

Biological Assessment of

City of Madison STP

Madison County

NPDES #FL0020281

Sampled 15 July 1991

December 1991

Biology Section
Division of Technical Services

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger: City of Madison STP
County: Madison
NPDES Number: FL0020281
State Permit Expiration Date:

Toxics Sampling Inspection (**XSI**)	
Date Sampled:	15 July 1991
Results:	No problem levels of metals or organic priority pollutants in discharge, based on single grab sample.

Results:

Compliance Biomonitoring Inspection (**CBI**)	
Date Sampled:	15 July 1991
Results:	Not toxic to *Notropis leedsi* or to *Ceriodaphnia dubia* .

Impact Bioassessment Inspection (**IBI**)	
Date Sampled:	15 July 1991
Results:	Violations of biological integrity, growth of nuisance species, and imbalances of aquatic fauna occurred in the creek downstream of the discharge. The biota indicated that this site was grossly polluted with organic wastes. Violations of dominance of nuisance species and imbalances of aquatic flora occurred at County Camp Pond (the ultimate receiving waters), due to extreme nutrient enrichment.

Water Quality Inspection (**WQI**)	
Date Sampled:	15 July 1991
Results:	Violations of the following parameters occurred in the unnamed creek receiving the discharge: dissolved oxygen, specific conductance, unionized ammonia, and total coliform bacteria. Very high AGP and nutrients.

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

Introduction

The City of Madison Sewage Treatment Plant is a 0.7 MGD complete mix activated sludge domestic waste treatment facility located on Jesse Hughey Drive. The plant receives substantial inputs from Dixie Packers, a food processing operation. Discharge is to an unnamed stream which flows to County Camp Pond. Permit limits (as annual averages unless specified) are as follows: BOD (15 mg/L), TSS (20 mg/L), ammonia (1.5 mg/L), organic nitrogen (5 mg/L), dissolved oxygen (6.0 mg/L minimum), fecal coliform bacteria (200 organisms/ 100ml), and dechlorination (0.01 mg/L of Cl_2 maximum in final effluent).

This facility has a history of problems. In 1981, an intensive survey by DER indicated widspread dissolved oxygen and unionized ammonia violations in the receiving waters. Dixie Packers, Inc., is currently under regulatory proceedings for numerous violations of their pre-treatment standards for BOD, TSS and flow. In June, 1990, the company was fined $100,000 for these violations, which have constantly disrupted the treatment process at the Madison STP. A review of recent monthly operating report data indicated that the facility has exceeded ammonia limits on every sampling since October, 1990.

In April, 1991, a construction permit was granted to upgrade the facility, which includes building a 76,576 cubic foot aeration tank and additional clarifier.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Big Boggy Branch, Wakulla County) and a test site (in the unnamed stream down gradient of the discharge). A third site, located in County Camp Pond (which ultimately receives the discharge), was also sampled for phytoplankton and

Major characteristics of community structure of control and test sites (invertebrates and AGP).

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	34	4
Florida Index	9	0
% Contribution of Dominant Taxon	18.4	91.7
% Malacostraca	1.7	0
% Diptera	52.3	99.5
% Gastropoda	13.2	0
% Oligochaeta	17.2	.39
% Pelecypoda	6.9	0
% Odonata	2.3	0
% Other	6.4	.1
% Predators	13.1	.1
% Collector-Gatherers	40.9	54.0
% Collector-Filterers	14.1	0
% Scrapers	14.7	0
% Shredders	16.6	45.9
% Piercers	.30	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	27	3
Florida Index	7	0
Shannon-Weaver Diversity	3.5	0.06
% Malacostraca	1.9	0
% Diptera	83.9	99.7
% Ephemeroptera	.49	0
% Gastropoda	4.9	0
% Odonata	1.5	0
% Hirudinea	3.9	0
% Other	3.4	.3
% Predators	14.1	0
% Collector-Gatherers	49.8	50.2
% Collector-Filterers	9.7	0
% Scrapers	9.9	0
% Shredders	16.8	49.8
% Parasites	2.4	0
Algal Growth Potential (mg dry wt/l)	0.81	25.6

Major characteristics of community structure of control and test sites (algae).

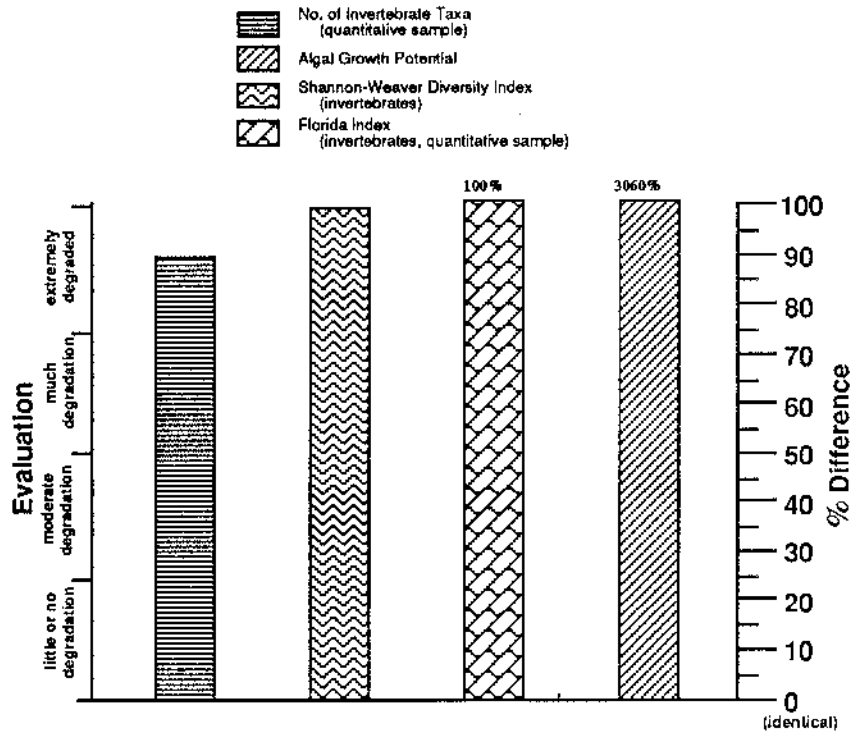
Phytoplankton Algae	County Camp Pond
Number of Taxa	11
% Contribution of Dominant Taxon	45.2
Chlorophyll a (ug/L)	120.6
Diatom/B-G Abundance Ratio	0
% Blue-green	88.0
% Green	11.4
% Diatoms	0
% Euglenophytes	0
% Cryptophytes	0.6

