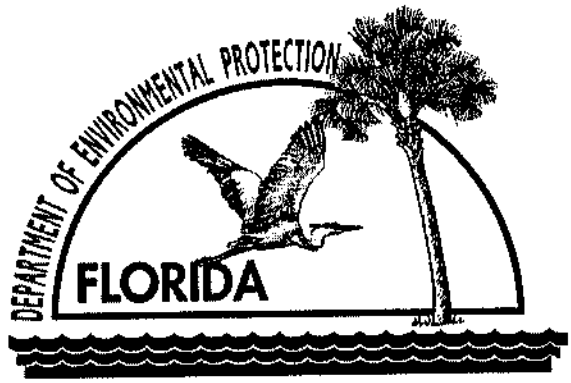
#221



Biological Assessment of

City of Auburndale WWTP

Polk County

NPDES #FL0021466

Sampled February 1998

FILE COPY
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November 1998

Biology Section
Division of Administrative and Technical Services
Bureau of Laboratories

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger:	City of Auburndale WWTP
County:	Polk
NPDES Number:	FL0021466
NPDES Permit Expiration Date:	20 October 2002

Toxics Sampling Inspection (XSI)

Date Sampled: 02 February 1998

Results: The herbicide atrazine was detected in the effluent below toxic levels. Cadmium, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 02 February 1998

Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi*, or to the invertebrate, *Ceriodaphnia dubia*, during the 48-hour bioassay.

Impact Bioassessment Inspection (IBI)

Date Sampled: 02 February 1998

Results: Qualitative measures of macroinvertebrate community health indicated "poor" conditions at both the control and test sites, with SCI scores of 15 and 13, respectively. Because of the stressed conditions at the control site, additional negative influences from the discharge could not be determined.

Water Quality Inspection (WQI)

Date Sampled: 02 February 1998

Results: Elevated concentrations of total phosphorus (0.34 mg/L) and nitrate+nitrite (0.63 mg/L) at the Lake Lena Run test site were attributed to the discharge. AGP increased from 9.4 mg dry wt/L at the control site to 36.1 mg dry wt/L at the test site, both exceeding the 5 mg dry wt/L "problem threshold". This indicates the discharge is exacerbating the existing nutrient enrichment in Lake Lena Run. Total residual chlorine (0.03 mg/L) in the effluent exceeded the permit limit of 0.01 mg/L.

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

Introduction

The City of Auburndale Wastewater Treatment Plant is located in Polk County, Florida (see maps in Appendix). Activities at this plant include treatment and disposal of domestic sanitary wastewater. Wastewater at this facility is treated in an oxidation ditch, followed by clarification, denitrification, filtration, and ultra-violet disinfection. A portion of the wastewater is discharged to Lake Lena Run and the remaining wastewater is pumped to a spray-field. While the design flow of the wastewater system is 1.4 MGD, the actual mean flow during this survey was 1.5 MGD.

State Permit limits for the Auburndale WWTP are listed in Table 1. According to the facility's monthly operating reports, the plant has had past violations of total nitrogen, chronic toxicity, and fecal coliform bacteria (see *Facility Summary* in Appendix).

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 control site (located in Lake Lena Run, approximately 100 meters north of State Road 655) and a test site (located in Lake Lena Run 100 meters downstream of the discharge). 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.

The effluent was analyzed for nutrients, metals, and for organic constituents (base neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi,* as test organisms, were performed on an effluent sample. Benthic macroinvertebrate communities were evaluated at control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip-net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days. Phytoplankton were sampled at both control and test sites via subsurface grabs. Periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of the SOP's can be viewed on our web site: "www.dep. state.fl.us/labs/sops.htm".

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat assessment, taxa richness, Shannon-Weaver diversity Index, the Florida Index, Ephemeroptera/Plecoptera/Trichoptera (EPT) Index, community composition, functional feeding groups, algal biomass, and the Stream Condition Index (SCI). For a discussion of each of these measures see the *Explanation of Measurements of Community Health* in the Appendix.

For graphical purposes, the percent differences between the control and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the % filter-feeders are measured as the control site minus test site divided by the control site. The percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential could not be compared, because not all of these parameters were collected at the control site.

The following personnel were involved in this investigation: James Fine and Joe Squitieri (DEP Southwest District), and Ken Espy, Marshall Faircloth, Joy Jackson, Scott Lashbrook, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburello, David Whiting, Vicki Whiting, and Steve Wolfe (DEP Central Biology Laboratory in Tallahassee). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, Russel Frydenborg, and Michael Tanski, as well as District representatives.

Results

Habitat quality was "suboptimal" at both the control (73 points) and test (72 points) sites, primarily due to bank instability and an insufficient riparian buffer zone width (see Habitat Assessment Field Data Sheets in Appendix). Substrate at both sites consisted of aquatic vegetation and sand. Phys-

ical/chemical parameters were similar at the control and test sites (Table 1). For example, dissolved oxygen was 8.9 mg/L at the control site and 9.0 mg/L at the test site while pH varied from 6.8 SU at the control site to 6.6 SU at the test site. Temperature (17.5 °C at the control site and 17.1 °C at the test site) and conductivity (230 µmhos/cm at the control site and 185 µmhos/cm at the test site) were also comparable. .

Cadmium, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards. The herbicide atrazine (0.15 µg/L) was detected in the effluent below acutely toxic levels (Table 1). The effluent total residual chlorine value (0.03 mg/L) exceeded the permit limit of 0.01 mg/L.

The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay (Appendix).

