

Biological Assessment of

Pensacola Naval Air Station
Wastewater Treatment Plant

Escambia County

NPDES #FL0002500

Sampled April 1996

July 1996

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 NAS
County: Escambia
NPDES Number: FL0002500
State Permit Expiration Date: 31 December 1996

Toxics Sampling Inspection (XSI)

Date Sampled: 9 April 1996

Results: The effluent copper concentration (3.0 µg/L) exceeded the Class III standard of 2.9 µg/L for marine waters, a violation of Rule 62-302.530(24) FAC. No other organics or metals were found at levels exceeding Class III standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 9 April 1996

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 9 April 1996

Results: Although there were some differences between the reference and test site macroinvertebrate populations (attributable to differences in substrate), conditions near the discharge were relatively healthy. Taxa which require good water quality, including the polychaete, *Armandia maculata,* the amphipods, *Monoculodes intermedius, Acanthohaustorius millsi,* and *Eudevenopus honduranus*, and the decapod, *Pagurus politus*, were represented at one or both test sites. The presence of such taxa suggests that conditions near the outfall were satisfactory. The phytoplankton communities at all receiving water sites were low in biomass (density and chlorophyll *a*) and dominated by diatoms and cryptophytes. Overall, the facility did not appear to have an adverse effect on the receiving water algal communities.

Water Quality Inspection (WQI)

Date Sampled: 9 April 1996

Results: Fecal and total coliform measurements complied with Class III water quality standards in the effluent sample and at the three Pensacola Bay stations. Nitrate-nitrite concentrations of the effluent (at 8.0 mg/L) were elevated, resulting in an effluent total nitrogen value (8.77 mg/L) which exceeded the facility's maximum annual average permit limit of 6.0 mg/L. Nitrate-nitrite levels of the Pensacola Bay stations (0.07 mg/L at the reference site, 0.074 mg/L at test site 1, and 0.072 mg/L at test site 2) were higher than those found in approximately 75% of Florida's estuaries. Other effluent nutrients were relatively low (*e.g.*, total phosphorus was 0.13 mg/L, ammonia was 0.15 mg/L), resulting in receiving water values which were low or undetected. All receiving water AGP values were below the "problem threshold" of 10 mg dry wt/L for marine waters.

Introduction

The Pensacola Naval Air Station (NAS) Wastewater Treatment Plant is located in Escambia County, Florida (see maps in Appendix). Although the facility's design flow is 4.0 MGD, its average discharge into the Class III lower Pensacola Bay is only 1.3 MGD. The effluent flow during this survey (1.6 MGD) was similar to the facility's mean flow.

In the past, the facility treated both industrial and domestic wastewater for the Pensacola Naval Air Station. On January 1, 1996, the facility was converted to processing domestic wastewater only. The domestic treatment process includes grit removal, primary clarification, digestion, aeration, mixed media filtration, chlorination, and dechlorination.

Domestic permit limits include: flow (2.35 MGD as a monthly average), pH (6.5 to 8.5 SU), total residual chlorine (0.01 mg/L maximum), dissolved oxygen (4.0 mg/L as an instantaneous minimum, 5.0 mg/L minimum as a daily average), CBOD (8.0 mg/L maximum as an annual average), TSS (8.0 mg/L maximum as an annual average), total nitrogen (6.0 mg/L maximum as an annual average), total phosphorus (1.0 mg/L maximum as an annual average), and fecal coliform bacteria (200 organisms/100 mL maximum). The previous permit limits for industrial wastewater treatment may be found in the Appendix.

In 1995, numerous violations of the industrial wastewater permit occurred, including exceedances for iron, silver, TKN, phenols, oil & grease, cyanide, copper, cadmium, unionized ammonia, and fecal coliforms (see Appendix). In January, 1996, violations of the domestic wastewater permit included exceedances for total nitrogen (11.45 mg/L), silver (1.6 µg/L), and cyanide (6.0 µg/L). A previous bioassessment conducted in August, 1990, determined the facility was not toxic to the test organisms, had no deleterious levels of organics or metals, and was not harming receiving water biota. At that time, however, the effluent was somewhat elevated in nitrate-nitrite concentrations (6.8 mg/L) (FDER 1990).

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	46	25	34
Shannon-Weaver Diversity	4.5	3.4	4.4
% Amphipoda	4.0	5.2	3.0
% Decapoda	1.3	1.5	1.5
% Gastropoda	9.3	18.7	19.3
% Tanaidacea	0.4	3.0	2.2
% Polychaeta	46.2	62.7	61.5
% Pelecypoda	30	7.5	1.5
% Other	9.3	1.4	11
# Polychaete taxa	19	7	13
% Predator/ Carnivore	7.8	5.4	20.7
% Above-Surface Deposit Feeders	20.4	31.6	24.4
% Below Surface Deposit Feeders	10.7	7.5	17.8
% Scavengers	2.9	3.7	1.9
% Suspension Feeders	40.7	35.1	17.0
% Scrapers	5.8	12.2	10.4
Phytoplankton Algae			
Number of Taxa	18	15	17
Shannon-Weaver Diversity	2.8	2.2	2.7
Chlorophyll a (µg/L)	0.5	0.44	0.44
Algal Density (#/mL)	2,447	2,178	2,394
% Blue-green	2.6	4.3	5.2
% Green	3.0	0.9	3.0
% Cryptophyceae	43.8	49.1	39.5
% Diatoms	45.9	44.8	48.9
Algal Growth Potential (mg dry wt/l)	2.9	8.0	0.6

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 at Fair Point) and two test sites bracketing 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 *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms were performed on an effluent sample (Weber 1991). The effluent was analyzed for cyanide, nutrients, metals, and organic constituents (base neutrals and acid extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Collection methods consisted of three Ponar dredge grabs per station (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* for the freshwater effluent, and *Dunaliella tertiolecta* for the marine receiving waters, followed Miller *et al.* (1978) and EPA (1974).