chlorophyll *a* (see Appendix). There was no upstream-downstream situation possible for this investigation. Although a search was made for a reference stream near the test site, one was not located. Data from Big Boggy Branch were used for this comparison for several reasons. First, the data were recently collected using the same staff and methods. Second, these data are typical (*i.e.*, not unusually or especially good) for slow moving swamp fed systems. Lastly, the Habitat Assessment score was considerably better at the test site (lower at the reference), meaning that disturbances observed would be directly attributable to water quality, not habitat. That is, one would expect the test site's biotic assemblage to be of higher quality than the reference site's, based on habitat. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms, were performed on an effluent sample (Peltier and Weber 1985, FDER 1985). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on reference and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Collection methods consisted of a timed (one hour per site) multi-substrate (*e.g.*, snags, vegetation, sediment) semi-quantitative effort. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Phytoplankton and chlorophyll *a* were sampled at County Camp Pond, which ultimately receives the Madison STP discharge (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa, Shannon-Weaver Diversity

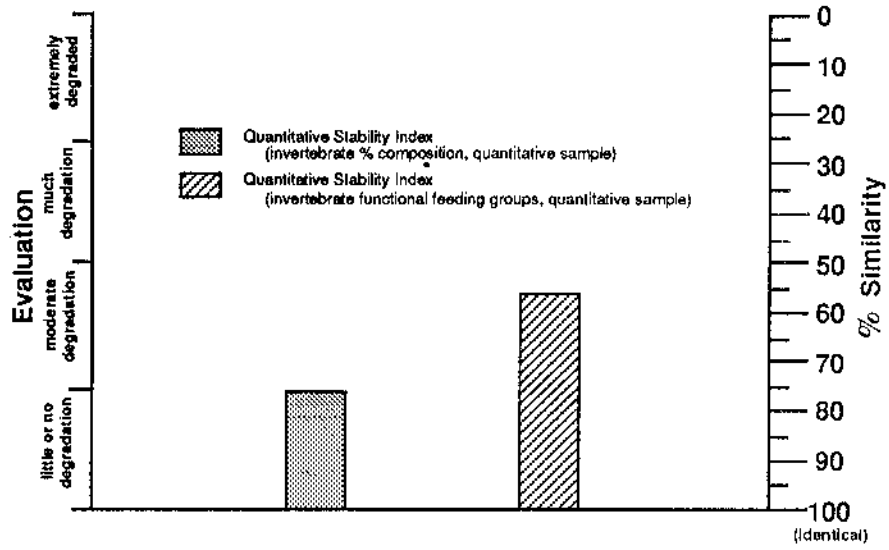


Effect of discharge on receiving stream
(measured as difference between control and test sites).

Index, and chlorophyll *a* are well known. Others are briefly explained here. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index and Florida Index are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandy McClure (Tallahassee Biology Laboratory).



Effect of discharge on receiving stream
(measured as similarity between control and test sites).

Results and Discussion

Habitat quality at the Madison STP test site (with 59 points) was adequate to support aquatic life. In fact, habitat there was twice as good as the reference site (with 30 points). The test site could be described as a swamp-fed stream within a mesic hammock community. However, evidence of the STP discharge was quite obvious, as sludge deposits of up to 0.3 meters were observed, as well as an abundant growth of sulfur reducing bacteria (cf., *Sphaerotilus sp.*). Both dissolved oxygen (1.0 mg/L) and conductivity (1500 µmhos/cm) were in violation of water quality standards at the test site (17-302.510(3)(g) FAC and 17-302.510(3)(O) FAC, respectively).

The full strength sample of effluent (zero chlorine residual) was not acutely toxic to the waterflea, *Ceriodaphnia dubia*, nor to the fish, *Notropis leedsi*, after 48 hours.

Small amounts of organic compounds were detected in the effluent, including 1,2-Dichlorobenzene (4.5 µg/L), 1,4-Dichlorobenzene (less than 3 µg/L), and trace amounts of aliphatics and phthalates. These concentrations are well below toxic levels, although dichlorobenzene is bio-accumulative.

Low levels of metals, including aluminum (48 µg/L), iron 197 µg/L), and zinc (9 µg/L) were also found in the effluent. These concentrations are not considered troublesome to aquatic organisms.

Nutrient concentrations were elevated in the effluent and at the downstream test site (see Table in Appendix). Ortho and total phosphorus at the test site were 3.9 mg/L and 4.7 mg/L, respectively, making this stream among the most phosphorus enriched streams in the state (Friedemann and Hand 1989). Similarly, total nitrogen (14.2 mg/L) was extremely high at the test site (TKN of 13 mg/L plus nitrate + nitrite of 1.2 mg/L), making this unnamed stream among the most nitrogen enriched flowing waters in the state (Friedemann and Hand 1989). Ammonia (6.6 mg/L) at the test site exceeded the facility's permit limit of 1.5 mg/L. The unionized ammonia portion was calculated to be 0.29 mg/L, a violation of 17-302.560 (3) FAC (unionized ammonia standard).

