Biological Assessment of

Pensacola Main Street Wastewater Treatment Plant

Escambia County

NPDES #FL0021440

Sampled June 1997

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May 1998

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: Pensacola Main Street Wastewater Treatment Plant
County: Escambia
NPDES Number: FL0021440
State Permit Expiration Date: 1 April 1999

Toxics Sampling Inspection (XSI)

Date Sampled: 17 June 1997

Results: No organic pollutants were detected in the effluent. The metals analysis detected aluminum (111 µg/L), iron (674 µg/L), and zinc (26 µg/L) in the discharge. The concentration of iron exceeded the standard for Class III marine waters, (300 µg/L), a violation of Rule 62-302.530(39)FAC.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 17 June 1997

Results: The effluent was not acutely toxic to the cladoceran, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi*, in 48-hour static bioassays.

Impact Bioassessment Inspection (IBI)

Date Sampled: 17 June 1997

Results: While several quantitative measures of benthic macroinvertebrate community health indicated degradation at the test sites, differences in sediment composition between the sites were the likely cause. The changes in sediment composition from those encountered during past studies may be the result of the two hurricanes striking the area in recent years. The pollution-tolerant, burrowing polychaete, *Cossura* sp., was very abundant at the test sites. It is unclear if the Pensacola Main Street discharge or stormwater contributed to the increased mud and silt found at the test sites. The presence of pollution sensitive mysids and cumaceans at the test sites suggested that conditions were not severely degraded there. The phytoplankton data did not indicate that Pensacola Main Street discharge was responsible for any disruption of the algal community in Pensacola Bay.

Water Quality Inspection (WQI)

Date Sampled: 17 June 1997

Results: Effluent fecal and total coliforms complied with Class III water quality standards. Effluent nutrient concentrations were somewhat elevated compared to background levels, especially ammonia and TKN (1.5 mg/L and 3.3 mg/L, respectively). The nutrients were either low or undetected at the reference and test sites. Algal Growth Potential (AGP) levels corresponded to the low nutrients at the study sites, with 0.1 mg dry wt/L at the reference site, 0.3 mg dry wt/L at test site 1 and undetected at test site 2. These were well below the "problem threshold" of 10 mg dry wt/L for marine waters. The effluent AGP was 48.2 mg dry wt/L.

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 City of Pensacola Main Street Sewage Treatment Plant is located on West Government Street in Pensacola, Escambia County, Florida (see map in Appendix). This facility has a design-flow capacity of 20 MGD, and provides advanced treatment for domestic wastewater. The facility's Advanced Wastewater Treatment (AWT) includes pure-oxygen activated-sludge processing, with mechanically-cleaned bar screens, an aerated grit chamber, alum addition for phosphorus removal, primary clarification, lime addition for pH adjustment, nitrification, biological denitrification, polymer addition, and finally chlorination and dechlorination. Flow during this survey was 14.71 MGD.

The state permit limits for the Pensacola Main Street STP are listed in Table 1. In the past year, the facility has exceeded its permit limit for pH on two occasions (see Facility Summary in Appendix). During every month beginning January, 1996, through September, 1996, the annual average total nitrogen limit was exceeded. The fecal coliform level was exceeded once (800 organisms/100 mL) in April, 1996. Further, the facility insufficiently dechlorinated on two separate occasions in 1996 (with total residual chlorine of 0.02 mg/L and 0.78 mg/L). The facility has failed 33% of the toxicity tests performed in the past two years. This toxicity has been attributed to a number of compounds detected in the effluent on the different sample dates, including pentachlorophenol, diazinon, dimethyl phthalate, arsenic, silver, cadmium, zinc, and unidentified organics. A variety of industrial contributors to the Main Street STP (a chemical company, four hospitals, a paperboard manufacturer, a plastics plant, a wood preserving facility, and an electric company) are possible sources for the observed contaminants.

A Consent Order is currently being drafted to bring the facility into compliance with permit conditions, especially with regard to total nitrogen and toxicity. The facility will be required to modify the present process to an anoxic/oxic process.

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 off Fair Point in Pensacola Bay) and two test sites within 50 meters of the discharge (see maps in Appendix). A habitat assessment was performed in situ to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using the water flea, *Ceriodaphnia dubia*, and the shiner, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base, neutral, and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test-site samples. Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected using three replicate Petite Ponar grabs. Phytoplankton were sampled at both reference and test sites via subsurface grabs (Ross 1990). Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential (AGP) tests were performed using *Selenastrum capricornutum* as the test organism for the freshwater effluent (Miller et al. 1978), and *Dunaliella tertiolecta* for the marine receiving water sites (EPA 1974). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Sediment from reference and test sites was analyzed for particle grain size (Ross 1990).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These are briefly discussed here.

Habitat Assessment: Six attributes known to have potential effects on the estuarine biota were evaluated and scored. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Excellent (81-100 points), Good (39-80 points), Fair (25-38 points), or Poor (0-24 points).

Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Flori-

da Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high percent contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such Chang et al. (1992), Farrell (1992), Hudson et al. (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the percent of tubificid oligochaetes, a decrease in the percent of pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel et al. 1994).

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient-enriched conditions in flowing streams.

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, diversity, the number of polychaete taxa, and percent Pelecypoda are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal density, chlorophyll *a*, algal growth potential, and percent tubificidae are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Glenn Butts, Sarah Dimitroff, Laurence Donelan, Nicole Kilburn, and John Bowles (Northwest District), Lyn Burton, Jennifer Eichelberger, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Elizabeth Miller, Urania Quintana, Lisa Tamburello, David Whiting, and Vicki Whiting (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality at the reference site (56 points) was 24% higher than that of test site 1 or 2 (32 points each). The shoreline at the reference site was mostly natural, while those at the test sites consisted mostly of riprap. The test sites were potentially influenced by stormwater runoff from urban Pensacola, and wave action near the test sites is often higher than at the reference site. All sites received low scores for community types present (see Marine Habitat Assessment Sheets in Appendix). The pH was slightly lower at test site 1 (7.4 SU) compared to test site 2 (7.9 SU) or the reference site (8.0 SU) (Table 1). Salinity at the reference site (with 21.1 ppt), was higher than salinity at the test sites (with 19.1 ppt at both). All were adequately oxygenated and similar in clarity. A major difference between the test and reference areas was the surrounding land use, with 100% residential at the reference site and 70% commercial and 30% residential at the test sites (see Physical/Chemical Data Sheets in Appendix).

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

No organic constituents were detected in the effluent. Aluminum, iron, and zinc were measured in the discharge at levels above detection limits (Table 1). The concentration of iron in the effluent (674 µg/L) exceeded Class III marine water quality standards (300 mg/L), a violation of Rule 62-302.530(39) FAC.

