

Biological Assessment of

Flagler Beach Wastewater Treatment Plant

Flagler County

NPDES #FL0026611

Sampled October 1992

April 1993

Biology Section
Division of Technical Services

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger: Flagler Beach WWTP
County: Flagler
NPDES Number: FL0026611
State Permit Expiration Date: 5 August 1993

Toxics Sampling Inspection (XSI)

Date Sampled: 27 October 1992

Results: Atrazine was present in the effluent at a concentration of 0.072 µg/L, which is below known toxic levels (LC_{50} = 1.2 µg/L using the shrimp, *Palaemonetes*). Aluminum (519 µg/L) and iron (32 µg/L) were detected in the discharge at levels above quantitation limits. These concentrations are well within Class III standards for marine waters.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 27 October 1992

Results: The sample of effluent was not acutely toxic to the crustacean, *Mysidopsis bahia*, or to the fish, *Notropis leedsi.*

Impact Bioassessment Inspection (IBI)

Date Sampled: 27 October 1992

Results: Quantitative measures of benthic macroinvertebrate community health suggested that no degradation was associated with the discharge. Taxa richness and diversity were slightly higher at the test sites compared to the control. Similarly, there was no evidence that the facility was harming receiving water phytoplankton.

Water Quality Inspection (WQI)

Date Sampled: 27 October 1992

Results: Levels of both fecal and total coliform bacterial were well within water quality standards in the effluent and at all receiving water stations. The discharge did not contribute to undesirable levels of nutrients in the receiving waters, as this portion of the Intracoastal Waterway was relatively low in these substances. Algal growth potential results were below the "problem threshold" for marine 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 Flagler Beach Wastewater Treatment Plant is located on A Street in Flagler Beach, Flagler County, Florida (see maps in Appendix). This 1.0 MGD activated sludge wastewater treatment plant is also equipped with tertiary filters. The disinfected and de-chlorinated (via sulfur dioxide injection) effluent is discharged through a 20 inch diameter pipe into the Class III Intracoastal Waterway (Smith Creek) (see maps in Appendix). For the past year, the plant has been operating at less than design capacity (actual mean flow has been 0.62 MGD). Flow during the present survey was 0.63 MGD.

Permit limits are as follows: flow (1.0 MGD), pH (6.0-8.5 S.U.), chlorine residual for disinfection (0.5 mg/L to 1.0 mg/L), chlorine residual at discharge (0.01 mg/L maximum), BOD (20 mg/L maximum annual average), TSS (20 mg/L maximum annual average), fecal coliform (200 colonies/ 100 mL maximum monthly average), total phosphorus (1.33 mg/L maximum annual average), and organic nitrogen (3.33 mg/L maximum annual average).

Although there have been a few sporadic problems (*e.g.*, sewage spills associated with the facility's collection system, overfeed of alum into the oxidation ditch), overall, the plant has been operating satisfactorily (see Appendix). Previous biological sampling near the Flagler Beach WWTP effluent boil indicated a Shannon-Weaver diversity of 2.5, while diversity from a nearby reference site (Channel Marker 19) ranged from 2.5 to 3.0. Past chemical sampling in this part of the Intracoastal Waterway suggested increased turbidity, BOD, TKN, and nitrate-nitrite associated with the outfall, although generally, an improving trend is evident between 1971 and the present.

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 approximately 0.5 miles south of the outfall) and two test sites bracketing the discharge (see map 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 screening toxicity bioassays, using *Ceriodaphnia dubia*, *Mysidopsis bahia*, and *Notropis leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, 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

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	28	37	47
Shannon-Weaver Diversity	3.03	3.76	3.77
% Polychaeta	74.7	57.3	55.1
% Malacostraca	9.3	16.4	11.4
% Gastropoda	9.3	10.3	17.0
% Cumacea	3.8	7.3	7.2
% Pelecypoda	0.8	2.7	2.4
% Other	2.1	6.1	6.9
% Carnivores	4.8	3.8	2.7
% Deposit Feeders	78.7	73.2	85.7
% Suspension Feeders	4.6	4.2	0.8
% Browsers	10.4	17.4	9.4
% Scavengers	1.5	1.4	1.2
Phytoplankton Algae			
Number of Taxa	18	19	23
% Contribution of Dominant Taxon	22.4	20.5	33.3
Chlorophyll a (µg/L)	7.5	7.5	10.7
Diatom/Blue-green Abundance Ratio	0.98	0.95	0.90
% Diatoms	96.9	93.7	87.8
% Blue-green	2.0	4.5	10.0
% Dinoflagellates	1.0	1.8	2.2
Algal Growth Potential (mg dry wt/L)	5.1	4.6	4.3

and test sites. Invertebrates were collected via three Ponar grabs per site (Ross 1990). Phytoplankton was sampled at reference and test sites by subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Dunaliella tertiolecta*, followed the methods outlined in EPA (1974).

Explanation of Measurements of Community Health

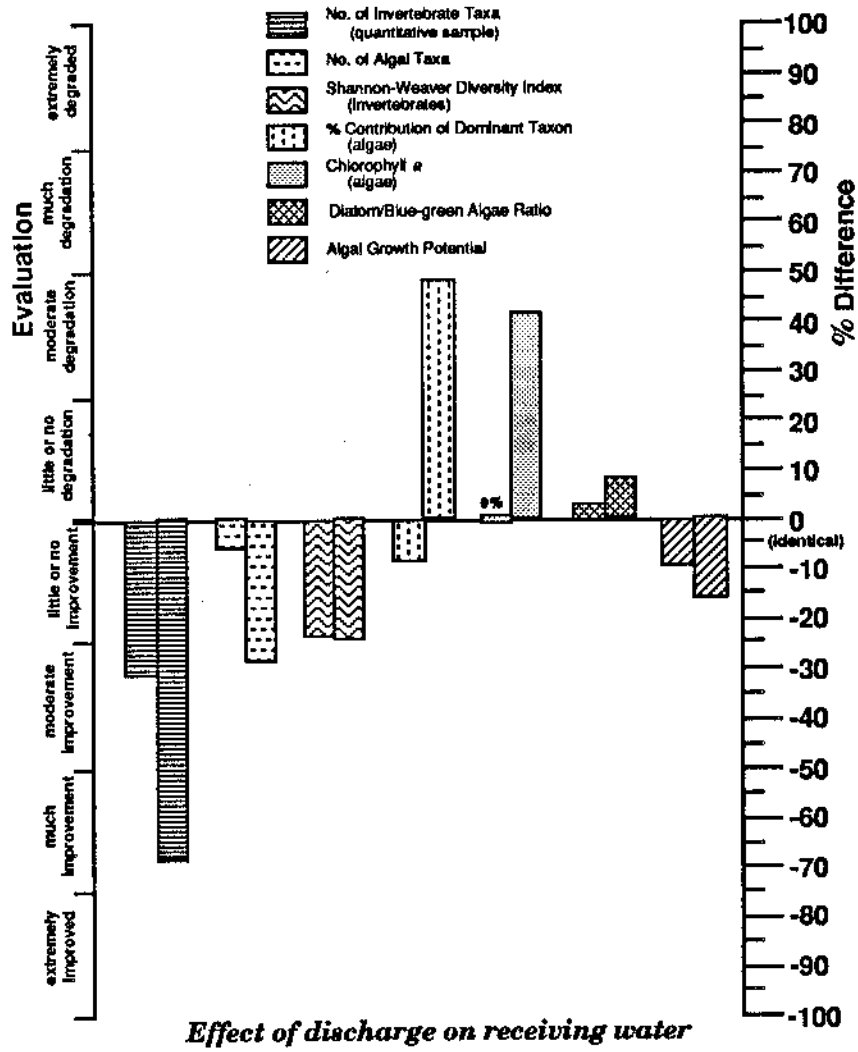
Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa, Shannon-Weaver Diversity Index, and chlorophyll *a* are well known. Others are briefly explained here. Excessive numerical dominance of a single type of organism (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 (% 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 reference and test sites 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 and Lindy Payne (DER Northeast District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Roberto Llanso, Kathleen Lurding, Kim Pearce, Urania Quintana, Landon Ross, and Greg Wynn (Tallahassee Biology Laboratory).

