

Biological Assessment of

Monsanto Chemical Corporation

Escambia County

NPDES #FL0002488

Sampled June 1996

September 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: Monsanto Chemical Corporation
County: Escambia
NPDES Number: FL0002488
State Permit Expiration Date: 1 February, 1997

Toxics Sampling Inspection (XSI)

Date Sampled: 21 May, 1996

Results: No organic compounds were detected in either effluent at concentrations above the minimum quantitation limit. Copper in the north outfall (17 µg/L) exceeded the hardness-based Class III water quality standard. Iron measured in both effluents (1,160 and 1,680 µg/L in the north and south outfalls, respectively) was in violation of Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 21 May, 1996

Results: Toxicity tests were conducted on both the north and south discharges. Neither effluent sample was acutely toxic to the invertebrate, *Ceriodaphnia dubia* or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 25 June, 1996

Results: Most quantitative measures of benthic macroinvertebrate community health indicated that the test site was not adversely affected by the discharges. In fact, many community parameters at both the reference and test sites were considerably better than the values usually encountered in North Florida streams, indicating that healthy conditions prevailed. For example, the Florida Index score was 36 at the reference site and 28 at the test site, while the EPT Index was 19 at the reference site and 18 at the test site. Quantitative measures of periphyton community health suggested no adverse effects from the discharges. Algal taxa richness and diversity was higher at the test site than at the reference site. Chlorophyll *a* at the test site was typical for a Florida stream.

Water Quality Inspection (WQI)

Date Sampled: 21 May, 1996

Results: Fecal coliforms in the south outfall effluent (295 organisms/100 mL) exceeded the permit limit. Fecal coliforms in the north effluent (1,700 organisms/100 mL) exceeded Class III water quality standards. With the exception of nitrate-nitrite, nutrients at both the reference and test sites were below average for a typical Florida stream. Nitrate-nitrite values at both sites were higher than those found in approximately 75% of other Florida streams (0.25 and 0.28 mg/L at reference and test sites, respectively). Algal growth potential values (4.4 mg dry wt/L at the reference site and 1.1 mg dry wt/L at the test site) were less than the 5.0 mg dry wt/L "problem threshold", suggesting nutrient enrichment is not presently a concern.

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide the basis for specific condition recommendations for permit renewal.

Introduction

Monsanto Chemical Corporation, located in Escambia County, Florida (see maps in Appendix), is a chemical manufacturing facility. This facility produces synthetic organic fibers, agricultural chemicals, industrial organic chemicals, plastics, and synthetic resins. There are two permitted surface water discharges to the Escambia River, the south outfall (001) and the north outfall (002) (see maps in Appendix). These effluents consist of once-through cooling water, cooling tower blow-down, chilled water blow-down, steam condensate, neutralized ion exchange backwash, potable water, fire water, neutralized process discharge from the Fiber Web Holzoff Nonwovens Plant, and stormwater. The design flow of the south outfall (001) is 25.0 MGD, while the design flow of the north outfall (002) is 2.0 MGD. Average flow from the south and north outfalls has been 24.2 MGD and 2.2 MGD, respectively. During this survey, the south outfall was discharging at a rate of 26.9 MGD, while flow at the north outfall was 1.8 MGD.

Permit limits for the south outfall (001) are as follows: copper (0.03 mg/L maximum), nickel (0.10 mg/L maximum), zinc (0.10 mg/L maximum), oil and grease (5 mg/L maximum), total residual chlorine (0.01 mg/L maximum), pH (6.0 SU minimum, 8.5 SU maximum), temperature (99° F maximum), and fecal coliforms (200 organisms/100 mL maximum).

Permit limits for the north outfall (002) are as follows: copper (0.03 mg/L maximum), nickel (0.10 mg/L maximum), zinc (0.20 mg/L

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	50	32
Florida Index	16	5
SCI	27	23
EPT Index	4	5
% Contribution of Dominant Taxon	22.1	27.6
% Oligochacta	21.4	6.6
% Diptera	64.5	44.1
% Ephemeroptera	1.3	0.7
% Trichoptera	1.9	5.9
% Odonata	0	0.7
% Coleoptera	0.6	0
% Amphipoda	2.2	27.6
% Gastropoda	2.6	2.6
% Pelecypoda	3.5	0.7
% Isopoda	0.3	7.2
% Other	1.6	3.3
% Predators	5.7	3.6
% Above Surface Deposit Feeders	34.6	45.7
% Below Surface Deposit Feeders	20.8	5.9
% Suspension Feeders	9.0	6.9
% Scrapers	1.3	3.6
% Shredders	25.4	28.0
% Plant Piercers	0	3.6
% Other	1.1	1.3
Macroinvertebrate Hester-Dendy		
Number of Taxa	46	42
Florida Index	36	28
Shannon-Weaver Diversity	3.21	3.97
EPT Index	19	18
% Diptera	13.3	58.1
% Ephemeroptera	18.8	13.4
% Trichoptera	66.6	26.3
% Coleoptera	0.5	0
% Other	0.7	2.2
% Predators	2	16.5
% Above Surface Deposit Feeders	15.2	46.4
% Suspension Feeders	68.9	22.7
% Scrapers	8.3	5.0
% Shredders	3.8	5.4
% Other	0.8	1.9
Periphyton Algae		
Number of Taxa	31	42
Shannon-Weaver Diversity	4.24	4.65
Algal Density (#/sq. cm)	46,147	120,032
Chlorophyll a (mg/sq. m)	0.41	5.0
Diatom/Diatom + B-G Abundance Ratio	0.95	0.85
% Blue-green	4.8	12.2
% Green	1.9	18.8
% Diatoms	93.3	68.5
% Cryptophytes	0	0.5
Algal Growth Potential (mg dry wt/l)	4.4	1.1

maximum), total residual chlorine (0.01 mg/L maximum), pH (6.0 SU minimum, 8.5 SU maximum), and temperature (99° F maximum). The facility has a mixing zone for zinc at the north outfall. This mixing zone extends into the Escambia River, downstream from the discharge, for 100 feet. If the zinc limitation is exceeded in the discharge, a grab sample is taken from the edge of the mixing zone.

Both outfalls are subject to permit limits for BOD$_5$, total nitrogen, and total phosphorus. These limits, termed "net" values in the permit, are calculated three times weekly by subtracting the river water intake values from the sum of the values from the north and south outfalls.. The limits for these parameters are as follows: BOD$_5$ (650 lbs/day as a monthly average), total nitrogen (150 lbs/day as a monthly average), and total phosphorus (45 lbs/day as a monthly average). Additionally, toxicity tests are routinely performed on both outfalls.