Nutrient levels are shown in Table 1. Elevated effluent levels of total nitrogen (6.8 mg/L), total phosphorus (2.5 mg/L), TKN (1.0 mg/L), and nitrate+nitrite (5.8 mg/L) appeared to contribute to nutrient enrichment at the test site, relative to the control site.

Ortho-phosphate was 0.009 mg/L at the control site and 0.25 mg/L at the test site. Total phosphorus increased from 0.069 mg/L at the control site to 0.34 mg/L at the test site, which is higher than 70% of Florida's streams (see Typical Values for Selected Parameters in Florida Waters in Appendix). Nitrate+nitrite values increased from 0.039 mg/L at the control site to 0.63 mg/L at the test site, which is higher than 80% of Florida's streams. Ammonia (control = 0.044 mg/L, test = 0.071 mg/L) and TKN (control = 1.0 mg/L, test = 1.3 mg/L) also increased at the test site compared to the control site.

The AGP values at both the control (9.4 mg dry wt/L) and test sites (36.1 mg dry wt/L) exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987). The effluent's AGP value was 147.3 mg dry wt/L.

The effluent fecal coliform result (estimated at 100 counts/100mL) complied with the facility's permit limit of ≤ 800 counts/100mL. The fecal and total coliforms were comparable at the control and test sites (Table 1).

Periphyton was only collected at the test site, therefore no conclusion can be drawn from the data. The test site data, however, did show a high algal density (1,305,298 cells/mL) and chlorophyll *a* value (24.3 mg/m²). Phytoplankton was not collected from the receiving waters.

Only one out of the four replicate Hester-Dendys was recovered from the control site, therefore a valid comparison could not be made between the study sites. The test site data, however, did show low EPT (2) and Florida Index (6) scores. The pollution-tolerant midge, *Glyptotendipes* sp., dominated the control and test sites.

In the qualitative macroinvertebrate samples, taxa richness increased from 15 at the control site to 18 at the test site. The EPT Index was 0 at the control site and 1 at the test site. The pollution-tolerant midge, *Polypedilum illinoense,* was the dominant taxon at the control and test sites (55% and 50% contribution, respectively). The Florida Index was similar at the control (3 points) and test sites (2 points). There were no suspension feeders at either site. The SCI placed both sites in the "poor" category with 15 points for the control site and 13 points for the test site.

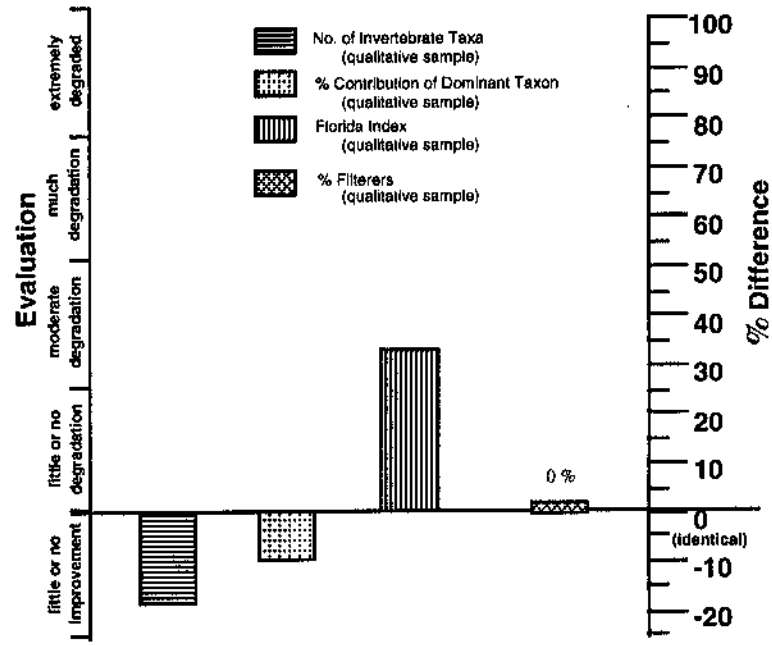


Figure 1. Effect of discharge on the benthic macroinvertebrate community.

Table 1. Effluent limits and summary of chemistry data.

City of Auburndale WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
Atrazine	-	0.15 I	-	-
Metals (µg/L)				
Aluminum	≤1500 **	75 U	-	-
Arsenic	≤50.0 **	40 U	-	-
Cadmium	≤1.2 **c	0.02 I	-	-
Chromium	≤226.5 **c	10 U	-	-
Copper	≤13.0 **c	6.1	-	-
Iron	≤1000 **	57	-	-
Lead	≤3.7 **c	0.5 I	-	-
Mercury	≤0.012 **	0.1 U	-	-
Nickel	≤173.1 **c	7 U	-	-
Selenium	≤5.0 **	50 U	-	-
Silver	≤0.07 **	0.05 U	-	-
Zinc	≤116.4 **c	88	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	2.3	0.009 I	0.25
Total phosphorus	-	2.5	0.069 A	0.34
Ammonia	-	0.012 I	0.044	0.071
Nitrate+nitrite	-	5.8	0.039	0.63
TKN	2.2 *	1.0 A	1.0	1.3
Total Nitrogen	9.0 *	6.8	1.04	1.93
General Phys-Chem Parameters				
Habitat Assessment	-	-	73	72
D.O. (mg/L)-top	≥7.0 *	8.1 J	9.2 J	8.8 J
pH (SU)	6.0-8.5 *	7.0 J	6.5 J	6.8 J
Conductivity (µmhos/cm)	-	516	233	187
Temperature (°C)	-	20.1	17.1	17.5
BOD5 (mg/L)	12.0 *	2 UQ	3	3
Turbidity (NTU)	-	0.1	7.2	6.3
TSS (mg/L)	-	1 U	16	18
Color (Pt-Co)	-	32	38	36
Total Residual Chlorine (mg/L)	≤0.01 *	0.03	-	-
Flow (MGD)	1.4 *	1.5	-	-
Hardness (mg $CaCO_3$)	-	111.6	-	-
AGP (mg dry wt/L)	-	147.3	9.4	36.1
Toxicity				
Bioassay Fish	-	No Mortality	-	-
Bioassay Invertebrate	-	No Mortality	-	-
Microbiology (counts/100mL)				
Fecal coliform	≤800 *	100 J	240 J	300 J
Total coliform	-	460	840	720