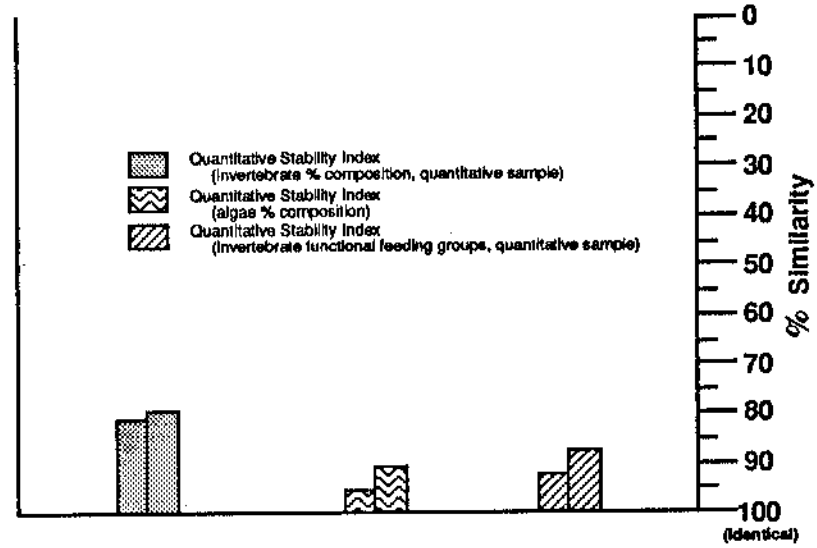
Results and Discussion

The study area can best be characterized as a coast-parallel, high salinity, estuarine lagoon. The chan-



Effect of discharge on receiving water
(measured as difference between control and test sites).
(Left bar represents comparison between control site and test site 1; right bar represents comparison between control site and test site 2.)

nel of the Intracoastal Waterway extends through the area referred to as Smith Creek. Habitat quality was higher at the reference site (with 73 points) than at test site 1 (62 points) or test site 2 (55 points). Land use near the test sites was predominantly residential, commercial, or natural (salt marsh), while the reference site was surrounded only by native *Spartina* sp. salt marsh. The study sites were similar with respect to many physical/chemical parameters, such as specific conductance (between 39,800 µmhos/cm and 41,100 µmhos/cm, or approximately 30 ppt), temperature (near 23° C), pH (between 7.4 and 7.7), dissolved oxygen (5.9 mg/L), and substrate composition (sand, mud, and shell at all sites).



Effect of discharge on receiving water
(measured as similarity between control and test sites).
(Left bar represents comparison between control site and test site 1; right bar represents comparison between control site and test site 2.)

Analysis for effluent organic constituents revealed the presence of low concentrations of atrazine (0.072 µg/L). This is well below the lowest concentration of atrazine which is known to be toxic (LC_{50} = 1.2 µg/L using the shrimp, *Palaemonetes* sp.) (AQUIRE 1993). Aluminum (519 µg/L) and iron (32 µg/L) were detected in the discharge at levels above quantitation limits. These concentrations are well within Class III standards for marine waters.

The sample of effluent was not acutely toxic to the crustacean, *Mysidopsis bahia*, or to the fish, *Notropis leedsi*. The mortality seen in the *Ceriodaphnia dubia* test was attributed to the 5,500 µmho/cm conductivity of the effluent (Appendix). *Ceriodaphnia dubia* is not considered as an appropriate test organism at this level of specific conductance.

Levels of both fecal and total coliform bacterial were well within water quality standards in the effluent and at all receiving water stations (see Chemistry Summary Table).

Nutrient concentrations in the receiving waters were all less than 50% of other Florida estuaries (see Chemistry Summary Table and Typical Water Quality Values in Appendix). Although the nitrate-nitrite of the effluent was 10 mg/L, this was not manifest in elevated nitrogen levels at the test sites.

Algal growth potential at the reference site, was 5.1 mg dry wt/L, while waters from test sites 1 and 2 yielded 4.6 mg dry wt/L and 4.3 mg dry wt/L, respectively. These levels are below the "problem threshold" of 10 mg dry wt/L for marine waters, above which cultural eutrophication and its consequences are likely to occur (Ron Raschke, US EPA, personal communication).

Quantitative measures of benthic macroinvertebrate community health suggested that no degradation was associated with the discharge (see table and figures). 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. The figure on this page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Taxa richness at both test site 1 (with 37 taxa) and test site 2 (with 47 taxa), was higher than the number of different kinds of organisms recovered from the reference site (28 taxa). Similarly, Shannon-Weaver diversity was better at the test sites (3.8 at both test sites), when compared to the reference site (3.0). Benthic community structure was fairly similar at all three study areas, with polychaetes (*e.g., Streblospio benedicti, Mediomastus ambiseta*) being the most abundant group at each station, followed by malacostracans (*e.g., Corophium* sp.), gastropods (*e.g., Acteocina canaliculata*), and cumaceans (*e.g., Cyclaspis varians*). In general, the benthic data at the study stations were similar enough to suggest that the WWTP was having no detrimental effects on macroinvertebrate populations.

The phytoplankton assemblage found in the Intracoastal Waterway

was dominated by diatoms (greater than 88% of the population) at all three receiving water stations. Again, taxa richness was slightly higher at the test sites (19 and 23 taxa at test sites 1 and 2, respectively) compared to the reference (18 taxa). Chlorophyll *a* at test site 1 (7.5 µg/L) was identical to that of the reference site, and only slightly higher (by 3.2 µg/L) at test site 2. The % contribution of the dominant taxon (*Skeletonema* sp.) was 48% higher at test site 2. *Skeletonema* sp. is a cosmopolitan taxon able to live in a wide range of salinity regimes (Livingston and Prasad 1989), therefore, this finding is not particularly alarming. Overall, there is no evidence that the facility is harming receiving water phytoplankton.

Conclusions

Atrazine was present in the effluent at a concentration of 0.072 µg/L, which is below known toxic levels (LC_{50} = 1.2 µg/L using the shrimp, *Palaemonetes* sp.). Aluminum (519 µg/L) and iron (32 µg/L) were detected in the discharge at levels above quantitation limits. These concentrations are well within Class III standards for marine waters.

The sample of effluent was not acutely toxic to the crustacean, *Mysidopsis bahia*, or to the fish, *Notropis leedsi*.

Levels of both fecal and total coliform bacterial were well within water quality standards in the effluent and at all receiving water stations.

The discharge did not contribute to undesirable levels of nutrients in the receiving waters, as this portion of the Intracoastal Waterway was relatively low in these substances. Algal growth potential results were below the "problem threshold" for marine waters.

Quantitative measures of benthic macroinvertebrate community health suggested that no degradation was associated with the discharge. Taxa richness and diversity were slightly higher at the test sites compared to the control. Similarly, there was no evidence that the facility was harming receiving water phytoplankton.

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.

Aquatic Toxicity Information Retrieval Data Base (AQUIRE). 1993. U.S. EPA Environmental Research Laboratory, Duluth, Mn.

Environmental Protection Agency. 1974. Marine algal assay procedure: Bottle test. Nat'l Environ. Res. Center, Office of Res. and Dev., U.S. EPA, Corvallis, Oregon. 43 p.