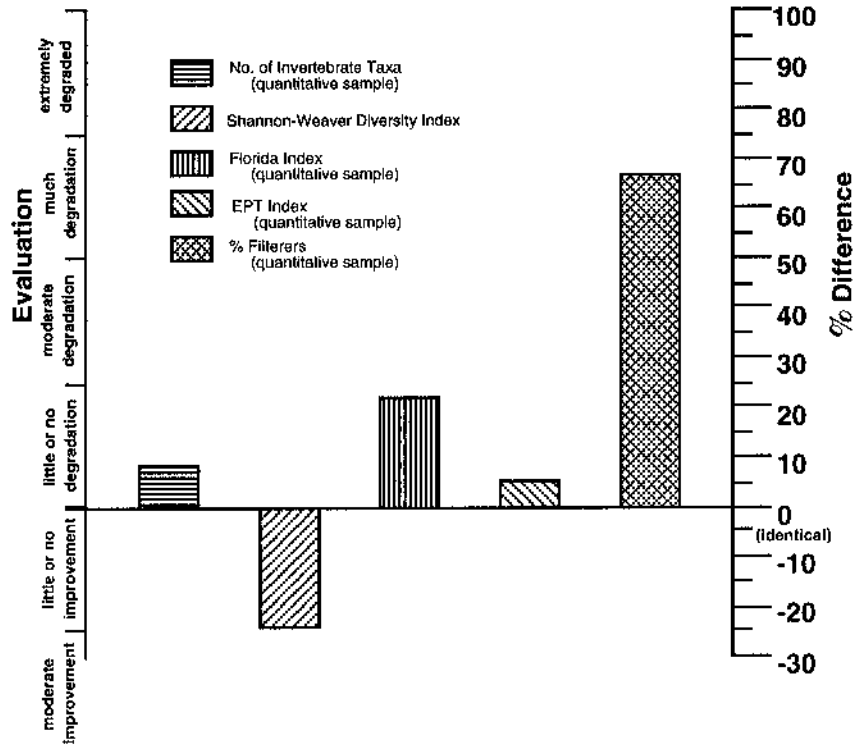
Permit limits for fecal coliforms were violated at the south outfall four separate times in 1995. Permit limits for pH were violated at the south outfall on three occasions in 1995, and once in 1996. North outfall permit limits for pH were violated in May, 1995, and February, 1996. The north outfall also failed three separate *Ceriodaphnia dubia* toxicity tests conducted in January, 1995, as well as one test in November, 1995.

In May, 1995, two separate oil spills occurred, one consisting of about 1 quart of oil, and the other consisting of an unknown amount. In August, 1995, there was a spill of 10 gallons of sulfuric acid into the storm sewer which decreased the pH to 4.7 SU. In February, 1996 a line break caused a spill of hexamethalemediamine, resulting in an increase of pH (to 10.5 SU) for about 1 hour.

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 the Escambia River at Upper Bluffs, upstream of both outfalls) and a test site (the area downstream from the south outfall). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on both effluents (Weber 1991). The effluents were analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers



Effect of discharge on the benthic macroinvertebrate community.

which were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

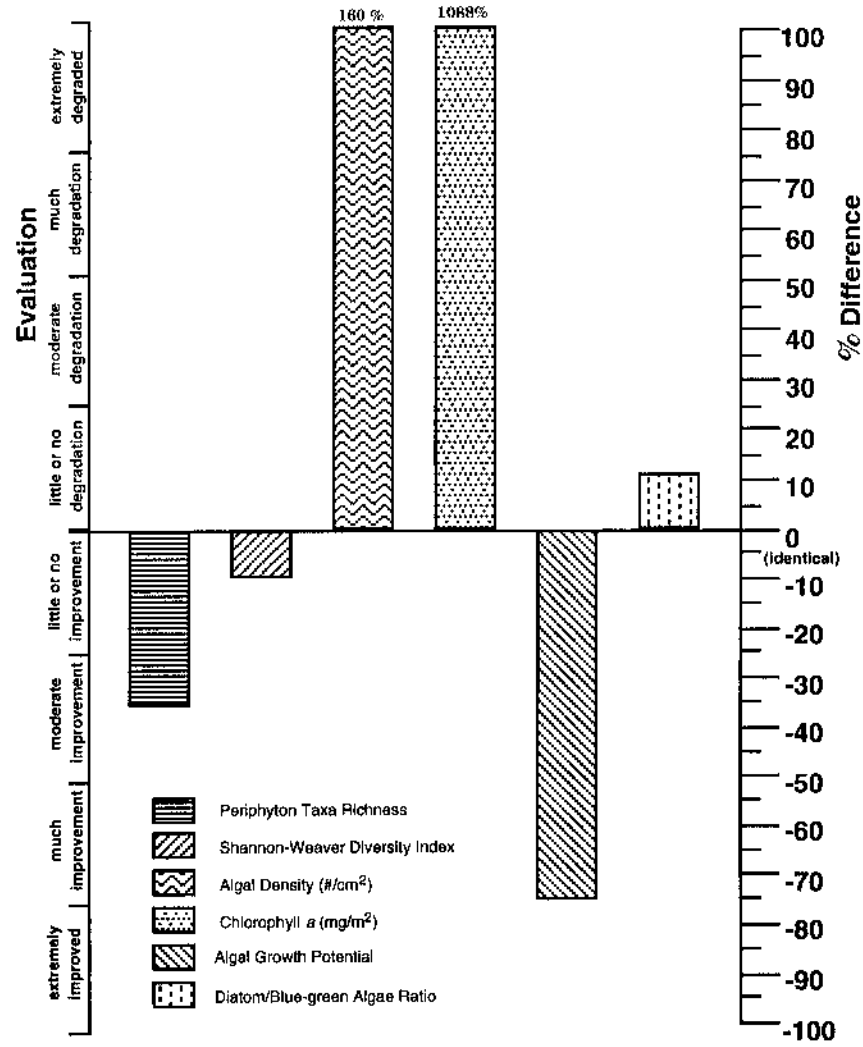
Explanation of Measurements of Community Health

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

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 points possible for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

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

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.



Effect of discharge on the algal community.

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 Hudson *et al.* (1990), Lenat (1993), and Chang *et al.* (1992) are used as appropriate.

Ephemeroptera/Plecoptera/Trichoptera Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation.

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A de-

creased 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).

The Stream Condition Index for Florida (SCI) is a composite macroinvertebrate metric (Barbour *et al.* 1996). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SCI calculation table in Appendix).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving 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: Randy Payne, Tracy Keefer, Glenn Butts, and Lisa Kelley (DEP NW District) and Lyn Burton, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Bart Richard, and David Whiting (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

The Escambia River is a large, alluvial, lotic system. The study area was situated in the final reach of the river before it empties into Escambia Bay. The reference site received a habitat assessment score of 114 points, placing it in the "optimal" category, while the test site, with 100 habitat assessment points, was in the high range of the "suboptimal" category. The test site received lower scores in the categories of riparian zone vegetation quality, water velocity, and artificial channelization. Both sites scored in the marginal category for bank stability. Bottom substrate at the reference site was mostly sand with a small amount of woody debris, aquatic vegetation, and undercut banks and roots. Substrates at the test site consisted mostly of mud/muck/silt, with small amounts of woody debris, aquatic vegetation, and undercut banks and roots.

Physical/chemical parameters were similar at both Escambia River sites. For example, conductivity ranged from 135 µmhos/cm to 141 µmhos/cm, pH ranged from 6.8 SU to 6.7 SU, and temperature ranged from 28.8 °C to 28.6 °C. Dissolved oxygen, (5.5 mg/L at both sites) was adequate to support aquatic life.

Toxicity tests were conducted on both the north and south discharges. Neither effluent sample was acutely toxic to the invertebrate, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi* (Appendix).

Atrazine was found in the south outfall at an estimated concentration of 0.05 µg/L, which is below the routine criterion of detection. Hexazinone was estimated to be 0.2 µg/L in both effluents, a concentration which is also below the criterion for detection. The concentrations of these organic compounds were below acutely or chronically toxic levels (AQUIRE 1991, Montgomery 1993).

Copper was detected in the north outfall at 17 µg/L. While this concentration complied with the facility's permit limit (30 µg/L), at an effluent hardness of 19.8 mg $CaCO_3$/L, it exceeded the hardness-based Class III water quality standard of 3 µg/L. Copper was also detected in the south outfall (9 µg/L) at a level below the quantitation limit, but greater than or equal to the minimum detection limit. For regulatory purposes, the copper from the south outfall was then assumed to equal the detection limit, which was 3 µg/L. At an effluent hardness of 31.4 $CaCO_3$/L, this level of copper complied with its Class III standard of 4.4 µg/L.

