

Biological Assessment of

Mosaic Fertilizer, L.L.C. – Kingsford Mine Complex

(formerly known as IMC Phosphates Co.-Kingsford Mine Complex)

Polk County

NPDES #FL0000256

Sampled August 11, 2008

February 2009

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Mosaic Fertilizer, L.L.C. – Kingsford Mine Complex
Physical Address:	2600 Doc Durrance Road Bradley, FL 33835
County:	Polk
NPDES Number:	FL0000256
Permit Expiration:	December 4, 2008

Toxics Sampling Inspection **(XSI)**

Date Sampled: August 11, 2008

Results: Iron detected at D-002 (1810 µg/L) constitutes a violation of Class III Water Quality Criterion (62-302.530(38)). Iron was also detected at D-006 and D-009 at levels that complied with Class III Water Quality Criteria. Aluminum was present at D-009 above the Practical Quantitation Limit (PQL) and at D-006 below the PQL, but there is no water quality criterion for aluminum. All other metals detected at D-002, D-006, and D-009 were either undetected or detected at levels above the Minimum Detection Limit (MDL) and below the PQL which complied with Class III Water Quality Criteria or were undetected. Metals were not sampled at the Test Site or Control Site, and organic constituents were not sampled during this inspection.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: August 11, 2008

Results: The effluent samples were not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during the 48-hour acute bioassays.

Water Quality Inspection **(WQI)**

Date Sampled: August 11, 2008

Results: TKN and total nitrogen at D-009 were elevated, but nitrogen levels at the Test Site cannot be directly attributed to the outfall because nitrogen levels were similar at the Control Site. In addition, ortho-phosphate and total phosphorus levels at the Control Site were extremely high (7.5 and 9.5 mg/L, respectively), indicating nutrient inputs from other sources. Physical/chemical parameters at D-002, D-006, and D-009 were within permit limits with the exception of pH. The pH's at D-006 (8.7 SU) and D-009 (8.8 SU) constitute violations of Class III Water Quality Criterion (62-302.530(51)(c)) and permit limits. Test Site pH was within acceptable limits at 7.9 SU. AGP values of all three effluents, the Control Site, and the Test Site were above the 5 mg dry wt/L "problem threshold" (Raschke & Shultz, 1987). The extremely high ortho-phosphate and total phosphorus levels at the Control Site skewed the N:P ratio, making it appear that the site was nitrogen limited. However, given the available nutrients at that site versus the low chlorophyll *a* value and low algal density in phytoplankton counts, it appears that there is inhibition of algal growth at the Control Site.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: August 11, 2008

Results: The Control Site Stream Condition Index (SCI) score of 28A placed it in Category 3, the lowest category, while the Test Site scored of 39A placed it in Category 2. The Test Site had somewhat higher numbers of long-lived and sensitive taxa than the Control Site, which may be a reflection of the altered habitat at the Control Site. Although both sites scored in the "Optimal" category for Habitat Assessment (123 and 155 at Control and Test Sites, respectively), the Control Site had less substrate diversity and availability than the Test Site and was impacted by silt smothering. Because of the altered habitat and extremely high nutrients at the Control Site, this site does not represent unaffected background conditions. Without a comparable control site for comparison, contrasts in algal and benthic macroinvertebrate communities cannot be attributed to the effluent. In fact, the only algal community metric that indicates the influence of D-009 on the Test Site is that diatom communities of both phytoplankton samples were dominated by the eutraphentic diatom *Cyclostephanos invisitatus* (Van Dam et al, 1994). The periphytic diatom community at the Test Site was also dominated by *Cyclostephanos invisitatus*.

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

Introduction

The Mosaic Fertilizer, L.L.C. – Kingsford Mine Complex (formerly known as IMC Phosphates Co.-Kingsford Mine Complex) is located in Polk County, Florida (Appendix A). This facility is a phosphate mine. Phosphate mining and beneficiation operations ceased in September of 2005 however, mining of sand tailings and reclamation activities continue. The wastewater treatment consists of gravity settling of sands, clays and other suspended solids within earthen-diked clay settling areas. The effluent is discharged, as necessary, through nine outfalls. Effluent from D-001, D-002, D-004, D-005, D-006 and D-007 is discharged into either Lake Branch or Mizelle Creek before flowing into the South Prong of the Alafia River. Effluent from D-008 and D-009 is discharged into the North Prong of the Alafia River via either George Allen Creek or Guy Branch to Thirtymile Creek. D-006 will be transferred to the Mosaic New Wales Chemical plant during this permit renewal (see Facility Summary in Appendix B). The mean flow from July 2007 to June 2008 is as follows: D-001 was 0.033 MGD; D-002 was 0.52 MGD; D-005 was 2.48 MGD; D-006 was 7.15 MGD; D-007 was 3.68 MGD; and D-009 was 9.23 MGD. D-003 and D-008 have not discharged since January, 2003, and D-003 has been released since this inspection was conducted. D-004 has not discharged since November, 2005. The actual mean flow during this survey was 0.46 MGD at D-002, 7.1 MGD at D-006, and 4.76 MGD at D-009 (Jacki Champion, Bureau of Mining and Minerals Regulation, Phosphate Management).

Surface Water Quality Criteria and facility permit limits are listed in Table 1. According to the facility's monthly discharge monitoring reports, the plant has no violations for D-009. In the FDEP 2003 Fifth Year Inspection, D-002 had high iron (976 ug/L), and D-005 had high radium 226+228 (13.3 pCi/L). The ambient water assessment sites, which differ from the current study, were all in the good or excellent categories; however the South Prong showed signs of stress from an upstream source. In the 2003 Fifth Year Inspection, Control Site 006 and Test Site 006 were located in the South Prong of the Alafia bracketing D-006. Two additional tests sites, Test Site 002a and Test Site 002b, were located in Mizelle Creek below D-002.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Outfalls 002, 006, and 009 were sampled for NPDES priority pollutants, metals, radium, nutrients, phytoplankton and physical and chemical characteristics. The FDEP 2003 inspection used one control site in the South Prong Alafia upstream of D-006 and three test sites, one in the South Prong downstream of D-006 and two in Mizelle Creek, downstream of D-002. Attempts to conduct the biological assessment in the South Prong at these sites for the current inspection were abandoned due to heavy rainfalls deeming the stream un-wadeable. Chemical and biological comparisons were made for D-009 at a Control Site (located in George Allen Creek, which flows into Thirtymile Creek) and a Test Site (located in Thirtymile Creek, which flows into the North Prong of the Alafia River).

Detailed methods and their relationship to Florida Administrative Code are given in Appendix C.

All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/2002sops.htm for details) and met FDEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Jacki Champion, Mike Lynch and Scott Rose (Bureau of Mining and Minerals Regulation, Phosphate Management) and FDEP Central Laboratory in Tallahassee. See Appendix D for the chain of custody form (sample submittal form). The report was reviewed by District representatives and the Point Source Studies Review Committee (Nancy Ross, Jennifer Paris, and Michael Tanski).

Results and Discussion

- Specific chemical results are reported in Tables 1, and a complete list of chemical analytes can be reviewed in Appendix E. Due to a special project which required all of the FDEP Chemistry Laboratory's capacity, organic constituents, oil and grease, and gross alpha particles were not collected during this inspection.
- D-002 conductivity, pH and dissolved oxygen complied with Class III Water Quality Criteria (62-302 F.A.C.) and facility permit limits as well as conductivity and D.O. at D-006 and D-009. However, pH at both D-006 and D-009 exceeded Class III Water Quality Criterion (62-302.530(51)(c)) and permit limits. Control and Test Site pH, dissolved oxygen, and temperature were similar and complied with Class III Water Quality Criteria. Although conductivity was elevated at both the Control and Test Sites, it also complied with Class III Water Quality Criterion.
- The effluent samples were not acutely toxic to the fish, *Cyprinella leedsi*, or to the water flea, *Ceriodaphnia dubia*, during 48-hour acute screening bioassays (See Table 1 for percent mortality, Appendix F for bioassay bench sheets, and Appendix G for supporting standard reference toxicant data). Although the 48-hour acute screening toxicity test does not reflect the required permit conditions, passing test results provide confidence that the required permit conditions would likely be met.
- Microbiological samples for fecal coliforms were not collected during

Table 1. Effluent limits, Class III Freshwater Criteria and chemical, microbiological and toxicological data.

Mosaic Kingsford Mine	Class III Criteria	Effluent Limits	D-002	D-006	D-009	CONTROL SITE	TEST SITE
Nutrients (mg/L)							
Ortho-phosphate	-	Report	0.13	0.26	0.21	7.5	0.43
Total Phosphorus	-	≤ 5.0	0.31	0.42	0.66	9.5	0.76
Total Ammonia	-	Report	0.29	0.01 U	0.01 U	0.04	0.12
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	0.17	0.004 U	0.006 I	0.028	0.091
Total Kjeldahl Nitrogen	-	-	1.1	1.5	2.1	1.4	1.6
Organic Nitrogen	-	-	0.81 c	1.495 c	2.095 c	1.36 c	1.48 c
Total Nitrogen	-	≤ 3.00	1.27 c	1.502 c	2.106 c	1.428 c	1.691 c
General Physical and Chemical Parameters							
Habitat Assessment	-	-	-	-	-	123	155
Dissolved Oxygen (mg/L)	≥ 5.0	-	6.7	13.3	8.2	5.7	5.1
pH (SU)	6.0 - 8.5	6.0-8.5	7.5	8.7	8.8	7.3	7.9
Conductivity (µmhos/cm)	≤ 1,275	≤ 1,275	377	736	310	559	328
Temperature (°C)	-	Report	26.6	31.4	30.3	25.8	27.6
Sample Depth (m)	-	-	0	0	0	0.1	0.3
Total Residual Chlorine (mg/L)	≤ 0.01	-	≤0.03 r U	≤0.03 r U	≤0.03 r U	0	0
Chlorophyll a (µg/L) - Corrected	-	Report	1.4 I	67	130	1.6 I	76
Phaeophytin (µg/L)	-	-	1.1	1.4 I	8.4	1.2 I	15
Total Suspended Solids (mg/L)	-	≤ 60	5 I	11 I	23	-	-
Fixed Suspended Solids (mg/L)	-	≤ 25	-	-	-	-	-
Total Dissolved Solids (mg/L)	-	-	254	478 A	192	-	-
Turbidity (NTU)	< 29 t	-	-	-	-	17	15
CBOD, 5 day (mg/L), N - inhibited	-	-	0.2 U	5.4 AJV	6 JV	-	-
Chloride (mg/L)	-	-	12	14	7.2	-	-
Fluoride (mg/L)	≤ 10.0	≤ 10.0	1.1	2.9	1.4	4.6	1.5
Sulfate (mg/L)	-	Report	31	190	19	81	23
Flow (MGD)	-	Report	0.52	7.15	9.23	-	-
Hardness (mg $CaCO_3$)	-	-	160.63 c	290.57 c	155.21 c	-	-
Toxicity (48-hour acute screening bioassay, percent mortality in 100% effluent)							
Bioassay - Water flea *(Ceriodaphnia dubia)*	-	≥50 d	0 p	0	0	-	-
Bioassay - Fish *(Cyprinella leedsi)*	-	≥50 d	0	0	5	-	-

Value exceeds the Class III Water Quality Criteria or permit limits

c - Value is calculated
d - Percent mortality limits for 96-hour acute screening bioassay
p - Two of twenty organisms (2 of 20) lost in lab accident. Eighteen of eighteen (18 of 18) were surviving at 48 hours.
r - Measured in the lab
t - Shall not exceed 29 NTUs above background
A - Value reported is the mean of two or more determinations
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J - Estimated value
U - Material analyzed for but not detected; value reported is the method detection limit
V - Analyte was detected in both sample and method blank

this inspection because they are not of great concern for phosphate mining operations.

- D-002 total nitrogen concentration was 1.27 mg/L, D-006 total nitrogen was 1.502 mg/L, and D-009 total nitrogen was 2.106 mg/L (Table 1). Total nitrogen at the Test Site (1.691 mg/L) was similar to that of the Control Site (1.428 mg/L). Ortho-phosphate (7.5 mg/L) and total phosphorus (9.5 mg/L) at the Control Site were extremely high compared to D-009 and the Test Site (0.21 mg/L to 0.43 mg/L ortho-phosphate and 0.66 mg/L to 0.76 mg/L total phosphorus, Table 1). Because the Control Site did not represent unaffected background conditions, comparisons cannot be made to the Test Site that would indicate that Test Site nutrient enrichment is attributable to D-009.

- Iron detected at D-002 (1810 µg/L) constitutes a violation of Class III Water Quality Criterion (62-302.530 (38)). Iron was also detected at D-006 and D-009 at levels that complied with Class III Water Quality Criteria. Aluminum was present at D-009 above the Practical Quantitation Limit (PQL) and at D-006 between the MDL and the PQL, but there is no water quality criterion for aluminum. Arsenic and nickel were detected at D-002, D-006, and D-009 at levels above the MDL but below the PQL, which comply with water quality criteria. Chromium was detected at D-002 and D-009 at levels between the MDL and PQL, which complies with water quality criterion. Cadmium, lead, and selenium were detected at D-009 at levels between the MDL and PQL, which also complies with water quality criteria. All other metals were undetected (Table 2).

- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al.* 1978). Raschke and Shultz (1987) found that AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying

Table 2. Effluent limits, Class III Freshwater Criteria and metals data. Class III Criteria based on hardness are presented individually for each site based on hardness at that site.

Mosaic Kingsford Mine	D-002 Class III Criteria	D-002	D-006 Class III Criteria	D-006	D-009 Class III Criteria	D-009
Metals (µg/L unless otherwise noted)						
Aluminum	-	60 U	-	100 I	-	620
Arsenic	≤ 50	0.52 I	≤ 50	1.4 I	≤ 50	1.6 I
Cadmium	≤ 0.4 b	0.02 U	≤ 0.60 b	0.02 U	≤ 0.37 b	0.039 I
Calcium (mg/L)	-	32.5	-	63.1	-	30
Chromium-III	≤ 127.1 b	0.73 I	≤ 206.45 b	0.5 U	≤ 123.53 b	1.3 I
Copper	≤ 14.0 b	0.5 U	≤ 23.21 b	0.5 U	≤ 13.58 b	0.5 U
Iron	≤ 1,000	1810	≤ 1,000	34 I	≤ 1,000	250
Lead	≤ 5.8 b	0.2 U	≤ 12.37 b	0.2 U	≤ 5.57 b	0.42 I
Magnesium (mg/L)	-	19.3	-	32.3	-	19.5
Mercury	≤ 0.012	-	≤ 0.012	-	≤ 0.012	-
Nickel	≤ 77.9 b	0.44 I	≤ 128.61 b	0.63 I	≤ 75.66 b	0.69 I
Selenium	≤ 5.0	0.5 U	≤ 5.0	0.5 U	≤ 5.0	0.51 I
Silver	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Zinc	≤ 179.0 b	5 U	≤ 295.82 b	5 U	≤ 173.89 b	5 U

Value exceeds the Class III Water Quality Criteria or permit limits

b - Value is calculated based on hardness

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

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

Note: Metals sampling was not performed at the Control and Test Sites.

nutrient enrichment. D-002 AGP was 30.9 A mg dry weight/L, D-006 AGP was 17.9 mg dry wt/L, and D-009 AGP was 24.8 mg dry wt/L (Table 3). The AGP values at the upstream Control Site and downstream Test Site were 11.7 mg dry wt/L and 36.5 mg dry wt/L, respectively. All AGP values were above the "problem" threshold. This indicates there is nutrient enrichment related to the Mosaic Kingsford Mine discharge in this portion of Thirtymile Creek and that there are additional sources of nutrient input affecting the Control Site. The analytical chemistry suggests that the effluents and Test Site are nitrogen-limited. The extremely high ortho-phosphate and total phosphorus levels at the Control Site skewed the calculation of the N:P ratio, making it appear that the site is nitrogen limited. However, there are ample nutrients at this site to support large amounts of algal growth. The fact that AGP was not extremely high coupled with the low algal density observed in phytoplankton samples and low chlorophyll-a values indicates that there is growth inhibition at the Control Site (Tables 1, 2, & 4b).

