

Biological Assessment of

Veit Dairy

Jackson County

Sampled January 6 and February 3, 2004

May 2004

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection

Summary

Discharger: Veit Dairy

County: Jackson

Toxics Sampling Inspection

Date Sampled: Not sampled.

Results: Samples were not collected for metals or organic constituent analysis.

Biomonitoring Inspection

Date Sampled: January 6, 2004

Results: The sample from Test Site 1 was acutely toxic to the fish, *Cyprinella leedsi,* and to the water flea, *Ceriodaphnia dubia,* during the 48-hour acute definitive bioassays, an exceedance of Class III Water Quality Criteria (62-302.200(1) and 62-302.530(62) F.A.C).

Water Quality Inspection

Date Sampled: January 6, 2004

Results: Fecal and total coliforms (400,000 counts/100mL) were detected at Test Site 1 at levels that exceeded Class III Surface Water Quality Criteria (≤800 fecal coliforms and ≤2400 total coliforms, 62-302.530(6) and (7) F.A.C.). Total Kjeldahl Nitrogen, ammonia, orthophosphate, and total phosphorus concentrations detected at Test Site 1 were all more than 100 times the levels detected at Control Site 2 in Alligator Creek. The unionized ammonia value at Test Site 1 was 45 times greater than the Class III Surface Water Quality Criterion, an exceedance of 62-302.530(3) F.A.C. The turbidity value at Test Site 1 (182 NTU) was more than 29 NTU above the value at Control Site 2 (3.2 NTU), an exceedance of the Class III Surface Water Quality Criterion (62-302.530(70) F.A.C.). Conductivity measured at Test Site 1 was 2,106 µmhos/cm, an exceedance of the Class III Surface Water Quality Criterion (≤1,275 µmhos/cm, 62-302.530(23) F.A.C.). The biochemical oxygen demand (BOD) measured in the sample from Test Site 1 was 195 mg/L, which does not comply with the Class III Surface Water Quality Criterion (62-305.530(12) F.A.C.). This level of oxygen demand is enough to lower the dissolved oxygen to an unacceptable level. Dissolved oxygen at Test Site 1 was 1.6 mg/L, which fails to meet the Class III Surface Water Quality Criterion (≥5.0 mg/L, 62-302.530(31) F.A.C.).

Impact Bioassessment Inspection

Date Sampled: January 6 and February 3, 2004

Results: Hester-Dendy samples from Test Site 1 only yielded 6 organisms. It is inappropriate to calculate the Shannon-Weaver diversity index on so few individuals, therefore the Biological Integrity Criterion (62-302.530 (11) F.A.C.) cannot be applied to this site. The lack of macroinvertebrate colonization at Test Site 1 is most likely attributable to the high turbidity and toxicity at this site. Stream Condition Index samples resulted in the following scores: Test Site 1, Very Poor; Test Site 2, Good; Control Site 1, Poor; and Control Site 2, Good. These results indicate that the macroinvertebrate community at Test Site 1 in Alligator Creek is degraded as a result of the dairy's wastewater.

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 Veit Dairy is located in Jackson County, Florida (Appendix 1). This facility is a Concentrated Animal Feeding Operation (CAFO). The dairy utilizes approximately 620 mature dairy cattle. Operations include a milking parlor, free stall barn, scrape alley, manure disposal flush system, solids separator, dual anaerobic lagoon, and discharge of wastewater to surface waters of the State. The wastewater to the lagoons appears to be primarily from the free stall barn and scrape alley, which are washed down twice a day. After a short retention time, the wastewater in the lagoons is discharged into a ditch that cuts through a pasture and then flows into a tributary of Alligator Creek. The dairy does not have a permit for discharging wastewater (Facility information provided by Chad Nowling and Greg Smith, FDEP-Northwest District).

A preliminary inspection of the dairy was performed on 6/27/03 by Greg Smith and Chad Nowling. During that inspection the wastewater from the lagoons was discharging directly into a wetland located just north of the lagoons (see Map in Appendix 1). The water then migrated through the pasture and wetland towards the unnamed tributary of Alligator Creek. Since that inspection, there has been some ditching and dredging in the pasture. The wastewater from the lagoons was changed from discharging to the wetland to the ditch that directs the water to the unnamed tributary of Alligator Creek. The mean flow of wastewater into the tributary from the dairy is not known.

Methods

The purpose of this investigation was to determine the potential effects of the dairy's wastewater on the receiving water biota. Chemical and biological comparisons were made between two control sites and two test sites. Control Site 1 was located in Minnow Creek above Highway 164 (selected as a minimally impacted stream typical of the area), and Control Site 2 was located in Alligator Creek below Highway 77 (above the point where the dairy wastewater enters the creek). Test Site 1 was located in Alligator Creek just below Highway 164 approximately 500 meters downstream of the lagoons. Test Site 2 was located in Alligator Creek below Williams Rd. approximately 2500 meters downstream of Test Site 1 (see Map in Appendix 1). Reviewing the map, the two Test Sites appear to be connected. However, the entire stretch of Alligator Creek below the discharge could not be surveyed due to fencing and other obstacles.

For this assessment samples were collected to assess toxicological effects, microbiological and nutrient concentrations, and macroinvertebrate communities. Surface Water Quality Criteria evaluated for this study are listed with chemical, toxicological, and microbiological results in Table 1. Macroinvertebrate data are listed in Tables 2, 3, and 4a-4d. Detailed methods and their relationship to Florida Administrative Code are given in Appendix 2.

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 DEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Greg Smith and Chad Nowling (FDEP Northwest district), and David Whiting, Julie Espy, Johnny Richardson, and Thomas Deck (FDEP Central Laboratory in Tallahassee). The report was reviewed by District representatives.

Results and Discussion

- Specific chemical results are reported in Table 1, and a complete list of chemical analytes can be reviewed in Appendix 3. Samples were not collected for metals or organic constituent analyses for this study.
- Conductivity at Test Site 1 was 2,106 µmhos/cm, an exceedance of the Class III Surface Water Quality Criterion (≤ 1,275 µmhos/cm, 62-302.530(23) F.A.C.).
- The biochemical oxygen demand (BOD) measured in the sample from Test Site 1 was 195 mg/L, which does not comply with the Class III Surface Water Quality Criterion (62-305.530(12) F.A.C.). This level of oxygen demand is enough to lower the dissolved oxygen to an unacceptable level. Dissolved oxygen at Test Site 1 was 1.6 mg/L, which fails to meet the Class III Surface Water Quality Criterion (≥ 5.0 mg/L, 62-302.530 (31) F.A.C.).
- Dissolved oxygen, pH, conductivity, and BOD values from Test Site 2 and both Control Sites complied with Class III Surface Water Quality Criteria.
- The turbidity value at Test Site 1 (182 NTU) was more than 29 NTU above background (Control Site values, 8.4 and 3.2 NTU), an exceedance of the Class III Surface Water Quality Criterion (62-302.530(70) F.A.C.).
- The effluent sample was acutely toxic to the fish, *Cyprinella leedsi,* and to the water flea, *Ceriodaphnia dubia,* during 48-hour acute definitive bioassays. This constitutes an exceedance of 62-302.200(1) and 62-302.530(62) F.A.C. The sample was aerated prior to testing to raise

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

Veit Dairy	Class III Stds	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Nutrients (mg/L)					
Ortho-phosphate	-	0.004 U	0.12	18	0.19
Total Phosphorus	-	0.051 I	0.17	21	0.28
Ammonia	-	0.6	0.74	115 A	0.21
Unionized Ammonia	≤0.02	≤0.02 c	≤0.02 c	0.9 c	≤0.02 c
Nitrate+Nitrite	-	0.1	0.39	0.004 U	1
Total Kjeldahl Nitrogen	-	1.1 A	1.6	160	1
Organic Nitrogen	-	0.5 c	0.86 c	45 c	0.79 c
Total Nitrogen	-	1.2 c	1.99 c	160 c	2 c
General Physical and Chemical Parameters					
Habitat Assessment	-	130	82	55	110
Dissolved Oxygen (mg/L)	≥5.0	9.4	7.1	1.6	6.8
pH (S.U.)	6.0 - 8.5	7.5	6.9	7.5	6.2
Conductivity (umhos/cm)	≤1,275	47	97	2,106	97
Temperature (C)	-	12.4	14.4	12.4	14.2
Turbidity (NTU)	-	8.4	3.2	182	2.6
BOD (mg/L)	-	2.9	2.8	195 L	2.9 A
Microbiology (# counts/100ml)					
Fecal Coliforms-Membrane Filter	≤800	270	240	400,000	180 B
Total Coliforms-Membrane Filter	≤2,400	2,200	1,400 B	400,000	480
Toxicology Bioassays (48-Hr, LC50, percent sample concentration)					
Fish - Acute definitive	**	-	-	10.9%	-
Water flea - Acute definitive	**	-	-	19%	-

** - 62-302.200(1)(a)

c - Calculated value

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

B - Results based on colony counts outside the acceptable range

I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit

L - Actual value is known to be greater than value given

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

Value exceeds the Class III Water Quality Criteria

the dissolved oxygen concentration to an acceptable level. All test organisms in the 100% sample died within 10 minutes of starting the test. The 48-hour LC_{50} (the concentration of sample that is calculated to produced 50% mortality of the test organisms) for the water from Test Site 1 was calculated to be 10.9% for the fish and 19% for the invertebrate (See Table 1 for percent mortality and Appendix 4 for bioassay bench sheets).

- Fecal and total coliforms were detected in water samples from all sites. Levels at Control Sites 1 and 2, and Test Site 2 complied with Class III Surface Water Quality Criteria. However, coliform levels at Test Site 1, just below the dairy, exceeded Class III Surface Water Quality Criteria (62-302.530(6) & (7) F.A.C.) by a factor of 500 times the fecal coliform Criterion and 167 times the total coliform Criterion (See Table 1 for results).

- The calculated unionized ammonia value for Test Site 1 was 0.9 mg/L, an exceedance of the Class III Surface Water Quality Criterion (≤ 0.02 mg/L, 62-302.530(3) F.A.C.). The total ammonia concentration at Test Site 1 was 115 mg/L (Table 1), which is 155 times the concentration detected at Control Site 2 and 192 times the concentration at Control Site 1. The concentration of ammonia at Test Site 2 was 0.21 mg/L, less than 1% of the concentration at Test Site 1.

- Concentrations of total phosphorus (21 mg/L), ortho-phosphate (18 mg/L), and total Kjeldahl nitrogen (160 mg/L, Table 1) at Test Site 1 were as much as or more than 100 times the concentrations detected at either Control Site. Levels of these nutrients at Test Site 2 were approximately 1% of those at Test Site 1. Nitrate+nitrite was detected at both Control Sites and Test Site 2, but not at Test Site 1.

- Habitat assessment scores were 130 at Control Site 1, 82 at Control Site 2, 55 at Test Site 1 and 110 at Test Site 2 (Table 1, data sheets in Appendix 5). The Control Site 1 score placed it in the optimal range, while Control Site 2 and Test Site 2 scored in the suboptimal range. Test Site 1 scored lowest, in the marginal range. Control Site 2 lost points for substrate availability, water velocity, and riparian buffer zone components. The riparian buffer zone at Control Site 2 was accessible by cattle. Test Site 1 received lower points for substrate diversity, habitat smothering (both scoring in the poor category), and artificial channelization (see photo in Appendix 8).

- Measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed a more robust community at Test Site 2 compared to the Control Sites and Test Site 1 (Table 2, Appendices 6a and 6b). The sample from Test Site 2 had a higher number of individuals, which

Table 2. Macroinvertebrate Hester-Dendy Samples - Quantitative

Veit Dairy	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Summary Statisics				
Shannon-Weaver Diversity	2.57	3.7	1.92 *	3.74
Number of Taxa	18	28	4	33
Florida Index	4	6	1	14
Number of EPT Taxa	1	2	0	3
Percent Dominant Taxon	35.3	18.6	33.3	18.6
Dominant Taxon (name)	*Lirceus*	*Hydrobaenus*	*Polypedilum illinoense grp. /Dicrotendipes simpsoni*	*Dicrotendipes simpsoni*
Dominant Taxon (group)	Isopoda	Diptera	Diptera/Diptera	Diptera
Total Number of Individuals (#/m2)				
Total Number of Individuals (counted)	199	300	6	593
Community Composition: Percent of total				
Amphipoda	14.6	0.0	0.0	0.3
Bivalvia	2.5	0.0	0.0	0.0
Coleoptera	2.0	10.3	16.7	2.9
Diptera	14.1	73.3	83.3	88.5
Ephemeroptera	0.5	0.7	0.0	0.7
Isopoda	65.8	1.0	0.0	0.2
Oligochaeta	0.0	14.3	0.0	7.2
Plecoptera	0.0	0.0	0.0	0.0
Trichoptera	0.0	0.0	0.0	0.0
Other	0.5	0.4	0.0	0.2
Functional Feeding Groups: Percent of total				
Burrowing Deposit Feeders	0.0	14.3	0.0	7.2
Predators	9.1	11.2	0.0	3.3
Scavengers	1.5	14.2	0.0	5.6
Surface Deposit Feeders	14.4	39.1	50	49.2
Suspension Feeders	7.9	13.6	16.6	21.3
Scrapers	1.6	9.7	0.0	7.6
Shredders	0.6	9.5	33.4	10.2
Unknown	0.0	1.6	0.0	0.8

* - Value should be used with caution, Shannon-Weaver diversity index values are influenced by # of individuals

contributes to it also having more total taxa and EPT taxa, receiving more Florida Index points and having a higher Shannon-Weaver diversity score than samples from the other three sites. Samples from Test Site 1 only yielded 6 organisms. It is inappropriate to calculate the Shannon-Weaver diversity index on so few individuals, therefore the Biological Integrity Criterion cannot be assessed for this site. The high turbidity and ammonia values, low dissolved oxygen, and toxicity measured at this site all can have detrimental effects on macroinvertebrates, and these factors are most likely the cause of the low macroinvertebrate density.

- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Tables 3 and 4a-4d and in Appendices 7a and 7b. The SCI score at Control Site 1 was 19, placing it in the "Poor" category. However, one more Florida Index point (i.e. one more taxon) would have placed it into the "Good" category. The SCI score at Test Site 1 was 13, placing it in the "Very Poor" category. The dominant taxon was, *Goeldichironomus holoprasinus,* a pollution tolerant dipteran. The SCI scores at Control Site 2 and Test Site 2 were 25 and 23, respectively, placing them both in the "Good" category. Test Site 2 and both Control Sites were dominated by filter-feeding bivalves, which are known to be sensitive to increases in turbidity. There were no bivalves collected at Test Site 1. There were only 7 taxa

Table 3. Macroinvertebrate Dipnet Samples - Qualitative

Veit Dairy	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Stream Condition Index (value)	19	25	13	23
Stream Condition Index (word)	Poor	Good	Very Poor	Good
Stream Condition Index Metrics				
Number of Taxa	19	29	7	20
Florida Index	6	4	2	7
Number of EPT Taxa	1	1	0	0
Number of Chironomid Taxa	8	13	3	8
Percent Dominant Taxon	43.6	21.6	55.4	20
Percent Diptera	38.61	31.03	100	46.96
Percent Suspension Feeders and Filterers	59.41	30.17	16.07	35.65
Dominant Taxon (name)	*Pisidium*	*Sphaeriidae*	*Goeldichironomus holoprasinus*	*Sphaeriidae*
Dominant Taxon (group)	Bivalvia	Bivalvia	Diptera	Bivlavia
Total Number of Individuals	101	116	112	115
Community Composition: Percent of total				
Amphipoda	3.0	0.0	0.0	0.9
Bivalvia	43.6	21.6	0.0	20.0
Coleoptera	0.0	9.5	0.0	8.7
Diptera	38.6	31.0	100.0	47.0
Ephemeroptera	0.0	0.0	0.0	0.0
Gastropoda	1.0	1.7	0.0	0.0
Isopoda	3.0	19.8	0.0	5.2
Oligochaeta	7.9	8.6	0.0	17.4
Plecoptera	0.0	0.0	0.0	0.0
Trichoptera	1.0	0.9	0.0	0.0
Other	1.9	7.8	0.0	0.8
Functional Feeding Groups: Percent of total				
Burrowing Deposit Feeders	7.9	8.6	0.0	17.4
Predators	4.5	13.8	0.0	6.1
Surface Deposit Feeders	10.4	14.7	80.4	21.7
Suspension Feeders and Filterers	59.4	30.2	16.1	35.6
Scrapers	1.0	1.7	3.1	2.6
Shredders	7.9	5.2	0.4	5.2
Unknown	5.9	3.4	0.0	5.2

collected at Test Site 1, and all were Dipterans.

Summary

Water samples collected from Test Site 1, just below the dairy, were in exceedance of eight Class III Surface Water Quality Criteria (62-302 F.A.C.). Water collected from this site exceeded criteria for unionized ammonia, turbidity, dissolved oxygen, conductivity, BOD, fecal and total coliforms, and toxicity. There were no exceedances at the other three study sites for the parameters measured. Test Site 2 does not appear to be significantly influenced by the wastewater from the dairy based on the data collected for this study. This could be due to the wastewater previously being discharged directly to the wetland and only recently being discharged into the unnamed tributary to Alligator Creek, or efficient nutrient uptake in the unnamed tributary prior to the confluence with Alligator Creek. The macroinvertebrate community, nutrient concentrations, and other chemical parameters were better at Test Site 2 compared to Test Site 1. There are wetland areas between the two sites that may be mitigating effects from the dairy's wastewater at Test Site 2. Based on the data collected for this study, the Alligator Creek watershed appears to have elevated nutrients throughout; but levels just below the dairy are more than

Table 4a. Stream Condition Index Metrics: Panhandle West, Winter Index

Control Site 1

Metric:	Value	5	3	1	Score
Total Number of Taxa	19	≥27	26-14	<14	3
Number of EPT Taxa	1	≥6	5-3	<3	1
Number of Chironomid Taxa	8	≥9	8-5	<5	3
Percent Contribution of Dominant Taxon	43.56	≤25	26-62	>62	3
Percent Diptera	38.61	-	≤60	>60	3
Florida Index	6	≥3	12-7	<7	1
Percent Suspension Feeders and Filterers	59.41	≥3	12-7	<7	5
Total Score		**Poor**			**19**
Interpretation of Scores		Excellent			27-33
		Good			21-26
		Poor			14-20
		Very Poor			7-13

100 times the values measured at other sites. The wastewater discharged from the Veit Dairy is having negative effects on the water quality of the unnamed tributary to Alligator Creek. The reach of the effects in the unnamed tributary prior to the confluence with Alligator Creek cannot be determined from this investigation, but it extends at least 100 meters below Highway 164. We would recommend that the facility not be allowed to continue discharging untreated wastewater into waters of the State, as the current discharge has been documented as having produced negative biological impacts.

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Table 4b. Stream Condition Index Metrics: Panhandle West, Winter Index

Control Site 2

Metric:	Value	5	3	1	Score
Total Number of Taxa	29	≥27	26-14	<14	5
Number of EPT Taxa	1	≥6	5-3	<3	1
Number of Chironomid Taxa	13	≥9	8-5	<5	5
Percent Contribution of Dominant Taxon	21.55	≤25	26-62	>62	5
Percent Diptera	31.03	-	≤60	>60	3
Florida Index	4	≥3	12-7	<7	1
Percent Suspension Feeders and Filterers	30.17	≥3	12-7	<7	5
Total Score		**Good**			**25**
Interpretation of Scores		Excellent			27-33
		Good			21-26
		Poor			14-20
		Very Poor			7-13

Table 4c. Stream Condition Index Metrics: Panhandle West, Winter Index

Test Site 1

Metric:	Value	5	3	1	Score
Total Number of Taxa	7	≥27	26-14	<14	1
Number of EPT Taxa	0	≥6	5-3	<3	1
Number of Chironomid Taxa	3	≥9	8-5	<5	1
Percent Contribution of Dominant Taxon	55.36	≤25	26-62	>62	3
Percent Diptera	100	-	≤60	>60	1
Florida Index	2	≥3	12-7	<7	1
Percent Suspension Feeders and Filterers	16.07	≥3	12-7	<7	5
Total Score		**Very Poor**			**13**
Interpretation of Scores		Excellent			27-33
		Good			21-26
		Poor			14-20
		Very Poor			7-13

Table 4d. Stream Condition Index Metrics: Panhandle West, Winter Index

Test Site 2

Metric:	Value	5	3	1	Score
Total Number of Taxa	20	≥27	26-14	<14	3
Number of EPT Taxa	0	≥6	5-3	<3	1
Number of Chironomid Taxa	8	≥9	8-5	<5	3
Percent Contribution of Dominant Taxon	20	≤25	26-62	>62	5
Percent Diptera	46.96	-	≤60	>60	3
Florida Index	7	≥3	12-7	<7	3
Percent Suspension Feeders and Filterers	35.65	≥3	12-7	<7	5
Total Score		**Good**			**23**
Interpretation of Scores		Excellent			27-33
		Good			21-26
		Poor			14-20
		Very Poor			7-13

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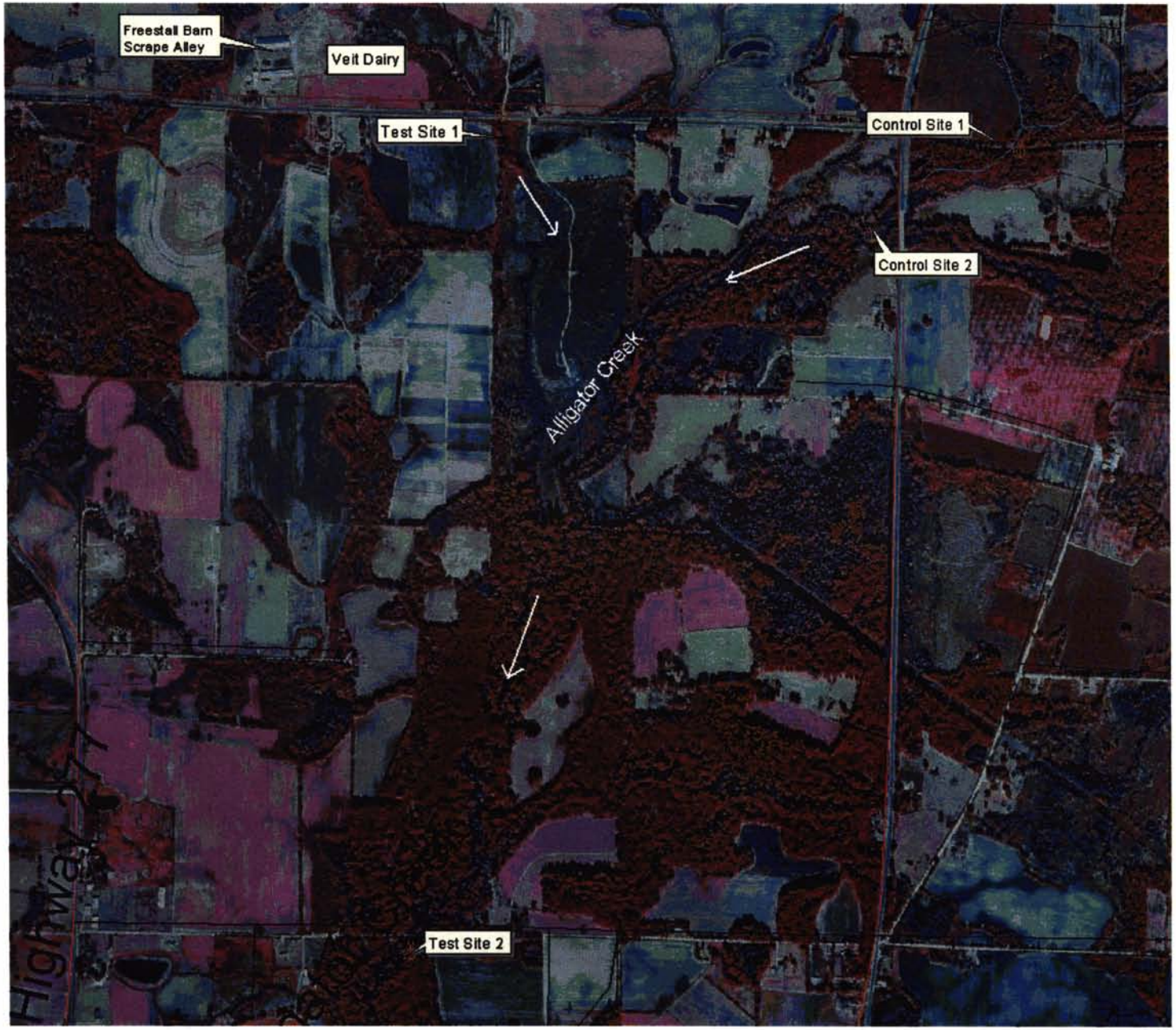
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Appendices