Effluent nutrient levels were somewhat elevated compared to background levels, especially ammonia and TKN (1.5 mg/L and 3.3 mg/L, respectively). Orthophosphate (0.29 mg/L) and total phosphorus (0.55 mg/L) levels were also elevated in the effluent. These nutrients were either undetected or present at low concentrations at the reference and test sites (Table 1). Algal Growth Potential levels corresponded to the low nutrient levels at the study sites (reference site = 0.1 mg dry wt/L, test site 1 = 0.3 mg dry wt/L, and test site 2 = undetected). These levels are well below the "problem threshold" of 10

Table 1. Effluent limits and summary of chemistry data.

Pensacola Main Street WWTP	Permit Limits	Effluent Sample	Reference Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
Phenols	≤ 300 *	None Detected	-	-	-
Metals (µg/L)					
Aluminum	≤ 1,500 **	111 A	-	-	-
Arsenic	≤ 50 **	40 U	-	-	-
Cadmium	≤ 9.3 **	0.5 U	-	-	-
Copper	≤ 2.9 **	1.0 U	-	-	-
Chromium	-	10 U	-	-	-
Iron	≤ 300 **	674 A	-	-	-
Lead	≤ 5.6 **	20 U	-	-	-
Mercury	≤ 0.025 **	0.1 U	-	-	-
Nickel	≤ 8.3 **	6 U	-	-	-
Selenium	≤ 71 **	50 U	-	-	-
Silver	≤ 2.3 *	0.4 U	-	-	-
Zinc	≤ 86 **	26 A	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	0.29	0.004 U	0.004 U	0.004 U
Total Phosphorus	≤ 1.0 *a	0.55	0.026 I	0.026 I	0.031 I
Ammonia	-	1.5 A	0.02 U	0.02 U	0.051
Nitrate+Nitrite	-	0.11	0.004 U	0.004 U	0.005 I
TKN	-	3.3	0.38 I	0.48	0.44
Total Nitrogen	6.0-7.0	3.41	-	-	-
General Phys-Chem Parameters					
Habitat Assessment	-	-	56	32	32
D.O. (mg/L) surface	≥ 5.0 *	6.4	6.6	6.5	6.3
D.O. (mg/L) bottom	-	-	5.6	4.3	4.5
pH (SU) surface	6.0-8.5 *	6.9	8.0	7.4	7.9
pH (SU) bottom	-	-	8.0	7.9	7.9
Conductivity (µmhos/cm) surface	-	774	33,646	30,440	30,809
Conductivity (µmhos/cm) bottom	-	-	44,739	44,379	44,387
Temperature (°C) surface	-	31.1	28.3	28.4	28.1
Temperature (°C) bottom	-	-	25.3	24.8	24.8
Salinity (ppt) surface	-	0.4	21.1	19.1	19.1
Salinity (ppt) bottom	-	-	29.0	28.7	28.7
Tot. Residual Chlorine (mg/L)	≤ 0.01 *	-	-	-	-
Flow (MGD)	20.0 *a	-	-	-	-
Tot. Suspended Solids (mg/L)	≤ 8.0 *a	5	18	19	16
B.O.D., 5 day (mg/L)	≤ 8.0 *a	1.8	0.7	1.0	1.3
Turbidity (NTU's)	-	4	2	2	2
Color (PCU's)	-	20	5	0	5
AGP (mg dry wt/L)	-	48.2	0.1 AI	0.3 I	0.1 U
Toxicity					
Bioassay Fish	-	Not toxic	-	-	-
Bioassay Invertebrate	-	Not toxic	-	-	-
Microbiology (# organisms/100 mL)					
Fecal Coliform	200 *	20	-	-	-
Total Coliform	-	20	-	-	-

* Permit limit

** Class III water quality standard

a - Annual average

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

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

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

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

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	54	14	20
Shannon-Weaver Diversity	4.1	1.9	2.2
No. Polychaete Taxa	20	8	10
Community Composition			
% Amphipoda	10	0.0	1
% Cumacea	1	3	2
% Decapoda	4	0.0	1
% Mysidacea	1	3	3
% Nemertea	3	0.0	3
% Pelecypoda	51	2	5
% Polychaeta	24	90	85
% Tubificidae	2	0.0	0.0
% Other	0.0	2	0.0
Functional Feeding Groups			
% Predator/Carnivores	10	3	5
% Surface Deposit Feeders	6	6	5
% Burrowing Deposit Feeders	6	79	75
% Scavengers	4	0.0	1
% Suspension Feeders	54	12	12
% Browser-grazers	4	0.0	1
% Scrapers	1	0.5	0
% Unknown	14	0.0	1
Phytoplankton Algae			
Number of Taxa	11	6	13
Shannon-Weaver Diversity	2.3	1.9	2.4
Chlorophyll a (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	1,044	1,054	1,705
% Blue-green	1	0.0	2
% Green	1	0.0	3
% Diatoms	60	46	51
% Dinoflagellates	4	3	6
% Cryptophytes	34	52	40
AGP (mg dry wt/L)	0.1 AI	0.3 I	0.1 U

A - Value reported is the mean of two or more determinations
I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit
U - Material analyzed for but not detected; value reported is the minimum detection limit

mg dry wt/L used to indicate cultural eutrophication and its consequences in marine waters (Ron Raschke, US EPA, personal communication). The effluent AGP was 48.2 mg dry wt/L.

Effluent total coliforms (20 organisms/100 mL) and fecal coliforms (20 organisms/100 mL) complied with Class III water quality standards (Table 1).

Sediments at the test sites consisted of particles that were predominantly (92%) less than 0.125 mm in diameter. In contrast, the sediments at the reference site were much larger, with 83% of the sample ranging from 0.25 mm to 2.0 mm. Variations in benthic macroinvertebrate communities between test and reference stations are likely related to differences in substrate type, as well as to water quality.

Quantitative measures of benthic macroinvertebrate community health indicated that communities at the test sites were not as good as those at the reference site (Table 2). Figure 1 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.

Taxa richness was substantially higher at the reference site (with 54 taxa), than at either test site (14 and 20 taxa, at test site 1 and 2, respectively) (Table 2). Shannon-Weaver diversity declined by 54% at test site 1 (1.9) and 46% at test site 2 (2.2) compared to the reference site (4.1). Normally, a reduction in the Shannon-Weaver diversity of greater than 25% is a violation of Class III water quality standards. However, because the reference and test site substrates were so different in this study, it is not reasonable to expect them to have similar diversity values. The number of polychaete taxa decreased from 20 at the reference site to 8 and 10 polychaete taxa at test sites 1 and 2, respectively. The test sites were dominated by the pollution tolerant polychaete species, *Cossura* sp., which made up 68% of the total population at test site 1 and 64% at test site 2. The presence of *Cossura* sp. in such high numbers may be related to the substrate type at the test sites, since this is a species of burrowing polychaete normally found in silty sediments (Ewing 1984). Pollution-sensitive pelecypods made up 50% of the reference site popula-

tion, with *Nuculana* sp. being the dominant taxon. In contrast, only 2% and 5% of the test site 1 and test site 2 communities, respectively, consisted of pelecypods. The occurrences of pollution sensitive mysids *(Mysidopsis bigelowi)* and cumaceans *(Cyclaspis varians)*, at the test and reference sites alike, suggested that conditions at the test sites were not grossly degraded.

