#221



Biological Assessment of

Avon Park Correctional Facility WWTP

Polk County

NPDES #FL0040029

Sampled August and October 1997

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May 1998

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Avon Park Correctional WWTP
County: Polk
NPDES Number: FL0040029
State Permit Expiration Date: 28 September 1998

Toxics Sampling Inspection (XSI)

Date Sampled: 4 August 1997

Results: No organic pollutants were detected in the effluent. Metals detected in the effluent complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 4 August 1997

Results: The effluent sample was toxic to the invertebrate, *Ceriodaphnia dubia* (a violation of Rules 62-302.500(1)(d), 62-302.530(62), and 62-4.244(3)(a) FAC). The effluent was not toxic to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 30 October 1997

Results: The Stream Condition Index (SCI) placed both the control and test sites in the "good" category. Macroinvertebrate communities were generally similar at the control and test sites, and were fairly healthy despite a lack of flow. Although low Florida Index and EPT Index scores were probably associated with low water velocity in the canal, Shannon-Weaver diversity was actually better than expected. The discharge did not appear to exert a noticeable adverse effect on the benthic or algal communities. Apparently, the slightly elevated nutrient levels at the test site did not lead to imbalances in the community.

Water Quality Inspection (WQI)

Date Sampled: 4 August 1997

Results: Elevated concentrations of ortho-phosphate, total phosphorus, and nitrate+nitrite were observed in the effluent. Slight to moderate increases in these nutrients at the test site were associated with the discharge. Algal Growth Potential (AGP) increased from 5 mg dry wt/L at the control site to 10.6 mg dry wt/L at the test site, which exceeded the "problem threshold" of 5 mg dry wt/L, due to the influence of the discharge.

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 Avon Park Correctional Facility wastewater treatment plant is located one mile southeast of Lake Arbuckle and just north of Avon Park Air Force Base Auxillary Field in Polk County, Florida (see maps in Appendix). This is a 0.50 MGD design capacity extended-aeration wastewater treatment facility with surge control. The aerated, disinfected effluent flows through a dual-cell Hypalon-lined polishing pond. However, the polishing pond was being bypassed during the inspection. Following dechlorination, wastewater is discharged to Rim Canal, which ultimately flows into Lake Arbuckle.

State permit limits for the Avon Park Correctional Facility WWTP effluent are listed in Table 1. Past monthly operating reports have indicated permit violations (see Facility Summary in Appendix). Ammonia (0.26 mg/L) exceeded the monthly average limit (0.2 mg/L) during September, 1996. During two previous DEP inspections, the facility exceeded its total residual chlorine (TRC) permit limit of 0.01 mg/L. The TRC was 0.8 mg/L in December, 1994, and 0.75 mg/L in August, 1997. The Avon Park Correctional WWTP had not reported any TRC excursions on these occasions because the facility had been performing the TRC tests incorrectly by measuring free residual chlorine instead of total residual chlorine.

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 Rim Canal, 100 meters upstream of the outfall) and a test site (100 meters below the discharge) (see maps in Appendix). 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 were performed on an effluent sample using the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*, as test organisms (Weber 1993). The effluent was analyzed for metals and for organic constituents (base, neutral, and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the effluent and samples from control and test sites. Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

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 (Ross 1990). Phytoplankton were sampled by taking subsurface grabs, and periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for phytoplankton and periphyton communities (Ross 1990). Algal Growth Potential (AGP) tests, using *Selenastrum capricornutum* as the test organism, followed Miller et al. (1978). Due to a period of heavy rainfall, neither macroinvertebrate and periphyton sampling nor habitat assessments could be conducted when the other measurements were taken. Phytoplankton, AGP, chemistry, and toxicity bioassay samples were taken on August 4, 1997, while the postponed sampling occurred on October 30, 1997.

Explanation of Measurements of Community Health

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

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

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

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

son et al. (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

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.

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

The Stream Condition Index (SCI) for Florida is a composite macroinvertebrate metric (Barbour et al. 1996). 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).

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 diatom to blue-green algae ratio, and the % filter-feeders are measured as the control site minus test site divided by the control site. The percent differences between sites involving the algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus control site divided by the control site. If the value for a particular measurement is zero at the control site, this measurement is not used in the graphical comparison between the test and control sites as no background level is available for comparison.

The following personnel were involved in this investigation: James Fine and Andrea Grainger (DEP Southwest District) and Lyn Burton, Jennifer Eichelberger, Ken Espy, Marshall Faircloth, Russel Frydenborg, 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, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality in Rim Canal, the immediate receiving waters of the Avon Park Correctional Facility WWTP discharge, was rated as suboptimal, with scores of 85 and 83 at the control and test sites, respectively (see Habitat Assessment Data Sheets in Appendix). Rim Canal is an artificially channelized ditch with less than the optimal instream habitat and little or no water velocity. The predominant landuse in the watershed is forest/natural (50%), with agricultural (20%), and a bombing range (15%) comprising most of the remaining usage.