Livingston, R. J. and A. K. S. K. Prasad. 1989. A photographic atlas of North Florida estuarine phytoplankton and a summary of life history relationships with various environmental conditions. FSU Center for Aquatic Research and Resource Management. 306 p.

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.

Chemistry summary table for

Flagler Beach Wastewater Treatment Plant	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
Atrazine	0.072 T			
Metals (ug/L)				
Aluminum	519			
Antimony	15 U			
Arsenic	20 U			
Cadmium	0.8 U			
Copper	8 T			
Chromium	10 U			
Iron	32			
Lead	15 U			
Mercury	0.1 U			
Nickel	5 U			
Selenium	30 U			
Silver	0.1 U			
Zinc	8 T			
Nutrients (mg/L)				
Ortho-phosphate	0.14	0.031 T	0.036 T	0.031 T
Total phosphorus	0.22	0.081	0.085	0.071
Ammonia	0.026	0.030 U	0.030 U	0.030 U
Nitrate+Nitrite	10	0.030 U	0.048 T	0.030 U
TKN	0.69	0.68	0.63	0.63
Other Parameters				
Habitat Assessment		73	62	55
D.O. (mg/L)	6.7	5.85	5.85	5.90
pH (SU's)	7.26	7.7	7.35	7.49
Conductivity (µmhos/cm)	5,500	41,000	39,800	41,100
Temperature (°C)	23.0	23.0	23.5	22.6
BOD	1U	1.45	1.25	2.5
Algal Growth Potential (mg dry wt/L)	88.4	5.1	4.6	4.3
TSS	3	18	23	30
Bioassay Invertebrate-Mysid shrimp	Not toxic			
Bioassay Fish	Not toxic			
Bioassay Invertebrate-Cladoceran	LC50 < 100%	mortality due to salinity of 2.7 ppt		
Fecal coliform (org/100 ml)	15	20U	30	20U
Total coliform (org/100 ml)	70	20U	155	25

T - Value reported is less than the practical quantitation limit

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

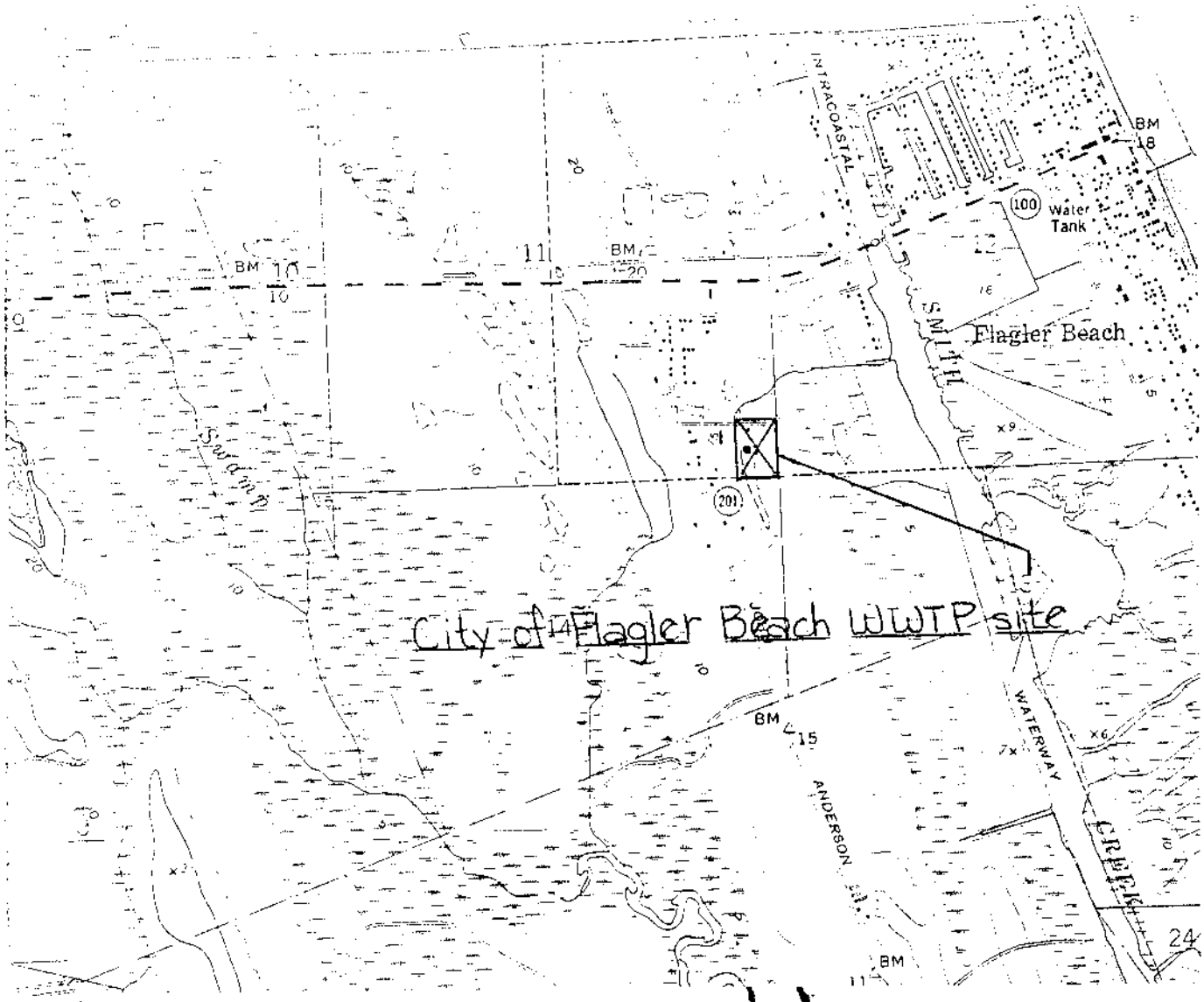
Typical Values for Selected Parameters in Florida Waters

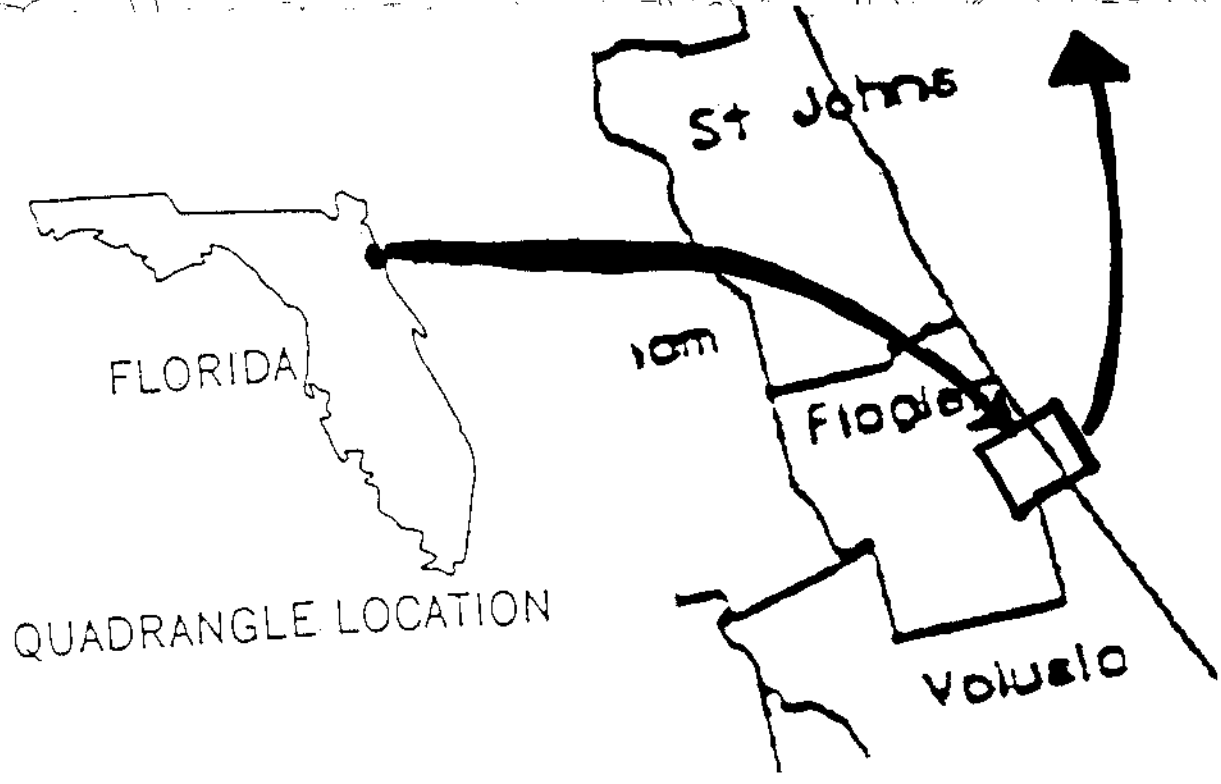
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

