

Biological Assessment of

Pensacola Naval Air Station WWTP

Escambia County

NPDES #FL0002500

Sampled March 2000

January 2001

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Pensacola Naval Air Station (NAS) WWTP
County:	Escambia
NPDES Permit Number:	FL0002500
Permit Expiration:	01 October 2004

Toxics Sampling Inspection **(XSI)**

Date Sampled: 06 March 2000

Results: Aluminum, iron, magnesium, nickel, and zinc were detected in the effluent and were in compliance with Class III (marine) water quality standards and permit limits. No organic constituents were detected in the effluent.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: 06 March 2000

Results: The effluent sample was not toxic to the vertebrate, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour acute screening bioassays.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: 06 March 2000

Results: Taxa richness and diversity were slightly lower in the test site phytoplankton communities compared to the control site community. The macroinvertebrate communities at the control and test sites were very similar in taxa richness, diversity, and number of polychaete taxa. There was a shift, however, away from pollution-sensitive taxa found at the control site to more pollution-tolerant taxa at the test sites.

Water Quality Inspection **(WQI)**

Date Sampled: 06 March 2000

Results: The effluent pH value (6.3 SU) failed to meet the permit limit (6.5 – 8.5 SU) as well as the Class III water standard (Rule 62-302.530(52) FAC). Effluent nutrient concentrations of nitrate+nitrite (8.8 mg/L), and TKN (1.1 mg/L) may be responsible for the extremely high level of AGP in the effluent sample (160.5 mg dry wt/L). Nutrient and AGP values at the receiving water sites were similar and typical of other Florida estuaries.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Pensacola Naval Air Station (NAS) is in Escambia County, Florida in the City of Pensacola (see locus map in the Appendix). Pensacola NAS has an activated sludge domestic WWTP. Activities at the WWTP include pretreatment (screening and grit removal), primary clarification, flow equalization, nitrification, secondary clarification, denitrification filtering, chlorination, dechlorination, digestion, residual handling, and recirculation. A pretreatment facility for bilge water effluent from naval vessels is also part of the system. The bilge water pretreatment consists of load equalization tanks, oil chamber and tramp oil tanks, waste oil pumps, sludge holding chamber, and effluent pump station to the wastewater treatment facility.

The effluent is continuously discharged into the Class III (marine) waters of Pensacola Bay via a discharge pipe approximately 600 meters from the shore at a depth of nearly 5 meters. The design flow of the wastewater system is 2.35 MGD; the mean flow during this survey was approximately 1.25 MGD.

State Class III water standards and permit limits for the effluent are listed in Table 1. A review of Pensacola NAS WWTP Monthly Operating Reports (MOR's) by the Florida Department of Environmental Protection (FDEP) indicates the facility had an effluent copper concentration exceedance in April 1996, and in 1997 the facility failed acute toxicity screening tests (see Facility Summary in Appendix). The MOR's review also described a chronic toxicity test conducted in December 1999; at that time the effluent had adverse effects on two different test species and was in violation of the 'No Observable Effect Concentration' (NOEC) permit limit for reproduction in *Ceriodaphnia dubia* and for growth in *Pimephales promelas*. There were other permit violations listed in 1999 for total nitrogen, total copper, and total zinc.

Methods

The purpose of this investigation was to determine the effects of the Pensacola NAS WWTP discharge on Pensacola Bay. The WWTP was last inspected for this purpose on April 9, 1996 (FDEP 1996). To establish discharge effects, a comparison of biological community health was made between three field designated sites: a control site and two test sites. The control site was located at channel marker "R4" approximately 1.0 kilometer northwest of Fair Point and about 4.8 kilometers west of the outfall. Test site 1 was 915 meters south of the outfall and test site 2, 915 meters north of the outfall (see map in Appendix).

A Habitat Assessment was performed in situ establishing comparability between sites. Supplemental physical and chemical data was also collected from the effluent and field sites. The effluent from Pensacola NAS was analyzed for nutrients, metals, volatile organics, semi-volatile organics, organonitrogen and phosphorus pesticides. Data for this report was collected on March 6, 2000.

Using the invertebrate species, *Ceriodaphnia dubia*, and the vertebrate species, *Cyprinella leedsi*, as test organisms, acute screening toxicity bioassays were conducted on an effluent sample. Also, bacterial populations were analyzed for total and fecal coliforms.

Quanitative invertebrate sampling was done using a Petite ponar dredge. Benthic macroinvertebrate communities from all field sites were evaluated.

Phytoplankton were sampled by subsurface water bottle grabs. Chlorophyll *a* was determined for the phytoplankton communities using laboratory spectrophotometer analyses. Algal Growth Potential (AGP) was measured via algal response of the test organism *Dunaliella tertiolecta*. All field and laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's), which may be reviewed at www.floridadep.org/labs/sops.htm.

Several measurements of macroinvertebrate and algal community health have been used to determine the effects of the discharge on those community assemblages in the receiving water. These measurements are: algal biomass; community composition; functional feeding groups; habitat assessment; taxa richness, and Shannon-Weaver Diversity Index. For a brief review of each of these measurements, see *Explanation of Measurements of Community Health* in the Appendix.

For graphical purposes, the percent difference for: diatom to bluegreen algae ratio, diversity index, and number of taxa, is calculated as the control site minus the test site divided by the control site. The percent difference for algal density, algal growth potential, % tubificids and chlorophyll *a* is calculated as the test site minus the control site divided by the control site.

Table 1. Effluent limits and summary of chemistry data.

