

Biological Assessment of

William Tyson Wastewater Treatment Plant

DeSoto County

NPDES #FL0027511

Sampled April 1995

October 1995

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 Arcadia, William Tyson WWTP
County: DeSoto
NPDES Number: FL0027511
State Permit Expiration Date: 31 December 1996

Toxics Sampling Inspection (**XSI**)

Date Sampled: 11 April 1995

Results: No organic pollutants were detected in the effluent, however, silver (0.3 µg/L) exceeded the Class III water standard of 0.07 µg/L, in violation of Rule 62-302.530(60) FAC.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 11 April 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: 11 April 1995

Results: The discharge was adversely affecting the benthic macroinvertebrate community, resulting in a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). The Stream Invertebrate Index for Florida (SIIF) score at the reference site (19 points) placed it in the "moderate impairment" category, whereas the test site SIIF value (11 points) ranked it as "severely degraded". Since the effluent has a history of being acutely toxic, the past episodes of toxicity could have contributed to the observed biological problems. Additionally, the effluent silver concentration (0.3 µg/L), the elevated conductivity (846 µmhos/cm), or the extreme nitrogen enrichment at the test site may have stressed the fauna there. Periphyton data suggest that the facility was not having negative effects on the local algal community, probably due to the relatively high water velocity at the test site. However, AGP data suggest that enrichment effects may appear where water velocity decreases, farther downstream in the Peace River.

Water Quality Inspection (**WQI**)

Date Sampled: 11 April 1995

Results: The facility was responsible for increasing test site concentrations of ammonia (0.38 mg/L) and nitrate-nitrite (10.0 mg/L) to levels higher than those found in 90% to 95% of other Florida streams. In contrast, the total phosphorus concentration of the reference site was quite elevated (0.99 mg/L), decreasing to 0.36 mg/L downstream of the discharge. This implies that stormwater runoff was contributing to the phosphorus enrichment, either from natural phosphatic rock deposits or from human sources. Algal Growth Potential (AGP) slightly exceeded the 5 mg dry wt/L "problem threshold" at the reference site (5.7 mg dry wt/L) but was extremely high at the test site (167.3 mg dry wt/L). The effluent AGP was 12.6 mg dry wt/L. The high AGP of the test site was likely due to the nitrogen enrichment caused by the facility, in conjunction with the existing phosphorus levels in the stream (due to stormwater inputs). The reference site dissolved oxygen value was below Class III water quality standards.

Introduction

The William Tyson Wastewater Treatment Plant, owned and operated by the City of Arcadia, is located in DeSoto County (see map in Appendix). Treatment at this 2.0 MGD facility includes a trickling filtration process, clarification, denitrification, filtration, disinfection, dechlorination, and post-aeration. Effluent is discharged to an unnamed Class III tributary of the Peace River.

State permit limits are as follows: pH (6.0 to 8.5 SU), total residual chlorine (1.0 mg/L for disinfection, 0.01 mg/L at discharge), dissolved oxygen (6.0 mg/L minimum), unionized ammonia (0.02 mg/L maximum), TKN (9.7 mg/L at a pH of 6.5, 3.0 mg/L at a pH of 7.0, 1.0 mg/L at a pH 7.5, 0.5 mg/L at a pH of 8.0), TSS and BOD (20 mg/L as a yearly average, 30 mg/L as a monthly average, 45 mg/L as a weekly average, 60 mg/L maximum), fecal coliforms (200 organisms/100 mL maximum or as an annual average) (see Facility Summary in Appendix). Additionally, bimonthly acute toxicity tests are performed on the effluent, as well as ambient monitoring on the receiving waters.

In the past few years, there have been numerous problems with this facility. Permit limits for pH, total residual chlorine (both the disinfection level and discharge limit), fecal coliform bacteria, unionized ammonia, TKN, TSS, and BOD have been exceeded on several occasions. The effluent has failed the majority of the acute toxicity tests performed on it. Ambient monitoring of the receiving waters indicated elevated levels of nitrate-nitrite attributed to the discharge. In May, 1995, the facility received a compliance inspection rating of "unsatisfactory".

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	16	11
Florida Index	4	3
SIIF	19	11
EPT Index	0	0
% Contribution of Dominant Taxon	46.4	39.0
% Oligochaeta	15.2	38.1
% Diptera	38.4	50.9
% Other	46.4	11.0
% Predators	8.8	1.4
% Above Surface Deposit Feeders	21.2	22.0
% Below Surface Deposit Feeders	15.2	37.2
% Suspension Feeders	48.8	2.5
% Scrapers	0	9.6
% Shredders	6.0	20.4
Macroinvertebrate Hester-Dendy		
Number of Taxa	18	8
Florida Index	6	1
Shannon-Weaver Diversity	3.0	1.5
EPT Index	0	0
% Oligochaeta	2.9	0.2
% Diptera	87.3	91.8
% Other	9.8	8.0
% Predators	15.2	32.5
% Above Surface Deposit Feeders	42.7	29.9
% Below Surface Deposit Feeders	2.0	0.2
% Suspension Feeders	10.3	1.0
% Scrapers	1.0	8.0
% Shredders	27.9	28.3
Periphyton Algae		
Number of Taxa	11	21
Shannon-Weaver Diversity	2.4	3.9
Algal Density (#/sq. cm)	47,404	15,333
Chlorophyll a (mg/sq. m)	3.9	0.9
Diatom/Diatom + B-G Abundance Ratio	1.0	0.9
% Blue-green	0	4.2
% Green	10.0	29.2
% Diatoms	90.0	64.6
% Other	0	2.1
Algal Growth Potential (mg dry wt/L)	5.7	167.3

