the test site is better than the reference.

Although the number of taxa recovered from Hester-Dendy samplers was higher at the test site (31, compared to 27 at the reference site, see taxa list in Appendix), the organisms found there were predominately pollution tolerant. The Florida Index decreased by 46.7% below the discharge , indicating that many pollution sensitive organisms were unable to survive there. The test site proved inhospitable to trichopterans and ephemeropterans, which are normally present in unaffected streams. The most abundant organism present on Hester-Dendy samplers at the test site was *Polypedilum illinoense,* a midge frequently associated with disturbed conditions (Hudson *et al.* 1990).

Measurements of macroinvertebrate populations collected via dip net sweeps indicated a higher degree of degradation downstream of the discharge. The Florida Index score was decreased by 86% between the reference and test site (see table). The area below the discharge was dominated by oligochaetes, particularly *Lumbriculus inconstans,* which is often associated with organic enrichment.

Quantitative stability indices for percent composition and functional feeding groups also demonstrated the shifts in structure and function between the two study areas, indicating a mild to moderate amount of degradation. The figure on p. 3 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

The periphyton community response was somewhat ambiguous at the test site, as some metrics suggested improvements and others degradation. More algal taxa were recovered from the test site, which also showed a decrease in the percent contribution of the single dominant taxon. *Cocconeis placentula*, a cosmopolitan diatom which can be found in all types of conditions, including eutrophy , was overwhelmingly dominant at the reference site (see taxa list in Appendix). The abundance of this organism at the reference site made the test site appear better by comparison.

An aspect of the algal data which suggested degradation at the test site was the displacement of the diatom fraction by blue-green algae. The diatom to blue-green abundance ratio was decreased by 43% downstream of the discharge. This type of community shift is a typical response to nutrient enrichment. Chlorophyll *a* was extremely low (0.29 mg/m^2) at the test site, which conflicts with the very high nutrient and AGP results. Apparently, there were other factors operating at the test site which inhibited algal growth, such as sporadic inputs detrimental to algae (*e.g.*, herbicides, chlorine pulses, etc.).

Conclusions

The effluent sample collected from the Ortega Utility Company WWTP was not toxic to the test organisms, *Ceriodaphnia dubia* and *Notropis leedsi*, in 48 hour static acute bioassays. Aliphatics (36 µg/L) and aromatic hydrocarbons (15 µg/L) were detected in the effluent, but the concentrations were not of concern. Copper, iron, and zinc were also measured, but at concentrations less than Class III standards.

Nutrients were at problem levels downstream of the discharge. Total phosphorus, ortho-phosphate, and nitrate-nitrite were all higher than 95% of typical Florida streams. The enrichment potential of these high concentrations of bioavailable nutrients was also demonstrated by the algal growth potential. The 10.9 mg dry wt/L measured at the test site was more than double the problem threshold of 5 mg dry wt/L.

Total coliform bacteria were above Class III standards at the test site (8000 organisms/100 ml), but low in the effluent. Fecal coliforms were low in the effluent and at the test site. It could not be determined whether the high bacterial populations observed at the test site were due to the effluent or other sources.

Benthic macroinvertebrate communities were moderately degraded at the test site when compared to a reference site in the same ecoregion. The Florida Index was decreased, and other sensitive groups, such as trichopterans and ephemeropterans were eliminated downstream of the effluent.

The periphyton algal population at the test site was represented by more taxa than that of the reference site, but a high proportion of these

were cyanophytes. A community shift of this type is a common symptom of nutrient enrichment. Algal density and chlorophyll *a* were both very low below the discharge, suggesting that there were other factors operating at the test site which inhibited algal growth, such as sporadic inputs detrimental to algae.

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.

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

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 pp.

Chemistry summary table for

Ortega Utility Company	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
Tentative ID & estimated concentration:			
aliphatics	36		
aromatics	15		
Metals (ug/L)			
Aluminum	21 T	Field blank contaminated	
Arsenic	20 U		
Cadmium	0.07 U		
Copper	12		
Chromium	10 U		
Iron	25		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Silver	0.07 U		
Zinc	21		
Nutrients (mg/L)			
Ortho-phosphorus	3.2 A	0.045 A	3.1 A
Total phosphorus	3.1	0.2 U	3.2
Ammonia	0.055 A	0.08	0.053 A
Nitrate+Nitrite	2.1 A	0.04 U	2.0 A
TKN	0.69	0.74	0.84
Other Parameters			
Habitat Assessment		78	67
D.O. (mg/L)	6.6	8.1	7.2
pH (SU's)	7.1	6.4	7.2
Conductivity (µmhos/cm)	1025	300	1000
Temperature (°C)	22.0	24.1	21.0
Hardness (mg CaCO3)	240		
AGP (mg dry wt/L)	16.8	1.87	10.9
Bioassay Fish-Dechlorinated	Not toxic		
Bioassay Invertebrate-Dechlorinated	Not toxic		
Fecal coliform (org/100 ml)	< 20		< 20
Total coliform (org/100 ml)	< 20		8000