Pensacola NAS WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
Benzene	< 71.28 a *	None detected	-	-	-
Metals (µg/L)					
Aluminum	≤ 1500 **	150 I	-	-	-
Arsenic	≤ 36 **	4.0 U	-	-	-
Cadmium	≤ 9.3 c *	0.040 U	-	-	-
Chromium	≤ 50 **	0.70 U	-	-	-
Copper	≤ 2.9 b *	2.5 U	-	-	-
Iron	≤ 300.0 b *	40 I	-	-	-
Lead	≤5.6 **	0.25 U	-	-	-
Magnesium	-	6.7 A	-	-	-
Nickel	≤ 8.3 **	3.1 I	-	-	-
Selenium	≤ 71 **	1.2 U	-	-	-
Silver	≤0.07 **	0.030 U	-	-	-
Zinc	≤ 86.0 b *	48 A	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	0.86 A	0.020 U	0.020 U	0.020 U
Total phosphorus	< 2.0 b *	0.94 A	0.023 I	0.017 I	0.022 I
Ammonia	-	0.031	0.012 I	0.010 U	0.010 U
Nitrate+Nitrite	-	8.8 A	0.004 U	0.004 U	0.004 U
TKN	-	1.1 A	0.29	0.30 A	0.31
Organic Nitrogen	-	1.069	0.278	0.29	0.30
Total Nitrogen	< 12.0 b *	9.9	0.294	0.304	0.314
AGP (mg dry wt/L)	-	160.5	0.1	0.1	0.2
General Phys-Chem Parameters					
Habitat Assessment Score	-	-	60	47	47
DO (mg/L) - suface	4.0 - 5.0 *	-	7.7	8.1	8.2
DO (mg/L) - mid-depth	4.0 - 5.0 *	-	7.5	7.8	8.0
DO (mg/L) - bottom	4.0 - 5.0 *	-	7.1	7.0	7.1
pH (SU) - surface	6.5-8.5 *	6.3	8.0	8.0	7.9
pH (SU) - mid-depth	6.5-8.5 *	-	8.0	8.0	7.8
pH (SU) - bottom	6.5-8.5 *	-	7.9	7.9	7.1
Conductivity (µmhos/cm) - surface	-	898	44206	38823	39160
Conductivity (µmhos/cm) - mid-depth	-	-	46253	41200	39314
Conductivity (µmhos/cm) - bottom	-	-	51320	51377	51590
Salinity (ppt) - surface	-		28.5	24.8	25
Salinity (ppt) - mid-depth	-	-	29.9	25.6	25.1
Salinity (ppt) - bottom	-	-	33.7	33.5	34
Temperature (°C) - surface	-	22.9	18.9	18.4	18.3
Temperature (°C) - mid-depth	-	-	18.8	18.6	18.5
Temperature (°C) - bottom	-	-	18.6	18.4	18.4
CBOD, 5 day (mg/L)	< 16.0 b *	3.5	1.5	1.4	1.5
Flow (MGD)	2.35 *	1.25	-	-	-
TSS (mg/L)	< 16.0 b *	5.0	-	-	-
Vinyl Chloride	< 80.7 a *	-	-	-	-
Oil and grease	5.0 b *	-	-	-	-
Toxicity (48-hour static, screening bioassay)					
Bioassay - Vertebrate	-	Not Toxic	-	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-	-
Microbiology (# counts/100 ml)					
Fecal Coliforms	800 b *	<10	-	-	-
Total Coliforms	≤ 2400 **	<10	-	-	-

A - Value reported is the mean of two or more determinations
I - Value reported is < the MQL, and ≥ the MDL
U - Analyzed for but not detected; value reported is the MDL

* Permit Limit
** Class III water quality standard
a - Annual Average
b - Daily Maximum
c - Single Sample

Table 2. Community structure of control and test sites.

Pensacola NAS WWTP	Control Site	Test Site 1	Test Site 2
Macroinvertebrate Quantitative			
Number of Taxa	39	38	39
Shannon-Weaver diversity	4.26	4.36	4.38
Number of Polychaete Taxa	26	21	24
Community Composition			
% Amphipoda	1.3	10.9	12.3
% Cumacea	9.8	0.9	3.5
% Gastropoda	0.0	2.3	0.6
% Nemertea	4.8	4.1	4.1
% Pelecypoda	9.3	7.2	10.6
% Polychaeta	70.5	48.4	65.7
% Tubificidae	2.8	21.7	0.0
% Other	1.6	4.2	2.9
Functional Feeding Groups			
% Browsers-grazers	0.6	3.4	6.2
% Burrowing Deposit Feeders	54.4	36.7	16.5
% Predators/Carnivores	11.0	14.9	18.1
% Scavengers	1.3	3.9	6.2
% Scrapers	0.0	1.7	0.3
% Surface Deposit Feeders	7.8	13.4	24.6
% Suspension Feeders	23.9	25.6	25.0
% Unknown	1.0	0.6	3.2
Phytoplankton Algae			
Number of Taxa	11	8	7
Shannon-Weaver diversity	1.54	1.11	1.01
Chlorophyll *a* (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	7147.4	10158.7	7590.1
% Brown	0.3	0.0	0.0
% Cryptophytes	0.0	0.7	0.2
% Diatoms	92.9	97.5	97.0
% Dinoflagellates	0.3	0.2	0.5
% Green	6.6	1.6	2.3
AGP (mg dry wt/L)	0.1	0.1	0.2

The Florida Department of Environmental Protection personnel involved in this investigation were the field biologist from the Northwest District: Glenn Butts, and personnel from the Central Biology Laboratory in Tallahassee Ken Espy, Marshall Faircloth, Michael Heyn, Joy Jackson, Edwin Loschi, Elizabeth Miller, Urania Quintana, Johnny Richardson, Julie Riley, and Steve Wolfe. The Point Source Studies Review Committee: Dr. Wayne Magley, Michael Tanski, Chuck Ziegmont, and District representatives reviewed this report.

Results

The results for this report are presented in Tables 1–3.

Discussion

The metals aluminum, iron, magnesium, nickel, and zinc were all detected in the effluent at levels that complied with Class III (marine) water quality standards and permit limits (Table 1). No organic constituents were detected in the effluent.

An acute screening bioassay tshowed no toxicity to the vertebrate *Ceriodaphnia dubia* or to the invertebrate *Cyprinella leedsi* (see Bioassay Bench Sheets in Appendix).

All of the physical/chemical parameters were similar among the three study sites (Table 1). The effluent pH was 6.3 SU which failed to comply with the facilty permit limit and Class III water quality standard (Rule 62-302.530(52) FAC). The effluent temperature (22.9°C) was approximately 4°C warmer than ambient water temperatures measured at the study sites. Effluent conductivity was 898 µmhos/cm. Bottom salinity values at the study sites ranged from 33.5 ppt to 34 ppt (Table 1 and Field Data sheets in the Appendix).

CBOD results complied with permit limits and Class III water quality standards (Table 1).

Table 3. Sediment analysis of control and test sites.

Pensacola NAS WWTP	Control Site	Test Site 1	Test Site 2
Sediment Particle Size (%Vol)			
< 0.063 mm	81.5	79 A	83.1
0.063-0.125 mm	10.3	11 A	11.0
0.125-0.25 mm	5.4	5.7 A	4.37
0.25-0.5 mm	2.4	3.3 A	1.4
0.5-2.0 mm	0.4	0.48 A	0.2
> 2.0 mm % total dry weight	0.5	0.38 A	0.5
A - Value reported is the mean of two or more determinations			