Past data (FDEP 1992) indicate a shift to poorer quality in the invertebrate community structure at the test sites. In 1991, the community structure at test site 1 was made up of 58% polychaeta, 24% pelecypoda, and 13% decapoda, compared to the current survey in which the community at test site 1 was made up of 90% polychaeta, 2% pelecypoda, and no decapods. A similar shift was seen at test site 2. Previously, the community was made up of 30% polychaeta, 30% pelecypoda, and 19% decapoda and, during this study, changed to 85% polychaeta, 5% pelecypoda, and 1% decapoda. The benthic community at the reference site, on the other hand, seemed improved since the last survey. Consequently, larger differences between test and reference sites were observed during the current study.

These changes in community composition seem to be primarily a result of shifts in the sediment composition at the test sites. In 1991, the test site was composed mainly of shell, gravel, and coarse organic material (see Physical/ Chemical Data Sheet in Appendix), compared to the current study where the sediments were primarily sand, muck, and silt. The reference site was made up of mostly shell, gravel, and mud, consistent with past data.

Figure 2 represents changes in the phytoplankton algal community. As with the macroinvertebrates, larger differences (that is higher percentages) correspond with greater degrees of degradation. Phytoplankton taxa richness was similar at test site 2 and the reference site (with 13 taxa and 11 taxa, respectively), while test site 1 was lower with 6 taxa (Table 2). The Shannon-Weaver diversity index yielded similar values at the sites (with 2.3 at the reference site, 2.4 at test site 2, and 1.9 at test site 1). Algal densities at all three sites were somewhat low, with 1,044 #/mL at the reference site, 1,054 #/mL at test site 1, and 1,705 #/mL at test site 2. The diatom, *Chroomonas* sp., dominated the test and reference sites alike (see taxa list in Appendix). Chlorophyll *a* corresponded with the low algal densities, and was undetected at the reference and test sites.

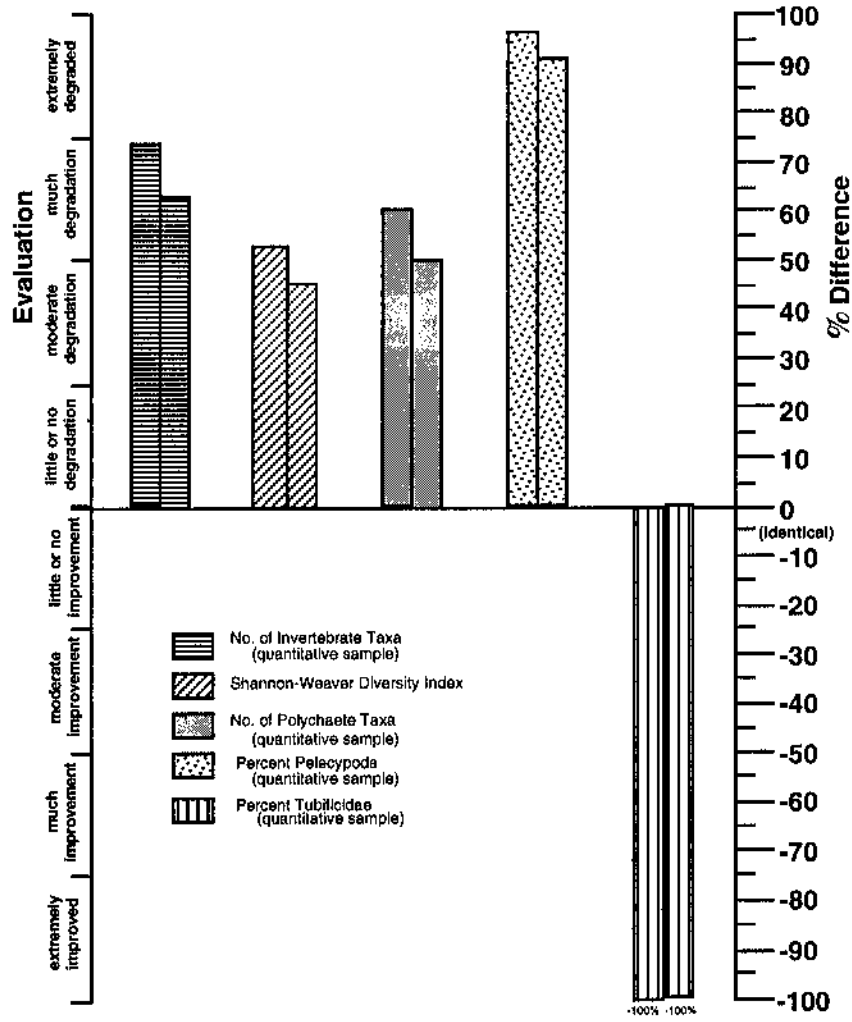


Figure 1. Effect of discharge on the benthic macroinvertebrate community.

Conclusions

No organic constituents were detected in the effluent. Of analyzed metals, the iron concentration was in violation of Class III metals standards for marine waters, Rule 62-302.530(39) FAC.

The sample of effluent was not acutely toxic to the test organisms during the 48-hour bioassays.

Effluent total coliforms and fecal coliforms complied with Class III water quality standards.

Nutrient levels in the effluent were somewhat elevated compared to background levels, especially ammonia and TKN, while nutrients at the study sites were low or undetected. Algal Growth Potential (AGP) levels corresponded to the low nutrient levels at the study sites. All levels were well below the "problem threshold" of 10 mg dry wt/L. The effluent AGP was 48.2 mg dry wt/L.

Quantitative measures of benthic macroinvertebrate community health indicated that communities at the test sites were of poorer quality than those at the reference site. Differences in the sediment composition between the reference and test sites are thought to be responsible for the depauperate communities found at the test sites, and for this reason no violations were cited. Also, the presence of pollution-sensitive mysids and cumaceans at the test sites suggested that conditions were not severely degraded there. As a result, it would not be appropriate to place too much emphasis on the community differences.

The phytoplankton data did not suggest any degradation to the algal communities as a result of the the Pensacola Main Street discharge. Chlorophyll *a* corresponded with the low algal densities, and was undetected at the reference and test sites.