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

T - Value reported is less than the practical quantitation limit

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

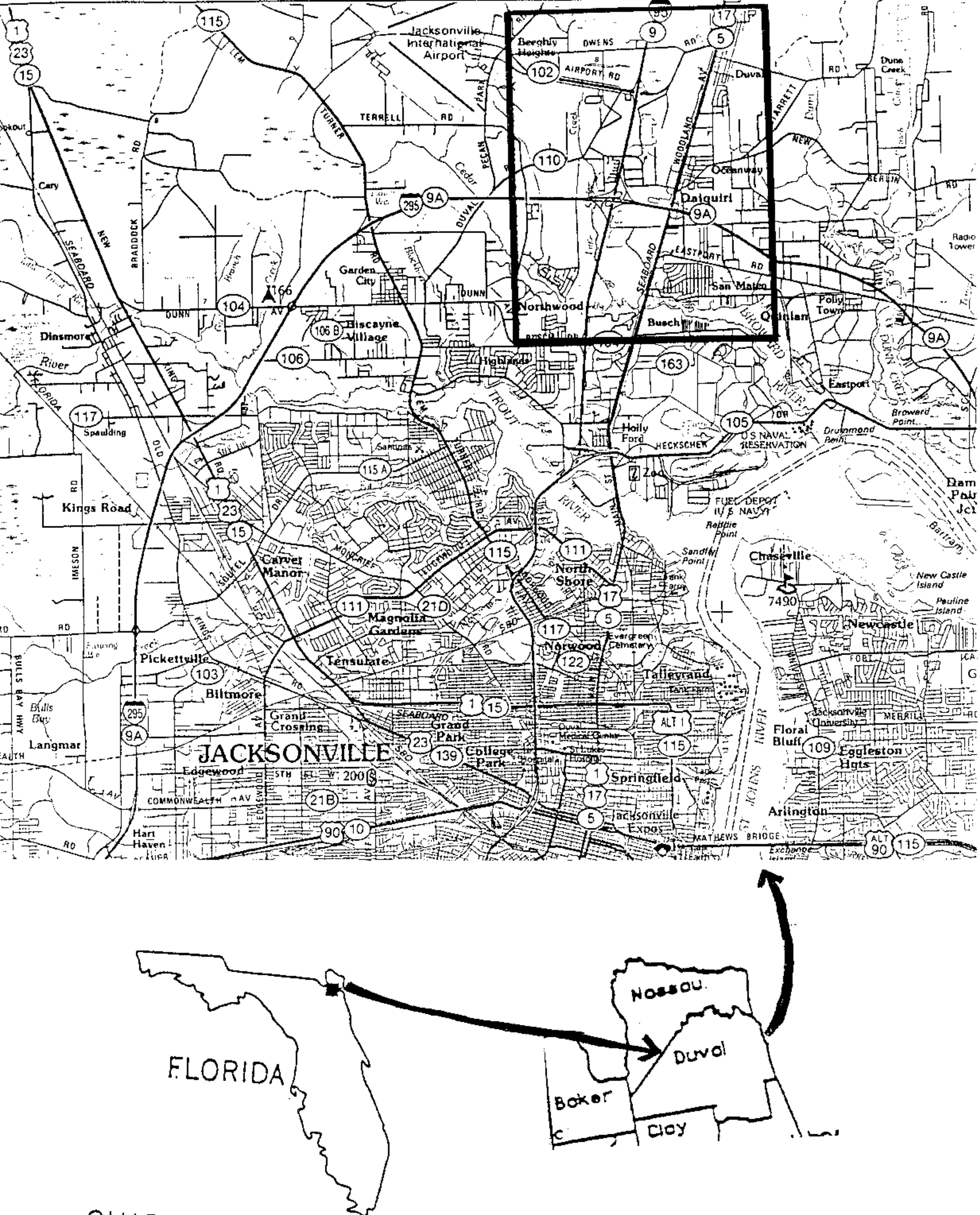
Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