Explanation of Measurements of Community Health

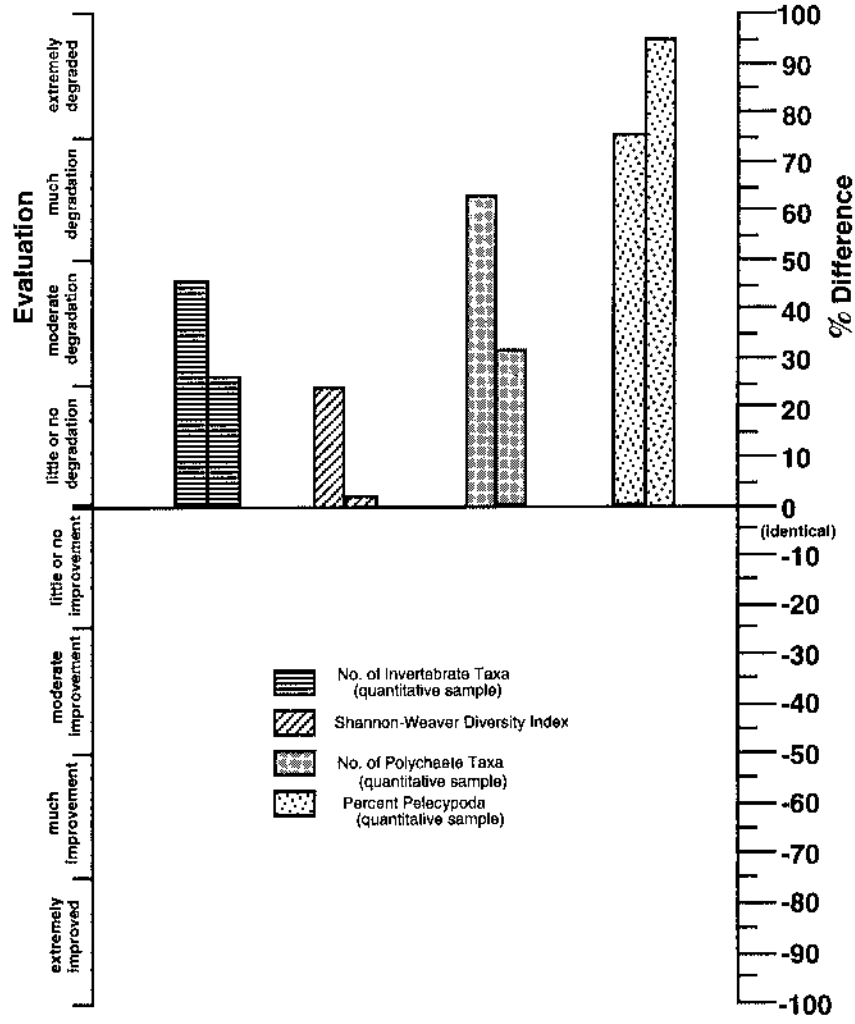
Several different measurements of macroinvertebrate community health have been employed to determine the effects of a discharge. These are briefly discussed here.

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

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % 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. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), 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



Effect of discharge on the benthic macroinvertebrate community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

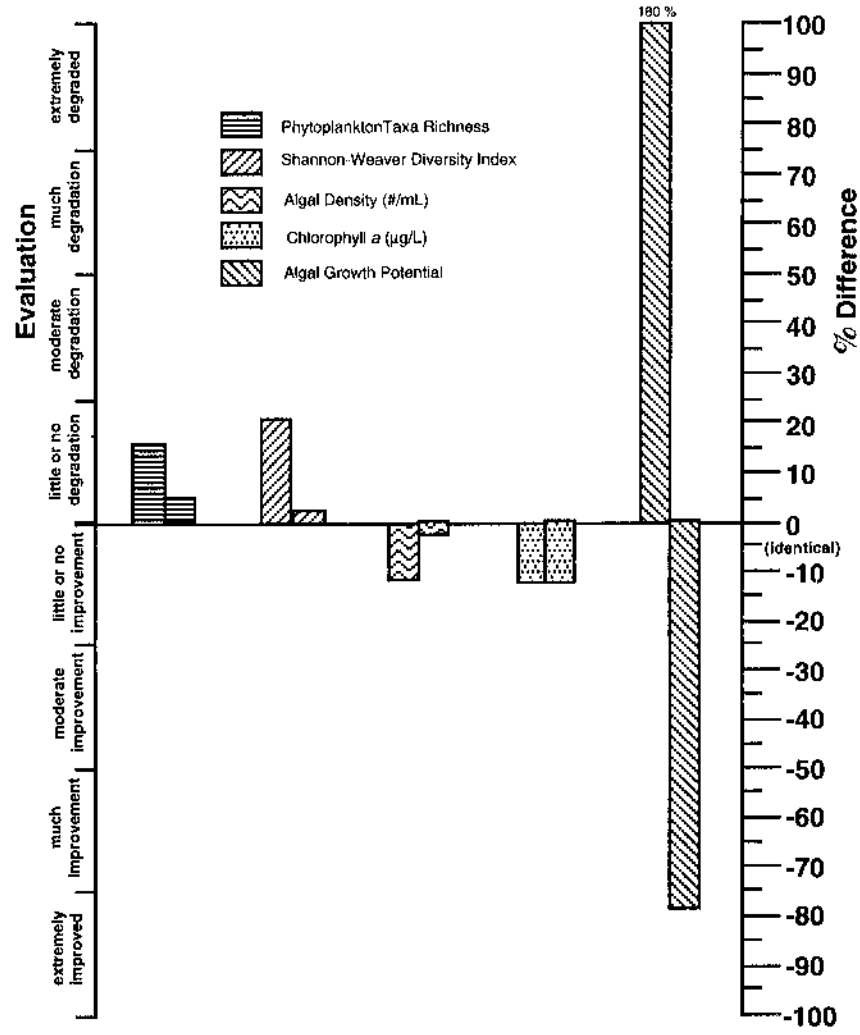
% tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

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, the diversity index, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, algal density, 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: Glenn Butts, Lisa Kelley, and Laurence Donelan (DEP Northwest District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Todd Space, David Whiting, Vicki Whiting, and Greg Wynn (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.



Effect of discharge on the algal community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

Results and Discussion

The Pensacola NAS outfall is located 732 meters offshore, at a depth of 7.9 meters. The littoral zone ranges from 0.5 meters to 3.0 meters (approximately 720 meters from shore). The depth then drops rapidly to 7.9 meters. The area approximately 0.5 mile south of the outfall has been dredged to maintain a turning basin. Habitat quality at test sites 1 and 2 was the same (with 45 points) while the reference site scored somewhat higher (with 59 points). Sample depths ranged between 4.6 m to 5.5 m at all three sites. The sediments at all three sites consisted largely of coarse sand, mud, muck, and silt. The reference site sediments had a higher percentage of sand than did the two test sites.

The water at all three sites was fairly clear, with Secchi readings between 1.1 m and 1.7 m. Dissolved oxygen levels were adequate for

aquatic life, ranging from 8.9 mg/L to 9.0 mg/L at the surface, and from 5.3 mg/L to 6.2 mg/L at the bottom. During this sampling, salinity at the surface of Pensacola Bay ranged from 8.4 ppt to 9.7 ppt, while the bottom salinity ranged from 19.1 ppt at test site 2 to 25.6 ppt at the reference site. Surface layer temperature at all three receiving water sites was measured to be between 17.1 °C and 17.3 °C, while surface pH ranged from 7.4 SU to 7.7 SU.