* Permit limit
** Class III water quality standard
c - Value is calculated based on hardness
A - Value reported is the mean of two or more determinations
J - Estimated value
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the minimum detection limit

Table 2. Major characteristics of community structure of control and test sites.

City of Auburndale WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	15	18
Florida Index	3	2
SCI	15	13
EPT Index	0	1
% Dominant Taxon	55.1	49.5
Community Composition		
% Diptera	69.4	83.2
% Ephemeroptera	0.0	2.1
% Hemiptera	0.0	3.2
% Hirudinea	6.1	0.0
% Oligochaeta	21.5	7.4
% Other	3.0	4.2
Functional Feeding Groups		
% Predators	9.7	5.8
% Burrowing Deposit Feeders	21.4	7.4
% Surface Deposit Feeders	32.1	42.1
% Scrapers	0.0	1.6
% Shredders	30.6	38.4
% Unknown	6.1	4.8
Macroinvertebrate Hester-Dendy		
Number of Taxa	20	39
Florida Index	9	6
Shannon-Weaver Diversity	2.2	1.3
EPT Index	2	2
Community Composition		
% Diptera	97.1	96.0
% Ephemeroptera	0.2	0.3
% Trichoptera	1.1	0.0
% Other	1.3	3.8
Functional Feeding Groups		
% Predators	1.7	0.7
% Surface Deposit Feeders	52.2	48.8
% Shredders	42.9	45.4
% Other	3.2	5.2
Periphyton Algae		
Number of Taxa	-	32
Shannon-Weaver Diversity	-	3.4
Algal Density (#/cm^2)	-	1,305,298.3
Chlorophyll a (mg/m^2)	-	24.3 A
Diatom/Diatom + B-G Ratio	-	0.98
% Blue-green	-	1.8
% Green	-	15.4
% Diatoms	-	82.8
AGP (mg dry wt/L)	9.4	36.1

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

Discussion

Cadmium, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards. The herbicide atrazine was detected in the effluent below toxic levels.

The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay.

Fecal and total coliforms in the effluent and both study sites complied with the facility's permit limit and Class III water quality standards.

Elevated concentrations of total phosphorus and nitrate+nitrite at the Lake Lena Run test site were attributed to the discharge. The AGP increased from 9.4 mg dry wt/L at the control site to 36.1 mg dry wt/L at the test site, both exceeding the 5 mg dry wt/L "problem threshold". The facility appears to be exacerbating the existing nutrient enrichment in Lake Lena Run.

Qualitative measures of macroinvertebrate community health indicated stressed conditions at the control and test sites. For example, Florida Index scores, with 3 points at the control site and 2 points at the test site, and the EPT values (0 and 1 at the control and test, respectively) were well below the expectations for a healthy peninsular stream. Both sites ranked in the "poor" category based on SCI scores of 15 and 13 at the control and test sites, respectively.

Literature Cited

Barbour, M. T., J. Gerritsen, and J. S. White. 1996. Development of the Stream Condition Index for Florida. Prepared for the Fla. Dept. Environ. Protection. 105 p.

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.

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

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. 1993. 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.

Explanation of Measurements of Community Health

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

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

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 only a few organisms are abundant, to the exclusion of other taxa.

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

Ephemeroptera/Plecoptera/Trichoptera (EPT) Index: This index 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 control conditions, may indicate degradation.

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.

Functional Feeding Groups: 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 (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996) developed for Florida. The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).

