

Biological Assessment of

Air Products and Chemicals, Inc.

Santa Rosa

NPDES #FL0002313

Sampled July 1996

November 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: Air Products and Chemical, Inc.
County: Santa Rosa
NPDES Number: FL0002313
State Permit Expiration Date: 29 April 1997

Toxics Sampling Inspection (XSI)

Date Sampled: 30 July 1996

Results: Cyanide (0.01 µg/L), chromium (12 µg/L), and iron (603 µg/L) were detected in the effluent sample at concentrations which complied with Class III marine water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 30 July 1996

Results: The sample of undiluted effluent was not toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi.*

Impact Bioassessment Inspection (IBI)

Date Sampled: 30 July 1996

Results: Quantitative measures of benthic macroinvertebrate community health suggested the sites which receive effluent on an outgoing tide, test site 2 and the Fisherman's Point, were moderately degraded. For example, reductions in taxa richness and the Shannon-Weaver diversity index were observed between the reference site and these two sites. The lowered diversities at test site 2 and Fisherman's Point (compared with the reference site) represented violations of the biological integrity criterion (Rule 62-302.530(11) FAC). Further evidence that test site 2 and Fisherman's Point were disturbed included the relative lack of known pollution sensitive organisms at these stations.

It is possible the discharge was having adverse effects on the phytoplankton populations of Escambia Bay. The algal communities at test site 1, test site 2, and Fisherman's Point, which potentially receive discharge from the facility's Alpha Pond, were lower in taxa richness and diversity than the reference site. Additionally, these sites were largely composed of an unidentified green flagellate (35%, 68%, and 37% of the respective populations), which theoretically could have originated in Alpha Pond, although no samples were taken from that location to verify this. In contrast, the reference site was dominated by *Chroomonas* sp. (15.2%). The chlorophyll *a* levels at test site 1 (12 µg/L) and test site 2 (16 µg/L) were higher than those found in 70% of Florida's estuaries.

Water Quality Inspection (WQI)

Date Sampled: 30 July 1996

Results: Although effluent levels of ammonia (4.9 mg/L), TKN (8.8 mg/L), and total phosphorus (2.5 mg/L) were somewhat elevated, there did not appear to be any nutrient enrichment in Escambia Bay attributable to the discharge. Algal growth potential (AGP) results also indicated nutrient enrichment was not a problem in Escambia Bay. All receiving sites had AGPs of 0.7 mg dry wt/L or less, which is considerably lower than the 10 mg dry wt/L "problem threshold" for marine waters. The effluent AGP was 227.7 mg dry wt/L.

Introduction

Air Products and Chemicals, Inc. (APCI) is a chemical manufacturing plant located in Pace, Florida (see map in Appendix). APCI produces nitrogen fertilizer, amines, methanol, ammonia, and nitric acid.

The wastewater system consists of neutralization, equalization, anaerobic treatment, and extended aeration. Final treatment occurs in a 75 acre pond network (consisting of four oxidation ponds) which discharges through a 300 m ditch into the upper, Class III portion of Escambia Bay. The facility has a design flow of 1.5 MGD with a mean flow of 1.18 MGD. Flow during this survey was 1.16 MGD.

Effluent permit limits are as follows: COD (1,390 lbs/day as a daily average, 2,530 lbs/day maximum), TSS (400 lbs/day as a daily average, 800 lbs/day maximum), total nitrogen (limited to 146,000 lbs/ year as follows: from December through April, 750 lbs/day as a daily average, 1,400 lbs/day maximum; from May through November, 405 lbs/day as a daily average, 1,400 lbs/day maximum), total phosphorus (32 lbs/day as a daily average, 64 lbs/day maximum), and polychlorinated biphenyls (0.001 µg/L maximum).

A semi-circular mixing zone, extending radially about the point of discharge for 282 meters in Escambia Bay, has been granted for the following parameters (with permit limits in parentheses): cyanide (100 µg/L), chromium (200 µg/L), copper (30 µg/L) silver (5 µg/L), phenol (20 µg/L), mercury (4 mg/L), and pH (6.0 to 9.0 SU).

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2	Fisherman's Point
Macroinvertebrate Ponar				
Number of Taxa	28	18	15	19
Shannon-Weaver Diversity	3.1	2.7	2.4	0.5
% Polychaeta	43.1	76.4	59.1	96.1
# Polychaete Taxa	7	6	2	5
% Diptera	9.1	11.5	16.4	0.2
% Gastropoda	4.8	3.3	6.9	0.5
% Pelecypoda	0.9	1.7	5.0	0.2
% Amphipoda	37.6	0.6	0	1.4
% Decapoda	0.5	0.6	0	0
% Isopoda	0	1.7	1.3	0
% Tubificidae	2.3	0	5.0	0
% Nematoda	0.7	4.4	6.3	0.4
% Other	1.0	0	0	1.1
% Predator/Carnivores	6.0	36.5	45.6	1.1
% Above-Surface Deposit Feeders	34.5	31.9	30.5	49.0
% Below Surface Deposit Feeders	9.8	18.1	8.2	0
% Scavengers	18.9	1.1	0.6	0.1
% Shredders	1.6	2.2	2.2	0
% Browser-grazer	18.1	1.1	0.6	0.1
% Suspension Feeders	5.3	5.2	5.4	49.0
% Scrapers	3.9	0	1.9	0
% Other	1.2	3.9	5.0	1.2
Phytoplankton Algae				
Number of Taxa	22	15	12	17
Shannon-Weaver Diversity	3.9	3.1	2.6	3.1
Chlorophyll a (µg/L)	10 U	12 I	16 I	9 U
Algal Density (#/mL)	664	4,623	7,099	3,812
% Blue-green	13.6	6.7	2.0	7.2
% Green	38.0	47.6	71.7	43.0
% Cryptophytes	16.7	22.2	12.5	12.4
% Diatoms	22.7	15.6	7.9	26.7
Algal Growth Potential (mg dry wt/l)	0.7	0.1	0.1	0.4

A review of Monthly Operating Report (MOR) data revealed no permit violations in the past year. However, in December, 1995, the effluent from Alpha Pond was toxic to both the invertebrate, *Mysidopsis bahia,* and the fathead minnow, *Pimephales promelas.* The facility is currently implementing corrective action to address previous dinitrotoluene contamination in groundwater. The Department has received a UIC permit application for partial disposal of this treated groundwater. The facility has proposed to begin recycling wastewater and to increase the holding capacity of the percolation ponds. This increased capacity will decrease the amount of flow entering Escambia Bay.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in northeastern Escambia Bay near the mouth of the Escambia River), two test sites (bracketing the discharge), and a far-field effects site (located off Fisherman's Point) (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. An acute toxicity bioassay, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals, cyanide, and organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

