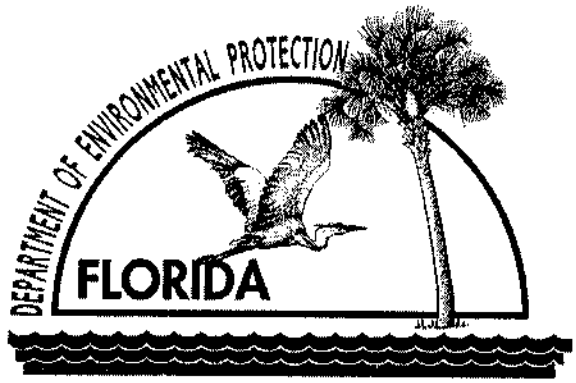


Biological Assessment of

City of Monticello Sewage Treatment Plant

Jefferson County

NPDES #FL0027839

Sampled December 1995

April 1996

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: City of Monticello STP
County: Jefferson
NPDES Number: FL0027839
NPDES Permit Expiration Date: 30 September 96

Toxics Sampling Inspection (XSI)

Date Sampled: 12 December 1995

Results: No organics were detected in the effluent. No metals were found in the effluent above Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 12 December 1995

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 12 December 1995

Results: Most measures of benthic macroinvertebrate community health indicated the test site was stressed, compared with the reference site. In this case, the reduction in biological health at the test site may be attributed to the recent desiccation there and to insufficient time for subsequent invertebrate recruitment, rather than to other anthropogenic factors. There also appeared to be no adverse changes in the periphyton community that could be related to the Monticello discharge.

Water Quality Inspection (WQI)

Date Sampled: 12 December 1995

Results: The effluent (2,100 organisms/100 mL) and reference site (3,000 organisms/100 mL) fecal coliform counts exceeded Class III water quality standards (Rule 62-302.560(6) FAC), as well the permit limit. Similarly, effluent and reference site total coliforms (15,000 and 10,000 organisms/100 mL, respectively) exceeded Class III water quality standards, Rule 62-302.560(7) FAC. These results indicate the facility was not adequately disinfecting the discharge at the time of sampling, and that additional bacterial sources are present in the basin, presumably from stormwater inputs. The low test site coliform levels indicate the treatment wetland is effectively reducing bacteria levels, both from the effluent and from stormwater. Although effluent values of nitrate-nitrite (10 mg/L) and total phosphorus (1.2 mg/L) were somewhat elevated, nutrient enrichment was not observed at the test site. In fact, bioreactive nutrients actually decreased from the reference site to the test site. The reference site nitrate-nitrite value (0.31 mg/L) was higher than those found in approximately 80% of other Florida streams, which may be related to the presence of the nursery upstream. Algal growth potential (AGP) results were 5.2 mg dry wt/L in the effluent sample, 23.5 mg dry wt/L at the reference site, and 48.5 mg dry wt/L at the test site. The low AGP of the effluent, despite the elevated bioreactive nutrients, suggests that substances inhibitory to algal growth were also present in the sample. The elevated AGP at the reference site probably reflects stormwater inputs.

Introduction

The City of Monticello Sewage Treatment Plant, located in Jefferson County Florida, is a 1.0 MGD domestic wastewater facility (see maps in Appendix). Treatment includes flow equalization, nitrification, clarification, digestion, and disinfection. The effluent is discharged into an unnamed storage wetland near the facility, which is intermittently pumped (approximately four miles) to a treatment wetland adjacent to Wolf Creek Swamp (see maps in Appendix). Effluent flow to the storage wetland during this survey (0.442 MGD) was similar to the facility's average flow (0.462 MGD). Water is discharged from the storage wetland into the treatment wetland during periods of extended rainfall, generally only in the winter (Ren Gebhard, facility manager, personal communication). The treatment wetland, as well as Wolf Creek Swamp, usually go dry during the summer while the facility is not discharging. During placement of the Hester-Dendy samplers, the amount of water being discharged into the treatment wetland could be characterized as a "trickle" (flow data to the treatment wetland was not available).

Permit limits include: flow (1.0 MGD maximum), pH (6-8.5 SU), CBOD and TSS (20 mg/L as an annual average), chlorine residual (maximum of 0.01 mg/L at discharge), dissolved oxygen (minimum of 5.0 mg/L), fecal coliforms (200 organisms/100 mL maximum), and total phosphorus (6.6 mg/L as a monthly maximum). Extensive monitoring is also required at the treatment and

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	35	26
Florida Index	14	4
SCI	33	23
EPT Index	6	0
% Contribution of Dominant Taxon	13.1	20.1
% Oligochaeta	2.0	6.4
% Diptera	58.2	57.4
% Ephemeroptera	23.5	0
% Pelecypoda	3.3	5.4
% Gastropoda	10.5	10.3
% Coleoptera	2	0.5
% Amphipoda	0	9.3
% Isopoda	0	10.8
% Trichoptera	0.7	0
% Predators	10.5	3.9
% Above Surface Deposit Feeders	39.2	33.3
% Below Surface Deposit Feeders	2.0	6.4
% Suspension Feeders	18.6	7.8
% Scrapers	22.9	10.3
% Shredders	6.9	27.2
% Scavengers	0	11.0
Macroinvertebrate Hester-Dendy		
Number of Taxa	26	12
Florida Index	10	1
Shannon-Weaver Diversity	4.0	3.2
EPT Index	4	0
% Oligochaeta	0.9	5.4
% Diptera	35.1	59.5
% Ephemeroptera	19.8	0
% Amphipoda	0	8.1
% Gastropoda	37.8	24.3
% Coleoptera	4.5	2.7
% Other	1.8	0
% Predators	12.5	0
% Above Surface Deposit Feeders	25.8	29.7
% Below Surface Deposit Feeders	0.9	5.4
% Suspension Feeders	6.8	4.1
% Scrapers	50.0	25.7
% Shredders	3.6	24.3
Periphyton Algae		
Number of Taxa	31	24
Shannon-Weaver Diversity	4.0	4.3
Algal Density (#/sq. cm)	32,155	15,658
Chlorophyll a (mg/sq. m)	0.11	0.10
Diatom/Diatom + B-G Abundance Ratio	0.87	0.55
% Blue-green	10.3	39.5
% Green	17.1	13.2
% Diatoms	71.8	47.4
% Other	0.9	0
Algal Growth Potential (mg dry wt/l)	23.5	48.5

receiving wetlands (see Facility Summary in Appendix).

There has been only one exceedance of permit limits (fecal coliforms greater than 200 organisms/100 mL) during the past year.