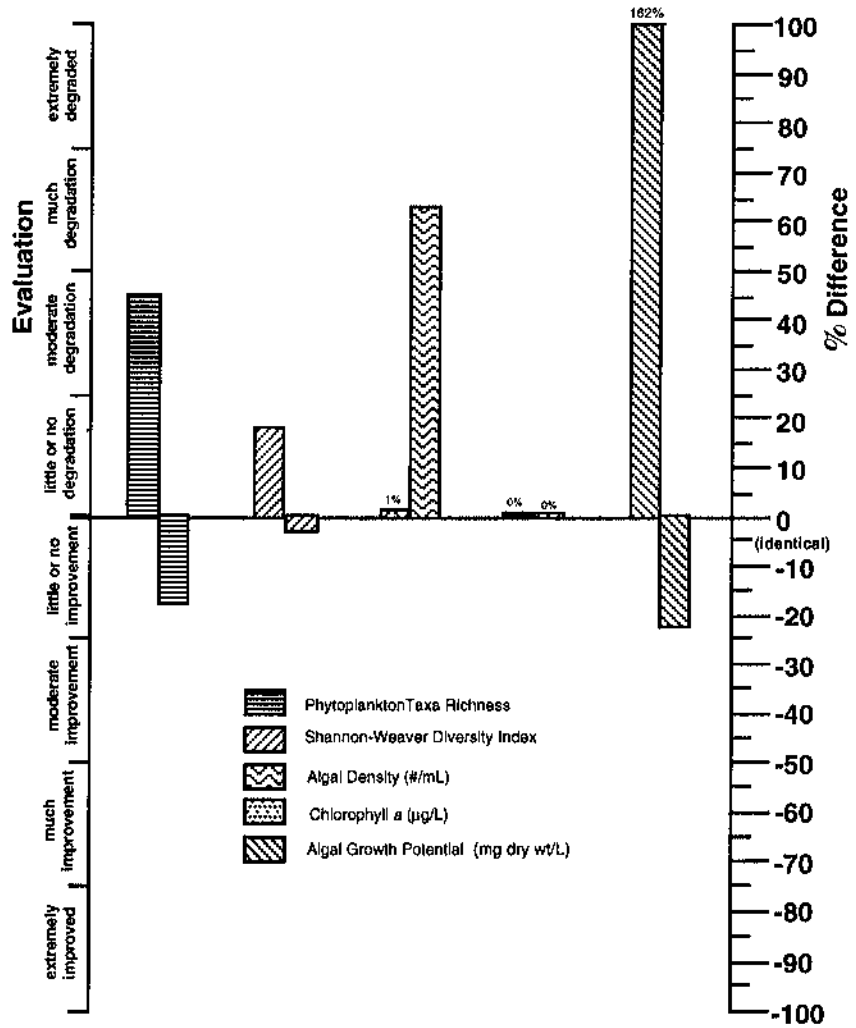


Figure 2. Effect of discharge on the phytoplankton community.

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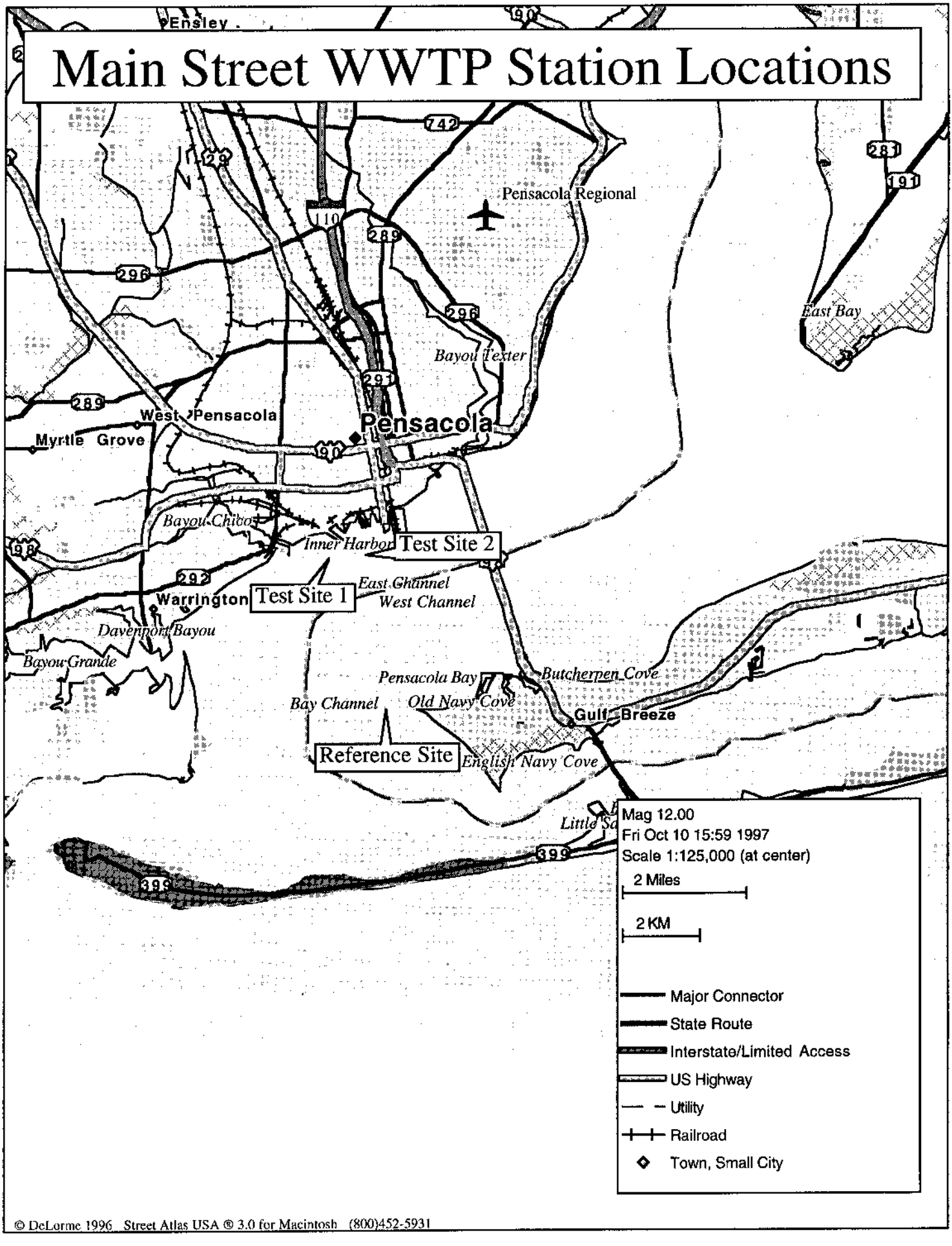
Typical Values for Selected Parameters in Florida Waters

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

Parameter	Percentile Distribution 5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphate	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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