Typical Values for Selected Parameters in Florida Waters

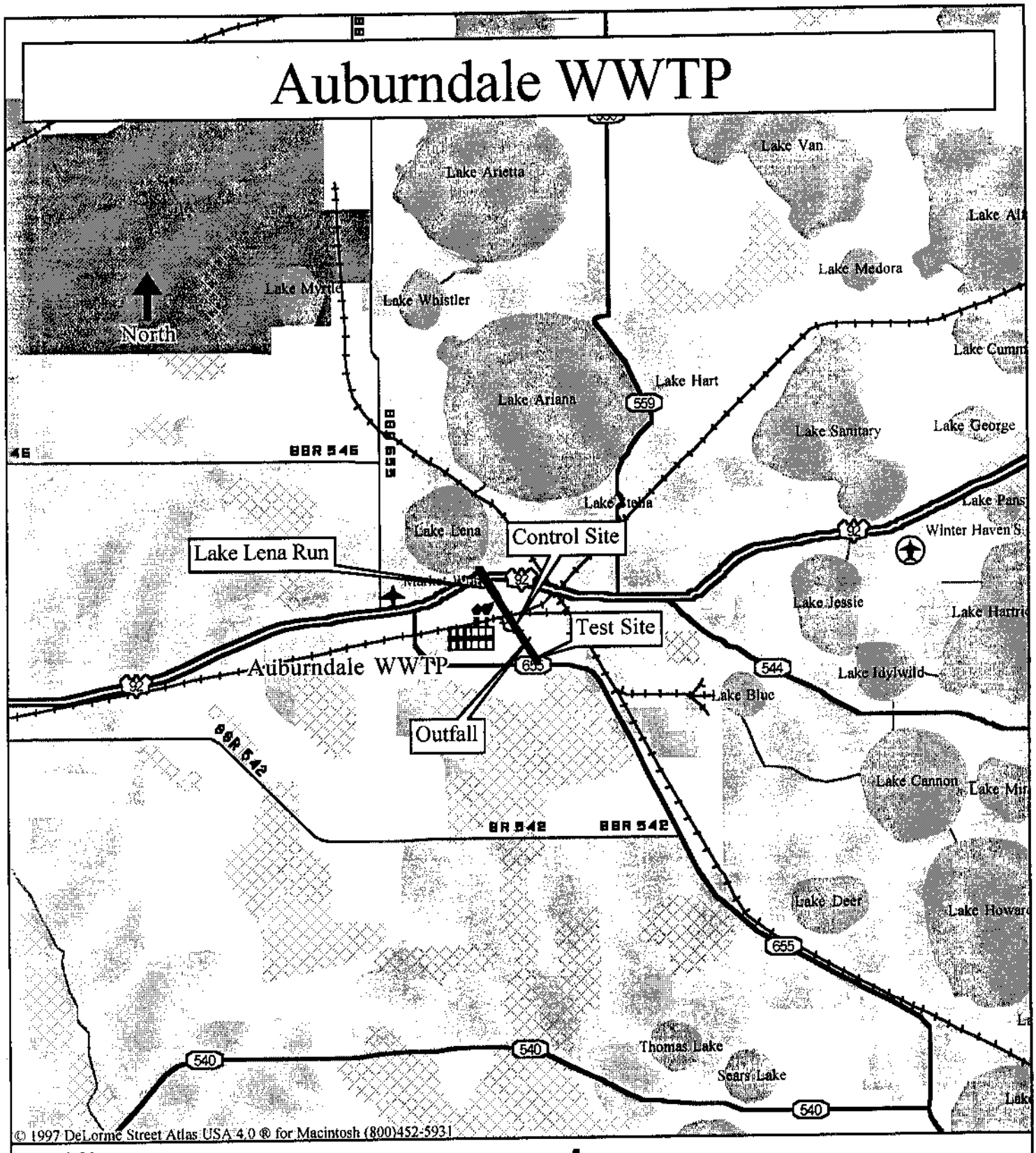
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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

Auburndale WWTP



Mag 13.00
Tue Nov 10 15:43 1998
Scale 1:62,500 (at center)
1 Miles
2 KM

Major Connector
State Route
US Highway
Railroad
Public Airport
Private Airport
Water
City Park
Woodland
Population Center

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: City of Auburndale WWTP		Date Summary Prepared: 2/2/98
Location (attach detailed map):	County: Polk	District: SWD
Federal Permit # and expiration date: FL0021466	State GMS # and 405.3M01748 State expiration date: 6/4/95 (permit pending)	Facility Type: Industrial Municipal Federal Agricultural Other (list):

Function of facility:
Treatment & disposal of sanitary wastewater

Description of treatment process:
1.4 MGD type I complete mix oxidation ditch followed by clarification, denitification filters & UV disinfection. Surface water discharge of 0.65 mgd and land application of 0.750 MGD.

Receiving waters: Lake Lena Run	Classification: I II III	
Design Flow: 1.4 MGD	Mean Flow: 1.47 MGD (3 month ADF)	Flow during survey: 1.5 MGD

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)
See Attached sheet	

Describe special permit conditions and permit modifications:

WASTE MGT TAMPA SWDIST TEL:813-744-6125 Jun 03 98 9:39 No.003 P.03

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

City of Auburndale
(Facility)

Description of permitted outfall(s):
Outfall 001 is to Lake Lena Run, limited to 0.650 MGD, monthly average.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:
4/97 - chronic toxicity, C. dubia reproduction NOEC < 100% re follow-ups failed
5/8/97 weekly TN was 10. mg/L
1/+2/96 monthly TN was exceeded
8/+9/95 33 days of chlorine standard of .01 mg/L
9/95 - fecal violation

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
Facility is currently under enforcement (Consent Order 97-0497) for unpermitted discharges from the sprayfield and violations of the surface water limits

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
n/a

Additional information:

Staff contributing to this review (signature):
(Biologist)
(Inspector)
(Engineer)
( )
( )
( )

WASTE MGT TAMPA SUDIST TEL:813-744-6125 Jun 03 98 9:39 No.003 P.04

WASTE MGT TAMPA SWDIST TEL:813-744-6125 Jun 03 98 9:40 No.003 P.05

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS -

1. During the period beginning on the effective date of this permit and lasting through expiration, th permittee is authorized to discharge from outfall serial number 001 - Treated Domestic Wastewater.