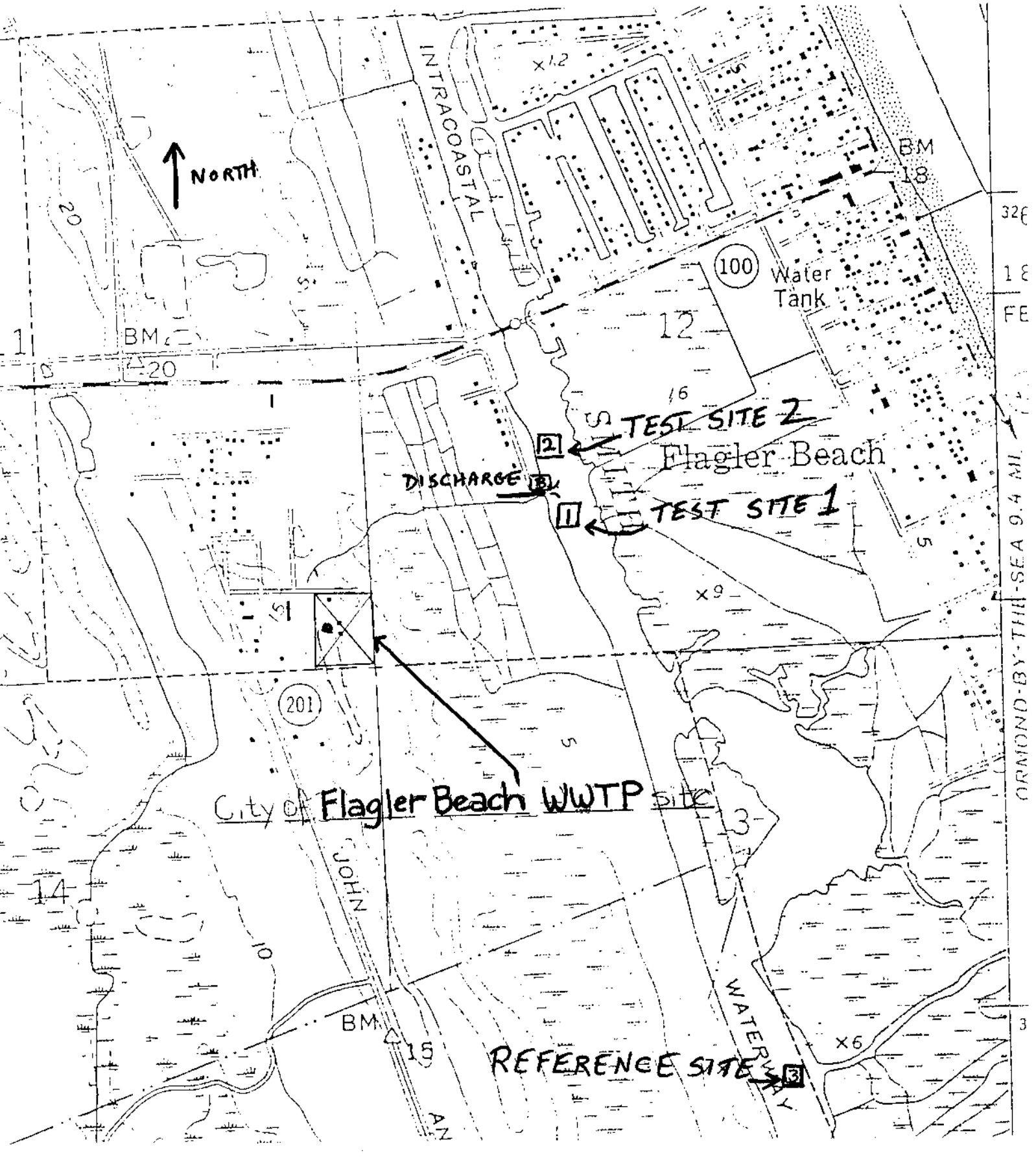
Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	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