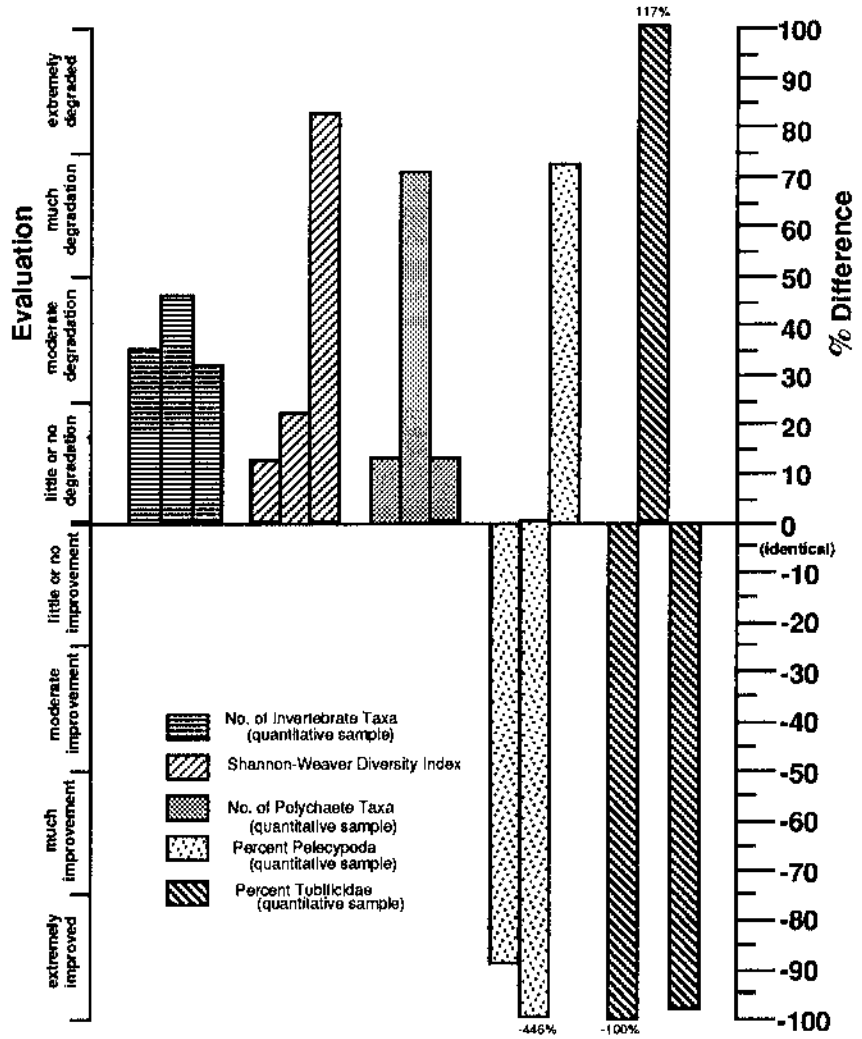
Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected using nine replicate petite Ponar grabs per site. Phytoplankton was sampled at reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* for the effluent and reference site, and *Dunaliella tertiolecta* for the remaining (higher salinity) sites, followed Miller *et al.* (1978) and EPA (1974).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal 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,



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.

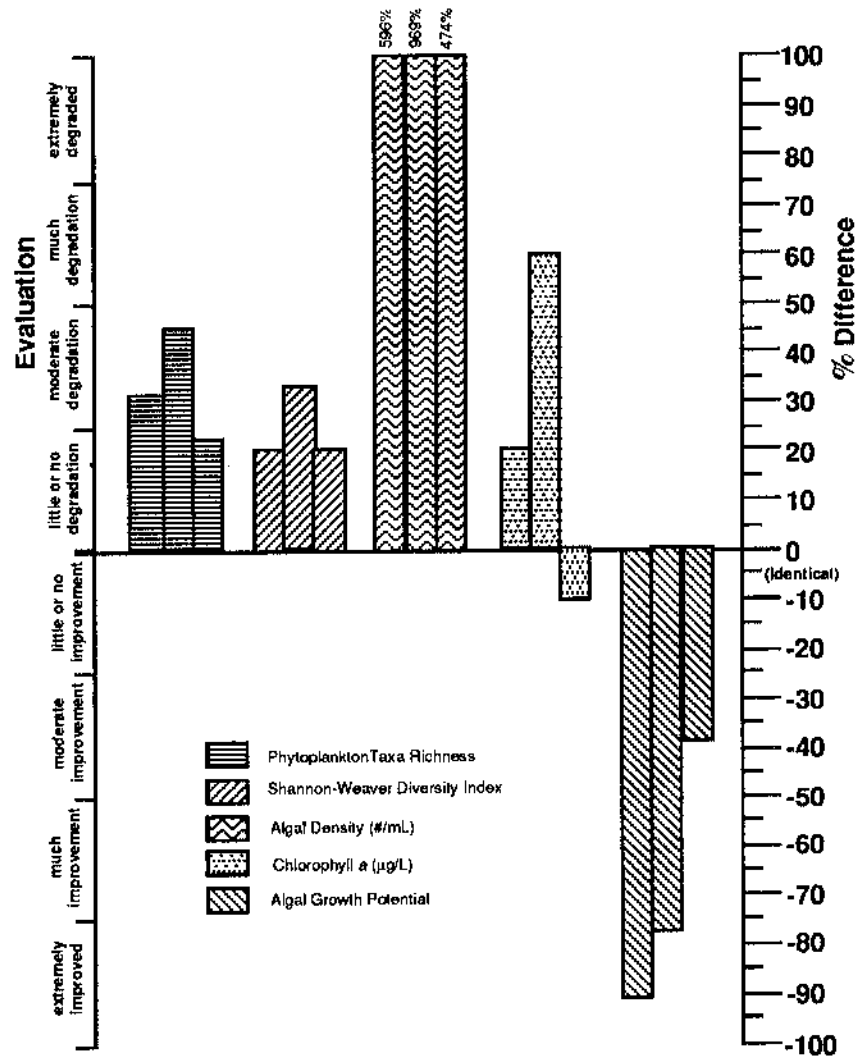
to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

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 % 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).



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.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the % filter-feeders, 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, Tracy Keefer, Randy Payne, and Laurence Donelan (DEP Northwest District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding,

Elizabeth Miller, Bart Richard, Urania Quintana, Lisa Tamburello, 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.

Results and Discussion

The receiving waters for the Air Products and Chemicals (APCI) discharge, Escambia Bay, is a oligohaline estuary. The shores of the upper Escambia Bay are primarily vegetated with *Spartina* and *Juncus* (Appendix). Habitat quality was somewhat better at the reference site (with 61 points) than at test site 1 (50 points), test site 2 (55 points) or Fisherman's Point (44 points).

There were moderate differences in the physical/chemical measurements between the reference site and the remaining test sites, most of which could be explained by the influence of the Escambia River. Bottom salinity was lowest at the reference site (1.5 ppt), intermediate at test sites 1 and 2 (3 ppt to 3.5 ppt, respectively), and slightly higher at Fisherman's Point (6 ppt). Surface dissolved oxygen was lowest at the reference site (5.9 mg/L) and ranged from 7.7 mg/L to 8.4 mg/L at the other three sites. The surface pH of the reference site (6.4 SU) was approximately one unit lower than the test sites (which ranged from 7.2 SU to 7.8 SU).

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or the fish, *Cyprinella leedsi*.

Cyanide (0.01 µg/L) was detected in the effluent sample at a concentration which complied with the Class III marine water quality standard.

Similarly, chromium (12 µg/L) and iron (603 µg/L) were detected in the effluent at concentrations which complied with Class III water quality standards.