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 100 meters upstream of the discharge in an unnamed tributary of the Peace River) and a test site (located 100 meters downstream of the discharge in the same unnamed tributary). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

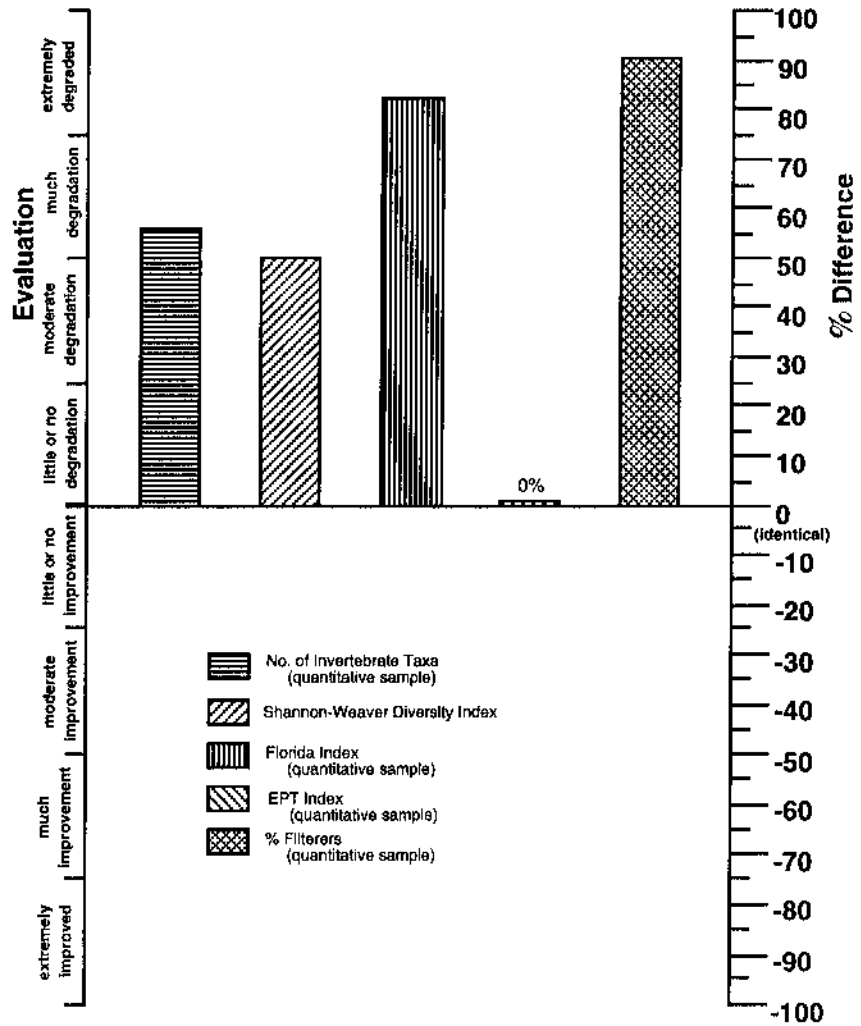
Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate sampling was performed using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). 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 the 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.