Algal growth potential at the test site (25.6 mg algal dry wt/L) also was

a problem. Raschke and Schultz (1987) report that AGP values above 5 mg dry wt/L generally coincide with symptoms of nutrient enrichment (algae blooms, dissolved oxygen crashes, fish kills).

Fecal coliform bacteria were within limits at the test site (280 organisms/100 mL), but total coliform standards there (with 3000 organisms/100 mL) were violated (17-302.560(5) FAC).

The benthic macroinvertebrate community at the Madison STP stream test site was extremely degraded. This was apparently due to the heavy organic loading (= very low D.O., toxic unionized ammonia, etc.) which the stream could not assimilate (see Table and Graphs). The graph on p. 2 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond to greater degrees of degradation. Negative values mean that the test site is better than the reference. The graph on p. 3 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond to greater degradation.

Taxa richness was very low at the test site both in timed qualitative (4 taxa) and Hester-Dendy samples (3 taxa). The taxa present (e.g., *Chironomus decorus, Goeldechironomus holoprasinus, Limnodrilus hoffmeisteri*) are known to be pollution tolerant and nuisance organisms (Beck and Beck 1969). Florida Index was zero for both sampling methods. Shannon-Weaver diversity was only 0.06, which is indicative of dramatically disturbed conditions. Trophic relationships, (as represented by the Quantitative Stability Index for functional feeding groups) were also askew at the test site. Therefore, violations of three types of macroinvertebrate based biological criteria occurred at the creek test site due to the Madison STP discharge: biological integrity (17-302.560(5) FAC), imbalances of fauna (17-302.560(19) FAC), and dominance of nuisance species (17-302.510(3)(q) FAC).

County Camp Pond, the ultimate receiving water for the Madison STP discharge, was also very degraded with respect to phytoplankton communities (see Table). Chlorophyll *a* there was measured to be 120.6 µg/L. Values above 40 µg/L are considered to be indicative of hypereutrophic conditions. A thick algal scum, consisting primarily of the nuisance blue-green alga, *Anabaena circinalis*, virtually covered the lake. This cyanophyte is particularly noxious, as it produces toxic metabolic by-products in addition to removing dissolved oxygen via respiration. Only eleven taxa of phytoplankters were found in County Camp Pond, and 88% of the individuals were blue-green algae. A diatom to blue-green algae ratio of zero further emphasizes the grossly polluted state of this lake system. These algae data clearly show that imbalances of aquatic flora and dominance of nuisance species standards were violated in County Camp Pond.

Conclusions

Numerous environmental problems were associated with the Madison STP discharge, primarily due to gross organic loading. Violations of the following parameters occurred in the unnamed creek receiving the discharge: dissolved oxygen, specific conductance, unionized ammonia, total coliform bacteria, biological integrity, growth of nuisance species, and imbalances of aquatic fauna. Extreme nutrient enrichment and elevated algal growth potential was observed downstream of the discharge. Growth of nuisance species and imbalances of aquatic flora violations occurred at County Camp Pond, the ultimate receiving waters.

Literature Cited

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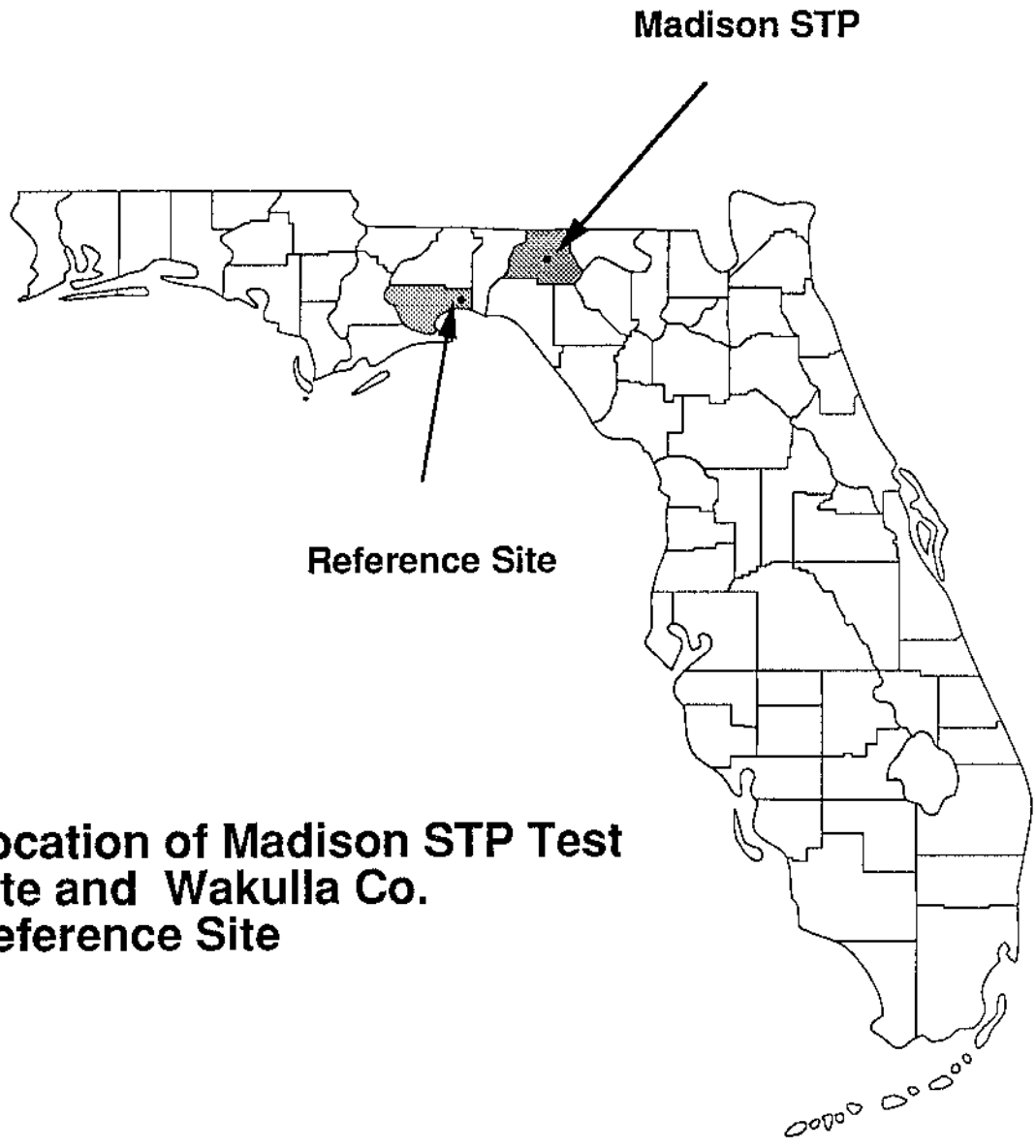
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Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