The pH was similar at the control (6.5 SU) and test site (6.6 SU) (Table 1). The specific conductance below the discharge was 211 µmhos/cm and the control site was 168 µmhos/cm. Dissolved-oxygen concentrations at the test (4.5 mg/L) and control (4.8 mg/L) sites were below the Class III water quality standard of 5.0 mg/L (Rule 62-302.530(52) FAC). Total residual chlorine in the effluent sample (0.27 mg/L) was above the monthly average permit limit of 0.01 mg/L and a violation of Class III water quality standards (Rule 62-302.530(19) FAC).

No organic pollutants were detected in the effluent. Aluminum, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards (Table 1).

Two 48-hour static screening acute toxicity bioassays were performed on a sample of effluent from this facility. The full strength effluent was toxic to *Ceriodaphnia dubia*, causing 85% mortality at 24-hours (a violation of Rules 62-302.500(1)(d), 62-302.530(62), and 62-4.244(3)(a) FAC). No additional mortality occurred at 48-hours. The effluent was not toxic to the fish, *Cyprinella leedsi*.

Elevated concentrations of ortho-phosphate (2.5 mg/L), total phosphorus (2.6 mg/L), and nitrate+nitrite (4.3 mg/L) were observed in the effluent. Ortho-phosphate increased from 0.016 mg/L at the control site to 0.061 mg/L at the test site. Also, the level of total phosphorus was 0.080 mg/L at the test site compared to 0.048 mg/L at the control site. Nitrate+nitrite was not detected at the control site, but the nitrate+nitrite level at the

Table 1. Effluent limits and summary of chemistry data.

Avon Park Correctional WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
None detected	-	-	-	-
Metals (µg/L)				
Aluminum	≤1,500 **	62 A	-	-
Arsenic	≤50 **	40 U	-	-
Cadium	≤1.0 **c	0.05 U	-	-
Chromium	≤188.4 **c	10 U	-	-
Copper	≤10.7 **c	1.8 I	-	-
Iron	≤1,000 **	42 A	-	-
Lead	≤2.7 **c	0.1 I	-	-
Mercury	≤0.012 **	0.10 U	-	-
Nickel	≤143.1 **c	6 U	-	-
Selenium	≤5.0 **	50 U	-	-
Silver	≤0.07 **	0.04 U	-	-
Zinc	≤96.2 **c	95 A	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	2.5 A	0.016 A	0.061
Total phosphorus	-	2.6	0.048	0.080
Ammonia	0.2 *	0.043 A	0.025 A	0.025 A
Nitrate+Nitrite	-	4.3	0.020 U	0.072
TKN	-	0.74	1.1	1.1
Organic Nitrogen	1.4 *	0.70	-	-
General Phys-Chem Parameters				
Habitat Assessment	-	-	85	83
D.O. (mg/L)	≥ 6.0 *	8.1	4.8	4.5
pH (SU)	-	7.1	6.5	6.6
Conductivity (µmhos/cm)	-	350	168	211
Temperature (°C)	-	28.5	20.4	20.7
C.B.O.D., 5 day (mg/L)	5.0 *	-	-	-
Tot. Suspended Solids (mg/L)	20.0 *	-	-	-
Tot. Residual Chlorine (mg/L)	0.01 *	0.27	-	-
Flow (MGD)	0.50 *	0.420	-	-
Hardness (mg $CaCO_3$)	-	89.1	-	-
AGP (mg dry wt/L)	-	118.6	5.0	10.6
Toxicity				
Bioassay Fish	-	No mortality	-	-
Bioassay Invertebrate	-	85% mortality	-	-

* Permit limit, maximum 30-day average
** Class III water quality standard
c - Value is calculated based on hardness
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

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

Avon Park Correctional W W TP	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	24	20
Shannon-Weaver Diversity	3.8	3.9
Chlorophyll a (µg/L)	1.1 U	1.0 U
Algal Density (#/mL)	527	238
% Blue-green	18	28
% Green	49	16
% Euglenophytes	4	10
% Diatoms	26	45
Periphyton Algae		
Number of Taxa	38	30
Shannon-Weaver Diversity	4.0	3.7
Algal Density (#/cm^2)	214,232	224,873
Chlorophyll a (mg/m^2)	16.5	14.3
Diatom/Diatom + B-G Ratio	0.99	0.98
% Blue-green	1	2
% Green	8	16
% Diatoms	91	82
AGP (mg dry wt/L)	5.0	10.6

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

test site was 0.072 mg/L. Increased nutrients at the test site, compared to the control site, correlated with the elevated concentrations found in the effluent. Ammonia (0.025 mg/L) and TKN (1.1 mg/L) levels were the same at the control and test sites.

The effluent Algal Growth Potential (AGP) was 118.6 mg dry wt/L. The AGP increased from 5.0 mg dry wt/L at the control site, a level equal to the "problem threshold" (Raschke and Schultz 1987) to 10.6 mg dry wt/L at the test site (roughly twice the "problem threshold"). This indicates that the discharge increased the bioavailable nutrients at the test site.