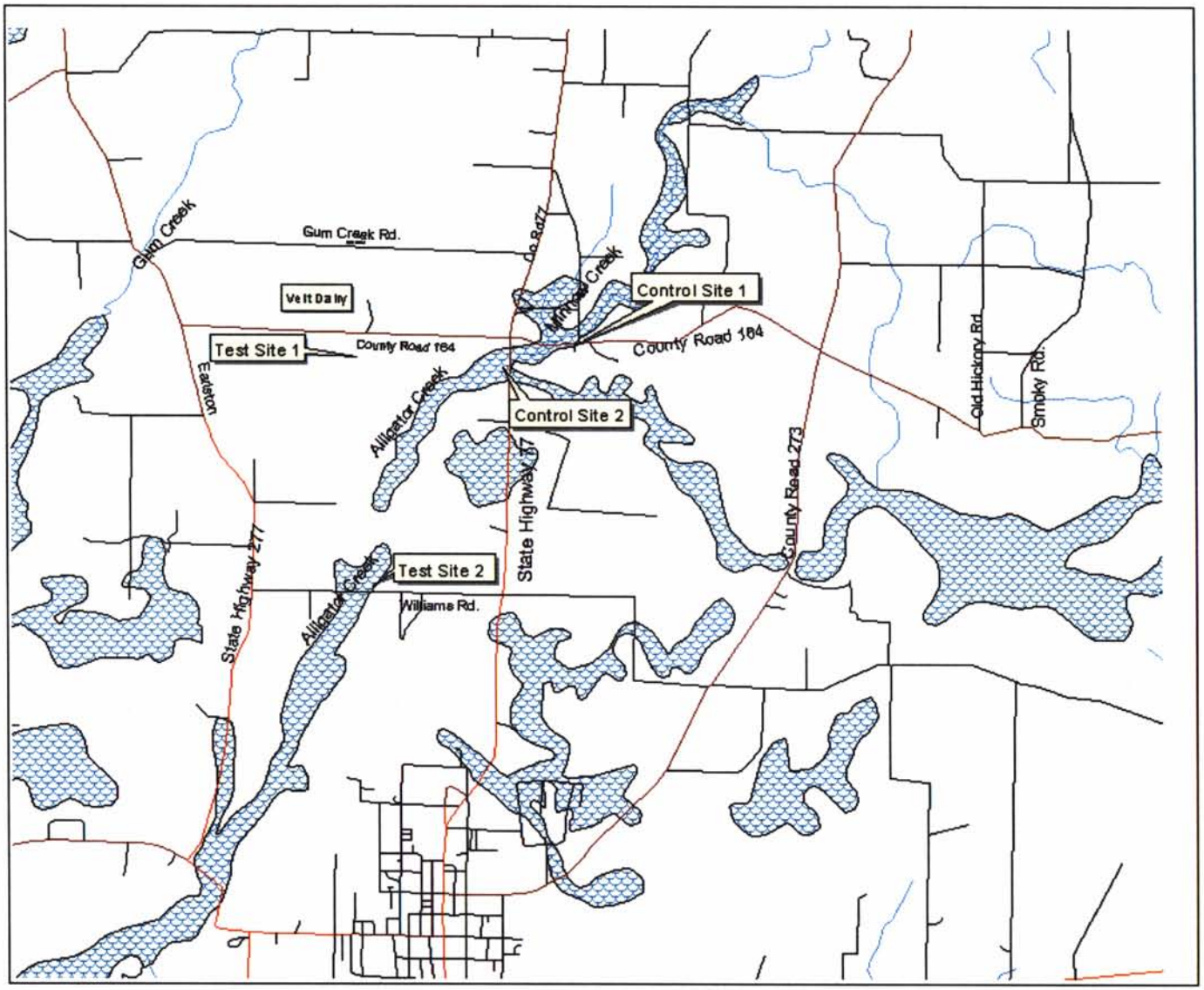
- Appendix 1. Map of facility
- Appendix 2. Explanation of measurements
- Appendix 3. Chemical analyses of effluent and receiving water
- Appendix 4. Additional physical, chemical, toxicological and microbiological results
- Appendix 5. Habitat Assessment field sheets
- Appendix 6a. Hester-Dendy multi-plate samplers: Taxa list and macroinvertebrate density (average number of individuals per m^2)
- Appendix 6b. Hester-Dendy multi-plate samplers: Taxa list and total number of macroinvertebrates counted
- Appendix 7a. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix 7b. Dipnet samples: Taxa list and number of macroinvertebrates counted

- Appendix 8. Photos from study sites

Appendix 1



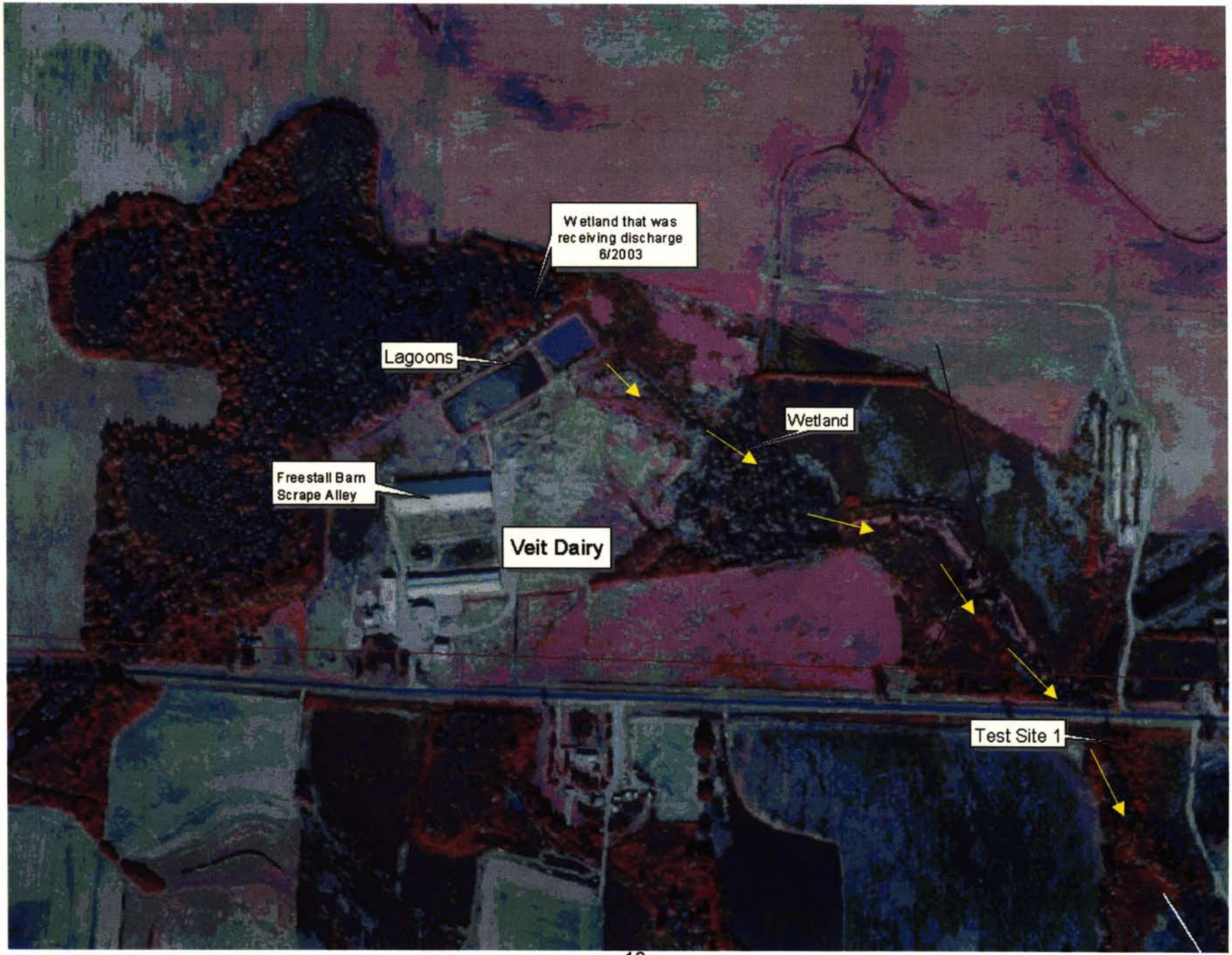
Veit Dairy



Veit Dairy

N
W E
S

FDEP Bureau of Laboratories
Created by: Julie Espy
Created on: December 30, 2003


Wetland that was receiving discharge 6/2003
Lagoons
Wetland
Freestall Barn Scrape Alley
Veit Dairy
Test Site 1

Appendix 2

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 Discharge

The dairy's discharge was analyzed for nutrients following FDEP SOPs. Neither metals nor organic constituents (base, neutral, and acid extractables) or pesticides were collected for this study. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix 4. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.). The facility does not have a permit to discharge into waters of the state.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the discharge 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(21), 62-302.530(62).

(4) Bacteriological Testing

The discharge and water from control and test sites were 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).

(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) 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(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..

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(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(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 (Magurran1988). 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(11) F.A.C..

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their ranked sensitivity to pollution (Beck 1954). A site with a high Florida Index score is considered healthy (Ross 1990). Decreases in Florida Index points 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..

Ephemeroptera/Plecoptera/Trichoptera (EPT) Taxa: This value is the number of EPT taxa present. More EPT taxa are usually present in unpolluted waters (Plafkin *et al.*, 1989, Wallace *et al.*, 1996). Decreases in the number of EPT taxa 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..

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). Shifts in community composition 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..

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 (FDEP 1994) and shredders (EA Engineering 1994). Changes in the proportions of functional feeding groups 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..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida. Using data from qualitative dipnet samples, the SCI assigns points to seven parameters, depending on how closely each parameter approaches an expected reference condition (QA Rule SOP LT 7200). Points are summed to yield a final SCI score (range 7-33, depending on region and index period). Included in the calculation of SCI are taxa richness, number of EPT taxa, number of Chironomid taxa, percent contribution of the dominant taxon, the Florida Index, percent contribution of Diptera, and the percent contribution of suspension and filter feeders. Scores are broken into four ordinal groups: Excellent, Good, Poor and Very Poor. 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 of "Poor" or "Very Poor" 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..