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Chemistry summary table for Madison STP.

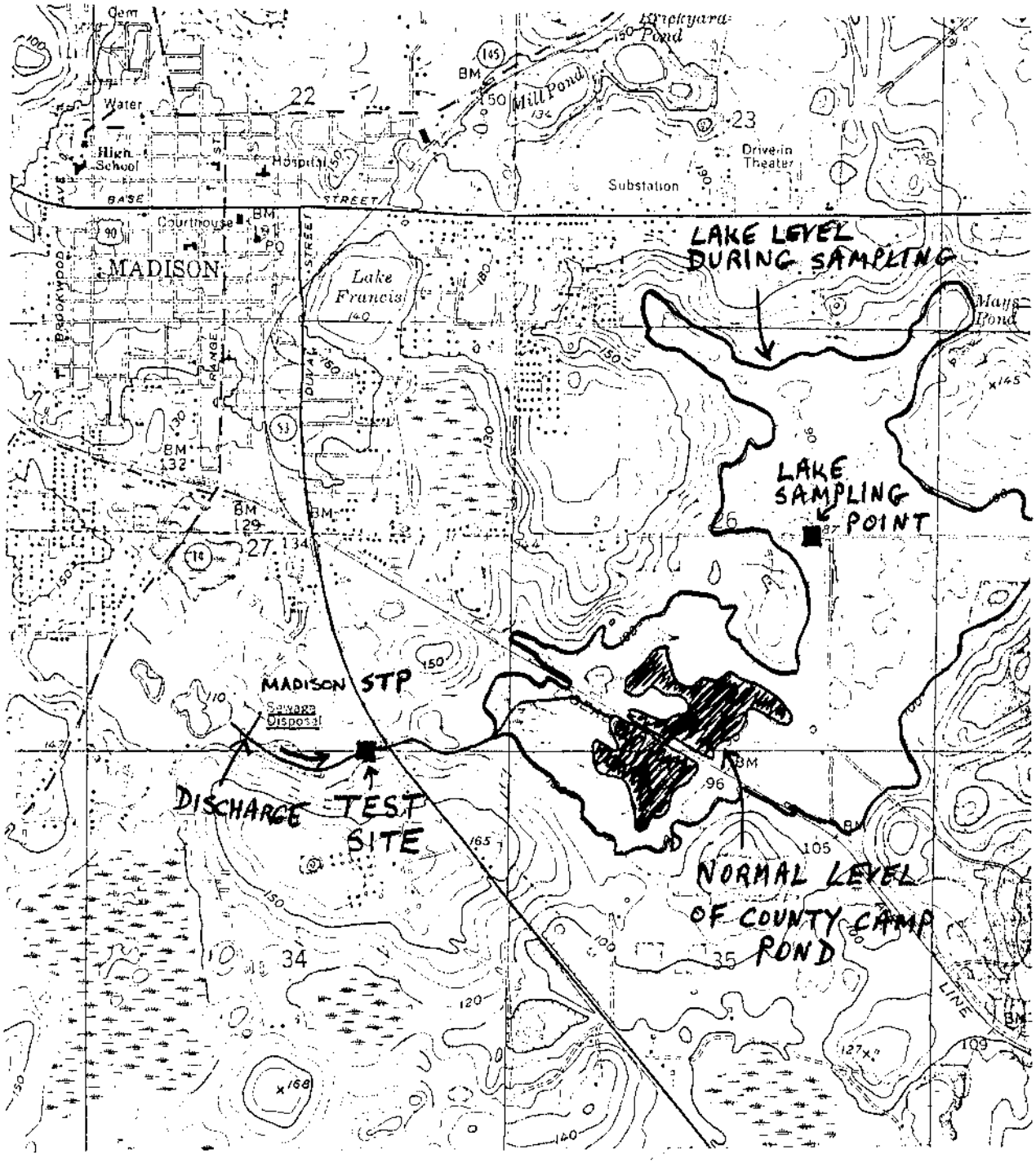
	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
1, 2-Dichlorobenzene	4.5 T		
1,4-Dichlorobenzene	3 K		
Aliphatics	Trace		
Phthalates	Trace		
Metals (ug/L)			
Aluminum	48 T		
Arsenic	20 U		
Cadmium	0.4 U		
Copper	5 U		
Chromium	10 U		
Iron	197 A		
Lead	15 U		
Mercury	0.2 U		
Nickel	5 U		
Silver	0.4 U		
Zinc	9 T		
Nutrients (mg/L)			
Ortho-phosphorus	5.5	0.14	3.9
Total phosphorus	6.7	0.2 U	4.7
Ammonia	1.4 A	0.04	6.6
Nitrate+Nitrite	1.4	0.04 U	1.2
TKN	4.4	0.2 U	13
Other Parameters			
Habitat Assessment		30	64
D.O. (mg/L)	5.0	6.8	1.0
Conductivity (umhos/cm)	1500	440	1500
Temperature (° C)	28.9	20.8	26.0
pH		7.9	7.8
Bioassay Fish-Dechlorinated	not toxic		
Bioassay Invertebrate-Dechlorinated	Toxic at 72 hrs- 85 % dead		
Fecal coliform		30	280
Total coliform		300	3000