Levels of iron measured in both effluents (1,160 and 1,680 µg/L in the north and south outfalls, respectively) were in violation of Class III water quality standards, Rule 62-302.530(39) FAC. Zinc (11 µg/L) was detected in the north outfall at a value less than the minimum quantitation limit, and well within the permit limit.

Fecal coliforms measured in the south outfall effluent (295 organisms/100 mL) exceeded the permit limit of 200 organisms/100 mL established for the south outfall. Fecal coliforms in the north effluent (1,700 organisms/100 mL) exceeded Class III water quality standards. Fecal coliform levels at both the Escambia River reference and test sites, at 10 organisms/100 mL and 50 organisms/100 mL, respectively, complied with Class III water quality standards. Total coliforms (170 organisms/100 mL at the reference site, 185 organisms/100 mL at the test site) also complied with water quality standards.

With the exception of nitrate-nitrite, nutrients at both the reference and test sites were below average for a typical Florida stream (see Chemistry Summary Table in Appendix). Nitrate-nitrite values at both sites were higher than those found in approximately 75% of other Florida streams (0.25 and 0.28 mg/L at reference and test sites, respectively). The south effluent, with 0.38 mg/L of nitrate-nitrite, may have contributed to the very minor increase in the test site nitrate-nitrite level.

Algal growth potential (AGP) was determined to be 4.4 mg dry wt/L at the reference site and 1.1 mg dry wt/L at the test site. Both values were less than the 5.0 mg dry wt/L problem threshold (Raschke and Schultz 1987), suggesting nutrient enrichment is not presently a concern.

Most quantitative measures of benthic macroinvertebrate community health indicated that the test site was not adversely affected by the discharges. The Figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site is better than the reference site.

In the Hester-Dendy samples, the values of many community parameters were very high at both the reference and test sites, indicating that healthy conditions prevailed. For example, taxa richness (46 at the reference site, 42 at the test site), Florida Index (36 at the reference site, 28 at the test site), and EPT Index (19 at the reference site, 18 at the test site) were considerably better than the values usually encountered in North Florida streams. The Shannon-Weaver diversity at the test site (4.0) was actually 20% higher than the reference site value (3.2). The lower diversity score at the reference site appeared to be caused by the high abundance (66.6% of the total population) of caddisflies found there, especially *Hydropsyche* sp. and *Macrostemum carolina*. The reduction in percent filterers at the test site, when compared to the reference site, coincided with a decrease in trichopteran abundance there. Trichopterans were still well represented at the test site, however, with 7 trichopteran taxa, representing 26.3% of the population.

Some qualitative measures of benthic macroinvertebrate community health were lower at the test site than at the reference site. The reference site received an SCI score of 27, which places it in the lower range of the "excellent" category. The test site received an SCI score of 23, which places it in the middle of the "good" category. This decrease in the SCI score may be related to factors other than water quality. Within the reach between the reference and test site, the Escambia River is undergoing a transition from a uni-directional flowing system to a tidally influenced one. It is possible that dipnet sampling was less efficient at the test site. It should be noted that on the Hester-Dendy samplers, which control for substrate differences, an excellent population of invertebrates was collected at both the reference and test sites.

Quantitative measures of periphyton community health suggested no adverse effects from the discharges. The Figure on p. 3 represents changes in the periphyton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Algal taxa richness was higher at the test site (with 42 taxa) than at the reference site (with 31 taxa). Diversity ranged from 4.2 at the reference site to 4.7 at the test site. Chlorophyll *a* increased from 0.4 mg/m^2 at the reference site to 5.0 mg/m^2 at the test site (which also corresponded with an increase in algal density there). The test chlorophyll *a* value, however, was typical for a Florida stream. The diatom/blue-green ratio was 0.95 at the reference site and 0.85 at the test site, both commonly encountered values.

Conclusions

Toxicity tests were conducted on both the north and south discharges. Neither effluent sample was acutely toxic to the invertebrate, *Ceriodaphnia dubia* or to the fish, *Cyprinella leedsi*.

No organic compounds were detected in either effluent at concentrations above the minimum quantitation limit.

Copper in the north outfall (17 µg/L) exceeded the hardness-based Class III water quality standard. Iron measured in both effluents (1,160 and 1,680 µg/L in the north and south outfalls, respectively) was in violation of Class III water quality standards, Rule 62-302.530(39) FAC.

Fecal coliforms in the south outfall effluent (295 organisms/100 mL) exceeded the permit limit. Fecal coliforms in the north effluent (1,700 organisms/100 mL) exceeded Class III water quality standards.

With the exception of nitrate-nitrite, nutrients at both the reference and test sites were below average for a typical Florida stream. Nitrate-nitrite values at both sites were higher than those found in approximately 75% of other Florida streams (0.25 and 0.28 mg/L at reference and test sites, respectively).

Algal growth potential values (4.4 mg dry wt/L at the reference site and 1.1 mg dry wt/L at the test site) were less than the 5.0 mg dry wt/L "problem threshold", suggesting nutrient enrichment is not presently a concern.

Most quantitative measures of benthic macroinvertebrate community health indicated that the test site was not adversely affected by the discharges. In fact, many community parameters at both the reference and test sites were considerably better than the values usually encountered in North Florida streams, indicating that healthy conditions prevailed. For example, the Florida Index score was 36 at the reference site and 28 at the test site, while the EPT Index was 19 at the reference site and 18 at the test site.

Quantitative measures of periphyton community health suggested no adverse effects from the discharges. Algal taxa richness and diversity were higher at the test site than at the reference site. Chlorophyll *a* at the test site was typical for a Florida stream.

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Chemistry summary table for Monsanto Chemical Corp.	North Effluent	South Effluent	Reference Site	Test Site
Organic Constituents (ug/L)				
Atrazine	0.049 U	0.050 T		
Hexazinone	0.20 T	0.20 T		
Metals (ug/L)				
Aluminum	179 I	407 A		
Arsenic	10 U	10 U		
Cadmium	0.05 U	0.05 U		
Copper	17 A	9 I		
Chromium	10 U	10 U		
Iron	1160 A	1680		
Lead	10 U	10 U		
Mercury	0.10 U	0.10 U		
Nickel	4 U	4 U		
Selenium	30 U	30 U		
Silver	0.04 U	0.04 U		
Zinc	11 I	10 U		
Nutrients (mg/L)				
Ortho-phosphate	0.018 I	0.018 I	0.006 I	0.008 I
Total phosphorus	0.064 A	0.072	0.050	0.046
Ammonia	0.27 A	0.045	0.059 A	0.040
Nitrate+Nitrite	0.22 A	0.38	0.25 A	0.28
TKN	0.77 A	0.36	0.34	0.29
General Phys-Chem Parameters				
Habitat Assessment			114	100
D. O. (mg/L) 5/21/96	6.6	7.5	5.7	6.1
D. O. (mg/L) 6/25/96			5.5	5.5
pH (SU) 5/21/96	6.6	6.9	6.2	6.2
pH (SU) 6/25/96			6.8	6.7
Specific Conductance(µmhos/cm) 5/21/96	150	295	160	179
Specific Conductance(µmhos/cm) 6/24/96			135	141
Temperature (°C) 5/21/96	31.6	30.2	26.0	26.5
Temperature (°C) 6/24/96			28.8	28.6
Total Suspended Solids (mg/L)	8.0	9.0	13.0	7.0
Biological Oxygen Demand, 5 day (mg/L)	2.5	0.6	0.5	0.5
Turbidity (NTU)	9.0	16.0	19.0	14.0
Color (PCU)	50	80	60	60
Hardness (mg CaCO3)	19.8	31.4	29.7	29.7
Algal Growth Potential (mg dry wt/L)	25.9	24.2	4.4	1.1
Toxicity				
Bioassay Fish	5% Mortality	5% Mortality		
Bioassay Invertebrate	No Mortality	No Mortality		
Microbiological Communities (org/100 mL)				
Fecal Coliform	1700	295	10	50
Total Coliform			170	185