- Chlorophyll-*a* was detected in water samples of the effluents and from the Control and Test Sites (Table 1). While chlorophyll-*a* values were low at D-002 and at the Control Site (1.4 I and 1.6 I µg/L, respectively), they were much higher at D-006 (67 µg/L) and at the Test Site (76 µg/L) and highest in D-009 (130 µg/L).
- Although there were differences in the periphyton algal community at the Control and Test Sites, the evidence that there is algal growth inhibition at the Control Site, as noted in the AGP discussion, makes comparisons between the two sites meaningless (Table 4a, Appendix J).
- Although there were differences in the phytoplankton algal communities at the Control and Test Sites, the evidence that there is algal growth inhibition, as noted in the AGP discussion, makes comparisons between the two sites meaningless. The phytoplankton sample taken from D-002 was dominated by green algae (43.0%) and blue-green algae (41.0%) and had low algal density (658 algal units/mL) compared to the other effluents (87,159 algal units/mL and 96,602 algal units/mL at EFF-006 and EFF-009, respectively). D-006 was dominated by blue-green algae (72.2%), and the diatom portion of the sample was dominated by the hypereutraphentic diatom, *Stephanodiscus minutulus* (Van Dam et al,

Table 3. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN) and total nitrogen (TN) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus.

Mosaic Kingsford Mine												
Location	AGP (measured)		Predicted AGP (TSIN) ± 20%				Predicted AGP (TN) ± 20%				Inorganic N:P ratio	Total N:P ratio
D-002	30.9	A	17.5	±	3.5		48.3	±	9.7		3.5	4.1
D-006	17.9		0.5	±	0.1		57.2	±	11.4		0.1	3.6
D-009	24.8		0.6	±	0.1		80.0	±	16.0		0.1	3.2
CONTROL SITE	11.7		2.6	±	0.5		54.3	±	10.9		0.0	0.2
TEST SITE	36.5		8.0	±	1.6		64.3	±	12.9		0.5	2.2

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

1994). D-009 was dominated by blue-green algae (47.3%), and the diatom portion of the sample was dominated by the eutraphentic diatom, *Cyclostephanos invisitatus* (Van Dam et al, 1994). The fact that the Test Site phytoplankton (and periphyton) diatoms were also dominated by *Cyclostephanos invisitatus* is the only clear evidence that EFF-009 is influencing this site. As noted in the AGP discussion, phytoplankton algal density at the Control Site was very low (536 algal units/mL). The Control Site sample was heavily dominated by diatoms (81.2%).

- Habitat assessment scores were 123 at the Control Site and 155 at the Test Site (Table 1, data sheets in Appendix H), placing both in the Optimal category (Appendix C). The Control Site lost points for lack of substrate diversity and availability, slower water velocity, greater habitat smothering, and artificial channelization. There were a lower percentage of roots and snags at the Control Site and the bottom was muddier and siltier than the sandy bottom Test Site.

- Hester Dendy samplers were deployed on July 14 and retrieved after 28 days but the samples were not analyzed because D-009 had stopped discharging from July 21 to July 27, according to the flow chart at the outfall, and the samplers at the Control Site had been turned over and were heavily silted. In addition, one of the sample bags leaked during shipping.

- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Table 5 and in Appendix K1 and K2. The Control Site SCI score of 28A placed it in the lowest category, Category 3, and the Test Site SCI score of 39A placed it at the low end of Category 2. As with algal communities, the fact that the Control Site did not represent unaffected background conditions makes comparison between the Control Site and Test Site macroinvertebrate communities inappropriate.

Summary

DMR data indicate no exceedances by this facility in the past year. However, data from this inspection indicate exceedance of iron in D-002 and violation of the Class III Water Quality Criterion for pH at D-006 and D-009 by this facility. The extremely high ortho-phosphate and total phosphorus at the Control Site are cause for concern and indicate that there may be a source of nutrient enrichment in that area of the mining operation. A clay settling area south of the Control Site drains into D-008, but that outfall has not discharged since January, 2003. There is also a closed gypsum stack further south of the Control Site with an outfall into George

Table 4a. Periphyton Composition - Qualitative.

Mosaic Kingsford Mine	CONTROL SITE	TEST SITE
Number of Wet Taxa	4	25
Number of Wet Algal Units Identified	300	300
Percent Dominant Wet Taxon	42.9	22.6
Dominant Wet Taxon Name	*Jaaginema* sp. (Blue-green)	*Jaaginema* sp. (Blue-green)
Number of Diatom Taxa	47	37
Number of Diatom Algal Units Identified	500	501
Percent Dominant Diatom Taxon	18.2	53.7
Dominant Diatom Taxon Name	*Nitzschia* sp.	*Cyclostephanos invistatus*
Percentage Composition for Wet Algae		
Blue-green algae	2.0	24.7
Green algae	0.3	12.7
Diatoms	97.7	58.7
Euglenophytes	0.0	4.0

Table 4b. Phytoplankton Composition

Mosaic Kingsford Mine	D-002	D-006	D-009	CONTROL SITE	TEST SITE
Number of Taxa	37	22	42	21	37
Number of Wet Algal Units Identified	295	302	300	296	302
Algal Density (number/mL)	658	87,159	96,602	536	46,456
Percent Dominant Wet Taxon	14.6	26.1	16.9	29.6	13.7
Dominant Wet Taxon Name	*Synechocystis* sp. (Blue-green)	*Rhabdogloea* sp. (Blue-green)	*Synechocystis* sp. (Blue-green)	*Trachelomonas* sp. (Euglenophyceae)	*Anabaena circinalis* (Blue-green)
Number of Diatom Taxa	58	8	9	51	13
Number of Diatom Valves Identified	500	500	500	500	500
Percent Dominant Diatom Taxon	20.2	38.6	67.8	18.6	58.6
Dominant Diatom Taxon Name	*Navicula* sp.	*Stephanodiscus minutulus*	*Cyclostephanos invisitatus*	*Nitzschia* sp.	*Cyclostephanos invisitatus*
Chlorophyll a (µg/L) - Corrected	1.4 I	67.0	130.0	1.6 I	76.0
Phaeophytin (µg/L)	1.1	1.4 I	8.4	1.2 I	15.0
Percentage Composition					
Blue-green algae	41.0	72.2	47.3	6.7	40.4
Green algae	43.0	22.9	29.7	3.2	44.0
Diatoms	7.1	5.0	15.0	81.2	12.9
Cryptophytes	1.1	0.0	3.0	0.8	1.7
Euglenophytes	7.5	0.0	2.0	7.8	1.0
Pyrrophytes	0.0	0.0	3.0	0.4	0.0

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

Allen Creek, but that outfall did not discharge in 2007 or in 2008 up to the date of sampling (according to DMR's up to April 2008). In August, 2007 there was a small process water release into George Allen Creek with a phosphate concentration of 150 mg/L. Since rainfall has been very low over the last year, it's possible that the Control Site is still showing the effects of that release (personal communication, Jacki Champion). Since there is no reclamation going on at this time and the site has essentially recovered as evidenced by matures trees and plants in the area, the source of the additional nutrient inputs is undetermined. The inspection did not reveal anything that would explain the apparent algal inhibition at the Control Site. However, it was noted by the sampler that there is the possibility of vegetative spraying on the roadside upstream from the Control Site.

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Table 5. Macroinvertebrate Dipnet Samples - Qualitative.

Mosaic Kingsford	Control Site		Test Site	
Summary Statistics				
Stream Condition Index 2007 (value)	28 A		39 A	
Stream Condition Index 2007 (category) *	Category 3		Category 2	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	23	22	20	30
Number of Ephemeroptera Taxa	1	1	1	3
Number of Trichoptera Taxa	3	2	2	2
Number of Clinger Taxa	2	2	4	4
Number of Long-lived Taxa	1	0	1	4
Number of Sensitive Taxa	0	0	0	1
Percent of Dominant Taxon	43.2	39.5	35.9	20.0
Percent Suspension Feeders and Filterers	5.8	2.7	8.5	8.6
Percent of Tanytarsini Individuals	1.3	1.4	0.7	0.0
Percent of Very Tolerant Individuals	1.9	2.7	7.0	12.9
Total Number of Individuals	155	147	142	140
Community Composition: Percent of total				
Dominant Taxon Name	Hydrobiidae (Gastropoda)	Hydrobiidae (Gastropoda)	*Amnicola* sp. (Gastropoda)	*Amnicola* sp. (Gastropoda)
Amphipoda	2.6	2.7	14.1	11.4
Bivalvia	2.6	0.0	7.0	7.1
Coleoptera	15.5	22.5	20.4	22.9
Decapoda	0.7	0.0	0.0	0.7
Diptera	9.7	15.7	3.5	7.9
Ephemeroptera	2.6	2.7	3.5	3.6
Gastropoda	51.6	45.6	41.6	25.0
Lepidoptera	0.7	1.4	0.0	0.0
Odonata	2.6	1.4	0.0	1.4
Oligochaeta	7.7	4.1	6.3	15.0
Platyhelminthes	0.0	0.0	2.1	1.4
Trichoptera	3.9	4.1	1.4	3.6
Functional Feeding Groups: Percent of total				
Burrowing Deposit Feeders	7.7	4.1	6.3	15.0
Predators	4.8	4.4	0.7	4.3
Scavengers	0.3	0.0	0.0	0.7
Scrapers	18.1	20.8	54.2	40.0
Shredders	5.5	7.8	7.8	7.1
Surface Deposit Feeders	57.7	60.2	20.4	22.9
Suspension Feeders	5.8	2.7	8.5	8.6
Unknown	0.0	0.0	2.1	1.4

A - Value reported is the mean of two determinations

* SCI_2007 categories from Table LT 7200-2 of Draft DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160 F.A.C.),September 17, 2007: Values 0 ≤ 34 are Category III; Values 35 < 67 are Category II; Values 68 ≤ 100 are Category I

Wallace, J. B., J. W. Grubaugh and M. R. Whiles. 1996. Biotic indices and stream ecosystem processes: results from an experimental study. Ecol. Appl. 6(1): 140-151.

USEPA. 2000. Nutrient Criteria Technical Guidance Manual – River and Streams. EPA-822-B-00-002.

USEPA 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. 5th Edition. EPA-821-R-02-012

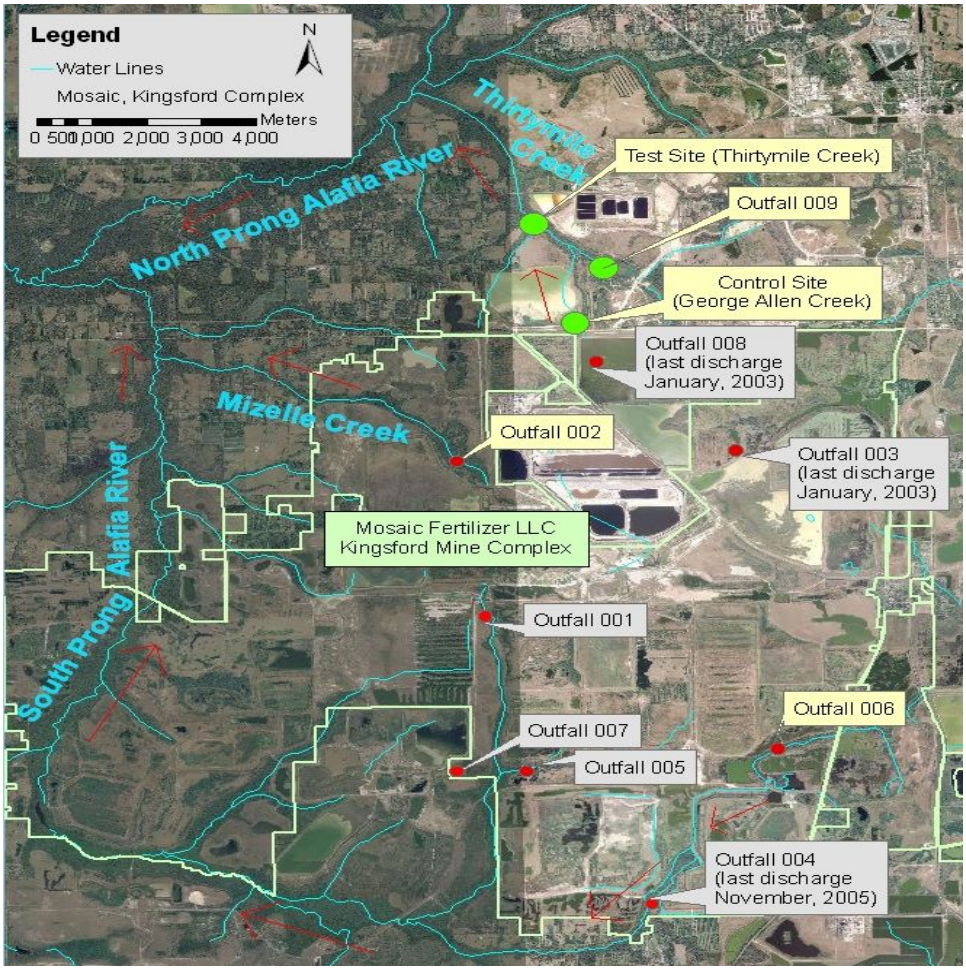
Van Dam, H., Mertens, A. & Sinkeldam, J. 1994. A coded checklist and ecological indicator values of freshwater diatoms from the Netherlands. Netherlands Journal of Aquatic Ecology, 28 (1): 117-133.