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

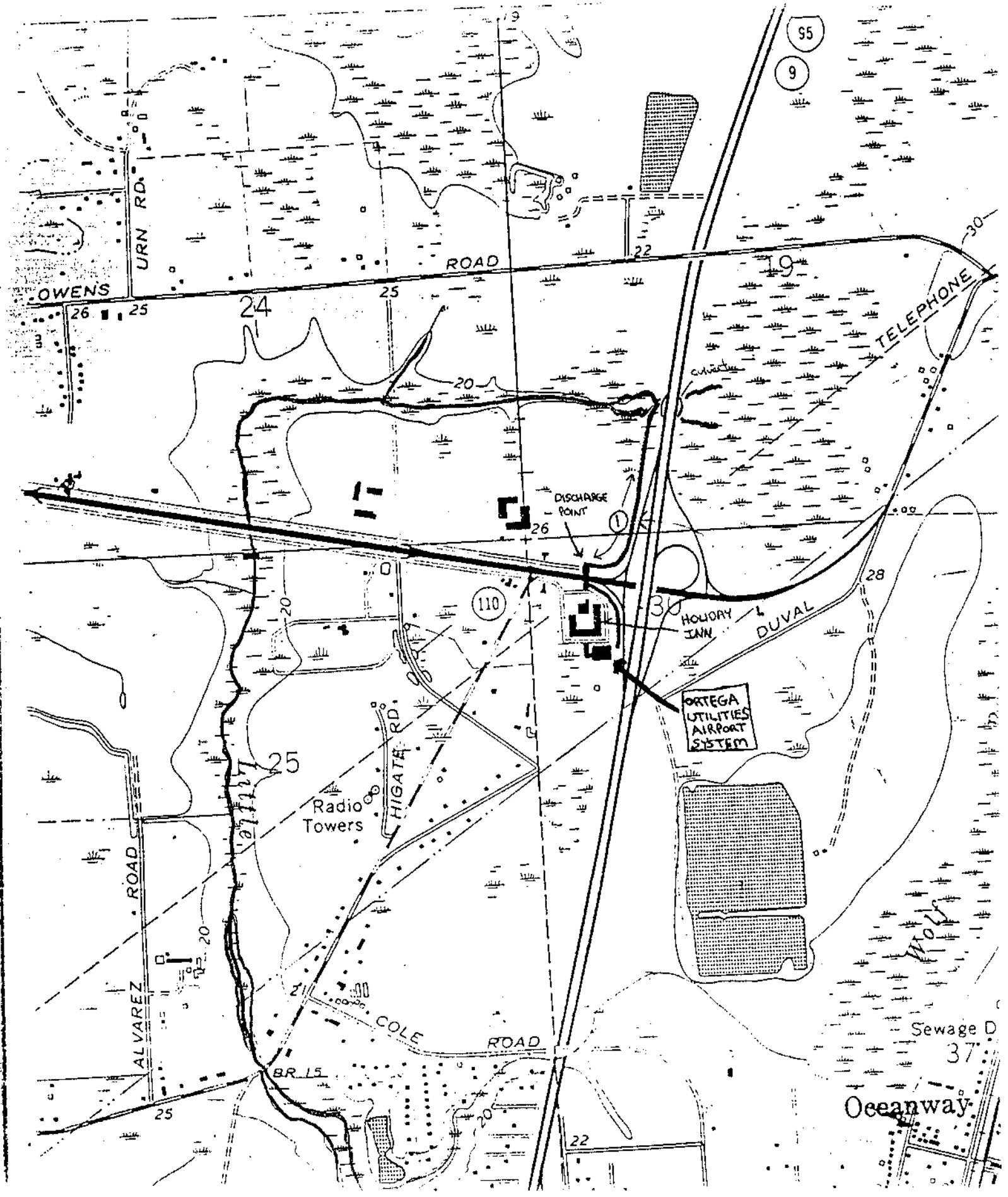
Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates



QUADRANGLE LOCATION

Ortega Utilities
Airport System
Study

1. Drainage Creek (Unnamed - Ortega Utilities
AIRPORT SYSTEM EFFLUENT CREEK) Downstream



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name:		Prepared by:
		Date:
Location (attach detailed map):	County DUVAL	District
Federal Permit # and expiration date:	State GMS # and State expiration date:	Facility Type: Industrial **Municipal** Federal Agricultural Other (list):

Function of facility:

Description of treatment process: Operation of a 0.175 MGD extended Aeration Sewage Treatment Plant consisting of a comminutor, aeration tank, grit chamber, clarifier and chlorine contact chamber. All is here dechlorination.