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

T - Value reported is less than the criterion of detection

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

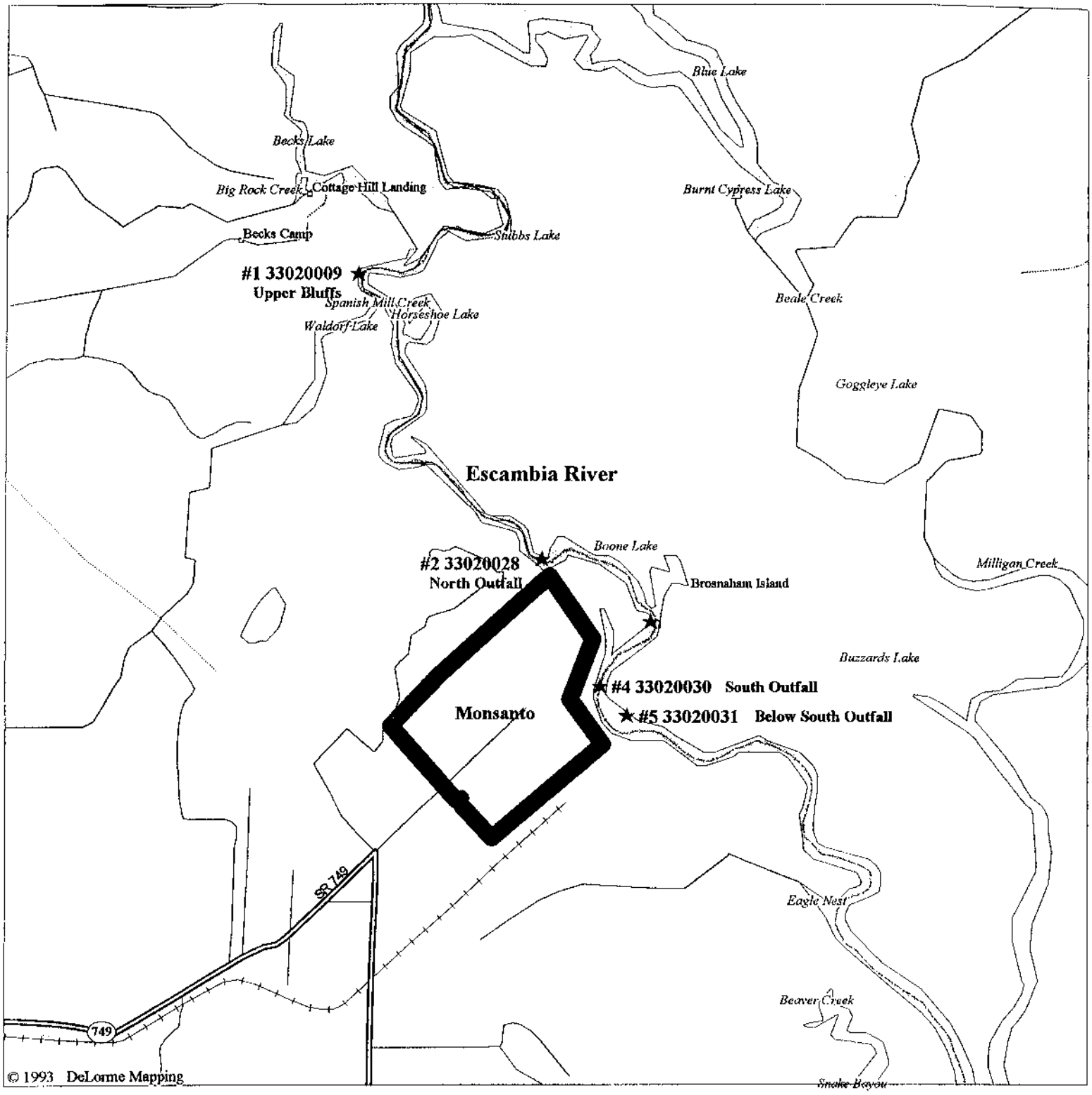
Typical Values for Selected Parameters in Florida Waters

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



LEGEND

- Geo Feature
- County Boundary
- Population Center
- Street, Road
- Variable Trails
- State Route
- Railroad
- River
- Intermittent River
- Utility (powerline)
- Open Water

Scale 1:31,250 (at center)

2000 Feet

1000 Meters

Monsanto CSI / Escambia River
Mag 14.00
Wed Jun 19 15:55:03 1996

FACILITY SUMMARY

Facility Name: Monsanto Chem. Corp
State GMS ID# 1017P00580

Date Summary Prepared: 4/18/96

Location map:
3000 Old Chemstrand Rd.
Cantonment, FL 32533
Lat/Long.: 30°35'30"N/87°14'15"W

County: Escambia

District: NW/10

Wastewater Permit: FL0002488 issued 5/1/95 expires 2/1/97
(Combines NPDES Permit # FL0002488 and FDEP permit # IO17-191996)

Facility Type: Industrial

Function of facility: The facility provides industrial wastewater treatment for the Monsanto Chemical Corporation.

Description of treatment process: To discharge once through cooling water, cooling tower blow-down, chilled water blow-down, steam condensate, neutralized ion exchange backwash, potable water, fire water, neutralized process discharge from Fiber Web Holzoff Nonwovens Plant, and stormwater through two outfalls into the Escambia River. The north outfall discharges at an average flow of about 2 MGD and the south outfall discharges at an average flow of about 25 MGD.

Receiving waters: Escambia River

Classification: Class III, Propagation, recreation, maintenance of a healthy population of fish and wildlife.

Design Flow:	Mean Flow:	Flow during survey:
North Outfall ≈ 2.0 MGD	North = 2.167 MGD	North (2/96) = 1.8 MGD
South Outfall ≈ 25.0 MGD	South = 24.15 MGD	South (2/96) = 26.9 MGD

Discharge is: Continuous
Other (describe):
The best time to sample is:

If facility has a mixing zone, give details (size, parameters, etc.): The facility has a mixing zone for zinc at the North oufall. The mixing zone shall extend 100 feet downstream in the Escambia River. If the zinc limitation is exceeded in the discharge, a grab sample shall be taken from the edge of the mixing zone and analyzed for zinc.

List effluent limits (attach relevant paperwork):

South Outfall:

Parameter	Frequency	Limitations
Flow	Continuous	no limit
BOD_5	3/wk	*
Total Phosphorous	3/wk	*
Total Nitrogen	3/wk	*
Copper	1/month	0.03 mg/l
Nickel	1/month	0.10 mg/l
Zinc	1/month	0.10 mg/l
Oil & Grease	1/wk	5 mg/l
Total Residual Cl_2	Daily	0.01 mg/l (max.)
pH	Continuous	6.0 std. (min.), 8.5 std. (max)
Temperature	3/wk	99°F (max.)
Fecal Coliform	1/month	200/100ml

North Outfall:

Parameter	Frequency	Limitations
Flow	Continuous	no limit
BOD_5	3/wk	*
Total Phosphorous	3/wk	*
Total Nitrogen	3/wk	*
Copper	1/month	0.03 mg/l
Nickel	1/month	0.10 mg/l
Zinc	1/month	0.20 mg/l
Total Residual Cl_2	Daily	0.01 mg/l (max.)
pH	Continuous	6.0 std. (min.), 8.5 std. (max)
Temperature	3/wk	99°F (max.)