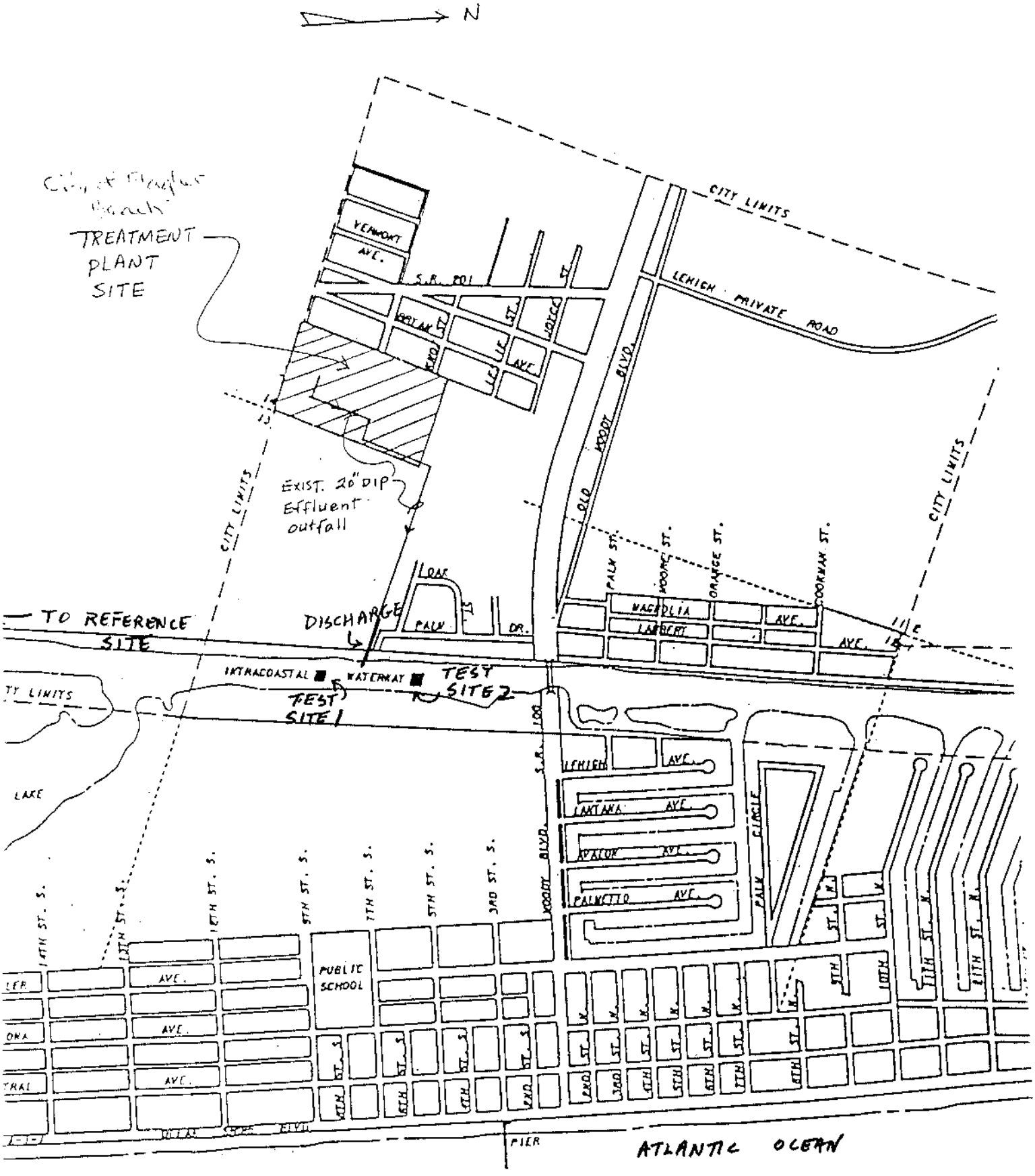

INTRACOASTAL
BM 18
100
Water Tank
BM 10
11
BM 20
12
Flagler Beach
201
City of Flagler Beach WWTP site
BM 15
WATERWAY
ANDERSON
24
BM


St Johns
FLORIDA
10m
Flood
Volusia
QUADRANGLE LOCATION

[3] - City of Flagler Beach WWTP effluent discharge (effluent boil).
[1] - Test Site #1 / ICW 150 ft South of City of Flagler Beach WWTP effluent discharge boil, 60 ft off West Bank.
[2] - Test site #2 / ICW 120 ft North of City of Flagler Beach WWTP effluent discharge boil, 60 ft off West Bank.
[3] - Reference site / Intracoastal waterway at Channel 19 marker.



Effluent Outfall Location Map



EFFLUENT OUTFALL LOCATION

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: City of Flagler Beach WWTP		Date Summary Prepared: 11/07/92
Location (attach detailed map): A Street Flagler Beach FL	County: Flagler County	District: [illegible]
Federal Permit # and expiration date: 09-30-97	State GMS # and State expiration date:	Facility Type: Industrial Municipal Federal Agricultural Other (list):

Function of facility: [illegible]

Description of treatment process: [illegible]

Receiving waters:	Classification: I II III

Design Flow: 1.0 MGD	Mean Flow: 0.618 MGD from last 9 months	Flow during survey: 0.630 MGD

Discharge is: Continuous Intermittent Seasonal Rainfall dependent
Other (describe)

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):

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

Parameter	Limit (units)

Describe special permit conditions and permit modifications:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

(Facility)

Description of permitted outfall(s): The only permitted outfall discharges into the Intracoastal Waterway on the west bank south of State Road 100 (See Effluent outfall Location Map).

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

06/27/90 FLDER informed of raw sewage spillage due to electrical storm knocking power out on 6/27/90 (Lift station pump knocked out).

06/05/89 FLDER informed of force main leak on previous Sunday evening (date not specified). Corrected and cleaned up.

09/19/12 Accidental overfeed of Alum into oxidation ditch created low pH, corrected immediately Due to operator not mechanical error.

Reviewing the MOR data for the past 2 years, the City of Flagler Beach WWTP has had no problems and looks good.

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

01/16/89 EPA letter states bioassay was invalid due to 20% control mortality and tests were not run according to Standard Methods.

Basin Studies from 1985-1987 revealed the following data and conclusions for The City of Flagler Beach WWTP effluent boil and the ICW at Marker 19.

01/27/87 Biological Sampling at Effluent Discharge Boil, Diversity Index = 2.47. Chemical Summary from study showed increased turbidity, TSS, BOD, TKN and NO2-NO3 probably outfall related compared to other ICW sites.

ICW at Marker 19
→ 07/30/86 Biological Sampling Diversity Index = 2.495
→ 03/31/86 Biological Sampling Diversity Index = 2.553
→ 11/21/85 Biological Sampling Diversity Index = 3.034

This station (ICW at Marker 19) characterized by a fair/stressed macroinvertebrate community. Both the number of taxa and the faund density were low.

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

10/24/91 RI inspection on this date. Everything is satisfactory.

The City of Flagler Beach WWTP MOR results, DMR results and cooperation with State and Federal compliance regulations and suggestions are all good. No major problems with this facility at this time.

Schematic diagram of WWTP enclosed also.
No CEI was done at this time.

Additional information:

2. Enclosed are the results of data collected the City of Flagler Beach WWTP effluent discharge boil. This data is monitored and collected by the Ambient Surface Water Program.

Staff contributing to this review (signature):

Scott Balyn (Biologist)

Sandy Payne CEI

(Engineer)

( )

( )

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3. Enclosed are the results of data collected at ICW Marker 19 (Reference Site) This site is also monitored by the Ambient Surface Water Program.

City of Flagler Beach

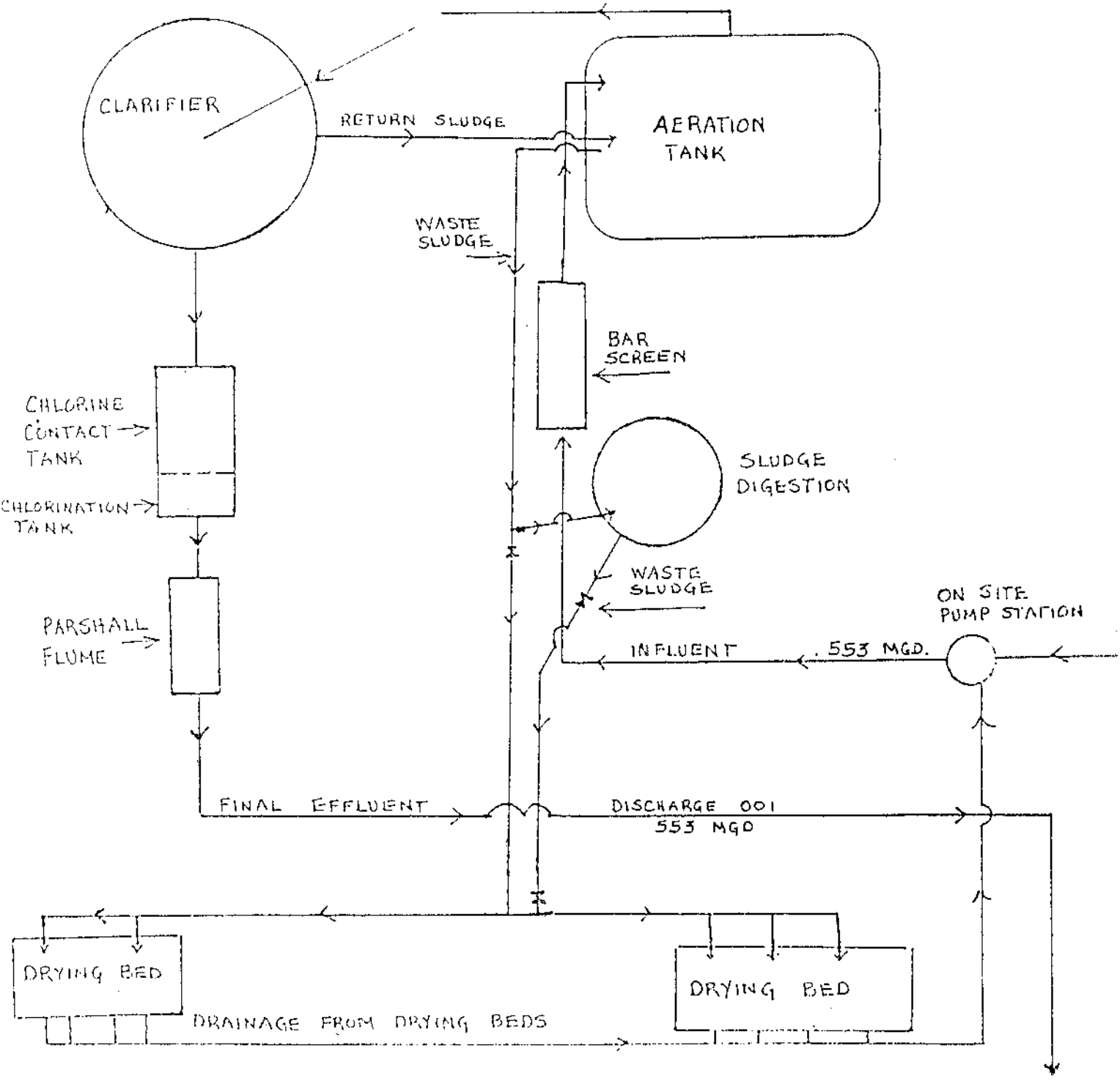
WATER & WASTEWATER DEPTS.