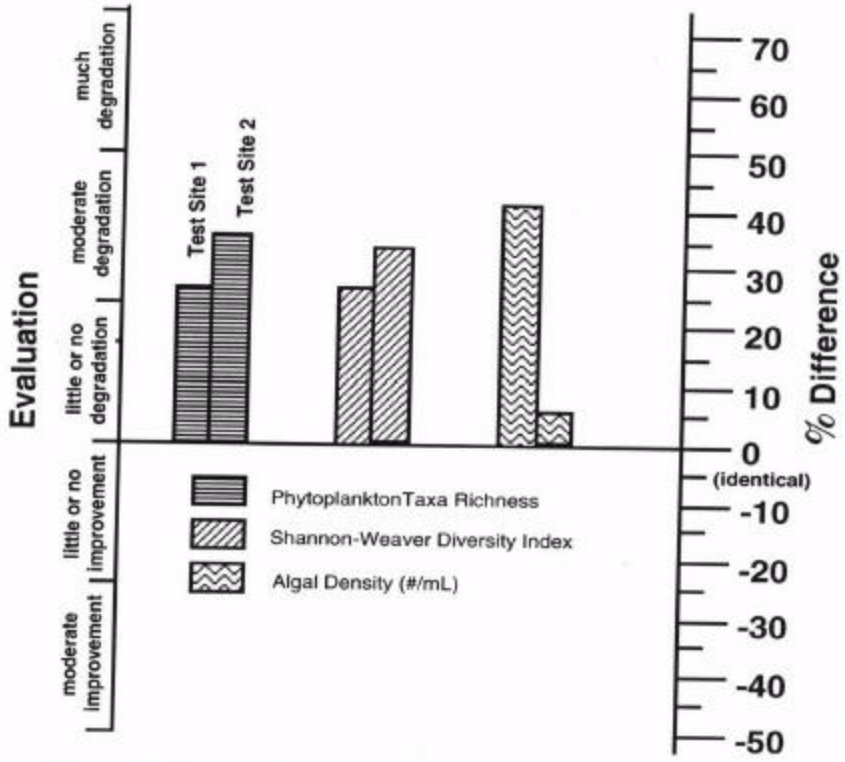


Figure 1. Effect of discharge on the algal communities.

Effluent nutrients were in compliance with the facility's permit limits (Table 1). However, these levels were much higher than those measured in the receiving waters and probably contributed to the extremely elevated AGP value (160.5 mg dry wt/L) in the effluent sample (Table 1).

All receiving water AGP values were well below the 10 mg dry wt/L "problem threshold" for marine waters (Ron Raschke, USEPA, pers. comm.) (Table 1). The nutrient concentrations at the control and test sites were within a narrow range of values, between the 5th–20th percentile compared to other typical estuaries in Florida (see *Typical Values for Selected Parameters in Florida Waters*).

Sediment particle sizes were comparable among the study sites (Table 3). For example, the smallest grain size category (< 0.063 mm) accounted for 81.5 % of the sample volume at the control site, 79 % of the volume at test site 1, and 83.1 % of the volume at test site 2.

At the test sites there was a slight increase in algal density with decreases in phytoplankton diversity and taxa richness compared to the control site (Table 2 and Figure 1). Although the number of taxa and diversity were somewhat lower at the test sites, the values were low throughout the study area indicating sources of stress in addition to the effluent.

Habitat assessment scores placed both test sites, with 47 points each, in the "fair" category and the control site with 60 points in the "good" category. The test sites lost points due to littoral alterations and fewer community types (see Habitat Assessment Field Sheet in Appendix).

The macroinvertebrate communities at the three study sites were similar (Table 2 and Figure 2). For example diversity at the control site was 4.26 and there were 39 total taxa, compared to a diversity value of 4.36 and 38 taxa at test site 1, and 4.38 and 39 taxa at test site 2 (see Table 2 and Taxa Lists in Appendix).

There was a decrease in the number of pollution-sensitive cu-

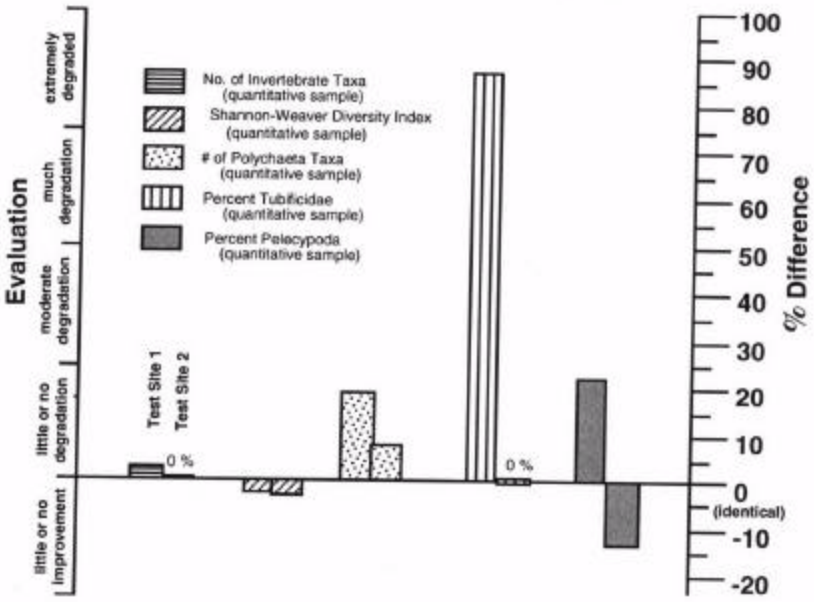


Figure 2. Effect of discharge on the invertebrate community.

maceans at both test sites compared to the control site (Table 2). There was a decrease of 90% at test site 1 and a 64% decrease at test site 2 (Table 2). Further, there was a 19% decrease in number of polychaete taxa at test site 1 and an 8% decline at test site 2, compared to the control site (Table 2). The single dominant taxa at test site 1 was the amphipod, *Ampelisca abdita* with 10% community contribution. Tubificid worms were also common at test site 1 with 22% contribution. At the control site, the polychaetes, *Leitscoloplos* sp. and *Notomastus* sp., were codominant with 16% combined community contribution. Tubificid worms and *Ampelisca abdita* are generally considered pollution-tolerant organisms (Farrell 1992).

Shifts in community structure may reflect the higher nutrient levels at the test sites as a result of the effluent. Dilution effects and tidal conditions in Pensacola Bay, however, may to some extent mitigate the nutrient inputs from Pensacola NAS effluent.

References

Anonymous (EA Engineering, Science, and Technology and Tetra Tech, Inc). 1994. Bioassessment for the Nonpoint Source Program. Draft. Available from: FDEP, Tallahassee, FL 32399-2400.

Barbour MT, Gerritsen J, White JS (Tetra Tech, Inc). 1996. Development of the Stream Condition Index (SCI) for Florida. Owings Mills (MD): FDEP. 105p. Available from: FDEP, Tallahassee, FL 32399-2400.

Farrell DH. 1992. A Community Based Metric for Marine Benthos [DRAFT]. Fla. Dept. Environ. Reg. SW Dist. Office. 15p.