Although effluent levels of ammonia (4.9 mg/L), TKN (8.8 mg/L), and total phosphorus (2.5 mg/L) were somewhat elevated, there did not appear to be any nutrient enrichment in Escambia Bay attributable to the discharge. The concentrations of most nutrients in all the Escambia Bay sites were low or undetected. Moderate amounts of nitrate-nitrite (0.13 mg/L) at the reference site appeared to be coming from the Escambia River.

Algal growth potential (AGP) results also indicated that nutrient enrichment was not a problem in Escambia Bay. All receiving sites had AGPs of 0.7 mg dry wt/L or less, which is considerably lower than the 10 mg dry wt/L "problem threshold" for marine waters. The effluent AGP was 227.7 mg dry wt/L.

Quantitative measures of benthic macroinvertebrate community health suggested that test site 2 and the Fisherman's Point site were moderately disturbed. Both of these sites receive effluent during an outgoing tide. The figure on p. 2 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference site. The relative abundance of each individual taxon appears in the Appendix.

Taxa richness was much higher at the reference site than the remaining sites, (with 28 taxa at the reference site, 18 taxa at test site 1, 15 taxa at test site 2, and 19 taxa at Fisherman's Point). Shannon-Weaver diversity was highest at the reference site (3.1), lower at test sites 1 and 2 (2.7 and 2.4, respectively) and lowest at Fisherman's point (0.5). The 29.2% decrease in the Shannon-Weaver diversity index between the reference site and test site 2 represents a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). The 83.9% reduction in diversity between the reference site and Fisherman's Point is also a violation of this same Class III water quality standard.

A total of 7 polychaete taxa were recovered from the reference site. Fewer polychaete taxa were found at the remaining sites (with 6 polychaete taxa, 2 taxa, and 5 taxa at test site 1, test site 2, and Fisherman's Point, respectively). The relative lack of polychaete taxa at test site 2 is another indication of disturbance there. Conversely, test site 2 had the highest abundance of pelecypods (with 5%), followed by test site 1 (1.7%), the reference site (0.9%), and Fisherman's Point (0.24%).

Several pollution sensitive marine taxa, such as *Mysidopsis bahia*, *Melita nitida*, and *Rhithropanopeus harrisii* were found at the reference site. The sensitive amphipod, *Melita* sp., was recovered from test site 1. In contrast, no amphipods at all were found at test site 2, and the amphipods at Fish-

erman's Point (*e.g., Grandidierella* sp.) are considered fairly pollution tolerant. Test site 2 was dominated by such pollution tolerant taxa such as *Laeonereis culveri* and *Limnodrilus hoffmeisteri.* The polychaete, *Boccardia sp.*, was extremely abundant at Fisherman's Point, accounting for 94.7% of the total population (and therefore, the low diversity). No information on the pollution sensitivity of this organism was found.

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 highest at the reference site (with 22 taxa), decreasing to 17 taxa at Fisherman's Point, 15 taxa at test site 1, and 12 taxa at test site 2. Phytoplankton Shannon-Weaver diversity was also highest at the reference site (3.9), intermediate at test site 1 and Fisherman's Point (3.1 at both stations) and lowest at test site 2 (2.6). The algal communities at test site 1, test site 2, and Fisherman's Point, which potentially receive discharge from the facility's Alpha Pond, were largely composed of an unidentified green flagellate (35%, 68%, and 37% of the respective populations). It is possible that this phytoplankter is being exported to Escambia Bay from Alpha Pond, although no samples were taken from that location to verify this theory. In contrast, the reference site was dominated by *Chroomonas* sp. (15.2%). The chlorophyll *a* levels at test site 1 (12 µg/L) and test site 2 (16 µg/L) were higher than those found in 70% of Florida's estuaries (see Table of Typical Water Quality Values in Appendix). Given the low nutrients present in Escambia Bay, this observation is also consistent with the idea that phytoplankton are being imported to the Bay in the vicinity of the discharge.

Conclusions

The Air Products effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi.*

Cyanide (0.01 µg/L), chromium (12 µg/L), and iron (603 µg/L) were detected in the effluent sample at concentrations which complied with Class III marine water quality standards.

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Further evidence that test site 2 and Fisherman's Point were disturbed included the relative lack of known pollution sensitive organisms at these stations. Test site 2 was dominated by such pollution tolerant taxa such as *Laeonereis culveri* and *Limnodrilus hoffmeisteri.* The polychaete, *Boccardia sp.*, was extremely abundant at Fisherman's Point, accounting for 94.7% of the total population (and therefore, the low diversity). No information on the pollution sensitivity of this organism was found.

It is possible the discharge was having adverse effects on the phytoplankton populations of Escambia Bay. The algal communities at test site 1, test site 2, and Fisherman's Point, which potentially receive discharge from the facility's Alpha Pond, were lower in taxa richness and diversity than the reference site. Additionally, these sites were largely composed of an unidentified green flagellate (35%, 68%, and 37% of the respective populations), which theoretically could have originated in Alpha Pond, although no samples were taken from that location to verify this. In contrast, the reference site was dominated by *Chroomonas* sp. (15.2%). The chlorophyll *a* levels at test site 1 (12 µg/L) and test site 2 (16 µg/L) were higher than those found in 70% of Florida's estuaries. Given the low nutrients present in Escambia Bay, this observation is also consistent with the idea that phytoplankton is being imported to the Bay in the vicinity of the discharge.

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Chemistry Summary Table for Air Products and Chemicals, Inc.	Effluent	Reference Site	Test Site 1	Test Site 2	Fishermans Point
Organic Constituents (ug/L)					
Cyanide	0.01 I				
Metals (ug/L)					
Aluminum	100 U				
Arsenic	20 U				
Copper	5 U				
Chromium	12 I				
Iron	603 A				
Lead	10 U				
Mercury	0.10 U				
Selenium	30 U				
Zinc	5 U				
Nutrients (mg/L)					
Ortho-phosphate	2.0	0.015 U	0.015 U	0.015 U	0.015 U
Total phosphorus	2.5	0.034 I	0.032 I	0.031 I	0.025 I
Ammonia	4.9	0.02 U	0.025 A	0.02 U	0.02 U
Nitrate+Nitrite	0.38 A	0.13 A	0.089	0.02 U	0.024 I
TKN	8.8	0.41	0.58	0.58	0.5
General Phys-Chem Parameters					
Habitat Assessment	-	61	50	55	44
D.O. (mg/L) Surface	6.8	5.9	8.1	8.4	7.7
D.O. (mg/L) Mid-depth	-	6.3	8.1	8.3	7.8
D. O. (mg/L) Bottom	-	6.3	8.1	8.3	7.7
pH (SU) Surface	7.5	6.4	7.2	7.8	7.3
pH (SU) Mid-depth	-	6.5	7.4	7.8	7.6
pH (SU) Bottom	-	6.5	7.3	7.8	7.4
Specific Conductance (µmhos/cm)-Surface	1225	580	5030	5970	5630
Specific Conductance (µmhos/cm)-Mid-depth	-	1322	5030	6020	7060
Specific Conductance (µmhos/cm)-Bottom	-	2360	5040	6020	9620
Salinity (ppt)- Surface	0.8	0.5	3.0	3.5	3.3
Salinity (ppt)- Mid-depth	-	0.9	3.0	3.5	4.0
Salinity (ppt)- Bottom	-	1.5	3.0	3.5	6.0
Temperature (°C)- Surface	25.3	28.3	32.0	32.1	30.6
Temperature (°C)- Mid-depth	-	28.4	32.0	32.1	30.3
Temperature (°C)- Bottom	-	29.0	32.0	32.1	30.5
Algal Growth Potential (mg dry wt/L)	227.7 *	0.7 *	0.1	0.1	0.4
Toxicity					
Bioassay Fish	Not toxic	-	-	-	-
Bioassay Invertebrate	Not toxic	-	-	-	-