(7) 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.

Appendix 3

Chemical analysis of effluent and receiving water

Date Sampled	Site Location	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-BOD	Biochemical Oxygen Demand-5 Da	195	mg/L	L		
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-#	7	# Taxa			
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-Microbiology	Fecal Coliforms-Membrane Filter	400000	#/100 mL			
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-Microbiology	Total Coliforms-Membrane Filter	400000	#/100 mL			
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-Toxicology	Bioassay-Acute-Def-FW-C.dubia, I	19	LC50			
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Bio-Toxicology	Bioassay-Acute-Def-FW-Fish, LC5	10.2	LC50			
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	Ammonia-N	115	mg N/L	A	5	10
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	N_KJEL_TOT	160	mg N/L		6	20
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	O-Phosphate-P	18	mg P/L		0.48	1.2
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	Total-P	21	mg P/L		2	6
1/6/2004 10:50	ALLIGATOR CREEK 164	TEST SITE 1	Nutrients-Liquid	Turbidity	182	NTU		0.25	0.25
2/3/2004	ALLIGATOR CREEK @ 164	TEST SITE 1 REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	1	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 164	TEST SITE 1 REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	2	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 164	TEST SITE 1 REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	0	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 164	TEST SITE 1 REP.4	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	1	# Taxa			
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Bio-BOD	Biochemical Oxygen Demand-5 Da	2.8	mg/L			
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-#	29	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 77	CONTROL SITE 2 REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	13	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 77	CONTROL SITE 2 REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	11	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 77	CONTROL SITE 2 REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	21	# Taxa			
2/3/2004	ALLIGATOR CREEK @ 77	CONTROL SITE 2 REP.4	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	17	# Taxa			
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Bio-Microbiology	Fecal Coliforms-Membrane Filter	240	#/100 mL			
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Bio-Microbiology	Total Coliforms-Membrane Filter	1400	#/100 mL	B		
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	Ammonia-N	0.74	mg N/L		0.05	0.1
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	N_KJEL_TOT	1.6	mg N/L		0.06	0.2
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	NO2NO3-N	0.39	mg N/L		0.004	0.01
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	O-Phosphate-P	0.12	mg P/L		0.004	0.01
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	Total-P	0.17	mg P/L		0.02	0.06
1/6/2004 10:30	ALLIGATOR CREEK @ 77	CONTROL SITE 2	Nutrients-Liquid	Turbidity	3.2	NTU		0.05	0.05

Date Sampled	Site Location	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Bio-BOD	Biochemical Oxygen Demand-5 Da	2.9	mg/L	A		
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-#	20	# Taxa			
2/3/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2 REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	17	# Taxa			
2/3/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2 REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	22	# Taxa			
2/3/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2 REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	19	# Taxa			
2/3/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2 REP.4	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	11	# Taxa			
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Bio-Microbiology	Fecal Coliforms-Membrane Filter	180	#/100 mL	B		
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Bio-Microbiology	Total Coliforms-Membrane Filter	480	#/100 mL			
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	Ammonia-N	0.21	mg N/L		0.01	0.02
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	N_KJEL_TOT	1	mg N/L		0.06	0.2
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	NO2NO3-N	1	mg N/L		0.008	0.02
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	O-Phosphate-P	0.19	mg P/L		0.012	0.03
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	Total-P	0.28	mg P/L		0.02	0.06
1/6/2004	ALLIGATOR CREEK @ WILLIAMS RD	TEST SITE 2	Nutrients-Liquid	Turbidity	2.6	NTU		0.05	0.05
1/6/2004 10:20	FIELD BLK	FIELD BLK	Bio-BOD	Biochemical Oxygen Demand-5 Da	0.2	mg/L	U		
1/6/2004 10:20	FIELD BLK	FIELD BLK	Bio-Microbiology	Fecal Coliforms-Membrane Filter	1	#/100 mL	K		
1/6/2004 10:20	FIELD BLK	FIELD BLK	Bio-Microbiology	Total Coliforms-Membrane Filter	1	#/100 mL	K		
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	N_KJEL_TOT	0.06	mg N/L	U	0.06	0.2
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06
1/6/2004 10:20	FIELD BLK	FIELD BLK	Nutrients-Liquid	Turbidity	0.05	NTU		0.05	0.05
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Bio-BOD	Biochemical Oxygen Demand-5 Da	2.9	mg/L			
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-#	19	# Taxa			
2/3/2004	MINNOW CREEK @ 164	CONTROL SITE 1 REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	7	# Taxa			
2/3/2004	MINNOW CREEK @ 164	CONTROL SITE 1 REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	9	# Taxa			
2/3/2004	MINNOW CREEK @ 164	CONTROL SITE 1 REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	10	# Taxa			
2/3/2004	MINNOW CREEK @ 164	CONTROL SITE 1 REP.4	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-#	10	# Taxa			
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Bio-Microbiology	Fecal Coliforms-Membrane Filter	270	#/100 mL			
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Bio-Microbiology	Total Coliforms-Membrane Filter	2200	#/100 mL			
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	Ammonia-N	0.6	mg N/L		0.02	0.04
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	N_KJEL_TOT	1.1	mg N/L	A	0.06	0.2
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	NO2NO3-N	0.1	mg N/L		0.004	0.01
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	Total-P	0.051	mg P/L	I	0.02	0.06
1/6/2004 10:50	MINNOW CREEK @ 164	CONTROL SITE 1	Nutrients-Liquid	Turbidity	8.4	NTU		0.05	0.05

Appendix 4

Additional physical, chemical, and toxicological results

Data recorded during the 48-hour acute bioassays of a sample of effluent from Veit Dairy, Jackson County, Florida, performed from 7 to 9 January, 2004.

Facility:	**Veit Dairy**		**NPDES#:**	**none**	Facility Type:	**Analysts:**	Christa Pierini
Location:			Contact/District:	J. Richardson/NW Biology Section			Sarah Prichard
County:	Jackson		Test type:	acute definitive renewal			Marshall Faircloth
Sample Collection Date:	1/6/2004	Time: 1050	# tests:	2	Receiving Water:		Josh Ayres
Test Beginning Date:	1/7/2004	Time: 1400	Chlorination Type:				
Test Ending Date:	1/9/2004	Time: 1330	FDEP SOP#:	TA07_01	**Page 1 of 2**	**Reviewer:**	Julie Espy

100% sample aerated for 45 minutes to raise Dissolved Oxygen from 1.3 mg/L to 5.2 mg/L.
All test organisms in 100% sample died within 10 minutes of loading.

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours [A]Feeding: YCT/Algae
Chamber size: 30 ml Food Batch #: #4/#23

	Sample/Diluen	SURVIVAL # Alive			pH (standard units)			Temperature °C[B]			Diss. Oxygen mg/L			Conductivity Uncorrected mmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/20	5	5	5	8.0	-	7.9	24.0	-	24.3	7.0	-	6.9	0.165	0.206
Control B	0/20	5	5	5	-	-	7.9	-	-	24.1	-	-	7.2		0.172
Control C	0/20	5	5	5	-	-	7.9	-	-	24.0	-	-	7.2		0.181
Control D	0/20	5	5	5	-	-	7.9	-	-	24.0	-	-	7.6		0.174
6.25% A	1.25/18.75	5	5	5	8.3	-	8.3	24.0	-	24.2	7.2	-	7.1	0.292	0.298
6.25% B	1.25/18.75	5	5	5	-	-	8.3	-	-	24.0	-	-	7.1		0.310
6.25% C	1.25/18.75	5	5	5	-	-	8.3	-	-	24.0	-	-	7.2		0.310
6.25% D	1.25/18.75	5	5	5	-	-	8.3	-	-	24.0	-	-	7.2		0.320
12.5% A	2.5/17.5	5	5	5	8.3	-	8.3	24.1	-	24.3	7.3	-	7.0	0.375	0.376
12.5% B	2.5/17.5	5	5	5	-	-	8.3	-	-	24.0	-	-	7.1		0.376
12.5% C	2.5/17.5	5	5	5	-	-	8.3	-	-	24.7	-	-	6.9		0.360
12.5%D	2.5/17.5	5	5	5	-	-	8.3	-	-	24.0	-	-	7.0		0.380
25% A	5/15	5	1	0	8.3	-	8.4	24.0	-	24.1	7.2	-	7.0	0.612	0.560
25% B	5/15	5	4	0	-	-	8.4	-	-	24.0	-	-	6.6		0.573
25% C	5/15	5	4	1	-	-	8.4	-	-	24.1	-	-	6.6		0.566
25% D	5/15	5	2	1	-	-	8.4	-	-	24.4	-	-	6.7		0.576
50% A	10/10	5	0	-	8.3	8.4	-	24.0	24.4	-	7.0	6.0	-	1.11	-
50% B	10/10	5	0	-	-	8.4	-	-	24.4	-	-	5.9	-	-	-
50% C	10/10	5	0	-	-	8.5	-	-	24.4	-	-	5.6	-	-	-
50% D	10/10	5	0	-	-	8.4	-	-	24.4	-	-	5.6	-	-	-
100% A	20/0	5	-	-	8.3	-	-	24.1	-	-	5.2	-	-	1.95	-
100% B	20/0	5	-	-	-	-	-	-	-	-	-	-	-	-	-
100% C	20/0	5	-	-	-	-	-	-	-	-	-	-	-	-	-
100% D	20/0	5	-	-	-	-	-	-	-	-	-	-	-	-	-

[A]Organisms fed prior to testing and before renewal.
[B]Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0 - 24.5°C.
Incubator #3 temperature range for the test period was 22.5 - 24.5°C.
Photoperiod during the test was 16 hours of light : 8 hours of dark.

LIMS	
Job number:	TLH-2004-01-07-08
sample number:	725883

Data Transcription Verification
date: 2/19/04
by: James Daniels/Josh Ayres

Total Residual CL2	mg/L	Method
Field:	not measured	-
Lab: 100% sample:	0.00	Hach
Control water:	0.02	Hach

Ammonia	Total (mg/L)
Control water:	<0.017
100% Sample:	138

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water:	68	73
100% Sample:	268	91

Salinity[C]	ppt
100% sample:	[D]~1
Control water:	0

[C]Salinity based on conductivity and temperature.
[D]Apparent salinity - no known source of seawater ions.
Light Intensity during the test was 50-100 foot candles.

Data recorded during the 48-hour acute bioassays of a sample of effluent from Veit Dairy, Jackson County, Florida, performed from 7 to 9 January, 2004.

Facility:	**Veit Dairy**		**NPDES#:**	**none**	Facility Type:	**Analysts:**	Christa Pierini
Location:			Contact/District:	J. Richardson/NW Biology Section			Sarah Prichard
County:	Jackson		Test type:	acute definitive renewal			Marshall Faircloth
Sample Collection Date:	1/6/2004	Time: 1050	# tests:	2	Receiving Water:		Josh Ayres
Test Beginning Date:	1/7/2004	Time: 1400	Chlorination Type:				
Test Ending Date:	1/9/2004	Time: 1330	FDEP SOP#:	TA07_02	**Page 2 of 2**	**Reviewer:**	Julie Espy

100% sample aerated for 45 minutes to raise Dissolved Oxygen from 1.3 mg/L to 5.2 mg/L.

Test organisms in the 25% sample concentration died within 45 minutes of loading, in the 50% sample concentration died within 10 minutes of loading, and in the 100% sample concentration died within 4 minutes of loading.