Main Street WWTP Station Locations



© DeLorme 1996 Street Atlas USA ® 3.0 for Macintosh (800)452-5931

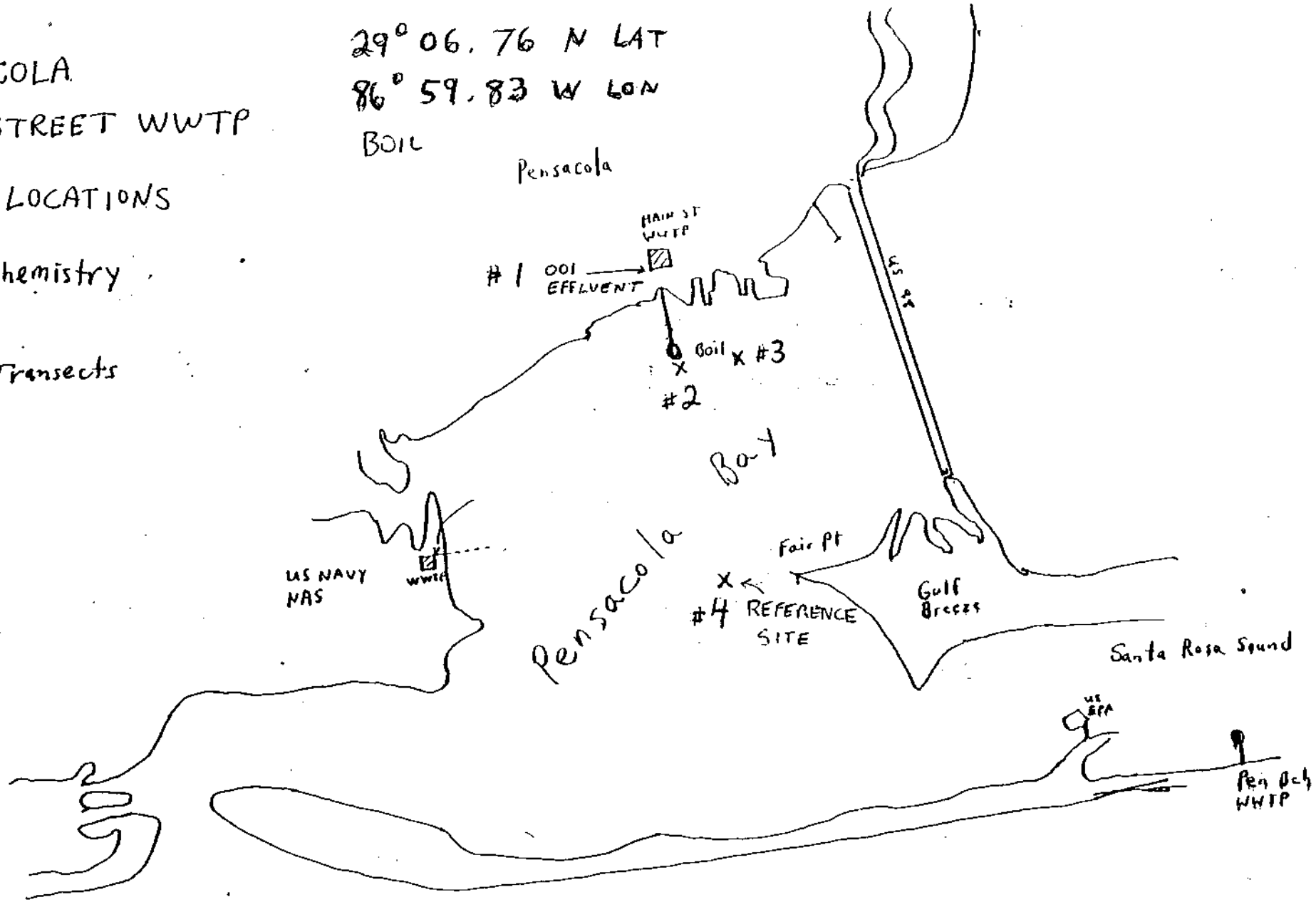
PENSACOLA
MAIN STREET WWTP

SAMPLE LOCATIONS

Water Chemistry

Biology Transects

29° 06.76 N LAT
86° 59.83 W LON
BOIL



Facility Summary

Facility Name: Main Street WWTF Date Summary Prepared: 5/7/97

Location map: 401 West Government Street Pensacola, Florida
County: Escambia
District: Northwest/10

NPDES Permit # FL0021440 expiration date: 9/30/99
State Permit # DO17-212396 expiration date: 4/1/99
Facility Type: Ind. **Dom.** Fed. Agric.

Function of facility: To operate a 20.0 MGD WWTF with final effluent discharge to Pensacola Bay.

Description of treatment process: Treatment includes AWT pure oxygen activated sludge, with mechanical cleaned bar screens, aerated grit chamber, alum addition for phosphorus removal, primary clarification, lime addition for pH adjustment, nitrification and biological denitrification, polymer addition, final clarification, chlorination, and dechlorination.

Receiving waters: Pensacola Bay Classification: I II **III**

Design Flow: 20.0 MGD Mean Flow: 15.5 MGD Flow during survey: 14.71 MGD (DEC 96 MOR)

Discharge is: **Continuous** Intermittent Seasonal Rainfall dependent
Other (describe)
Best time to sample is: N/A

If facility has a mixing zone, give details (size, parameters, etc.) N/A

List effluent limits (attach relevant paperwork):

Parameter	Frequency	Sample Type	Limit (units)
Flow*	Continuous	---	20.0 MGD (ann avg daily flow)
pH-Eff.	Hourly	Grab	6.5 (min) to 8.5 (max)
Chlorine Residual	Daily, 7/week	Grab***	.01 (max)
Dissolved Oxygen	Daily, 7/week	Grab	≥5 mg/L (avg 24 hrs)
CBOD5 - Inf.	Daily, 7/week	24 Hr. Comp.**	N/A
CBOD5 - Eff.	Daily, 7/week	24 Hr. Comp.**	8.0 mg/L (max ann avg)
TSS - Inf.	Daily, 7/week	24 Hr. Comp.**	N/A
TSS - Eff.	Daily, 7/week	24 Hr. Comp.**	8.0 mg/L (max ann avg)
Silver	Monthly	24 Hr. Comp.**	2.3 ug/L (max)
Total N	Daily, 7/week	24 Hr. Comp.**	****
Total P	Daily, 7/week	24 Hr. Comp.**	1.0 mg/L (max ann avg)

Phenols	Quarterly	Grab	300 ug/L (max)
Fecal Coliform	Daily, 7/week	Grab	200/100 mL (max)

* - Flow recorder and totalizer
** - Flow proportional sampling
*** - Prior to discharge to State waters
**** - 7.0 mg/L (max ann avg) at flows up to 16.5 MGD (ann avg daily flow)
6.0 mg/L (max ann avg) at flows equal to or exceeding 16.5 MGD (ann avg daily flow). The 6.0 mg/L total nitrogen limitation shall be effective when the rolling "three month" monthly average daily flow equals or exceeds 16.5 MGD for three consecutive months. At that time, the 7.0 mg/L limitation shall no longer be effective for flows less than 16.5 MGD.

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

OCT 96 - pH excursion of 5.8 S.U.

SEP 96 - Total N (ann avg) excursion of 6.1 mg/L.

AUG 96 - Total N (ann avg) excursion of 6.2 mg/L.

JUL 96 - Total N (ann avg) excursion of 6.2 mg/L.
Fecal excursion of >800/100 mL

JUN 96 - pH excursion of 5.0 S.U.
Total N (ann avg) excursion of 6.4 mg/L

MAY 96 - Total N (ann avg) excursion of 6.7 mg/L.