Methods

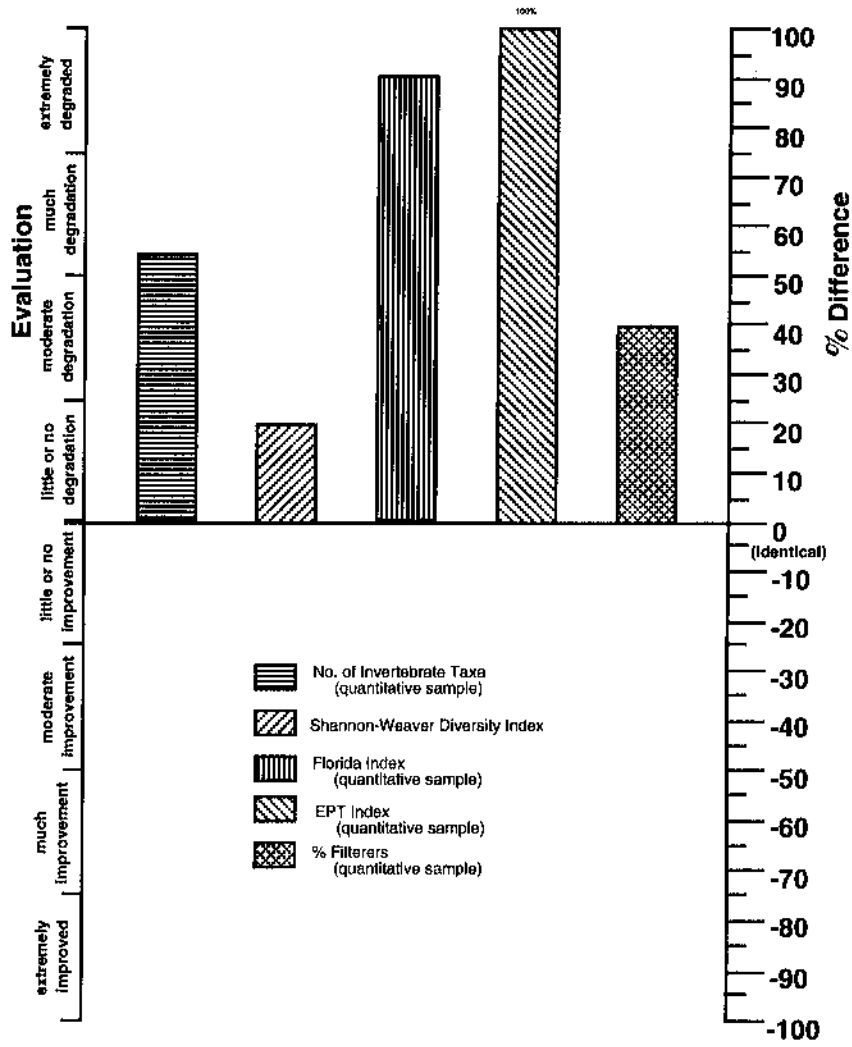
The focus of this investigation was to determine the discharger's effects on the receiving waters. Effluent was collected prior to the storage wetland. A comparison of biological community health was made between a reference site (in an unnamed creek flowing into Wolf Creek Swamp) and a test site (located in an intermittently flowing, stream-like portion of Wolf Creek Swamp, approximately one mile downstream of the discharge). Habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the effluent, the reference site, and the test site. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at the reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using 20 discrete dip net sweeps. Hester-Dendy artificial substrates, which were incubated for 28 days (Ross 1990), were also deployed. Periphyton was sampled at the reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

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

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



Effect of discharge on the benthic macroinvertebrate community.

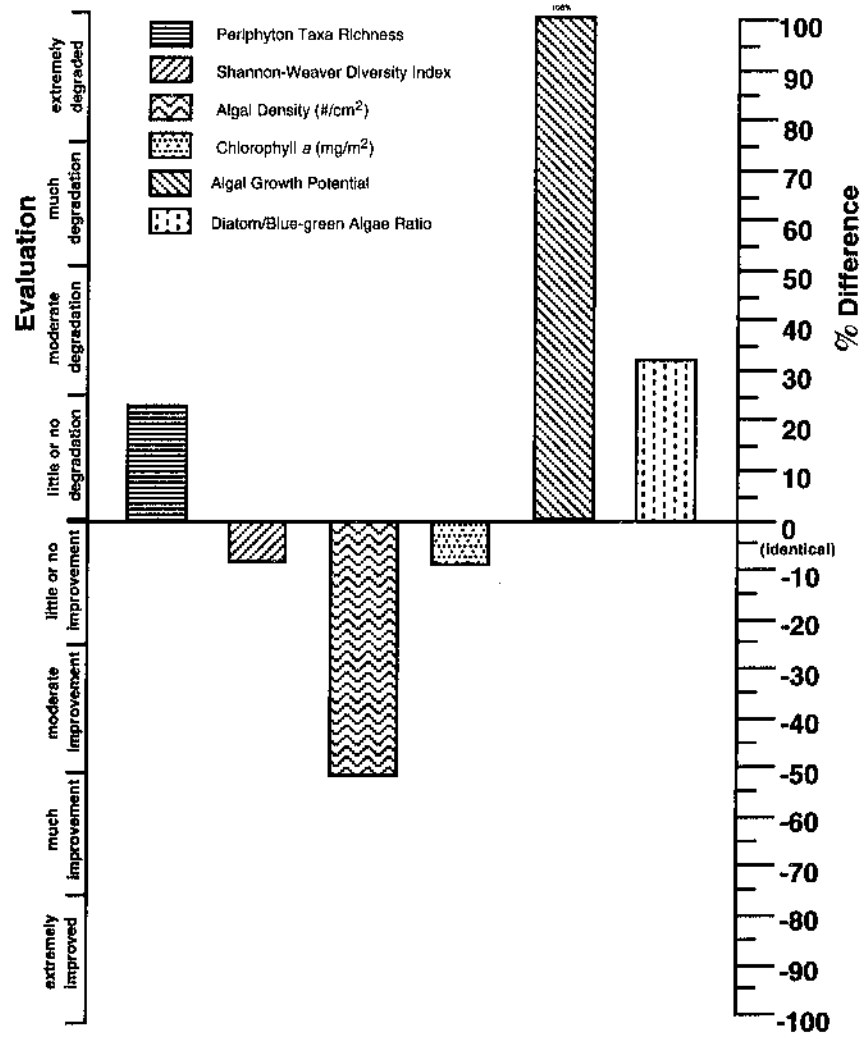
Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single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

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

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

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.



Effect of discharge on the algal community.

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream Condition Index for Florida (SCI) is a composite macroinvertebrate metric (EA Engineering 1994). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SCI calculation table in Appendix).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, and the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Glenn Butts and Lisa Kelley (DEP Northwest District) and Lyn Burton, Russel Frydenborg, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Lisa Tamburello, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

As is routine with bioassessment studies, there was an attempt to establish appropriate test and reference sites to evaluate potential effects from the discharge. Information regarding the test site, which became available after the study was complete, indicated it was significantly influenced by factors other than the discharge (*i.e.*, recent desiccation). The Monticello STP manager had observed that the test site area was dry during the entire summer preceding our study (Ren Gebhard, personal communication). This desiccation event, which occurred within two months prior to sampling, is expected to have been the overriding factor affecting the macroinvertebrate community there. It is likely that incomplete recruitment of invertebrates at the test site had occurred before it was sampled.

At first glance, the habitat quality scores, with 119 points at the reference site and 109 points at the test site, appeared fairly similar. However, the test site scored in the "marginal" category for bottom substrate/available cover, mostly due to the observation that the leaf packs and snags were "fresh", or recently deposited. This was consistent with the only recent return of water to the site. The test site did score well in the categories of riparian zone width, riparian zone vegetation quality, bank stability, and deposition.

There were some differences between the reference and test sites regarding physical/chemical measurements. Dissolved oxygen was 10.5 mg/L at the reference site, decreasing to 6.1 mg/L at the test site. The pH was 7.6 SU at the reference site and 6.6 SU at the test site. The temperature at the reference (8.1 °C) was slightly higher than the test site (6.6 °C). Specific conductance at both sites was equally low, ranging from 30 µmhos/cm at the reference site to 42 µmhos/cm at the test site. The low specific conductance at the test site suggests that very little effluent (with a conductivity of 358 µmhos/cm) actually reached this sampling station, presumably due to dilution.