Both phytoplankton (free-floating in the water column) and periphyton (attached) algal communities were sampled for this bioassessment. The discharge did not appear to be adversely effecting either of these communities. Since the attached algae are considered most important in lotic systems, it is the periphyton data which will be used to compare between the control and test sites. The number of taxa (38 at the control site and 30 taxa at the test site), Shannon-Weaver diversity (4.0 at the control site and 3.7 at the test site), and the algal densities (214,232 #/cm2 at the control site and 224,873 #/cm2 at the test site) showed no significant change between the sites. Periphyton chlorophyll *a* decreased from 16.5 mg/m2 at the control site to 14.3 mg/m2 at the test site.

Benthic macroinvertebrate samples collected via dip-net sweeps in Rim Canal were fairly similar at the test and control sites (Table 3). The Stream Condition Index (SCI) placed both sample sites in the "good" category (test = 25 points, control = 21 points) (Appendix). A larger number of taxa was found at the test site (n = 32) than at the control site (n = 22). Although the Florida Index and EPT Index scored higher at the test site than the control site, values at both sample sites were lower than expected for a Peninsular stream. The percent of suspension filter feeders found at the test site (5%) was lower than at the control site (18%).

The quantitative measures of macroinvertebrate community health derived from the Hester-Dendy samples also showed general similarities between the control and test sites (Table 3). Figure 2 indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values suggest that the test site is healthier than the control site. Hester-Dendy taxa richness decreased from 35 taxa at the control site to 27 taxa at the test site. Shannon-Weaver diversity was surprisingly good at both stations, with 4.2 at the control site and 3.9 at the test site. The Florida Index value at the test site (3 points) was less than the control site (7 points). Note that the Florida Index at the test site, as determined with Hester Dendy samples (3), was the same as the control site Florida Index (also 3) in the dip net samples. Similar to the dip net samples, relatively few EPT taxa were found at both the control site (1 taxon) and test site (2 taxa) (Table 3). The percent of filter feeders was slightly lower at the test site (9%) when compared to the control site (12%).

Conclusions

Habitat quality was "suboptimal" at both sample sites, due to artificial channelization and low water velocity.

Dissolved-oxygen concentrations were slightly below the Class III water quality standards (Rule 62-302.530(52) FAC) at the test and control sites. Total residual chlorine (0.27 mg/L) was above the facility's permit limit of 0.01 mg/L and a violation of Class III water quality standards (Rule 62-302.530(19) FAC).

No organic pollutants were detected in the effluent. Aluminum, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III water quality standards.

The effluent was toxic to *Ceriodaphnia dubia* (a violation of Rules 62-302.500(1)(d), 62-302.530(62), and 62-4.244(3)(a) FAC). The effluent was not toxic to the fish, *Cyprinella leedsi*.

Elevated concentrations of ortho-phosphate, total phosphorus, and nitrate+nitrite were observed in the effluent. Moderate increases in these nutrients at the test site were associated with the discharge.

Algal growth potential increased from 5 mg dry wt/L at the control site to 10.6 mg dry wt/L at the test site due to the influence of the discharge.

The periphyton and phytoplankton communities did not show any adverse effects from the effluent. Apparently, the slightly elevated nutrient levels at the test site did not lead to imbalances in these communities.

Macroinvertebrate communities were generally similar at the control and test sites. Although low Florida Index and EPT Index scores were probably associated with low water velocity in the canal, Shannon-Weaver diversity was actually better than expected. The dis-

Table 3. Major characteristics of macroinvertebrate community structure of control and test sites.

Avon Park Correctional WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	22	32
Florida Index	3	4
SCI	21	25
EPT Index	1	2
% Dominant Taxon	21	23
Community Composition		
% Acarina	0.0	14
% Coleoptera	21	23
% Diptera	29	14
% Ephemeroptera	4	14
% Gastropoda	13	11
% Hemiptera	0.0	4
% Odonata	2	4
% Oligochaeta	16	8
% Pelecypoda	13	3
% Other	2	4
Functional Feeding Groups		
% Predators	10	25
% Burrowing Deposit Feeders	16	8
% Surface Deposit Feeders	21	24
% Suspension Feeders	18	5
% Scrapers	25	29
% Shredders	3	3
Macroinvertebrate Hester-Dendy		
Number of Taxa	35	27
Florida Index	7	3
Shannon-Weaver Diversity	4.2	3.9
EPT Index	1	2
Community Composition		
% Diptera	82	64
% Ephemeroptera	6	23
% Gastropoda	9	9
% Trichoptera	0.0	0.5
% Other	3	3
Functional Feeding Groups		
% Predators	7	11
% Surface Deposit Feeders	53	44
% Suspension Feeders	12	9
% Scrapers	13	19
% Shredders	7	4

charge did not exert a noticeable adverse effect of the benthic community.