WATER Dept.
Phone (904) 437-3776

P.O. Box 70
Flagler Beach, Fla. 32136

WASTEWATER Dept.
Phone (904) 439-2334

SCHEMATIC OF WASTEWATER FLOW
FLAGLER BEACH WASTEWATER TREATMENT PLANT
FLAGLER BEACH, FLORIDA 32136
DISCHARGE SERIAL NO. 001
DECEMBER 30, 1991 PAGE 1 OF 1



D STATE PERMIT EFFLUENT LIMITS

PERMITTEE:

City of Flagler Beach STP

I.D. Number: 3118M00029
Permit Number: DO18-151015
Date of Issue: August 5, 1988
Expiration Date: August 5, 1993

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

PARAMETER	MONTHLY AVERAGE	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow (mgd)	1.0	Continuous	See A	Influent or Effluent
*BOD_5 (mg/l)	30	Weekly	8-hour composite	Influent and Effluent
*TSS (mg/l)	30	Weekly	8-hour composite	Influent and Effluent
ON_N (mg/l)	5.0	Weekly	8-hour composite	Effluent
pH Units	6.0 - 8.5	Continuous***	Grab	Effluent
Chlorine Residual(mg/l)	0.5 Minimum 1.0 Maximum	Continuous***	Grab	Effluent
Fecal Coliform no./100 (ml)	200	Weekly	Grab	Effluent
TP (mg/l)	2.0	Weekly	8-hour composite	Effluent

A Recording flowmeter and totalizer required.
* or 90% removal, whichever is more stringent.
*** Hourly measurements during the period of required operator attendance may be substituted for continuing measurement where such devices are not available.
Continuous

	ANNUAL	MONTHLY	WEEKLY	ONE TIME MAXIMUM
BOD_5	20	30**	45**	60**
TSS	20	30**	45**	60**
O&G.N	3.33	5.		
TP	1.33	2.		

** Rule 17-6.180

13. By August 5, 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 permittee may request a modification of the above effluent limit for TRC. The Department's mixing zone 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 (NPDES) permit for the facility.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - FINAL

1. These limitations are to be achieved by the effective date of the permit, and shall remain in effect until permit expiration for outfall Serial Number 001.

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

PARAMETERS	DISCHARGE LIMITATIONS (lbs/day) Monthly Average	(lbs/day) Weekly Average	Other Units (Specify) Monthly Average	Other Units (Specify) Weekly Average	MONITORING REQUIREMENTS Measurement Frequency	Sample Type	Sampling Point
Flow, M^3/Day (MGD)	--	--	--	--	Continuous	Recording flow meter & totalizer	Influent & Effluent
Biochemical Oxygen Demand (5 Day)	114 (250)	170 (375)	30 mg/l	45 mg/l	Weekly	8-hour Composite	Influent & Effluent
Suspended Solids	114 (250)	170 (375)	30 mg/l	45 mg/l	Weekly	8-hour Composite	Influent & Effluent
Fecal Coliform Bacteria, Geometric Mean (No./100 ml)	--	--	200/100 ml	—	Weekly	Grab	Effluent
pH	See Item 4 on Page I-2				Continuous or hourly grab	—	Effluent
Total Chlorine Residual	(See Part I.A.2 for effluent limit and approved testing procedures. See Part I.B.1 for compliance schedule and compliance dates.)				7 days/week	Grab	Effluent
Organic Nitrogen (as N)	19(42)	23(50)	5 mg/l	6 mg/l	Weekly	8-hour Composite	Effluent
NH_3 - N	76(167)	91(200)	20 mg/l	24 mg/l	Weekly	8-hour Composite	Effluent
Total Phosphorus (as P)	8(17)	9(20)	2.0 mg/l	2.4 mg/l	Weekly	8-hour Composite	Effluent

DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP Northeast District	STORET STATION NUMBER: 27010106	DATE (M/D/Y): 10/27/92	TIME: 1510	RECEIVING BODY OF WATER: (ICW) Intracoastal Waterway

REMARKS: Area is east of City of Flagler Beach WWTP discharge. Sunny, hot	LOCATION: Intracoastal Waterway at Channel marker 19	FIELD ID/NAME: (Reference Site)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						100

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

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

Point-Source Pollution (list location and describe): NONE

→ Maybe runoff

Estimated System Width (range, m): 50-60	Estimated System Depth (range, m): 2-3	yes
High Water Mark (m above bed): 0.60	Velocity (range, m/s): 0.08-0.1	Impounded ☐ Channelized ☐

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: ☒ oyster Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	3	DIP NET	Rock or Shell Rubble			
Leaf Packs				Sand	20	2	DIP NET
Aquatic Vegetation (MARSH PLANTS)	20	6	DIP NET	Mud/Muck	20	2	DIP NET
Submerged Roots	5	2	DIP NET	Other: OYSTER BEDS	20	3	DIP NET
Undercut Banks	5	2	DIP NET	Other:			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):	SALINITY			Secchi (m):
Top	23.0	5.85	7.7	41,000	30			0.8
Mid-depth	23.0	5.85	7.7	41,000				
Bottom	23.0	5.85	7.7	41,000				

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

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: No development on the waterway in this area. Category tide at time of sampling. Oyster beds and marsh plants.

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

ANALYSIS DATE: 10/27/92	ANALYST: SCOTT Bulgrin / Lindy Payne	SIGNATURE: Scott Bulgrin / Lindy Payne

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FLDER Northeast District	STORET STATION NUMBER: 27010106	DATE (M/DY): 10/27/92	RECEIVING BODY OF WATER: Intracoastal Waterway (ICW)
REMARKS: Area is South of [illegible]	LOCATION: Intracoastal Waterway at Channel Marker 19		FIELD ID/NAME: (Reference Site)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 10	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 31	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 3	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 10	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 9	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE: 73

COMMENTS: Area appears unimpacted, no development on waterway in this area. Extensive tides at time of sampling. Oyster bars and Marsh dominate area.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/27/92	Scott Bulgrin	Scott Bulgrin
	Lindy Payne	Lindy B. Payne

DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DER Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 10/27/92	TIME: 1120	RECEIVING BODY OF WATER: City of Flagler Beach WWTP discharges into the Intracoastal Waterway

REMARKS: Area south of WWTP discharge. Residential Area on one bank. Salt Marshes on other	LOCATION: ICW, 150 ft South of City of Flagler Beach WWTP effluent discharge boil, 60 ft off west bank	FIELD ID/NAME: (TEST SITE #1)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
			50		10	40

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

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

Point-Source Pollution (list location and describe): City of Flagler Beach WWTP effluent discharge

Boats, Recreational Park urban Stormwater Runoff

Estimated System Width (range, m): 50-60	Estimated System Depth (range, m): 2-4	yes
High Water Mark (m above bed): 0.60	Velocity (range, m/s): 0.06-0.1	Impounded ☐ Channelized ☐

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)	10	3	DIP NET	Rock or Shell Rubble			
Leaf Packs				Sand	20	2	DIP NET
Aquatic Vegetation	20	6	DIP NET	Mud/Muck	20	2	DIP NET
Submerged Roots	5	2	DIP NET	Other: Rip Rap Seawall	20	3	DIP NET
Undercut Banks	5	2	DIP NET	Other: Docks			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):	SALINITY			Secchi (m):
Top	23.5	5.85	7.35	39800	30			0.8
Mid-depth	23.5	5.85	7.35	39800				
Bottom	23.5	5.95	7.35	39800				

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

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: Sunny, Hot. Going to a Slack Tide, at time of Sampling.