No organic priority pollutants were detected in the effluent sample. None of the metals detected in the effluent exceeded Class III standards.

The full strength effluent sample was not acutely toxic to the invertebrate, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi* (Appendix).

Fecal coliform bacteria numbered 2,100 organisms/100 mL in the effluent, 3,000 organisms/100 mL at the reference site, and 18 organisms/100 mL at the test site. The effluent and reference site values exceeded Class III water quality standards (Rule 62-302.560(6) FAC), and the effluent also exceeded permit limits. Total coliform counts were 15,000 organisms/100 mL in the effluent, 10,000 organisms/100 mL at the reference site, and 80 organisms/100 mL at the test site. Again, effluent and reference site levels of total coliforms exceeded Class III water quality standards, Rule 62-302.560(7) FAC. These results indicate the facility was not adequately disinfecting the effluent discharge at the time of sampling, and that additional bacterial sources are present in the basin, presumably from stormwater inputs (a major plant nursery is upstream of the reference site). The low test site coliform levels suggest the treatment wetland is effectively reducing bacteria levels, both from the effluent and from stormwater.

Effluent values of nitrate-nitrite (10 mg/L) and total phosphorus (1.2 mg/L) were somewhat elevated on this sample date, compared to the facility's MOR data. Average concentrations of nitrate-nitrite for November and December, 1995, were 5.93 mg/L and 8.21 mg/L, respectively, and those for total phosphorus were 0.711 mg/L and 0.934 mg/L, respectively. Ammonia, on the other hand, was undetected on this sample date, but averaged 0.070 mg/L in November, 1995, and 0.077 mg/L for the month of December, 1995. Despite the relatively elevated effluent levels, nutrient enrichment was not observed at the test site. In fact, bioreactive nutrients actually decreased from the reference site to the test site. For example, ortho-phosphate at the reference site was 0.068 mg/L, decreasing to 0.037 mg/L at the test site, and nitrate-nitrite decreased

from 0.31 mg/L at the reference site to 0.029 mg/L at the test site. The reference site nitrate-nitrite value was higher than those found in approximately 80% of other Florida streams, which may be related to the presence of a plant nursery upstream.

Algal growth potential (AGP) results were 5.2 mg dry wt/L in the effluent sample, 23.5 mg dry wt/L at the reference site, and 48.5 mg dry wt/L at the test site. The low AGP of the effluent, despite the elevated bioreactive nutrients, suggests that substances inhibitory to algal growth were also present in the sample. The elevated AGP at the reference site probably reflects stormwater inputs (plant nursery upstream). The rather high test site AGP does not coincide with the nutrient results, and may have been caused by a laboratory or sampling error (*e.g.*, sampling bottle may have had residual nutrients adsorbed onto the plastic surface). A follow-up sampling, conducted in March, 1996, resulted in AGP's of 17.5 mg dry wt/L at the reference and 2.1 mg dry wt/L at the test site. On this follow-up sample, the test site AGP was below the "problem threshold" of 5 mg dry wt/L (Raschke and Schultz 1987).

Most measures of benthic macroinvertebrate community health indicated the test site was stressed which, in this case, was probably more related to the recent history of desiccation at the site than to other anthropogenic factors, such as the Monticello STP discharge. The Figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference.

In the Hester-Dendy samples, macroinvertebrate taxa richness decreased from 26 taxa at the reference site to 12 taxa at the test site (a 53.8 % reduction). Similarly, Shannon-Weaver Diversity decreased from 4.0 at the reference site to 3.2 at the test site. The Florida index decreased from 10 at the reference site to 1 at the test site (a 90% reduction). Finally, the EPT Index decreased from 4 at the reference site to 0 (zero) at the test site.

The dip net results were analogous to the Hester-Dendy results, although taxa richness and Florida Index values were higher at both sites using dip net sampling. The Stream Condition Index (SCI), which summarizes the health of stream biota, ranked the reference site (with 33 points) in the "excellent" category, and the test site (with 21 SCI points) in the lower range of the "good" category. As mentioned previously, the reduction in biological health at the test site may be attributed to the recent desiccation at the site and insufficient time for subsequent invertebrate recruitment, rather than the discharge.

The Figure on p. 3 represents changes in the periphyton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. The periphyton community would be expected to respond quickly to re-inundation at the test site (within weeks). Therefore, it was not surprising that the periphyton assemblage at the test site was fairly similar to the reference site population. Periphyton taxa richness was slightly higher at the reference site, with 31 taxa, than at the test site, with 24 taxa. Conversely, Shannon-Weaver diversity was higher at the test site (4.3) compared with the reference site (4.0). Algal density at the reference site (32,155 organisms/cm^2) was double that of the test site and (15,658 organisms/cm^2), but chlorophyll *a* was almost identical between the reference and test sites (0.11 mg/m^2 and 0.10 mg/m^2, respectively). A moderate (33%) decline in the diatom/blue-green ratio was noted between the reference and test sites. Overall, given the recent history of the test site, there appeared to be no adverse changes in the periphyton community related to the Monticello discharge.

Conclusions

No organic priority pollutants were detected in the effluent sample. No metals were detected in the effluent above Class III water quality standards.

The full strength effluent sample was not acutely toxic to the invertebrate, *Ceriodaphnia dubia,* or to the fish, *Cyprinella leedsi.*

The effluent (2,100 organisms/100 mL) and reference site (3,000 organisms/100 mL) fecal coliform counts exceeded Class III water quality standards, and the effluent also exceeded permit limits for fecal coliforms. Similarly, effluent total coliforms (15,000 organisms/100 mL) and reference site total coliforms (10,000 organisms/100 mL) exceeded Class III water quality standards. These results indicate the facility was not adequately disinfecting the effluent discharge at the time of sampling, and that additional bacterial sources are present in the basin, presumably from stormwater inputs (a major plant nursery is upstream of the reference site).

The low test site coliform levels suggest the treatment wetland is effectively reducing bacteria levels, both from the effluent and from stormwater.

Although effluent values of nitrate-nitrite (10 mg/L) and total phosphorus (1.2 mg/L) were somewhat elevated, nutrient enrichment was not observed at the test site. In fact, bioreactive nutrients actually decreased from the reference site to the test site. The reference site nitrate-nitrite value (0.31 mg/L) was higher than those found in approximately 80% of other Florida streams, which may be related to the presence of the nursery upstream.

Algal growth potential (AGP) results were 5.2 mg dry wt/L in the effluent sample, 23.5 mg dry wt/L at the reference site, and 48.5 mg dry wt/L at the test site. The low AGP of the effluent, despite the elevated bioreactive nutrients, suggests that substances inhibitory to algal growth were also present in the sample. The elevated AGP at the reference site probably reflects stormwater inputs (plant nursery upstream). The rather high test site AGP does not coincide with the nutrient results, and may have been caused by a laboratory or sampling error. A follow-up sampling, conducted in March, 1996, resulted in AGP's of 17.5 mg dry wt/L at the reference and 2.1 mg dry wt/L at the test site.