APR 96 - Fecal excursion of 800/100 mL
Total N (ann avg) excursion of 6.8 mg/L.

MAR 96 - Total N (ann avg) excursion of 6.9 mg/L.

FEB 96 - Total N (ann avg) excursion of 6.9 mg/L.
Chlorine Res. (max) excursion of .78 mg/L.

JAN 96 - Total N (ann avg) excursion of <6.7 mg/L.
Chlorine Res. (max) excursion of .02 mg/L.

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

The latest bioassay reviewed occurred January 1997. Results indicate both test species, Ceridaphnia dubia and Cyprinella leedsi passed the 96 hour static renewal screen acute toxicity tests with a 10% mortality for C. dubia and a 0% mortality for C. leedsi. The permit states that the tests will only be valid if the control mortality does not exceed 10% for either species.

After reviewing the last two years worth of bioassays, the facility failed 33% of the tests.

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

No definite trends can be identified within the data set.

Additional information:

Due to past nitrogen and toxicity problems with the facility's effluent, a Consent Order is currently being drafted to bring the facility into compliance with permit conditions. According to the draft C.O., the facility will be required to submit a permit modification requesting the Department for approval to modify the present treatment process to an anoxic/oxic process. This modification should bring the facility into compliance. In any case, the draft C.O. will require the facility to be in compliance with Department standards by April 1, 1999.

Staff contributing to this review (signature)

Glenn Butts_____ Biologist
_____ Inspector
_____ Engineer
Nikki Kilburn_____ Other
_____ Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0008	DATE (M/D/Y): 06/17-97	TIME 1035	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	COUNTY: SANTA ROSA	LOCATION: OFF FAIR POINT, BUOY 19	FIELD ID/NAME:
control site			# 4

RIPARIAN ZONE/INSTREAM FEATURES

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

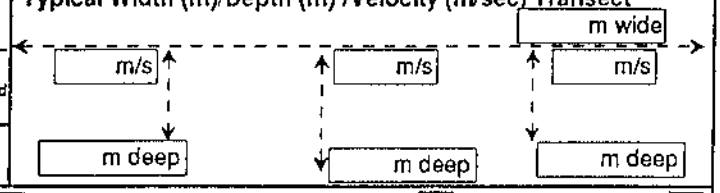
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				100			

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

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

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Artificially Channelized [ ] no [ ] recent, severe [ ] some recovery [ ] mostly recovered

Artificially Impounded [ ] yes more sinuous

High Water Mark: ____ (m above present water level) + ____ (present depth in m) = ____ (m above bed)

Canopy Cover % : Open : [X] Lightly Shaded (11-45%): [ ] Moderately Shaded (46-80%): [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

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

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

Sediment Deposition: Sludge: [ ] Sand smothering: none (slight) moderate severe Silt smothering: none (slight) moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	40	3	PONAR
Leaf Packs or Mats				Mud/Muck/Silt	20		
Aquatic Vegetation				Other: DETRITUS	10		
Rock or Shell Rubble	30			Other:			
Undercut banks/Roots				***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Salinity		Secchi (m):
Top	0.5	28.28	8.01	6.63	33,646	21.1		4
Mid-depth	3.9	26.63	7.98	5.89	37,885	24.5		
Bottom	8	25.33	7.96	5.6	44,759	29.0		

System Type : Stream: [ ] (1st - 2nd order / 3rd - 4th order / 5th - 6th order / 7th order or greater) Lake: [ ] Wetland: [ ] Estuary: [X] Other: [ ]

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

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

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

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

Weather Conditions/Notes: WINDY, RAIN SQUALS, 1.5-2.0 ft Chop

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS, S. Dimitroff, L. Donelan	Glenn Butts	

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

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0008	DATE (M/D/Y): 06-17-97	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: OFF FAIR POINT,	FIELD ID/NAME:
CONTROL SITE	BUOY 19	# 4

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 3	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 15	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 8	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 9	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 13	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 56

COMMENTS: RAIN SQUALS, WINDY & CHOPPY IN BAY

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06-17-97	G. Butts	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8070 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0512	DATE (M/D/Y): 06-17-97	TIME: 0845	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	COUNTY: ESCAMBIA	LOCATION: AT MAIN STREET WWTP BOIL	FIELD ID/NAME: # 2

RIPARIAN ZONE/INSTREAM FEATURES

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

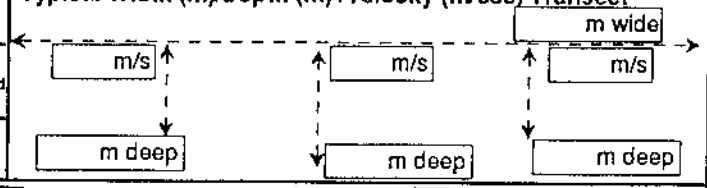
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				30	70		

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

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

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



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

High Water Mark: ____ (m above present water level) + ____ (present depth in m) = ____ (m above bed)

Canopy Cover % : Open : ☒ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☒ Other: ☐ ____

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none ☐ slight ☐ moderate ☐ severe ☐ Silt smothering: none ☐ slight ☐ moderate ☐ severe ☐ Other: CLAY

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	10	3	PONAR
Aquatic Vegetation				Other: CLAY	80		
Rock or Shell Rubble				Other: DETRITUS	10		
Undercut banks/Roots				***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Salinity		Secchi (m):
Top	1.0ft	28.42	7.41	6.47	30440	19.1		4
Mid-depth	3.3m	~~26.5~~	7.93	5.45	38398	→	22.7	
Bottom	9.7m	24.8	7.86	4.3	44.379	28.7		

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

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

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

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

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

Weather Conditions/Notes:
RAIN SQUALS, BAY VERY CHOPPY

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. Butts, S. Dimitroff, L. Donelan	Glenn Butts	

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

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0512	DATE (M/D/Y): 06-17-97	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: AT MAIN STREET WWTP BOIL	FIELD ID/NAME:
TEST SITE 1		# 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 3	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: 12	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: 4	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: 5	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: 5	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 32

COMMENTS: WINDY, Rough (1.5 ft+ Chop), RAIN SQUALS

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06-17-97	G. BUTTS	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0513	DATE (M/D/Y): 06-17-97	TIME: 0950	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Test site 2	ESCAMBIA	50 YDS EAST OF MAIN STREET BOIL	# 3

RIPARIAN ZONE/INSTREAM FEATURES

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

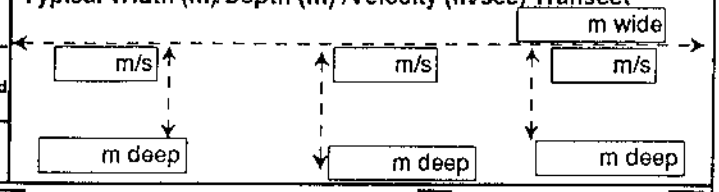
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				30	70		