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

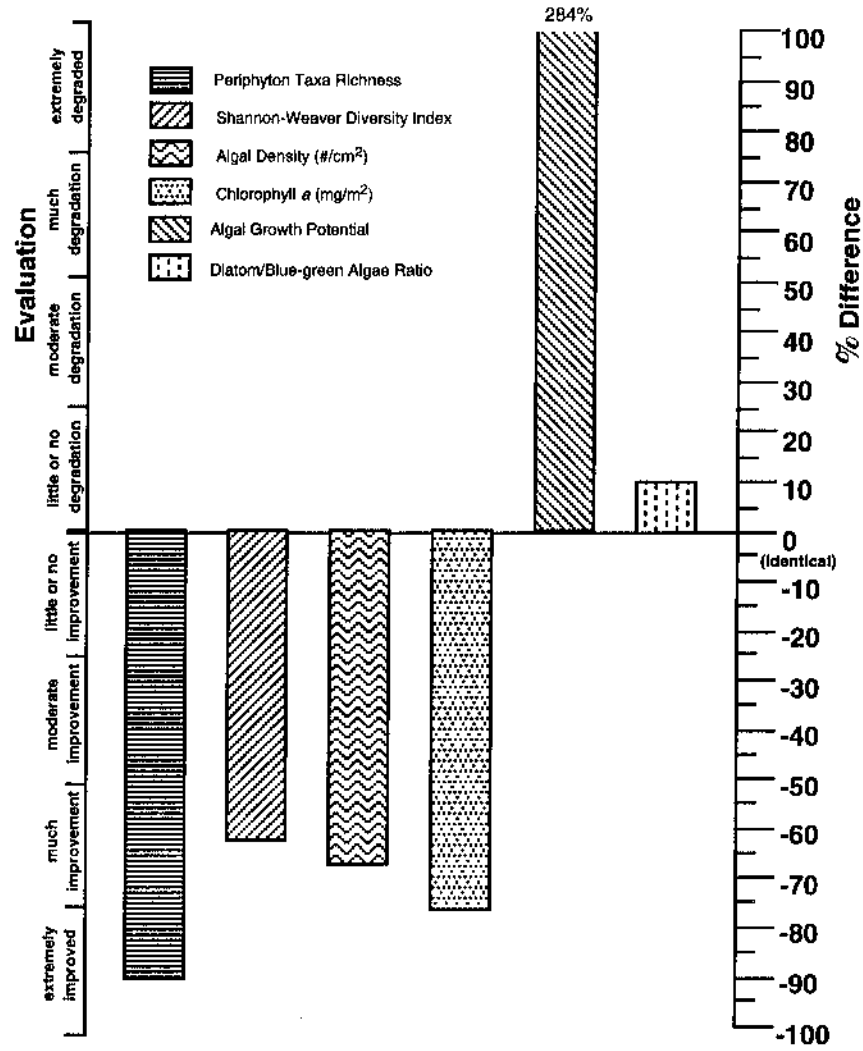


Effect of discharge on the benthic macroinvertebrate community.

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 Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

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



Effect of discharge on the algal community.

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.

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

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders are measured as the reference site minus test site divided by the

reference site. The percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Lisa Carter and Stephan Schulze (DEP Southwest District), Lyn Burton, Michael Corrigan, Christy LeDuc, Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Tina Mikulski, Elizabeth Miller, Urania Quintana, Bart Richard, Landon Ross, Lisa Tamburello, David Whiting, Vicki Whiting, 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

This study took place in a small, approximately two mile long, unnamed tributary of the Peace River, whose headwaters drain portions of the urban/residential City of Arcadia. Habitat quality was improved at the test site (with 116 points), compared with the reference site (which scored 93 points). The improved habitat at the test site was primarily related to the increased water velocity and decreased sediment deposition there. Dissolved oxygen was below Class III water quality standards at the reference site (2.3 mg/L), and 5.4 mg/L at the test site. The pH values (with 6.1 SU at the reference site and 6.9 SU at the test site) and temperatures (with 23.7 °C at the reference site and 24.0 °C at the test site) were comparable at the two sampling stations. Conductivity at the test site (846 µmhos/cm) was substantially higher than that of the reference site (197 µmhos/cm), although it still complied with Class III standards.

The effluent sample was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*. No mortality occurred during the two 48 hour acute bioassays (Appendix).

No organic pollutants were detected in the effluent. Of the metals analyzed for, aluminum (815 µg/L), iron (52 µg/L), silver (0.3 µg/L), and zinc (15 µg/L) were detected in the effluent. Of these, only the silver level (0.3 µg/L) exceeded its Class III water quality standard of 0.07 µg/L, in violation of Rule 62-302.530(60) FAC.

The discharge contained high concentrations of ammonia (0.52 mg/L) and nitrate-nitrite (15.0 mg/L), which led to nutrient enrichment of the receiving waters. Test site levels of these substances were quite elevated, where 0.38 mg/L of ammonia and 10.0 mg/L of nitrate-nitrite were found. These values exceeded those found in over 90% to 95% of other Florida streams (see Table of Typical Water Quality Parameters in Appendix. In contrast, the total phosphorus concentration of the reference site was quite elevated (0.99 mg/L), decreasing to 0.36 mg/L downstream of the discharge. This implies that stormwater runoff was contributing to the phosphorus enrichment, either from natural phosphatic rock deposits or from human sources.

Algal Growth Potential (AGP) only slightly exceeded the 5 mg dry wt/L "problem threshold" at the reference site (5.7 mg dry wt/L), but was extremely high at the test site (167.3 mg dry wt/L) (Raschke and Schultz 1987). The effluent AGP was 12.6 mg dry wt/L. The high AGP of the test site was likely due to the nitrogen enrichment caused by the facility, in conjunction with the existing phosphorus levels in the stream (due to stormwater inputs).

Most measures of macroinvertebrate health indicated that the discharge was adversely affecting the community. The Figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (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, substantial declines in taxa richness (18 taxa at the reference site, 8 at the test site), Shannon-Weaver diversity (3.0 at the reference site, 1.5 at the test site), Florida Index (6 at the reference site, 1 at the test site), and the percent of suspension feeders (10.3% at the reference site, 1.0% at the test site) demonstrated the negative effects of the discharge. The 50% reduction in diversity represents a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). Since the effluent has a history of being acutely toxic, the past episodes of toxicity could have contributed to the observed biological problems. Additionally, the effluent silver concentration (0.3 µg/L), the elevated con-

ductivity (846 µmhos/cm), or the extreme nitrogen enrichment at the test site may have stressed the fauna there.