The effluent was not acutely toxic to the cladoceran, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

Copper (5 µg/L) was detected in the effluent at a concentration below the minimum quantitation limit, but greater than or equal to the minimum detection limit (which was 3.0 µg/L). For regulatory purposes, the effluent copper was considered to be equal to 3.0 µg/L, a value which exceeds the Class III standard of 2.9 µg/L for marine waters. Therefore, effluent copper was in violation of Rule 62-302.530(24) FAC. No other metals were found at levels exceeding Class III standards.

Nitrate-nitrite concentrations of the effluent (at 8.0 mg/L) were elevated, resulting in an effluent total nitrogen value (8.77 mg/L) which exceeded the facility's maximum annual average permit limit of 6.0 mg/L. Nitrate-nitrite levels of the Pensacola Bay stations (0.07 mg/L at the reference site, 0.074 mg/L at test site 1, and 0.072 mg/L at test site 2) were higher than those found in approximately 75% of Florida's estuaries (see Table of Typical Water Quality Values in Appendix). Other effluent nutrients were relatively low (*e.g.*, total phosphorus was 0.13 mg/L, ammonia was 0.15 mg/L), resulting in receiving water values which were low or undetected.

The algal growth potential (AGP) of the effluent (14.1 mg dry wt/L) was fairly low considering the high nitrate-nitrite levels, suggesting either phosphorus limitation in the sample or growth inhibition from the copper present. All receiving water AGP values were below the "problem threshold" of 10 mg dry wt/L for marine waters (Ron Raschke, USEPA, personal communication). AGP was 2.9 mg dry wt/L at the reference site, 8.0 mg dry wt/L at test site 1, and 0.6 mg dry wt/L test site 2. The somewhat higher AGP value at test site 1 was unexplained, since the nutrient levels at all three sites were very similar.

Fecal coliforms were very low in the effluent (with 10 organisms/100 mL) and at all three Pensacola Bay stations (also with 10 organisms/100 mL at each site). Total coliform measurements also complied with Class III standards in the effluent sample (780 organisms/100 mL) and at the receiving water sites (with 10 organisms/100 mL at the reference site, 40 organisms/100 mL at test site 1, and 20 organisms/100 mL at test site 2).

Quantitative measures of benthic macroinvertebrate health suggested that although there were differences between the reference and test site populations, conditions near the discharge were relatively healthy. The Figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site is better than the reference site.

Macroinvertebrate taxa richness was highest at the reference site, with 46 total taxa, decreasing to 34 taxa at test site 2 and 25 taxa at test site 1. Similarly, Shannon-Weaver diversity was highest at the reference site (4.5), slightly less at test site 2 (4.4), and lowest at test site 1 (3.4). Note that the diversity at both test sites was within 25% of the reference site value, and therefore, complied with the biological integrity criterion. The number of polychaete taxa was highest at the reference site (with 19 polychaetes), intermediate at test site 2 (with 13 taxa), and lowest at test site 1 (which had 7 polychaete taxa).

There were similarities between the reference and test sites regarding the pollution sensitivity of the organisms inhabiting them. The moderately pollution sensitive polychaete, *Spiophanes bombyx*, was the dominant organism at all three sites (Farrell 1992). Other pollution sensitive taxa collected at the reference site included the polychaete, *Armandia maculata*, the amphipods, *Acanthohaustorius millsi* and *Metharpinia floridana*, and the echinoderms, *Mellita quinquiesperforata* and *Amphipholis squamata* (Farrell 1992). Similarly, taxa which require good water quality were well represented at the test sites. For example, pollution sensitive taxa occurring at one or both test sites included the polychaete, *Armandia maculata*, the amphipods, *Monoculodes intermedius*, *Acanthohaustorius millsi*, and *Eudevenopus honduranus*, and the decapod, *Pagurus*

politus. The presence of such taxa suggests that conditions near the outfall were satisfactory. Some of the observed changes between test and reference sites (*e.g.*, taxa richness, % pelecypods) could be attributed to substrate differences (higher silt composition at the test sites).

The Figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Phytoplankton taxa richness was very similar at all three receiving water sites. A total of 18 taxa was found at the reference site, 15 taxa were recovered from test site 1, and 17 taxa were collected at test site 2. Algal Shannon-Weaver diversity was 2.8 at the reference site, 2.2 at test site 1, and 2.7 at test site 2. Diatoms were generally the most abundant algal group at all three sites, accounting for approximately 45% or more of the total population. Cryptophytes (*i.e.*, *Chroomonas* sp.) were also common at all three sites, composing from 39.5% to 49.1% of the total phytoplankton community. Chlorophyll *a* concentrations, with 0.5 µg/L at the reference site and 0.44 µg/L at both test sites, were very low compared to other Florida estuaries. Algal density was similarly low at all three sites. Overall, the facility did not appear to have an adverse effect on the receiving water algal communities.

Conclusions

The effluent was not acutely toxic to the cladoceran, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

The effluent copper concentration (3.0 µg/L) exceeded the Class III standard of 2.9 µg/L for marine waters, a violation of Rule 62-302.530(24) FAC. No other organics or metals were found at levels exceeding Class III standards.

Nitrate-nitrite concentrations of the effluent (at 8.0 mg/L) were elevated, resulting in an effluent total nitrogen value (8.77 mg/L) which exceeded the facility's maximum annual average permit limit of 6.0 mg/L. Nitrate-nitrite levels of the Pensacola Bay stations (0.07 mg/L at the reference site, 0.074 mg/L at test site 1, and 0.072 mg/L at test site 2) were higher than those found in approximately 75% of Florida's estuaries. Other effluent nutrients were relatively low (*e.g.*, total phosphorus was 0.13 mg/L, ammonia was 0.15 mg/L), resulting in receiving water values which were low or undetected.

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The phytoplankton communities at all receiving water sites were low in biomass (density and chlorophyll *a*) and dominated by diatoms and cryptophytes. Overall, the facility did not appear to have an adverse effect on the receiving water algal communities.