FDEP. 1992. Biological Assessment of Pensacola Naval Air Station, Escambia County. Tallahassee (FL): FDEP Biology Section. 5p. Available from: FDEP, Tallahassee (FL) 32399-2400.

FDEP. 1994. Lake Bioassessments for the Determination of Nonpoint Source Impairment in Florida. Tallahassee (FL): FDEP Biology Section. 73p. Available from: FDEP, Tallahassee, FL 32399-2400.

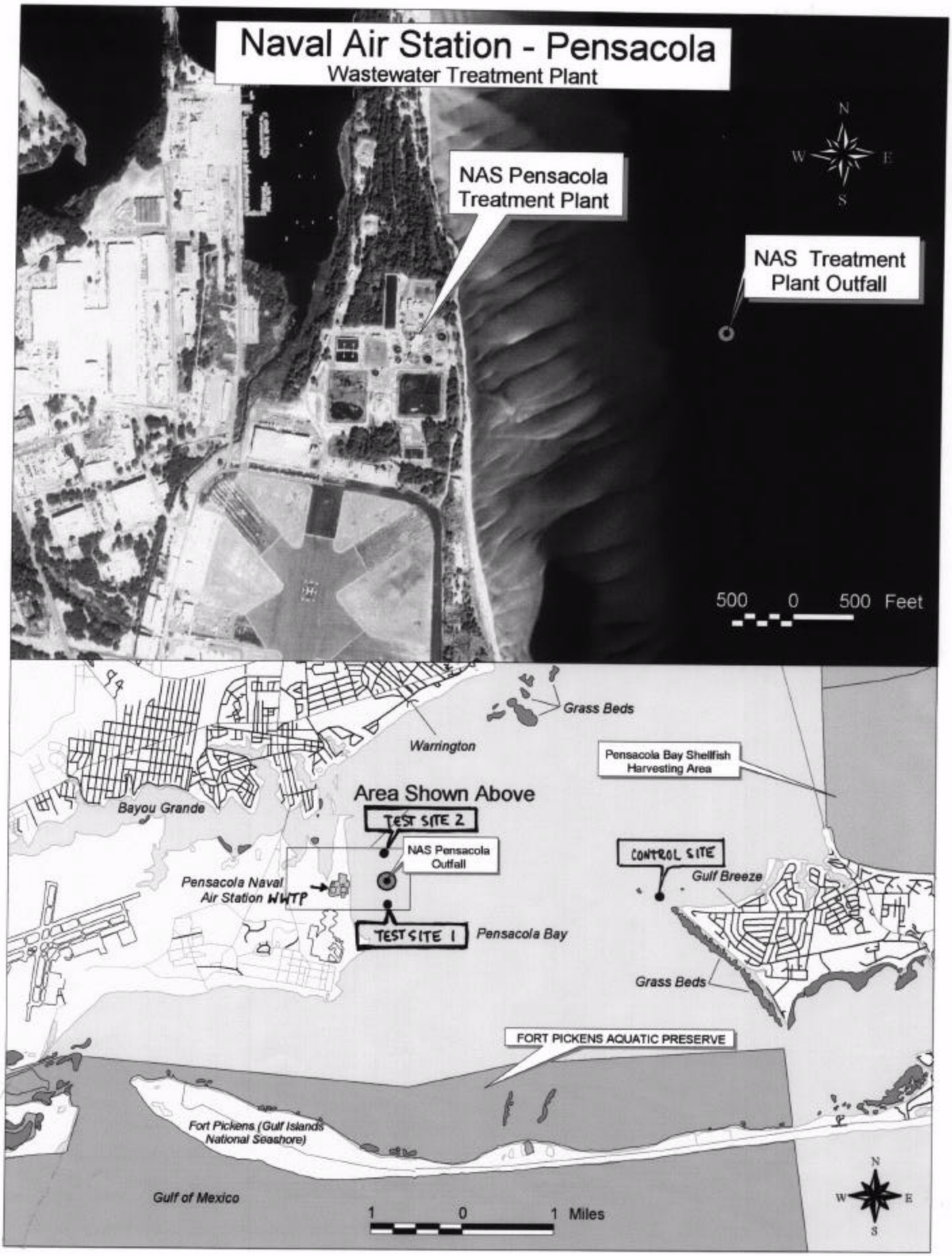
FDEP. 1996. Biological Assessment of Pensacola Naval Air Station, Escambia County. Tallahassee (FL): FDEP Biology Section. 5p. Available from: FDEP, Tallahassee (FL) 32399-2400.

Miller WE, Maloney TE, Greene JC. 1978. The *Selenastrum capricornutum* Printz Algal Assay Bottle Test. Cincinnati: USEPA, EPA-600/9-78-018. 126p.

Raschke RL, Schultz DA. 1987. The Use of the Algal Growth Potential Test for Data Assessment. J Wat Pollution Control Federation 59(4):222-227.

Ross LT. 1990. Methods for Aquatic Biology. Tallahassee (FL): FDEP Tech Series 10(1). 47p. Available from: FDEP, Tallahassee, FL 32399-2400.

Weber CI. 1993. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 4th ed. Cincinnati: USEPA, EPA/600/4-90/027. 216p.


Naval Air Station - Pensacola
Wastewater Treatment Plant
NAS Pensacola Treatment Plant
NAS Treatment Plant Outfall
N
W
E
S
500 0 500 Feet
Grass Beds
Warrington
Pensacola Bay Shellfish Harvesting Area
Area Shown Above
Bayou Grande
TEST SITE 2
NAS Pensacola Outfall
CONTROL SITE
Gulf Breeze
Pensacola Naval Air Station WWTP
TEST SITE 1
Pensacola Bay
Grass Beds
FORT PICKENS AQUATIC PRESERVE
Fort Pickens (Gulf Islands National Seashore)
Gulf of Mexico
1 0 1 Miles

Typical Values for Selected Parameters in Florida Waters

Pensacola NAS WWTP

Estuaries Percentile Distribution (690 stations)

Control Site

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	**4.01**	**4.53**	4.98	4.26
Dredge Taxa Richness	4	6	9	11	15	18.5	25	**35**	**41**	62	90	39
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	1.0
TKN	**0.26**	**0.34**	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49	0.29
NH3+NH4	**0.01**	**0.02**	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28	0.012
NO2+NO3	0.00	**0.00**	**0.01**	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23	0.004
Total Phosphorus	0.01	**0.02**	**0.06**	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59	0.023
Ortho-Phosphate	0.01	**0.02**	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44	0.020
Turbidity	**<3.50**	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75	0