Some dip net results showed a similar trend of declining community health at the test site. For example, taxa richness decreased by 31% between the reference and test sites. However, the Florida Index was basically unchanged (4 at the reference site, 3 at the test site). The Stream Invertebrate Index for Florida (SIIF) score at the reference site (19 points) placed it in the "moderate impairment" category, whereas the test site SIIF value (11 points) ranked it as "severely degraded" (Appendix). Some taxa sensitive to pollution, such as *Procladius* sp. and *Rheotanytarsus exiguus* grp., were found at the reference site, but were absent from the test site. Pollution tolerant taxa, such as the chironomid, *Polypedilum illinoense*, and the oligochaete, *Limnodrilus hoffmeisteri*, dominated the test site community. In summary, the macroinvertebrate data suggest that the discharge is degrading the biota of the receiving stream, resulting in an imbalance of aquatic fauna.

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. With the exception of the algal growth potential, the facility appeared to have no negative effects on the test site periphyton. Periphyton taxa richness, diversity, chlorophyll *a*, algal density, and the diatom to blue-green ratio were either improved or unchanged between sites. Given the nutrient values, periphyton chlorophyll *a* was unusually low at the test site (0.9 mg/m^2), indicating no biomass problems near the discharge. Both sites were dominated by diatoms, while chlorophytes were the second most numerous group. In summary, these data suggest that the facility is not exerting negative effects on the immediate receiving water periphyton community, probably due to the relatively high water velocity at the test site. However, AGP data suggest that enrichment effects may appear where water velocity decreases, farther downstream in the Peace River.

Conclusions

The reference site dissolved oxygen value was below Class III water quality standards.

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

No organic pollutants were detected in the effluent, however, silver (0.3 µg/L) exceeded the Class III water quality standard of 0.07 µg/L, in violation of Rule 62-302.530(60) FAC.

The facility was responsible for increasing test site concentrations of ammonia (0.38 mg/L) and nitrate-nitrite (10.0 mg/L) to levels higher than those found in 90% to 95% of other Florida streams. In contrast, the total phosphorus concentration of the reference site was quite elevated (0.99 mg/L), decreasing to 0.36 mg/L downstream of the discharge. This implies that stormwater runoff was contributing to the phosphorus enrichment, either from natural phosphatic rock deposits or from human sources.

Algal Growth Potential (AGP) only slightly exceeded the 5 mg dry wt/L "problem threshold" at the reference site (5.7 mg dry wt/L), but was extremely high at the test site (167.3 mg dry wt/L). The effluent AGP was 12.6 mg dry wt/L. The high AGP of the test site was likely due to the nitrogen enrichment caused by the facility, in conjunction with the existing phosphorus levels in the stream (due to stormwater inputs).

Most measures of macroinvertebrate health indicated that the discharge was adversely affecting the community. In the Hester-Dendy samples, substantial declines in taxa richness, Shannon-Weaver diversity, the Florida Index, and the % suspension feeders demonstrated the negative effects of the discharge. The 50% reduction in diversity represents a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). The Stream Invertebrate Index for Florida (SIIF) score at the reference site (19 points) placed it in the "moderate impairment" category, whereas the test site SIIF value (11 points) ranked it as "severely degraded". Since the effluent has a history of being acutely toxic, the past episodes of toxicity could have contributed to the observed biological problems. Additionally, the effluent silver concentration (0.3 µg/L), the elevated conductivity (846 µmhos/cm), or the extreme nitrogen enrichment at the test site may have stressed the fauna there.

Periphyton taxa richness, diversity, chlorophyll *a*, algal den-

sity, and the diatom to blue-green ratio were either improved or unchanged between sites. Given the nutrient values, chlorophyll *a* was unusually low at the test site (0.9 mg/m^2), indicating no biomass problems near the discharge. In summary, these data suggest that the facility is not exerting negative effects on the immediate receiving water periphyton community, probably due to the relatively high water velocity at the test site. However, AGP data suggest that enrichment effects may appear where water velocity decreases, farther downstream in the Peace River.

Literature Cited

Chang, S., F. W. Steimle, R. N. Reid, S. A. Fromm, V. S. Zdanowicz, and R. A. Pikanowski. 1992. Association of benthic macrofauna with habitat types and quality in the New York Bight. Mar. Ecol. Prog. Ser. 89: 237-251.

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

Engle, V. D., J. K. Summers, and G. R. Gaston. 1994. A benthic index of environmental condition of Gulf of Mexico estuaries. Estuaries 17(2): 372-384.

Farrell, D. H. 1992. A community based metric for marine benthos. Fla. Dept. Environ. Reg. SW Dist. Office. unpublished rept. 15 p.

FDEP. 1994. Lake bioassessments for the determination of nonpoint source impairment in Florida. Fla. Dept. Environ. Prot. Biology Section, Tallahassee, Fla. 73 p.

Hudson, P. L., D. R. Lenat, B. A. Caldwell, and D. Smith. 1990. Chironomidae of the Southeastern United States: A checklist of species and notes on biology, distribution, and habitat. U. S. Fish Wildl. Serv., Fish. Wildl. Res. 7. 46 pp.