Such discharge shall be limited and monitored by the permittee as specified below:

PARAMETERS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	Annual Average	Monthly Average	Weekly Average	Measurement Frequency	Sample Type	Sampli Poin
Flow, MGD	Report	Report	Report	Continuous	Recorder	Efflue
Biochemical Oxygen Demand (5 Day), mg/l	N/A	8.0	12.0	1/Week	8 Hour Composite	Efflue
Total Suspended Solids, mg/l	N/A	Report	N/A	1/Week	8 Hour Composite	Influe
mg/l	20.0	30.0	45.0	1/Week	8 Hour Composite	Effluer
Total Nitrogen, mg/l	4.0	6.0	9.0	1/Week	8 Hour Composite	Effluen
Total Kjeldahl Nitrogen, mg/l	N/A	1.5	2.2	1/Week	8 Hour Composite	Effluen
Ultimate Oxygen Demand, lbs/day	N/A	99.19	N/A	1/Week	8 Hour Composite	Effluen
Fecal Coliform, N/100 ml	See Item 10 on Page I-3			1/Week	Grab	Effluen
pH, Standard Units	See Item 3 on Page I-2			Continuous	Recorder	Effluen
Total Residual Chlorine, mg/l	See Item 6 on Pages I-2 and I-3			1/Week	Grab	Effluen
Dissolved Oxygen, mg/l	See Item 7 on Page I-3			1/Week	Grab	Effluen
Chronic Whole Effluent Toxicity	See Item 9 on Page I-3			See Part IV	Composite	Efflu

PART I (CONTINUATION)
EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. Samples taken in compliance with the effluent monitoring requirements specified in this permit shall be taken at the nearest accessible point after final treatment but prior to the actual discharge or mixing with the receiving water.

3. The pH of the effluent shall not be less than 6.0 standard units nor greater than 8.5 standard units and shall be monitored continuously with a recorder. (Hourly grab samples may be substituted for the continuous recordings during periods of certified operator attendance.) The pH values shall not deviate outside the required range more than 7 hours and 26 minutes in any calendar month and no individual excursion shall exceed 60 minutes. An "excursion" is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in this permit.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts. Also, the effluent shall not cause a visible sheen on the receiving water.

5. Any bypass of the treatment facility, which is not included in the effluent monitored above, is to be monitored for flow and for all other parameters in this permit. For parameters other than flow, at least one grab sample per day shall be monitored. Daily flow shall be monitored or estimated, as appropriate, to obtain reportable data. All monitoring results shall be reported on a Discharge Monitoring Report (DMR) form (EPA 3320-1).

6. a. The <u>interim</u> daily maximum concentration of total residual chlorine (TRC) shall not exceed 0.20 mg/l and shall be monitored by grab sample once per week.

   b. The <u>final</u> daily maximum concentration of TRC in the effluent shall not exceed 0.01 mg/l and shall be achieved no later than two (2) years from the effective date of this permit. (This parameter shall be monitored by grab sample once per week.)

   This limit is included to prevent toxic effects from chlorine in the receiving waters. This limit does not provide for a zone of mixing for TRC in the receiving waters. The permittee may apply for a mixing zone for TRC from the Florida Department of Environmental Regulation (FDER), if the permittee determines such to be a benefit. If a mixing zone for TRC is granted by FDER and concurred in by EPA, the permittee may apply for a modification of the above TRC limit from EPA.

WASTE MGT TAMPA SWDIST TEL:813-744-6125 Jun 16 98 15:15 No.007 P.03

c. Testing for TRC shall be conducted according to either the low-level amperometric titration method or the DPD colorimetric method as specified in Section 4500-Cl E. or 4500-Cl G., Standard Methods for the Examination of Water and Wastewater, 17th Edition. If chlorine is not detected using one of these methods, the permittee shall report on the discharge monitoring report form, the analytical results for chlorine as being measured at less than the detection level for the test method selected; the test method shall also be reported. The permittee shall then be considered to be in compliance with the above daily maximum concentration limit for TRC.

7. The effluent dissolved oxygen concentration shall not be less than 7.0 mg/l.

8. The permittee shall conduct instream monitoring of the dissolved oxygen concentration both upstream and downstream of the outfall. Monitoring shall be conducted once every two weeks and the results shall be reported on a DMR form.

9. The effluent shall not be chronically toxic to, or produce adverse physiological or behavioral responses in aquatic animals. An effluent no observable effect concentration (NOEC) of less than 100% for any test species will constitute a violation of Florida Administrative Code (FAC) Section 17-302.510(3)(p) [May 29, 1990] and the terms of this permit. The testing for this requirement shall conform with Part IV of this permit.

10. a. The arithmetic average of the monthly fecal coliform values (computed as a geometric mean) of samples collected during an annual period shall not exceed 200 per 100 ml of effluent sample.

b. Any one sample shall not exceed 800 fecal coliform values per 100 ml of sample.

11. In addition to the specified limits, the monthly average effluent concentration of total suspended solids shall not exceed 15% of the influent value (85% removal).

12. The following calculation shall be used in the determination of compliance with the limitation for ultimate oxygen demand (UOD):

$$UOD = [\ 11.93 \times Q \times BOD_5\ ] + [\ 38.11 \times Q \times TKN]$$

where,
Q = WWTP flow in MGD;
BOD_5 = measured monthly average concentration of 5-day biochemical oxygen demand in mg/l
TKN = measured monthly average concentration of total kjeldahl nitrogen in mg/l

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13. Direct discharge from the spray irrigation site to area surface waters is not authorized by this permit.

14. If the results for a given sample analysis are such that any parameter is not detected at or above the minimum level for the test method used, a value of zero will be used for that sample in calculating an arithmetic effluent mean value for the parameter. (In the case of fecal coliform, a value of 1.0 shall be used in calculating the geometric mean.)