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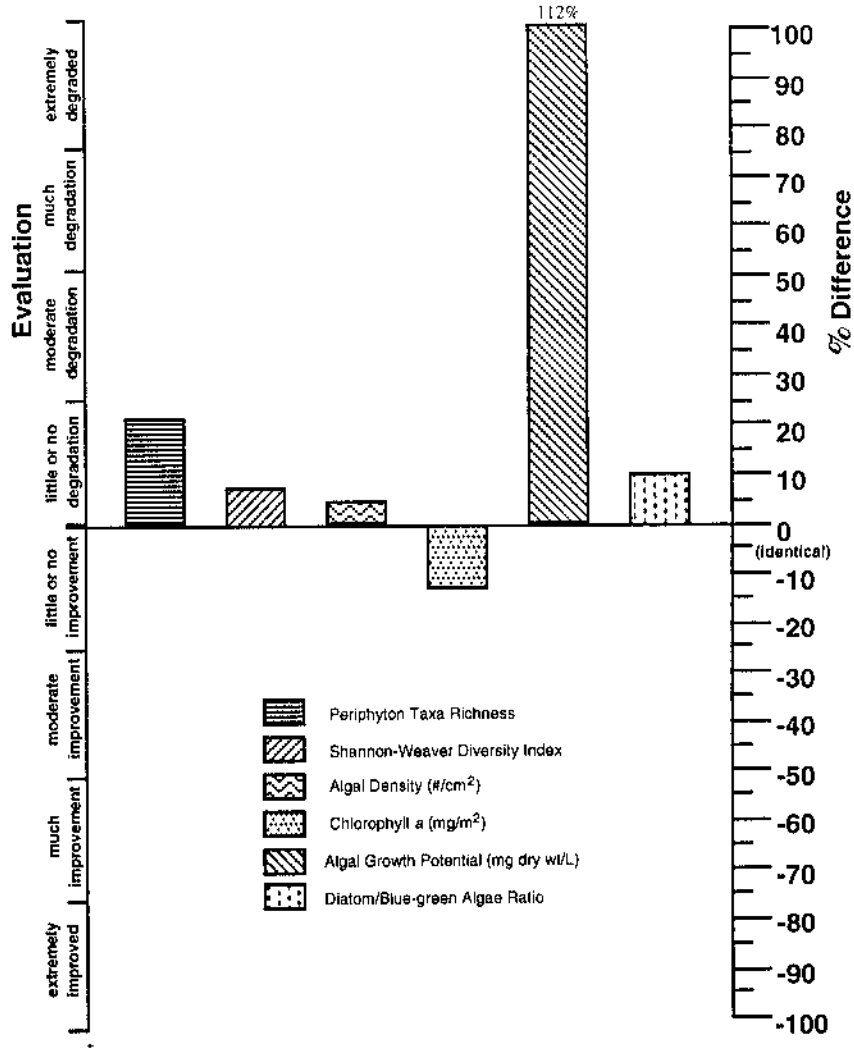


Figure 1. Effect of discharge on the periphyton community.

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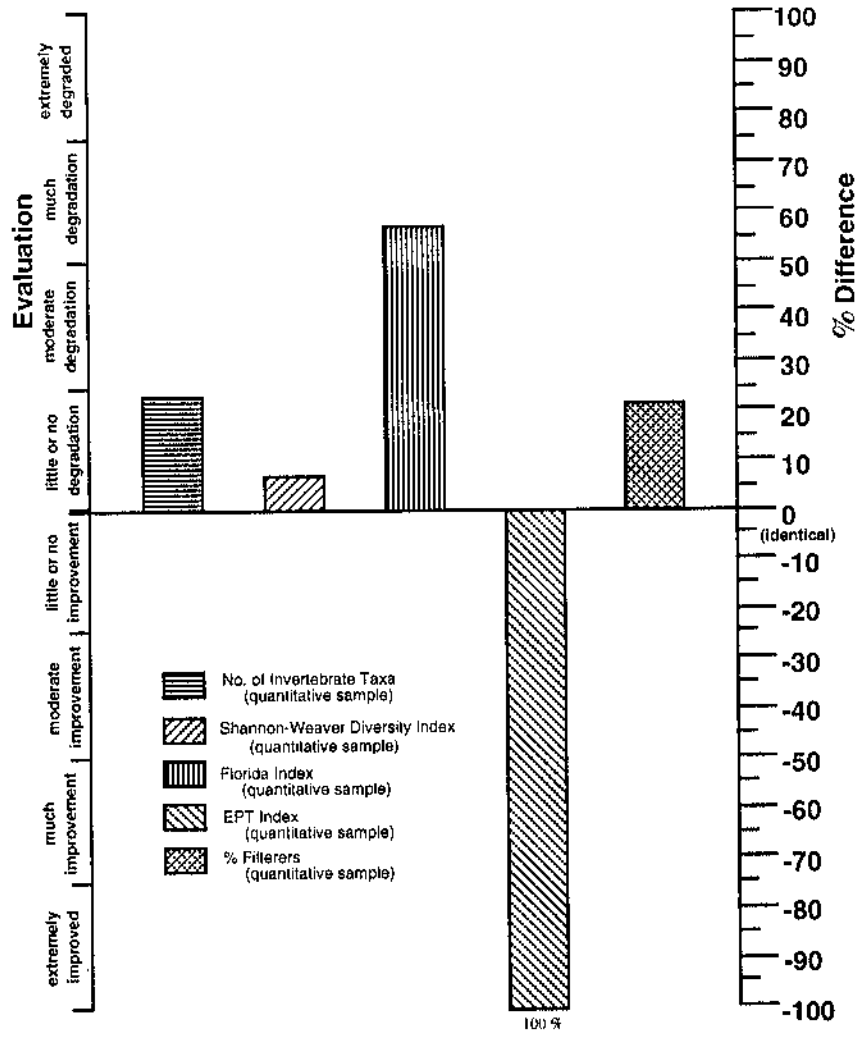