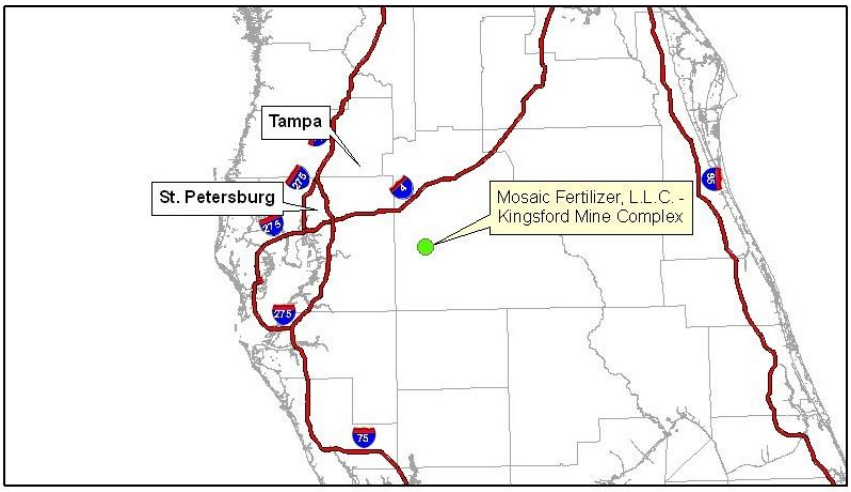
Appendices

- Appendix A. Map of facility
- Appendix B. Facility summary and DMR data
- Appendix C. Explanation of measurements
- Appendix D. Chain of Custody form
- Appendix E. Chemical analyses of effluent and receiving water.
- Appendix F. Additional physical, chemical, toxicological and microbiological results
- Appendix G. Standard Reference Toxicant test data
- Appendix H. Habitat Assessment field sheets
- Appendix I-1. Periphyton: Wet Taxa list and number of individuals counted
- Appendix I-2. Periphyton: Diatom Taxa list and number of valves counted
- Appendix J-1. Phytoplankton: Wet Taxa list and number of individuals counted
- Appendix J-2. Phytoplankton: Wet Taxa list and density (number of individuals per mL)
- Appendix J-3. Phytoplankton: Diatom Taxa list and number of valves counted
- Appendix K-1. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix K-2. Dipnet samples: Taxa list and number of macroinvertebrates counted

Appendix A

Map of Facility





Appendix B

Facility Summary and DMR data

PART I: Information gathered prior to sampling event	
Prepared By: Jacki Champion	**Contact Number: 813-632-7600 X133**
Facility Name (as it appears on permit): Mosaic Fertilizer, L.L.C. – Kingsford Mine Complex	**Former Names: IMC Phosphates Co.-Kingsford Mine Complex**
NPDES Permit Number: FL0000256	**Permit Expiration Date: 12/4/08**
Physical Address: 2600 Doc Durrance Road Bradley, FL 33835	
District: South West	**County: Polk**
Function of Facility: Closed Phosphate Mine	
Facility Type: Phosphate Mine	**Permitted Capacity (MGD): Report only**
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): 7/07 to 6/08 MGD **D-001-0.033** **D-002-0.52** **D-003-0** **D-004-0** **D-005-2.48** **D-006-7.15** **D-007-3.68** **D-008-0** **D-009-9.23**	
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months): na	
Description of type of Discharge: ☐ **Continuous** ☒ **Intermittent** ☐ **Seasonal** ☒ **Rainfall Dependent** ☐ **Other, please specify**	

Parameters (Units)	Discharge Limitations			Monitoring Requirements		
	Daily Minimum	Monthly Average	Daily Maximum	Monitoring Frequency	Sample Type	Sample Point
Flow (mgd)	N/A	Report	Report	Continuous	Recorder	††
Solids, Total Suspended (TSS) (mg/l)	N/A	30	60	Weekly	Grab	††
Solids, Fixed Suspended (FS) (mg/l) *	N/A	12	25	Weekly	Grab	††
Phosphorus, Total (as P) (mg/l)	N/A	3.0 **	5.0	Weekly	Grab	††
Phosphorus, Total (as P) (lbs/day)	N/A	Report †	Report †	Weekly	Calculated	††
Phosphate, Ortho (as P) (MG/L) †††	N/A	Report	Report	Weekly	Grab	EFF-003
pH (standard units) (See I.A.2.)	6.0	Report	8.5 See Condition I.A.11.	Weekly	Grab	††
Temperature (°C)	N/A	Report	Report See Condition I.A.11.	Weekly	Grab	††
Total Ammonia (as N) (MG/L) †††	N/A	Report	Report See Condition I.A.11.	Weekly	Grab	EFF-003
Ammonia, Unionized (MG/L) †††	N/A	Report	0.02 See Condition I.A.11.	Weekly	Calculated	EFF-003
Nitrogen, Total (as N) (mg/l)	N/A	N/A	3.0 ***	Monthly	Grab	††
Nitrogen, Total (as N) (lbs/day)	N/A	N/A	Report †	Monthly	Calculated	††
Specific Conductance (µmho/cm)	N/A	N/A	See Condition I.A.3.	Monthly	Grab	††
Oxygen, Dissolved (DO) (mg/l)	5.0	N/A	N/A	Monthly	Grab	††
Alpha, Gross Particle Activity (PCI/L) †††	N/A	N/A	15.0 See Condition I.A.12.	Monthly	24-hour flow proportioned composite	EFF-003
Radium 226 + Radium 228, Total (PCI/L) †††	N/A	N/A	5.0 See Condition I.A.12.	Monthly	24-hour flow proportioned composite	EFF-003
Fluoride, Total (as F) (mg/l)	N/A	N/A	10.0	Quarterly	Grab	††
Sulfate, Total (mg/l)	N/A	N/A	Report	Quarterly	Grab	††
Chlorophyll a (µg/l)	N/A	N/A	Report	Quarterly	Grab	††
Acute Whole Effluent Toxicity	See Condition I.A.4.					††

†† Samples shall be taken at discharge sites EFF-01, EFF-02, EFF-03, EFF-04, EFF-05, EFF-06, and EFF-09.

PART I: Continued

Receiving Waters:	Classification (indicate whether fresh or marine):
D-001, D-005, D-007- Lake Branch to the South Prong Alafia **D-002-Mizelle Creek to South Prong Alafia** **D-003-Bird Branch to North Prong Alafia** **D-004, D-006-South Prong Alafia** **D-008-George Allen Creek to Thritymile Creek to North Prong Alafia** **D-009-Guy Branch to Thritymile Creek to North Prong**	**Class III Fresh waters**

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):
Annual acute freshwater 96-hr static screening tests, single grab sample

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.): none

Facility Mixing Zone Details (if applicable):
none

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Date	Parameter and Units	Limit	Result
none			

Describe previous FYI and WQBEL study: The previous FYI in 2003 had one control site in the South Prong Alafia and three test sites, one in the South Prong and two in Mizelle Creek. Outfall 002 has high iron-976 ug/L and Outfall 005 had high radium 226+228-13.3 pCi/L. The SCI sites were all in the good or excellent categories; however the South Prong showed signs of stress from an upstream source.

Describe previous or current Enforcement Actions (including WLs): none

Describe any violations or problems noted in previous inspection: none

Discuss whether DMR trends within previous five years are improving or declining:
static

PART II: Sampling Event Information	
Date(s) sample collected: 8/11/08	**Sampler(s): Jacki Champion; Scott Rose; Mike Lynch**
Temperature (Deg C):002-26.58; 006-31.39; 009-30.27	**pH (SU):002-7.54; 006-8.74; 009-8.84**
Dissolved Oxygen (mg/L):002-6.72; 006-13.30; 009-8.22	**Conductivity (umhos/cm): 002-377; 006-736; 009-310**
Total Residual Chlorine (mg/L): na	**Total Residual Chlorine - after Disinfection (mg/L): na**
Method of Chlorination: na	**Method of De-chlorination: na**
Flow During Sample Collection for each outfall(MGD): **002-0.46 MGD** **006-7.1 MGD** **009-4.76 MGD**	
Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day): **9/07-8/08** **002-0.5737 MGD** **006-7.5407 MGD** **009-8.1780 MGD**	
Describe Discharge during Sampling Event: **☒ Continuous ☒ Intermittent ☐ Seasonal ☒ Rainfall Dependent ☐ Other, please specify** **Outfall 002, 006 Outfall 009**	
Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here: **Outfall D-009 did not discharge from July 21 to July 27. This outfall is typically a very steady discharger.** **The Hester-Dendy samplers placed at the Control Site in George Allen Branch were turned over and silted heavily.** **There was an odor of a dead animal in the vicinity of Outfall 002 during the sampling.**	

Appendix C

Explanation of Measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.floridadep.org/labs/qa/index.htm .

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix E. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Tables 1 and 2, Appendix B). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi* following FDEP SOPs TA07_01 and TA07_02. Failure of toxicity testing may constitute a violation of 62-302.520(20), 62-302.530(61) and/or facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

(4) Bacteriological Testing

The effluent and water from control and test sites were not analyzed for the presence and concentration of total and fecal coliform bacteria following FDEP SOPs MB1_0 and MB1_1. High levels of fecal or total coliform bacteria may constitute violation of 62-302.530(6), 62-302.530(7) and/or facility permit limits.

(5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(6) Algal Growth Potential (AGP)

The effluent and water from control and test sites are autoclaved, filtered (0.45μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum,* USEPA 2002*),* and incubated for 14 days (FDEP SOP TA08_05). The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute one line of evidence for violation of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of ± 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may be a violation of 62-302.530(61) F.A.C..

(7) Algal Phytoplankton and Periphyton Assemblages

Methods: Qualitative periphyton were sampled at both control and test sites by taking subsamples of algae from natural substrates throughout the sample reach (QA Rule FS7220). Phytoplankton were sampled using a 1 L grab sample (QA Rule SOP FS7100). Periphyton were subsampled and identified to the lowest practical level, usually species (FDEP SOPs AB03, AB03_1 and AB05). Wet taxa and diatoms are identified separately. In the wet taxa analysis, soft algae are identified to the lowest practical level, and diatoms are identified only to order level (diatom). In the diatom analysis, diatoms are identified to the lowest practical level.

Chlorophyll *a* Content: Chlorophyll *a* content is measured in phytoplankton samples to estimate algal biomass (FDEP SOP BB05). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Extreme nutrient enrichment tends to reduce the number of different types of algae present in a sample because a few tolerant taxa tend to reproduce rapidly and constitute the majority of the cells present. However, moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999) as the algal community begins to respond to the increased input of nutrients.

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute violations of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C.

(8) Benthic Macroinvertebrate Assemblages

Methods: Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days (QA Rule SOP FS7430). Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species (FDEP SOP IZ06).

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute violations of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute violations of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitutes a violation of 62-302.530(10) F.A.C..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Karr and Chu 1998; Fore et. al. 2007).). Shifts in community composition related to a facility's effluent may constitute violations of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute violations of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida (Fore et. al. 2007). This Index was revised in 2007 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned according to in which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists -and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa,

number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. Scores are broken into three categories (I, II, and III). SCI 2007 categories are from Table LT 7200-2 of Draft DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160 F.A.C.), September 17, 2007. A decrease in ordinal SCI score from the Control to the Test site may be evidence of degradation related to a facility's effluent. An SCI score in Category I, if it is shown to be related to a facility's effluent, may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(9) Statistical Comparisons

Statistical comparisons of the proportions of taxa, major groups or feeding groups were made using 95% confidence intervals on proportions. A 95% confidence interval is the range of values above and below a given proportion that has a 95% chance of containing the true proportion (Sokal and Rohlf 1995). If the 95% confidence intervals for two proportions do not overlap, then the proportion of X in sample 1 is significantly different from the proportion of X in sample 2 at $p<0.05$. A "$p<0.05$" level of significance means that there is less than a 5% chance that the true proportions in the two samples are the same. All comparisons that are labeled as significant in the text have a probability <0.05 that the proportions are the same.

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-08-11-22
Mosaic Kingsford Mine

Requester: Jennifer Paris
Field Report Prepared By: Jacki Champion
Collected By: Jacki Champion / Mike Lynch / Scott Rose
Send Final Report To Vishwas Sathe
Sampling Agency: FDEP

Customer: BMR-TAMPA
Project ID: FYI5
PMAS: 1143

Lab ID *	Location / Field ID / Matrix / Temp (C) / pH / Latitude / Longitude	Comp / Grab / Collection (begin) Date Time Eastern Central / Tot Res Chlorine (mg/L) / Diss Oxygen (mg/L) / Sample Depth m ft / Salinity (PPTh) / Sp Conductance (umho/cm) / NPDES Number / Comments	Collection (end) Date Time Eastern Central / Storet Station Number	Bottle Group(s)**
	Mosaic Kingsford Mine Outfall 009 Fresh Water 30.27 8.84	Grab 8/11/08 1:35 Eastern Diss Oxygen (mg/L) 8.22 310 Sp Conductance (umho/cm) FL0000356		A
	Mosaic Kingsford Mine Outfall 009 Fresh Water 30.27 8.84	Grab 8/11/08 Eastern Diss Oxygen (mg/L) 8.22 310 Sp Conductance (umho/cm) FL0000356 Comments Bioassay		A
	Mosaic Kingsford Mine Outfall 006 Fresh Water 31.39 8.74	Grab 8/11/08 5:40 Eastern Diss Oxygen (mg/L) 13.30 736 Sp Conductance (umho/cm) FL0000356		A
	Mosaic Kingsford Mine Outfall 006 Fresh Water 31.39 8.74	Grab 8/11/08 Eastern Diss Oxygen (mg/L) 13.30 736 Sp Conductance (umho/cm) FL0000356 Comments Bioassay 6 bioassay recd by JV. J.P. 1841 8.0.8 6 started Ready		A

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	8/11/08 6:45	DHL				8/12/08		8/12/08

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

8-12-08 9:05

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-08-11-22
Mosaic Kingsford Mine

Requester: Jennifer Paris

Field Report Prepared By: Jachi Champion

Customer: BMR-TAMPA

Collected By: Jachi Champion / Mike Lynch / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1143

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Kingsford Mine	☐ Comp ☒ Grab	Date 8/11/08 Time 4:00		A
	Field ID: Outfall 002	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 6.72	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 26.58	pH: 7.54	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 377
	Latitude o ' "	Longitude o ' "		Comments	NPDES Number: FL0000256

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Kingsford Mine	☐ Comp ☒ Grab	Date 8/11/08 Time 4:00		A
	Field ID: Outfall 002	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 6.72	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 26.58	pH: 7.51	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 377
	Latitude o ' "	Longitude o ' "		Comments: Bioassay	NPDES Number: FL0000256

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Kingsford Mine	☐ Comp ☒ Grab	Date 8/11/08 Time 1:30		D
	Field ID: BLANKS	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "		Comments	NPDES Number: FL0000256

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "		Comments	NPDES Number

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	8/11/08 6:45	DHL					SL	8-12-08 9:25

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-08-11-22
Mosaic Kingsford Mine

Customer: BMR-TAMPA

Project ID: FYI5

PMAS: 1143

Requester: Jennifer Paris

Field Report Prepared By: Jacki Champion

Collected By: Jacki Champion/Mike Lynch/Scott Rose

Send Final Report To: Vishwas Sathe

Sampling Agency: FDEP

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic Kingsford Mine	☐ Comp ☒ Grab Date 8/11/08 Time 10:40 Eastern Central	Date — Time — Eastern Central	B/C
	Field ID: Test Site (Thirtymile Creek)	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 5.10	Storet Station Number:
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 27.57	pH: 7.91	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number:
	Latitude o ' "	Longitude o ' "	Comments: Macroinverts - SCI	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic Kingsford Mine	☒ Comp ☐ Grab Date 7/14/08 Time Eastern Central	Date 8/11/08 Time 10:40 Eastern Central	C
	Field ID: Test Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 5.10	Storet Station Number:
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 27.57	pH: 7.91	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number:
	Latitude o ' "	Longitude o ' "	Comments: Hester Dendy	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic Kingsford Mine	☒ Comp ☐ Grab Date 7/14/08 Time Eastern Central	Date 8/11/08 Time 10:40 Eastern Central	C
	Field ID: Test Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 5.10	Storet Station Number:
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 27.57	pH: 7.91	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number:
	Latitude o ' "	Longitude o ' "	Comments: Hester Dendy	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic Kingsford Mine	☒ Comp ☐ Grab Date 7/14/08 Time Eastern Central	Date 8/11/08 Time 10:40 Eastern Central	C
	Field ID: Test Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 5.10	Storet Station Number:
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 27.57	pH: 7.91	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number:
	Latitude o ' "	Longitude o ' "	Comments: Hester Dendy	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J Champion	8/11/08 1645	DHL						8.12.08/905

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-08-11-22
Mosaic Kingsford Mine

Requester: Jennifer Paris

Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA

Collected By: Jacki Champion / Mike Lynch / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1143

Lab ID *	Location	Field ID	Matrix (Include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Latitude	Longitude	Comp / Grab	Collection (begin) Date Time Eastern Central	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Sample Depth m / ft	Salinity (PPTh) / Sp Conductance (umho/cm)	Collection (end) Date Time Eastern Central	Storet Station Number	NPDES Number	Bottle Group(s)**	Comments
	Mosaic Kingsford Mine	Control Site (George Allen Creek)	Fresh water	25.77	7.31 (7.9 corr)			Grab	8/11/08 12:30 Central		5.73						B/C	Macroinverts-SCI
	Mosaic Kingsford Mine	Control Site	Fresh water	25.77	7.31			Comp	7/14/08 Eastern Central		5.73			8/11/08 12:30 Eastern Central			C	Hester Dendy
	Mosaic Kingsford Mine	Control Site	Fresh Water	25.77	7.31			Comp	7/14/08 Eastern Central		5.73			8/11/08 12:30 Eastern Central			C	Hester Dendy
	Mosaic Kingsford Mine	Control Site	fresh water	25.77	7.31			Comp	7/14/08 Eastern Central		5.73			8/11/08 12:30 Eastern Central			C	Hester Dendy