*Limitation for BOD5, Total Nitrogen and Total Phosphorus shall be "Net". Net values shall be calculated three times weekly by subtacting river water intake values from the sum of the north and south outfall values.

Parameter	Monthly average
Net BOD5	650 lbs/day
Net Total Nitrogen	150 lbs/day
Net Total Phosphorous	45 lbs/day

Bioassay Permit requirement: LC_{50} at 100%

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

South Outfall excursions:

Fecal : 12/95 = 3000col/100ml
11/95 = 800col/100ml
05/95 = 3300col/100ml
03/95 = 300col/100ml

pH: 01/96 = 8.53 s.u.
12/95 = 5.2 s.u.
11/95 = 5.7 s.u.
08/95 = 4.46 s.u.

North Outfall excursions:

pH : 02/96 = 10.50 s.u.
05/95 = 5.47 s.u., 9.67 s.u.

Spills:

2/06/96: Line break caused spill of hexamethalemediamine. pH values reached 10.5 s.u. for about 1 hour.

8/06/95: H_2SO_4 spill of 10 gal into storm sewer. pH reached 4.7 min. and the hourly average dropped <6.0.

5/19/95: Unknown amount of oil spilled into surface water.

5/01/95: 1 quart oil spill into surface water.

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

Previous Bioassays	Pass/Fail	% Mortality
TIE (38 tests) 8-9 thru 8-30-94	passed 2 of 38	
North Outfall:		
1-9 thru 1-13-95	fail	100 CD/15 FH
1-23 thru 1-25-95	fail	100 CD
1-30 thru 2-3-95	fail	100 CD
3-27 thru 3-31-95	pass	30 CD / 10 FH
4-3 thru 4-7-95	pass	30 CD / 10 FH
5-8 thru 5-12-95	pass	10 CD / 10 FH
6-19 thru 6-23-95	pass	30 CD / 10 FH
7-24 thru 7-28-95	pass	0 CD / 15 FH
8-14 thru 8-18-95	pass	20 CD / 20 FH
9-11 thru 9-15-95	pass	0 CD / 5 FH
10-23 thru 10-27-95	pass	10 CD / 25 FH
11-20 thru 11-24-95	fail	100 CD / 5 FH
12-4 thru 12-8-95	pass	0 CD / 30 FH
12-18 thru 12-22-95	pass	5 CD
2-5 thru 2-9-96	pass	5 CD /25 FH
South Outfall:		
1-9 thru 1-13-95	pass	5 CD / 0 FH
7-24 thru 7-28-95	pass	5 CD / 15 FH
8-14 thru 8-18-95	pass	5 CD / 5 FH

CD = *Ceriodaphnia dubia* FH = *Pimephales promelas*

NOTE: Bioassay samples are filtered.

7/12/94 Warning letter NWIW 17-1278: On 6/20/94 an industrial wastewater spill occurred. A mixture of lubricating oil and water was discharged from the "Hallon Pond"

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

FDEP sampling event on 5/29/95 was comparable to Monsanto sampling on 5/20/95.

Additional information:

Staff contributing to this review

Biologist
Inspector
Engineer
Lisa Kelley OPS
Other

NETS B-10 B-7

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: 33.02.0009	DATE (M/D/Y): 06-25-96	TIME 1000	RECEIVING BODY OF WATER: ESCAMBIA

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
BACKGROUND	ESCAMBIA	AT UPPER BLUFFS	#1

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 ☐

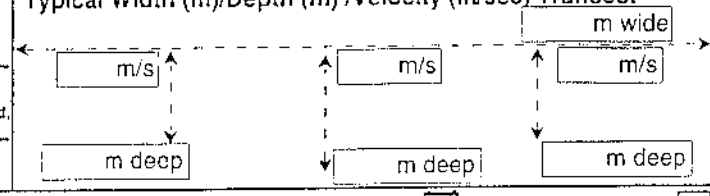
Width of riparian vegetation (m) on least buffered side: *List & map dominant vegetation on back*

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)	3 ✓	6	Net	Sand	90 ✓	1	Net
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	4 ✓	7	Net	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	3 ✓	6	Net	*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	.2	28.77	6.75	5.5	135			0.6
Mid-depth	1.2	28.67	6.68	5.28	131			
Bottom	2.5	28.16	6.70	5.31	130			

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

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:

HOT, CLOUDY

PICKED UP HD's

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

SAMPLING TEAM	SIGNATURE	DATE
PAYNE, KEEFER, BUTTS	Glenn Butts	06-25-96

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: 33.02.0009	DATE (M/D/Y): 05-21-96	TIME: 0910	RECEIVING BODY OF WATER: ESCAMBIA RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
BACKGROUND	ESCAMBIA	AT UPPER BLUFFS	# 1

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

68 m wide

m/s	m/s	m/s
2	4.8	2
m deep	m deep	m deep

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

Artificially Impounded ☐ yes

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):	BOD	TURB	Secchi (m):
Top	0.5	25.97	6.15	5.69	160	0.5	19.0	0.5
Mid-depth	2.4	1	1	1	1			
Bottom	4.8	1	1	1	1			

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

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: CLEAR, NO RAIN PAST TWO WEEKS

HD SAMPLERS IN PLACE

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

SAMPLING TEAM:	SIGNATURE:	DATE:
R. PAYNE, T. KEEFER, G. BUTTS	Glenn Butts	05-21-96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0009	DATE (M/D/Y): 05-21-96	RECEIVING BODY OF WATER: ESCAMBIA RIVER

REMARKS:	LOCATION:	FIELD ID/NAME:
BACKGROUND	AT UPPER BLUFFS	# 1

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **15**	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity **16**	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization **15**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition **14**	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **9**	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width **20**	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality **20**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

5 Add **5 points** if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

114 **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
05-21-96	G. Butts, R. PAYNE	Glenn Butts

B-53

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: 33.02.0031	DATE (M/D/Y): 06-25-96	TIME: 0810	RECEIVING BODY OF WATER: ESCAMBIA RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
TEST SITE	ESCAMBIA	150 ft BELOW SOUTH OUTFALL (MONSANTO 001)	# 5 B67 Nat Duplicate

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)
50		20				30	

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

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

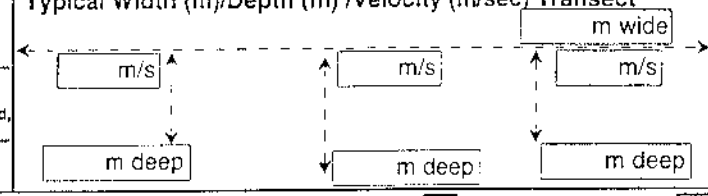
Width of riparian vegetation (m) on least buffered side: | *List & map dominant vegetation on back*

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)	~~3~~ 3	7	N/A	Sand			
Leaf Packs or Mats				Mud/Muck/Silt	90 ✓	1	Petite
Aquatic Vegetation	3 ✓	5	N/A	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	~~3~~ 3 ✓	7	N/A	*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	.2	28.60	6.66	5.45	141			.6
Mid-depth	2.5	28.37	6.67	5.27	136			
Bottom	5m	28.37	6.67	5.29	135			