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Chemistry summary table for

Pensacola NAS	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
Cyanide	0.01 U	-	-	-
Metals (ug/L)				
Aluminum	110 I			
Arsenic	10 U			
Copper	5 I			
Chromium	10 U			
Iron	18 A			
Lead	10 U			
Mercury	0.10 U			
Nickel	4 U			
Silver	0.05 U			
Selenium	30 U			
Zinc	36 A			
Nutrients (mg/L)				
Ortho-phosphate	0.10 A	0.02 U	0.02 U	0.02 U
Total phosphorus	0.13 A	0.021 I	0.029 I	0.033 I
Ammonia	0.15 A	0.02 U	0.029 I	0.028 I
Nitrate+Nitrite	8.0	0.07	0.075 A	0.072
TKN	0.77 A	0.37	0.32	0.38
General Phys-Chem Parameters				
Habitat Assessment	-	59	45	45
D. O. (mg/L) surface	9.4	9.0	8.9	8.9
D.O. (mg/L) bottom	-	6.2	5.3	5.7
pH (SU) surface	7.1	7.7	7.7	7.4
pH (SU) bottom	-	7.8	7.7	7.6
Specific Conductance surface (µhmos/cm)	1289	14500	16400	16600
Specific Conductance bottom (µhmos/cm)	-	40000	36000	35500
Salinity (ppt) surface	0.7	8.4	9.6	9.7
Salinity (ppt) bottom	-	25.6	23.6	19.1
Temperature (°C) surface	21.5	17.3	17.1	17.1
Temperature (°C) bottom	-	17.3	17.2	17.2
Total Suspended Solids (mg/L)	5	10	13	8
Biological Oxygen Demand, 5 day (mg/L)	2.8	1.6	1.6	1.4
Turbidity (NTU)	2	3	3	3
Color (PCU)	15	30	30	30
Hardness (mg CaCO3)	184	1600	1840	1890
Algal Growth Potential (mg dry wt/L)	14.1	2.9	8.0	0.6
Toxicity				
Bioassay Fish	None	-	-	-
Bioassay Invertebrate	None	-	-	-
Microbiological Communities (org/100 mL)				
Fecal Coliform	10	10	10	10
Total Coliform	780	10	40	20

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

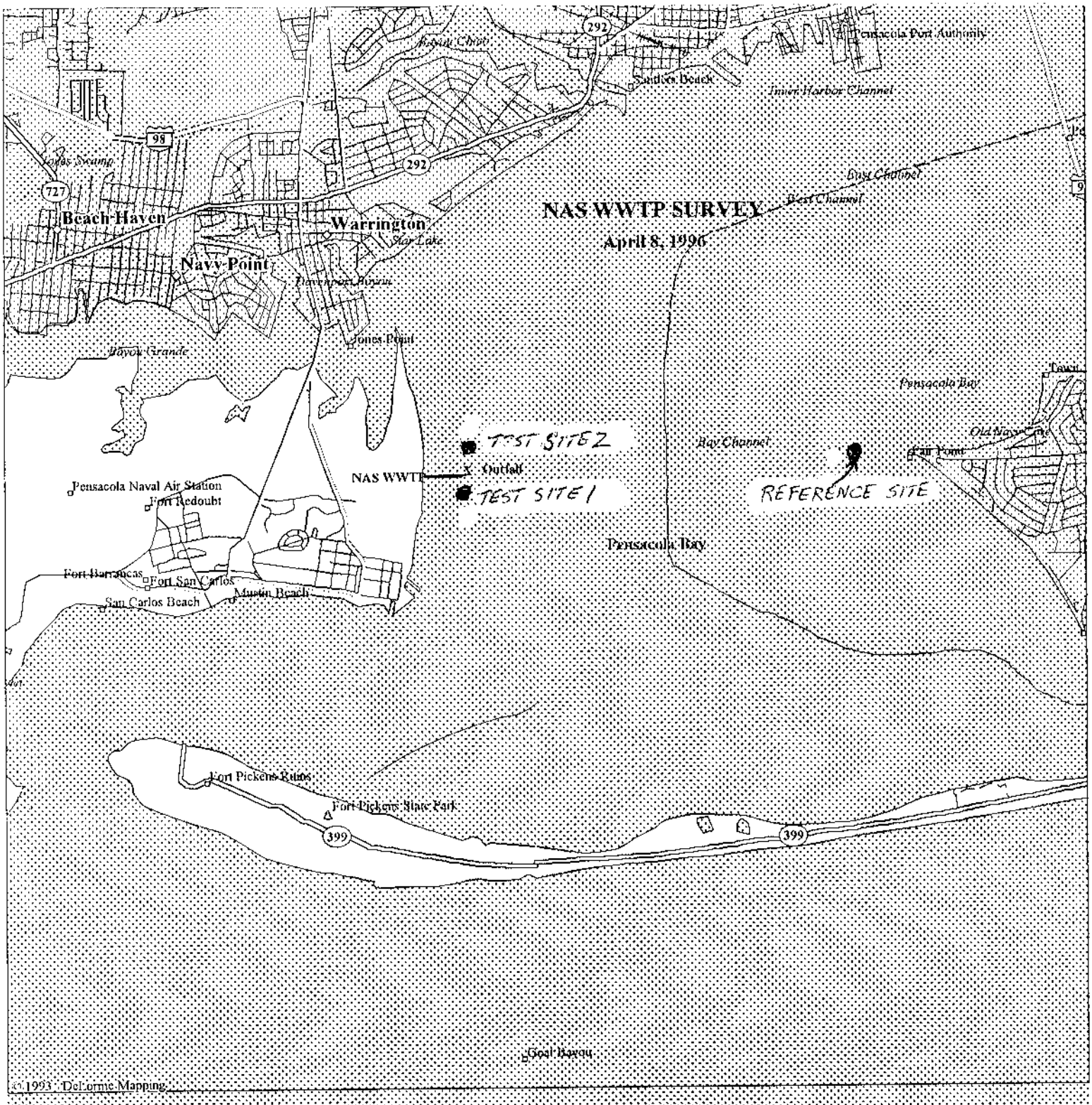
Typical Values for Selected Parameters in Florida Waters