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

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

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Artificially Channelized ☐ no ☐ recent, severe ☐ some recovery ☐ mostly recovered

Artificially Impounded ☐ yes more sinuous

High Water Mark: ____ (m above present water level) + ____ (present depth in m) = ____ (m above bed)

Canopy Cover % : Open : ☒ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☒ Other: ☐ ____

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: none slight moderate severe Silt smothering: none slight moderate severe Other: CLAY

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	10	3	PONAR
Aquatic Vegetation				Other: CLAY	80		
Rock or Shell Rubble				Other: DETRITUS	10		
Undercut banks/Roots				***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Salinity		Secchi (m):
Top	1.0	29.11	7.93	6.3	30,809	19.1		4
Mid-depth	3.3	26.71	7.95	5.84	38,238	24.5		
Bottom	7.7	24.8	7.88	4.5	44,387	25.7		

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

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

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

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

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

Weather Conditions/Notes: WINDY, RAIN SQUALS, 1.5-2.0 ft Chop

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. Butts, S. Dimitroff, L. Donelan	Glenn Butts	

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

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0J13	DATE (M/D/Y): 06-17-97	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: 50 YDS EAST OF MAIN STREET BOIL	FIELD ID/NAME:
TEST SITE 2		# 3

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 3	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: 12	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: 4	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: 5	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: 5	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: 32

COMMENTS: WINDY, BAY CHOPPY W/ 1.5-2.0 ft SWELLS

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06-17-97	G. BUTTS	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: NW DISTRICT	STORET STATION NUMBER: 33.02.0312	DATE (M/D/Y): 09-24-91	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS: SCHOOLS OF SPANISH MACKERAL CIRCLING BOIL	LOCATION: 50 ft SOUTH OF MAIN STREET BOIL	FIELD ID/NAME: TEST SITE 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
				100		

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):

MAIN STREET WWTP

Estimated Stream Width (range, m):		Estimated Stream Depth (range, m):		yes
High Water Mark (m above bed):		Velocity (range, m/s):		Impounded ☐ Channelized ☐

Canopy Cover % (check box): Open: ☒ Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☒ H_2S

Sediment Oils: Absent: ☐ Slight: ☒ Moderate: ☐ Profuse: ☐

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

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	10
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell	30	Coarse Organic Debris:	30
Sand	10	Mud/Muck (organic):	20

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	27.5	7.6	Secchi Depth (m):	2.4
Mid-depth			pH (SU):	7.8
Bottom	28.3	4.4	Conductivity (µmho/cm):	46400
			Other Parameters:	

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐ BAY

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

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

ANALYSIS DATE: 09-24-91	ANALYST: G. BUTTS	SIGNATURE: Glenn Butts

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Pensacola/Escambia Co Main ST WWTP
Sample Collection: Date 6/16/97 Time 1025
County: Escambia
Test Beginning: Date 6/17/97 Time 1420
Contact / District: Glen Butts NWD
Test Ending: Date 6/19/97 Time 1415
NPDES Permit #: FL00 21440
Organism Batch #: 23 Diluent Batch #: 22
LIMS Sample #: 180972 LIMS Job #: 97-JUN 1719
Organism Age: ~24 h old
Test Organism: Ceriodaphnia dubia
sample log: 6/23/97 KR/MF

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Temperature range: room 24.5-25.5 °C
incubator 25.0-25.9 °C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.2	8.3 @ 24.6 °C	109.6 @ 103.6 1015 @ 1003 @ 25.5 °C 10210 @ 9944
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.4 @ 25.4	8.3 @ 24.5 °C	108.8 @ 103.6 1008 @ 1003 @ 25.4 °C 10140 @ 9944
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.2	8.3 @ 24.6 °C	108.7 @ 103.6 1009 @ 1003 @ 25.3 °C 10180 @ 9944

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctl	A	5	5	5	8.1		8.1	25.3		25.3	7.5		7.4	170		185
Ctl	B	5	5	5			8.1			25.1			7.4			175
Ctl	C	5	5	5			8.1			25.0			7.4			175
Ctl	D	5	5	5			8.1			24.9			7.4			165
100%	A	5	5	5	7.3		8.7	25.4		25.2	7.9		7.3	770		730
100%	B	5	5	5			8.7			25.0			7.3			750
100%	C	5	5	5			8.7			24.9			7.3			750
100%	D	5	5	5			8.7			24.9			7.4			775
Measured/Loaded by:		KR	KS	JS	ND		JS	ND		JS	ND		JS	ND		JS
Recorded by:		DW	KS	JS	KR		JS	KR		JS	KR		JS	KR		JS

Investigators' Signatures
Kellie Ralston
Julie Sharpe
Keri Johnson
Robert Brooks
Marshall Faircloth

Water Quality Parameters (Parameter entries verified by MF 8/21/97)	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			NOT MEASURED		
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	JS
Alkalinity (mg/L as $CaCO_3$):		60	225	Hach	KJ
Hardness (mg/L as $CaCO_3$):		84	265	Hach	KJ
Total ammonia (mg/L as N):		<0.017	0.78	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -60.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

reviewer

form updated 4/01/96

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Pensacola/Escambia Co Main St WWTP
County: Escambia
Contact / District: Glen Bulls NWD
NPDES Permit #: FL0021440
LIMS Sample #: 180972 **LIMS Job #:** 97-JUN 1719
sample log: 6-23-97 KNMF
Test Type: (Screening) / Definitive
Static / Static Renewal / Flow-through
Temperature range: room 24.5-25.5 °C
incubator 25.0-25.9 °C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 6/16/97 Time 1025
Test Beginning: Date 6/17/97 Time 1400
Test Ending: Date 6/19/97 Time 1415
Organism Batch #: 44 **Diluent Batch #:** well
Organism Age: 11 days (hatch 6-6-97)
Test Organism: Cyprinella leedsi

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.2	8.3 @ 24.6°C	109.6 @ 103.6 1015 @ 1003 @ 25.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.4 @ 25.4	8.3 @ 24.5°C	108.8 @ 103.6 (10210 @ 9944) 1005 @ 1003 @ 25.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.2	8.3 @ 24.6°C	108.7 @ 103.6 (10140 @ 9944) 1009 @ 1003 @ 25.3 °C (10180 @ 9944)