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	8/11/08 6:45	DHL					SK	8-12-08 / 9:05

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix E

Chemical analysis of effluent and receiving water

Date_Sampled	Field_Sample_ID	SCH_Group	Name	Value	Qualifier		Units_Word_Result	
	MDL	PQL						
8/11/2008 16:00	D-002	AGP/LN	Algal Growth Potential	30.9	A	mg DryWt/L	0.3	0.9
8/11/2008 16:00	D-002	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.2	U	mg/L	0.2	2
8/11/2008 16:00	D-002	Chlorophyll/Grain Size/BOD	Phaeophytin-a	1.1		ug/L	0.24	0.71
8/11/2008 16:00	D-002	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.4	I	ug/L	0.55	1.7
8/11/2008 16:00	D-002	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
8/11/2008 16:00	D-002	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
8/11/2008 16:00	D-002	Metals	Aluminum	60	U	ug/L	60	240
8/11/2008 16:00	D-002	Metals	Calcium	32.5		mg/L	0.075	0.3
8/11/2008 16:00	D-002	Metals	Magnesium	19.3		mg/L	0.04	0.16
8/11/2008 16:00	D-002	Metals	Iron	1.81E+03		ug/L	30	120
8/11/2008 16:00	D-002	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
8/11/2008 16:00	D-002	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/11/2008 16:00	D-002	Metals	Zinc	5	U	ug/L	5	20
8/11/2008 16:00	D-002	Metals	Nickel	0.44	I	ug/L	0.25	1
8/11/2008 16:00	D-002	Metals	Chromium	0.73	I	ug/L	0.5	2
8/11/2008 16:00	D-002	Metals	Arsenic	0.52	I	ug/L	0.5	2
8/11/2008 16:00	D-002	Metals	Copper	0.5	U	ug/L	0.5	2
8/11/2008 16:00	D-002	Metals	Sodium	24.7		mg/L	0.5	2
8/11/2008 16:00	D-002	Metals	Lead	0.2	U	ug/L	0.2	0.8
8/11/2008 16:00	D-002	Metals	Selenium	0.5	U	ug/L	0.5	2
8/11/2008 16:00	D-002	Nutrients	TSS	5	I	mg/L	4	16
8/11/2008 16:00	D-002	Nutrients	O-Phosphate-P	0.13		mg P/L	0.008	0.02
8/11/2008 16:00	D-002	Nutrients	Kjeldahl Nitrogen	1.1		mg N/L	0.08	0.2
8/11/2008 16:00	D-002	Nutrients	Sulfate	31		mg SO4/L	0.2	0.5
8/11/2008 16:00	D-002	Nutrients	Fluoride	1.1		mg F/L	0.05	0.1
8/11/2008 16:00	D-002	Nutrients	Ammonia-N	0.29		mg N/L	0.01	0.02
8/11/2008 16:00	D-002	Nutrients	Total-P	0.31		mg P/L	0.02	0.06
8/11/2008 16:00	D-002	Nutrients	TDS	254		mg/L	15	60
8/11/2008 16:00	D-002	Nutrients	Chloride	12		mg Cl/L	0.2	1
8/11/2008 16:00	D-002	Nutrients	NO2NO3-N	0.17		mg N/L	0.004	0.01
8/11/2008 16:00	D-002	Nutrients	Specific Conductance	377		umhos/cm		
8/11/2008 16:00	D-002	Nutrients	pH	7.54				
8/11/2008 16:00	D-002	Nutrients	pH	7.54				
8/11/2008 16:00	D-002	Nutrients	Dissolved Oxygen	6.72		mg/L		
8/11/2008 16:00	D-002	Nutrients	Specific Conductance	377		umhos/cm		
8/11/2008 16:00	D-002	Nutrients	Temperature	26.58		C		
8/11/2008 16:00	D-002	Nutrients	Dissolved Oxygen	6.72		mg/L		
8/11/2008 16:00	D-002	Nutrients	Temperature	26.58		C		
8/11/2008 17:00	D-006	AGP/LN	Algal Growth Potential	17.9		mg DryWt/L	0.3	0.9

8/11/2008 17:00	D-006	Chlorophyll/Grain Size/BOD	Phaeophytin-a	1.4	I	ug/L	0.69	2
8/11/2008 17:00	D-006	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	5.4	AJV	mg/L	0.2	2
8/11/2008 17:00	D-006	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	67		ug/L	1.6	4.9
8/11/2008 17:00	D-006	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
8/11/2008 17:00	D-006	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
8/11/2008 17:00	D-006	Metals	Aluminum	100	I	ug/L	60	240
8/11/2008 17:00	D-006	Metals	Copper	0.5	U	ug/L	0.5	2
8/11/2008 17:00	D-006	Metals	Zinc	5	U	ug/L	5	20
8/11/2008 17:00	D-006	Metals	Arsenic	1.4	I	ug/L	0.5	2
8/11/2008 17:00	D-006	Metals	Lead	0.2	U	ug/L	0.2	0.8
8/11/2008 17:00	D-006	Metals	Nickel	0.63	I	ug/L	0.25	1
8/11/2008 17:00	D-006	Metals	Magnesium	32.3		mg/L	0.04	0.16
8/11/2008 17:00	D-006	Metals	Chromium	0.5	U	ug/L	0.5	2
8/11/2008 17:00	D-006	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/11/2008 17:00	D-006	Metals	Calcium	63.1		mg/L	0.075	0.3
8/11/2008 17:00	D-006	Metals	Sodium	57.7		mg/L	0.5	2
8/11/2008 17:00	D-006	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
8/11/2008 17:00	D-006	Metals	Iron	34	I	ug/L	30	120
8/11/2008 17:00	D-006	Metals	Selenium	0.5	U	ug/L	0.5	2
8/11/2008 17:00	D-006	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
8/11/2008 17:00	D-006	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
8/11/2008 17:00	D-006	Nutrients	O-Phosphate-P	0.26		mg P/L	0.016	0.04
8/11/2008 17:00	D-006	Nutrients	TDS	478	A	mg/L	15	60
8/11/2008 17:00	D-006	Nutrients	Sulfate	190		mg SO4/L	0.4	1
8/11/2008 17:00	D-006	Nutrients	Chloride	14		mg Cl/L	0.4	2
8/11/2008 17:00	D-006	Nutrients	Total-P	0.42		mg P/L	0.02	0.06
8/11/2008 17:00	D-006	Nutrients	Fluoride	2.9		mg F/L	0.05	0.1
8/11/2008 17:00	D-006	Nutrients	Kjeldahl Nitrogen	1.5		mg N/L	0.08	0.2
8/11/2008 17:00	D-006	Nutrients	TSS	11	I	mg/L	4	16
8/11/2008 17:00	D-006	Nutrients	Temperature	30.39		C		
8/11/2008 17:00	D-006	Nutrients	Dissolved Oxygen	13.3		mg/L		
8/11/2008 17:00	D-006	Nutrients	Specific Conductance	736		umhos/cm		
8/11/2008 17:00	D-006	Nutrients	pH	8.74				
8/11/2008 17:00	D-006	Nutrients	Specific Conductance	736		umhos/cm		
8/11/2008 17:00	D-006	Nutrients	pH	8.74				
8/11/2008 17:00	D-006	Nutrients	Temperature	31.39		C		
8/11/2008 17:00	D-006	Nutrients	Dissolved Oxygen	13.3		mg/L		
8/11/2008 13:35	D-009	AGP/LN	Algal Growth Potential	24.8		mg DryWt/L	0.3	0.9
8/11/2008 13:35	D-009	Chlorophyll/Grain Size/BOD	Phaeophytin-a	8.4		ug/L	1.4	4.1
8/11/2008 13:35	D-009	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	6	JV	mg/L	0.2	2
8/11/2008 13:35	D-009	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	130		ug/L	3.1	9.7
8/11/2008 13:35	D-009	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
8/11/2008 13:35	D-009	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
8/11/2008 13:35	D-009	Metals	Copper	0.5	U	ug/L	0.5	2

8/11/2008 13:35	D-009	Metals	Calcium	30		mg/L	0.075	0.3
8/11/2008 13:35	D-009	Metals	Iron	250		ug/L	30	120
8/11/2008 13:35	D-009	Metals	Cadmium	0.039	I	ug/L	0.02	0.08
8/11/2008 13:35	D-009	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/11/2008 13:35	D-009	Metals	Zinc	5	U	ug/L	5	20
8/11/2008 13:35	D-009	Metals	Aluminum	620		ug/L	60	240
8/11/2008 13:35	D-009	Metals	Selenium	0.51	I	ug/L	0.5	2
8/11/2008 13:35	D-009	Metals	Sodium	11.6		mg/L	0.5	2
8/11/2008 13:35	D-009	Metals	Lead	0.42	I	ug/L	0.2	0.8
8/11/2008 13:35	D-009	Metals	Arsenic	1.6	I	ug/L	0.5	2
8/11/2008 13:35	D-009	Metals	Nickel	0.69	I	ug/L	0.25	1
8/11/2008 13:35	D-009	Metals	Magnesium	19.5		mg/L	0.04	0.16
8/11/2008 13:35	D-009	Metals	Chromium	1.3	I	ug/L	0.5	2
8/11/2008 13:35	D-009	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
8/11/2008 13:35	D-009	Nutrients	Sulfate	19		mg SO4/L	0.2	0.5
8/11/2008 13:35	D-009	Nutrients	Chloride	7.2		mg Cl/L	0.2	1
8/11/2008 13:35	D-009	Nutrients	O-Phosphate-P	0.21		mg P/L	0.016	0.04
8/11/2008 13:35	D-009	Nutrients	Total-P	0.66		mg P/L	0.02	0.06
8/11/2008 13:35	D-009	Nutrients	TDS	192		mg/L	15	60
8/11/2008 13:35	D-009	Nutrients	Fluoride	1.4		mg F/L	0.05	0.1
8/11/2008 13:35	D-009	Nutrients	NO2NO3-N	0.006	I	mg N/L	0.004	0.01
8/11/2008 13:35	D-009	Nutrients	TSS	23		mg/L	4	16
8/11/2008 13:35	D-009	Nutrients	Kjeldahl Nitrogen	2.1		mg N/L	0.08	0.2
8/11/2008 13:35	D-009	Nutrients	Dissolved Oxygen	8.22		mg/L		
8/11/2008 13:35	D-009	Nutrients	Dissolved Oxygen	8.22		mg/L		
8/11/2008 13:35	D-009	Nutrients	Temperature	30.27		C		
8/11/2008 13:35	D-009	Nutrients	Specific Conductance	310		umhos/cm		
8/11/2008 13:35	D-009	Nutrients	Temperature	30.27		C		
8/11/2008 13:35	D-009	Nutrients	pH	8.84				
8/11/2008 13:35	D-009	Nutrients	Specific Conductance	310		umhos/cm		
8/11/2008 13:35	D-009	Nutrients	pH	8.84				
8/11/2008 12:30	CONTROL SITE	AGP/LN	Algal Growth Potential	11.7		mg DryWt/L	0.3	0.9
8/11/2008 12:30	CONTROL SITE	Chlorophyll/Grain Size/BOD	Phaeophytin-a	1.2	I	ug/L	0.48	1.4
8/11/2008 12:30	CONTROL SITE	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.6	I	ug/L	1.1	3.4
8/11/2008 12:30	CONTROL SITE	Nutrients	Turbidity	17		NTU	0.1	0.1
8/11/2008 12:30	CONTROL SITE	Nutrients	O-Phosphate-P	7.5		mg P/L	0.16	0.4
8/11/2008 12:30	CONTROL SITE	Nutrients	Total-P	9.5		mg P/L	0.53	1.6
8/11/2008 12:30	CONTROL SITE	Nutrients	NO2NO3-N	0.028		mg N/L	0.004	0.01
8/11/2008 12:30	CONTROL SITE	Nutrients	Sulfate	81		mg SO4/L	0.2	0.5
8/11/2008 12:30	CONTROL SITE	Nutrients	Fluoride	4.6		mg F/L	0.05	0.1
8/11/2008 12:30	CONTROL SITE	Nutrients	Ammonia-N	0.04		mg N/L	0.01	0.02
8/11/2008 12:30	CONTROL SITE	Nutrients	Kjeldahl Nitrogen	1.4		mg N/L	0.08	0.2
8/11/2008 12:30	CONTROL SITE	Nutrients	Temperature	25.77		C		
8/11/2008 12:30	CONTROL SITE	Nutrients	Dissolved Oxygen	5.73		mg/L		

8/11/2008 12:30	CONTROL SITE	Nutrients	pH	7.31				
8/11/2008 12:30	CONTROL SITE	Nutrients	pH	7.31				
8/11/2008 12:30	CONTROL SITE	Nutrients	Temperature	25.77		C		
8/11/2008 12:30	CONTROL SITE	Nutrients	Dissolved Oxygen	5.73		mg/L		
8/11/2008 10:40	TEST SITE	AGP/LN	Algal Growth Potential	36.5		mg DryWt/L	0.3	0.9
8/11/2008 10:40	TEST SITE	Chlorophyll/Grain Size/BOD	Phaeophytin-a	15		ug/L	0.87	2.6
8/11/2008 10:40	TEST SITE	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	76		ug/L	2	6.2
8/11/2008 10:40	TEST SITE	Nutrients	Fluoride	1.5		mg F/L	0.05	0.1
8/11/2008 10:40	TEST SITE	Nutrients	Kjeldahl Nitrogen	1.6		mg N/L	0.08	0.2
8/11/2008 10:40	TEST SITE	Nutrients	Sulfate	23		mg SO4/L	0.2	0.5
8/11/2008 10:40	TEST SITE	Nutrients	Turbidity	15		NTU	0.1	0.1
8/11/2008 10:40	TEST SITE	Nutrients	Total-P	0.76		mg P/L	0.02	0.06
8/11/2008 10:40	TEST SITE	Nutrients	NO2NO3-N	0.091		mg N/L	0.004	0.01
8/11/2008 10:40	TEST SITE	Nutrients	O-Phosphate-P	0.43		mg P/L	0.04	0.1
8/11/2008 10:40	TEST SITE	Nutrients	Ammonia-N	0.12		mg N/L	0.01	0.02
8/11/2008 10:40	TEST SITE	Nutrients	Temperature	27.57		C		
8/11/2008 10:40	TEST SITE	Nutrients	Temperature	27.57		C		
8/11/2008 10:40	TEST SITE	Nutrients	Dissolved Oxygen	5.1		mg/L		
8/11/2008 10:40	TEST SITE	Nutrients	Dissolved Oxygen	5.1		mg/L		
8/11/2008 10:40	TEST SITE	Nutrients	pH	7.91				
8/11/2008 10:40	TEST SITE	Nutrients	pH	7.91				
8/11/2008 13:30	BLANKS	Metals	Sodium	0.5	U	mg/L	0.5	2
8/11/2008 13:30	BLANKS	Metals	Zinc	5	U	ug/L	5	20
8/11/2008 13:30	BLANKS	Metals	Selenium	0.5	U	ug/L	0.5	2
8/11/2008 13:30	BLANKS	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
8/11/2008 13:30	BLANKS	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/11/2008 13:30	BLANKS	Metals	Chromium	0.5	U	ug/L	0.5	2
8/11/2008 13:30	BLANKS	Metals	Copper	0.5	U	ug/L	0.5	2
8/11/2008 13:30	BLANKS	Metals	Nickel	0.25	U	ug/L	0.25	1
8/11/2008 13:30	BLANKS	Metals	Aluminum	60	U	ug/L	60	240
8/11/2008 13:30	BLANKS	Metals	Lead	0.2	U	ug/L	0.2	0.8
8/11/2008 13:30	BLANKS	Metals	Calcium	0.075	U	mg/L	0.075	0.3
8/11/2008 13:30	BLANKS	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
8/11/2008 13:30	BLANKS	Metals	Arsenic	0.5	U	ug/L	0.5	2
8/11/2008 13:30	BLANKS	Metals	Iron	30	U	ug/L	30	120
8/11/2008 13:30	BLANKS	Nutrients	Fluoride	0.05	U	mg F/L	0.05	0.1
8/11/2008 13:30	BLANKS	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
8/11/2008 13:30	BLANKS	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	1
8/11/2008 13:30	BLANKS	Nutrients	O-Phosphate-P	0.004	I	mg P/L	0.004	0.01
8/11/2008 13:30	BLANKS	Nutrients	Total-P	0.02	U	mg P/L	0.02	0.06
8/11/2008 13:30	BLANKS	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
8/11/2008 13:30	BLANKS	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
8/11/2008 13:30	BLANKS	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic - Kingsford 2 outfall 002