Test Site 1

Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	**4.01**	**4.53**	4.98	4.36
Dredge Taxa Richness	4	6	9	11	15	18	25	**35**	**41**	62	90	38
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	1.0
TKN	**0.26**	**0.34**	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49	0.30
NH3+NH4	**0.01**	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28	0.010
NO2+NO3	0.00	**0.00**	**0.01**	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23	0.004
Total Phosphorus	**0.01**	**0.02**	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59	0.017
Ortho-Phosphate	0.01	**0.02**	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44	0.020
Turbidity	**<3.50**	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75	0

Test Site 2

Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	**4.01**	**4.53**	4.98	4.38
Dredge Taxa Richness	4	6	9	11	15	18	25	**35**	**41**	62	90	39
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	1.0
TKN	**0.26**	**0.34**	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49	0.31
NH3+NH4	**0.01**	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28	0.010
NO2+NO3	0.00	**0.00**	**0.01**	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23	0.004
Total Phosphorus	0.01	**0.02**	**0.06**	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59	0.022
Ortho-Phosphate	0.01	**0.02**	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44	0.020
Turbidity	**<3.50**	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75	0

Units: Phytoplankton Chlorophyll *a* (µg/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates. Increasing percentile ranks for parameters above the bold line indicates healthy conditions. Increasing percentile ranks for parameters below the bold line indicates unhealthy conditions.

Adapted from Joe Hand, FDEP, pers. comm., 1991. (Data was collected between 1980 and 1989)

Explanation of Measurements of Community Health

Different measurements of macroinvertebrate and algal community health are used to determine the biotic effects of a discharge. The measurements are briefly discussed here.

Taxa richness: Environmental stressors tend 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 that 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 as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance

Functional feeding groups/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).

Algal Growth Potential: *Selenestrum* sp, *Duniella* sp.

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.

Facility Summary

Facility Name: Naval Air Station Pensacola WWTP **Date Summary Prepared:** March 3, 2000

Location map: **County:** Escambia **District:** Northwest/10
310 John Towers Rd. Bldg. 3297
Pensacola, Fl. 32508-5303

NPDS Permit # FL0002500 **State Permit #** FL0002500 **Facility Type:** Dom.
expiration date: 12/31/04 **expiration date:** 10/01/04

Function of facility: to maintain and operate a 2.35 MGD maximum monthly average daily flow permitted capacity activated sludge domestic wastewater treatment facility.

Description of treatment process:

Treatment Facilities

The facility is an existing 2.35 MGD maximum monthly average daily flow permitted capacity domestic wastewater treatment facility operating in the conventional activated sludge mode. The facility consists of pretreatment (screening and grit removal), primary clarification, flow equalization, nitrification, secondary clarification, denitrification filters, chlorination, dechlorination, digestion, residual handling and recirculation. The wastewater treatment facility is located at latitude 30°21'47"N and longitude 87°15'26"W.

A pretreatment facility for bilge water effluent from naval vessels visiting the port facilities is also a part of the WWTF. The bilge water treatment plant consists of load equalization tanks, oil chamber and tramp oil tanks, waste oil pumps, sludge holding chamber, and effluent pump station to the domestic wastewater treatment facility.

Effluent Disposal

Effluent disposal is through surface water discharge to Pensacola Bay (class III waters) at Discharge Location (D-001) which is approximately 2500 feet in length and discharges at a depth of approximately 14 feet. the point of discharge is located approximately at latitude 30°21'47" N, longitude 87°15'26" W.

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

Design Flow: 2.35 MGD **Mean Flow:** 1.45 MGD **Flow during survey:** 1.25 MGD

Discharge is: Continuous **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):

Permit Effluent Limits

Parameter	Frequency	Sample Type	Limit (units)
Flow	Continuous	Recording Flow Meter and Totalizer	2.35 MGD (mthly. avg.)

CBOD (5-day)	1/week	16-Hr. Composite	8.0 mg/L (annul. avg.) 8.0 mg/L (mthly. avg.) 12.0 mg/L (wkly. avg.) 16.0 mg/L (daily max.)
TSS	1/week	16-Hr. Composite	8.0 mg/L (annul. avg.) 8.0 mg/L (mthly. avg.) 12.0 mg/L (wkly. avg.) 16.0 mg/L (daily max.)
Total Nitrogen (as N)	1/week	16-Hr. Composite	6.0 mg/L (annul. avg.) 6.0 mg/L (mthly. avg.) 9.0 mg/L (wkly. avg.) 12.0 mg/L (daily max.)
Total Phosphorus (as P)	1/week	16-Hr. Composite	1.0 mg/L (annul. avg.) 1.0 mg/L (mthly. avg.) 1.5 mg/L (wkly. avg.) 2.0 mg/L (daily max.)
Total Residual Cl (for disinfection)	Continuous	Meter	0.5 mg/L (daily max.)
Total Residual Cl (after dechlorination)	Daily	Grab	0.01 mg/L (daily max.)
pH	Continuous	Meter	6.5 – 8.5 std. units
Dissolved Oxygen	Daily	Grab	4.0 mg/L (daily min.) 5.0 mg/L (min. daily avg.)
Fecal Coliform	1/week	Grab	mthly. arithmetic. mean 800/100 ml (daily max.)
Oil and Grease	1/week	Grab	5.0 mg/L (daily max.)
Total Recoverable Copper	1/week	16-Hr. Composite	2.9 ug/L (daily max.)
Total Recoverable Iron	1/week	16-Hr. Composite	0.3 mg/L (daily max.)
Total Recoverable Zinc	1/week	16-Hr. Composite	86.0 ug/L (daily max.)
Benzene	1/week	16-Hr. Composite	71.28 ug/L (annl. avg.)
Vinyl Chloride	1/week	16-Hr. Composite	80.7 ug/L (annl. avg.)
Total Recoverable Cadmium	1/week	16-Hr. Composite	9.3 ug/L (max. sgl. smpl.)

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

Total N (mg/L)

	Single Sample	Wkly. Avg.	Mthly. Avg.	Annul. Avg.
December	16.08	13.56	8.66	----------
November	10.70	----------	8.00	----------
March	----------	----------	----------	6.60 *
February	----------	----------	----------	7.60 *
January	----------	----------	----------	8.00 *

Total Cu (ug/L)

December 6, 1999 8.0 single sample
December 7, 1999 4.0 single sample
December 12, 1999 4.0 single sample

Total Zn (ug/L)

November 15, 1999 110 single sample

*Construction of denitrification filters completed June 1, 1998. The Total N annual average has continued to improve since completion of the filters.

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

Until 10/99, NAS Pensacola was required by their FDEP permit to run acute screen toxicity tests on 100% effluent quarterly on the test species, *Ceriodaphnia dubia* and *Cyprinella leedsi*. The most recent failure was in 1997. The facility's state permit that was renewed in 10/99 now requires quarterly chronic tests on the test species *Ceriodaphnia dubia* and *Pimephales promelas* using 100%, 50%, 25%, 12.5% and 6.25% effluent. The first of these tests was run in 12/99 and was in violation of the NOEC for reproduction for CD and for growth for the fathead minnow. Follow-up testing has been conducted but the results have not been received by the Department.