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



LEGEND

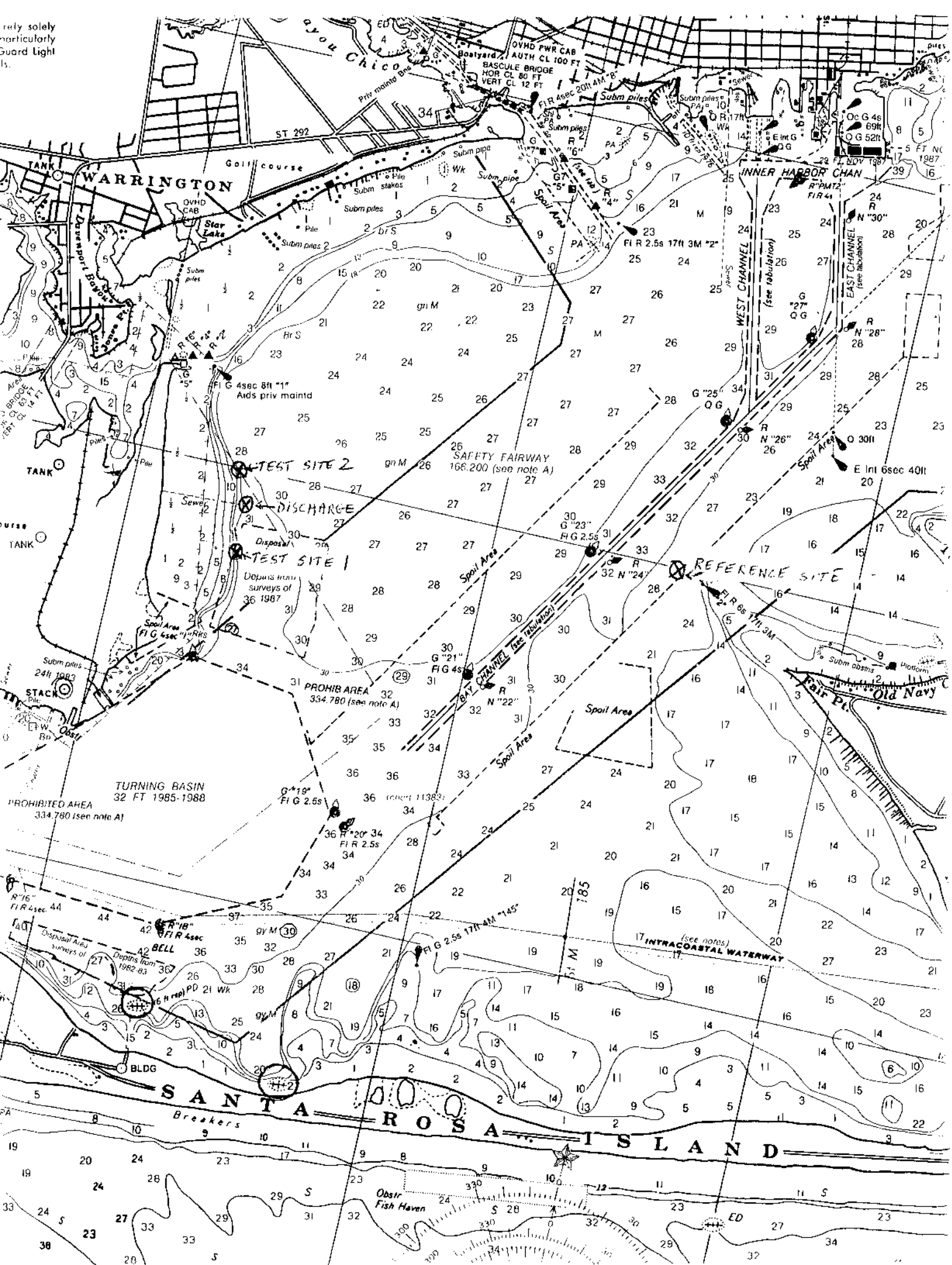
- Population Center
- State Route
- Geo Feature
- Town, Small City
- Park
- US Highway
- County Boundary
- Street, Road
- Trails
- Major Street/Road
- State Route
- US Highway
- Railroad
- River
- Open Water

Scale 1:62,500 (at center)

1 Miles

2 KM

Pensacola Bay
Mag 13.00
Wed Mar 27 10:43:18 1996


WARRINGTON
Bayou Chico
Bayou Texar
Pensacola Bay
Star Lake
Dupont Bayou
Golf course
ST 292
QVHD CAB
Boatyard
QVHD PWR CAB
AUTH CL 100 FT
BASCULE BRIDGE
HOR CL 80 FT
VERT CL 12 FT
Fl R 4sec 20ft 4M "8"
Subm piles
Subm pipe
Subm stakes
Pile
Wk
Fl G 4sec 8ft "1"
Aids priv maintd
TEST SITE 2
TEST SITE 1
DISCHARGE
Disposal Area
Depths from surveys of 36 1987
SAFETY FAIRWAY
166.200 (see note A)
Spoil Area
Fl G 4sec "1" Rks
Subm piles 24ft 1983
STACK
Obstr
PROHIB AREA
334.780 (see note A)
TURNING BASIN
32 FT 1985-1988
PROHIBITED AREA
334.780 (see note A)
G "19" Fl G 2.5s
R "20" 34 Fl R 2.5s
R "16" Fl R 4sec
R "18" Fl R 4sec
BELL
Depths from 1982-83
PD 21 Wk
(6 ft rep)
BLDG
SANTA ROSA ISLAND
Breakers
Obstr
Fish Haven
WEST CHANNEL
(see tabulation)
EAST CHANNEL
(see tabulation)
INNER HARBOR CHAN
R "PMTZ" Fl R 4s
Fl R 2.5s 17ft 3M "2"
G "25" Q G
R N "28"
R N "26"
Q 30ft
E Int 6sec 40ft
G "23" Fl G 2.5s
R N "24"
REFERENCE SITE
Fl R 6s 17ft 3M
BAY CHANNEL (see tabulation)
R N "22"
G "21" Fl G 4s
Subm obstn
Platform
Fair Pt.
Old Navy
INTRACOASTAL WATERWAY
(see notes)
Fl G 2.5s 17ft 4M "145"
185
Oc G 4s 69ft
Q G 52ft
E Int G Q G
R "PMTZ" Fl R 4s
N "30"
G "27" Q G
R N "28"
G "25" Q G
R N "26"
Q 30ft
E Int 6sec 40ft
G "23" Fl G 2.5s
R N "24"
R "2" Fl R 6s 17ft 3M
G "21" Fl G 4s
R N "22"
Fl G 2.5s 17ft 4M "145"
INTRACOASTAL WATERWAY
(see notes)

FACILITY SUMMARY

Facility Name: Naval Air Station Pensacola **Date Summary Prepared**: 3/28/96

Location map: Naval Air Station
Pensacola, FL 32508-6500
Lat/Long: 30°21'47"N/87°15'26" W

County: Escambia **District**: 10/NW

NPDES Permit #	**State Permits:**	**Facility Type:**
FL0002500 expires 12/31/99	Industrial # IO17-194654 issued 09/03/91 expires 08/1/96 Domestic # DC17-258606 issued 12/21/94 expires 12/31/96	Combined Industrial and Domestic

NOTE: The facility is converting its process to handle domestic wastewater only. The facility operated under the industrial permit through December 1995, when cleaning of the plant was completed. The domestic permit (DC17-258606) was implemented on January 1, 1996 in lieu of the industrial permit (IO17-194654).

Function of facility: The facility provides Industrial and Domestic wastewater treatment for the Pensacola Naval Air Station.

Description of treatment process: 4.0 MGD combined industial and domestic WWTP with discharge to Pensacola Bay.

Industrial Process: Grit removal, Industrial comminutor, Primary clarifier, 2 surge tanks, 2 chemical mixing tanks, 2 flocculators, Digestor.

Domestic Process: Grit removal, 4 Primary clarifiers, 2 digestors, aeration basin, 2 secondary clarifiers, 4 mixed media filters, Chlorine Contact Chamber, Dechlorination chamber.

Receiving waters: Pensacola Bay **Classification**: Class III: Propagation, recreation, maintenance of a healthy population of fish and wildlife.