Address: 2600 Doc Durrance Rd

City: Bradley County: Polk

Contact/District: Jacki Champion BMR-TAMPA

NPDES Permit #: FL 0000256

LIMS Job #: TH-2008-08-12-103-03 LIMS Sample #: 1123085

Lims Data Entry: 8-19-08 MF Data Entry Verification: 8-20-08

Sample Collection: Date: 8/11/08 Time: 1600

Hold Time Start: Date: 8/11/08 Time: 1600

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: (Screen) Definitive

(Static) / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Test 1 validation: Test 1: SOP TA 07_01

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07_02

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment : yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration : (yes) no Initial DO: 9.7 mg/L Final DO: 7.7 mg/L Duration: 20 minutes Rate: ~ 100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Dechlorination: yes (no) ____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) (Yes) No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 2 min. 25.4 max. 26.4 mean 25.9

Incubator # ____ min. ____ max. ____ mean ____

Room B246 min. 24.9 max. 25.7 mean 25.3

Test 1:% mortality in 100% sample: 0 % LC50: >100

Test 2:% mortality in 100% sample: 0 % LC50: >100

Investigators' Signatures

James Daniels

Barbara Bard

Marshall Faircloth

Loretta C. Wolfe
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ Well Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A			Not measured		BA
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	JD	BA
Alkalinity (mg/L as $CaCO_3$):	89	155				160	HACH	BA	JD
Hardness (mg/L as $CaCO_3$):	83	142				168	HACH	BA	JD
Total Ammonia (mg/L as N):	<0.017	<0.017				0.183	DENVER	MF	JD
Salinity (ppth):	–	–				0.11	YSI / (Mettler)	JD	BA

V 1.4 9/12/05

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 112385 Test #: 1/2 SOP#:TA 07_01 Test Started: Date 8.12.08 Time: 1240

Organism/Batch/Age: C.d.bs/29-08/<24hrs Test Ended: Date 8.14.08 Time: 13:45

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW 1 8.5.08

Food/Batch: YCT 1-15-08 P.sub 1-15-08 Artemia 0hr — 24hr — 48hr — 72hr — Artemia Lot# —

Feeding: Prior to Test (circled) Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5 Ⓐ	3 2 m			
	D	D	5	5	5			
Loaded/Verified by: MF BA		Checked by:	BA	BA	BA			

m = missing d = dead BR/AR = Before/After Renewal

Comments: Ⓐ Spilled @ 24 hrs BA cup lost 2 organisms

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 0% Ⓑ LC50: >100%

If Calculated: 95% CI ______ Method ______

Ⓑ 2 organisms lost at 24 hours no mortality based on 18 Total at 48 hours. MF 8-28-08

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1123085 Test #: 02/08 SOP#:TA 07 02 Test Started: Date 8.12.08 Time: 1330
Organism/Batch/Age: Clad/s/8.12.08/13days Test Ended: Date 8.14.08 Time: 1325
Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: Well / 8.11.08
Food/Batch: YCT ↘ P.sub — Artemia 0hr 127 24hr — 48hr — 72hr — Artemia Lot# 38433
Feeding: (Prior to Test) Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	E9	5	5	5			
	B	E10	5	5	5			
	C	E11	5	5	5			
	D	E12	5	5	5			
100%	A	E13	5	5	5			
	B	E14	5	5	5			
	C	E15	5	5	5			
	D	E16	5	5	5			
Loaded/Verified by: JD / BM		Checked by:	JD	JD	JD			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 0 % LC50: >100%
If Calculated: 95% CI______ Method______

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1123085 Test #: 1 of 2

TEST SOP #: TA07_01 Test Species: (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
PH (S.U.)	8.0		8.1			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L	8.2		7.3			
Conductivity (µmhos) mmhos	175		174.1			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.5		8.4			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L	7.8		7.4			
Conductivity (µmhos) mmhos	374		392			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
eplicate						
H (S.U.)						
emperature °C						
issolved Oxygen mg/L						
onductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

omments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1123085 **Test #:** 2 of 2

TEST SOP #: TA07_ 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.8	8.2	8.3			
Temperature °C	24.7	24.0	24.4			
Dissolved Oxygen mg/L	7.9	7.1	6.9			
Conductivity (µmhos) mmhos	278	234	291			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.3	8.3	8.3			
Temperature °C	25.9	24.2	24.4			
Dissolved Oxygen mg/L	7.7	7.2	7.1			
Conductivity (µmhos) mmhos	380	391	392			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic - Kingsford 3 outfall 006

Address : 2600 Doc Durrance Rd

City: Bradley **County:** Polk

Contact/District: Jacki Champion BMR-TAMPA

NPDES Permit #: FL 0000251

LIMS Job #: TH-2008-8-12-103-02 **LIMS Sample #:** 1123084

Lims Data Entry: 8-19-08 MF Data Entry Verification: 8.20.08 BA

Sample Collection: Date: 8.11.08 Time: 1700

Hold Time Start: Date: 8.11.08 Time: 1700

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: (Screen)
(Static) / Static Renewal / Flow-through
Test Duration: (48) 96 Hours.

Test 1 validation: **Test 1:** SOP TA 07_01
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: **Test 2:** SOP TA 07_02
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment : yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration : (yes) no Initial DO: 9.6 mg/L Final DO: 8.2 mg/L Duration: 20 minutes Rate: ~ 100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Dechlorination: yes (no) ____mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) (Yes) No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 2 min. 25.4 max 26.4 mean 25.9

Incubator # ____ min. ____ max. ____ mean ____

Room B246 min. 24.9 max 25.7 mean 25.3

Test 1:% mortality in 100% sample: 0 % LC50: >100 %

Test 2:% mortality in 100% sample: 0 % LC50: >100 %

Investigators' Signatures

James Dean

Bree Alaka

Marshall Faircloth

Loretta C. Wolfe
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ Well Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A		Not Measured			BA
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	JD	BA
Alkalinity (mg/L as $CaCO_3$):	89	155				179	HACH	BA	JD
Hardness (mg/L as $CaCO_3$):	83	142				269	HACH	BA	JD
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	JD
Salinity (ppth):	–	–				0.50	YSI / (Mettler)	JD	BA

V 1.4 9/12/05

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1123084 Test #: 01/01 SOP#:TA 07_01 Test Started: Date 8.12.08 Time: 1220
Organism/Batch/Age: Cdubia/29-08/24 hrs Test Ended: Date 8.14.08 Time: 13:50
Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 8.5.08
Food/Batch: YCT 6-18-08 P.sub 7-18-08 Artemia 0hr — 24hr — 48hr — 72hr — Artemia Lot# —
Feeding: (Prior to Test) Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Loaded/Verified by: MF / BA		Checked by:	BA	BA	BA			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 0% LC50: >100%

If Calculated: 95% CI_____ Method_____

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1123084 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 8.12.08 Time: 1825
Organism/Batch/Age: Cladoc/8.12.08/13days Test Ended: Date 8.14.08 Time: 1330
Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: Well H2O / 8.11.08
Food/Batch: YCT — P.sub — Artemia 0hr 127 24hr — 48hr — 72hr — Artemia Lot# 38938
Feeding: (Prior to Test) Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	E1	5	5	5			
	B	E2	5	5	5			
	C	E3	5	5	5			
	D	E4	5	5	5			
100%	A	E5	5	5	5			
	B	E6	5	5	5			
	C	E7	5	5	5			
	D	E8	5	5	5			
Loaded/Verified by: JD / BR		Checked by:	JD	JD	JD			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 0% LC50: >100%

If Calculated: 95% CI______ Method______

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 112384 **Test #:** 1 of 2

TEST SOP #: TA07_01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.0		8.2			
Temperature °C	24.8		24.1			
Dissolved Oxygen mg/L	8.2		7.4			
Conductivity (µmhos) mmhos	175		195.1			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.8		8.5			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L	8.2		7.3			
Conductivity (µmhos) mmhos	728		786			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1123084 **Test #:** 2 of 2

TEST SOP #: TA07_02 **Test Species:** ~~*Ceriodaphnia dubia*~~ *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.8	8.2	8.3			
Temperature °C	24.4	24.0	24.2			
Dissolved Oxygen mg/L	7.7	7.2	7.1			
Conductivity (µmhos) mmhos	280	285	290			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.7	8.5	8.7			
Temperature °C	25.9	24.1	24.3			
Dissolved Oxygen mg/L	8.2	6.8	7.1			
Conductivity (µmhos) mmhos	741	739	770			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic - Kingsford 1 Outfall 009

Address: 2600 Doc Durrance Rd

City: Bradley **County:** Polk

Contact/District: Jacki Champion BMR - Tampa

NPDES Permit #: FL 0000256

LIMS Job # TLH-2008-08-12-103-1 **LIMS Sample #:** 1123483

Lims Data Entry: 8-19-08 MF Data Entry Verification: 8-20-08 BA

Sample Collection: Date: 8.11.08 Time: 1335

Hold Time Start: Date: 8.11.08 Time: 1335

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: (Screen) Static / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Test 1 validation: **Test 1:** SOP TA 07_01

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: **Test 2:** SOP TA 07_02

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment : yes (no) Initial pH: _____ NaOH N HCl N _____ Drops mL Final pH: _____

Aeration : yes (no) Initial DO: _____mg/L Final DO: _____mg/L Duration: _____minutes Rate: ~ _____bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: _____ Final Salinity: _____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: _____ Final Salinity: _____ Salts Hypersaline brine

Dechlorination: yes (no) _____mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: _____

Sample Validation:

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) (Yes) No NA per BA 8-19-08

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 2 min. 25.1 max. 26.1 mean 25.9

Incubator # ____ min. _____ max. _____ mean _____

Room B246 min. 24.5 max. 25.7 mean 25.3

Test 1:% mortality in 100% sample: 0% LC50: >100 %

Test 2:% mortality in 100% sample: 5% LC50: >100 %

Investigators' Signatures

James Daniels

Brice Alcock

Marshall Faircloth

Loretta C. Wolfe

REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ (Well Water)	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A		Not	Measured	—	BA
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	JD	BA
Alkalinity (mg/L as $CaCO_3$):	39	135				149	HACH	BA	JD
Hardness (mg/L as $CaCO_3$):	83	142				139	HACH	BA	JD
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	JD
Salinity (ppth):	—	—				0.08	YSI / Mettler	JD	BA

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FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1123083 Test #: 1/2 SOP#:TA 07 01 Test Started: Date 8-12-08 Time: 1230
Organism/Batch/Age: C.dubia/29.08/<24 hrs Test Ended: Date 8-14-08 Time: 13:40
Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 8.5.08
Food/Batch: YCT 6-18-08 P.sub 7-18-08 Artemia 0hr — 24hr — 48hr — 72hr — Artemia Lot# —
Feeding: (Prior to Test) Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Loaded/Verified by: MH BA		Checked by:	BA	BA	BA			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 0 % LC50: >100%
If Calculated: 95% CI________ Method________

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1123083 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 8.12.08 Time: 1335
Organism/Batch/Age: C.leadsi / 8.12.08 / 13 days Test Ended: Date 8.14.08 Time: 1335
Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: Dep Well / 8.11.08
Food/Batch: YCT — P.sub — Artemia 0hr 127 24hr — 48hr — 72hr — Artemia Lot# 38438
Feeding: (Prior to Test) Prior to Renewal Daily

Concentration	Replicate	Chamber #	0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	E17	5	5	5			
	B	E18	5	5	5			
	C	E19	5	5	5			
	D	E20	5	5	5			
100%	A	E21	5	5	5			
	B	E22	5	5	5			
	C	E23	5	4 1D	4			
	D	E24	5	5	5			
Loaded/Verified by: JD / BD	Checked by:		JD	JD	JD			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 5% LC50: >100%

If Calculated: 95% CI______ Method______

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

IMS Sample # : 1123083 Test #: 1 of 2

TEST SOP #: TA07_01 Test Species: (Ceriodaphnia dubia) Cyprinella leedsi Pimephales promelas Americamysis bahia Menidia beryllina Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.1		8.1			
Temperature °C	24.0		24.2			
Dissolved Oxygen mg/L	8.1		7.6			
Conductivity (µmhos) mmhos	171		183			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.7		8.4			
Temperature °C	24.0	24.1	24.1			
Dissolved Oxygen mg/L	7.7	BD	7.3			
Conductivity (µmhos) mmhos	309		322			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
eplicate						
H (S.U.)						
emperature °C						
issolved Oxygen mg/L						
onductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

omments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

000024

V 2.0 2/24/04

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1123083 **Test #:** 2 of 2

TEST SOP #: TA07_02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.9	8.2	8.2			
Temperature °C	24.0	24.0	24.3			
Dissolved Oxygen mg/L	7.8	7.3	6.8			
Conductivity (µmhos) mmhos	280	286	283			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.8	8.4	8.2			
Temperature °C	23.9	24.2	24.3			
Dissolved Oxygen mg/L	7.6	6.7	6.5			
Conductivity (µmhos) mmhos	34	326	326			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Appendix G