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.

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

The Total Nitrogen Annual Average has continued to improve since completion of denitrification filters June 1, 1998.

Additional information:

August 1999 was unavailable for review for the data set of January 1999 to December 1999 during the creation of this report. The DMR has not been returned from the Tallahassee branch office.

Staff contributing to this review (signature)

Glenn Butts	Biologist
	Inspector
	Engineer
Kim Allen	Other
Kenny Ferguson	Other

Module No. 1506 4844

Sample No. # 1

State of Florida

Department of Environmental Protection

Laboratory Submittal Form

Sample Grab Time: 0930

Composite Sample Begin Time: _____

Compostie Sample End Time : _____

Submitting Agency/Code: 8010

Storet Station/GMS/Field Indent

1017F00625

Collection Date (m/d/y): 03-06-00

County of Sample Origin: ESCAMBIA

Sample Location: PENSACOLA NAS EFFLUENT

NPDES ID: FL0002500

Water	Soils/Sediment	Tissue	Chemical
X Effluent	___ Trip Blank	___ Terrestrial	___ Fish
___ Surface Fresh	___ Field Blank	___ Freshwater Sed	___ Shellfish
___ Surface Salt	___ Equipment Blank	___ Marine Sed	___ Other
___ Ground Water		___ Sludge	
___ Stormwater	___ Duplicate		

(Circle) Reactive / Flammable

Field Parameters Measured By-

Name:

Signature: Glenn Butts

Material Sampled By-

Name:

Signature: Glenn Butts

Field Report Prepared By

Signature: Glenn Butts

Field Parameters	Units	Code	Value
Total Residual Chlorine	mg/l	50060	
DO (Probe)	mg/l	299	
PH Field	S.U.	400	
Salinity	PPT	480	
Conductivity Field	umhos/cm	94	
Sample Depth	Feet	460	
Water Temp	oC	10	

X	Parameter	Units	Code	Value	X	Parameter	Units	Code	Value
X	BOD, 5-day	mg/l	310	3.5		Chlorophyll (b)	ug/l	32212	
	CBOD, 5-day	mg/l	80082			Chlorophyll (c)	ug/l	32214	
X	NFLT Residue	mg/l	530	5u		Hardness X	mg/l	900	
	DO (Winkler)	mg/l	300			Alkalinity	mg/l	410	
	pH Lab	S.U.	403			Oil and Grease	mg/l	556	
X	Turbidity	NTU	82079	0		N-NH3	mg/l	610	
X	Color	Pt-Co	80	5		N-NO2-NO3	mg/l	630	
	Conductivity Lab	umohs/cm	95			Un-ion NH3	mg/l	619	
X	Total Coliform (MF)	#/100ml	31501	10u		N-TKN	mg/l	625	
X	Fecal Coliform (MF)	#/100ml	31616	10u		PO4 Total	mg/l	665	
	Chlorophyll (A) (non-corrected)	ug/l	32211			Chloride	mg/l	940	
	Chlorophyll (A) (corrected)	ug/l	32210			Sulfate	mg/l	945	

Remarks:

Sampled by: Glenn Butts Date: 03-06-00

Received by: [signature] Date: 3-06-00 Reviewed by: [signature] Date: 3/13/00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 0010 / SUBMITTING AGENCY NAME: NWD FDEP	STORET STATION NUMBER: 33-02-0K24	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS: CONTROL SITE	LOCATION: AT MARKER "R4" NW OF FAIR POINT	FIELD ID/NAME: # 2

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

Point-Source Pollution (list location and describe):

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

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

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [ ] Sand: [ ] Shell: [ ] Other: [ ]

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Riffles		3/3	POW/AR
Leaf Packs				Sand	30		
Aquatic Vegetation				Mud/Muck/Silt	70		
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other:			

WATER QUALITY

	Depth (~~m~~ ft):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):	SAL		Secchi (m):
Top	1.0	18.90	7.98	7.67	44206	28.5		2.4
Mid-depth	12	18.8	7.98	7.5	46253	29.9		
Bottom	24	18.6	7.93	7.06	51320	33.7		

System Type : Stream: [ ] (Sand Bottomed, Sand Bot w/ Spring, Swamp & Bog, Calcareous, Alluvial, Misc.) 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:

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

SAMPLING TEAM: G. BUTTS	SIGNATURE: Glenn Butts	DATE:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0L19	DATE (M/D/Y): 03-07-00	TIME: 0955	RECEIVING BODY OF WATER: PENSACOLA BAY
REMARKS: TEST SITE 1	LOCATION: 1000 YDS SOUTH OF MAS OUTFALL			FIELD ID/NAME: # 3

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

Point-Source Pollution (list location and describe):

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

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

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [ ] Sand: [ ] Shell: [ ] Other: [ ]

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Riffles		POOR	3/3
Leaf Packs				Sand	15		
Aquatic Vegetation				Mud/Muck/Silt	85		
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):	Sal		Secchi (m):
Top	1.0	18.4	8.0	8.13	38823	24.8		1.8
Mid-depth	1.2	18.61	8.02	7.78	41200	25.6		
Bottom	2.5	18.91	7.92	6.95	51377	33.5		

System Type : Stream: [ ] (Sand Bottomed, Sand Bot w/ Spring, Swamp & Bog, Calcareous, Alluvial, Misc.) 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:

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

SAMPLING TEAM:	SIGNATURE:	DATE:
G. BUTTS	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: 33.02.0K24	DATE (M/D/Y):	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: AT MARKER "R4", NW	FIELD ID/NAME:
CONTROL SITE	OF FAIR POINT	# 2

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 4	>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 60

COMMENTS:

ANALYSIS DATE:	ANALYST: G. BUTTS	SIGNATURE: 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: 33.02.0419	DATE (M/D/Y): 03-07-04	RECEIVING BODY OF WATER: PENSACOLA BAY

REMARKS:	LOCATION: 1000 YDS SOUTH OF NAS OUTFALL	FIELD ID/NAME:
TEST SITE 1		# 3

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 6	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 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: 4	>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 47

COMMENTS:

ANALYSIS DATE:	ANALYST: G. BUTTS	SIGNATURE: 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: 33.02.0111	DATE (M/D/Y):	RECEIVING BODY OF WATER: PENSACOLA

REMARKS:	LOCATION: 1000 YDS NORTH OF NAS OUTFALL	FIELD ID/NAME:
TEST SITE 2		# 4

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 6	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 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: 4	>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 81 - 100	Primarily sand, with small areas of mud. 8-11 points 49 - 67	Mixture of sand and mud, or well-aerated mud only. 25 44 4-7 points	Anaerobic mud. 0-3 points 0 - 22