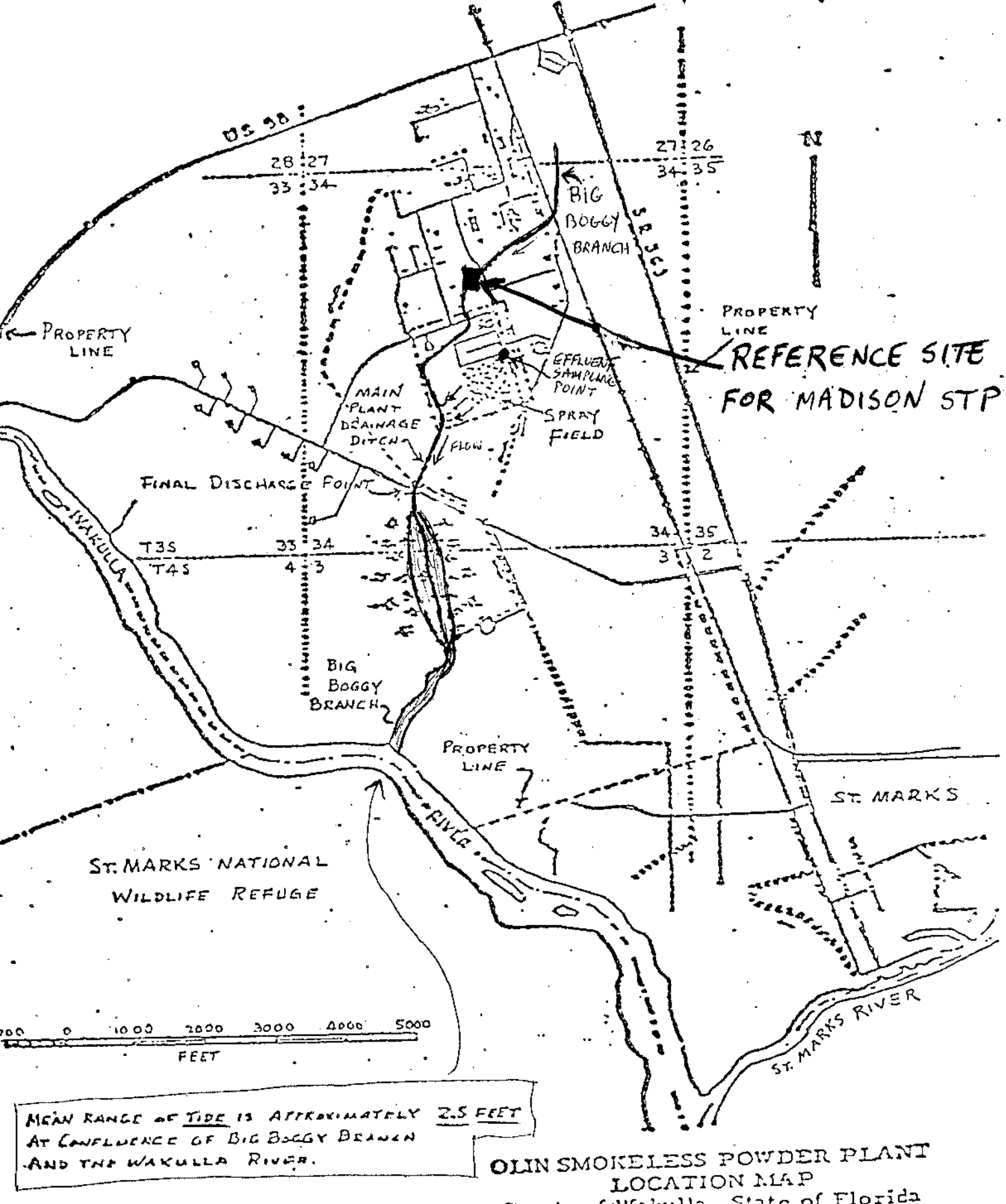


Location of Madison STP Test Site and Wakulla Co. Reference Site

FIGURE 2

CITY OF MADISON STP
DETAIL STUDY AREA





MEAN RANGE OF TIDE IS APPROXIMATELY 2.5 FEET AT CONFLUENCE OF BIG BOGGY BRANCH AND THE WAKULLA RIVER.