* - *Selenastrum capricornutum*

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

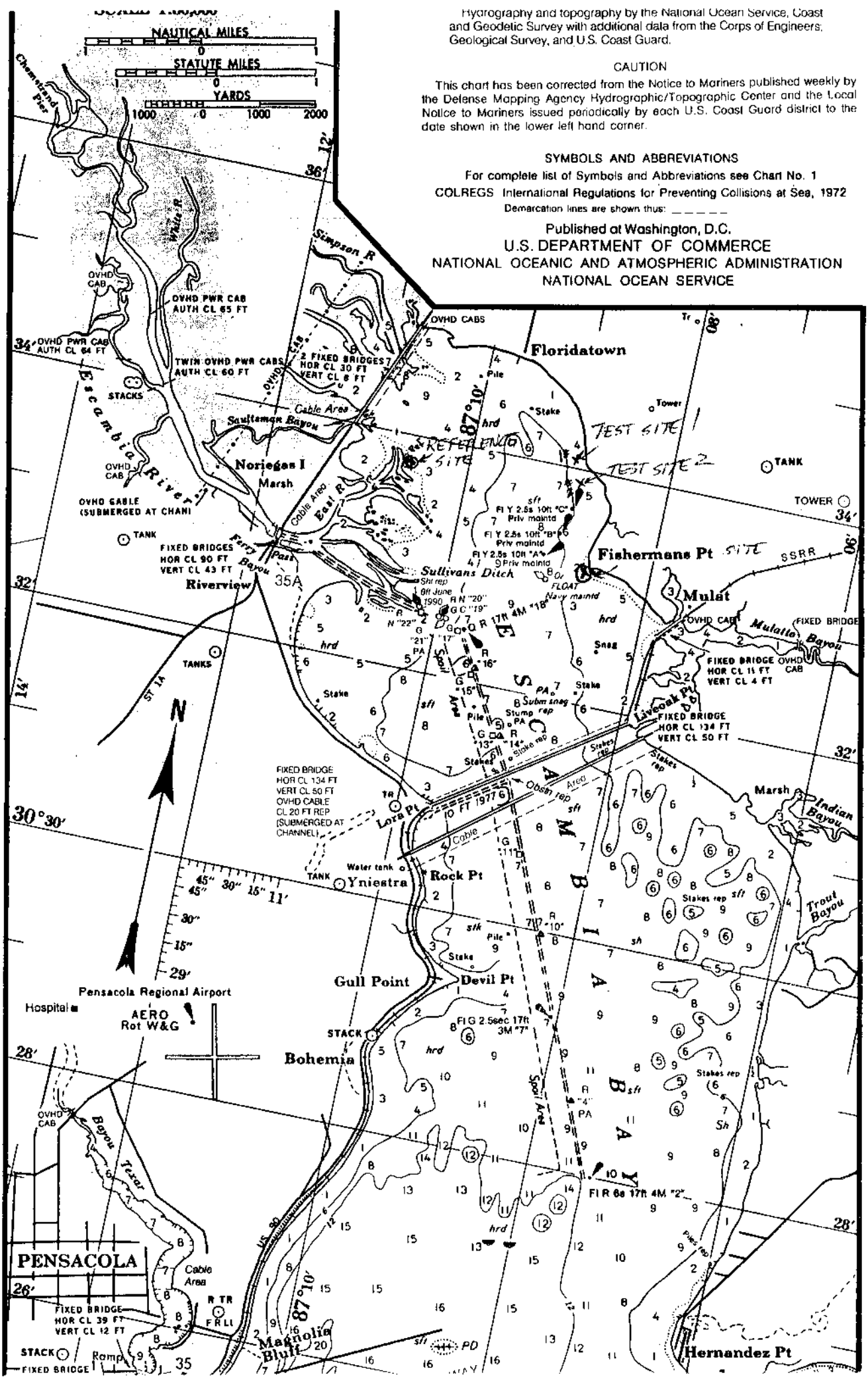
Typical Values for Selected Parameters in Florida Waters

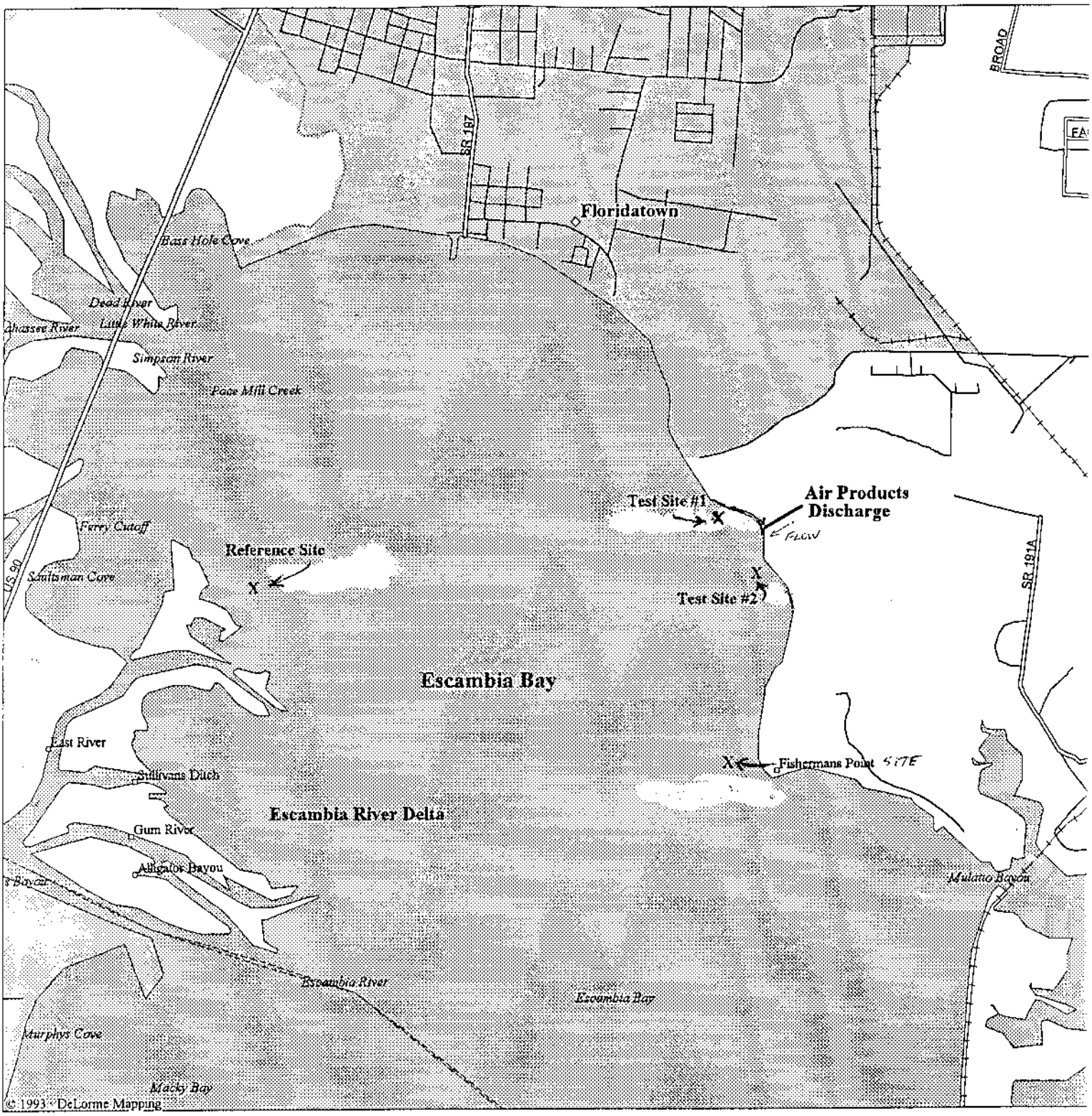
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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 Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphate	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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