Organism: ***Pimephales promelas*** Life stage: days 13 [A]Feeding: *Artemia*

Chamber size: 1000 ml Food Batch #: 0194025G

	Sample/Diluen	SURVIVAL # Alive			pH (standard units)			Temperature °C[B]			Diss. Oxygen mg/L			Conductivity Uncorrected mmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/500	5	5	5	8.2	7.9	8.1	24.0	25.1	24.0	7.2	6.7	6.7	0.317	0.716
Control B	0/500	5	5	5	8.2	7.9	8.1	24.0	24.8	24.0	7.1	6.7	6.9	0.310	0.663
Control C	0/500	5	5	5	8.2	7.9	8.1	24.0	24.6	24.3	7.2	6.8	7.2	0.308	0.888
Control D	0/500	5	5	5	8.2	7.9	8.1	24.0	24.4	25.8	7.3	6.8	6.9	0.311	0.744
6.25% A	31.25/468.75	5	5	5	8.3	8.0	8.2	24.0	24.9	24.1	7.4	6.7	7.0	0.410	0.846
6.25% B	31.25/468.75	5	5	5	8.3	8.0	8.2	24.1	24.5	24.4	7.5	6.5	6.8	0.425	0.790
6.25% C	31.25/468.75	5	5	5	8.3	8.1	8.2	24.0	24.9	24.3	7.5	6.2	6.6	0.430	0.619
6.25% D	31.25/468.75	5	5	5	8.3	8.1	8.2	24.1	24.3	25.8	7.4	6.2	6.7	0.428	0.786
12.5% A	62.5/437.5	5	3	2	8.3	8.1	8.2	24.0	24.2	24.0	7.6	5.9	6.6	0.515	0.670
12.5% B	62.5/437.5	5	3	2	8.3	8.2	8.2	24.1	24.6	24.0	7.5	5.8	6.6	0.535	0.714
12.5% C	62.5/437.5	5	4	1	8.3	8.2	8.2	24.1	24.3	24.2	7.4	5.7	6.4	0.539	0.731
12.5%D	62.5/437.5	5	3	1	8.3	8.2	8.2	24.0	24.8	24.2	7.3	5.6	6.2	0.542	0.712
25% A	125/375	5	0	-	8.3	-	-	24.0	-	-	7.3	-	-	0.743	-
25% B	125/375	5	0	-	8.3	-	-	24.1	-	-	7.2	-	-	0.745	-
25% C	125/375	5	0	-	8.3	-	-	24.1	-	-	7.1	-	-	0.745	-
25% D	125/375	5	0	-	8.3	-	-	24.0	-	-	7.0	-	-	0.735	-
50% A	250/250	5	0	-	8.3	-	-	24.0	-	-	7.0	-	-	1.15	-
50% B	250/250	5	0	-	8.3	-	-	24.0	-	-	6.8	-	-	1.19	-
50% C	250/250	5	0	-	8.3	-	-	24.0	-	-	6.7	-	-	1.18	-
50% D	250/250	5	0	-	8.3	-	-	24.1	-	-	6.6	-	-	1.19	-
100% A	500/0	5	0	-	8.3	-	-	24.0	-	-	6.0	-	-	2.02	-
100% B	500/0	5	0	-	8.3	-	-	24.0	-	-	5.6	-	-	2.02	-
100% C	500/0	5	0	-	8.3	-	-	24.1	-	-	5.4	-	-	1.97	-
100% D	500/0	5	0	-	8.3	-	-	24.1	-	-	5.3	-	-	1.99	-

[A]Organisms fed prior to testing and before renewal.

[B]Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0 - 24.5°C.
Incubator #3 temperature range for the test period was 22.5 - 24.5°C.
Photoperiod during the test was 16 hours of light : 8 hours of dark.

LIMS	
Job number:	TLH-2004-01-07-08
sample number:	725883

Data Transcription Verification
date: 2/19/04
by: James Daniels/Josh Ayres

Total Residual CL2	mg/L	Method
Field:	-	-
Lab: 100% sample:	0.00	Hach
Control water:	0.01	Hach

Ammonia	Total (mg/L)
Control water:	<0.017
100% Sample:	138

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water:	78	94
100% Sample:	268	91

Salinity[C]	ppt
100% sample:	[D]~1
Control water:	0

[C]Salinity based on conductivity and temperature.

[D]Apparent salinity - no known source of seawater ions.

Light Intensity during the test was 50-100 foot candles.

Appendix 5

Habitat Assessment Field Sheets

DEP-SOP-001/01: Form FD 9000-3 (June 20 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 1/6/04	TIME 12:30	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Jackson	LOCATION: Minnow Creek control site 1		FIELD ID/NAME:

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)

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☑ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side:

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK [ ] + [ ] = [ ]
(m above present water level) (present depth in m) (m above bed)

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

m wide

m/s	0,2 m/s	m/s
m deep	m deep	m deep

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☑ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☑ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☑ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE SILT SMOTHERING: NONE SLIGHT MODERATE OTHER:
SLIGHT SEVERE SEVERE

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	8	10		SAND		5	
LEAF PACKS OF MATS	9	5		MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	1	4		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	0.10	12.4	7.47	9.3	47			
MID-DEPTH	0.10	12.4	7.3	9.10	47			
BOTTOM	0.10	12.4	7.2	9.4	47			

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ☐ 5TH – 6TH ORDER ☐
3RD-4TH 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: ☑ slightly tannic

WEATHER CONDITIONS/NOTES:
30° 50' 12.4"
85° 31' 45.5"

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

SAMPLING TEAM: J. Richardson, D. Whiting

SIGNATURE:

DATE: 1/6/04

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

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

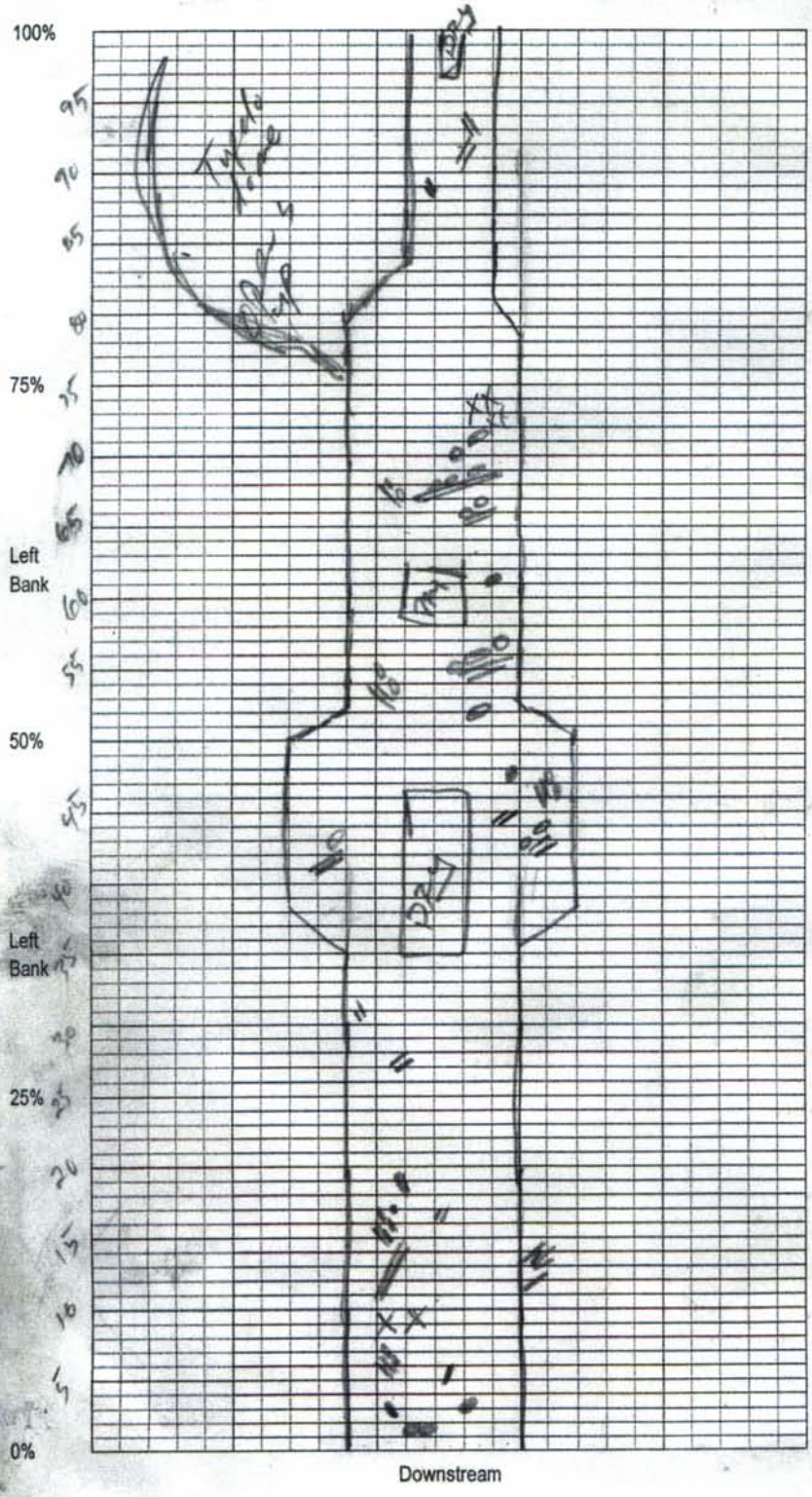
SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 1/6/04	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Jackson	LOCATION: N. Snow Creek Control Site 1	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 13	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 12	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 14	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 11 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** 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 16 Secondary Score 90	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

130 **TOTAL SCORE**

ANALYSIS DATE: 1/6/04	ANALYST: J. Richardson	SIGNATURE:

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (December 11, 2001)
Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- // Snags
- XX Roots/undercut banks
- Leaf Packs (or mats)
- ☐ Macrophytes
- ☐ _____
- ☐ _____
- ☐ _____

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 vegetation is altered or eliminated.

Plants observed/other notes:

600 9
30
1 1
6
8
28

minnow Creek
Control Site1

DEP-SOP-001/01: Form FD 9000-3 (June 20 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: _____ SUBMITTING AGENCY NAME: _____	STORET STATION NUMBER:	DATE (M/D/Y): 1/6/04	TIME 1030	RECEIVING BODY OF WATER: Holmes Crk	
REMARKS:	COUNTY: Jackson	LOCATION: Alligator Creek @ 77		FIELD ID/NAME: Control Site 2	

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)
✓		✓	✓	✓			

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: LT 4m RT 0m

LIST & MAP DOMINANT VEGETATION ON BACK

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 7 m wide; too windy; m/s; m/s; m/s; 0.2 m deep; 1.0 m deep; 0.4 m deep

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

ARTIFICIALLY IMPOUNDED ☐ yes ☐ more sinuous

HIGH WATER MARK: 1.0 (m above present water level) + 1.0 (present depth in m) = 2.0 (m above bed)

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☑ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☐ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☑ OTHER: ☑ manure

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)	3.6	5	DIPNET	SAND	93	5	DIPNET
LEAF PACKS OF MATS	1.2	5	DIPNET	MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	1.5	5	DIPNET				

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	0.6	14.4	6.9	7.1	95			1.0
MID-DEPTH								
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: ☑ manure

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:

Field Blank Collected @ 1020

30 50 4.1

85 32 2.0

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

SAMPLING TEAM: ESPY, DECK

SIGNATURE: Julie Espy

DATE: 1/6/04

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):	RECEIVING BODY OF WATER:
		1/6/04	Holmes Ck

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Jackson	Alligator Ck @ 77	Control Site 2

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 12	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 6	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 7	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 8 Primary Score 33	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 9 Left Bank 9	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 2 Left Bank 3	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 3 Left Bank 3 Secondary Score 49	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