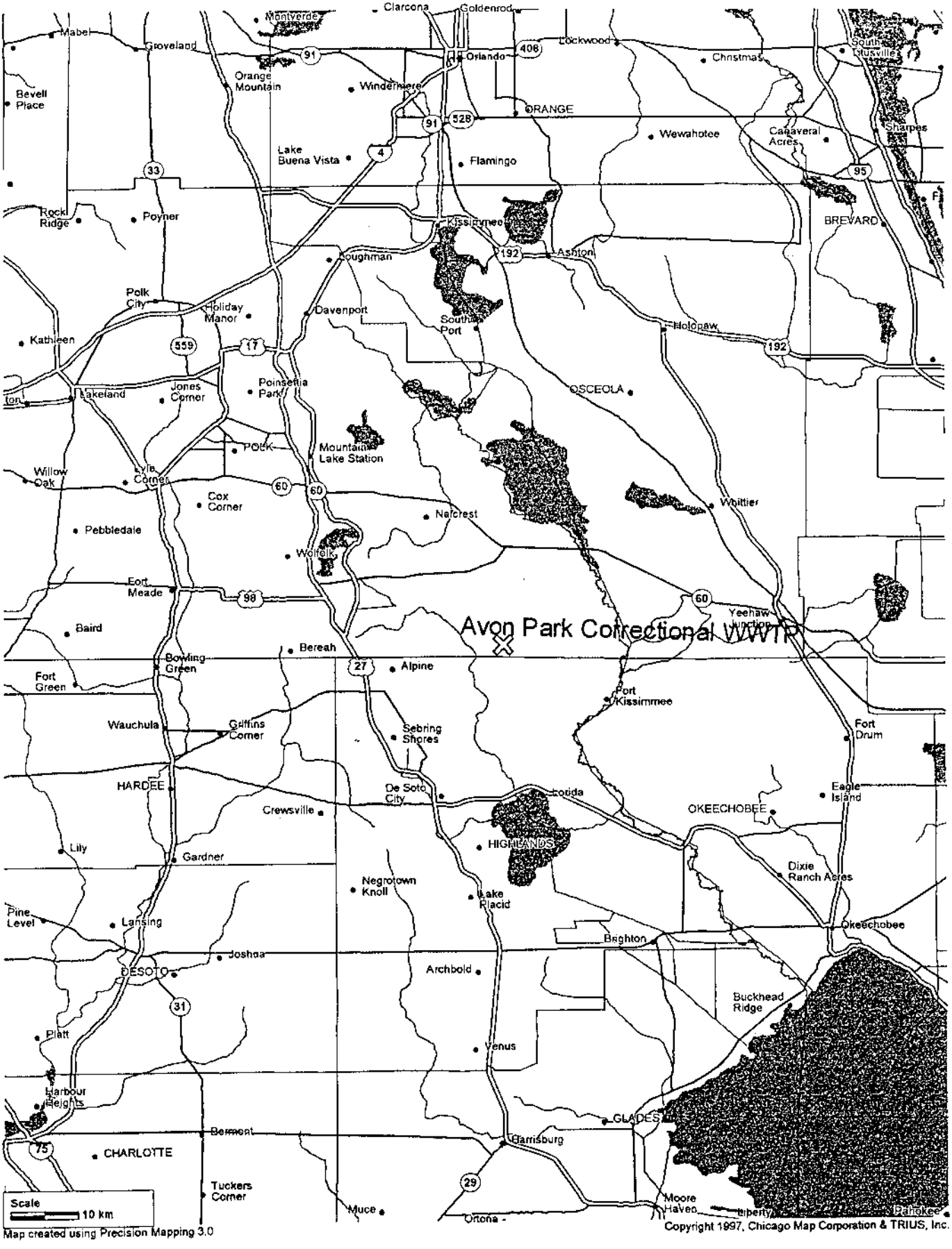
Figure 2. Effect of discharge on the benthic macroinvertebrate community.