OLIN SMOKELESS POWDER PLANT
LOCATION MAP
County of Wakulla, State of Florida
Olin Corporation, P. O. Box 222
St. Marks, Florida 32355

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7-15-91	UNNAMED STREAM

REMARKS:	LOCATION:	FIELD ID/NAME:
WOULD BE NICE MESIC HAMMOCK STREAM W/O	MADISON STP STP DISCHARGE	002 DOWN

Habitat Parameter (score)	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 22	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 2025 RBF	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 12	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 8	Stable. No evidence of erosion or bank failure. Little potential for futuro problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 7	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	64 59 RBF

COMMENTS: VERY GRAY WATER (STP) SLUDGE DEPOSITS ~.3 M THICK

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7-15-91	RBF	Russell Frydenborg

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7-15-91	UNNAMED STREAM MADISON STP DISCHARGE

REMARKS:	LOCATION:	FIELD ID/NAME:
COATED W/ CF. SPHAEROTOLUS	MADISON STP DOWNSTREAM	DOWN

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
25%	25%	25%	25%			

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

Local Watershed NPS Pollution (check box): No evidence ☐ Some potential sources ☐ Obvious sources ☑

Point-Source Pollution (list location and describe): MADISON STP ~ 400 M UPSTREAM

Estimated Stream Width (range, m): 3 M	Estimated Stream Depth (range, m): .1 - .3		yes
High Water Mark (m above bed): .3	Velocity (range, m/s): .25 m/sec	Impounded ☐ Channelized ☐	

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☑

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☑ Petroleum: ☐ Chemical: ☐ Anaerobic: ☑ Other: ☐ _____

Sediment Oils: Absent: ☐ Slight: ☐ Moderate: ☑ Profuse: ☐

Sediment Deposits: Sludge: ☑ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	20
Sand:	60%	Mud/Muck (organic):	20

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	26.0		Secchi Depth (m):	
Mid-depth		1.0	pH (SU):	7.8
Bottom			Conductivity (µmho/cm):	1500
			Other Parameters: Turbidity	3.1 NTU

Stream Type (check box): Blackwater: ☑ Deep Aquifer Fed: ☑ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐ _____

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

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

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

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

Weather Conditions: HOT SUNNY

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7-15-91	RBF	Russell Frydenborg

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		4-22-91	BIG BOGGY CK.

REMARKS:	LOCATION:	FIELD ID/NAME:
	OLIN UPSTREAM	01 / REFERENCE SITE FOR MADISON STP

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
50					50	

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

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

Point-Source Pollution (list location and describe):

Estimated Stream Width (range, m): 1-3 M	Estimated Stream Depth (range, m): .1-.3	Impounded yes ☐
High Water Mark (m above bed): .4	Velocity (range, m/s): <.05	Channelized ☒

Canopy Cover % (check box): Open: ☒ Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☒ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:	10	Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell	10	Coarse Organic Debris:	5
Sand:	70	Mud/Muck (organic):	5

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	20.8	6.8	Secchi Depth (m):	.5
Mid-depth			pH (SU):	7.9
Bottom	20.4	6.8	Conductivity (µmho/cm):	440
			Other Parameters:	

Stream Type (check box): Blackwater: ☒ Deep Aquifer Fed: ☒ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐

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

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

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

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

Weather Conditions: PART SUN BREEZE

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

ANALYSIS DATE:	ANA	SIGNATURE:
4-22-91	R. FRYDENBORG	Russel Frydenborg

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		4-22-91	BIG BOGGY BR

REMARKS:	LOCATION:	FIELD ID/NAME:
1100 HRS	UPSTREAM OL/N	001 REFERENCE SITE FOR MADISON STP

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 15	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 5	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 3	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 2	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 5	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
\	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	30

COMMENTS: SOME COOLING WATER

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4-22-91 1100	R. FRYDENBORG	Russell Frydenborg

SAMPLE # 20610

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: MADISON WWTP
Address/City:
County:
Contact/District: RUSS F./TALLAHASSEE
NPDES Permit #: Outfall #:

Sample Collection: Date 7-15-91 Time
Test Beginning: Date 7-16-91 Time 1130
Test Ending: Date 7-18-91 Time 1045
Test Organism: CERIODAPHNIA DUBIA
Life Stage/Age: <24HRS

Test Number: 1 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks:
* all organisms are growing exuberantly and appear destressed - MF 7/16/91
A. checked at 72hrs. all controls still alive and >3 in vial D 7/19/91

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.9@9	9.0@20.0	1355@24.2	21.5@23.4
24 hr	7@7.9@9	9.0@20.0	1344@23.2	20.5@23.0
48 hr	7@7.9@9	9.0@20.0	1353@23.4	20.5@23.3

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	A	5	5	5	8.6		8.6	8.1		8.3	20.0		21.0	173		190
control	B	5	5	5			8.7			8.3						
control	C	5	5	5			8.7			8.3						
control	D	5	5	4			8.7			8.3						
100%	A	5	5	5*A	7.9		8.7	7.5		8.6	20.5		21.0	1683		1850
100%	B	5	5	5*A			8.7			8.7						
100%	C	5	5	4*A			8.7			8.7						
100%	D	5	5	4*A			8.7			8.7						
Measured/Loaded by:		KP	KP	KP	MF	MF		MF	MF	KP	MF	MF		ME		KP
Recorded by:		KP	KP	KP	AJ	KP		AJ	KP	AJ	AJ			AJ		AD

Investigators' Signatures
Alison Jourden
Kim Pearce
Marshall Faulkner

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	LAB BLANK		0.0	Hach	KWP
Lab Tot. Resid. Cl2:			0.0	Hach	KWP
Alkalinity:	119	73	200	Hach	KWP
Hardness:	127	88	122	Hach	KWP
Total Ammonia:	0.0	0.0	3.0	Hach	KWP

Ammonia meter slope:

DER Biology Section -- Acute Bioassay Bench Sheet

Sample Source: MADISON WWTP
Address/City:
County:
Contact/District:
NPDES Permit #: Outfall #:

Sample Collection: Date 7-15-91 Time
Test Beginning: Date 7-16-91 Time 1130
Test Ending: Date 7-18-91 Time 1045
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 26 days

Test Number: 2 of 2 Test Type: (Screening) Definitive
(Static) Static Renewal | Flow-through