Hulbert, J. L. 1990. A proposed lake condition index for Florida. North Amer. Benth. Soc. 38th Ann. Mtg., Blacksburg, VA, 11 p.

Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. J. N. Am. Benthol. Soc. 12(3): 270-290.

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. U. S. Environ. Prot. Agency, EPA-600/9-78-018. 126 p.

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.

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

Weber, C. I. 1991. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Whitmore, T. J. 1989. Florida diatom assemblages as indicators of trophic state and pH. Limnol. Oceanogr. 34(5): 882-895.

Chemistry summary table for

William Tyson WWTP	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
None Detected			
Metals (ug/L)			
Aluminum	815 A		
Arsenic	10 U		
Chromium	10 U		
Copper	4 I		
Iron	52 A		
Lead	10 U		
Mercury	0.1 U		
Nickel	4 U		
Selenium	30 U		
Silver	0.3 A		
Zinc	15 A		
Nutrients (mg/L)			
Ortho-phosphate	0.02 I	0.48 A	0.03 I
Total phosphorus	0.21	0.99	0.36
Ammonia	0.52	0.03 I	0.38
Un-ionized ammonia	0.005		
Nitrate+Nitrite	15.0	0.02 U	10.0
TKN	3.40	0.65	1.70
General Phys-Chem Parameters			
Habitat Assessment		93	116
D.O. (mg/L)	7.7	2.3	5.4
pH (SU)	7.2	6.1	6.9
Conductivity (µmhos/cm)	1020	197	846
Temperature (°C)	24.3	23.7	24.0
Hardness (mg CaCO3)	115.9		
Algal Growth Potential (mg dry wt/L)	12.6	5.7	167.3
Toxicity			
Bioassay Fish-Chlorinated	Not Toxic		
Bioassay Invertebrate-Chlorinated	Not Toxic		

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 Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphate	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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


William Tyson WWTP
DeSoto Co
PEACE
RIVER
ARCADIA
MANATEE
BREVARD
HERNANDO
MILLS
LAFAYETTE
OAK RIDGE CEMETERY
Radio Tower
ABANDONED
Sewage Disposal
Tra Park
test site
outfall
effluent site

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: City of Arcadia Wm. Tyson WWTP		Date Summary Prepared: Sept 19, 1995
Location (attach detailed map):	County: De Soto	District: Southwest
Federal Permit # and expiration date: FL0027511 09/30/95	State GMS # and State expiration date: 4014M 00340 0014-187069 12/31/96	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Domestic Wastewater Treatment Facility

Description of treatment process: Influent → Headworks (Screening, grit removal), Trickling filter biological process, clarification (final settling), de-nitrification filtration (Nitrogen removal), disinfection by application of chlorine, de-chlorination, discharge to Peace River by means of aerated outfall to unnamed tributary. Alternative reuse is public access spray irrigation on city golf course.

Receiving waters: Tributary to Peace River.	Classification: I II (III)	
Design Flow: 2.0 MGD	Mean Flow:	Flow during survey:

Discharge is: (Continuous) Intermittent Seasonal Rainfall dependent
Other (describe)

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.): N/A.

List effluent limits (if necessary, attach relevant paperwork):

Parameter	Limit (units)
pH	6.0-8.5 std units
CBOD5 & TSS	20/30-15/10 mg/l
Cl2 Before De-Chlor	0.5 (1.0 Reuse) mg/l
F.C.	200/200 #/100 (Non detectable in Reuse)
D.O.	6.0 mg/l
Unionized ammonia	0.02 mg/l.
TKN(NH3) @ 30°C	9.7 pH 6.5 3.0 2.0 1.0 2.5 0.5 8.0 } mg/l.
Cl2 after de-chlor	0.01 mg/l.

Describe special permit conditions and permit modifications:

Ambient monitoring
Toxicity testing using acute screening.

Wm. Tyson
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Description of permitted outfall(s): Aeration lagoon into unnamed tributary of Peace River.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: pH excursions, Cl2 residual excursion, unionized ammonia, TKN de-chlorination excursions. These have been periodically reported to us and to USEPA. They are generally random occurrences and are attributed by the facility to mechanical failures, installation of new equipment, excessive rain, etc. No obvious trend is apparent. This facility has fulfilled the majority of its required biomonitoring and toxicity tests as of 1992.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
No current enforcement actions since modified plant was put on line in 1991.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
No Major Changes.