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

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:
Partly Cloudy, Hot

PICKED UP HD's

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

SAMPLING TEAM: Payne, Keefer, Butts

SIGNATURE: Glenn Butts

DATE: 06-25-96

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: 33.02.0031	DATE (M/D/Y): 05-21-96	TIME: 1030	RECEIVING BODY OF WATER: ESCAMBIA RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
TEST SITE	ESCAMBIA	150 ft BELOW SOUTH OUTFALL (MONSANTO 001)	# 5

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)
50		20				30	

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

54 m wide

m/s	m/s	m/s
1.5		0.5
m deep	5.4 m deep	m deep

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):	BOD	TURB	Secchi (m):
Top	0.5	26.52	6.2	6.09	179	0.5	14.0	0.5
Mid-depth	2.7	1	1	1	1			
Bottom	5.4	1	1	1	1			

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

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: CLEAR

HD SAMPLERS IN PLACE

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

SAMPLING TEAM:	SIGNATURE:	DATE:
R. PAYNE, T. KEEFER, G. BUTTS	Glenn Butts	05-21-96

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (v2)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD	STORET STATION NUMBER: 33.02.0031	DATE (M/D/Y): 05-21-96	RECEIVING BODY OF WATER: ESCAMBIA RIVER

REMARKS:	LOCATION: 150 ft BELOW SOUTH OUTFALL (MONSANTO 001)	FIELD ID/NAME:
TEST SITE		# 5

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [16]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [12]	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [11]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition [14]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability [9]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width [18]	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality [15]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[5] Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

[100] **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
05-21-96	G. BUTTS, R. PAYNE	Glenn Butts

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Monsanto 28 Outfall 002, North
County: Escambia
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0002488
LIMS Sample #: 139659 LIMS Job #: 96-MAY-21-17-01

Sample Collection: Date 5.20.96 Time 1230
Test Beginning: Date 5.21.96 Time 1335
Test Ending: Date 5-23-96 Time 1345
Organism Batch #: 23 Diluent Batch #: 24
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) / Definitive
(Static) / Static Renewal / 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
0 hr	7.0 @ 7.0 7.0 @ 7.0	24.3 @ 24.4	8.2 @ 24.5 °C	106.7 @ 105.4 1027 @ 1025 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.2 @ 25.6 °C	106.2 @ 105.4 1019 @ 1025 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.2 @ 25.5 °C	110.6 @ 105.4 1022 @ 1025 @ 25.7 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
ctl	A	5	5	5	8.1		8.2	24.2		24.4	7.7		7.9	190		205 A
ctl	B	5	5	5			8.2			24.4			7.9			205
ctl	C	5	5	5			8.3			24.4			8.0			205
ctl	D	5	5	5			8.3			24.4			8.0			205
100%	A	5	5	5	7.7		8.3	24.7		24.2	7.8		8.0	95		110
100%	B	5	5	5			8.1			24.2			8.1			95
100%	C	5	5	5			8.1			24.3			8.1			90
100%	D	5	5	5			8.0			24.4			8.1			95
					probe error MF 5/23/96 *		7.9							A		
							7.9									
							7.9									
							7.9									
Measured/Loaded by:		MF	MF	MF	LM		JN	LM		JN	LM		JN	LM		JN
Recorded by:		TM	MF	MF	JN		MF	JN		MF	JN		MF	JN		MF

Investigators' Signatures

Joyce North
Tina Mikulski
Marshall Faircloth
David Wolf

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	120	75	30	Hach	TM
Hardness (mg/L as $CaCO_3$):	130	95	20	Hach	TM
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	LM

Ammonia Meter #98136 Ammonia Meter Slope: -55.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Monsanto 88, Outfall 002, North (New)
County: Escambia
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0002488
LIMS Sample #: 139659 LIMS Job #: 96-MAY-21-17-01

Sample Collection: Date 5.20.96 Time 1230
Test Beginning: Date 5.21.96 Time 1420
Test Ending: Date 5-23-96 Time 1410
Organism Batch #: 36 Diluent Batch #: WCU
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.4	8.2 @ 24.5 °C	106.7 @ 105.4 1027 @ 1025 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.2 @ 25.6 °C	106.2 @ 105.4 1019 @ 1025 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.2 @ 25.5 °C	110.6 @ 105.4 1022 @ 1025 @ 25.7 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctl A	58	5	5	~~4~~ 3	7.9	8.4	8.4	24.8	24.2	24.3	7.8	7.9	7.8	250	250	250
Ctl B	48	5	5	5	7.9	8.4	8.5	24.8	24.2	24.3	7.7	7.9	7.7	250	250	250
Ctl C	119	5	5	5	7.9	8.4	8.5	24.8	24.1	24.2	7.8	7.9	7.8	250	250	250
Ctl D	380	5	5	5	7.9	8.4	8.5	24.8	24.1	24.2	7.8	7.9	8.0	250	250	250
100% A	11	5	5	5	7.9	7.7	8.1	25.2	24.1	24.2	7.1	7.9	8.0	85	85	85
100% B	136	5	5	5	7.7	7.7	8.0	25.4	24.1	24.2	6.8	7.9	7.9	80	80	85
100% C	148	5	5	5	7.6	7.7	7.9	25.4	24.1	24.1	6.6	7.8	7.9	80	80	85
100% D	602	5	4	4	7.6	7.7	7.8	25.4	24.2	24.2	6.6	7.7	7.9	80	85	85
			* antty error mf sp 5/96													
Measured/Loaded by:		DW	MF	MF	LM	MF	JN	LM	MF	JN	LM	MF	JN	LM	MF	JN
Recorded by:		TM	MF	MF	JN	TM	MF	JN	TM	MF	JN	TM	MF	JN	TM	MF

Investigators' Signatures

Joseph Morris
Tina Mikulski
Marshall Fairchild

Steven A Wolfe
reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	120	75	30	Hach	TM
Hardness (mg/L as $CaCO_3$):	130	95	20	Hach	TM
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	LM

Ammonia Meter #98136 Meter Slope: -55.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Monsanto ~~30~~ 180, Cantonment, South
County: Escambia
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0002488
LIMS Sample #: 139660 LIMS Job #: 96-MAY-21-17-02

Sample Collection: Date 5.20.96 Time 1330
Test Beginning: Date 5.21.96 Time 1340
Test Ending: Date 5-23-96 Time 1350
Organism Batch #: 23 Diluent Batch #: 24
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | 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
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 24.4	8.2 @ 24.5 °C	110.7 @ 105.4 102.7 @ 102.5 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.2 @ 25.6 °C	106.2 @ 105.4 101.9 @ 102.5 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.2 @ 25.5 °C	110.6 @ 105.4 102.2 @ 102.5 @ 25.7 °C

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
		0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Ctl	A	5	5	5	8.0		8.2	24.0		24.2	7.9		8.1	190		230
Ctl	B	5	5	5			8.3			24.3			8.1			225
Ctl	C	5	5	5			8.3			24.3			8.1			225
Ctl	D	5	5	5			8.3			24.4			8.1			225
100%	A	5	5	5	7.8		8.0	24.0		24.7	7.9		8.1	210		215
100%	B	5	5	5			8.0			24.8			8.0			225
100%	C	5	5	5			8.0			24.9			8.0			225
100%	D	5	5	5			8.0			25.0			7.9			220
Measured/Loaded by:		MF	MF	MF	LM		JN	LM		JN	LM		JN	LM		JN
Recorded by:		TM	MF	MF	JN		MF	JN		MF	JN		MF	JN		MF