Most measures of benthic macroinvertebrate community health indicated the test site was stressed, compared with the reference site. In this case, the reduction in biological health at the test site may be attributed to the recent desiccation there and to insufficient time for subsequent invertebrate recruitment, rather than to other anthropogenic factors.

Given the recent history of the test site, there appeared to be no adverse changes in the periphyton community that could be related to the Monticello discharge.

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Chemistry summary table for

City of Monticello STP	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
No organics detected			
Metals (ug/L)			
Aluminum	96.2		
Arsenic	1.0 U		
Cadmium	0.10 U		
Chromium	12.0 U		
Copper	6.3		
Iron	90.0		
Lead	1.0 U		
Mercury	0.10 U		
Nickel	18.0 U		
Selenium	1.0 U		
Silver	0.10 U		
Zinc	31.6		
Nutrients (mg/L)			
Ortho-phosphate	1.1 A	0.068	0.037 I
Total phosphorus	1.2	0.072	0.047
Ammonia	0.020 U	0.050 A	0.024 I
Nitrate+Nitrite	10	0.31 A	0.029 I
TKN	0.96	0.39 A	1.5
General Phys-Chem Parameters			
Habitat Assessment		119	109
D.O. (mg/L)	7.7	10.5	6.1
pH (SU)	7.2	7.6	6.6
Conductivity (µmhos/cm)	358	30	42
Temperature (°C)	13.5	8.1	6.6
Total Suspended Solids (mg/L)	7 A	2	2 U
Biological Oxygen Demand, 5 day (mg/L)	2.3 A		
Hardness (mg CaCO3)	140.8		
Algal Growth Potential (mg dry wt/L)	5.2	23.5	48.5
Toxicity			
Bioassay Fish	No Mortality		
Bioassay Invertebrate	No Mortality		
Microbiological Communities (org/100 mL)			
Fecal coliform	2,100	3,000	18
Total coliform	15,000	10,000	80

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

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

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

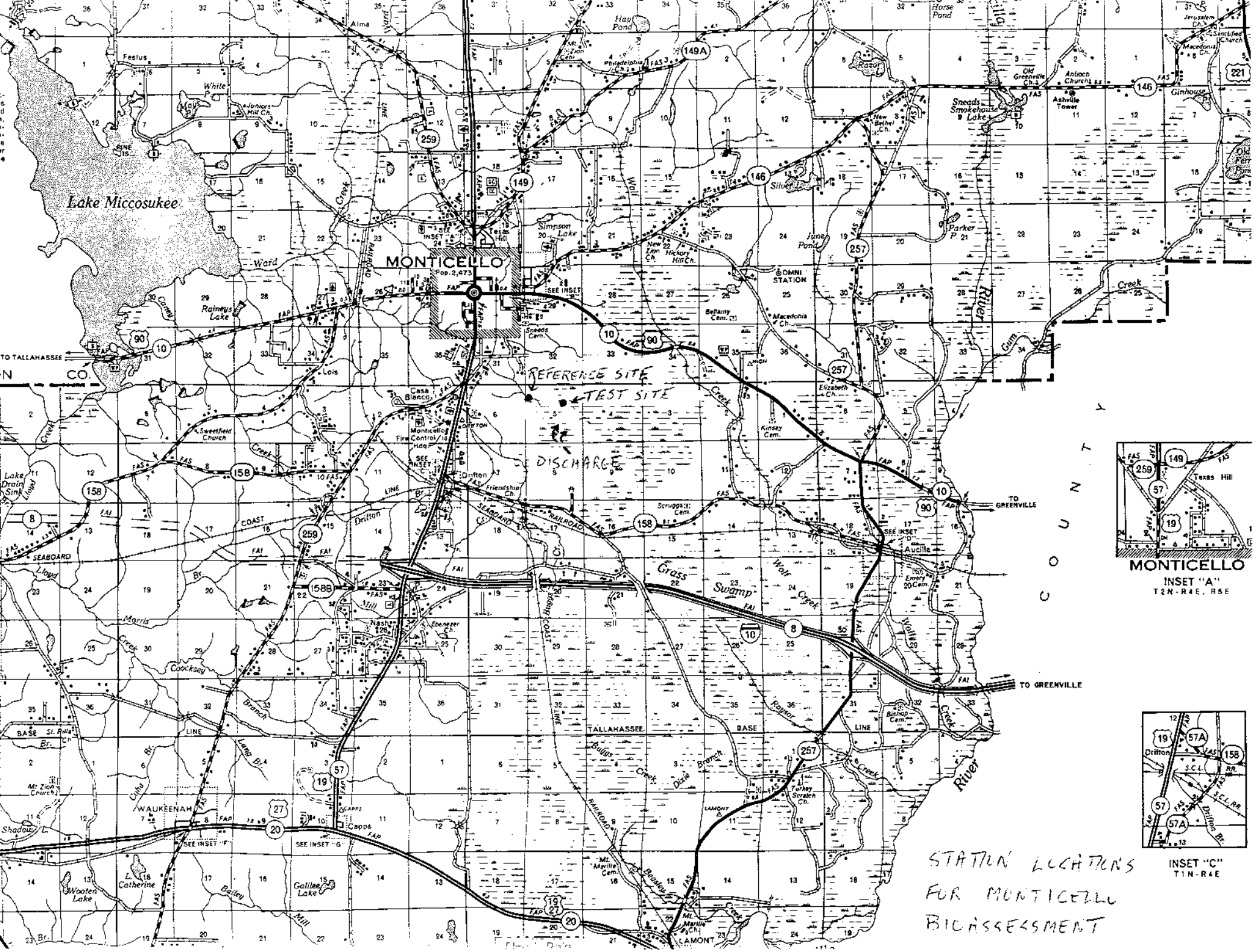
Typical Values for Selected Parameters in Florida Waters