Remarks:
Sample # 20610

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7,9@9	9.0@20.0	1355@24.2	21.5@23.4
24 hr	7@7,9@9	9.0@20.0	1344@23.2	20@23.0
48 hr	7@7,9@9	9.0@20.0	1353@23.4	20.5@23.3

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
CONTROL	1	5	5	5	8.2	7.7	8.2	7.7	8.0	8.2	21.0	19.8	19.5			
CONTROL	75	5	5	5	8.2	7.7	8.1	7.7	8.1	8.2				242	235	240
100%	163	5	5	5	7.9	7.4	8.0	7.4	8.0	8.3	20.8	19.8	19.5			
100%	63	5	5	5	7.9	7.5	8.0	7.4	8.0	8.3				1785	1728	1744
Measured/Loaded by:		MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		KP	MF	KP	AJ	KP	AJ	AJ	KP	AJ	AJ	KP	AJ	AJ	KP	AJ

Investigators' Signatures

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	LAB BLANK		0.0	Hach	KWP
Lab Tot. Resid. Cl2:			0.0	Hach	KWP
Alkalinity:	119	73	200	Hach	KWP
Hardness:	127	88	122	Hach	KWP
Total Ammonia:	0.0	0.0	3.0	Hach	KWP

Ammonia meter slope:

JOB ID: _____

SAMPLE ID: 21556, 557, 561, 562

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY SAMPLE SUBMITTAL FORM
PAGE 1

COLLECTION TIME A — GRAB SAMPLE

COLLECTION TIME B — COMPOSITE SAMPLE
BEGIN: _____
END: _____

SUBMITTING AGENCY CODE:	SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	COLLECTION DATE (M/D/Y):	DEPTH, FEET:
	DER		8/12/91	surf

COUNTY OF SAMPLE ORIGIN:	SAMPLE LOCATION:	FIELD ID/NAME:
Madison	Unnamed stream N Madison STP	downstream

WATER
- [x] SURFACE (FRESH)
- [ ] GROUND
- [ ] SURFACE (SALT)
- [ ] EFFLUENT
- [ ] TRIP BLANK
- [ ] FIELD BLANK
- [ ] EQUIPMENT BLANK
- [ ] DRINKING

SOIL/SEDIMENT
- [ ] SOIL
- [ ] FRESHWATER SEDIMENT
- [ ] MARINE SEDIMENT
- [ ] SLUDGE

TISSUE
- [ ] PLANT
- [ ] FISH
- [ ] SHELLFISH
- [ ] OTHER

CHEMICAL WASTE
- [ ]

PROGM. MOD. #	NPDES NUMBER (& OUTFALL NO., IF APPLICABLE): (required for all discharge related samples)
16C1	FL0020281

FIELD PARAMETERS MEASURED BY (NAME): _____

(SIGNATURE): K Burton

SAMPLED BY (NAME): _____

(SIGNATURE): SM McClure

FIELD REPORT, IF ANY, PREPARED BY (NAME): _____

(SIGNATURE): SM McClure

FIELD PARAMETERS	UNITS	CODE*	VALUE
CHLORINE, TOTAL RESIDUAL	mg/l	50060	
DISSOLVED OXYGEN (PROBE)	mg/l	00299	
pH	stnd. units	00400	
SALINITY	PPTH	00480	
SECCHI DEPTH	m	00078	
SPECIFIC CONDUCTANCE	µmho/cm	00094	
TEMPERATURE	°C	00010	

ANALYSIS/METHOD REQUESTED	SAMPLE CONTAINER DESCRIPTION	NO. OF CONTAINERS SUBMITTED	PRESERVATIVE USED
Fecal Coliform	whirlpak	3	ice
Bacteria-Total Fecal	Whirlpak	2	ice

NOTE, FILL OUT PAGE 2 (REVERSE) IF ANY LAB PARAMETERS LISTED THERE ARE DESIRED

SEND COPIES OF ANALYSIS REPORT TO:
- [ ] SUBMITTING AGENCY
- [x] D Richardson
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

*STORET CODES MAY ONLY APPLY TO FIELD MEASUREMENTS

[ ] SUBMITTING OFFICE FILL IN SHADED AREAS

PLEASE TYPE OR PRINT CLEARLY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY SAMPLE SUBMITTAL FORM
PAGE 2

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	CHLOROPHYLL-a (CORRECTED)	µg/l	32223	
	CHLOROPHYLL-a (NON-CORRECTED)	µg/l	32210	
	CHLOROPHYLL-b	µg/l	32212	
	CHLOROPHYLL-c	µg/l	32214	
	PHAEOPHYTIN-a	µg/l	32218	
	BOD, 5-DAY CARBONACEOUS	mg/l	80082	
	BOD, 5-DAY N-INHIBITED	mg/l	00314	
✓	FECAL COLIFORMS, MEMBRANE	no./100 ml	31616	280
	FECAL COLIFORMS, TUBE	no./100 ml	31615	
✓	TOTAL COLIFORMS, MEMBRANE	no./100 ml	31501	3,100
	TOTAL COLIFORMS, TUBE	no./100 ml	31506	
	FECAL STREPTOCOCCI, MEMBRANE	no./100 ml	31673	
	HETEROTROPHIC PLATE COUNT	no./1 ml	31751	
	SEDIMENT PRTCL SIZE, >2.0mm	%	80258	
	SEDIMENT PRTCL SIZE, 0.5-2.0mm	%	80254	
	SEDIMENT PRTCL SIZE, 0.126-0.5mm	%	46531	
	SEDIMENT PRTCL SIZE, 0.063-0.125mm	%	80251	
	SEDIMENT PRTCL SIZE, <0.063mm	%	80250	
	SEDIMENT PRTCL SIZE, 0.25-0.5mm	%	80253	
	SEDIMENT PRTCL SIZE, 0.125-0.25mm	%	80252	
	SEDIMENT ORGANIC FRACTION	%	80096	
	ALGAL ASSAY, LIMITING NUTRIENT	—	—	REPORT