TOTAL SCORE: 47

COMMENTS:

ANALYSIS DATE:	ANALYST: G. BUTTS	SIGNATURE: Glenn Butts

Percent Change Chart for AGP's setup on 3/17/00

	LIMS #	Field ID	Treatment	Day 10	Day 12	Day 14	% Change	%change	
Pensacola NAS	438877	# 1	AGP fresh	47.046	50.803	160.459	7.99	215.85	× EFFLUENT
	440109	#3	AGP fresh	0.135	0.202	0.187	49.63	-7.43	
	440181	SWIFT CREEK	AGP fresh	31.82	42.31	45.473	32.97	7.48	
	440182	EFFLUENT	AGP fresh	0.146	0.528	1.387	261.64	162.69	
	440183	TEST SITE	AGP fresh	9.701	11.377	12.735	17.28	11.94	
	440184	CONTROL SIT	AGP fresh	0.309	0.681	1.445	120.39	112.19	
	440185	TEST SITE	AGP fresh	8.641	10.664	13.063	23.41	22.50	
	440185ld	TEST SITE	AGP fresh	9.032	12.311	12.55	36.30	1.94	
	440687	B-031400-1	AGP fresh	1.073	1.371	1.42	-94.69	3.72	
NAS	439131	#2	AGP salt	0.108	0.057	0.068	-40.74	19.30	× control site
NAS	439132	#3	AGP salt	0.056	0.064	0.11	0.00	68.75	× test site - 1
NAS	439133	#4	AGP salt	0.174	0.056	0.14	-30.46	144.64	× test site - 2
NAS	439322	1	AGP salt	0.23	0.121	0.12	-69.57	-4.13	
	439322ld	1	AGP salt	0.296	0.07	0.11	-100.00	57.14	

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Pensacola NAS
County: Escambia
Contact / District: Glenn Bicttis / NW-DIST
NPDES Permit #: FL0002500
LIMS Sample #: 438878 LIMS Job #: TLH-2000-03-07-28-01
sample log 3/17/00
Test Type: ~~Screening~~ | Definitive
(Static | Static Renewal | Flow-through)
Test Number: 1 of 2

Sample Collection: Date 3/6/00 Time 9:30
Test Beginning: Date 3/7/00 Time 12:00
Test Ending: Date 3/9/00 Time 13:25
Organism Batch #: 12 Diluent Batch #: #7
Organism Age: <24hrs SRT toxicant batch #: N/A
Test organism: Ceriodaphnia dubia
Remarks:

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	Cond. 24 h	Cond. 48 h
Control A	A	5	5	5	8.2	—	8.4	23.9	–	24.7	8.0	–	7.7	180	—	255
Control B	B	5	5	5	—	—	8.4	–	–	24.7	–	–	7.7	–	–	210
Control C	C	5	5	5	–	–	8.4	–	–	24.7	–	–	7.7	–	–	220
Control D	D	5	5	5	–	–	8.4	–	–	24.4	–	–	7.7	–	–	260
100% A	A	5	5	5	7.4	–	8.7	24.4	–	24.7	8.2	–	7.8	635	–	770
100% B	B	5	5	5	–	–	8.7	–	–	24.7	–	–	7.8	–	–	770
100% C	C	5	5	5	–	–	8.7	–	–	24.7	–	–	7.8	–	–	860
100% D	D	5	5	5	–	–	8.7	–	–	24.4	–	–	7.7	–	–	850
measured by:		MF	SG	MF	MF	–	MF	MF	–	MF	MF	–	MF	MF	–	MF
recorded by:		DPH	SG	MF	SG	–	SG	SG	–	SH	SG	–	SG	SG	–	SG

Investigators' Signatures
Marshall Faulk
Shannon Gerard
Della Parkitka

Temperature Range °C
Incubator # 2 24.0°-26.5°C
Room B246 24.0°-26.0°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	DPH/SG	SG
Alkalinity (mg/L as $CaCO_3$):		82	136	Hach	DPH	SG
Hardness (mg/L as $CaCO_3$):		88	175	Hach	DPH	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DPH	SG
Salinity:		0	0	Ysi	SG	SG

BJS
reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Pensacola NAS
County: Escambia
Contact / District: Glenn Butts / NW-DIST
NPDES Permit #: FL0002500
LIMS Sample #: 438878 LIMS Job #: TLH-2000-03-07-28-01
sample log 3/17/00
Test Type: ~~Screening~~ I Definitive
(Static) I Static Renewal I Flow-through
Test Number: 2 of 2

Sample Collection: Date 3/6/00 Time 9:30
Test Beginning: Date 3/7/00 Time 1200
Test Ending: Date 3/9/00 Time 1330
Organism Batch #: 16 Diluent Batch #: Well
Organism Age: 11 days SRT toxicant batch #: NA
Test organism: Cyprinella leedsi
Remarks: + DPH 518/00 Receiving Rec

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	24 h	48 h
Control	C9	5	5	5	7.8	8.3	8.4	24.3	24.6	24.4	7.9	7.3	7.5	255	275	280
Control	C10	5	5	5	7.8	8.3	8.4	24.4	24.4	24.0	7.9	7.3	7.5	250	260	275
Control	C11	5	5	5	7.8	8.4	8.4	24.4	25.3	24.9	7.9	7.3	7.6	250	270	280
Control	C12	5	5	5	7.8	8.3	8.4	24.4	24.9	24.8	7.9	7.3	7.7	250	270	270
100%	C13	5	5	5	7.4	~~7.5~~	8.4	24.5	23.9	27.0	7.8	7.4	7.1	640	670	785
100%	C14	5	5	5	7.4	~~7.5~~	8.4	24.6	24.9	27.1	7.7	7.3	7.1	655	680	735
100%	C15	5	5	5	7.4	*~~7.5~~	8.4	24.7	25.6	27.1	7.7	7.0	7.1	655	710	765
100%	C16	5	5	5	7.4	*~~7.4~~	8.4	24.7	24.9	25.4	7.7	7.2	7.1	660	670	700
measured by:		DPH	SG	MF	MF	SG	MF	MF	SG	MF	MF	SG	MF	MF	SG	MF
recorded by:		SG	SG	MF	SG	DPH	SG	SG	DPH	SG	SG	DPH	SG	SG	DPH	SG

Investigators' Signatures
Marshall Faircloth
Shannon Gerard
Della Parker Hall

Temperature Range °C
Incubator # 2 25.5° - 26.0°C
Room 3246 24.0° - 26.0°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			not measured			
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	DPH/SG	SG
Alkalinity (mg/L as $CaCO_3$):		130	136	Hach	DPH	SG
Hardness (mg/L as $CaCO_3$):		135	175	Hach	DPH	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DPH	SG
Salinity:		0	0	ysi	SG	SG

BJS
reviewer form updated 3/3/99

Phytoplankton taxa list and densities (#/ml) for Pensacola Naval Air Station WWTP, collected via subsurface nalgene water bottle grabs from Pensacola Bay on March 7, 2000.