Additional information:

Staff contributing to this review (signature):

(Biologist)

(Inspector)

(Engineer)

( )

( )

( )

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:
		4-11-95	1315	Peace River

REMARKS:	LOCATION:	FIELD ID/NAME:
Practically no flow.	William Tyson WWTP	Reference

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)
40%							

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): 2.1

Canopy Cover % : Open : ☐ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☑ 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			
Leaf Packs or Mats	40			Mud/Muck/Silt	45		
Aquatic Vegetation	5			Other:			
Rock or Shell Rubble				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								
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:
Sunny 85° F

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

SAMPLING TEAM: Lee Carter, J. Stephen Seivard

SIGNATURE:

DATE: 4-11-95

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FL DEP	STORET STATION NUMBER:	DATE (M/D/Y): 4/11/95	RECEIVING BODY OF WATER: Peace River

REMARKS: There was about .2m layer of flocculent muscle below 1m of water column	LOCATION: William Tyson WWTP	FIELD ID/NAME: Reference

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 17	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 1	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 19	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 5	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 13	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 14	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 (18) 17 16	50% to 80% of riparian zone is vegetated, but one class of plants 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 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**
93	**TOTAL SCORE**	

ANALYSIS DATE: 4-11-95	ANALYST: L. Carter / S. Schultz	SIGNATURE:

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:
		4-11-95	1440	Tecu River

REMARKS:	LOCATION:	FIELD ID/NAME:
0-4/all has crushed flow in the upstream.	William Tyson WWTP	Ctrl 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)
100%							

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): 1.5

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)	3	IIII		Sand ✓ 50%	35	IIII	
Leaf Packs or Mats	2	III		Mud/Muck/Silt			
Aquatic Vegetation	35	IIII		Other:			
Rock or Shell Rubble				Other:			
Shorezone (Roots/Veg.)	10	III		*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	surface	24.04	6.91	5.41	846			VOS
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: ☑ Algae

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:

Abundant Colonies. Grew on treatments amount since Nov.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
L. Fauth, J. Schultz		4-11-95

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: STOT Tampa	STORET STATION NUMBER:	DATE (M/D/Y): 4-11-95	RECEIVING BODY OF WATER: Peace River

REMARKS: Cyanobacteria abundant in Stream	LOCATION: William Tyson WWTP	FIELD ID/NAME: Test site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [17]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 (17) 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [12]	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 13 (12) 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [19]	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 [19]	Less than 20% of habitats affected by sand or silt accumulation 20 (19) 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of 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 [13]	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 [17]	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 18 (17) 16	50% to 80% of riparian zone is vegetated, but one class of plants 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 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.

[116] **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: William Tyson WWTP
County:
Contact / District: L. Carter / Southwest
NPDES Permit #: FL00
LIMS Sample #: 103899 **LIMS Job #:** 95-AAR-12-24
sampelog 4-19-95
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2
Remarks:

Sample Collection: Date 4/11/95 Time 1210
Test Beginning: Date 4/12/95 Time 1245
Test Ending: Date 4/14/95 Time 1245
Organism Batch #: 14 **Diluent Batch #:** well H_2O
Organism Age: 12 days old
Test Organism: cyprinella leedsi

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 10.0 @ 10.0	25.1 @ 25.2	8.2 @ 25.0 °C	112.7 @ 98.6 997 @ 990 @ 24.9 °C 1033 @ 10195
24 hr	7.0 @ 7.0 10.0 @ 10.0	23.8 @ 23.9	8.3 @ 24.5 °C	111.8 @ 98.6 990 @ 990 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.7	8.3 @ 24.1 °C	1103 @ 98.6 1050 @ 10175 968 @ 990 @ 23.7 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	183	5	5	5	7.7	8.1	8.3	25.9	24.2	23.1	8.0	7.7	8.1	260	250	245
Control B	114	5	5	5	7.7	8.1	8.3		24.0	23.1	7.9	8.2	8.1	250	250	245
Control C	43	5	5	5	7.7	8.1	8.3		24.0	23.1	8.1	8.1	8.1	255	245	245
Control D	304	5	5	5	7.7	8.1	8.3		24.1	23.4	8.0	8.0	8.1	255	250	245
100% A	68	5	5	5	7.2	7.8	8.1	24.3	24.2	23.2	7.7	7.7	8.1	1020	1025	1010
100% B	41	5	5	5	7.2	7.8	8.1		24.2	23.0	7.7	7.7	7.9	1030	1020	1005
100% C	142	5	5	5	7.2	7.8	8.1		24.1	23.0	7.7	7.8	7.6	1020	1020	1005
100% D	502	5	5	5	7.2	7.8	8.1		24.1	23.3	7.7	7.6	7.8	1020	1020	1015
Recorded by:		JRS	MF	JRS	JRS	JN	JRS	JRS	JN	JRS	JRS	JN	JRS	JRS	JN	JRS
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF

Investigators' Signatures
Jennifer Sparapani
Joyce Smith
Marshall Faircloth
Tobias G. Rader

Reviewer

form updated 10/05/94

	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			*0.06		
Lab Total Residual Cl2 (mg/L):	<0.03	—	~~<0.03~~	DR-100	~~JRS~~ TR
Alkalinity (mg/L as $CaCO_3$):	1225	—	145	HACH	JRS
Hardness (mg/L as $CaCO_3$):	1225	—	125	HACH	JRS
Total ammonia (mg/L as N):	<0.017	—	0.322	orion	JN

* Recorded wrong number

Ammonia Meter #98136 Ammonia Meter Slope: -57.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

5th year

Sample Source: William Tyson WWTP
County:
Contact/District: L Carter / Southwest
NPDES Permit #: FL00
LIMS Sample #: 102899 **LIMS Job #:** 95-APR-12-24-01
sample log 4-19-95