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 24 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 48 h
Ctl A	G1	5	5	5	7.9	8.3	8.3	26.3	24.9	24.9	7.5	7.4	7.4	260	255	255
Ctl B	G2	5	5	5	7.9	8.3	8.3	26.3	25.4	24.9	7.5	7.4	7.4	260	260	260
Ctl C	G3	5	5	5	7.9	8.3	8.3	26.2	25.3	24.9	7.6	7.4	7.4	260	255	260
Ctl D	G4	5	5	5	7.9	8.3	8.3	26.2	25.7	25.6	7.6	7.4	7.5	260	265	265
100% A	G6	5	5	5	7.1	8.1	8.4	25.6	25.1	25.3	8.3	7.0	7.1	790	785	790
100% B	G7	5	5	5	7.1	8.1	8.4	25.6	25.6	24.9	8.3	7.2	7.1	790	790	785
100% C	G8	5	5	5	7.1	8.1	8.4	25.5	25.0	24.8	8.3	7.2	7.2	790	780	780
100% D	G9	5	5	5	7.1	8.1	8.4	25.5	25.3	25.2	8.3	7.2	7.3	790	785	790
Measured/Loaded by:		ND	ND	JS	ND	ND	JS	ND	ND	JS	ND	ND	JS	ND	ND	JS
Recorded by:		DW	ND	JS	KR	KJ	ND	KR	KJ	ND	KR	KJ	ND	KR	KJ	ND

Investigators' Signatures
Kellie Ralston
Julie Thomas
Kevin Johnson
Mabell Fairchild
reviewer

form updated 4/01/96

Water Quality Parameters (Parameter entries verified by MF 8-27-97)

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			NOT MEASURED		
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	JS
Alkalinity (mg/L as $CaCO_3$):		114	225	Hach	KJ
Hardness (mg/L as $CaCO_3$):		125	265	Hach	KJ
Total ammonia (mg/L as N):		<0.017	0.78	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: 60.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Benthic macroinvertebrate taxa list for Pensacola Main Street WWTP, collected via Ponar grab samples in Pensacola Bay, on 17 June, 1997. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Amphipoda			
Ampelisca abdita	14	–	–
Ampelisca cristata	222	–	–
Ampelisca sp.	69	–	–
Grandidierella bonnieroides	14	–	–
Listriella barnardi	56	–	14
Listriella sp.	28	–	–
Monoculodes sp.	83	–	–
Cumacea			
Cyclaspis pustulata	28	–	–
Cyclaspis varians	28	14	14
Leucon sp.	–	28	–
Oxyurostylis	–	–	14
Decapoda			
Undetermined Decapoda	56	–	–
Pagurus sp.	69	–	–
Palaemonetes sp.	28	–	–
Penaeidae	14	–	14
Pinnixa sp.	14	–	–
Xanthidae	28	–	–
Diptera			
Polypedilum illinoense grp.	–	14	–
Echinodermata			
Amphiuridae	14	–	–
Ophiuridae	28	–	–
Ephemeroptera			
Leptophlebia sp.	–	14	–
Gastropoda			
Anachis obesa	14	–	–
Caecum pulchellum	28	–	–
Drillia cydia	14	–	–
Mitrella lunata	14	–	–
Nassarius sp.	28	–	–
Strombiformis hemphilli	14	–	–
Urosalpinx sp.	28	–	–
Mysidacea			
Mysidopsis bigelowi	69	42	56
Nemertea			
Undetermined Nemertea	139	–	56
Oligochaeta			
Tubificidae	111	–	–

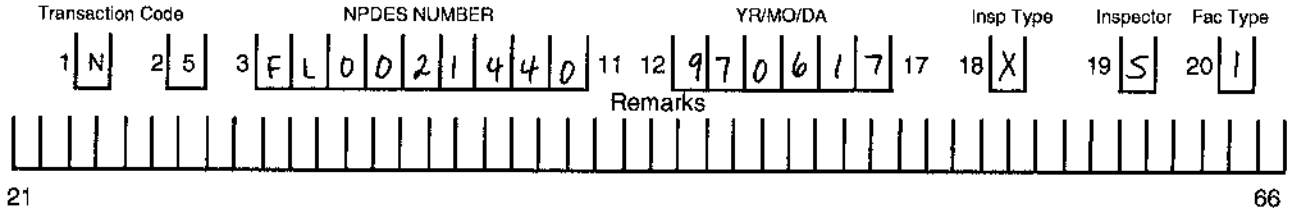
Pelecypoda			
Corbicula sp.	42	–	–
Corbula contracta	–	–	28
Corbula swiftiana	14	–	–
Corbulidae	14	–	–
Crassinella lunulata	69	–	–
Cyrenoida floridana	69	–	–
Mactra fragilis	83	–	14
Nuculana sp.	1875	28	14
Parvilucina multilineata	111	–	–
Undetermined Pelecypoda	14	–	–
Tellina lineata	139	–	–
Tellina sp.	–	–	14
Tellina versicolor	139	–	–
Tellinidae	–	–	1
Polychaeta			
Aricidea fragilis	–	125	14
Aricidea sp.	–	–	111
Bhawania heteroseta	14	–	–
Capitella sp.	–	–	42
Capitellidae	56	14	–
Cirratulidae	56	–	14
Cossura sp.	–	931	1097
Glycera americana	14	–	–
Glycinde sp.	14	–	–
Goniadidae	14	28	14
Goniadides carolinae	139	–	–
Lepidonotus sp.	14	–	–
Lumbrineris sp.	56	14	–
Magelona sp.	–	14	14
Malmgrenia sp.	14	–	–
Mediomastus sp.	56	–	–
Minuspio longibranchiata	278	–	–
Minuspio sp.	14	42	–
Nephtys picta	28	–	–
Nereidae	14	–	–
Nereis acuminata	14	–	–
Ninoe sp.	–	–	14
Paraprionospio pinnata	28	14	56
Paraprionospio sp.	14	14	14
Pectinaria gouldi	14	–	–
Pectinaria regalis	28	–	–
Pilargidae	–	–	14
Undetermined Polychaeta	–	14	–
Polycirrus sp.	28	–	–
Prionospio sp.	14	–	–
Pseudeurythoe ambigua	–	–	14
Scoloplos rubra	28	–	–
Sigambra tentaculata	14	–	–

Spionidae	14	28	14
Spiophanes sp.	14	–	–
Terebellidae	56	–	–
Tharyx sp.	167	–	–
Tanaidacea			
Kalliapseudes sp.	14	–	–

Phytoplankton taxa list and densities (#/mL) for Pensacola Main Street WWTP, collected via subsurface grabs in Pensacola Bay, on 17 June, 1997.

	Reference Site	Test Site 1	Test Site 2
Chlorophyceae			
Undetermined Chlorophyceae	12	–	44
Chrysophyceae			
Rhabdosphaera sp.	–	–	6
Bacillariophycea			
Bacteriastrum sp.	4	–	–
Chaetoceros sp.	321	148	132
Coscinodiscus sp.	–	–	31
Cyclotella sp.	226	242	539
Cymbella sp.	–	5	–
Fragilaria sp.	45	84	125
Nitzschia sp.	4	–	6
Pennales	8	–	31
Rhizosolenia sp.	21	–	6
Cryptophyceae			
Chroomonas sp.	349	543	658
Cyanophyceae			
Aphanocapsa sp.	–	–	25
Merismopedia sp.	8	–	6
Dinophyceae			
Peridinium sp.	8	–	6
Prorocentrum sp.	37	32	88

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)