	Control Site	Test Site 1	Test Site 2
Bacillariophyceae			
Chaetoceros sp.	285	445	357
Cyclotella sp.	5	13	2
Diploneis sp.	1	–	–
Leptocylindrus danicus	6	–	–
Leptocylindrus minimus	8	5	–
Nitzschia pungens	8	5	11
Nitzschia sp.	5	11	11
Rhizosolenia sp.	2	–	–
Skeletonema sp.	39	48	37
Undetermined Centrales sp.	–	9	–
Undetermined Pennales sp.	7	10	6
Chlorophyceae			
Chlorella sp.	–	–	1
Selenastrum sp.	3	–	–
Undetermined Chlorophyceae	23	9	9
Chrysophyceae			
Dinobryon sp.	1	–	–
Cryptophyceae			
Chroomonas sp.	–	4	1
Dinophyceae			
Glenodinium sp.	1	–	2
Oxytoxum sp.	–	1	–

Benthic macroinvertebrate taxa list for Pensacola Naval Air Station WWTP, collected via Petite ponar grab samples in Pensacola Bay, on March 7, 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Actiniaria	–	5	–
Amphipoda			
Ampelisca abdita	–	5	7
Cerapus sp.	1	–	–
Listriella barnardi	–	9	7
Undetermined Ampelisca	4	1	28
Undetermined Haustoriidae	–	9	–
Cumacea			
Cyclaspis sp.	15	2	8
Oxyurostylis smithi	7	–	–
Oxyurostylis sp.	17	–	4
Decapoda			
Pinnixa sp.	–	1	–
Undetermined Decapoda	–	–	9
Undetermined Portunidae	1	–	–
Gastropoda			
Nassarius acutus	–	1	–
Nassarius sp.	–	–	1
Olivella sp.	–	3	–
Rissoina sp.	–	–	1
Undetermined Gastropoda	–	1	–
Isopoda			
Hargeria rapax	–	1	–
Nemertea			
Undetermined Nemertea	19	9	14
Oligochaeta			
Undetermined Tubificidae	11	48	–
Ophiurida			
Undetermined Ophiurida	3	2	–
Undetermined Ophiuridae	1	–	–
Pelecypoda			
Corbula swiftiana	3	–	–
Mercenaria campechiensis	–	–	1
Mulinia lateralis	–	–	1
Mysella planulata	–	4	–
Nuculana acuta	–	–	1
Nuculana sp.	–	1	5
Parvilucina multilineata	9	–	–
Rangia cuneata	–	–	1
Tellina alternata	–	2	6
Tellina lineata	4	–	–
Tellina sp.	–	2	19
Tellina versicolor	7	–	–

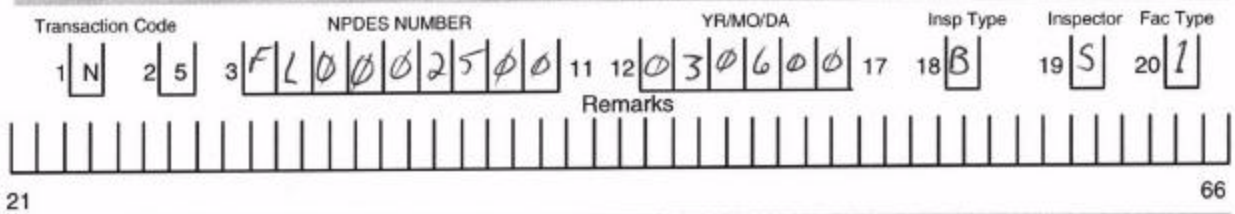
Benthic macroinvertebrate taxa list for Pensacola Naval Air Station, collected via petite Ponar grab samples in Pensacola Bay, on March 7, 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Pelecypoda			
Undetermined Pelecypoda	10	–	2
Undetermined Tellinidae	4	–	–
Undetermined Veneridae	–	7	–
Phoronida			
Phoronis architecta	1	–	–
Undetermined Phoronida	–	1	1
Polychaeta			
Aglaophamus circinata	–	–	2
Ampharete sp.	–	–	1
Anaitides longipes	–	–	1
Apoprionospio pygmaea	–	–	9
Armandia sp.	6	–	15
Caulleriella sp.	–	–	2
Chaetozone sp.	–	4	–
Chone sp.	–	2	–
Cossura delta	20	–	–
Cossura soyeri	15	–	7
Cossura sp.	23	4	–
Euchone sp.	1	–	–
Eumida sanguinea	–	–	4
Glycera sp.	2	1	–
Glycinde solitaria	3	–	–
Hesionidae Genus A	2	–	–
Lumbrineris sp.	6	–	–
Magelona sp.	1	–	1
Malmgreniella sp.	2	–	1
Megalomma bioculatum	1	1	–
Microspio sp.	–	–	8
Minuspio sp.	9	10	–
Myriochele oculata	8	–	9
Nephtys sp.	–	1	7
Notomastus sp.	1	–	–
Ophioglycera sp.	–	6	–
Owenia sp.	–	–	1
Paramphinome sp.	–	3	–
Paraprionospio pinnata	14	18	24
Phyllodoce mucosa	–	–	1
Piromis sp.	1	–	–
Poecilochaetus johnsoni	–	1	–
Polydora sp.	4	1	–
Prionospio sp.	–	5	3
Proscoloplos sp.	4	–	–
Scoloplos sp.	–	6	–

Benthic macroinvertebrate taxa list for Pensacola Naval Air Station, collected via petite Ponar grab samples in Pensacola Bay, on March 7, 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site 1	Test Site 2
Polychaeta			
Sigambra tentaculata	2	2	1
Spio pettiboneae	–	–	4
Spiophanes bombyx	–	6	32
Sthenelais sp.	1	1	2
Travisia hobsonae	1	–	–
Travisia sp.	4	–	–
Undetermined Capitellidae	64	21	32
Undetermined Cirratulidae	1	1	22
Undetermined Glycinde	–	3	23
Undetermined Goniadidae	8	–	4
Undetermined Hesionidae	–	1	1
Undetermined Leitoscoloplos	65	–	–
Undetermined Maldanidae	1	–	–
Undetermined Nereidae	–	–	1
Undetermined Opheliidae	–	2	–
Undetermined Paraonidae	4	–	–
Undetermined Pectinariidae	1	–	–
Undetermined Polychaeta	–	–	5
Undetermined Spionidae	5	7	1
Tanaidacea			
Kalliapseudes sp.	–	–	1

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)