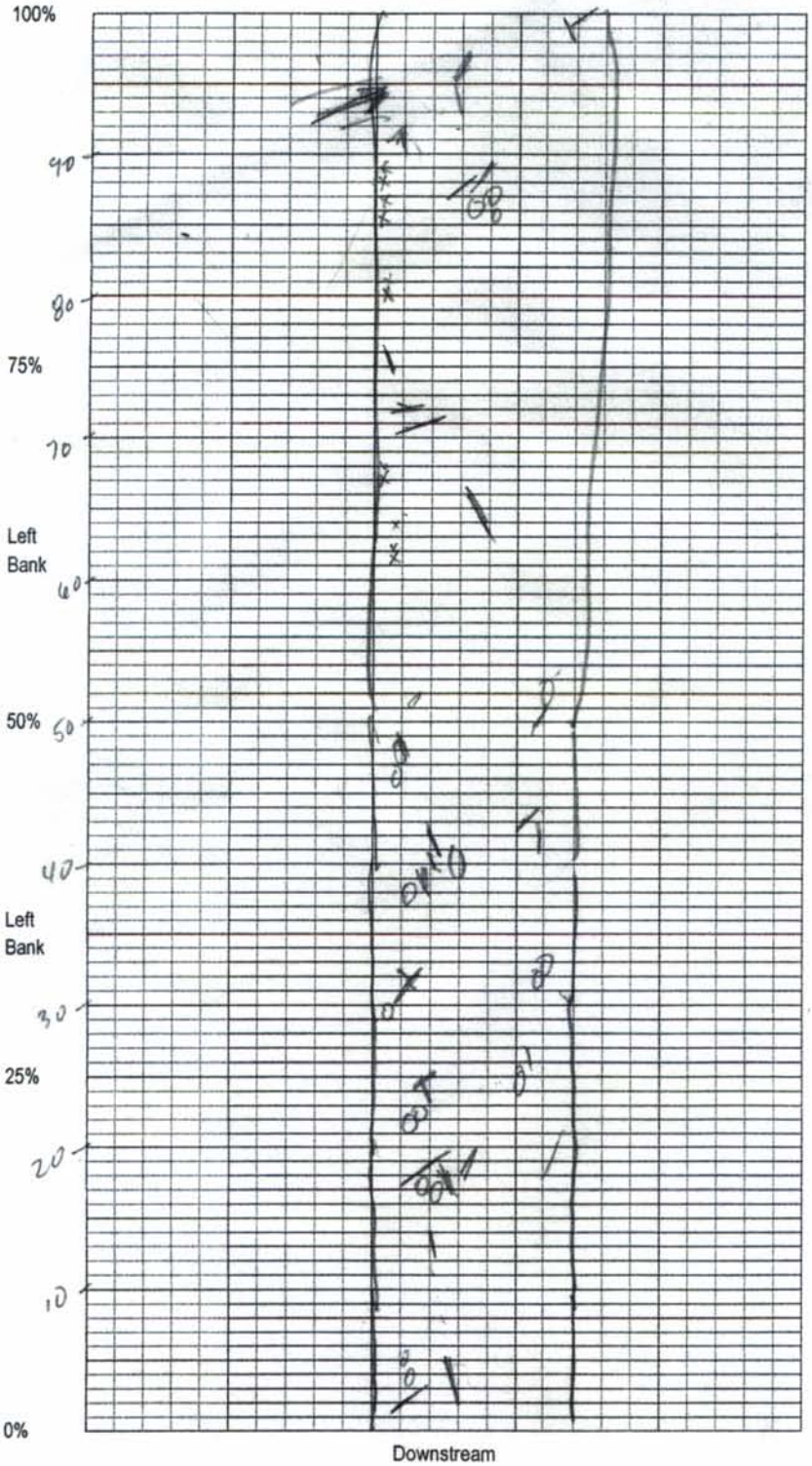
82 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
1-6-04	ESPY	Julie Espy

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (December 11, 2001)

Length of grid represents 100 m of stream (not linear meters).

(Horizontal scale is double vertical scale, draw proportionately).



~ 750 m²

Substrates: Code key, draw proportionate habitat abundance.

- Snags 3.6
- Roots/undercut banks 1.5
- Leaf Packs (or mats) 1.2
- Macrophytes
- _____
- _____
- _____

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 vegetation is altered or eliminated.

Plants observed/other notes:

DEP-SOP-001/01: Form FD 9000-3 (June 20 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: _____ SUBMITTING AGENCY NAME: _____	STORET STATION NUMBER:	DATE (M/D/Y): 1/6/04	TIME 10:50	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Jackson	LOCATION: Veit Dairy Test 1		FIELD ID/NAME:

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)

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☐ Heavy ☑

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☑

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: ☑

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☑ no ☐ recent, severe ☑ some recovery ☐ mostly recovered more sinuous

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK _____ + _____ = _____
(m above present water level) (present depth in m) (m above bed)

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

m wide		
m/s	0.08 m/s	m/s
m deep	0.5 m deep	m deep

CANOPY COVER %: OPEN: ☑ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☐ SEWAGE: ☑ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐ _____

SEDIMENT OILS: ABSENT: ☐ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☑ SAND SMOTHERING: NONE ☐ SLIGHT ☐ MODERATE ☐ SEVERE ☐ SILT SMOTHERING: NONE ☐ SLIGHT ☐ MODERATE ☐ SEVERE ☐ OTHER: _____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	7%	10		SAND			
LEAF PACKS OF MATS				MUD/MUCK/SILT	93%	10	
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS				DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.2	12.23	7.46	8.07	2106			
MID-DEPTH	0.2	12.45	7.47	4.33	2106			
BOTTOM	0.2	12.47	7.47	3.14	2108			

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: ☑ YOU ARE

WEATHER CONDITIONS/NOTES:
30° 50' 15.1"
85° 32' 43.1"

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

SAMPLING TEAM: J. Richardson, D. Lehiting

SIGNATURE: _____ DATE: 1/6/04

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

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

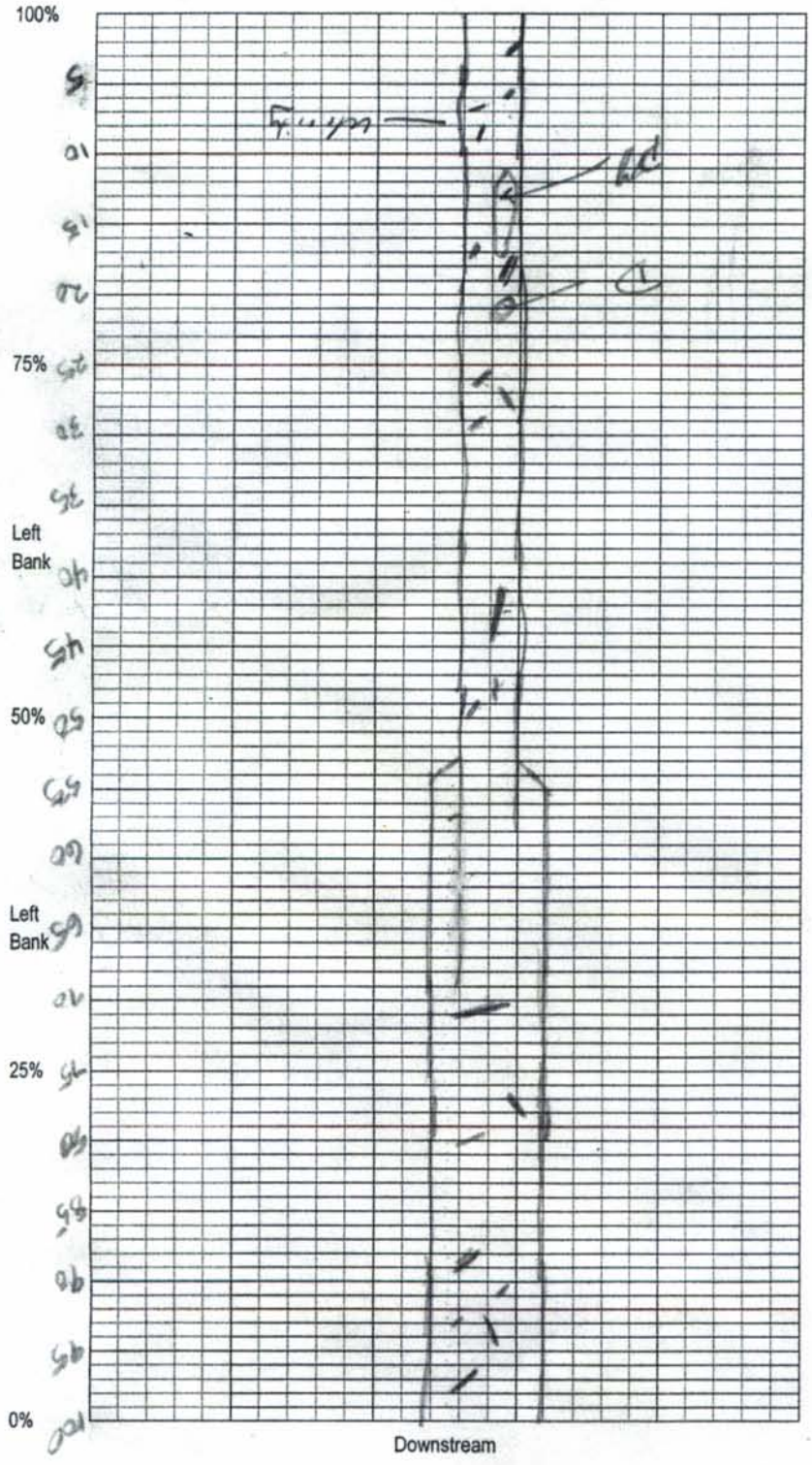
SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 11/6/04	RECEIVING BODY OF WATER:
REMARKS:	COUNTY: Jackson	LOCATION: Veit Dairy Test 1	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 2	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 1	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 6	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 2 Primary Score 19	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** 6	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 1 Left Bank 4	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 4 Left Bank 4	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 3 Left Bank 3 Secondary Score 36	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

55 **TOTAL SCORE**

ANALYSIS DATE: 11/6/04	ANALYST: J. Richardson D. Whiting	SIGNATURE:

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (December 11, 2001)
Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- [x] Snags
- [ ] Roots/undercut banks
- [ ] Leaf Packs (or mats)
- [ ] Macrophytes
- [ ] _____
- [ ] _____
- [ ] _____

Velocity: 0.08
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 vegetation is altered or eliminated.