Receiving waters:	Classification:
Design Flow: 0.175 MG(D)	Actual Mean Flow: 0.130 MG(D)

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)

Describe special permit conditions and permit modifications:

Chlorine required for ... while for the NPDES ... it is every 2 weeks ... TRN ... while every 2 weeks for ...

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

(Facility)

Description of permitted outfall(s): Effluent from the Cottage Utility Co. Aug. 1 System leaves the chlorine contact chamber and exits to the discharge pipe which runs out under the Airport Parkway to a drainage ditch in front of the Hotel.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: From the DMR data Dec 1990 - Nov. 1991

TKN reported on Feb 10, 1991 was 16.7 mg/l exceeded
TKN reported on Aug 1, 1991 was 5.23 mg/l exceeded
TKN reported on Aug. 5, 1991 was 3.9 mg/l exceeded

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

No current enforcement actions. The only [illegible] in the file was a letter from the EPA to Cottage Utility Airport System Inc. failure to submit Discharge Monitoring Reports (DMR's) for October thru December 1990.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set: A FL. D.E.R. sampling run was [illegible] Little Cedar Creek on Aug 20, 1990. [illegible] Dr. [illegible] Sampling [illegible]

Additional information: Waste load allocation for this source is 39.5 lbs/day CDO (ultimate oxygen demand). [illegible] Cottage Utility Co applied for a permit to [illegible] an effluent outfall pipeline to Little Cedar Creek, south of Airport Rd. for days but this project was dismissed.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - FINAL

1. During the period beginning on the effective date of discharge and lasting through the expiration date of this 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:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS		
	Annual Average	Monthly Average	Weekly Average	Daily Maximum	Sample Point	Measurement Frequency	Sample Type
Flow, MGD	REPORT	REPORT	REPORT	REPORT	Effluent	5 days/week	Flow Meter & Totalizer
Biochemical Oxygen Demand (BOD), (5 day), mg/l	13.0	16.3	19.5	26.0	Effluent	1/2 weeks	8-Hour Composite
Total Suspended Solids, mg/l	20.0	30.0	45.0	60.0	Effluent	1/2 weeks	8-Hour Composite
Total Kjeldahl Nitrogen (TKN), mg/l	1.85	2.3	2.8	3.7	Effluent	Monthly	Grab
Fecal Coliform	(See Page I-2, Item 7)				Effluent	1/Quarter	Grab
pH	(See Page I-2, Item 8)				Effluent	5 days/week	Grab
Total Residual Chlorine, mg/l	(See Pages I-2 & 3, Item 9 for limitation)				Effluent	1/2 weeks	Grab
Ultimate Oxygen Demand (UOD)	(See Page I-3, Item 10 for limitation)				Effluent	1/Month	Calculated

PART I (CONTINUATION)
EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. Any bypass of the treatment facility which is not included in the effluent monitored above is to be monitored for flow and all other parameters in this permit. For parameters other than flow, at least one grab sample per day shall be monitored. Daily flow shall be monitored or estimated, as appropriate, to obtain reportable data. All monitoring results shall be reported on a Discharge Monitoring Report (DMR) Form (3320-1).

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. The effluent shall not cause a visible sheen on the receiving water.

5. Samples taken in compliance with the monitoring requirements specified in this permit shall be taken at the nearest accessible point after final treatment but prior to the actual discharge or mixing with the receiving waters.

6. The annual average shall be reported on the discharge monitoring report for each month and shall be submitted as required in Part III. For the parameters; BOD_5, TSS, TKN, Fecal Coliform, and UOD; no violations for annual average will be deemed to have occurred until data have been collected for the first 12 months after the effective date of the permit.

7. The arithmetic average of the quarterly fecal coliform values (computed as a geometric mean) collected during an annual period shall not exceed 200 per 100 ml of effluent sample. Any one sample shall not exceed 800 fecal coliform values per 100 ml of sample.

8. The pH of the effluent shall not be less than 6.0 standard units nor greater than 8.5 standard units.

9. FINAL TRC LIMIT: The daily maximum concentration of total residual chlorine (TRC) in the final efflent shall not exceed 0.01 mg/l. The TRC shall be measured 1/2 weeks by grab sample. This limit is included to prevent toxic effects from chlorine in the receiving waters.