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	ALGAL ASSAY, GROWTH POTENTIAL	mg/l	88209	
	INVERT, DIVERSITY INDX, ART SUBST	—	61455	
	INVERT, DI, AS, 95% CONF INT	—	61456	
	INVERT, DIVERSITY INDX, NAT SUBST	—	61453	
	INVERT, DI, NS, 95% CONF INT	—	61454	
	INVERT, ART SUBST, NO. SPP.	—	61457	
	INVERT, NAT SUBST, NO. SPP.	—	61458	
	INVERT, FLORIDA INDEX	—	—	
	INVERT, SPECIES ID/COUNT	—	—	REPORT
	PERIPHYTON, SPECIES ID/COUNT	—	—	REPORT
	PHYTOPLNKTN, SPECIES ID/COUNT	—	—	REPORT
	TOXICITY ASSAY, MICROTOX	—	—	REPORT
	TOXICITY ASSAY, ACUTE, SCRNG	—	—	REPORT
	TOXICITY ASSAY, ACUTE, DFNTV	—	—	REPORT
	TOXICITY ASSAY, FLOW-THROUGH	—	—	REPORT
	TOXICITY ASSAY, CHRONIC, SCRNG	—	—	REPORT
	TOXICITY ASSAY, CHRONIC, DFNTV	—	—	REPORT

D S

D S

REMARKS:

ANALYST(S): M S Conyers DATE(S): 8/13/91

REVIEWED BY: DATE:

PLEASE TYPE OR PRINT CLEARLY

Taxa list for Madison STP., collected on Hester-Dendy samplers below the discharge on 12 August, 1991. Reference data is from Big Boggy Branch, Wakulla County.

	Reference Site	Test Site
Coleoptera		
Stenelmis sp.	1	0
Diptera		
Ablabesmyia cinctipes ?	1	0
Ablabesmyia mallochi	4	0
Chironomus decorus grp.	33	245
Cladotanytarsus sp.	2	0
Cryptochironomus sp.	3	0
Dicrotendipes modestus	2	0
Dicrotendipes neomodestus	8	0
Goeldichironomus holoprasinus	18	1
Orthocladius annectens	1	0
Palpomyia grp. sp.	1	0
Polypedilum fallax grp.	1	0
Polypedilum illinoense	1	0
Polypedilum scalaenum	1	0
Undetermined dipteran pupae	10	0
Tanytarsus sp.	12	0
Tribelo jucundum	1	0
Tribelos sp.	1	0
Ephemeroptera		
Callibaetis floridanus	1	0
Gastropoda		
Hebetancyclus excentricus	4	0
Micromenetus dilatus	1	0
Physella sp.	1	0
Hirudinea		
Helobdella sp.	5	0
Lepidoptera		
Undetermined Noctuidae	0	1
Malacostraca		
Hyalella azteca	2	0
Odonata		
Argia moesta	1	0
Enallagma cardenium	1	0
Enallagma sp.	1	0
Trichoptera		
Oxyethira sp.	2	0
Undetermined trichoptera pupa	1	0

Taxa list for Madison STP. collected via timed qualitative method below the discharge on 15 July, 1991. Reference data is from Big Boggy Branch, Wakulla County.

	Reference Site	Test Site
Coleoptera		
Undetermined curculionidae	12	0
Hydrobius sp.	24	0
Diptera		
Ablabesmyia mallochi	12	0
Chironomus decorus grp.	42	2832
Cladotanytarsus sp.	108	0
Clinotanypus sp.	6	0
Conchapelopia sp.	6	0
Cricotopus bicinctus	192	0
Cryptochironomus sp.	6	0
Goeldechironomus holoprasinus	0	480
Larsia sp.	6	0
Meropelopia sp.	6	0
Palpomyia grp. sp.	0	0
Polypedilum halterale grp.	6	0
Polypedilum illinoense	60	0
Polypedilum scalaenum	6	0
Procladius bellus	6	0
Procladius sp.	6	0
Undetermined dipteran pupae	36	0
Tanytarsus sp.	30	0
Tanypus neopunctipennis	12	0
Gastropoda		
Hebetancyclus excentricus	24	0
Physella cubensis	78	0
Pseudosuccinia columella	36	0
Hemiptera		
Belostoma testaceum	0	6
Lepidoptera		
Munroessa sp.	6	0
Undetermined noctuidae sp.	12	0
Malacostraca		
Hyalella azteca	18	0
Odonata		
Ischnura ramburii	18	0
Orthemis ferruginea	6	0
Oligochaeta		
Aulodrilus pigueti	42	0
Dero digitata	6	0
Limnodrilus angustipenis	6	0
Limnodrilus hoffmeisteri	30	24
Limnodrilus sp.	84	0
Lumbriculus inconstans	12	0

Pelecypoda		
Undetermined sphaeriid	72	0
Trichoptera		
Cheumatopsyche sp.	6	0
Oxyethira sp.	6	0

Phytoplankton taxa list for County Camp Pond, Madison County, Florida, collected 15 July, 1991.

Chlorophyta	
Ankistrodesmus sp.	44
Gloeocystis sp.	220
Kirchneriella sp.	264
Scenedesmus sp.	44
Tetraedron sp.	44
Unknown chlorophyte flagellate	220
Cryptophyta	
Cryptomonas sp.	44
Cyanophyta	
Anabaena circinalis	3297
Chroococcus sp.	176
Microcystis aeruginosa	835
Oscillatoria sp.	2110

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0020281		910715		B	S	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0020281		910715		X	S	1

Remarks

21 66