Standard Reference Toxicant data

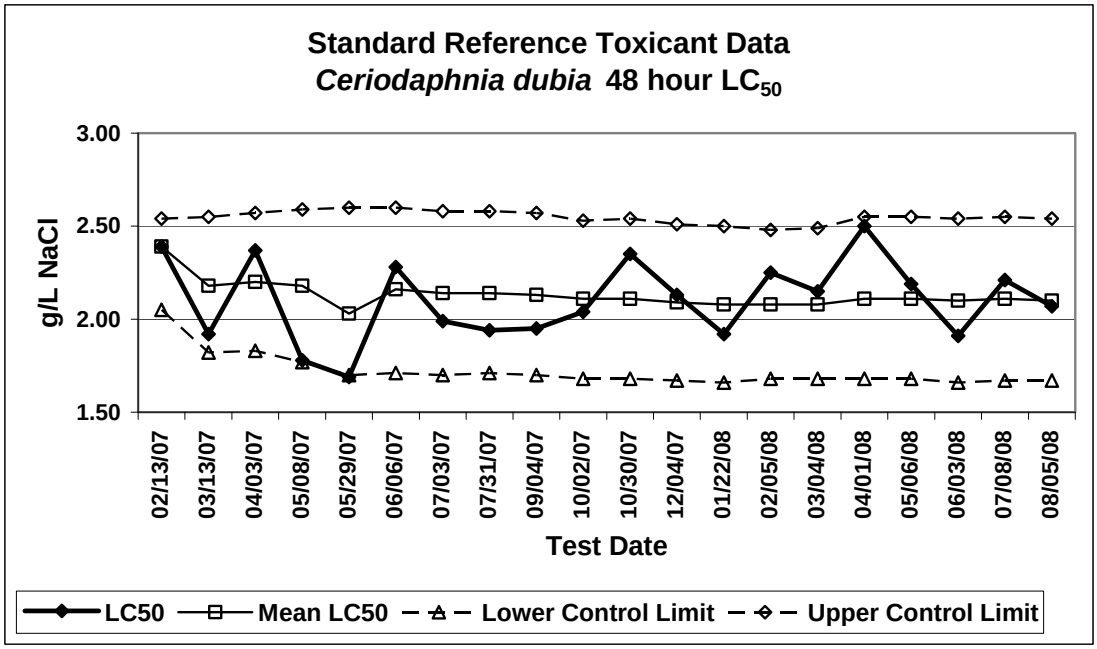
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
02/13/07	2.39	2.39	0.17	2.05	2.54
03/13/07	1.92	2.18	0.18	1.82	2.55
04/03/07	2.37	2.20	0.18	1.83	2.57
05/08/07	1.78	2.18	0.21	1.77	2.59
05/29/07	1.69	2.03	0.23	1.70	2.60
06/06/07	2.28	2.16	0.22	1.71	2.60
07/03/07	1.99	2.14	0.22	1.70	2.58
07/31/07	1.94	2.14	0.22	1.71	2.58
09/04/07	1.95	2.13	0.22	1.70	2.57
10/02/07	2.04	2.11	0.21	1.68	2.53
10/30/07	2.35	2.11	0.21	1.68	2.54
12/04/07	2.13	2.09	0.20	1.67	2.51
01/22/08	1.92	2.08	0.20	1.66	2.50
02/05/08	2.25	2.08	0.20	1.68	2.48
03/04/08	2.15	2.08	0.20	1.68	2.49
04/01/08	2.50	2.11	0.22	1.68	2.55
05/06/08	2.19	2.11	0.22	1.68	2.55
06/03/08	1.91	2.10	0.22	1.66	2.54
07/08/08	2.21	2.11	0.22	1.67	2.55
08/05/08	2.07	2.10	0.22	1.67	2.54

Means are of the last 20 SRT tests.
Lower Control Limit = mean - 2 * Std Dev
Upper Control Limit = mean + 2 * Std Dev

CV = 10.32
EPA reference 75th quartile CV = 29%



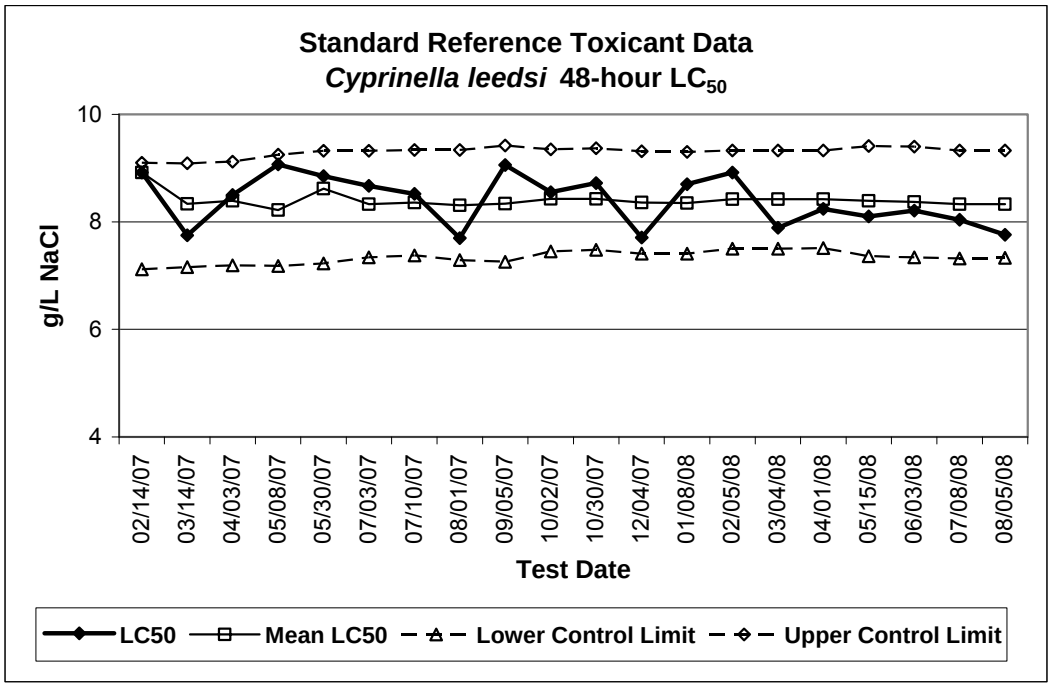
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Cyprinella leedsi (bannerfin shiner) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
02/14/07	8.92	8.92	#DIV/0!	7.12	9.10
03/14/07	7.75	8.34	0.83	7.16	9.09
04/03/07	8.50	8.39	0.59	7.19	9.12
05/08/07	9.07	8.22	0.52	7.18	9.25
05/30/07	8.85	8.62	0.53	7.23	9.32
07/03/07	8.67	8.33	0.50	7.34	9.32
07/10/07	8.52	8.36	0.49	7.38	9.34
08/01/07	7.7	8.31	0.51	7.29	9.34
09/05/07	9.06	8.34	0.54	7.26	9.42
10/02/07	8.55	8.43	0.47	7.45	9.35
10/30/07	8.72	8.43	0.47	7.48	9.37
12/04/07	7.71	8.36	0.47	7.41	9.31
01/08/08	8.7	8.35	0.47	7.41	9.30
02/05/08	8.92	8.42	0.46	7.50	9.33
03/04/08	7.89	8.42	0.46	7.50	9.33
04/01/08	8.24	8.42	0.45	7.51	9.33
05/15/08	8.1	8.39	0.51	7.36	9.41
06/03/08	8.21	8.37	0.51	7.34	9.40
07/08/08	8.04	8.33	0.50	7.32	9.33
08/05/08	7.76	8.33	0.50	7.33	9.33

Means are of the last 20 SRT tests.
Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev

CV = 6.02
EPA reference 75th quartile CV = 19%



MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 8/11/08

Shipped to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia						
Menidia beryllina	150	11 DAYS	SS080731	25°C	7.8	20‰
						Hardness
Cyprinella leedsi	150	12 DAYS	CL080830	25°C	7.8	80mg/L
Pimephales promelas	150	8 DAYS	FM080803	25°C	7.8	80mg/L

Packed by: DW

Shipped Via: Fed Ex

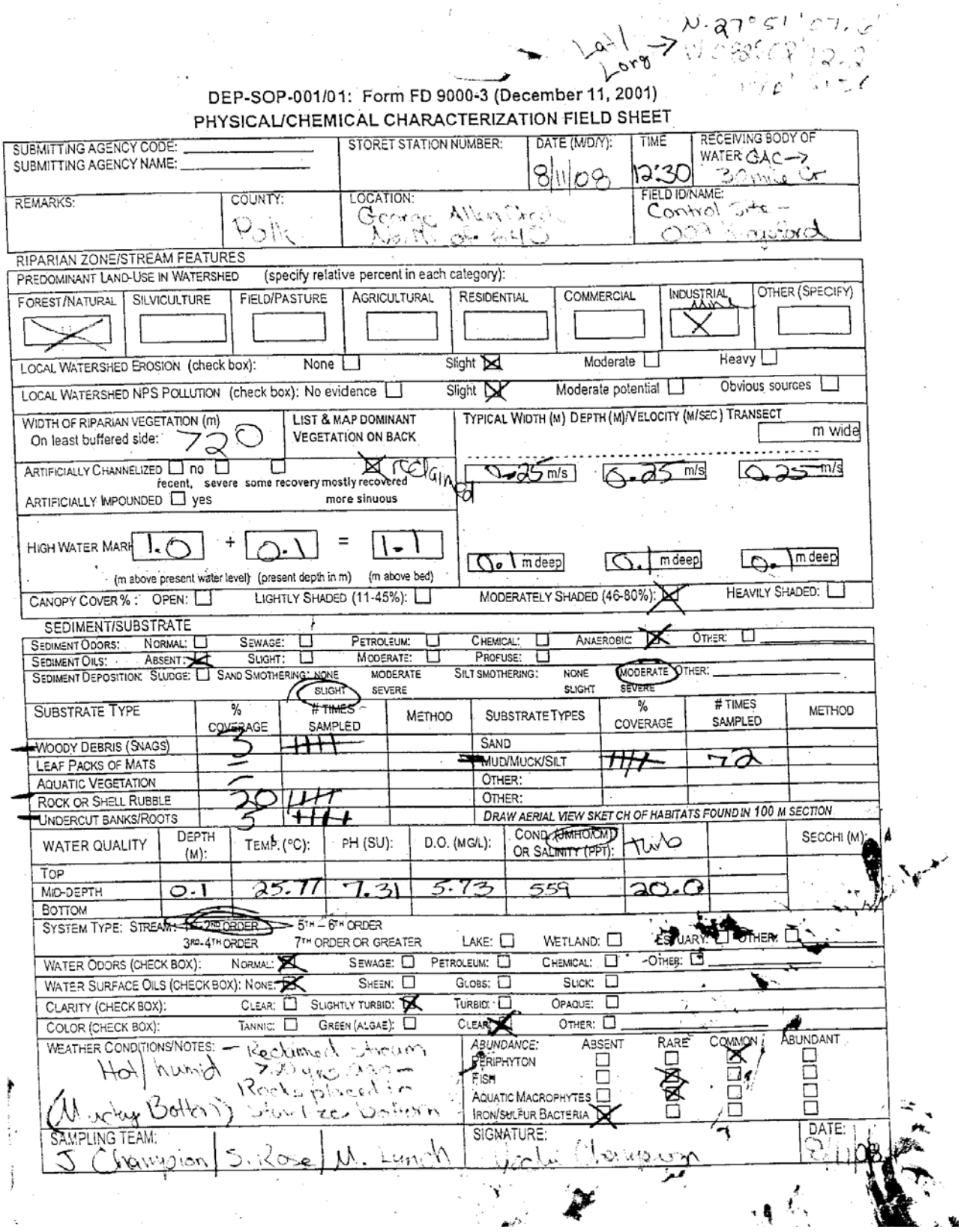
Notes: _____

Thank you for your order.

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Appendix H

Habitat Assessment Field Sheets



DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 8/11/08	TIME 12:30	RECEIVING BODY OF WATER GAC →
REMARKS:	COUNTY: Polk	LOCATION: George Allen Creek North of 640	FIELD ID/NAME: Control Site – Off Hayward	

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
X						X	

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: 720

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, ☐ severe ☒ some recovery mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 1.0 (m above present water level) + 0.1 (present depth in m) = 1.1 (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT — m wide

0.25 m/s	0.25 m/s	0.25 m/s
0.1 m deep	0.1 m deep	0.1 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 TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	5	IIII		SAND			
LEAF PACKS OF MATS	5			MUD/MUCK/SILT	IIII	72	
AQUATIC VEGETATION	5			OTHER:			
ROCK OR SHELL RUBBLE	20	IIII		OTHER:			
UNDERCUT BANKS/ROOTS	5	IIII					

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):		SECCHI (M):
TOP							
MID-DEPTH	0.1	25.77	7.31	5.73	559	20.0	
BOTTOM							

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: Hot/humid (Mucky Bottom) – Reclaimed stream >20 yrs ago – Rocks placed in stream to stabilize bottom

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☐	☒	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: J Champion / S. Rose / M. Lynch

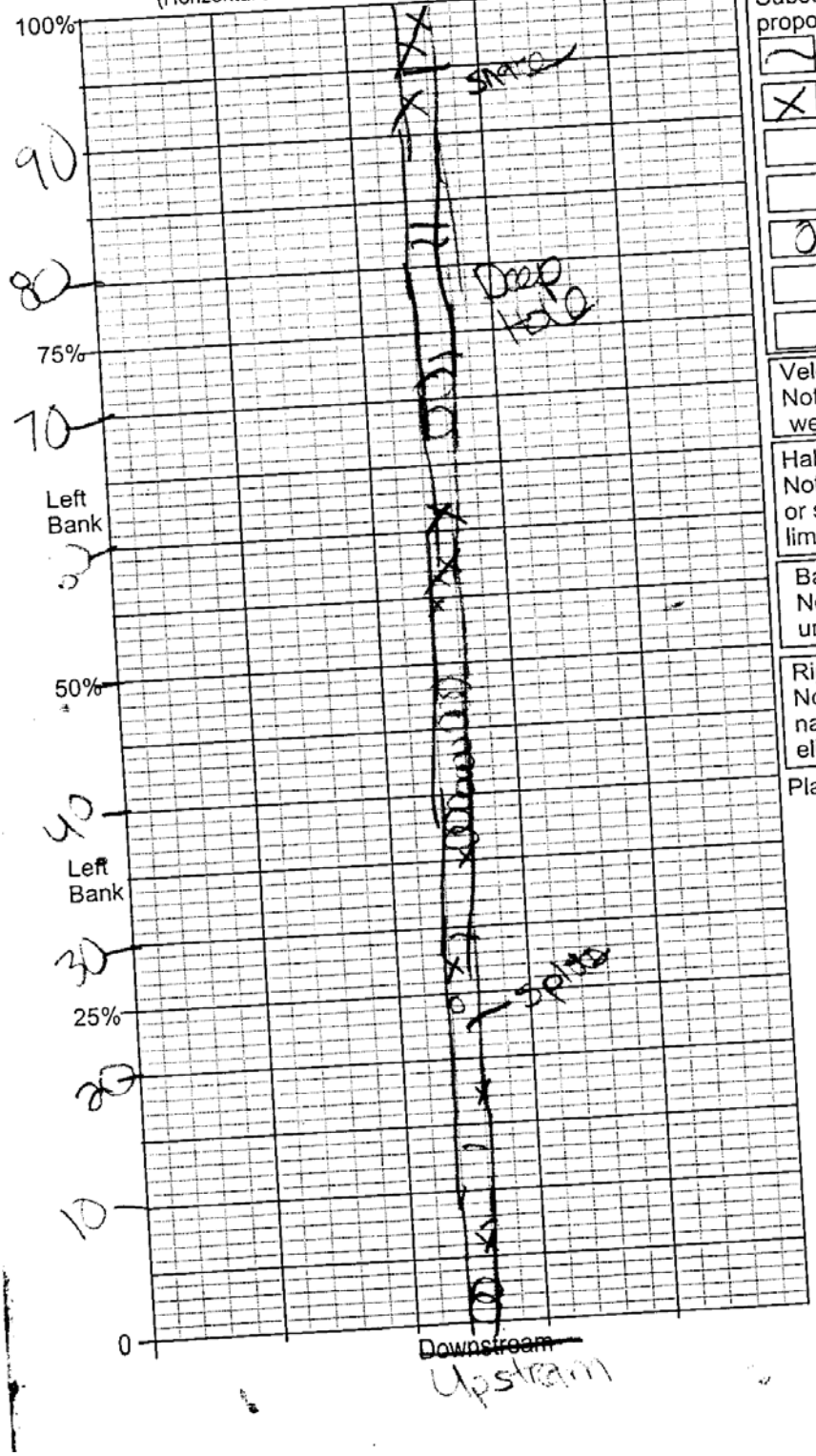
SIGNATURE: Jackie Champion

DATE: 8/11/08

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Field ID:



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- X Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- O Rock
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (mm/dd/yy): 8/11/08	RECEIVING BODY OF WATER: GAC → Thirtyone Cr
REMARKS:	COUNTY: Polk	LOCATION: George Allen Creek North of 640	FIELD ID/NAME: Control Site - DO4 Kingsford