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

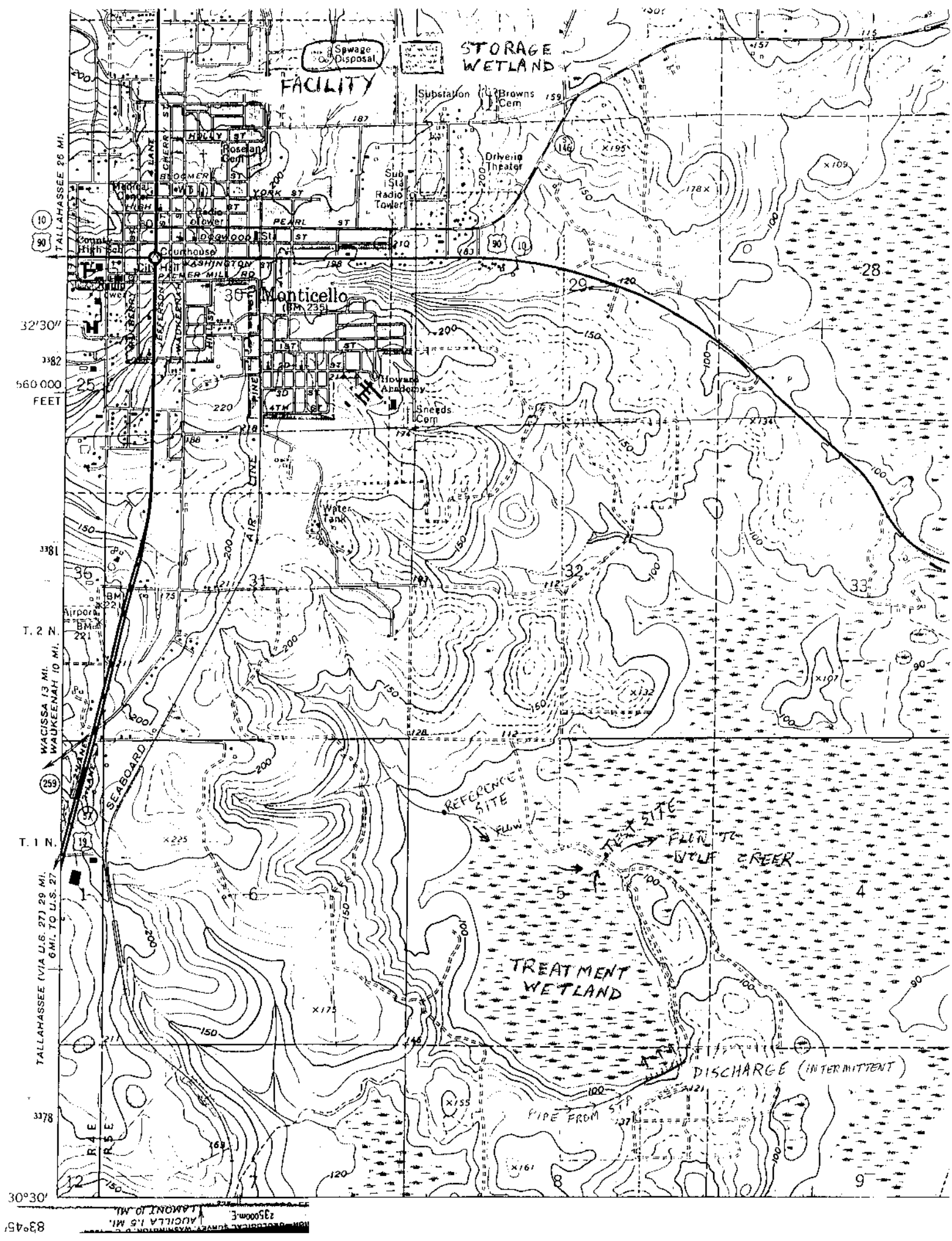
Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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



STATION LOCATIONS FOR MONTICELLO BIOASSESSMENT


STORAGE WETLAND
Sewage Disposal
FACILITY
Substation
Browns Cem
Roselawn Cem
Drive-in Theater
Sub Sta
Radio Tower
Radio Tower
County High Sch
Courthouse
Monticello
(BM 235)
Howard Academy
Sneeds Cem
Water Tank
Airport
BM 221
REFERENCE SITE
FLOW
TREATMENT WETLAND
WOLF CREEK
DISCHARGE (INTERMITTENT)
PIPE FROM STP
SEABOARD
AIR LINE
TALLAHASSEE 26 MI.
WACISSA 13 MI.
WAUKEENAH 10 MI.
TALLAHASSEE (VIA U.S. 27) 29 MI.
6 MI. TO U.S. 27
T. 2 N.
T. 1 N.
R. 5 E.
32°30'
30°30'
3382
3381
3378
660 000 FEET

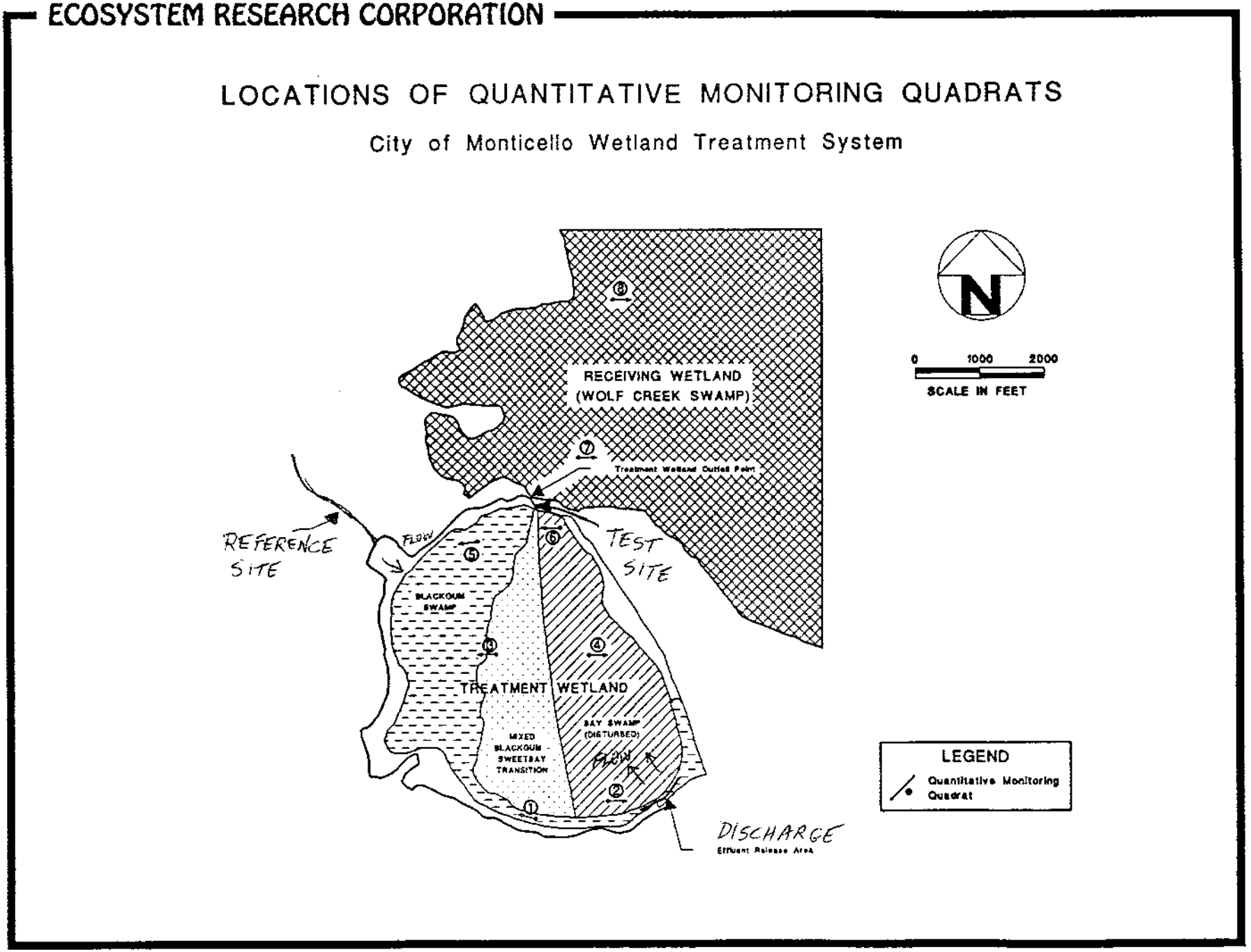


Figure 1. Locations of quantitative monitoring quadrats, City of Monticello wetland treatment system, Jefferson County, Florida.

Facility Summary

Facility Name: Monticello STP

Date Summary Prepared: 2/15/96

Location map: City of Monticello, STP
Dump Road, Jefferson Co.
Monticello, FL 32344

County: Jefferson
District: 10/NW

NPDES Permit #FL0027839
expiration date: 9/30/96

State GMS #1033M02337
expiration date: 5/1/98

Facility Type:
Domestic

Function of facility: The facility provides domestic Wastewater treatment for the City of Monticello.