9. FINAL TRC LIMIT: (continued)

Testing for total residual chlorine (TRC) shall be conducted according to the amperometric titration method, the low-level amperometric titration method (if compliance with a permit limitation of 0.20 mg/l or less is to be demonstrated), or the DPD colorimetric method as specified in Section 4500-Cl D., 4500-Cl E, or 4500-Cl G., respectively, Standard Methods for the Examination of Water and Wastewater, 17th Edition. If chlorine is not detected using one of these methods, the permittee shall report on the discharge monitoring report form, the analytical results for chlorine as being measured at less than the detection level for the test method selected; the test method shall also be reported. The permittee shall then be considered to be in compliance with the above daily maximum concentration limit for TRC.

10. The Ultimate Oxygen Demand (UOD) annual average shall not be more than 39.5 lbs/day. The UOD shall be calculated as shown below:

$$UOD = (11.93)(Q)(BOD) + (38.11)(Q)(TKN)$$

where Q = annual average flow in MGD
BOD = annual average 5-day BOD concentration in mg/l
TKN = annual average TKN concentration in mg/l

11. If the results for a given sample analysis are such that any parameter (other than fecal coliform) is not detected at or above the minimum level for the test method used, a value of zero will be used for that sample in calculating an arithmetic effluent mean value for that parameter. In the case of fecal coliform, a value of 1.0 shall be used in calculating the geometric mean.

Permittee:

Alan W. Potter, P.E.
President
Ortega Utility
Airport System

I.D. Number: 3116[illegible]205
Permit/Certification Number: DO16-134877
Date of Issue: September 2, 1987
Expiration Date: March 10, 1992

SPECIFIC CONDITIONS:

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

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow	0.175 MGD	Daily, 5/Week	Recording Flow Meter & Totalizer	Influent
BOD_5	(a) mg/l	Every two weeks	8-hr. composite	Influent/ Effluent
TSS	(a) mg/l	Every two weeks	8-hr. composite	Influent/ Effluent
TKN	(a) mg/l	Every two weeks	8-hr. composite	Effluent
pH units	6.0 to 8.5	Daily, 5/Week	grab(b)	Effluent
Chlorine Residual	Min. 0.5 mg/l Max. (c)	Daily, 5/Week	grab	Effluent
Fecal Coliform	Avg. 200/100 ml Max. 800/100 ml	Quarterly	grab	Effluent

(a) Limits (mg/l)

	annual	monthly	weekly	one time grab max
BOD_5	13	16.3	19.5	26
TSS	20	30	45	60
TKN	1.85	2.3	2.8	3.7

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

(c) For the period from the date of issue until two years from the date of issue, the maxima for chlorine residual are: Annual - 1.0 mg/l; monthly 1.3 mg/l; weekly - 1.5 mg/l; one time grab sample - 2.0 mg/l. Beginning two years from the date of issue of this permit, the permittee shall either:

(1) Complete and have in operation dechlorination facilities which reduce the total residual chlorine (TRC) content of the effluent to below 0.01 mg/l, or

(2) Apply for a mixing zone for TRC in the receiving stream pursuant to the Department's applicable mixing zone regulations. The Department's mixing zone regulations are contained in Florida Administrative Code Rule Section 17-4.244.

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: Fla. D.E.R. NorthEast District	STORET STATION NUMBER:	DATE (M/D/Y): 06/03/91	RECEIVING BODY OF WATER: Alligator Creek to Lake Rowell

REMARKS: Sunny hot 90's	LOCATION: Alligator Creek upstream of City of Starke WWTP Discharge ~ 50yds East of US301	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 14	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 30	Max. observed; >0.3 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 **0-7 points**
Artificial Channel/ Flow Alteration 14	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 10	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 5	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** 78

COMMENTS: water level low, flow fast, sand bottom, just downstream of waterfall which is about 1 ft.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06/03/91	SCOTT BULGRIN	Scott Bulgrin

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/DY):	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME: ORTEGA UTILITY

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover: 20	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: 15	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: 8	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: 9	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
	Add 5 points if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	67

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: Fla. D.E.R. Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 06/03/91	RECEIVING BODY OF WATER: Alligator Creek to Lake Rowell

REMARKS: Area studied near waterfall (1ft drop) downstream	LOCATION: Alligator Creek upstream of City of Starke WWTP discharge + 50 yds East of US301	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 Railroad
25%	5%		5%	60%		5%

Local Watershed Erosion (check box): None / slight [X] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Some potential sources [X] Obvious sources [ ]

Point-Source Pollution (list location and describe): Stormwater from Businesses, Roadway (US301) and Railroad tracks. Restaurants nearby