Design Flow: 4.0 MGD **Mean Flow**: 1.631 MGD (2/95 - 1/96) **Flow during survey**: 1.281 MGD (January 1996)

Discharge is: Continuous
The best time to sample is:

If facility has a mixing zone, give details (size, parameters, etc.): None

List effluent limits (attach relevant paperwork):

Industrial Permit # IO17-494654 limits:

Parameter	Frequency	Permit Limit
Flow	Continuous	2.5 MGD max monthly avg 4.0 MGD max daily
BOD5	4 per week	20.0 mg/l
TSS	4 per week	20.0 mg/l
TKN	4 per week	3.0 mg/l
Nitrate/Nitrite	4 per week	n/a
pH	Continuous	6.5 min. 8.5 max.
Fecal Coliform	4 per week	200/100 ml
Chlorine Residual	Continuous	0.01 mg/l (max.)
Dissolved Oxygen	Daily	5.0 mg/l (min.)
Temperature	Continuous	n/a
Turbidity	2 per week	29 NTU's above background
Ammonia	2 per week	n/a (un-ionized ammonia shall not be greater than 0.13 mg/l)
COD	2 per week	125 mg/l
Cadmium	2 per week	5 ug/l
Chromium (total)	2 per week	0.05 mg/l
Copper	2 per week	0.015 mg/l
Cyanide	2 per week	5 ug/l
Detergents	2 per week	0.5 mg/l
Lead	2 per week	0.05 mg/l
Mercury	2 per week	0.1 ug/l
Nickel	2 per week	0.1 mg/l
Phosphorus (Total)	2 per week	3.0 mg/l
Silver	2 per week	0.05 ug/l
Iron	2 per week	0.3 mg/l
Oil & Grease	2 per week	5.0 mg/l
Phenol	2 per week	1 ug/l
Zinc	2 per week	1 mg/l
Dieldrin	2 per year	0.003 ug/l

Domestic Permit # DC17-258606 Permit Limits:

Parameter	Frequency	Permit Limit
Flow	Continuous	2.35 MGD (max. mo. avg. daily flow)
pH - Eff	Continuous	6.5 min. 8.5 max.
Chlorine Residual	Continuous	0.01 mg/l (max.)
Dissolved Oxygen	7 per week	4.0 min.; 5.0 min. daily avg.
CBOD5 - Inf	2 per week	n/a
CBOD5 - Eff	2 per week	8.0 mg/l (max. ann. avg.)
TSS - Inf	2 per week	n/a

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

Previous Bioassessments have not been toxic to the test organisms.

A **FDEP fifth year survey** performed on Aug 6, 1990 revealed the following (see attachment I for complete results summary):

Toxics Sampling Inspection (XSI): "No deleterious levels of cyanide or metals detected."

Compliance Biomonitoring Inspection (CBI) : "Not toxic to *Ceriodaphnia dubia* or *Notropis leedsi*. Stimulatory to *Phytobacterium phosphoreum* (which generally indicates nitrogen enrichment)."

Impact Bioassessment Inspection (IBI): "Macroinvertebrate communities were healthy in vicinity of outfall. Elevated nitrate-nitrite in effluent (6.8 mg/l) appeared to be responsible for high algal growth potential results. This suggests that it may be appropriate to control for nitrate-nitrite, in addition to the current 3.0 mg/l limit on TKN."

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

A CSI was conducted on 12/13/1994 by Greg Smith. Samples were split and NAS results corresponded with FDEP results.

Additional information:

Staff contributing to this review (signature)

Glenn Butts — Biologist
Inspector
Engineer
Lisa Kelley Co-op — Other
Other

TSS - Eff	2 per week	8.0 mg/l (max. ann. avg.)
Total Nitrogen	2 per week	6.0 mg/l (max. ann. avg.)
Total Phosphorus	2 per week	1.0 mg/l (max. ann. avg.)
Fecal Coliform	1 per week	200/100 ml (max.)

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

PERMIT IO17-494654:

PARAMETER	PERMIT LIMIT	VIOLATION
Iron	0.3 mg/l	*12/06/95 = 0.38 mg/l
Silver	0.00005 mg/l	*12/06/95 = 0.001 mg/l
		05/17/95 = 0.0004 mg/l
TKN	3.0 mg/l	*12/14/95 = 5.50 mg/l
		*12/13/95 = 9.86 mg/l
		*12/07/95 = 3.49 mg/l
		08/01/95 = 7.06 mg/l
		07/31/95 = 3.45 mg/l
Phenols	1.0 ug/l	*12/12/95 =11.0 ug/l
		10/25/95 = 10.0 ug/l
Oil & Grease	5.0 mg/l	*12/18/95 = 5.9 mg/l
Cyanide	0.005 mg/l	11/01/95 = 0.007 mg/l
		10/11/95 = 0.007 mg/l
		10/06/95 = 0.007 mg/l
Copper	0.015 mg/l	10/12/95 = 0.018 mg/l
		05/17/95 = 0.016 mg/l
Cadmium	0.005 mg/l	10/11/95 = 0.0075 mg/l
		07/31/95 = 0.0114 mg/l
Un-Ionized Ammonia	0.13 mg/l	08/01/95 = 0.2623 mg/l
Fecal	200col/100ml	07/10/95 = >400col/100ml

*The violations for 12/95 resulted from cleaning the plant in order to convert from industrial to domestic wastewater treatment.

PERMIT DC17-258606

PARAMETER	PERMIT LIMIT	VIOLATION
Total Nitrogen	6.0 mg/l	1/96 Average = 11.45 mg/l
Silver	0.05 ug/l	1/96 Average = 1.6 ug/l
Cyanide	5.0 ug/l	1/96 Average = 6.0 ug/l

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0K24	DATE (M/D/Y): 04/09/96	TIME: 11:05	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: MARKER "R4" NW OF FAIR POINT	FIELD ID/NAME: REFERENCE SITE
REFERENCE SITE		

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	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 ☐

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

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

High Water Mark (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:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	70		PONAR
Leaf Packs or Mats				Mud/Muck/Silt	20		
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)				***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	17.28	7.7	8.99	14500	8.4		1.1
Mid-depth								
Bottom	5.5	17.29	7.82	6.2	40000	25.6		

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: ☐ Bay Choppy

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

Weather Conditions/Notes: Windy, Bay Choppy, Air temp 60°F, wind NW at 15-20 MPH

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS / L. DONELAN	Glenn Butts	04-09-96

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: 33.02.0K24	DATE (M/D/Y): 04/09/96	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: MARKER "R4" NW OF FAIR POINT	FIELD ID/NAME: REFERENCE SITE
REFERENCE SITE		

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations — 8	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 — 20	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 — 11	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 59

COMMENTS: RESIDENTIAL AREA, NO GRASS BEDS IN THIS AREA, GOOD SEDIMENT QUALITY

ANALYSIS DATE:	ANALYST:	SIGNATURE:
04-09-96	G. BUTTS / L. DONELAN	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0119	DATE (M/D/Y): 04/09/96	TIME 09:45	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: 1000 YDS SOUTH OF PENSACOLA NAS OUTFALL	FIELD ID/NAME: TEST SITE 1
TEST SITE 1		