NAUTICAL MILES
STATUTE MILES
YARDS
1000 0 1000 2000
Hydrography and topography by the National Ocean Service, Coast and Geodetic Survey with additional data from the Corps of Engineers, Geological Survey, and U.S. Coast Guard.
CAUTION
This chart has been corrected from the Notice to Mariners published weekly by the Defense Mapping Agency Hydrographic/Topographic Center and the Local Notice to Mariners issued periodically by each U.S. Coast Guard district to the date shown in the lower left hand corner.
SYMBOLS AND ABBREVIATIONS
For complete list of Symbols and Abbreviations see Chart No. 1
COLREGS International Regulations for Preventing Collisions at Sea, 1972
Demarcation lines are shown thus: _ _ _ _ _
Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
SIDE B
Chemstrand Pier
Wallace R
Simpson R
OVHD CAB
OVHD PWR CAB AUTH CL 65 FT
OVHD PWR CAB AUTH CL 64 FT
TWIN OVHD PWR CABS AUTH CL 60 FT
2 FIXED BRIDGES HOR CL 30 FT VERT CL 8 FT
OVHD CABS
Floridatown
STACKS
Cable Area
Saultemon Bayou
Escambia River
Norieges I
Marsh
OVHD CABLE (SUBMERGED AT CHANI
East R
Cable Area
Ferry Pass
Bayou
FIXED BRIDGES HOR CL 90 FT VERT CL 43 FT
Riverview
Sullivans Ditch
Shl rep 6ft June 1990
Fishermans Pt
Mulat
Mulatto Bayou
FIXED BRIDGE OVHD CAB
FIXED BRIDGE HOR CL 11 FT VERT CL 4 FT
Liveoak Pt
FIXED BRIDGE HOR CL 134 FT VERT CL 50 FT
TANKS
ST 14
FIXED BRIDGE HOR CL 134 FT VERT CL 50 FT OVHD CABLE CL 20 FT REP (SUBMERGED AT CHANNEL)
Lora Pt
Obstn rep
Marsh
Indian Bayou
Water tank
TANK Yniestra
Rock Pt
Trout Bayou
Pensacola Regional Airport
Hospital
AERO Rot W&G
Gull Point
Devil Pt
STACK
Bohemia
FIG 2.5sec 17ft 3M "7"
Spoil Area
FIR 6s 17ft 4M "2"
Bayou Texar
PENSACOLA
Cable Area
FIXED BRIDGE HOR CL 39 FT VERT CL 12 FT
R TR FRLL
Magnolia Bluff
Hernandez Pt
Ramp
FIXED BRIDGE
TEST SITE 1
TEST SITE 2
REFERENCE SITE
TANK
TOWER
SSRR
FLOAT Navy maintd
FI Y 2.5s 10ft "C" Priv maintd
FI Y 2.5s 10ft "B" Priv maintd
FI Y 2.5s 10ft "A" Priv maintd
87°10'
30°30'
45" 30" 15" 11'
45"
30"
15"
29'
12'
36'
34'
32'
30'
28'
26'
14'
35A
35



LEGEND

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

Scale 1:31,250 (at center)

2000 Feet

1000 Meters

Escambia Bay
Mag 14.00
Tue Jul 02 09:37:55 1996

Facility Summary

Facility Name: Air Products Date Summary Prepared: 7/15/96

Location map: Included County: Santa Rosa District: 10/Northwest

NPDES Permit # FL0002313 State GMS # 1057PO6140 Facility Type: **Ind.**
expiration date 4/29/97 expiration date 3/1/92* Dom. Fed. Agric.

* Facility has applied for a new permit. The new permit is currently in the draft process.

Function of facility: To operate a chemicals manufacturing plant with a 1.5 MGD design capacity wastewater treatment facility.

Description of treatment process: Consists of neutralization, equalization, anaerobic treatment, extended aeration treatment and final treatment in a 75 bipond complex (four oxidation ponds) discharging to Escambia Bay.

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

Design Flow: 1.5 MGD Mean Flow: 1.18 MGD Flow during survey: 1.16 MGD (APR 96 MOR)

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

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

The mixing zone shall be a semicircular area with a radius of 282 meters originating at the point of discharge (POD) of the effluent. The POD for the effluent is at the periphery of the Escambia Bay shoreline west of the Alpha pond spillway structure. If any of the parameters' limits listed below are exceeded in the Alpha pond discharge then a grab sample from the edge of the mixing zone shall be analyzed for that parameter.

Parameter	**Limit (units)**
Cyanide	0.1 mg/l
Chromium	0.2 mg/l
Copper	0.03 mg/l
Silver	0.005 mg/l
Phenol	0.02 mg/l
Mercury	0.004 mg/l
pH	6.0-9.0 (S.U.)

List effluent limits (attach relevant paperwork):

The Alpha pond discharge limitations, with the exception of those parameters identified above, for the Escambia Bay effluent shall be:

Parameter	**Limit (units)**	
	Monthly Avg.	**Maximum**
COD	1390 lbs/day	2530 lbs/day
TSS	400 lbs/day	800 lbs/day

Total Nitrogen		
(Dec - Apr)**	750 lbs/day	1400 lbs/day
(May - Nov)**	405 lbs/day	1400 lbs/day
Total Phosphorus	32 lbs/day	64 lbs/day
PCB	--	.001 ug/l
Flow	***	
BOD5	***	
Static Renewal		
Bioassay	***	
Ammonia	*	

* - Ammonia (Unionized) shall be calculated using the ammonia sample results and submitted in the monthly report.

** - Total Nitrogen discharge shall not exceed 146,000 lbs yearly.

*** - Limits for these parameters are listed in Section 62-3.121, Florida Administrative Code.

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

Facility has been well maintained within the past year. No violations are noted.