Estimated Stream Width (range, m): 3.0	Estimated Stream Depth (range, m): 1.50	yes
High Water Mark (m above bed): 2.0	Velocity (range, m/s): 0.3 L	Impounded [ ] Channelized [X]

Canopy Cover % (check box): Open: [ ] Lightly Shaded: [X] 25 Moderately Shaded: [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ] _____

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [ ] Sand: [X] Shell: [ ] Other: [X] clay, detrital

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	50
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	
Sand:	40	Mud/Muck (organic):	10

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	24.1	8.1	Secchi Depth (m):	0.6L
Mid-depth	24.1	8.1	pH (SU):	6.42
Bottom	24.1	8.1	Conductivity (µmho/cm):	300
			Other Parameters:	

Stream Type (check box): Blackwater: [ ] Deep Aquifer Fed: [ ] Surficial Aquifer Fed: [X] Alluvial: [ ] Other: [ ] _____

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ] _____

Water Surface Oils (check box): Slick: [ ] Sheen: [ ] Globs: [ ] None: [X]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [ ] Green (algae): [ ] Clear: [X] Other: [ ] _____

Weather Conditions: Sunny, Hot, 90's

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[X] some	[ ]	[ ]
Fish	[ ]	[ ]	[ ]	[X]
Aquatic Macrophytes	[ ]	[ ]	[X]	[ ]
Iron/sulfur Bacteria	[X]	[ ]	[ ]	[ ]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06/03/91	SCOTT BULGRIN	Scott Bulgrin

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL. D.E.R. Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 01/13/92	TIME: 1115	RECEIVING BODY OF WATER: Drainage Ditch to Little Cedar Creek to Broward River

REMARKS: Drainage Creek also a Stormwater Ditch for local businesses. TRASH in Ditch Cut trees fallen in ditch.	LOCATION: Drainage Creek (Unnamed) downstream of Ortega Utility - Airport System effluent.	FIELD ID/NAME: ORTEGA UTILITY (Drainage Ditch)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
50%				50%		

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): 1) Ortega Utilities - Airport System 3) I-95 Stormwater Runoff
2) Stormwater Runoff from Red Roof Inn, Denny's and the Airport Service Road.

Estimated System Width (range, m): 2.5-3.0	Estimated System Depth (range, m): 0.2-0.5	yes
High Water Mark (m above bed): 1.0	Velocity (range, m/s): 0.10	Impounded no ☐
		Channelized no ☐

Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☒ 75% 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)	30%	8	NET	Rock or Shell Rubble			
Leaf Packs	10%	4	NET	Sand	3%	1	NET
Aquatic Vegetation	30%	5	NET	Mud/Muck	27%	2	NET
Submerged Roots				Other:			
Undercut Banks				Other:			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):				Secchi (m):
Top	21	7.2	7.2	1000				0.3L
Mid-depth	21	7.2	7.2	1000				
Bottom	21	7.2	7.2	1000				

System Type : Stream: ☐ (Surficial Aquifer Fed / Deep Aquifer Fed / Alluvial / Blackwater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☒ DRAINAGE DITCH

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: Overcast 70°, Scattered showers

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☒	☐
Fish Gambusia affinis	☐	☐	☒	☐
Aquatic Macrophytes	☐	☐	☐	☒ Alligator Weed, Duckweed
Iron/sulfur Bacteria	☒	☐	☐	☐

ANALYSIS DATE: 01/13/92	ANALYST: SCOTT J. Bulgrin	SIGNATURE: Scott J. Bulgrin

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Ortega Utility Co. Airport System WWTP
Address/City:
County: Duval
Contact/District: NE / Scott Bulgrin
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 1/13/92 Time 1000
Test Beginning: Date 1/14/92 Time 1330
Test Ending: Date 1/16/92 Time 1330
Test Organism: N. Leeches
Life Stage/Age: 23 days

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

27458

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.0 7.9 @9	8.5 @ 24°C	23.5 @ 22.4	1374 @ 1378
24 hr	7.0 7.9 @9	8.6 @ 23.5	22.9 @ 23.1	1359 @ 23.4 1359
48 hr	7.0 7.9 @9	8.6 @ 23.5	22.5 @ 22.5°C	1392 @ 22.4 @ 1343

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	57	5	5	5	7.7	8.2	8.2	21.2	21.4	21.2	9.3	8.7	8.6			
Control	20	5	5	5	7.7	8.2	8.2				9.3	8.7	8.6	231	248	250
100%	46	5	5	5	7.3	8.0	8.2	20.9	21.4	21.0	9.8	8.8	8.5			
100%	21	5	5	5	7.3	8.0	8.2				9.8	8.8	8.9	976	1005	1011
Measured/Loaded by:		MF	AJ	AJ	MF	MF	MF	MF	AJ	MF	MF	ME		MF	MF	MF
Recorded by:		MF	AJ	AJ	AJ	AJ	RD	MF	AJ	RD	AJ	AJ		AJ	AJ	RD