Typical Values for Selected Parameters in Florida Waters

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

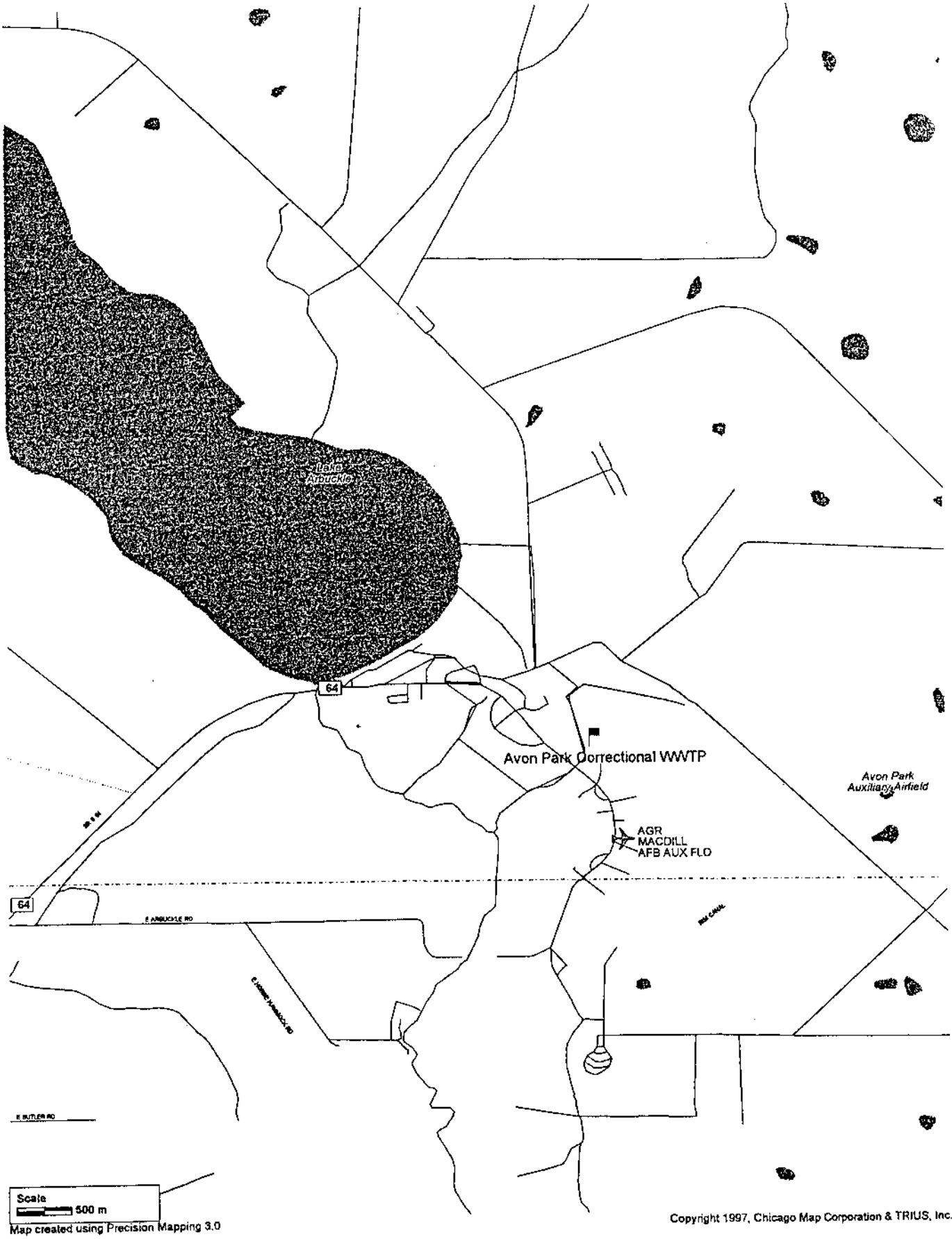
Parameter	Percentile Distribution 5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	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