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☒	☐
Fish	☐	☐	☒	☐
Aquatic Macrophytes (SALT MARSH Plants)	☐	☐	☒	☐
Iron/sulfur Bacteria	☒	☐	☐	☐

ANALYSIS DATE: 10/27/92	ANALYST: SCOTT Bulgrin / Lindy Payne	SIGNATURE: Scott Bulgrin / Lindy Payne

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

SUBMITTING AGENCY CODE: 80031 / SUBMITTING AGENCY NAME: FLDER Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 10/27/92	RECEIVING BODY OF WATER: City of Flagler Beach WWTP discharges into the Intracoastal Waterway

REMARKS: Sunny, hot, spring tide	LOCATION: ICW, 150 Ft South of City of Flagler Beach WWTP effluent discharge pipe, 60Ft off west bank	FIELD ID/NAME: (TEST SITE #1)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 6	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 31	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 3	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 5	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 8-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 7	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE: 62

COMMENTS: Area of discharge impacted by some docks, seawalls, boats, parks, stormwater runoff and other WWTP discharge.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/27/92	Scott Bulgrin Lindy Payne	Scott Bulgrin Lindy B. Payne

DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 3)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP NorthEast DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 10/27/92	TIME: 1320	RECEIVING BODY OF WATER: City of Flagler Beach WWTP discharge into the Intracoastal Waterway

REMARKS: Area north of WWTP discharge. Residential Areas, one brook, Salt marsh, Recreation on	LOCATION: ICW, 150ft North of City of Flagler Beach WWTP effluent discharge pipe, 60ft off west bank	FIELD ID/NAME: (TEST SITE #2)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	[redacted]	Other (Specify)
			50	20	10	20

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

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

Point-Source Pollution (list location and describe): City of Flagler Beach WWTP effluent discharge. Also North of site about a mile or so Beverly Beach WWTP discharge. Boats, Recreation, Park, URBAN STORMWATER RUNOFF

Estimated System Width (range, m): 50-60	Estimated System Depth (range, m): 2-3	yes: Impounded ☐ Channelized ☐
High Water Mark (m above bed): 0.60	Velocity (range, m/s): 0.08-0.1	

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: ☒ oyster Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	3	DIP NET	Rock or Shell Rubble			
Leaf Packs				Sand	20	2	DIP NET
Aquatic Vegetation	20	6	DIP NET	Mud/Muck	20	2	DIP NET
Submerged Roots	5	2	DIP NET	Other: Rip Rap	20	3	DIP NET
Undercut Banks	5	2	DIP NET	Other:			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	pH (SU):	Cond. (µmho/cm):	SALINITY			Secchi (m):
Top	22.6	5.90	7.49	41100	30			0.9
Mid-depth	22.6	5.90	7.49	41100				
Bottom	22.6	5.90	7.49	41100				

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

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: Sunny, Hot Slack tide at time of Sampling.

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

ANALYSIS DATE: 10/27/92	ANALYST: SCOTT Bulgrin / Lindy Payne	SIGNATURE: Scott Bulgrin / Lindy Payne

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

SUBMITTING AGENCY CODE: 8021 / SUBMITTING AGENCY NAME: FLDER Northeast District	STORET STATION NUMBER:	DATE (M/DY): 10/27/92	RECEIVING BODY OF WATER: City of Flagler Beach WWTP discharge into the Intracoastal waterway

REMARKS: Sunny hot	LOCATION: ICW, 150 ft North of City of Flagler Beach WWTP effluent discharge tail, 60 ft off west bank	FIELD ID/NAME: (TEST SITE #2)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 4	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 26	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 3	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 5	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 7	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE: 55

COMMENTS: Area of discharge impacted by some docks, seawalls, boats, parks, stormwater runoff and other WWTP discharge.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/27/92	Scott Bulgrin	Scott Bulgrin
	Lindy Payne	Lindy B. Payne

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Flagler Beach
Address/City:
County: Flagler
Contact/District: S. Bulgrin / NE
NPDES Permit #: FL00 Outfall #:
Test Number: 2 of 2 (3 KP 10/21)
Test Type: Screening | Definitive
Static | Static-Renewal | Flow-through

Sample Collection: Date 10/24/92 Time 1150
Test Beginning: Date 10/27/92 Time 1530
Test Ending: Date 10/29/92 Time 1530
Test Organism: M. beadlei
Life Stage/Age: 11 days
verified 10/29 KP

Remarks:
added mysid test as #3
43380-920CT-2708.01

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.7/9.9	8.5/24°C	23.5/23.6	9801K/9850 19K/@23.8°C
24 hr	7.7/9.9	8.5/24°C	25.2/25.4	9801K/9720 10K/@23
48 hr	7.7/9.9	8.5/24°C	20.7/23.3	9801K/9710 10K/@23.4

		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	21	5	5	5	7.7	8.2	8.2	23.1	23.3	23.3	8.7	8.4	7.8	240	245	320
Control	74	5	5	5	7.7	8.2	8.2				8.7	8.4	7.8	240	245	305
100%	153	5	5	5	6.9	7.4	7.6	23.0	23.3	23.3	8.9	8.1	7.6	5280	5240	5340
100%	41	5	5	5	6.9	7.4	7.6				8.9	8.1	7.6	5280	5240	5400
Measured/Loaded by:		MF	MF	MF	MF	TR	MF	MF	TR	MF	MF	TR	MF	MF	TR	MF
Recorded by:		MF	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM

Investigators' Signatures
Marla Faircloth
Tobin Rader
Christine Mikulsky
Kim Pearce

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:			0.0	~~0-Dec~~ Hach	MF
Alkalinity:	1150	750	800	hach	TR (Recorded wrong value)
Hardness:	1100	750	630	hach	TR
Total Ammonia:					

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Flagler Bch STP
Address/City:
County: Flagler
Contact/District: S. Bulgrin NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date ~~10-27~~ 10-26* Time ~~16:00~~ 11:50*
Test Beginning: Date 10-27 Time 1620
Test Ending: Date 10/29/92 Time
Test Organism: A. bahia
Life Stage/Age: 2 Days
verified 10/29 KP

* wrong time - Date by TM mf 10/27/92

Test Number: 3 of 3 Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

43380
92 OCT 27.08-01

Remarks:
Rapid test due to unexpected; unannounced Salinity of Effluent. adjusted to 10ppT and 2.7‰