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

Local Watershed NPS Pollution (check box): No evidence ☐ Some potential sources ☒ 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 (draw cross-section & provide at least 3 velocity & depth values)

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

High Water Mark (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:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	70		PONAR
Leaf Packs or Mats				Mud/Muck/Silt	30		
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)				***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	17.12	7.66	8.88	16400	9.6		1.7
Mid-depth								
Bottom	5.2	17.18	7.68	5.26	36000	23.6		

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: ☐ Bay choppy

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

Weather Conditions/Notes: Windy, Bay very choppy, Wind NW at 15-20 MPH
Air temp 60°F

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS / L. DONELAN	Glenn Butts	04-09-9

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: 33.02.0L19	DATE (M/D/Y): 04-09-96	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION:	FIELD ID/NAME:
TEST SITE 1	1000 YDS SOUTH OF PENSACOLA NAS OUTFALL	TEST SITE 1

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 5	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: 14	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: 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: 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: 45

COMMENTS: SURROUNDING AREA DREDGED AS A PORT TURNING BASIN, GOOD GULF FLUSHING, SUBSTRATE MOSTLY HARD SAND

ANALYSIS DATE:	ANALYST:	SIGNATURE:
04-09-96	G. BUTTS/L. DONELAN	Glenn Butts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 3070 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0L11	DATE (M/D/Y): 04/09/96	TIME: 0853	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION:	FIELD ID/NAME:
TEST SITE 2	1000 YDS NORTH OF PENSACOLA NAS OUTFALL	TEST SITE 2

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

Local Watershed NPS Pollution (check box): No evidence ☐ Some potential sources ☒ 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 (draw cross-section & provide at least 3 velocity & depth values)

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

High Water Mark (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:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	80		PONAR
Leaf Packs or Mats				Mud/Muck/Silt	20		
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)				*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	17.11	7.43	8.91	16600	9.7		1.7
Mid-depth								
Bottom	4.6	17.24	7.59	5.65	35500	19.1		

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: ☐ Bay Choppy

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

Weather Conditions/Notes: Windy, Choppy
Wind NW at 15-20 mph, Air Temp 60°F

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS / L. DONELAN	Glenn Butts	04.09.96

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: 33.02.0L11	DATE (M/D/Y): 04/09/96	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION:	FIELD ID/NAME:
TEST SITE 2	1000 YDS NORTH OF PENSACOLA NAS OUTFALL	TEST SITE 2

Habitat Parameter score	Excellent	Good	Fair	Poor
Littoral Alterations 5	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 14	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 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 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 45

COMMENTS:
SAME AS TEST SITE 1

ANALYSIS DATE:	ANALYST:	SIGNATURE:
04-09-96	G. BUTTS / L. DONELAN	Glenn Butts

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Pensacola NAS
County: ESCAMBIA
Contact / District: Glenn Batts / Northwest
NPDES Permit #: FL0002500
LIMS Sample #: 135066 LIMS Job #: 96-APR-09-15
samplelog - 4-12-96
Test Type: Screening / Definitive
Static / Static Renewal | Flow-through
Test Number: 1 of 2
Remarks:

Sample Collection: Date 4/8/96 Time 1100
Test Beginning: Date 4/9/96 Time 1330
Test Ending: Date 4/11/96 Time 13:45
Organism Batch #: 17 Diluent Batch #: 16
Organism Age: <24 hrs
Test Organism: Ceriodaphnia dubia

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	22.4 @ 22.5	8.1 @ 26.0 °C	108.8 @ 106.2 1420 @ 1409 @ 25.4 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.3 @ 21.2	8.1 @ 25.8 °C	108.1 @ 106.2 1404 @ 1409 @ 24.8 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.6	8.5 @ 23.2 °C	105.9 @ 106.2 1416 @ 1409 @ 24.9 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
CTL	A	5	5	5	8.2		8.3	23.3		24.0	9.7		7.6	195		200
CTL	B	5	5	5			8.3			24.0			7.6			200
CTL	C	5	5	5			8.3			24.0			7.7			200
CTL	D	5	5	5			8.3			24.1			7.7			200
100%	A	5	5	5	7.7		8.3	23.5		24.1	7.9		7.7	1125		1235
100%	B	5	5	5			8.4			24.1			7.7			1265
100%	C	5	5	5			8.4			24.1			7.8			1270
100%	D	5	5	5			8.4			24.1			7.8			1270
Measured/Loaded by:		MF	MF	DW	JN		JS	JN		JS	JN		JS	JN		JS
Recorded by:		MF	MF	DW	DB		DW	DB		DW	DB		DW	DB		DW

Investigators' Signatures

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.02	—	Glenn Batts
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	Dr-ICO	JLS
Alkalinity (mg/L as $CaCO_3$):	—	80	95	HACH	JLS
Hardness (mg/L as $CaCO_3$):	—	90	190	HACH	JLS
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -54.7 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

nple Source: Pensacola NAS
County: Escambia
act / District: Glenn Butts / Northwest
ES Permit #: FL0002500
S Sample #: 135066 LIMS Job #: 96-APR-09-15
sample log 4-2-96
Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Number: 2 of 2
narks:

Sample Collection: Date 4/8/96 Time 1100
Test Beginning: Date 4/9/96 Time 1345
Test Ending: Date 4/11/96 Time 13:45
Organism Batch #: 23 Diluent Batch #: well
Organism Age: 8 days
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	22.4 @ 22.4	8.1 @ 26.0 °C	108.8 @ 106.2 1420 @ 1409 @ 25.4 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.3 @ 21.2	8.1 @ 25.8 °C	108.1 @ 106.2 1404 @ 1409 @ 24.8 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.6	8.5 @ 23.2 °C	109.9 @ 106.2 1416 @ 1409 @ 24.9 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
TL A	147	5	5	5	7.7	8.4	8.4	24.3	23.3	23.6	7.5	8.0	7.8	250	245	250
TL B	48	5	5	5	7.7	8.4	8.4	24.1	23.1	23.5	7.5	8.0	7.8	250	245	250
TL C	380	5	5	5	7.7	8.4	8.4	24.1	23.3	23.5	7.6	8.0	7.9	250	245	250
TL D	602	5	5	5	7.7	8.4	8.4	24.0	23.8	23.6	7.6	8.0	7.9	250	245	250
10% A	308	5	5	5	7.4	8.2	8.3	24.1	23.6	23.7	7.8	8.1	7.9	1230	1270	1285
10% B	11	5	5	5	7.4	8.2	8.2	24.1	23.5	23.8	7.8	8.1	7.8	1230	1270	1285
10% C	25	5	5	5	7.4	8.2	8.2	24.1	23.7	23.8	8.0	8.2	7.9	1230	1275	1285
10% D	79	5	5	5	7.4	8.2	8.2	24.1	23.5	23.8	8.0	8.2	7.9	1230	1280	1285
Measured/Loaded by:		DW	MF	DW	DW	MF	JS	DW	MF	JS	DW	MF	JS	DW	MF	JS
Recorded by:		MF	MF	DW	DB	DW	DW	DB	DW	DW	DB	DW	DW	DB	DW	DW