LOCATION MAP



LOCATION MAP

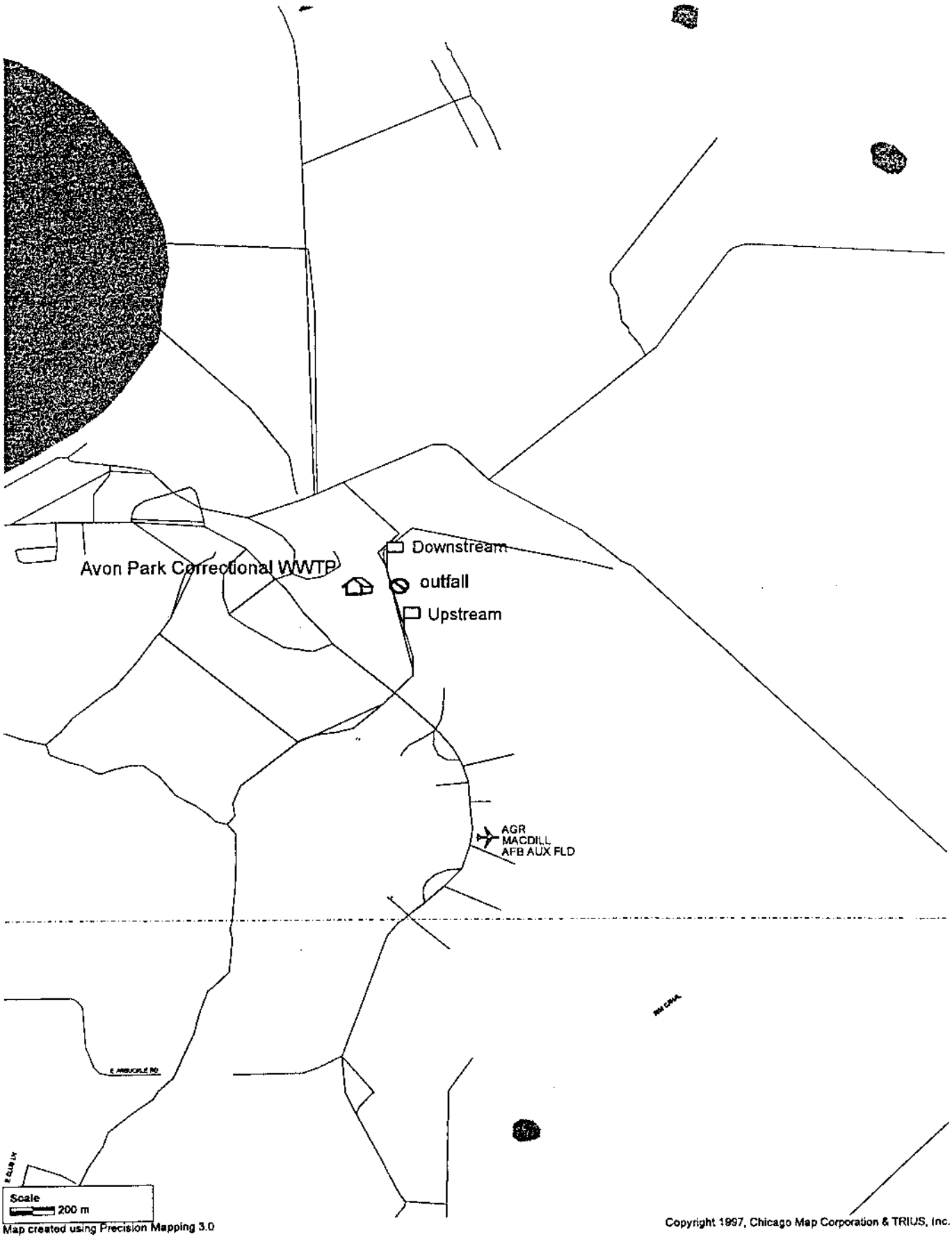
GET RID OF THIS MAP



Map created using Precision Mapping 3.0

Copyright 1997, Chicago Map Corporation & TRIUS, Inc.

LOCATION MAP



Map created using Precision Mapping 3.0

Copyright 1997, Chicago Map Corporation & TRIUS, Inc.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Avon Park Corr. WWTP | Date Summary Prepared: 7/28/97

Location (attach detailed map): | County: Polk | District: SW District

Federal Permit # and expiration date: FL0042099 | State GMS # and State expiration date: 0053-235115, 09/28/98 | Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Domestic Wastewater Treatment and Disposal Plant.

Description of treatment process: A 0.500 MGD AADF design capacity extended Aeration wastewater treatment Facility will surge control, dual clarifiers followed by chlorination to a dual-cell hypolon-lined polishing pond with post aeration and dechlorination.

Receiving waters: Rim Canal / Arbuckle Creek | Classification: I II (III)

Design Flow: 0.50 MGD | Mean Flow: ~~0.500 MGD~~ | Flow during survey: 0.400 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.):

NO

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

Parameter	Effluent Limit (Mg/L) Maximum 30 day average
Total Suspended Solids (TSS)	20.0
$CBOD_5$	5.0
Organic Nitrogen as N (ON)	1.4
Ammonia Nitrogen as N (NH_3-H)	0.2
Total Residual Chlorine	0.01
Dissolved Oxygen (DO)	6.0 (Minimum)

Describe special permit conditions and permit modifications:

2 of

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Avon Park Correctional
(Facility) WWTP

Description of permitted outfall(s):
Effluent is discharged from WWTP via Rim Canal That flows into Arbuckle Creek then into Lake Arbuckle.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:
Sept 96 : NH_3-N ; 0.26 monthly average ; 0.2 mg/L limit
Total Residual Chlorine was 0.75 mg/L on 8/9/97 during DEP insp, previous DEP insp. on 12/29/94 found a TRC of 0.8 mg/L where limit is 0.01. Facility has never reported a TRC excursion, but have been doing test incorrectly- measuring free instead of total.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
No current enforcement action
WQBEL developed in 1987, reissued in 1990 for the expanded plant with a discharge to the Rim Canal.

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

Additional information:

Staff contributing to this review (signature):
James M Lin (Biologist)
J Gustin (Inspector)
(Engineer)
( )
( )

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:
	26010225	10/30/97	1300	Rin Canal/Arbuckle

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
No Flow	Polk	Upstream	23953

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)
50		10	20	5			15 Bombing Range

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

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

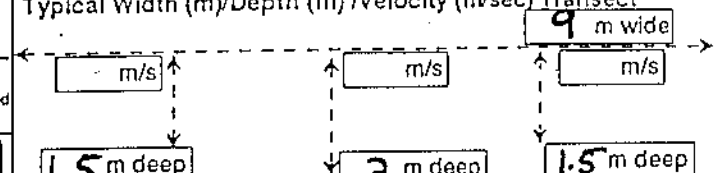
Width of riparian vegetation (m) on least buffered side: 30 — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 2 (present depth in m) = 2.5 (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	60	4	NET
Leaf Packs or Mats	5	7	NET	Mud/Muck/Silt	10	2	NET
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	25	7	NET	*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	20.38	6.48	4.8	168			0.7
Mid-depth								
Bottom								

System Type : Stream: ☐ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☒ Canal

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, clear day
Air Temp. 82°

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

SAMPLING TEAM:	SIGNATURE:	DATE:
James Fine	James Fine	10/30/97

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	2601022S	10/30/97	Rim Canal/Arbuckle Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
No Flow.	Upstream	23953