27458 92-JAN-14-16-01

BIOLOGY Matrix: W-EFFLUENT
Date Collected: 13-JAN-1992 10:00:00.
Field ID:WWTP
BSY-SN-CLD BSY-SN-FSH

Investigators' Signatures

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.5	HACH	SB
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	HACH	AJF
Alkalinity:	130	20	150	HACH	AJ
Hardness:	130	85	240	HACH	AJ
Total Ammonia:	0.0	0.0	1.5	HACH	AJ

Ammonia Meter Slope: _____ Ammonia Blank: 0.6 Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Ortega Utilities Co. Airport + System WWTP
Address/City:
County: Duval
Contact/District: Scott Burgun / NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 1/13/92 Time 1000
Test Beginning: Date 1/14/92 Time 1330
Test Ending: Date 1/16/92 Time 1330
Test Organism: C. dilutia
Life Stage/Age: <24 hrs

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

27458

Remarks: Controls invalid @ 2/8 hrs however test should be valid - lot # of extra set of controls were 4/4/5/5 at 1/16/92

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7.9@9	8.5@24C	22.5@22.4	1374@1378@
24 hr	7@7.9@9	8.6@23.5	22.9@23.1	1359@1378@23.9
48 hr	7@7.9@9	8.6@23.5°C	22.5°C@22.5°C	1332@1378@1347

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		5	5	4	8.1		8.3	23.3		22.0	9.2		8.9	150		155
Control		5	5	3			8.3						9.0			
Control		5	5	4			8.3						9.0			
Control		5	5	5			8.3						9.0			
100%		5	5	4	7.3		8.6	21.8		21.9	9.5		9.1	935		1019
100%		5	5	4			8.6						9.1			
100%		5	5	4			8.6						9.1			
100%		5	5	4			8.6						9.1			
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		MF	MF	MF	AJ		AJ	AJ		AJ	AJ		AJ	AJ		AJ

Investigators' Signatures

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.5	HACH	SB
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	130	70	150	Hach	AJ
Hardness:	130	55	240	Hach	AJ
Total Ammonia:	0.0	0.0	.58	HACH	AJ

Ammonia Ammonia 0 Salinity

Benthic macroinvertebrate taxa list for Ortega Utility Company, Duval County, collected downstream of the discharge and from a reference site in Alligator Creek via Hester-Dendy samplers.

	Reference Site	Test Site
Coleoptera		
Hygrotus sp.	–	8
Stenelmis sp.	1	–
Diptera		
Ablabesmyia mallochi	8	1
A. rhamphe grp.	1	–
Asheum beckae	–	1
Chironomus sp.	–	1
C. decorus grp.	–	2
Conchapelopia sp.	2	–
Corynoneura sp.	–	4
Cryptochironomus sp.	4	–
Dicrotendipes modestus	–	5
D. neomodestus	1	–
D. simpsoni	–	11
Fittkauimyia serta	–	1
Goeldichironomus holoprasinus	–	1
Helopelopia sp.	1	–
Kiefferulus sp.	1	15
Labrundinia sp. 4 Epler	–	1
L. pilosella	1	–
Palpomyia grp. sp.	1	1
Paralauterborniella nigrohalteralis	1	–
Polypedilum fallax grp.	2	–
P. halterale grp.	1	–
P. illinoense	16	56
P. scalaenum	3	–
P. trigonus	–	9
P. tritum	–	2
Pseudochironomus sp.	1	–
Paratanytarsus sp.	–	1
Rheocricotopus robacki	1	–
Stenochironomus sp.	1	–
Tanytarsus sp.	8	4
Tribelos fuscicorne	5	–
Undetermined dipteran pupa	3	2
Ephemeroptera		
Acerpenna pygmaeus	1	–
Baetis propinquus	1	–
Gastropoda		
Hebetancyclus excentricus	–	1

Micromenetus sp.	–	3
M. dilatus	–	3
Physella sp.	–	12
Malacostraca		
Asellus sp.	–	2
Odonata		
Ischnura sp.	–	1
I. posita	–	1
Pachydiplax longipennis	–	1
Oligochaeta		
Chaetogaster diaphanous	–	2
Dero digitata	–	9
D. lodeni	–	16
D. pectinata	–	1
Limnodrilus hoffmeisteri	1	–
L. udekemianus	2	–
Lumbriculus inconstans	2	–
Trichoptera		
Polycentropus sp.	2	–

Benthic macroinvertebrate taxa list for Ortega Utility Company, Duval County, collected from a reference site in Alligator Creek and a test site downstream of the discharge via discrete dip net sweeps .