B. SLUDGE MANAGEMENT PRACTICES

1. The permittee must sample and analyze the sludge and report to EPA the quantitative data for the 125 priority pollutants listed in 40 CFR Part 122, Appendix D, Tables II and III. Qualitative data for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) must also be submitted if the permittee knows or has reason to believe that TCDD is or may be present in the sludge.

   a. The permittee must submit the above data within 1 year of the effective date of this permit, and report annually thereafter.

2. The permittee must submit within 30 days of the effective date of this permit the sludge production volume (specify if daily or annual; if actual volume is not known, estimate the quantity of sludge being handled and so indicate) and the sludge disposal practice.

3. The permittee shall provide sludge inventory data to the State and EPA, as part of EPA's inventory updates as requested. The data should include, but not be limited to, sludge quantity and characteristics.

4. Reopener. If an applicable "acceptable management practice" or numerical limitation(s) for pollutant(s) in sewage sludge promulgated under Section 405(d)(2) of the Clean Water Act, as amended by the Water Quality Act of 1987, is more stringent than the sludge pollutant limit or acceptable management practice in this permit, or controls a pollutant not limited in this permit, this permit shall be promptly modified or revoked and reissued to conform to the requirements promulgated under Section 405(d)(2). The permittee shall comply with any additional limitation(s) by no later than the compliance deadline specified in the applicable regulations as required by Section 405(d)(2)(D) of the Clean Water Act.

WASTE MGT TAMPA SWDIST TEL:813-744-6125 Jun 16 98 15:16 No.007 P.05

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		2/2/98	Lake Lena Run – Lake Hayes

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Polk	City of Auburndale	Reference Site Test Site 1 (upstream)

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability 15	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). (15) 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity 19	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 (19) 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Artificial Channelization 9	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
Habitat Smothering 10	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 5	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 5	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 10	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, and/or 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, and/or 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 and/or 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
73	TOTAL SCORE	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/2/98	Samer Fino	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		2/2/98	1218	Lake Lena Run / Lake Haines

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Polk	City of Auburndale w WTP	Reference site / ~~Test Site~~ (upstream)

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40						60	

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

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

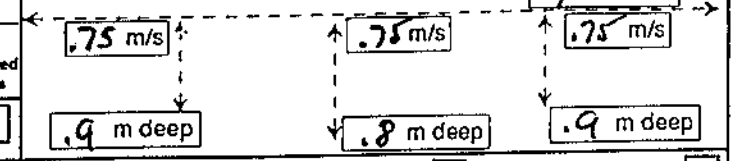
Width of riparian vegetation (m) on least buffered side: — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 1.0 (m above present water level) + .9 (present depth in m) = 1.9 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



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)				Sand / Clay	30	3	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	70	17		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	.1	17.51	6.83	8.89	230			VOB
Mid-depth	.4	17.39	6.82	8.83	233			
Bottom	.9	17.49	6.82	8.80	233			

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:
wind 30+ knots
overcast w/ Inclement weath

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

SAMPLING TEAM: James Fine — SIGNATURE: [signature] — DATE: 2/2/98

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/DY):	RECEIVING BODY OF WATER:
			Lake Lena Run – Lake Haines

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Polk	City of Auburndale WWTP	Test Site 1 (Downstream)

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability 14	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 (14) 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity 18	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 (18) 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Artificial Channelization 9	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
Habitat Smothering 11	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 4	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 6	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 10	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, and/or 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, and/or 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 and/or 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

	Comments
Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.	
72 TOTAL SCORE	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/2/98	James Fiel	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		2/2/98	1115	Lake Lena Run - Lake Haines

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Polk	City of Auburndale WWTP	Test Site #1 (Downstream)

RIPARIAN ZONE/INSTREAM FEATURES

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

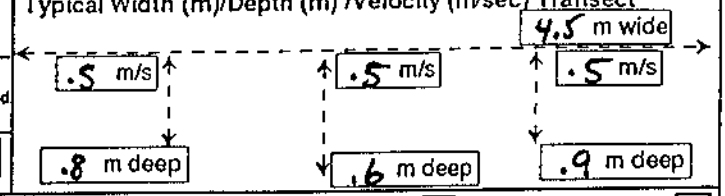
Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40						60	

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

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

Width of riparian vegetation (m) on least buffered side: *List & map dominant vegetation on back*

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



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

Artificially Impounded ☐ yes

High Water Mark: 1.0 (m above present water level) + .8 (present depth in m) = 1.8 (m above bed)

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

SEDIMENT/SUBSTRATE

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

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)				Sand	20	2	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation	80	13		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	.1	17.13	6.58	9.01	185			
Mid-depth	.4	17.11	6.58	9.02	186			VOB
Bottom	.8	17.05	6.53	9.19	187			

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:
James Fine	James Fine	2/2/98

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Auburndale WWTP
County:
Contact / District: James Fine / SWD
NPDES Permit #: FL0021466
LIMS Sample #: 304995 LIMS Job #: 1998-02-03-29
sample log: June 2

Sample Collection: Date 2/2/98 Time 09:50
Test Beginning: Date 2/3/98 Time 1330
Test Ending: Date 2/5/98 Time 1350
Organism Batch #: 6 Diluent Batch #: well H2O
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 24.0-25.0°C
incubator 25.5-27.0°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

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	23.0° @ 22.9°	8.2 @ 25.1°C	963 @ 96.3 968 @ 1005 @ 24.2 °C 9960 @ 100.59
24 hr	7.0 @ 7.0 9.0 @ ___	24.7 @ 24.7	8.2 @ 24.8 °C	101.9 @ 96.2 983 @ 1005 @ 25.7 °C
48 hr	7.0 @ 7.0 9.0 @ ___	22.3 @ 22.3	8.2 @ 25.1°C	101.1 @ 96.3 952 @ 1005 @ 25.8 °C 9930 @ 100.09