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

The latest bioassay on file was done December 1995 and results were both toxic for the Mysidopsis bahia (mysid shrimp) and Pimephales promelas (fathead minnow) at the Alpha pond discharge. The confirming bioassay, taken at a bayward point from the discharge, was found not toxic to species M. bahia and Cyprinoden variegatus (sheepshead minnow).

The facility is implementing corrective action to address dinitrotoluene (DNT) groundwater contamination from previous landfill events. The corrective measures are required by EPA Administrative Order on Consent (U.S. EPA Docket No. 95-04-R, effective 09/29/95) and a FDEP Consent Order (OGC File No. 94-1833, effective 09/19/95). The contaminated DNT groundwater will be treated by a carbon adsorption process. The Department has received a UIC permit application from the facility for partial disposal of this treated groundwater while the remainder will be released into a designated wetland site.

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

The MOR results appear to be consistent with the results taken from DEP sampling. No definite trends can be identified within the data set.

Additional information:

The facility is proposing to begin recycling wastewater and increase the percolation pond's holding capacity. This increased capacity will decrease the amount of flow entering surface waters.

Staff contributing to this review (signature)

Glenn Butler — Biologist

Inspector

Engineer

Nikki Kilburn, ES1 Co-op — Other

Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8070 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0A13	DATE (M/D/Y): 07-30-96	TIME: 0955	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
REFERENCE SITE	ESCAMBIA	AT ISLAND OFF RIVER DELTA	# 1 (6)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
95				5			

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

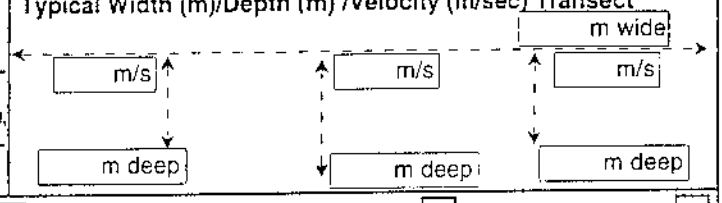
Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☒ Moderate potential ☐ Obvious sources ☐

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

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

High Water Mark (m above present water level):

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



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			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	.3	28.25	6.38	5.85	580			0.7
Mid-depth	1.0	28.96	6.76	6.06	2360			
Bottom	.5	28.37	6.54	6.28	1322			

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

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

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

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

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

Weather Conditions/Notes:
Flat.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Dowe Inn / Keefer / Wayne	Glenn Butts	

DEPARTMENT OF ENVIRONMENTAL REGULATION

MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0A13	DATE (M/D/Y): 07-30-96	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	LOCATION: AT ISLAND OFF RIVER DELTA	FIELD ID/NAME:
REFERENCE SITE		# 1

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

TOTAL SCORE 61

COMMENTS:

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: SCID / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.00C1	DATE (M/D/Y): 07-30-96	TIME: 1100	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	COUNTY: SANTA ROSA	LOCATION: OFF FISHERMAN'S POINT	FIELD ID/NAME: # 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				60	20	20	

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

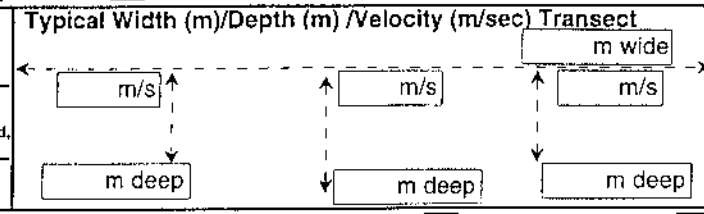
Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☐

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

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

High Water Mark (m above present water level):

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



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			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	1.84	30.56	7.30	7.68	5630			0.8
Mid-depth	.45	30.31	7.56	7.38	7060			
Bottom	1	30.53	7.44	7.68	5620			

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

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

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

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

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

Weather Conditions/Notes:
Hvy sed.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Keefer / Payne / Donelson	Glenn Britta	

DEPARTMENT OF ENVIRONMENTAL REGULATION

MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: DEP NWD	STORET STATION NUMBER: 33.02.0001	DATE (M/D/Y):	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	LOCATION: OFF FISHERMAN'S POINT	FIELD ID/NAME: # 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 7	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 15	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 8	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 7	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 4	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 44

COMMENTS:

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0A14	DATE (M/D/Y): 07-30-96	TIME: 1250	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	COUNTY: SANTA ROSA	LOCATION: AT TEST SITE #1	FIELD ID/NAME: #3

RIPARIAN ZONE/INSTREAM FEATURES

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

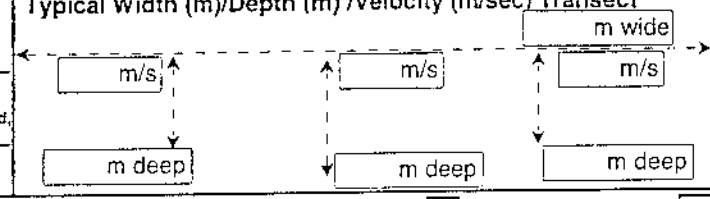
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						100	

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

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

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

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



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

High Water Mark (m above present water level):

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			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots							

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	.4	32.02	7.20	8.14	5,030			0.6
Mid-depth	.	32.03	7.36	8.08	5,030			
Bottom	.8	32.05	7.29	8.09	5,040			

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

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

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

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

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

Weather Conditions/Notes:

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

SAMPLING TEAM:	SIGNATURE: Glenn Brutke	DATE:

DEPARTMENT OF ENVIRONMENTAL REGULATION

MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDER NWD	STORET STATION NUMBER: 33.02.0A14	DATE (M/D/Y): 07-30-96	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	LOCATION: AT TEST SITE #1	FIELD ID/NAME: #3

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 6	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 7	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 6	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 50

COMMENTS:

ANALYSIS DATE:	ANALYST: G. BATTS	SIGNATURE: Glenn Batts

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0A10	DATE (M/D/Y): 07-30-96	TIME 1345	RECEIVING BODY OF WATER: ESCAMBIA BAY

REMARKS:	COUNTY: SANTA ROSA	LOCATION: AT TEST SITE #2	FIELD ID/NAME: # 4

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

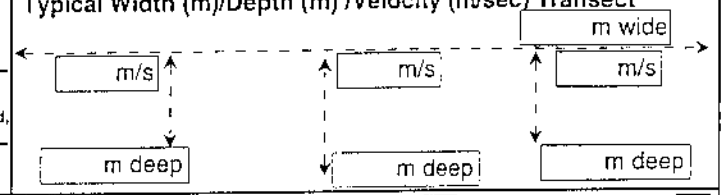
Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☐

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

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

High Water Mark (m above present water level):

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



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			
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots							

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	1.87	32.13	7.76	8.40	5970			.5
Mid-depth	.65	32.08	7.78	8.34	6020			
Bottom	1.3	32.07	7.76	8.30	6020			

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

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

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

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

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

Weather Conditions/Notes: wind out S. 10

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

SAMPLING TEAM:	SIGNATURE: Glenn Butts	DATE:

DEPARTMENT OF ENVIRONMENTAL REGULATION

MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0A10	DATE (M/D/Y): 07-30-96	RECEIVING BODY OF WATER: ESCAMBIA BAY

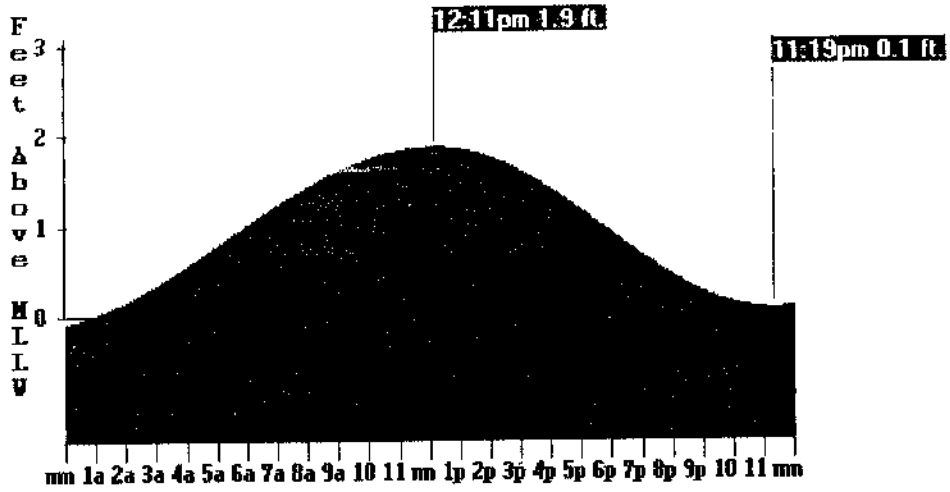
REMARKS:	LOCATION: AT TEST SITE # 2	FIELD ID/NAME: # 4

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 25	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 6	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 7	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 6	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 55

COMMENTS:

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



Lora Point Escambia Bay Tue Jul 30, 1996 CDT

TideMaster - (C) Zephyr Services, Pittsburgh PA

12:00M	0.0 ft	5:00a	0.8 ft	10:00a	1.8 ft	3:00p	1.6 ft	8:00p	0.5 ft
1:00a	0.1 ft	6:00a	1.0 ft	11:00a	1.9 ft	4:00p	1.4 ft	9:00p	0.3 ft
2:00a	0.2 ft	7:00a	1.3 ft	12:00N	1.9 ft	5:00p	1.2 ft	10:00p	0.2 ft
3:00a	0.4 ft	8:00a	1.5 ft	1:00p	1.9 ft	6:00p	0.9 ft	11:00p	0.1 ft
4:00a	0.6 ft	9:00a	1.6 ft	2:00p	1.8 ft	7:00p	0.7 ft	12:00M	0.1 ft

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Air Products
County: SANTA ROSA
Contact / District: GLENN BUTTS / NWD
NPDES Permit #: FL00 02313
LIMS Sample #: 147053 **LIMS Job #:** 96-JUL-30-06
sample log 8-2-96 MF

Sample Collection: Date 7/29/96 Time 1012
Test Beginning: Date 7/30/96 Time 1400
Test Ending: Date 8-2-96 Time 1405
Organism Batch #: 56 **Diluent Batch #:** well
Organism Age: 11 days

Test Organism: Cyprinella leedsi

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through

Test Number: 2 of 2

Remarks:

8 24hour Conductivity Calibration
102.7 @ 101.5
1011 @ 1006 @ 25.1°C

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm mf 8/2/ (Standard Curve first)
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 24.3 °C	101.5 ↔ 107.0 1006 ↔ 1008 @ 24.9 9938 9850
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.1	8.2 @ 24.8 °C	9960 @ 1006 incorrect MF 7/4 calibration 9930 @ 9989 @
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.4	8.4 @ 23.8 °C	103.4 @ 101.5 1027 @ 9850 @ 9989 @ 24.7 1004 & 1006

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctrl A	B9	5	5	5	7.9	8.3	8.4	24.7	23.7	24.0	8.0	8.3	8.0	250	250	255
Ctrl B	B10	5	5	5	7.9	8.3	8.4	24.6	23.7	23.9	7.9	8.2	8.0	250	250	255
Ctrl C	B11	5	5	5	8.0	8.3	8.4	24.6	23.8	23.9	7.8	8.0	7.9	250	250	250
Ctrl D	B12	5	5	5	8.0	8.3	8.4	24.5	23.9	23.8	7.8	8.0	8.0	250	250	250
100% A	B13	5	5	5	7.6	7.9	8.1	25.3	23.4	23.7	6.8	7.1	7.4	1200	1180	1180
100% B	B14	5	5	5	7.6	7.9	8.0	25.4	23.5	23.6	6.8	7.1	7.0	1225	1180	1190
100% C	B15	5	5	5	7.5	7.9	8.0	25.4	23.6	23.6	6.7	6.6	7.0	1225	1180	1190
100% D	B16	5	5	5	7.5	7.9	8.0	25.3	23.8	23.7	6.8	7.1*	7.1	1220	1190	1200
Measured/Loaded by:		MF	TM	TM	DB	DN	DN	DB	DN	DN	DB	DN	DN	DB	DN	DN
Recorded by:		TM	TM	TM	LM	LM	ND	LM	LM	ND	LM	LM	ND	LM	LM	ND

** 1200 wrote wrong # ND

*6.6 LM wrote wrong # 7/31/96

Investigators' Signatures Denise Nicholson

reviewer form updated 4/01/96

	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			NOT	measured	
Lab Total Residual Cl2 (mg/L):	<0.03	—	0.06	DR-100	TM/DN
Alkalinity (mg/L as $CaCO_3$):	130	—	135	HACH	DN/DB
Hardness (mg/L as $CaCO_3$):	130	—	70	HACH	DN/DB
Total ammonia (mg/L as N):	<.017	—	2.09	Orion	LM/ND

Water Quality Parameters

Ammonia Meter #98136 Ammonia Meter Slope: -57.7 Ammonia Blank: <.017 Control Salinity: 0 ppt Sample Salinity: 0 p

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Air Products
County: SANTA ROSA
Contact / District: GLENN BUTTS / NW
NPDES Permit #: FL00 02313
LIMS Sample #: 147053 **LIMS Job #:** 96- JUL-30-06
sample log 8-2-96 mf

Sample Collection: Date 7/29/96 Time 1012
Test Beginning: Date 7/30/96 Time 1330
Test Ending: Date 8-1-96 Time 1400
Organism Batch #: 32 **Diluent Batch #:** 32
Organism Age: <24hours

Test Organism: C. dubia

Test Type: (Screening) I Definitive
Static / Static Renewal I Flow-through

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749 ↔ Standard recorded first
0 hr	7.0 @ 7.0	23.8 @ 23.9	8.3 @ 24.3 °C	101.5 @ 107.0 mf 8/2/96
	9.0 @ 9.0			1006 ↔ 1008 @ 24.9 °C (9983 @ 9860)
24 hr	7.0 @ 7.0	25.1 @ 25.1	8.2 @ 24.8 °C	102.7 @ 101.5
	9.0 @ 9.0			1011 @ 1006 @ 25.1 °C
48 hr	7.0 @ 7.0	24.3 @ 24.4	98.4 @ 23.8 °C	103.4 @ 101.5
	9.0 @ 9.0			1004 @ 1006 @ 24.7 °C (9850 @ 9989)