Plants observed/other notes:

Veit Dairy Test 1

DEP-SOP-001/01: Form FD 9000-3 (June 20 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 1/6/04	TIME 12:30	RECEIVING BODY OF WATER: Holmes Crk
REMARKS:	COUNTY: Washington	LOCATION: Alligator Creek @ Williams Rd	FIELD ID/NAME: Test Site 2	

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)
✓		✓		✓			

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: >18m

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 + 1.0 = 2.0
(m above present water level) (present depth in m) (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 6 m wide

m/s	0.06 m/s	m/s
0.2 m deep	0.8 m deep	0.4 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)	3.8	5	DIPNET	SAND		5	DIPNET
LEAF PACKS OF MATS	1.5	5	DIPNET	MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	1.7	5	DIPNET	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	0.6	14.2	6.2	6.8	97			VOB
MID-DEPTH								
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:
30 48 54.8
85 32 52.6

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

SAMPLING TEAM: ESPY, DECK

SIGNATURE: Julie Espy

DATE: 1/6/04

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):	RECEIVING BODY OF WATER:
		1/6/04	Holmes Ck

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Washington	Alligator Ck @ Williams Rd	Test Site 2

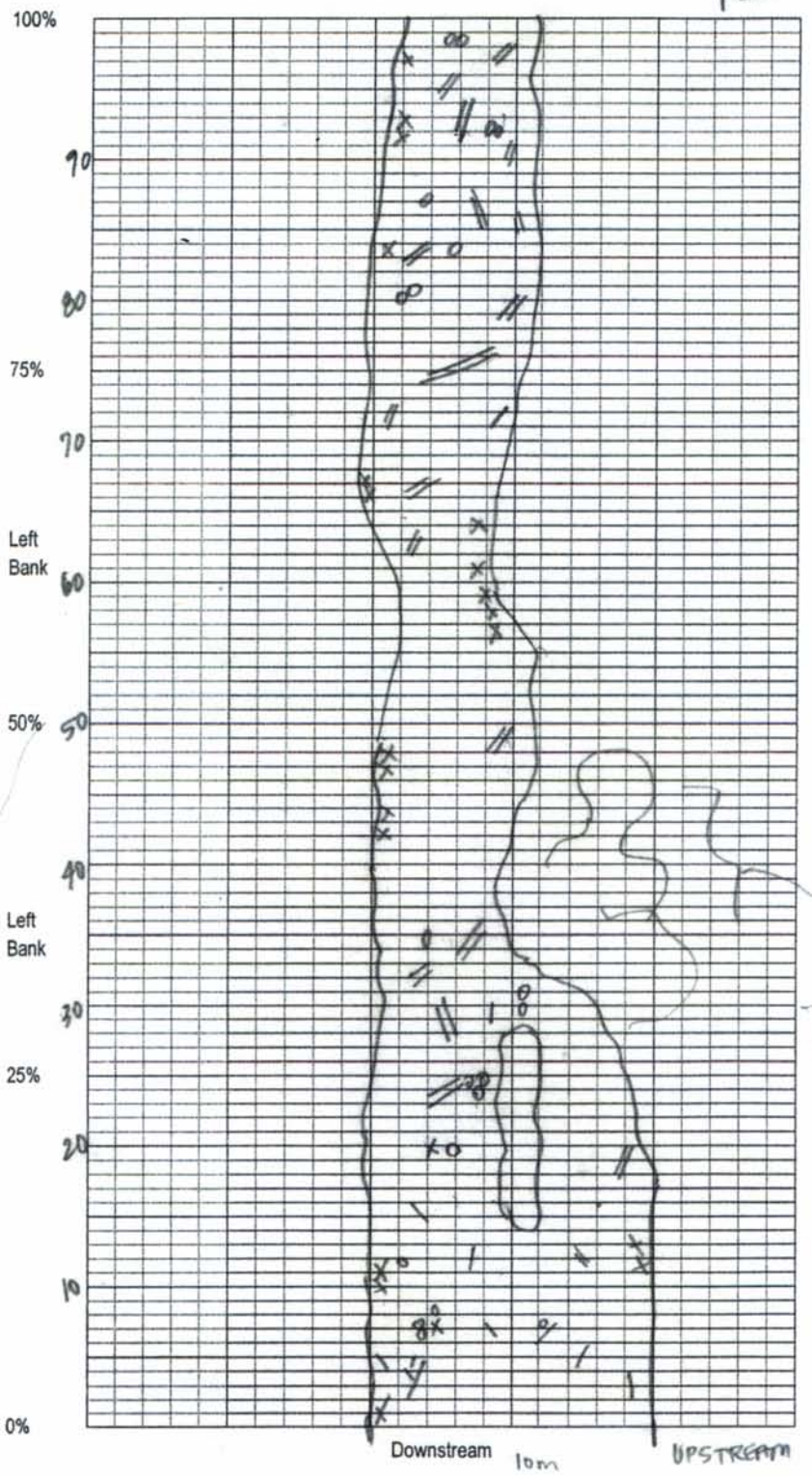
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 14	Four or more productive habitats present [snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. 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 7 (22)	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 7 (31)	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 12 Primary Score 40	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 9 Left Bank 9	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 (58)	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 6 Left Bank 6 Secondary Score 70	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

110 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
1-6-04	ESPY	Julie Espy

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (December 11, 2001)
Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Test Site 2



Substrates: Code key, draw proportionate habitat abundance.

- Snags $\frac{25}{650}$ = 3.8%
- Roots/undercut banks 1.7
- Leaf Packs (or mats) 1.5
- Macrophytes
- _____
- _____
- _____

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 vegetation is altered or eliminated.

Plants observed/other notes:

Appendix 6a

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the Veit Dairy for 28 days (February 3, 2004). Taxa collected and density (average number of individuals/m^2) rounded to the nearest individual (n = 3 samples). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Annelida				
Oligochaeta				
Dero digitata complex	-	83	-	83
Dero furcata	-	2	-	-
Enchytraeidae	-	-	-	2
Arthropoda				
Crustacea				
Amphipoda				
Crangonyx sp.	58	-	-	-
Gammarus sp.	-	-	-	2
Hyalella azteca	-	-	-	2
Isopoda				
Caecidotea sp.	121	2	-	2
Lirceus sp.	139	4	-	-
Insecta				
Coleoptera				
Neoporus sp.	2	-	-	34
Neoporus clypealis	-	62	-	-
Dineutus serrulatus	6	-	-	-
Scirtes sp.	-	-	2	-
Diptera				
Chironomus sp.	-	3	-	5
Corynoneura sp.	-	-	-	24
Cricotopus bicinctus	-	5	-	17
Dicrotendipes modestus	-	19	-	35
Dicrotendipes simpsoni	2	69	4	219
Endochironomus sp.	-	3	-	-
Hydrobaenus sp.	6	111	-	168
Labrundinia pilosella	-	3	-	2
Microtendipes pedellus grp.	-	-	-	5
Nanocladius sp.	2	35	2	64
Orthocladius oliveri	-	-	-	5
Parachironomus tenuicaudatus complex	-	-	-	5
Parakiefferiella sp. d epler	-	-	-	5
Parametriocnemus sp.	2	-	-	-
Paratanytarsus sp.	-	5	-	-
Phaenopsectra punctipes grp.	-	-	-	5
Polypedilum flavum	-	3	-	-
Polypedilum illinoense grp.	2	36	4	102
Polypedilum tritum	2	67	-	116
Rheocricotopus robacki	-	-	-	5
Simulium sp.	4	-	-	-
Tanytarsus sp. a epler	-	5	-	5
Tanytarsus sp. c epler	-	8	-	7
Tanytarsus sp. g epler	-	3	-	-
Tanytarsus sp. l epler	19	15	-	47
Tanytarsus sp. m epler	-	8	-	142
Tanytarsus sp. n epler	-	8	-	-
Tanytarsus sp. s epler	13	30	-	47
Thienemanniella xena	-	-	-	5
Thienemannimyia grp.	2	3	-	-
Unniella multivirga	-	-	-	9

Appendix 6a cont'd

Ephemeroptera				
Baetidae	-	2	-	-
Pseudocloeon sp.	2	-	-	2
Caenis sp.	-	2	-	-
Heptageniidae	-	-	-	4
Trichoptera				
Tricorythodes albilineatus	-	-	-	2
Mollusca				
Bivalvia				
Sphaeriidae	10	-	-	-
Gastropoda				
Ancylidae	2	-	-	-
Hydrobiidae	-	-	-	2
Platyhelminthes				
Platyhelminthes	-	2	-	-

Appendix 6b

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the Veit Dairy for 28 days (February 3, 2004). Taxa collected and total number of individuals counted (n = 3 samples).

	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Annelida				
Oligochaeta				
Dero digitata complex	-	42	-	42
Dero furcata	-	1	-	-
Enchytraeidae	-	-	-	1
Arthropoda				
Crustacea				
Amphipoda				
Crangonyx sp.	29	-	-	-
Gammarus sp.	-	-	-	1
Hyalella azteca	-	-	-	1
Isopoda				
Caecidotea sp.	32	1	-	1
Lirceus sp.	37	2	-	-
Isopoda	62	-	-	-
Insecta				
Coleoptera				
Dytiscidae	-	-	-	3
Neoporus sp.	1	30	-	14
Neoporus clypealis	-	1	-	-
Dineutus serrulatus	3	-	-	-
Scirtes sp.	-	-	1	-
Diptera				
Chironomidae	2	47	-	85
Chironomus sp.	-	1	-	2
Corynoneura sp.	-	-	-	10
Cricotopus sp.	-	-	-	2
Cricotopus bicinctus	-	2	-	5
Dicrotendipes sp.	-	3	-	12
Dicrotendipes modestus	-	7	-	13
Dicrotendipes simpsoni	1	25	2	82
Endochironomus sp.	-	1	-	-
Hydrobaenus sp.	3	44	-	71
Labrundinia pilosella	-	1	-	1
Microtendipes pedellus grp.	-	-	-	2
Nanocladius sp.	1	14	1	27
Orthocladius oliveri	-	-	-	2
Parachironomus tenuicaudatus complex	-	-	-	2
Parakiefferiella sp. d epler	-	-	-	2
Parametriocnemus sp.	1	-	-	-
Paratanytarsus sp.	-	2	-	-
Phaenopsectra punctipes grp.	-	-	-	2
Polypedilum sp.	-	1	-	-
Polypedilum flavum	-	1	-	-
Polypedilum illinoense grp.	1	14	2	43
Polypedilum tritum	1	26	-	49
Rheocricotopus robacki	-	-	-	2

Appendix 6b cont'd

Tanytarsus sp. a epler	-	2	-	2
Tanytarsus sp. c epler	-	3	-	3
Tanytarsus sp. g epler	-	1	-	-
Tanytarsus sp. l epler	9	6	-	20
Tanytarsus sp. m epler	-	3	-	60
Tanytarsus sp. n epler	-	3	-	-
Tanytarsus sp. s epler	6	12	-	20
Thienemanniella xena	-	-	-	2
Thienemannimyia grp.	1	1	-	-
Unniella multivirga	-	-	-	4
Simulium sp.	2	-	-	-
Ephemeroptera				
Baetidae	-	1	-	-
Pseudocloeon sp.	1	-	-	1
Caenis sp.	-	1	-	-
Heptageniidae	-	-	-	2
Trichoptera				
Tricorythodes albilineatus	-	-	-	1
Mollusca				
Bivalvia				
Sphaeriidae(mollusca)	5	-	-	-
Gastropoda				
Ancylidae	1	-	-	-
Hydrobiidae	-	-	-	1
Platyhelminthes				
Platyhelminthes	-	1	-	-

Appendix 7a

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of the Veit Dairy (January 6, 2004). Taxa list and number of individuals counted (collapsed). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Annelida				
Hirudinea				
Helobdella triserialis	-	1	-	-
Oligochaeta				
Dero digitata complex	-	8	-	1
Enchytraeidae	1	-	-	-
Limnodrilus sp.	1	1	-	3
Nais communis complex	-	-	-	12
Pristinella osborni	-	-	-	4
Eclipidrilus palustris	6	1	-	-
Arthropoda				
Acariformes				
Hygrobates sp.	2	-	-	-
Neumania sp.	-	2	-	-
Crustacea				
Amphipoda				
Crangonyx sp.	3	-	-	-
Gammarus sp.	-	-	-	1
Decapoda				
Palaemonetes sp.	-	1	-	-
Isopoda				
Caecidotea sp.	-	9	-	6
Lirceus sp.	3	14	-	-
Insecta				
Coleoptera				
Neoporus sp.	-	10	-	-
Neoporus clypealis	-	-	-	6
Stenelmis sp.	-	-	-	4
Scirtidae	-	1	-	-
Diptera				
Ceratopogonidae	1	-	-	-
Dasyhelea sp.	-	-	7	1
Cladotanytarsus sp.	-	1	-	-
Cladotanytarsus sp. f epler	6	-	-	5
Cricotopus bicinctus	2	-	1	-
Dicrotendipes modestus	-	2	-	-
Dicrotendipes simpsoni	-	8	-	5
Einfeldia sp. a epler	-	1	-	-
Goeldichironomus holoprasinus	-	-	62	-
Hydrobaenus sp.	-	-	-	1
Mesosmittia sp.	-	-	1	-
Nanocladius sp.	-	1	-	-
Natarsia sp. a roback	-	3	-	-

Appendix 7a cont'd.