Description of treatment process: A 1.0MGD plant utilizing equalization, nitrification, clarification, disinfection, digestion, recirculation and a storage wetland (1MG). During periods of high flow, effluent is discharged into an unnamed treatment wetland eventually flowing to Wolf Creek Swamp (receiving wetland). Residuals are applied to the Earl Merritt Sod farm under an approved Agricultural Reuse Plan.

Receiving waters:
Unnamed treatment wetland to
Wolf Creek Swamp (receiving wetland)

Classification: III

Design Flow:1.0MGD

Mean Flow:0.462MGD

Flow during survey:0.442MGD
November 1995 MOR

Discharge is: Continuous to storage wetland. Intermittent to treatment and receiving wetlandS.
Other (describe)
best time to sample is:

If facility has a mixing zone, give details (size, parameters, etc.)
The facility has no mixing zone.

List effluent limits (attach relevant paperwork):

The following is a list of effluent parameters for the Treatment Plant (**TP**), Treatment Wetland (**SW-1**), Treatment Wetlands TW-5, TW-6, TW-13 (**TW**), Treatment Wetland Vegetative Transect B-1, B-2, B-3, B-4, B-5, B-6 (**B1-6**), and Receiving Wetland R-4, R-7 (**R4,7**)

Parameter	Location	Frequency	Limit (units)
Flow	TP,SW1	Continuous	1.0 MGD (max ann avg
pH-Eff.	TP	Continuous	6.0 min. 8.5 max.
pH-Eff	SW1,TW	Monthly	6.0 min. 8.5 max
pH-Eff	R4,7	Quarterly	6.0 min. 8.5 max
Cl2 Residual	TP	Continuous	0.01 mg/l (max.)
Dissolved Oxygen	TP	Daily, 7/wk	5.0 mg/l (min.)
Dissolved Oxygen	SW1,TW	Monthly	5.0 mg/l (min.)
Dissolved Oxygen	R4,7	Quarterly	
CBOD5-Inf	TP	Weekly	N/A
CBOD5-Eff	TP,	Weekly	20 mg/l (max ann avg)
CBOD5-Eff	SW1,TW	Monthly	20 mg/l (max ann avg)
CBOD5-Eff	R4,7	Quarterly	5.0 mg/l (max ann avg)
TSS-Inf	TP	Weekly	N/A
TSS-Eff	TP	Weekly	20 mg/l (max ann avg)
TSS-Eff	SW1,TW	Monthly	20 mg/l (max ann avg)
TSS-Eff	R4,7	Quarterly	5.0 mg/l (max ann avg)
fecal coliform	TP	Weekly	200/100 ml (max)
fecal coliform	SW1,TW	Monthly	200/100 ml (max)
fecal coliform	R4,7	Quarterly	
Total Ammonia**	TP**,SW1,TW	Monthly	** SW1&TW=20 mg/l
TKN**	TP,SW1,TW	Monthly	**
TKN	R4,7	Quarterly	
Total Nitrogen**	TP**,SW1,TW	Monthly	** SW1&TW=9.5 mg/l
Total Nitrogen	R4,7	Quarterly	3 mg/l (max)
Nitrate/Nitrite**	TP,SW1,TW	Monthly	**
Nitrate/Nitrite	R4,7	Quarterly	
Total P	TP,	Monthly	6.6 mg/l (max.)
Total P	SW1,TW	Monthly	1.1 mg/l (max.)
Total P	R4,7	Quarterly	0.2 mg/l (max ann avg)
			1.0 mg/l (max)
Temperature	SW1,TW	Monthly	
Temperature	R4,7	Quarterly	
Conductivity	SW1,TW	Monthly	
Conductivity	R4,7	Quarterly	
Color	SW1,TW	Monthly	
Ortho-Phosphorus	SW1,TW	Monthly	
Sulfate	SW1,TW, R4,7	Quarterly	
Sulfide	SW1,R4-7	Annual	
Chlorophyll a	SW1,TW, R4,7	Quarterly	
Non-metallic non-priority Pollutants	SW1,TW	Annual	
Metals (Pb,Hg,Cd, Cu,Zn,Fe,Ni,Ag)	SW1,TW	Semi-annual	
Benthic Macro-	B1-6	Quarterly	

Invertebrates			
Woody Vegetation	B1-6	Annual	
Herbaceous Veg.	B1-6	Quarterly	
Fish	B1-6	Quarterly	
Mosquitoes	B1-6	Monthly(April-Nov)	
Threatened & Endangered Plant & Animal Species list	B1-6	Annual	
Plant Tissue Analysis (Hg,Pb,Cd,Cr,Cu,Zn, Fe,Ni,Ag,TKN,TP)	B1-6	One Final Sample after 5 years	
Plant Tissue Analysis (TP,TKN,Fe,Zn)	B1-6	Annual	
Stage	B1-6	Continuous	
Ammonia	R4,7	Quarterly	2.0mg/l (max.)
Un-Ionized Ammonia	TW, R4,7	Monthly,Quarterly	0.02 mg/l (max.)

**Nutrient concentration in the reclaimed water shall be maintained below levels that would promote an imbalance of the natural population of aquatic flora and fauna or cause the proliferation of nuisance species.

List permit violations (from MOR data or other source) and plant upsets within past year:
June 14,1995: Fecal Coliform TNTC This excursion followed a period of high flow. The facility has been in compliance since this time.

Describe previous impact bioassessments, WQBEL's and previous or current enforcement actions:
None

Discuss comparability of MOR results to past FDEP results and whether there are trends (improving, declining) in the data set:
No FDEP data. No comparison can be made.

Additional information:

Staff contributing to this review

_____ Biologist
_____ Inspector
_____ Engineer
Lisa Kelley Co-op Other
_____ Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		12-12-95	12:28	

REMARKS:	LOCATION: Monticello STP Downstream from treatment wetlands	FIELD ID/NAME:
		Test Site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
75			20	5			

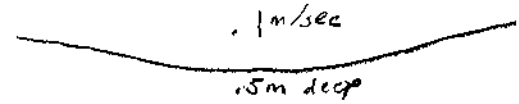
Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Some potential sources [X] Obvious sources [ ]

Width of riparian vegetation (m) on least buffered side: >30

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)



Artificially Channelized [X] no [ ] recent, severe [ ] some recovery [ ] mostly recovered, more sinuous

Artificially Impounded [ ] yes

High Water Mark (m above bed):

Canopy Cover % : Open : [ ] Lightly Shaded (11-45%): [X] Moderately Shaded (46-80%): [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [ ] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [ ] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposition: Sludge: [ ] Sand smothering: [ ] none slight [ ] moderate severe Silt smothering: [ ] none slight [ ] moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
✓ Woody Debris (Snags)	1			Sand	80		
✓ Leaf Packs or Mats	5			Mud/Muck/Silt			
✓ Aquatic Vegetation	[illegible]			Other:			
Rock or Shell Rubble	1			Other:			
Shorezone (Roots/Veg.)				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		6.6	6.59	6.05	42			
Mid-depth								
Bottom								

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

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [X] Green (algae): [ ] Clear: [ ] Other: [ ]

Weather Conditions/Notes:

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

SAMPLING TEAM:	SIGNATURE:	DATE:
LM, GW	LMiller Greg Wynn	12-12-95

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		12-12-95	

REMARKS:	LOCATION:	FIELD ID/NAME:
	Monticello STP Downstream from treatment wetland	Test Site