nvestigators' Signatures

Salt Water (Well Water) | 20% Min Water

Water Quality Parameters	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	0.02	—	Glenn Butts
Lab Total Residual Cl2 (mg/L): < 0.03	< 0.03	DR-100	JLS
Alkalinity (mg/L as $CaCO_3$): 120	95	HACH	JLS
Hardness (mg/L as $CaCO_3$): 125	190	HACH	JLS
Total ammonia (mg/L as N): < 0.017	< 0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -54.7 Ammonia Blank: < 0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

viewer form updated 5/05/95

Benthic macroinvertebrate taxa list for Pensacola NAS, collected via Ponar grab samples in Pensacola Bay, on 9 April, 1996. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Nemertea			
Undetermined Nemertea	-	-	3
Polychaeta			
Aricidea sp.	-	5	-
Armandia sp.	19	-	-
Armandia maculata	56	-	32
Bhawania heteroseta	5	-	-
Chaetozone gayheadia	5	-	5
Fabriciola trilobata	9	-	-
Glycera sp.	19	-	-
Goniadides carolinae	14	-	28
Hobsonia florida	42	-	-
Leitoscoloplos sp.	-	9	-
Leitoscoloplos fragilis	9	-	-
Lumbrineris verrilli	9	-	-
Micronephthys sp.	32	-	-
Mooreonuphis sp.	-	-	5
Nephtys sp.	-	5	14
Nephtys picta	5	14	5
Nereis sp.	5	-	-
Pectinaria gouldi	5	-	-
Phyllodoce sp.	19	-	32
Pseudeurythoe sp.	-	-	5
Sabella sp.	-	-	5
Spiophanes bombyx	162	255	102
Sthenelais sp.	5	-	-
Streblospio benedicti	-	-	9
Tharyx sp.	5	42	37
Tharyx annulosus	-	-	37
Travisia sp.	-	-	5
Undetermined Ampharetidae	14	-	-
Undetermined Capitellidae	19	32	46
Undetermined Goniadidae	-	-	5
Undetermined Nephtyidae	5	-	-
Undetermined Onuphidae	-	-	5
Undetermined Opheliidae	-	-	9
Undetermined Sabellidae	-	14	-
Undetermined Spionidae	19	14	-
Undetermined Syllidae	5	-	-
Gastropoda			
Anachis sp.	-	5	-
Caecum sp.	-	-	19

Caecum imbricatum	5	-	-
Caecum johnsoni	46	-	-
Cerithium sp.	14	19	19
Epitonium sp.	-	-	5
Kurtziella limonitella	-	-	5
Marginella apicina	9	-	-
Nassarius vibex	-	5	14
Natica sp.	-	19	14
Natica canrena	19	-	9
Odostomia sp.	-	5	5
Olivella sp.	-	5	-
Olivella nivea	-	-	5
Retusa sp.	-	-	5
Terebra sp.	-	-	5
Terebra protexta	-	14	-
Turbonilla sp.	-	28	19
Undetermined Naticidae	5	-	-
Undetermined Gastropoda	-	9	-
Pelecypoda			
Abra aequalis	5	-	-
Crassinella lunulata	42	-	-
Dinocardium robustum	5	-	-
Dosinia discus	9	14	-
Laevicardium sp.	5	-	-
Nuculana sp.	28	-	-
Nuculana acuta	23	-	-
Nuculana concentrica	83	-	-
Parvilucina multilineata	5	-	-
Tellina sp.	106	9	-
Tellina versicolor	-	9	-
Undetermined Hiatellidae	-	-	5
Undetermined Solenidae	-	-	5
Undetermined Tellinidae	5	14	-
Cumacea			
Cyclaspis sp.	5	-	-
Oxyurostylis smithi	-	5	-
Spilocuma watlingi	-	-	9
Tanaidacea			
Kalliapseudes sp.	5	19	14
Isopoda			
Cyathura polita	5	5	-
Undetermined Anthuridae	-	-	9
Amphipoda			
Acanthohaustorius sp.	5	-	-
Acanthohaustorius millsi	-	-	5
Ampelisca abdita	19	14	-
Corophium sp.	5	-	-
Eudevenopus honduranus	-	5	-
Listriella barnardi	9	14	-

Metharpinia floridana	5	-	-
Monoculodes intermedius	-	-	5
Undetermined Haustoriidae	-	-	9
Decapoda			
Acetes americanus	5	-	-
Pagurus sp.	-	5	-
Pagurus politus	9	5	-
Undetermined Xanthidae	-	-	9
Sipuncula			
Phascolion strombi	42	-	-
Phoronis sp.	-	-	14
Echinodermata			
Amphipholis squamata	5	-	-
Mellita quinquiesperforata	14	-	-
Undetermined Amphiuridae	5	-	-
Undetermined Mellitidae	14	-	-

Phytoplankton taxa list and densities (#/mL) for Pensacola NAS, collected via subsurface grabs in Pensacola Bay, on 9 April, 1996.

	Reference Site	Test Site 1	Test Site 2
Cyanophyceae			
Aphanocapsa sp.	-	62	21
Aphanothece sp.	42	21	51
Chroococcus sp.	21	10	10
Dactylococcopsis sp.	-	-	41
Bacillariophyceae			
Achnanthes sp.	11	-	-
Chaetoceros sp.	515	473	627
Corethron sp.	32	41	-
Cyclotella sp.	378	380	349
Entomoneis sp.	21	-	-
Leptocylindrus sp.	21	10	10
Melosira sp.	42	-	-
Nitzschia sp.	74	51	92
Rhizosolenia sp.	-	-	10
Skeletonema sp.	11	10	10
Synedra sp.	21	10	72
Chlorophyceae			
Ankistrodesmus sp.	11	-	-
Closterium sp.	-	-	10
Pyramimonas sp.	63	-	72
Scenedesmus sp.	-	10	10
Tetraselmis sp.	-	-	10
Undetermined Chlorophyceae	63	10	51
Dinophyceae			
Peridinium sp.	42	10	-
Prorocentrum sp.	-	10	-
Protoperidinium sp.	11	-	-
Cryptophyceae			
Chroomonas sp.	935	1048	853
Cryptomonas sp.	137	21	92

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0002500 11	12 960401 17	18 X	19 S	20 4

Remarks

21 66

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0002500 11	12 960409 17	18 B	19 S	20 4

Remarks

21 66