Investigators' Signatures

Jennifer Smith
Mary Merrell
Ping Mikulski
Marshall Faircloth
Dan Hunt
Steven H. Wolfe
reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			Not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.04	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	120	75	35	Hach	TM
Hardness (mg/L as $CaCO_3$):	130	95	35	Hach	TM
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	LM

Ammonia Meter #98136 Meter Slope: -55.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Monsanto (30), Outfall 001, South
County: Escambia
Contact / District: Glenn Batts / Northwest
NPDES Permit #: FL0002488
LIMS Sample #: 139660 LIMS Job #: 96-May-21-17-02

Sample Collection: Date 5/20/96 Time 1330
Test Beginning: Date 5/21/96 Time 1435
Test Ending: Date 5-27-96 Time 1415
Organism Batch #: 36 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:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.4	8.2 @ 24.5 °C	106.7 @ 105.4 101.7 @ 102.5 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.2 @ 25.6 °C	106.2 @ 105.4 101.9 @ 102.5 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.2 @ 25.5 °C	110.6 @ 105.4 102.2 @ 102.5 @ 25.7 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctl A	174	5	5	5	7.8	8.4	8.5	24.7	24.1	24.3	7.6	7.9	7.9	250	250	250
Ctl B	302	5	5	5	7.9	8.4	8.5	24.8	24.0	24.3	7.6	7.9	7.9	250	250	250
Ctl C	147	5	5	5	7.9	8.4	8.5	24.7	24.0	24.2	7.7	8.0	7.9	250	250	250
Ctl D	414	5	5	5	7.9	8.4	8.5	24.7	24.1	24.2	7.7	8.0	8.0	250	250	250
100% A	210	5	5	5	7.8	7.7	7.8	24.7	24.1	24.4	7.8	8.0	8.0	210	215	215
100% B	520	5	5	4	7.8	7.7	7.8	24.6	24.1	24.4	7.8	8.0	8.1	210	210	215
100% C	~~953~~ TM	5	5	5	7.8	7.7	7.8	24.6	24.1	24.4	7.9	8.0	8.1	210	210	215
100% D	53	5	4/5 * Data entry error mf 5/28/96	5	7.7	7.7	7.8	24.6	24.2	24.4	7.9	8.0	8.0	210	210	215
Measured/Loaded by:		DW	MF	MF	LM	MF	JN	LM	MF	JN	LM	MF	JN	LM	MF	JN
Recorded by:		JM	MF	MF	JN	JM	MF	JN	JM	MF	JN	JM	MF	JN	JM	MF

Investigators' Signatures

Joseph North
Lisa Nikolaus
Marshall Faircloth
Steven Hall

reviewer form updated 5/05/95

Water Quality Parameters	Salt Water / (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			Not measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.04	DR-100	JM
Alkalinity (mg/L as $CaCO_3$):	120	75	35	Hach	JM
Hardness (mg/L as $CaCO_3$):	130	95	35	Hach	JM
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	LM

Ammonia Meter #98136 Ammonia Meter Slope: -55.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Monsanto Chemical

Reference

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	50	≥ 31	30-16	<16	5	≥ 26	25-14	<14		≥ 22	21-12	<12	
EPT Index	4	≥ 7	6-4	<4	3	≥ 4	3-2	<2		-	≥2	<2	
# Chironomid Taxa	18	≥9	8-5	<5	5	≥7	6-4	<4		≥7	6-4	<4	
% Contribution of Dominant Taxon	22.1	≤22	23-61	>61	5	≤29	30-64	>64		≤31	32-66	>66	
% Diptera	64.5	-	≤50	>50	1	-	≤37	>37		-	≤47	> 47	
Florida Index	16	≥ 16	15-8	<8	5	≥7	6-4	<4		≥ 8	7-4	<5	
% Suspension feeders/Filterers	8.95	≥ 12	11-6	<6	3	-	≥7	<7		-	≥7	<7	
Total Score		Panhandle			27	Peninsula				Northeast			
Interpretation of Score		**Excellent**			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Test

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	32	≥ 31	30-16	<16	5	≥ 26	25-14	<14		≥ 22	21-12	<12	
EPT Index	5	≥ 7	6-4	<4	3	≥ 4	3-2	<2		-	≥2	<2	
# Chironomid Taxa	11	≥9	8-5	<5	5	≥7	6-4	<4		≥7	6-4	<4	
% Contribution of Dominant Taxon	27.6	≤22	23-61	>61	3	≤29	30-64	>64		≤31	32-66	>66	
% Diptera	44.1	-	≤50	>50	3	-	≤37	>37		-	≤47	> 47	
Florida Index	5	≥ 16	15-8	<8	1	≥7	6-4	<4		≥ 8	7-4	<5	
% Suspension feeders/Filterers	6.9	≥ 12	11-6	<6	3	-	≥7	<7		-	≥7	<7	
Total Score		Panhandle			23	Peninsula				Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Benthic macroinvertebrate taxa list for Monsanto Chemical Corp., collected via Hester-Dendy artificial substrates in the Escambia River, on 25 June, 1996. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Gastropoda		
Micromenetus sp.	3	–
Physella sp.	3	–
Ancylidae	13	–
Pelecypoda		
Pelecypoda	–	3
Pisidiidae	–	13
Trombidiformes		
Lebertia sp.	–	3
Amphipoda		
Gammarus sp.	3	3
Ephemeroptera		
Acerpenna pygmaeus	–	3
Baetis intercalaris	–	3
Baetis sp.	13	3
Caenis sp.	317	26
Heptagenia flavescens	19	–
Isonychia sp.	37	–
Labiobaetis sp.	26	3
Procloeon sp.	–	3
Stenacron interpunctatum	–	5
Stenacron sp.	11	3
Stenonema exiguum	45	32
Stenonema mexicanum integrum	19	21
Stenonema smithae	5	13
Stenonema sp.	42	–
Tricorythodes albilineatus	56	13
Baetidae	13	5
Coleoptera		
Ancyronyx sp.	3	–
Macronychus glabratus	3	–
Macronychus sp.	5	–
Stenelmis sp.	5	–
Megaloptera		
Corydalus cornutus	3	–
Nigronia sp.	3	–
Trichoptera		
Brachycentrus sp.	3	–
Cernotina sp.	3	53
Cheumatopsyche sp.	–	11
Chimarra sp.	124	–
Cyrnellus fraternus	21	119

Cyrnellus sp.	–	11
Hydropsyche sp.	966	21
Hydroptila sp.	24	16
Macrostemum carolina	963	–
Nectopsyche exquisita	–	3
Nectopsyche sp.	3	3
Oecetis sp.	8	3
Hydropsychidae	24	–
Polycentropodidae	–	11
Trichoptera	–	11
Diptera		
Ablabesmyia rhamphe grp.	32	156
Cricotopus bicinctus grp.	8	–
Cricotopus or *Orthocladius*	16	16
Cryptochironomus sp.	8	16
Cryptotendipes sp.	–	5
Dicrotendipes simpsoni	–	3
Labrundinia pilosella	–	3
Labrundinia sp.	–	3
Nilotanypus fimbriatus	5	–
Pentaneura inconspicua	3	–
Polypedilum convictum grp.	11	3
Polypedilum fallax	5	3
Polypedilum halterale grp.	–	3
Polypedilum illinoense grp.	26	16
Polypedilum scalaenum grp.	5	45
Pseudochironomus sp.	–	5
Rheocricotopus robacki	151	8
Rheotanytarsus distinctissimus grp.	16	3
Rheotanytarsus exiguus grp.	42	3
Rheotanytarsus sp.	3	–
Stenochironomus sp.	5	5
Tanytarsus sp.	13	–
Tanytarsus sp. A (Epler)	3	16
Tanytarsus sp. L (Epler)	11	24
Tanytarsus sp. P (Epler)	–	3
Thienemanniella sp. A (Epler)	5	–
Thienemannimyia grp.	5	3
Tribelos fuscicornis	21	228
Tribelos jucundus	–	3
Chironomidae	32	3

Benthic macroinvertebrate taxa list for Monsanto Chemical Company, collected via 20 discrete dip net sweeps in the Escambia River, on 25 June, 1996.