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 11	Four or more productive habitats present [snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 13	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 16	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 10 Primary Score 50	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 the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 13	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
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% -80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 73	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 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

123 TOTAL SCORE

ANALYSIS DATE: 8/11/08	ANALYST: J. Champion	SIGNATURE: Josh Champion

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: _____ SUBMITTING AGENCY NAME: _____	STORET STATION NUMBER:	DATE (M/D/Y): 8/11/08	TIME 10:40	RECEIVING BODY OF WATER Thrifgmire Cr → N. Prong Alafia
REMARKS:	COUNTY: Polk	LOCATION: Thrifgmire Creek @ RR Trestle		FIELD ID/NAME: Test Site – 009 Kingsford

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL (mine)	OTHER (SPECIFY)
X						X	

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: X

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☒ no ☐ recent, ☐ severe ☐ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK 0.3 + 0.5 = 0.8
(m above present water level) (present depth in m) (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT

3 m wide

0.5 m/s	0.5 m/s	0.3 m/s
0.4 m deep	0.5 m deep	0.4 m deep

1/3 3 2/3

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 TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	15	IIII		SAND	47	IIII	
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION	–			OTHER:			
ROCK OR SHELL RUBBLE	15	IIII		OTHER:			
UNDERCUT BANKS/ROOTS	23			DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND (UMHO/CM) OR SALINITY (PPT):	T.U.D.		SECCHI (M):
TOP								
MID-DEPTH	0.3	27.37	7.91	5.10	328	13.5		
BOTTOM								

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: humid | hot

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: J Champion / M Lynch / S [illegible]

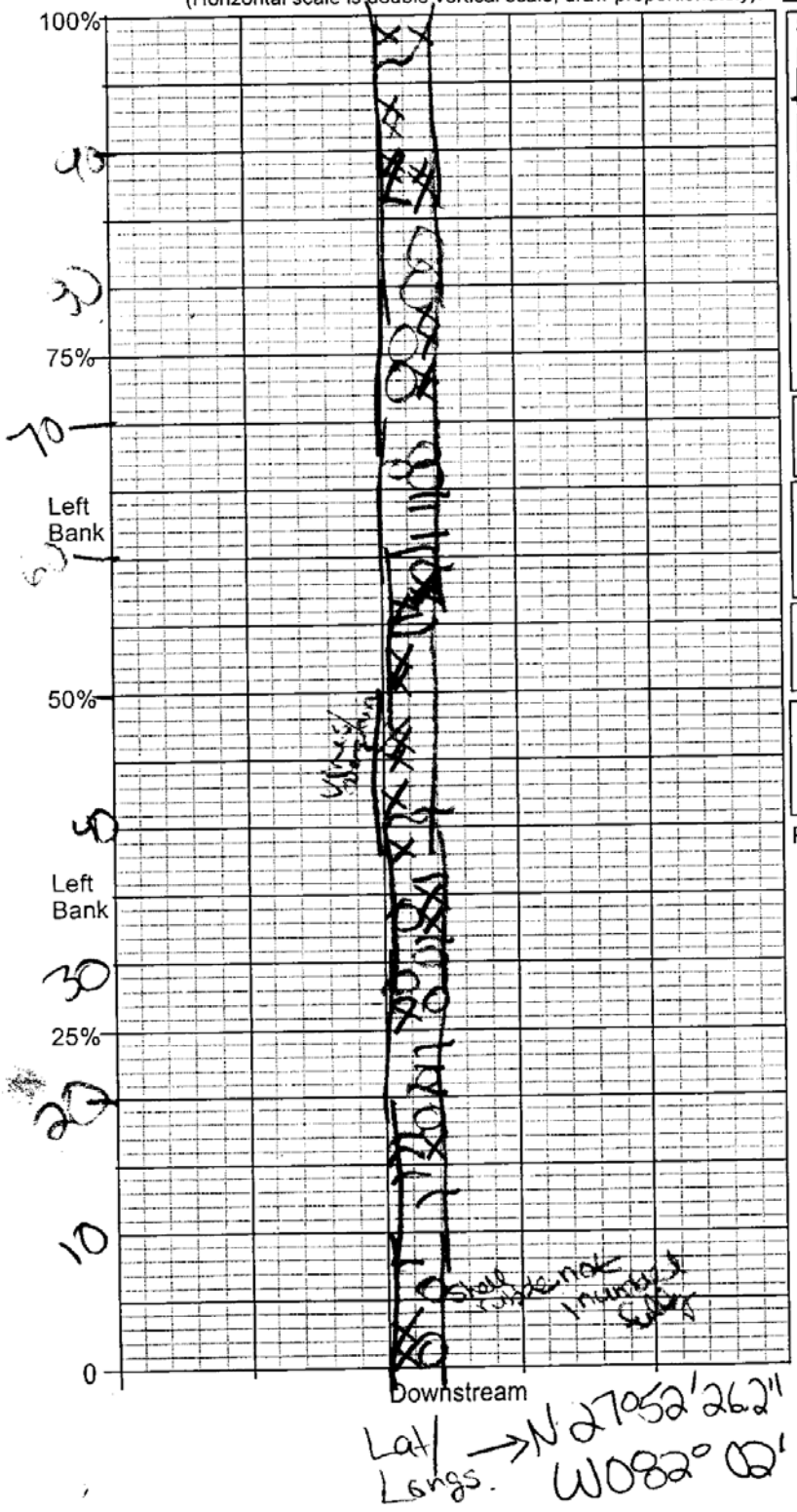
SIGNATURE: [illegible] DATE: 8/11/08

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

30-mile Creek

Field ID: 009 Downstream



Substrates: Code key, draw proportionate habitat abundance.

- Snags – 25
- Roots/undercut banks – 47
- Leaf Packs (or mats)
- Macrophytes
- Rocks/riffle – 25
- _____
- _____

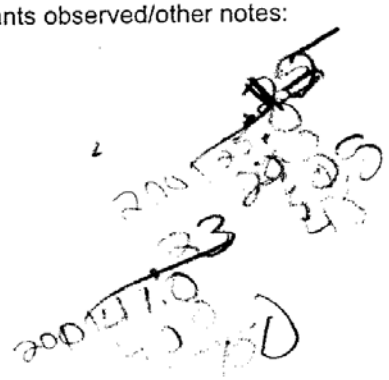
Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:



Lat/Longs. → N 27°52'26.2" W082° 00' 44.1"

at the pipe

DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 8/11/08	RECEIVING BODY OF WATER: Thirtymile Cr → N Prong Alafia
REMARKS:	COUNTY: Polk	LOCATION: Thirtymile Creek @ Rail Road Trestle	FIELD ID/NAME: Test Sta - 009 Kingsford

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 15	Four or more productive habitats present (snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock) 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). (15) 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 20	Greater than 30% productive habitat present at site (20) 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 20	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec (20) 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 20 Primary Score 75	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 the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 20	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
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% -80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	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 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

155 TOTAL SCORE

ANALYSIS DATE:	ANALYST: Jodie Champion	SIGNATURE: Jodie Champion
8/11/08		

DEP-SOP-001/01
FT 1100 Field Measurement of Hydrogen Ion Activity (pH)

Form FD 9000-7: Field Parameter Data Sheet for Surface Water

SURVEY/PROJECT: Kingsford & FYI5 SAMPLERS: JC/ML/SR METER # YSI600

STATION NUMBER	STATION DESCRIPTION	PARAMETER	DATE	TIME	TOTAL DEPTH	SAMPLE DEPTH	WATER TEMP	DO	%SAT DO	COND	SALINITY	PH	TURBIDITY
		UNIT	yy/mm/dd	hr:min	feet	feet	Celsius	mg/L	%	µS/cm	ppt	su	NTU
		STORET CODE	73672		81903	68	10	299	301	94	480	400	82078
	Outfall 002		8/11/08	9:00	—	—	26.58	6.72	83.6	377	—	7.54	14.8
	Outfall 006		8/11/08	5:00	—	—	31.39	13.30	180.9	736	—	8.71	7.58
	Outfall 009		8/11/08	1:35	—	—	30.21	8.66	107.1	315	—	8.14	22.0
	Test Site (Thirtymile Creek)		8/11/08	10:40			27.57	5.10	65.5	3288	—	7.91	
	Control Site (George Allen Creek)		8/11/08	12:30			25.77	5.73	70.0	55.9	—	7.31	20.0
	BLANKS		8/11/08	1:30									

FIELD CONDITIONS FOR STATION# _____ AT TIME _____:

CLOUD COVER (%): _____ WIND DIRECTION: _____ TIDAL STAGE: _____

PREVIOUS RAINFALL: _____ WIND SPEED (MPH/KNOTS): _____ WAVE CONDITIONS: _____

Note: This Sheet is used for recording Sample Data – Calibration information must also be documented

Revision Date: February 1, 2004

Appendix I-1

Wet algal taxa list and number of individuals counted for qualitative natural periphyton collections made from Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008.

	Control Site	Test Site
Bacillariophyta		
Bacillariophyta	293	176
Chlorophycota		
Ankistrodesmus falcatus	-	4
Chlamydomonas sp.	-	1
Chlorella sp.	-	5
Coccomonas sp.	-	1
Coelastrum microporum	-	1
Cosmarium sp.	-	1
Crucigenia rectangularis	-	2
Microthamnion kuetzingianum	1	-
Oedogonium sp.	-	2
Oocystis sp.	-	8
Pediastrum obtusum	-	1
Scenedesmus bijuga	-	4
Scenedesmus dimorphus	-	1
Scenedesmus quadricauda	-	3
Selenastrum sp.	-	4
Cyanophycota		
Anabaena sp.	-	1
Anabaena circinalis	-	16
Aphanocapsa sp.	-	6
Jaaginema sp.	3	28
Merismopedia warmingiana	-	18
Planktolyngbya sp.	1	-
Planktothrix sp.	-	2
Rhabdogloea sp.	-	3
Schizothrix calcicola	2	-
Euglenophycota		
Euglena sp.	-	1
Euglena acus	-	5
Euglena spirogyra	-	1
Phacus sp.	-	5

Appendix I-2

Diatom taxa list and number of valves counted for qualitative natural periphyton collections made from Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	17	3
Achnanthes exigua	23	6
Achnanthes hungarica	4	-
Achnanthes lanceolata apiculata	-	3
Achnanthes lanceolata rostrata	13	17
Achnanthes rupestoides	1	-
Bacillaria paxillifer	8	-
Caloneis sp.	1	-
Capartogramma crucicula	1	2
Cocconeis fluviatilis	61	2
Cocconeis placentula	7	7
Craticula minusculoides	11	-
Diadesmis confervacea	45	1
Diadesmis contenta	1	1
Eunotia sp.	9	-
Gomphonema sp.	1	-
Gomphonema affine	1	-
Gomphonema parvulum	11	4
Hippodonta sp.	2	4
Hippodonta capitata	6	1
Hippodonta hungarica	2	-
Luticola sp.	-	1
Navicula sp.	48	18
Navicula bouillantensis	9	3
Navicula cryptocephala	-	4
Navicula cryptotenella	3	3
Navicula ingenua	2	-
Navicula kotschyi	-	2
Navicula minima	29	6
Navicula radiosa	-	1
Navicula seminulum	11	-
Navicula symmetrica	2	4
Nitzschia sp.	91	78
Nitzschia acicularis	-	2
Nitzschia amphibia	9	-
Nitzschia clausii	3	2
Nitzschia dissipata	2	2
Nitzschia nana	6	-
Nitzschia palea	12	5
Nitzschia subacicularis	2	-
Pinnularia sp.	2	-

Appendix I-2 (continued)

	Control Site	Test Site
Bacillariophyceae		
Planothidium sp.	-	1
Planothidium frequentissimum	10	8
Planothidium lanceolatum	2	-
Sellaphora pupula	2	5
Surirella sp.	3	-
Tryblionella sp.	3	2
Undetermined Naviculaceae	9	1
Coscinodiscophyceae		
Cyclostephanos invisitatus	-	269
Cyclotella sp.	1	4
Cyclotella atomus	-	9
Cyclotella meneghiniana	9	-
Cyclotella pseudostelligera	-	4
Thalassiosira sp.	2	1
Undetermined Coscinodiscophyceae	-	15
Fragilariophyceae		
Fragilaria geocollegarum	1	-
Synedra parasitica	1	-
Synedra ulna	1	-

Appendix J-1

Wet algal taxa list and number of individuals counted for quantitative phytoplankton collections made from Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008.

	Control Site	Test Site	D-002	D-006	D-009
Bacillariophyta					
Bacillariophyta	242	39	21	15	45
Chlorophycota					
Actinastrum sp.	-	-	-	-	10
Actinastrum hantzschii	-	3	-	-	-
Ankistrodesmus sp.	-	-	-	-	2
Ankistrodesmus falcatus	1	5	3	7	1
Chlamydomonas sp.	-	3	2	5	4
Chlorella sp.	1	36	7	17	14
Chlorococcum sp.	-	4	2	-	-
Chlorococcum humicola	-	-	-	2	-
Coelastrum microporum	-	2	-	-	1
Cosmarium sp.	-	-	-	-	2
Crucigenia apiculata	-	-	1	-	-
Crucigenia crucifera	-	-	10	-	-
Crucigenia rectangularis	-	4	-	4	1
Crucigenia tetrapedia	-	-	11	-	2
Dictyosphaerium ehrenbergianum	-	-	16	-	-
Dictyosphaerium pulchellum	-	2	-	-	-
Elakatothrix viridis	-	-	-	-	1
Franceia droescheri	-	1	-	-	2
Golenkinia paucispina	-	2	-	-	-
Oocystis sp.	-	9	2	1	3
Pediastrum obtusum	-	2	3	-	-
Pediastrum tetras	-	1	1	-	1
Scenedesmus sp.	2	3	11	2	5
Scenedesmus abundans	1	6	-	-	4
Scenedesmus arcuatus	-	-	3	-	-
Scenedesmus bicaudatus	-	4	-	3	-
Scenedesmus bijuga	1	-	13	3	-
Scenedesmus dimorphus	-	3	9	-	3
Scenedesmus quadricauda	3	17	1	6	2
Schroederia judayi	-	-	-	-	5
Schroederia setigera	-	3	3	1	1
Selenastrum sp.	-	6	27	16	16
Selenastrum minutum	-	-	2	-	-
Staurastrum sp.	-	-	-	-	1
Tetraedron minimum	-	12	-	2	5
Tetraedron muticum	-	2	-	-	-
Tetraedron trigonum	-	2	-	-	2
Tetrastrum heterocanthum	-	-	-	-	1
Westella botryoides	-	1	-	-	-
Cryptophycophyta					
Cryptomonas sp.	2	5	3	-	9

Appendix J-1 (continued)

	Control Site	Test Site	D-002	D-006	D-009
Cyanophycota					
Anabaena sp.	1	-	-	-	3
Anabaena circinalis	-	36	-	-	34
Anabaenopsis circularis	-	-	-	3	-
Aphanocapsa sp.	2	9	7	10	-
Cyanobium parvum	-	-	7	-	-
Cylindrospermopsis raciborskii	-	5	-	26	3
Geitlerinema acutissimum	1	-	-	-	-
Glaucospira sp.	-	-	-	1	3
Jaaginema sp.	6	6	23	30	7
Merismopedia tenuissima	-	-	1	-	-
Merismopedia warmingiana	-	6	4	-	-
Microcystis sp.	-	-	-	-	3
Microcystis aeruginosa	-	6	-	-	4
Microcystis wesenbergii	-	-	-	-	4
Planktolyngbya sp.	2	-	1	2	6
Planktothrix sp.	1	-	-	-	-
Pseudanabaena sp.	1	1	1	-	2
Rhabdogloea sp.	-	26	3	75	26
Romeria sp.	-	-	22	1	2
Schizothrix calcicola	1	-	5	-	-
Snowella sp.	-	2	7	-	2
Synechocystis sp.	4	25	40	70	43
Euglenophycota					
Euglena sp.	2	-	3	-	2
Lepocinclis sp.	3	1	2	-	-
Phacus sp.	2	2	1	-	4
Trachelomonas sp.	16	-	16	-	-
Prasinophyta					
Spermatozoopsis exultans	-	-	1	-	-
Pyrrophycophyta					
Glenodinium sp.	1	-	-	-	9

Appendix J-2

Wet algal taxa list and densities (number of individuals per mL) for quantitative phytoplankton collections made from Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008.