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 (B)	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
C+L	A 61	5	5	5	7.7	8.2	8.4	25.2	24.7	26.4	7.6	7.9	6.6	251	251	265
C+L	B 62	5	5	5	7.7	8.2	8.4	25.3	24.5	26.8	7.6	7.8	6.6	260	256	274
C+L	C 63	5	5	5	7.8	8.2	8.4	25.3	24.3	26.6	7.6	8.0	6.6	261	257	273
C+L	D 64	5	5	5	7.8	8.2	8.4	25.3	24.6	26.5	7.5	8.0	6.7	258	256	268
100%	A 65	5	5	5	7.4	8.0	8.2	25.2	24.9	26.4	7.9	7.7	6.7	517	525	541
100%	B 66	5	5	5	7.4	8.0	8.2	25.2	24.5	26.6	7.8	7.7	6.7	523	522	550
100%	C 67	5	5	5	7.4	8.0	8.2	25.2	24.2	26.6	7.9	7.9	6.7	525	522	552
100%	D 68	5	5	5	7.4	8.0	8.2	25.2	24.4	26.6	7.9	7.9	6.7	535	526	557
													(48 hr)			
													7.7			
													7.7			
													7.8			
													7.7			
													7.8			
													7.9			
													7.7			
													7.8			
Measured/Loaded by:		MF	FW	JC	MF	MF	JC	MF	MF	JC	MF	MF	DW	MF	MF	DW
Recorded by:		ML	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW	FW

(A) → Salinity not adjusted on the D.O. meter. (FW 2/5/98.

Investigators' Signatures

Water Quality Parameters (verified by MF)	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):				DR100	
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.03	DR100	MF
Alkalinity (mg/L as $CaCO_3$):	107	61	80	Hach	FW
Hardness (mg/L as $CaCO_3$):	121	81	112	Hach	FW
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	ML

Ammonia Meter #98136 Ammonia Meter Slope: -58.8 Ammonia Blank: <0.017
Control Salinity: 0 ppt
Sample Salinity: 0 ppt

reviewer

form updated 4/01/96

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Auburndale WWTP
County:
Contact / District: ~~Kent~~ Dan Edwards James Fine / SWD
NPDES Permit #: FL0021466
LIMS Sample #: 304995 LIMS Job #: 1998-02-03-29
sample log: Dunc's
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.0-25.0°C
incubator
Test Number: 1 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 2/2/98 Time 09:50
Test Beginning: Date 2/3/98 Time 1330
Test Ending: Date 2/5/98 Time 13:50
Organism Batch #: 5 Diluent Batch #: 5
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

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	23.0° @ 22.9°	8.2 @ 25.1 °C	96.3 @ 96.3 968 @ 1005 @ 24.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.7	8.2 @ 24.8 °C	101.9 @ 96.3 983 @ 1005 @ 25.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.3 @ 22.3	8.2 @ 26.1 °C	101.1 @ 96.3 942 @ 1005 @ 25.8 °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) (A) 0 hr	D.O. (mg/L) (A) 24 h	D.O. (mg/L) (A) 48 hr	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
C+L A	A	5	5	5	8.1		8.2	24.1		24.2	7.1		6.8	179		180
C+L B	B	5	5	5			8.2			24.4			6.8			181
C+L C	C	5	5	5			8.2			24.5			6.7			186
C+L D	D	5	5	5			8.2			24.5			6.7			190
100% A	A	5	5	5	7.6		8.2	24.3		24.4	7.6		6.9	511		545
100% B	B	5	5	5			8.3			24.2			6.8			567
100% C	C	5	5	5			8.3			24.2			6.8			462
100% D	D	5	5	5			8.3			24.2			6.7			567
													(48hr)			
							(A) → Salinity not ~~100‰~~ adjusted for 48hr reading on the D.O. meter. (FW) 2/5/98					8.0			
													8.1			
													8.0			
													8.1			
													8.1			
													8.1			
													8.1			
Measured/Loaded by:		QW FW	MF FW	FW FW	~~BMF~~ FW		FW JC	FW FW		FW JC	FW FW		DW FW	FW FW		FW JC
Recorded by:																

Investigators' Signatures

Water Quality Parameters — Verified by MA

	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):				—	
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	0.03	DR100	MF
Alkalinity (mg/L as $CaCO_3$):	107	61	80	Hach	FW
Hardness (mg/L as $CaCO_3$):	121	81	112	Hach	FW
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	ORION	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Control

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	15	≥26	25-14	<14	3
EPT Index	0	≥4	3-2	<2	1
# Chironomid Taxa	8	≥7	6-4	<4	5
% Contribution of Dominant Taxon	55.1	≤29	30-64	>64	3
% Diptera	69.4	-	≤37	>37	1
Florida Index	3	≥7	6-4	<4	1
% Suspension feeders/Filterers	0	-	≥7	<7	1
Total Score		**Peninsula**			**15**
Interpretation of Scores		**Excellent**			26-32
		Good			20-25
		Poor			13-19
		Severely Degraded			7-12

Test

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	18	≥26	25-14	<14	3
EPT Index	1	≥4	3-2	<2	1
# Chironomid Taxa	6	≥7	6-4	<4	3
% Contribution of Dominant Taxon	49.5	≤29	30-64	>64	3
% Diptera	83.2	-	≤37	>37	1
Florida Index	2	≥7	6-4	<4	1
% Suspension feeders/Filterers	0	-	≥7	<7	1
Total Score		**Peninsula**			**13**
Interpretation of Scores		**Excellent**			26-32
		Good			20-25
		Poor			13-19
		Severely Degraded			7-12

Periphyton taxa list and densities (#/mm^2) for City of Auburndale WWTP, collected via glass microscope slides in Lake Lena Run, on 02 February, 1998.