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

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

Comments

[109] **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12-12-95	LM, GW	LM Miller Greg Wynn

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		12-12-95	

REMARKS:	LOCATION: Monticello STP- Reference Stream emptying into treatment wetland	FIELD ID/NAME: Reference Site

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

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

Comments

[119] **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
12-12-95	LM, GW	Lmeller, Greg Wyman

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		12-12-95	11:16	

REMARKS:	LOCATION:	FIELD ID/NAME:
	Monticello STP - Reference stream emptying into treatment wetland	Reference Site

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category): Believed to be downstream from a nursery (plants)

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
50	50						

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

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

Width of riparian vegetation (m) on least buffered side: 30

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): .5

Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☒ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

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

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

Sediment Deposition: Sludge: ☐ Sand smothering: none slight moderate severe Silt smothering: none slight moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
✓ Woody Debris (Snags)	10			Sand	60		
✓ Leaf Packs or Mats	25			Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
✓ Shorezone (Roots/Veg.)	5			*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		8.1	7.6	10.45	30			
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:

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

SAMPLING TEAM:	SIGNATURE:	DATE:
LM, GW		12-12-95

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Monticello
County: Jefferson
Contact / District: Liz Miller / FDEP Tallahassee
NPDES Permit #: FL00 27839
LIMS Sample #: 24826 (sample log 12-15-95) **LIMS Job #:** 95-DEC-13-10

Sample Collection: Date 12/12/95 Time 0949
Test Beginning: Date 12/12/95 Time 16:00
Test Ending: Date 12-14-95 Time 1600
Organism Batch #: 73 **Diluent Batch #:** Well
Organism Age: 11 days old
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	19.8 @ 19.9	8.9 @ 20.9 °C	973 @ 1018 963 @ 1025 @ 21.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.2 @ 21.3	8.9 @ 21.1 °C	988 @ 1018 971 @ 1025 @ 22.0 °C 9550 10180
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.9 °C	1015 @ 1018 990 @ 1025 @ 23.5 °C 9720 @ 10180

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A		5	5	5	7.9	8.2	8.3	21.4	21.8	23.5	8.1	8.5	8.0	235	240	250
Control B		5	5	5	8.0	8.2	8.3	21.1	21.5	23.5	8.2	8.4	8.0	235	235	250
Control C		5	5	5	8.0	8.2	8.3	21.0	21.5	23.4	8.3	8.4	8.1	235	235	250
Control D		5	5	5	8.0	8.2	8.3	21.1	21.6	23.4	8.4	8.5	8.1	235	240	250
100% A		5	5	5	7.5	7.9	8.1	24.2	21.7	23.4	8.6	8.3	8.0	485	465	480
100% B		5	5	5	7.5	7.9	8.1	24.4	21.6	23.4	8.5	8.3	8.0	490	460	480
100% C		5	5	5	7.5	7.9	8.2	24.4	21.5	23.4	8.5	8.3	7.9	485	460	480
100% D		5	5	5	7.5	7.9	8.1	24.5	21.7	23.4	8.5	8.4	8.0	490	465	480
Measured/Loaded by:		TM	MF	DE	JN	MF	JLS	JN	MF	JLS	JN	MF	JLS	JN	MF	JLS
Recorded by:		JRS	ML	JRS	JRS	JN	JN	JRS	JN	JN	JRS	JN	JN	JRS	JN	JN

Investigators' Signatures

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water: Well Water / 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		not	MDA-Sulfa	
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	120	110	HACH	JRS
Hardness (mg/L as $CaCO_3$):	125	145	HACH	JRS
Total ammonia (mg/L as N):	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Monticello
County: Jefferson
Contact / District: Liz Miller / FDEP Tallahassee
NPDES Permit #: FL0027839
LIMS Sample #: 124876 (sample log 12/15/95) **LIMS Job #:** 95-DEC-13-10

Sample Collection: Date 12/12/95 Time 0949
Test Beginning: Date 12/13/95 Time 1600
Test Ending: Date 12-14-95 Time 1600
Organism Batch #: ~~5457~~ **Diluent Batch #:** 49
Organism Age: <24 hours old
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	19.8 @ 19.9	8.9 @ 20.9 °C	973 @ 1018 963 @ 1025 @ 21.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.2 @ 21.3	8.9 @ 21.1 °C	988 @ 1018 971 @ 1025 @ 22.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.9 °C	9550 101.5 @ 10180 101.8 990 @ 1025 @ 23.5 °C 9720 @ 10180

*batch mislabeled JN 12-13-95

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Control	A	5	5	5	7.6		8.3	23.5	23.7		8.2		8.0	170		245
Control	B	5	5	5			8.3		23.6				8.0			190
Control	C	5	5	5			8.3		23.6				8.0			215
Control	D	5	5	5			8.3		23.6				7.9			185
100%	A	5	5	5	7.3		8.5	24.4	23.6		8.2		8.0	495		615
100%	B	5	5	5			8.5		23.6				8.0			485
100%	C	5	5	5			8.5		23.6				7.9			460
100%	D	5	5	5			8.5		23.5				8.0			495
									JN 12-15-95 wrong column							
Measured/Loaded by:		JM	MA	MF	JM		JLS	JM		JLS	JM		JLS	JM		JLS
Recorded by:		JRS	MF	JRS	JRS		JN	JRS		JN	JRS		JN	JRS		JN

Investigators' Signatures
Jennifer Carrapata
Joseph Smith
Marshall Faircloth
Tina Mikulasek

reviewer

form updated 5/05/95

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	JM
Alkalinity (mg/L as $CaCO_3$):	—	78	110	HACH	JRS
Hardness (mg/L as $CaCO_3$):	—	80	145	HACH	JRS
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

REFERENCE SITE

Winter Index Period: Stream Condition Index for Florida (SCI) (1996) Version 3													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle (65, 75a)				Peninsula (75b, c, d)				Northeast (75e & f)			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	35	≥26	25-13	<13	5	≥ 27	26-14	<14		≥18	17-9	<9	
EPT Index	6	≥6	5-3	<3	5	≥ 4	3-2	<2		-	≥3	<3	
# Chironomid Taxa	18	≥9	8-5	<5	5	≥9	8-5	<5		≥5	4-3	<3	
% Contribution of Dominant Taxon	13.1	≤25	26-62	>62	5	≤30	31-65	>65		≤44	45-72	>72	
% Diptera	58.2	-	≤60	>60	3	-	≤52	>52		-	≤67	>67	
Florida Index	14	≥ 13	12-7	<7	5	≥10	9-5	<5		≥ 6	5-3	<3	
% Suspension feeders/Filterers	18.6	≥ 13	12-7	<7	5	≥15	14-8	<8		≥ 32	31-16	<16	
Total Score		Panhandle			33	Peninsula				Northeast			
Interpretation of Score		Excellent			(27-33)	Excellent			27-33	Excellent			26-31
		Good			21-26	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