	Reference Site	Test Site
Nemertea		
Prostoma rubrum	23	–
Oligochaeta		
Aulodrilus pigueti	47	–
Bratislavia unidentata	23	–
Dero digitata	23	–
Dero pectinata	71	–
Dero trifida	–	35
Eclipidrilus palustris	23	–
Haber speciosus	23	–
Limnodrilus hoffmeisteri	335	53
Nais behningi	503	–
Nais communis	311	35
Pristina aequiseta	23	–
Pristinella osborni	47	–
Pristinella sima	23	–
Slavina appendiculata	23	–
Stylaria lacustris	95	–
Enchytraeidae	–	35
Hirudinea		
Gloiobdella elongata	–	17
Helobdella stagnalis	23	–
Gastropoda		
Amnicola dalli johnsoni	167	–
Littoridinops monroensis	23	–
Littoridinops sp.	–	35
Micromenetus floridensis	–	35
Pelecypoda		
Corbicula fluminea	47	–
Pisidiidae	215	17
Trombidiformes		
Lebertia sp.	–	17
Piona sp.	–	35
Mysidacea		
Mysidacea	71	35
Isopoda		
Caecidotea sp.	–	17
Cassidinidea ovalis	–	179
Lirceus sp.	23	–
Amphipoda		
Crangonyx sp.	23	–
Gammarus sp.	23	–

Hyalella azteca	119	755
Procambarus sp.	23	–
Ephemeroptera		
Caenis sp.	–	17
Labiobaetis propinquus	23	–
Ephemeroptera	71	–
Odonata		
Corduliidae	–	17
Hemiptera		
Corixidae	–	17
Coleoptera		
Macronychus glabratus	47	–
Trichoptera		
Hydropsyche sp.	47	–
Hydroptila sp.	–	89
Lype diversa	–	17
Nectopsyche pavida	23	–
Oecetis sp.	23	17
Oecetis sp. A	–	17
Triaenodes perna	–	17
Leptoceridae	47	–
Diptera		
Ablabesmyia rhamphe grp.	47	–
Coelotanypus sp.	143	–
Cricotopus bicinctus grp.	695	–
Cricotopus or *Orthocladius*	1414	179
Cryptotendipes sp.	47	17
Dicrotendipes modestus	95	251
Labrundinia sp.	47	–
Nanocladius sp.	47	–
Nanocladius rectinervis	95	–
Palpomyia/Bezzia grp. sp.	47	–
Polypedilum illinoense grp.	935	89
Polypedilum scalaenum grp.	–	17
Procladius sp.	47	–
Pseudochironomus sp.	–	503
Rheocricotopus robacki	143	–
Rheotanytarsus exiguus grp.	95	–
Stenochironomus sp.	–	17
Tanytarsus sp. A (Epler)	95	–
Tanytarsus sp. D (Epler)	47	–
Tanytarsus sp. L (Epler)	143	17
Thienemanniella sp.	47	–
Thienemanniella sp. A (Epler)	95	–
Tribelos fuscicornis	47	17
Xestochironomus sp.	167	17
Zavreliella marmorata	–	17
Chironomidae	287	53

Phytoplankton taxa list and densities (#/mL) for Monsanto Chemical Corp., collected via subsurface grabs in the Escambia River, on 21 May, 1996.

	Reference Site	Test Site
Cyanophyceae		
Aphanocapsa sp.	20	10
Chroococcus sp.	30	–
Dactylococcopsis sp.	80	82
Microcystis aeruginosa	10	–
Microcystis sp.	–	10
Oscillatoria sp.	10	–
Chrysophyceae		
Mallomonas sp.	10	–
Bacillariophyceae		
Cyclotella sp.	50	10
Frustulia rhomboides	10	–
Melosira sp.	–	10
Nitzschia sp.	40	10
Pennales	20	–
Chlorophyceae		
Chlamydomonas sp.	30	51
Chlorococcum sp.	–	41
Chodatella sp.	10	–
Dictyosphaerium sp.	10	–
Kirchneriella sp.	20	–
Oocystis sp.	10	–
Scenedesmus sp.	30	82
Schroederia sp.	10	51
Selenastrum sp.	–	10
Spermatozoopsis sp.	50	31
Tetradesmus sp.	10	–
Tetraedron sp.	–	51
Tetraedron trigonum	10	–
Chlorophyceae	–	72
Euglenophyceae		
Phacus sp.	10	21
Trachelomonas sp.	–	21
Cryptophyceae		
Chroomonas sp.	50	51
Cryptomonas sp.	20	31

Periphyton taxa list and densities (#/cm^2) for Monsanto Chemical Corp., collected via glass microscope slides in the Escambia River, on 25 June, 1996.

	Reference Site	Test Site
Cyanophyceae		
Anabaena sp.	440	3656
Lyngbya sp.	440	2437
Oscillatoria sp.	1318	8530
Bacillariophyceae		
Achnanthes exigua	440	–
Achnanthes linearis	879	–
Achnanthes minutissima	1318	2437
Achnanthes sp.	440	–
Amphipleura pellucida	879	2437
Bacillaria paradoxa	440	3656
Capartogramma crucicula	–	1828
Cocconeis placentula	1758	609
Cyclotella meneghiniana	440	1219
Cymbella lunata	–	1828
Cymbella minuta	1318	3046
Cymbella tumida	–	609
Diploneis sp.	–	2437
Eunotia incisa	440	–
Eunotia naegelii	440	609
Eunotia pectinalis	2197	3046
Eunotia sp.	13624	8530
Eunotia valida	440	–
Eunotia vanheurcki	1318	–
Frustulia rhomboides	3516	9749
Frustulia rhomboides capitata	1318	2437
Gomphonema brasiliense	–	609
Gomphonema parvulum	2637	3656
Gyrosigma sp.	440	3046
Navicula accommoda	–	609
Navicula arvensis	–	609
Navicula contenta biceps	1318	609
Navicula cryptocephala	440	1219
Navicula peregrina	–	609
Navicula radiosa	440	5484
Navicula rhynchocephala	879	4874
Navicula viridula	1758	5484
Nitzschia acicularis	–	609
Nitzschia amphibia	879	609
Nitzschia filiformis	440	–
Nitzschia ignorata	440	609
Nitzschia linearis	–	609

Nitzschia palea	440	4265
Nitzschia vermicularis	440	–
Pinnularia braunii	–	609
Surirella sp.	–	609
Synedra ulna	–	609
Pennales	1318	2437
Chlorophyceae		
Chlamydomonas sp.	–	1828
Chlorogonium sp.	440	14623
Coelastrum sp.	440	–
Cosmarium sp.	–	1828
Protoderma sp.	–	1219
Scenedesmus sp.	–	609
Spirogyra sp.	–	1828
Chlorophyceae	–	609
Cryptophyceae		
Cryptomonas sp.	–	609

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0002488 11	12 960521 17	18 X	19 S	20 2

Remarks

21 66

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0002488 11	12 960521 17	18 B	19 S	20 2

Remarks

21 66