	Control Site	Test Site	D-002	D-006	D-009
Bacillariophyta					
Bacillariophyta	435	5,999	47	4,329	14,491
Chlorophycota					
Actinastrum sp.	-	-	-	-	3,220
Actinastrum hantzschii	-	461	-	-	-
Ankistrodesmus sp.	-	-	-	-	644
Ankistrodesmus falcatus	2	769	7	2,020	322
Chlamydomonas sp.	-	461	4	1,443	1,288
Chlorella sp.	2	5,538	16	4,906	4,508
Chlorococcum sp.	-	615	4	-	-
Chlorococcum humicola	-	-	-	577	-
Coelastrum microporum	-	308	-	-	322
Cosmarium sp.	-	-	-	-	644
Crucigenia apiculata	-	-	2	-	-
Crucigenia crucifera	-	-	22	-	-
Crucigenia rectangularis	-	615	-	1,154	322
Crucigenia tetrapedia	-	-	25	-	644
Dictyosphaerium ehrenbergianum	-	-	36	-	-
Dictyosphaerium pulchellum	-	308	-	-	-
Elakatothrix viridis	-	-	-	-	322
Franceia droescheri	-	154	-	-	644
Golenkinia paucispina	-	308	-	-	-
Oocystis sp.	-	1,384	4	289	966
Pediastrum obtusum	-	308	7	-	-
Pediastrum tetras	-	154	2	-	322
Scenedesmus sp.	4	461	25	577	1,610
Scenedesmus abundans	2	923	-	-	1,288
Scenedesmus arcuatus	-	-	7	-	-
Scenedesmus bicaudatus	-	615	-	866	-
Scenedesmus bijuga	2	-	29	866	-
Scenedesmus dimorphus	-	461	20	-	966
Scenedesmus quadricauda	5	2,615	2	1,732	644
Schroederia judayi	-	-	-	-	1,610
Schroederia setigera	-	461	7	289	322
Selenastrum sp.	-	923	60	4,618	5,152
Selenastrum minutum	-	-	4	-	-
Staurastrum sp.	-	-	-	-	322
Tetraedron minimum	-	1,846	-	577	1,610
Tetraedron muticum	-	308	-	-	-
Tetraedron trigonum	-	308	-	-	644
Tetrastrum heterocanthum	-	-	-	-	322
Westella botryoides	-	154	-	-	-
Cryptophycophyta					
Cryptomonas sp.	4	769	7	-	2,898

Appendix J-2 (continued)

	Control Site	Test Site	D-002	D-006	D-009
Cyanophycota					
Anabaena sp.	2	-	-	-	966
Anabaena circinalis	-	5,538	-	-	10,948
Anabaenopsis circularis	-	-	-	866	-
Aphanocapsa sp.	4	1,384	16	2,886	-
Cyanobium parvum	-	-	16	-	-
Cylindrospermopsis raciborskii	-	769	-	7,504	966
Geitlerinema acutissimum	2	-	-	-	-
Glaucospira sp.	-	-	-	289	966
Jaaginema sp.	11	923	51	8,658	2,254
Merismopedia tenuissima	-	-	2	-	-
Merismopedia warmingiana	-	923	9	-	-
Microcystis sp.	-	-	-	-	966
Microcystis aeruginosa	-	923	-	-	1,288
Microcystis wesenbergii	-	-	-	-	1,288
Planktolyngbya sp.	4	-	2	577	1,932
Planktothrix sp.	2	-	-	-	-
Pseudanabaena sp.	2	154	2	-	644
Rhabdogloea sp.	-	4,000	7	21,645	8,372
Romeria sp.	-	-	49	289	644
Schizothrix calcicola	2	-	11	-	-
Snowella sp.	-	308	16	-	644
Synechocystis sp.	7	3,846	89	20,202	13,847
Euglenophycota					
Euglena sp.	4	-	7	-	644
Lepocinclis sp.	5	154	4	-	-
Phacus sp.	4	308	2	-	1,288
Trachelomonas sp.	29	-	36	-	-
Prasinophyta					
Spermatozoopsis exultans	-	-	2	-	-
Pyrrophycophyta					
Glenodinium sp.	2	-	-	-	2,898

Appendix J-3

Diatom taxa list and number of valves counted for quantitative phytoplankton collections made from Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008

	Control Site	Test Site	D-002	D-006	D-009
Bacillariophyceae					
Achnanthes sp.	25	1	12	-	-
Achnanthes exigua	36	1	15	-	-
Achnanthes hungarica	9	-	1	-	-
Achnanthes lanceolata apiculata	-	-	5	-	-
Achnanthes lanceolata rostrata	8	-	4	-	-
Achnanthes rupestoides	1	-	6	-	-
Achnanthidium sp.	2	-	-	-	-
Amphora sp.	4	-	1	-	-
Amphora veneta	3	-	-	-	-
Bacillaria paxillifer	3	-	2	-	-
Brachysira vitrea	-	-	2	-	-
Caloneis sp.	-	-	5	-	-
Capartogramma crucicula	-	-	12	-	-
Cocconeis fluviatilis	14	1	3	-	-
Cocconeis placentula	4	1	1	-	-
Craticula sp.	3	-	-	-	-
Craticula minusculoides	1	-	-	-	-
Diadesmis confervacea	49	-	1	-	-
Diadesmis contenta	2	-	3	-	-
Diploneis sp.	-	-	2	-	-
Diploneis parma	1	-	-	-	-
Eunotia sp.	1	-	6	-	-
Eunotia bilunaris	-	-	1	-	-
Fallacia sp.	1	-	1	-	-
Frustulia sp.	1	-	-	-	-
Gomphonema sp.	8	-	5	-	-
Gomphonema grovei lingulatum	-	-	1	-	-
Gomphonema parvulum	7	-	4	-	-
Gyrosigma sp.	-	-	1	-	-
Gyrosigma obscurum	1	-	-	-	-
Hippodonta sp.	2	-	8	-	-
Hippodonta capitata	6	-	3	-	-
Hippodonta hungarica	-	-	5	-	-
Luticola sp.	2	-	1	-	-
Navicula sp.	43	6	101	-	2
Navicula bouillantensis	1	-	-	-	-
Navicula cryptocephala	4	-	-	-	-
Navicula cryptotenella	5	-	3	-	-
Navicula elginensis	1	-	3	-	-
Navicula gastrum	-	-	1	-	-
Navicula ingenua	-	-	2	-	-

Appendix J-3 (continued)

	Control Site	Test Site	D-002	D-006	D-009
Bacillariophyceae					
Navicula longicephala	4	-	3	-	1
Navicula minima	35	-	14	-	-
Navicula seminulum	11	-	9	-	-
Neidium sp.	-	-	3	-	-
Nitzschia sp.	93	103	63	186	77
Nitzschia amphibia	7	-	10	-	-
Nitzschia filiformis	3	-	1	-	-
Nitzschia gracilis	-	-	4	-	-
Nitzschia nana	6	-	-	-	-
Nitzschia palea	24	-	12	-	-
Nitzschia reversa	-	1	-	-	2
Nitzschia subacicularis	-	-	1	8	-
Pinnularia sp.	1	-	8	-	-
Planothidium sp.	1	-	-	-	-
Planothidium frequentissimum	20	-	6	-	-
Planothidium lanceolatum	2	-	1	-	-
Sellaphora laevissima	-	-	1	-	-
Sellaphora pupula	4	1	5	-	-
Stauroneis sp.	2	-	1	-	-
Stauroneis phoenicenteron	-	-	3	-	-
Stauroneis prominula	3	-	-	-	-
Stauroneis smithii	-	-	2	-	-
Surirella sp.	1	-	-	-	-
Tryblionella sp.	-	-	2	-	-
Undetermined Naviculaceae	20	-	2	-	-
Coscinodiscophyceae					
Cyclostephanos sp.	-	-	-	23	-
Cyclostephanos invisitatus	-	293	26	-	339
Cyclotella sp.	1	4	30	34	-
Cyclotella atomus	-	-	1	2	-
Cyclotella meneghiniana	11	1	26	5	6
Cyclotella pseudostelligera	-	-	24	-	-
Stephanodiscus minutulus	-	69	-	193	56
Undetermined Coscinodiscophyceae	-	18	21	49	16
Fragilariophyceae					
Opephora sp.	-	-	-	-	1
Staurosira elliptica	2	-	-	-	-
Synedra parasitica	1	-	-	-	-

Appendix K-1

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted upstream and downstream of Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site		Test Site	
Annelida	**Rep 1**	**Rep 2**	**Rep 1**	**Rep 2**
Oligochaeta				
Allonais inaequalis	2	-	1	-
Aulodrilus pigueti	10	6	-	5
Bratislavia unidentata	-	-	1	-
Dero digitata complex	-	-	-	1
Limnodrilus hoffmeisteri	-	-	7	10
Pristina synclites	-	-	-	5
Arthropoda				
Crustacea				
Amphipoda				
Hyalella azteca	4	4	20	16
Decapoda				
Cambaridae	1	-	-	1
Insecta				
Coleoptera				
Dineutus sp.	-	-	-	1
Dubiraphia vittata	23	32	14	14
Microcylloepus pusillus	1	1	10	8
Prionocyphon sp.	-	-	-	2
Stenelmis sp.	-	-	5	7
Diptera				
Ablabesmyia rhamphe grp.	1	-	-	-
Atrichopogon sp.	2	-	-	1
Ceratopogonidae	-	1	-	-
Clinotanypus sp.	-	1	-	-
Cryptochironomus sp.	-	-	-	1
Paratanytarsus sp.	1	2	-	-
Pentaneura inconspicua	-	3	-	1
Pilaria sp.	-	-	1	-
Polypedilum flavum	1	-	-	3
Polypedilum halterale grp.	9	12	-	-
Polypedilum scalaenum grp.	-	2	1	1
Rheotanytarsus exiguus grp.	-	-	1	-
Stenochironomus sp.	-	1	1	-
Tanytarsus sp.	1	-	-	-
Thienemanniella sp.	-	1	-	-
Tribelos fuscicornis	-	-	1	4
Ephemeroptera				
Caenis sp.	4	4	5	2
Pseudocloeon sp.	-	-	-	1
Stenacron sp.	-	-	-	2
Lepidoptera				
Pyralidae	1	2	-	-

Appendix K-1 (continued)

	Control Site		Test Site	
	Rep 1	Rep 2	Rep 1	Rep 2
Odonata				
Argia sp.	4	1	-	-
Coenagrionidae	-	-	-	1
Gomphus sp.	-	-	-	1
Libellulidae	-	1	-	-
Trichoptera				
Cheumatopsyche sp.	4	3	1	2
Neotrichia sp.	1	3	1	3
Oecetis sp.	1	-	-	-
Mollusca				
Bivalvia				
Unionidae	-	-	-	1
Corbicula fluminea	-	-	10	9
Sphaeriidae	4	-	-	-
Gastropoda				
Amnicola sp.	-	-	51	28
Ancylidae	4	4	6	6
Hydrobiidae	67	58	-	-
Micromenetus sp.	-	-	-	1
Physa sp.	7	3	-	-
Planorbidae	2	2	-	-
Pyrgophorus platyrachis	-	-	2	-
Platyhelminthes				
Undetermined Platyhelminthes	-	-	3	2

Appendix K-2

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted upstream and downstream of Mosaic Fertilizer, LLC – Kingsford Mine Complex on August 11, 2008

	Control Site		Test Site	
	Rep 1	Rep 2	Rep 1	Rep 2
Annelida				
Oligochaeta				
Allonais inaequalis	1	-	1	-
Aulodrilus pigueti	10	4	-	1
Bratislavia unidentata	-	-	1	-
Dero digitata complex	-	-	-	1
Limnodrilus hoffmeisteri	-	-	1	2
Naididae	1	-	-	-
Pristina synclites	-	-	-	5
Tubificidae	-	2	6	12
Arthropoda				
Crustacea				
Amphipoda				
Hyalella azteca	4	4	20	16
Decapoda				
Cambaridae	1	-	-	1
Insecta				
Coleoptera				
Dineutus sp.	-	-	-	1
Dubiraphia vittata	23	32	14	14
Microcylloepus pusillus	1	1	10	8
Prionocyphon sp.	-	-	-	2
Stenelmis sp.	-	-	5	7
Diptera				
Ablabesmyia rhamphe grp.	1	-	-	-
Atrichopogon sp.	1	-	-	1
Ceratopogonidae	1	1	-	-
Chironomidae	2	2	-	2
Clinotanypus sp.	-	1	-	-
Cryptochironomus sp.	-	-	-	1
Paratanytarsus sp.	1	2	-	-
Pentaneura inconspicua	-	3	-	1
Pilaria sp.	-	-	1	-
Polypedilum flavum	1	-	-	2
Polypedilum halterale grp.	7	10	-	-
Polypedilum scalaenum grp.	-	2	1	1
Rheotanytarsus exiguus grp.	-	-	1	-
Stenochironomus sp.	-	1	1	-
Tanytarsus sp.	1	-	-	-
Thienemanniella sp.	-	1	-	-
Tribelos fuscicornis	-	-	1	3
Ephemeroptera				
Caenis sp.	4	4	5	2
Pseudocloeon sp.	-	-	-	1
Stenacron sp.	-	-	-	2

Appendix K-2 (continued)

	Control Site		Test Site	
	Rep 1	Rep 2	Rep 1	Rep 2
Lepidoptera				
Pyralidae	1	2	-	-
Odonata				
Argia sp.	4	1	-	-
Coenagrionidae	-	-	-	1
Gomphus sp.	-	-	-	1
Libellulidae	-	1	-	-
Trichoptera				
Cheumatopsyche sp.	4	3	1	2
Neotrichia sp.	1	3	1	3
Oecetis sp.	1	-	-	-
Mollusca				
Bivalvia				
Unionidae	-	-	-	1
Corbicula fluminea	-	-	10	9
Sphaeriidae	4	-	-	-
Gastropoda				
Amnicola sp.	-	-	51	28
Ancylidae	4	4	6	6
Hydrobiidae	67	58	-	-
Micromenetus sp.	-	-	-	1
Physa sp.	7	3	-	-
Planorbidae	2	2	-	-
Pyrgophorus platyrachis	-	-	2	-
Platyhelminthes				
Undetermined Platyhelminthes	-	-	3	2

The Bioassay of the Mosaic Fertilizer, LLC - Kingsford Mine Complex effluent sampled on August 11, 2008, NPDES #FL0000256

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 F L 0 0 0 0 2 5 6 11	12 0 8 0 8 1 1	18 B	19 S	20 2

Remarks

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The Priority Pollutants Analysis for Bioassay of the Mosaic Fertilizer, LLC - Kingsford Mine Complex effluent sampled on August 11, 2008, NPDES #FL0000256

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 F L 0 0 0 0 2 5 6 11	12 0 8 0 8 1 1	18 X	19 S	20 2

Remarks

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Biological Analyses of the Mosaic Fertilizer, LLC - Kingsford Mine Complex effluent sampled on August 11, 2008, NPDES #FL0000256

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 F L 0 0 0 0 2 5 6 11	12 0 8 0 8 1 1	18 S	19 S	20 2

Remarks

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