	Reference Site	Test Site
Coleoptera		
Agasicles hygrophila	1	1
Dineutus discolor	3	–
Stenelmis convexula	1	–
Suphisellus sp.	–	1
Tropisternus lateralis nimbatus	–	1
Undetermined chrysomelid	25	–
Diptera		
Ablabesmyia mallochi	36	
Chironomus stigmaterus	–	1
Cladotanytarsus sp.	3	–
Clinotanypus sp.	–	4
Coelotanypus sp.	–	1
Cricotopus bicinctus	16	–
Cryptochironomus sp.	7	–
Dicrotendipes simpsoni	–	2
Hemerodromia sp.	12	–
Labrundinia sp.	2	–
Nanocladius sp.	2	–
Palpomyia grp. sp.	2	–
Paralauterborniella nigrohalteralis	2	–
Paratanytarsus sp.	20	–
Pentaneura inconspicua	2	–
Polypedilum convictum grp.	6	–
P. fallax grp.	3	–
P. illinoense	60	–
P. scalaenum	6	–
Pseudochironomus sp.	3	–
Rheocricotopus robacki	5	–
Rheotanytarsus distinctissimus grp.	18	–
R. exiguus grp.	26	–
Stratiomys sp.	–	1
Tanytarsus sp.	95	–
Tanypus punctipennis	–	1
Thienemanniella sp.	8	–
Undetermined dipteran pupa	18	–
Ephemeroptera		
Baetis frondalis	2	–
Caenis sp.	2	–
Callibaetis floridanus	3	–
Centroptilum sp.	1	–
Hemiptera		

Mesovelia sp.	–	3
Lepidoptera		
Undetermined lepidopteran	1	–
Undetermined pyralid	–	5
Malacostraca		
Palaemonetes paludosus	2	–
Procambarus sp.	3	–
P. fallax	–	6
P. paeninsulanus	1	–
Megaloptera		
Corydalus cornutus	–	1
Odonata		
Argia sedula	1	–
Enallagma cardenium	20	–
Ischnura sp.	2	–
I. posita	1	–
I. ramburii	–	27
Pachydiplax longipennis	–	5
Progomphus sp.	3	–
Oligochaeta		
Limnodrilus hoffmeisteri	–	2
Lumbriculus inconstans	1	34
Pelecypoda		
Undetermined sphaeriid	1	–

Periphyton taxa list for Ortega Utilities, collected from a reference site in Alligator Creek and a test site downstream of the facility.

	Reference Site	Test Site
Diatoms		
Achnanthes exigua	12	3
A. hungarica	–	5
A. hustedtii	–	5
A. lanceolata	4	–
A. linearis	4	2
A. minutissima	–	–
A. lanceolata v. *dubia*	–	2
Bacillaria paradoxa	–	1
Cocconeis placentula	766	–
Cyclotella sp.	–	1
Diploneis ovalis	–	5
Eunotia curvata	–	1
E. pectinalis	88	12
Gomphonema angustatum	4	–
G. augur	–	1
G. parvulum	–	3
Melosira granulata	–	2
N. confervacea	–	1
N. exigua	4	1
N. radiosa	28	–
N. viridula	–	1
Nitzschia amphibia	–	5
N. palea	–	1
Surirella linearis	–	1
S. ovalis	–	1
Synedra parasitica	–	1
S. ulna	–	3
Chlorophyta		
Characium sp.	–	2
Oedogonium sp.	–	2
Spirogyra sp.	8	–
Chrysophyta		
Stipitococcus sp.	–	1
Cyanophyta		
Anabaena sp.	8	–
Aphanocapsa sp.	–	42
Chroococcus sp.	–	6
Gloeocapsa sp.	–	1
Lyngbya sp.	–	3
Microcystis sp.	12	–
Phormidium sp.	–	11
Plectonema sp.	124	–
Stigonema sp.	24	–

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 4 2 0 1 3 11	12 9 2 0 1 1 3 17	18 X	19 5	20 1

Remarks

21 66

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 4 2 0 1 3 11	12 9 2 0 1 1 3 17	18 B	19 5	20 1

Remarks

21 66