Test Type: ~~Screening~~ / Definitive
Static / Static Renewal / Flow-through

Test Number: 1 of 2

Remarks:

Sample Collection: Date 4/11/95 Time 1210
Test Beginning: Date 4/12/95 Time 1300
Test Ending: Date 4/14/95 Time 1300
Organism Batch #: 21 **Diluent Batch #:** 15
Organism Age: <24
Test Organism: * JRS 4/12/95 Wrong name of organism. * Ceriodaphnia dubia ~~C. reticulata~~

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	25.1 @ 25.2	8.2 @ 25.0°C	1127 @ 98.6
	10.0 @ 10.0			997 @ 990 @ 24.9°C (10350 @ 10175)
24 hr	7.0 @ 7.0	23.8 @ 23.9	8.3 @ 24.5°C	1118 @ 98.6
	10.0 @ 10.0			990 @ 990 @ 24.9°C (10300 @ 10175)
48 hr	7.0 @ 7.0	23.7 @ 23.7	8.3 @ 24.1°C	1103 @ 98.6
	9.0 @ 9.0			968 @ 990 @ 23.7°C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Control A	A	5	5	5	7.9		8.3	24.0		23.2	8.0		8.1	180		215
Control B	B	5	5	5	"		8.3	"		23.1			8.1			210
Control C	C	5	5	5			8.3			23.0			8.3			215
Control D	D	5	5	5			8.3			23.1			8.2			215
100% A	A	6	5	5	7.3		8.5	23.7		23.1	7.9		8.2	9165		1190
100% B	B	5	5	5			8.5			23.0			8.1			1135
100% C	C	5	5	5			8.5			23.1			8.2			980
100% D	D	5	5	5			8.5			23.1			8.1			1065
Recorded by:		MF	MF	JRS	JRS		JRS	JRS			JRS		JRS	JRS		JRS
Measured/Loaded by:		MF	MF	MF	MF		MF	MF			MF		MF	MF		MF

Investigators' Signatures

Jennifer Sparagan
Joseph Smith
Mahtell Faircloth
Tobin C. Fader

Reviewer

form updated 10/05/94

Water Quality Parameters * Wrong number recorded

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.06		
Lab Total Residual Cl2 (mg/L):	—	20.03	~~0.03~~ *	Dr-100	~~JRS~~ TR
Alkalinity (mg/L as $CaCO_3$):	—	80	145	HACH	JRS
Hardness (mg/L as $CaCO_3$):	—	85	125	HACH	JRS
Total ammonia (mg/L as N):	—	20.017	0.322	own	JN

Ammonia Meter #98136 Ammonia Meter Slope: -57.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

REFERENCE SITE

Calculation & Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft 1994)									
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**					**Peninsula (75b, c, d)**			
	Value	5	3	1	Score	5	3	1	Score
Number of Taxa	16	≥ 21	16–30	0–15		≥ 27	14–26	0–13	3
EPT Index	0	≥ 7	4–6	0–3			≥ 4	0–3	1
% Contribution of Dominant Taxon	46.4		≤ 20	> 20			≤ 37	> 37	1
Florida Index	4	≥ 18	9–17	0–8		≥ 7	4–6	0–3	3
% Diptera	38.4		≤ 38	> 38			≤ 32	> 32	1
% Suspension feeders/ Collector-Filterers	48.8	≥ 12	7–11	0–6		≥ 8	4–7	0–3	5
% Shredders	6.0		≥ 10	0–9			≥ 13	0–12	1
% Crustacean+Mollusks (Peninsula only)	46.4	–	–	–			≥ 16	0–15	3
# Crustacean+Mollusks (Peninsula only)	1	–	–	–			≥ 4	0–3	1
Total Score	**Panhandle**					**Peninsula**			**19**
Interpretation of Score	**No Impairment**				**29-23**	**No Impairment**			**33-27**
	Moderate Impairment				**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation				**14-7**	**Severe Degradation**			**16-9**

TEST SITE

Calculation & Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft 1994)									
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**					**Peninsula (75b, c, d)**			
	Value	5	3	1	Score	5	3	1	Score
Number of Taxa	11	≥ 21	16–30	0–15		≥ 27	14–26	0–13	1
EPT Index	0	≥ 7	4–6	0–3			≥ 4	0–3	1
% Contribution of Dominant Taxon	39.0		≤ 20	> 20			≤ 37	> 37	1
Florida Index	3	≥ 18	9–17	0–8		≥ 7	4–6	0–3	1
% Diptera	50.9		≤ 38	> 38			≤ 32	> 32	1
% Suspension feeders/ Collector-Filterers	2.5	≥ 12	7–11	0–6		≥ 8	4–7	0–3	1
% Shredders	20.4		≥ 10	0–9			≥ 13	0–12	3
% Crustacean+Mollusks (Peninsula only)	10.6	–	–	–			≥ 16	0–15	1
# Crustacean+Mollusks (Peninsula only)	3	–	–	–			≥ 4	0–3	1
Total Score	**Panhandle**					**Peninsula**			**11**
Interpretation of Score	**No Impairment**				**29-23**	**No Impairment**			**33-27**
	Moderate Impairment				**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation				**14-7**	**Severe Degradation**			**16-9**

Benthic macroinvertebrate taxa list for William Tyson WWTP, collected via 20 discrete dipnet sweeps on 11 April 1995. The test site was located 100 meters downstream and the reference site 100 meters upstream on an unnamed tributary of the Peace River.