	Test Site
Bacillariophyceae	
Achnanthes exigua	122171
Achnanthes exigua heterovalva	30007
Achnanthes hauckiana	4287
Achnanthes linearis	47154
Achnanthes minutissima	222908
Achnanthes sp.	422239
Cocconeis placentula	12860
Cyclotella sp.	4287
Cymbella sp.	8573
Eunotia sp.	8573
Fragilaria construens	12860
Gomphonema parvulum	34294
Gomphonema sp.	8573
Melosira sp.	12860
Navicula elginensis	4287
Navicula minima	60014
Navicula pupula	4287
Nitzschia amphibia	4287
Nitzschia palea	25720
Synedra rumpens	4287
Undetermined pennate diatom	25720
Chlorophyceae	
Characium sp.	130744
Cosmarium sp.	4287
Pediastrum sp.	4287
Scenedesmus sp.	10717
Selenastrum sp.	2143
Stigeoclonium sp.	49297
Cyanophyceae	
Anabaena sp.	6430
Dactylococcopsis sp.	4287
Lyngbya sp.	2143
Merismopedia sp.	8573
Microcystis sp.	2143

Benthic macroinvertebrate taxa list for City of Auburndale WWTP, collected via Hester-Dendy artificial substrates in Lake Lena Run, on 02 February, 1998. Densities, in number/m^2, represent one replicate - three of the replicates were lost for the control site.

	Control Site	Test Site
Acarina		
Piona sp.	–	2
Undetermined Oribatei	–	4
Amphipoda		
Hyalella azteca	16	337
Diptera		
Asheum beckae	40	111
Cricotopus bicinctus grp.	–	26
Cricotopus/orthocladius sp.	40	–
Dicrotendipes modestus	40	–
Dicrotendipes simpsoni	40	–
Endochironomus nigricans	873	54
Glyptotendipes sp.	2579	11308
Goeldichironomus carus	–	30
Goeldichironomus natans	–	28
Kiefferulus sp.	–	30
Nanocladius sp.	–	190
Palpomyia/Bezzia grp.	–	6
Parachironomus hirtalatus	–	115
Parachironomus sp.	119	–
Polypedilum illinoense grp.	198	966
Tanytarsus sp. A Epler	40	–
Thienemanniella sp.	159	26
Thienemanniella sp. D Epler	40	–
Thienemanniella xena	40	–
Undetermined Chironomidae	103	520
Ephemeroptera		
Caenis sp.	8	36
Gastropoda		
Hebetancylus excentricus	–	4
Physella sp.	32	4
Planorbella sp.	–	2
Spilochlamys sp.	–	2
Undetermined Ancylidae	–	4
Undetermined Gastropoda	–	2
Undetermined Hydrobiidae	8	–
Hirudinea		
Gloiobdella elongata	–	2
Helobdella stagnalis	–	20
Undetermined Erpobdellidae	–	2
Odonata		

Enallagma sp.	–	2
Ischnura posita	–	2
Ischnura ramburi	8	–
Ischnura sp.	–	4
Undetermined Coenagrionidae	8	–
Oligochaeta		
Dero digitata	–	8
Eclipidrilus palustris	–	2
Haber speciosus	–	2
Limnodrilus hoffmeisteri	–	2
Nais communis	–	12
Nais sp.	–	2
Slavina appendiculata	–	52
Stylaria lacustris	–	52
Undetermined Enchytraeidae	–	2
Trichoptera		
Cheumatopsyche sp.	48	4

Benthic macroinvertebrate taxa list fority of Auburndale, collected via 20 discrete dip net sweeps in Lake Lena Run, on 02 February, 1998.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	2	–
Coleoptera		
Peltodytes sexmaculatus	–	1
Undetermined Dryopidae	–	1
Diptera		
Cricotopus bicinctus grp.	1	4
Cryptochironomus sp.	2	–
Endochironomus nigricans	1	–
Glyptotendipes sp.	2	20
Goeldichironomus holoprasinus	1	–
Goeldichironomus natans	1	–
Goeldichironomus sp.	–	1
Nanocladius sp.	–	2
Parachironomus hirtalatus	–	1
Parachironomus sp.	1	–
Polypedilum illinoense grp.	54	47
Undetermined Chironomidae	5	4
Ephemeroptera		
Caenis sp.	–	2
Hemiptera		
Ranatra sp.	–	1
Tenagobia sp.	–	1
Undetermined Veliidae	–	1
Hirudinea		
Gloiobdella elongata	1	–
Undetermined Erpobdellidae	3	–
Undetermined Glossiphoniidae	2	–
Odonata		
Ischnura sp.	–	1
Libellula incesta	1	–
Undetermined Coenagrionidae	–	1
Oligochaeta		
Dero trifida	–	1
Dero vaga	–	2
Eclipidrilus sp.	9	–
Limnodrilus hoffmeisteri	11	–
Nais pardalis	–	1
Slavina appendiculata	–	2
Stylaria lacustris	1	1

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 FL0021466 11	12 980202 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 FL0021466 11	12 980202 17	18 B	19 S	20 1

Remarks

21 66