Parachironomus sp.	-	1	-	-
Pentaneura inconspicua	-	-	-	1
Polypedilum illinoense grp.	6	1	-	7
Polypedilum scalaenum grp.	1	-	-	-
Polypedilum trigonum	2	-	-	-
Polypedilum tritum	4	6	-	5
Procladius sp.	-	1	-	-
Tanytarsus sp. l epler	1	-	-	-
Tanytarsus sp. m epler	-	4	-	22
Tanytarsus sp. t epler	1	-	-	-
Tanytarsus sp. v epler	-	5	-	5
Tribelos jucundum	-	2	-	-
Culicidae	-	-	18	-
Psychoda sp.	-	-	20	-
Simulium sp.	15	-	-	2
Odontomyia sp.	-	-	3	-
Heteroptera				
Corixidae	-	2	-	-
Lepidoptera				
Pyralidae	-	1	-	-
Odonata				
Libellula auripennis	-	1	-	-
Trichoptera				
Oecetis inconspicua cmplx.	-	1	-	-
Oecetis nocturna	1	-	-	-
Mollusca				
Bivalvia				
Pisidium sp.	44	-	-	-
Sphaeriidae	-	25	-	23
Gastropoda				
Micromenetus sp.	1	2	-	-
Platyhelminthes				
Undetermined Platyhelminthes	-	-	-	1

Appendix 7b

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of Veit Dairy (January 6, 2004). Taxa list and number of individuals counted.

	Control Site 1	Control Site 2	Test Site 1	Test Site 2
Annelida				
Hirudinea				
Helobdella triserialis	-	1	-	-
Oligochaeta				
Dero digitata complex	-	8	-	1
Enchytraeidae	1	-	-	-
Limnodrilus sp.	1	1	-	3
Naididae	-	-	-	4
Nais communis complex	-	-	-	9
Pristinella osborni	-	-	-	3
Eclipidrilus palustris	6	1	-	-
Arthropoda				
Acariformes				
Hygrobates sp.	2	-	-	-
Neumania sp.	-	2	-	-
Crustacea				
Amphipda				
Crangonyx sp.	2	-	-	-
Gammarus sp.	-	-	-	1
Undetermined Amphipoda	1	-	-	-
Decapoda				
Palaemonetes sp.	-	1	-	-
Isopoda				
Caecidotea sp.	-	9	-	6
Lirceus sp.	3	13	-	-
Undetermined Isopoda	-	1	-	-
Insecta				
Coleoptera				
Dytiscidae	-	5	-	-
Neoporus sp.	-	5	-	5
Neoporus clypealis	-	-	-	1
Stenelmis sp.	-	-	-	4
Scirtidae	-	1	-	-
Diptera				
Ceratopogonidae	1	-	6	-
Dasyhelea sp.	-	-	1	1
Chironomidae	-	-	7	6
Cladotanytarsus sp.	-	1	-	-
Cladotanytarsus sp. f epler	6	-	-	4
Cricotopus bicinctus	2	-	1	-
Dicrotendipes sp.	-	-	-	3
Dicrotendipes modestus	-	2	-	-
Dicrotendipes simpsoni	-	8	-	1
Einfeldia sp. a epler	-	1	-	-
Goeldichironomus holoprasinus	-	-	55	-
Hydrobaenus sp.	-	-	-	1
Mesosmittia sp.	-	-	1	-
Nanocladius sp.	-	1	-	-
Natarsia sp. a roback	-	3	-	-

Appendix 7b cont'd

Parachironomus sp.	-	1	-	-
Pentaneura inconspicua	-	-	-	1
Polypedilum sp.	-	-	-	2
Polypedilum illinoense grp.	6	1	-	5
Polypedilum scalaenum grp.	1	-	-	-
Polypedilum trigonum	2	-	-	-
Polypedilum tritum	4	6	-	3
Procladius sp.	-	1	-	-
Tanytarsus sp.	-	7	-	-
Tanytarsus sp. l epler	1	-	-	-
Tanytarsus sp. m epler	-	1	-	21
Tanytarsus sp. t epler	1	-	-	-
Tanytarsus sp. v epler	-	1	-	4
Tribelos jucundum	-	2	-	-
Culicidae	-	-	18	-
Psychoda sp.	-	-	20	-
Simulium sp.	15	-	-	2
Odontomyia sp.	-	-	3	-
Heteroptera				
Corixidae	-	2	-	-
Lepidoptera				
Pyralidae	-	1	-	-
Odonata				
Libellula auripennis	-	1	-	-
Trichoptera				
Oecetis inconspicua cmplx.	-	1	-	-
Oecetis nocturna	1	-	-	-
Mollusca				
Bivalvia				
Pisidium sp.	1	-	-	-
Sphaeriidae	43	25	-	23
Gastropoda				
Micromenetus sp.	1	1	-	-
Planorbidae	-	1	-	-
Platyhelminthes				
Undetermined Platyhelminthes	-	-	-	1

Appendix 8



Photo #1

Wastewater from the scrape alley

Photo #2

Wastewater from the lagoons into ditch that crosses the pasture



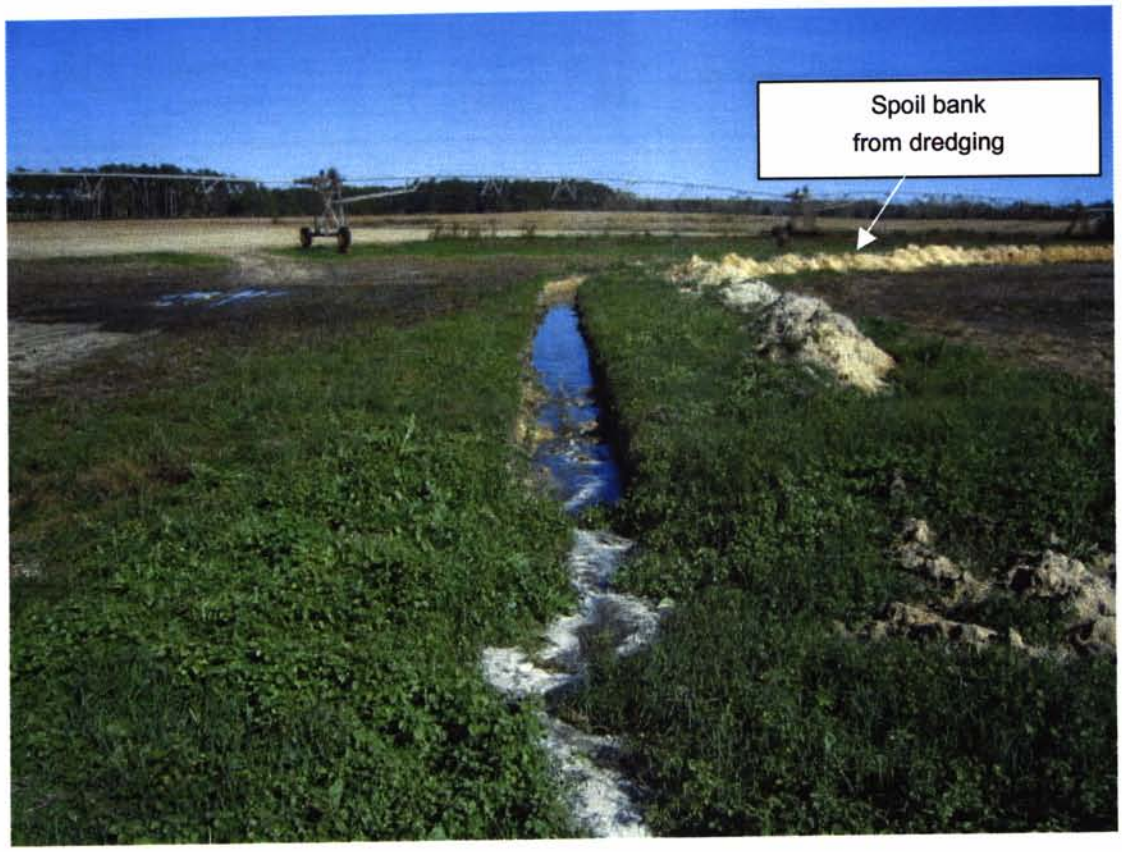


Photo #3

Ditching and dredging just below the point of discharge in Photo #2



Photo #4

The ditch as it goes through the pasture and enters a wetland on the property



Photo #5

Test Site #1

(The floating Hester-Dendy sampler is pictured here.)

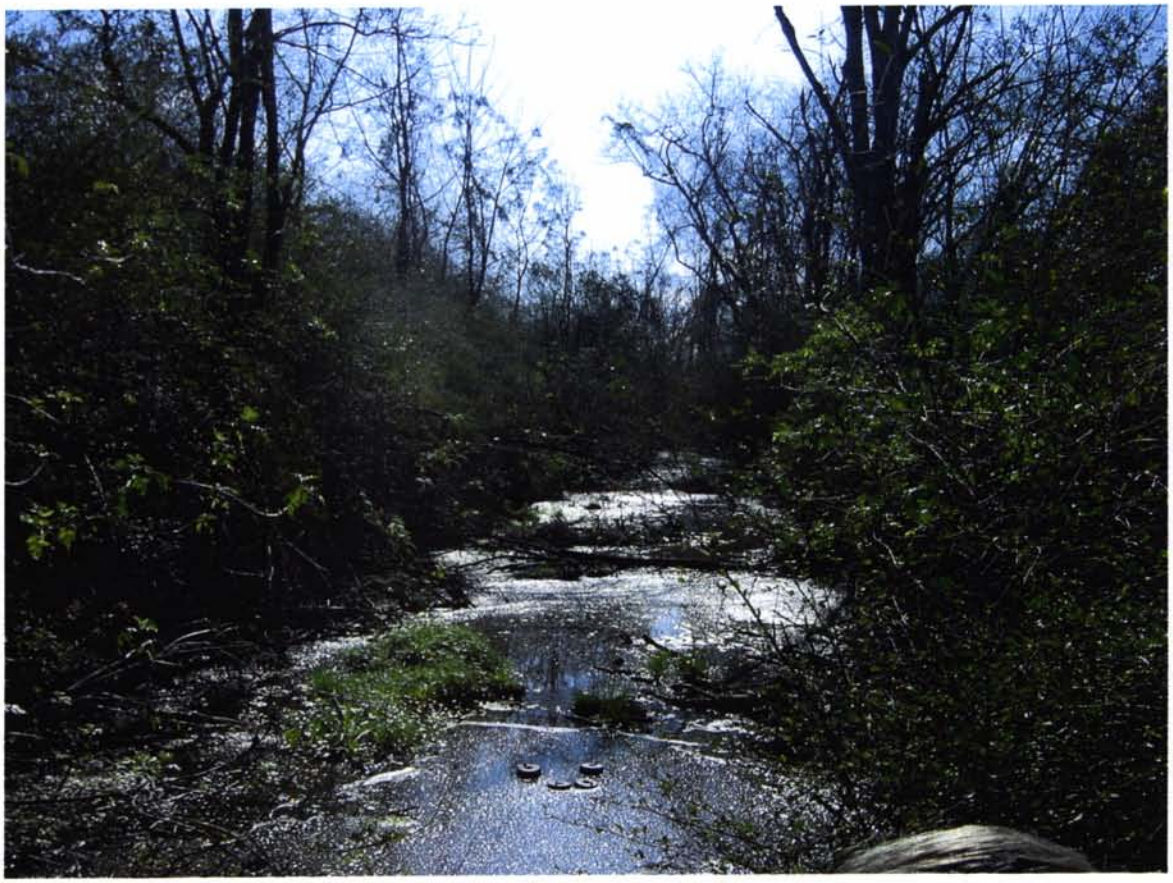


Photo #6

The water at Test Site 1, notice algal mats, turbidity, and color.