TEST SITE

Winter Index Period: Stream Condition Index for Florida (SCI) (1996) Version 3													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle (65, 75a)				Peninsula (75b, c, d)				Northeast (75e & f)			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	26	≥26	25-13	<13	5	≥ 27	26-14	<14		≥18	17-9	<9	
EPT Index	0	≥6	5-3	<3	1	≥ 4	3-2	<2		-	≥3	<3	
# Chironomid Taxa	11	≥9	8-5	<5	5	≥9	8-5	<5		≥5	4-3	<3	
% Contribution of Dominant Taxon	20.1	≤25	26-62	>62	5	≤30	31-65	>65		≤44	45-72	>72	
% Diptera	57.4	-	≤60	>60	3	-	≤52	>52		-	≤67	>67	
Florida Index	4	≥ 13	12-7	<7	1	≥10	9-5	<5		≥ 6	5-3	<3	
% Suspension feeders/Filterers	7.8	≥ 13	12-7	<7	3	≥15	14-8	<8		≥ 32	31-16	<16	
Total Score		Panhandle			23	Peninsula				Northeast			
Interpretation of Score		Excellent			27-33	Excellent			27-33	Excellent			26-31
		Good			(21-26)	Good			21-26	Good			20-25
		Poor			14-20	Poor			14-20	Poor			14-19
		Severely Degraded			7-13	Severely Degraded			7-13	Severely Degraded			7-13

Benthic macroinvertebrate taxa list for City of Monticello, collected via Hester-Dendy artificial substrates in an unnamed stream near Wolf Creek Swamp, on 12 December, 1995. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Oligochaeta		
Nais communis	1	2
Gastropoda		
Gastropoda	–	1
Ancylidae	7	1
Ferrissia sp.	6	–
Ferrissia hendersoni	6	–
Laevapex sp.	8	2
Hebetancylus excentricus	1	4
Micromenetus dilatatus	2	–
Physella sp.	12	1
Amphipoda		
Hyalella azteca	–	3
Decapoda		
Procambarus sp.	1	–
Ephemeroptera		
Stenonema exiguum	2	–
Stenonema smithae	15	–
Leptophlebia bradleyi	5	–
Coleoptera		
Ancyronyx variegatus	2	1
Macronychus glabratus	3	–
Trichoptera		
Cheumatopsyche sp.	1	–
Diptera		
Chironomidae	17	4
Ablabesmyia mallochi	2	–
Conchapelopia sp.	1	–
Nanocladius sp.	1	–
Chironomus sp.	4	10
Polypedilum illinoense	2	3
Polypedilum laetum	1	–
Polypedilum tritum	–	2
Polypedilum convictum grp.	1	–
Paratanytarsus sp. C Epler	1	–
Rheotanytarsus exiguus grp.	2	–
Tanytarsus sp. L Epler	1	–
Tanytarsus sp. A Epler	3	–
Tanytarsus sp. S Epler	2	–
Tanytarsus sp. O Epler	–	2
Tanytarsus sp. D Epler	–	1
Tanytarsus sp. T Epler	1	–

Benthic macroinvertebrate taxa list for City of Monticello, collected via 20 discrete dip net sweeps in an unnamed stream near Wolf Creek Swamp, on 12 December, 1995.

	Reference Site	Test Site
Oligochaeta		
Eclipidrilus sp.	–	1
Limnodrilus hoffmeisteri	3	3
Ilyodrilus templetoni	–	1
Dero trifida	–	4
Dero pectinata	–	2
Nais communis	–	2
Gastropoda		
Ancylidae	12	6
Micromenetus dilatatus	1	12
Physella sp.	3	3
Pelecypoda		
Pisidiidae	5	11
Isopoda		
Caecidotea sp.	–	22
Amphipoda		
Hyalella azteca	–	19
Ephemeroptera		
Stenonema smithae	3	–
Baetidae	2	–
Acerpenna pygmaeus	1	–
Leptophlebiidae	16	–
Habrophlebiodes brunneipennis	6	–
Leptophlebia intermedia	3	–
Leptophlebia bradleyi	5	–
Coleoptera		
Hydroporus sp.	1	–
Dineutus sp.	–	1
Stenelmis sp.	2	–
Trichoptera		
Cheumatopsyche sp.	1	–
Diptera		
Pseudolimnophila sp.	–	1
Dixella sp.	1	–
Simulium sp.	1	–
Palpomyia/Bezzia grp.	3	1
Chironomidae	6	5
Ablabesmyia mallochi	2	–
Conchapelopia sp.	2	–
Larsia decolorata	–	1
Paramerina sp.	4	–

Corynoneura sp.	3	–
Corynoneura taris	1	–
Parametriocnemus sp.	1	1
Chironomus sp.	–	39
Cryptochironomus sp.	1	–
Kiefferulus sp.	–	7
Polypedilum sp.	–	1
Polypedilum illinoense	5	12
Polypedilum tritum	–	40
Polypedilum convictum grp.	14	–
Stenochironomus sp.	2	–
Tribelos fuscicornis	1	–
Paratanytarsus sp.	1	–
Paratanytarsus sp. A Epler	1	1
Rheotanytarsus exiguus grp.	3	1
Stempellinella sp.	20	–
Tanytarsus sp.	4	–
Tanytarsus sp. F Epler	–	1
Tanytarsus sp. A Epler	3	–
Tanytarsus sp. O Epler	2	1
Tanytarsus sp. J Epler	1	5
Tanytarsus sp. C Epler	5	–
Chrysops sp.	1	–
Hemerodromia sp.	1	–

Periphyton taxa list and densities (#/cm^2) for City of Monticello, collected via glass microscope slides in an unnamed stream near Wolf Creek Swamp, on 12 December, 1995.

	Reference Site	Test Site
Cyanophyceae		
Anabaena sp.	550	206
Aphanocapsa sp.	–	824
Aphanothece sp.	–	412
Chroococcus sp.	275	1442
Dactylococcopsis sp.	824	–
Gloeocapsa sp.	–	824
Microcystis sp.	550	1648
Oscillatoria sp.	–	412
Phormidium sp.	1099	–
Plectonema sp.	–	412
Bacillariophyceae		
Achnanthes lanceolata apiculata	824	–
Achnanthes lapponica	–	824
Achnanthes linearis	–	206
Cyclotella meneghiniana	275	–
Eunotia sp.	1099	2060
Eunotia curvata	–	206
Eunotia pectinalis	1374	412
Eunotia sudetica	–	206
Eunotia vanheurcki	–	206
Gomphonema parvulum	–	824
Melosira sp.	550	–
Navicula arvensis	–	618
Navicula decussis	1374	–
Navicula exigua	550	–
Navicula hungarica	275	–
Navicula minima	–	618
Navicula minuscula	275	–
Navicula pupula	275	–
Navicula radiosa	275	–
Navicula rhynchocephala	3023	–
Neidium affine	275	–
Nitzschia linearis	275	–
Nitzschia palea	1649	618
Pinnularia braunii	550	206
Stauroneis smithi	275	–
Synedra filiformis	9619	–

Nitzschia linearis	275	–
Nitzschia palea	1649	618
Chlorophyceae		
Chlamydomonadaceae	–	412
Chlamydomonas sp.	550	206
Chlorococcum sp.	1099	618
Tetraedron sp.	2199	206
Ankistrodesmus sp.	–	206
Scenedesmus sp.	824	412
Selenastrum sp.	275	–
Dictyosphaerium sp.	275	–
Euastrum sp.	275	–
Dinophyceae		
Peridinium sp.	275	–

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0027839 11	12 97/12/12 17	18 X	19 S	20 1

Remarks

21 66

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0027839 11	12 97/12/12 17	18 B	19 S	20 1

Remarks

21 66