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.07/7.09	8.5/24°C	23.5/23.6	9901K/9850 10K/@23.8°
24 hr	7.07/7.09	8.5/24°C	25.2/25.4	9801K/9720 10K/@23.9°
48 hr	7.07/7.09	8.5/24°C	23.7/23.3	9601K/9710 10K/@24°C

mS/cm mMHOS

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	85	5	5	5	8.1	8.0	7.9	24.0	23.3	23.2	7.5	8.0	7.2	17.1	17.3	17.4
Control	183	5	5	5	8.1	8.0	7.9				7.5	8.0	7.2	17.1	17.3	17.4
100%	366	5	5	5	7.0	7.5	7.7	23.1	23.3	23.1	8.1	7.9	7.2	17.0	17.5	17.6
100%	219	5	5	5	7.0	7.5	7.7				8.1	7.9	7.2	17.0	17.5	17.6
												7.4				
								24hr		Control		7.4				
												7.5				
										100%		7.5				
											* not corrected for Salinity 10/28/92 mf					
Measured/Loaded by:		mf	mf	mf	mf	TR	mf	mf	TR	mf	mf	TR	mf	mf	TR	mf
Recorded by:		TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM

Investigators' Signatures
Marshall Faircloth
Tobin Rader
Christine M. Kubsky
Kim Pearce

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Clz:					
Lab Tot. Resid. Clz:			0.0	Hach	mf
Alkalinity:					
Hardness:					
Total Ammonia:	0.0	0.0	0.0	Hach	mf

Ammonia Meter Slope:
Ammonia Blank: 0
Salinity Sample: 2.7 ppt

Benthic macroinvertebrate taxa list for Flagler Beach Wastewater Treatment Plant, collected by Ponar dredge in the Intracoastal Waterway, Flagler County, on 27 October, 1992. Values represent the average number of individuals per m^2 out of three replicates.

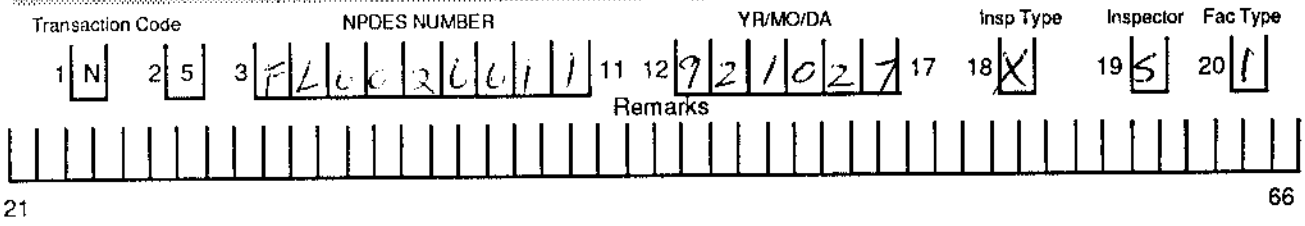
	Reference Site	Test Site 1	Test Site 2
Chordata			
Molgula sp.	–	12.5	74.9
Cnidaria			
Obelia sp.	–	–	12.5
Undetermined Anthozoa	–	12.5	87.3
Cumacea			
Cyclaspis varians	112.3	212.1	324.4
Oxyurostylis smithi	–	25.0	12.5
Decapoda			
Pinnixa sp.	–	–	25.0
Undetermined Decapoda	37.4	–	–
Gastropoda			
Acteocina canaliculata	187.1	274.5	686.1
Crepidula sp.	–	–	25.0
Mangelia sp.	–	–	12.5
Nassarius sp.	12.5	–	–
N. trivittatus	–	–	12.5
N. vibex	62.4	62.4	37.4
Sayella sp. ?	12.5	–	–
Turbonilla conradi	–	–	12.5
Undetermined hydrobiid	–	–	12.5
Malacostraca			
Ampelisca sp.	–	12.5	–
Bowmaniella sp.	49.9	–	–
B. cf. *floridana*	–	25.0	12.5
Cerapus sp.	–	137.2	99.8
Corophium sp.	–	237.0	299.4
Edotea montosa	49.9	–	74.9
E. triloba	–	12.5	–
Exosphaeroma diminuta ?	12.5	–	–
Grandidierella bonnieroides	62.4	25.0	12.5
Mysidopsis cf. *almyra*	49.9	25.0	12.5
Paracaprella tenuis	–	25.0	–
Undetermined amphipod	–	25.0	12.5
Undetermined Corophiidae	25.0	–	–
Undetermined Gammaridae	25.0	–	–
Undetermined Mysidae	–	12.5	12.5
Nemertina			
Undetermined Nemertea	12.5	12.5	12.5
Undetermined nemertean sp. A	12.5	74.9	12.5

Undetermined nemertean sp. B	–	37.4	49.9
Undetermined nemertean sp. C	–	–	12.5
Oligochaeta			
Undetermined Tubificidae	–	49.9	37.4
Pelecypoda			
Brachiodontes exustus	–	–	12.5
Macoma sp.	–	12.5	–
Parvilucina multilineata	–	12.5	–
Rangia cuneata	12.5	12.5	25.0
Sphenia antillensis ?	–	25.0	–
Tagelus sp.	–	–	37.4
T. divisus	–	–	12.5
Undetermined Mytillidae	–	25.0	–
Undetermined pelecypod	12.5	–	25.0
Polychaeta			
Capitella sp.	237.0	–	–
C. capitata	87.3	224.6	62.4
Cistena gouldii	–	–	12.5
Demonax microphthalmus	–	12.5	–
Diopatra cuprea	–	37.4	37.4
Eteone heteropoda	25.0	–	25.0
Glycinde solitaria	–	–	25.0
Laeonereis culveri	12.5	–	–
Leitoscoloplos sp.	–	12.5	–
L. robustus	–	49.9	–
Lepidonotus sublevis	–	–	12.5
Marphysa sanguinea	12.5	–	–
Mediomastus sp.	12.5	74.9	99.8
M. ambiseta	349.3	311.9	1147.7
Podarkeopsis levifuscina	–	–	37.4
Paranaitis speciosa	12.5	12.5	–
Polydora caulleryi	62.4	–	25.0
P. socialis	–	–	12.5
Sabellaria vulgaris	–	37.4	99.8
Streblospio benedicti	1372.3	1072.9	935.6
Undetermined Cirratulidae	–	–	25.0
Undetermined Maldanidae	12.5	–	–
Undetermined Onuphidae	–	12.5	–
Undetermined Phyllodocidae	–	12.5	12.5
Undetermined polychaete	12.5	–	12.5

Phytoplankton taxa list for Flagler Beach Wastewater Treatment Plant, collected via subsurface grabs in the Intracoastal Waterway on 27 October, 1992. Values are densities in #/mL.

	Reference Site	Test Site 1	Test Site 2
Diatoms			
Amphora sp.	51	50	50
Asterionella japonica	480	100	148
Bacillaria paradoxa	–	–	25
Biddulphia sp.	–	–	25
Chaetoceros sp.	202	374	124
Cocconeis sp.	–	–	25
Coscinodiscus sp.	25	–	–
Cyclotella sp.	–	75	50
Cymatosira sp.	–	–	25
Ditylum sp.	51	75	–
Eucampia sp.	202	100	50
Leptocylindrus sp.	25	–	25
Melosira sp.	–	–	25
Navicula sp.	76	174	–
Nitzschia sp.	177	125	124
N. closterium	25	274	99
N. seriata	126	199	124
Operophora sp.	–	–	25
Rhizosolenia sp.	–	25	25
R. setigera	–	25	25
R. stolterforthi	–	125	–
Skeletonema sp.	556	573	742
Thalassionema sp.	101	–	–
Thalassiosira sp.	51	75	124
Thalassiothrix sp.	253	199	25
Unidentified pennate diatom	–	50	74
Cyanophyta			
Anabaena sp.	25	–	–
Chroococcus sp.	25	125	198
Dactylococcopsis sp.	–	–	25
Pyrrhophyta			
Peridinium sp.	25	25	50
Prorocentrum micans	–	25	–

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



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