	Reference Site	Test Site
Oligochaeta		
Aulodrilus pigueti	13	–
Eclipidrilus sp.	2	–
Limnodrilus hoffmeisteri	2	81
Enchytraeidae	2	–
Hirudinea		
Mooreobdella tetragon	–	2
Gastropoda		
Micromenetus sp.	–	4
Physella sp.	–	17
Pelecypoda		
Pisidiidae	58	2
Odonata		
Argia sp.	–	1
Diptera		
Chironomus sp.	12	4
Denopelopia atria	2	–
Goeldichironomus holoprasinus	–	1
Palpomyia/Bezzia grp.	3	–
Paratanytarsus sp. B Epler	–	7
Polypedilum halterale grp.	1	–
Polypedilum illinoense	2	85
Procladius sp.	6	–
Rheotanytarsus sp.	1	–
Rheotanytarsus exiguus grp.	1	–
Tanypus sp.	1	–
Tanytarsus sp.	1	–
Tanytarsus sp. V Epler	1	–
Tribelos sp.	2	–
Tribelos fuscicornis	1	–
Tribelos jucundus	13	–
Chironomidae	1	14

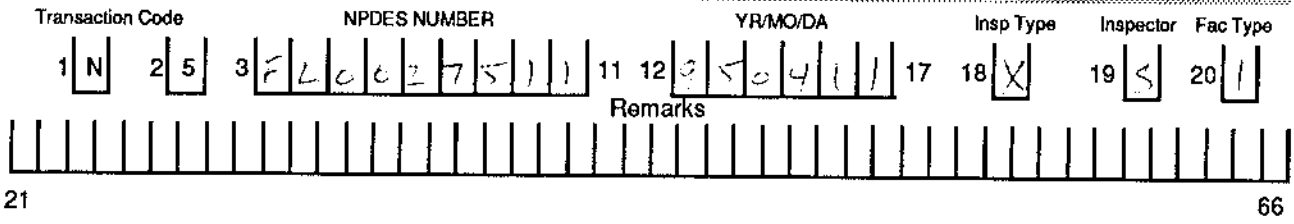
Benthic macroinvertebrate taxa list for the William Tyson WWTP, collected via Hester-Dendy artificial substrates on 11 April 1995. The test site was located 100 meters downstream and the reference site 100 meters upstream on an unnamed tributary of the Peace River. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Oligochaeta		
Aulodrilus pigueti	5	–
Limnodrilus hoffmeisteri	–	3
Hirudinea		
Desserobdella phalera	3	–
Gastropoda		
Physella sp.	3	93
Gastropoda	–	11
Pelecypoda		
Pisidiidae	21	–
Odonata		
Argia fumipennis	3	–
Diptera		
Ablabesmyia mallochi	13	–
Ablabesmyia rhamphe grp.	3	–
Chaoborus sp.	3	–
Chironomus sp.	103	8
Denopelopia sp.	8	–
Goeldichironomus holoprasinus	–	3
Kiefferulus sp.	–	3
Kiefferulus dux	5	5
Larsia decolorata	3	3
Monopelopia boliekae	3	–
Paratanytarsus sp. B Epler	11	26
Polypedilum illinoense	48	725
Rheopelopia sp.	3	–
Tanytarsus sp. V Epler	3	–
Tribelos jucundus	16	–
Chironomidae	16	418

Periphyton taxa list and densities (#/cm^2) for William Tyson WWTP, collected via standard diatometer on 11 April 1995. The test site was located 100 meters downstream and the reference site 100 meters upstream on an unnamed tributary of the Peace River.

	Reference Site	Test Site
Cyanophyceae		
Anabaena sp.	–	319
Lyngbya sp.	–	319
Bacillariophyceae		
Achnanthes hustedtii	4309	958
Achnanthes lanceolata dubia	431	–
Anomoeneis sp.	–	319
Anomoeneis serians brachysira	16376	–
Anomoeneis vitrea	–	319
Capartogramma crucicula	–	319
Eunotia sp.	15514	319
Eunotia pectinalis	1724	–
Gomphonema parvulum	1724	958
Hantzschia amphioxys	–	319
Navicula cryptocephala	–	319
Navicula pupula	862	–
Navicula pupula mutata	431	319
Navicula radiosa	–	319
Nitzschia amphibia	–	319
Nitzschia obtusa	–	319
Nitzschia palea	431	1597
Nitzschia romana	–	319
Pinnularia sp.	431	319
Pinnularia appendiculata	–	639
Pinnularia gibba	–	319
Pinnularia major	431	–
Pennales	–	1597
Chlorophyceae		
Characium sp.	–	319
Chlamydomonas sp.	431	–
Oedogonium sp.	1293	–
Scenedesmus sp.	–	2875
Stigeoclonium sp.	3017	1278
Euglenophyceae		
Trachelomonas sp.	–	319

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



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