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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Ctrl A	A	5	5	5	8.2		8.0	23.7		24.0	8.0		8.0	170		180
Ctrl B	B	5	5	5			8.2			23.9			8.0			180
Ctrl C	C	5	5	5			8.3			23.9			7.9			175
Ctrl D	D	5	5	5			8.3			23.9			8.1			180
100% A	A	5	5	5	7.7		8.8	24.2		24.0	7.5		8.8	1080		1170
100% B	B	5	5	5			8.8			23.9			8.9			1195
100% C	C	5	5	5			8.8			23.9			9.1			1130
100% D	D	5	5	5			8.8			23.9			8.9			1205
Measured/Loaded by:		MF	TM	MF	DB	~~ND~~	ND	DB		ND	DB		ND	DB		ND
Recorded by:		MF	TM	MF	LM	~~DN~~	DN	LM		DN	LM		DN	LM		DN

Investigators' Signatures Dennis Nicholson

Liz Monk
Patricia Bates
Marla Snyder
Tina Mikulski
Dan Watts
Marshall Fairfield
Steven H Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	—	<0.03	0.06	DR-100	TM/DN
Alkalinity (mg/L as $CaCO_3$):	—	80	135	HACH	DN/DB
Hardness (mg/L as $CaCO_3$):	—	90	70	HACH	DN/DB
Total ammonia (mg/L as N):	4 —	<.017	2.09	Orion	LM/ND

Ammonia Meter #98136 Meter Slope: -57.7 Ammonia Blank: <.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Benthic macroinvertebrate taxa list for Air Products WWTP, collected via Ponar grab samples in Escambia Bay, on 7 July, 1996. Densities, in number/m^2, represent the mean of three replicates.

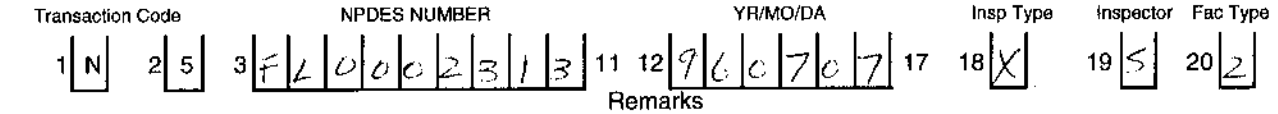
	Fisherman's Point	Reference Site	Test Site 1	Test Site 2
Rhynchocoela				
Nemertea	46	28	37	46
Polychaeta				
Boccardia sp.	11,014	97	-	-
Hobsonia florida	-	1005	5	-
Laeonereis culveri	23	236	394	347
Neanthes sp.	5	-	-	-
Neanthes succinea	19	-	-	-
Polydora sp.	-	9	-	-
Spiophanes bombyx	-	-	9	-
Streblospio benedicti	51	32	28	-
Ampharetidae	-	42	-	-
Capitellidae	-	301	153	23
Nereidae	28	-	19	65
Pilargidae	32	14	14	-
Spionidae	-	-	23	-
Oligochaeta				
Eclipidrilus sp.	-	9	-	-
Limnodrilus hoffmeisteri	5	79	-	37
Tubificidae	-	5	-	-
Gastropoda				
Littoridinops monroensis	-	19	-	-
Neritina reclivata	5	139	-	14
Pyramidella sp.	-	37	-	-
Pyramidellidae	56	-	28	37
Pelecypoda	5	9	-	-
Abra sp.	9	-	-	-
Rangia cuneata	-	28	9	28
Rangia sp.	14	-	5	9
Mysidacea				
Mysidopsis bahia	-	42	-	-
Tanaidacea				
Hargeria rapax	120	-	-	-
Isopoda				
Edotea montosa	5	-	14	9
Amphipoda				
Corophium simile	130	-	-	-
Gammarus mucronatus	-	51	-	-
Grandidierella bonnieroides	28	1449	-	-
Melita nitida	-	14	-	-
Melita sp.	-	-	5	-
Corophiidae	5	-	-	-

Decapoda	-	-	5	-
Callinectes sp.	-	5	-	-
Rhithropanopeus harrisii	-	5	-	-
Xanthidae	-	9	-	-
Diptera				
Chironomus sp.	-	-	14	14
Cladopelma sp.	-	5	-	-
Coelotanypus sp.	-	14	-	-
Cricotopus or orthocladius	-	-	-	5
Cryptochironomus sp.	9	32	42	83
Endochironomus subtendens	-	65	-	-
Palpomyia/bezzia grp.	5	46	5	-
Polypedilum halterale grp.	-	-	5	5
Polypedilum scalaenum grp.	-	56	9	5
Polypedilum sp.	-	5	9	-
Procladius sp.	-	5	-	-
Stenochironomus sp.	-	-	-	5
Tanypus sp.	-	-	5	-
Tanypus stellatus	-	-	5	-
Tanytarsus sp.	9	130	-	5
Tanytarsus sp. L epler	-	5	-	-
Chironomidae	5	5	5	-

Phytoplankton taxa list and densities (#/mL) for Air Products WWTP, collected via subsurface grabs in Escambia Bay, on 7 July, 1996.

	Fisherman's Point	Reference Site	Test Site 1	Test Site 2
Cyanophyceae				
Anabaena sp.	-	-	103	-
Aphanocapsa sp.	11	-	-	-
Chroococcus sp.	221	20	185	101
Dactylococcopsis sp.	32	30	21	40
Lyngbya sp.	-	10	-	-
Merismopedia sp.	11	20	-	-
Oscillatoria sp.	-	10	-	-
Chrysophyceae				
Mallomonas sp.	-	10	-	-
Bacillariophyceae				
Achnanthes sp.	-	-	21	-
Chaetoceros sp.	-	10	-	-
Cyclotella sp.	966	91	637	523
Navicula sp.	-	-	41	-
Nitzschia sp.	-	20	-	-
Rhizosolenia sp.	42	-	21	40
Pennales	11	30	-	-
Chlorophyceae	1407	70	1623	4826
Botryococcus sp.	-	10	-	-
Chlamydomonas sp.	42	40	-	-
Chlorella sp.	-	10	-	-
Crucigenia sp.	11	10	-	-
Dunaliella sp.	-	-	349	141
Elakatothrix sp.	-	10	-	-
Oocystis sp.	-	10	-	-
Pyramimonas sp.	210	-	144	161
Scenedesmus sp.	147	70	123	40
Spermatozoopsis sp.	11	20	-	-
Tetraedron sp.	32	20	103	80
Tetraselmis sp.	105	-	185	241
Euglenophyceae				
Euglena sp.	-	20	41	-
Trachelomonas sp.	-	10	-	-
Dinophyceae				
Peridinium sp.	84	-	-	20
Cryptophyceae				
Chroomonas sp.	242	101	432	261
Cryptomonas sp.	231	10	596	623

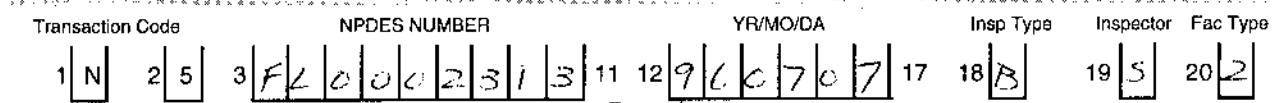
Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)



Remarks



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



Remarks