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **12**	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 **2**	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 **5**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered **5** 4 3 2 1
Deposition **18**	Less than 20% of habitats affected by sand or silt accumulation 20 19 **18** 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **10**	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 **13**	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 **13** 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

85 TOTAL SCORE

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/30/97	James Fine	James Fine

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-90)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	26010226	10/30/97	1228	Rim Canal / Arbuckle Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
No Flow.	Polk	Downstream	23954

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)
50		10	20	5			15 Bombing Range

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

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

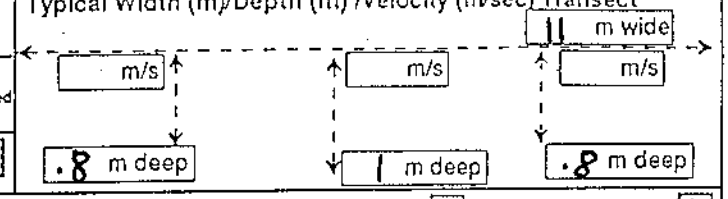
Width of riparian vegetation (m) on least buffered side: 15 — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 0.5 (m above present water level) + 1 (present depth in m) = 1.5 (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	55	4	NET
Leaf Packs or Mats	5	7	NET	Mud/Muck/Silt	15	2	NET
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	5	7	NET	*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	20.71	6.62	4.5	211			0.7
Mid-depth								
Bottom								

System Type : Stream: ☐ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☒ Canal

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, Clear Day
82° Air Temp.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
James Fine	James Fine	10/30/97

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	2601022 6	10/30/97	Rim Canal/Arbuckle Creek

REMARKS:	LOCATION:	FIELD ID/NAME:
No Flow	Down stream	23954

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover **12**	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 **2**	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 **5**	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered **(5)** 4 3 2 1
Deposition **18**	Less than 20% of habitats affected by sand or silt accumulation 20 19 **(18)** 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability **10**	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 **13**	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
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5 Add 5 points if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

83 TOTAL SCORE

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/30/97	James Fine	James Fine

Sample Source: Hoon Park Effluent Weir
County: Highlands
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL0040029
LIMS Sample #: 185220 LIMS Job #: 97-AU6-05-10
sample log: 5/12/97 DW

Sample Collection: Date 5-9-97 Time 1230
Test Beginning: Date 5-5-97 Time 1445
Test Ending: Date 5-7-97 Time 1530
Organism Batch #: 30 Diluent Batch #: 28
Organism Age: < 24hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) I Definitive
(Static) I Static Renewal I Flow-through
Temperature range: room N.A
incubator 24.5-26.6°C
Test Number: 1 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	24.9 @ 24.8	8.1 @ 25.7 °C	1033 @ 101.0 1005 @ 1004 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.1 @ 25.7 °C	1012 @ 101.0 1008 @ 1004 @ 25.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.1	8.3 @ 24.5 °C	1062 @ 101.0 1017 @ 1001 @ 25.5 °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	A	5	5	5	8.3		8.2	24.8		25.2	7.5		7.2	165		180
Control B	B	5	5	5			8.2			24.9			7.2			180
Control C	C	5	5	5			8.2			24.6			7.3			185
Control D	D	5	5	5			8.2			24.3			7.3			210
100% A	A	5	0 SD	0	7.9		8.3	25.4		25.1	7.6		7.4			340
100% B	B	5	1 D	1			8.4			25.0	~~7.6~~ 7.1		7.4	~~345~~		370
100% C	C	5	1 D	1			8.4			24.9			7.5			380
100% D	D	5	1 D	1			8.4			24.5			7.5			430
Measured/Loaded by:		MF	KJ	KJ	MF		KJ	MF		KJ	MF		KJ	MF		KJ
Recorded by:		MF	KJ	KJ	ND		MF	ND		MF	ND		MF	ND		MF

Investigators' Signatures
Marshall Faircloth
Kelli Johnson
Kelli Ralston

Water Quality Parameters (Salt Water / Well Water)
A wrote in wrong box - ND 5-5-97

	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	Parameter entries verified by MF	0.27	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L):	<0.05	0.06	DR100	KR
Alkalinity (mg/L as $CaCO_3$):	80	110	Hach	ND
Hardness (mg/L as $CaCO_3$):	85	110	Hach	ND
Total ammonia (mg/L as N):	<0.017	<0.017	ORION	MF

Ammonia Meter #98136 Ammonia Meter Slope: -56.1 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: Avon Park Correctional / WWTF
County: Highlands
Contact / District: Andrea Grainger / Southwest
NPDES Permit #: FL0040029
LIMS Sample #: 185220 LIMS Job #: 97-Aug-05 10
sample log: 5/2/97 CW

Sample Collection: Date 8-4-97 Time 1230
Test Beginning: Date 8-5-97 Time 1515
Test Ending: Date 8-7-97 Time 1530
Organism Batch #: 58 Diluent Batch #: well water
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) / Definitive
Static / Static Renewal / Flow-through
Temperature range: room NA
incubator 24.5-26.2
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	24.9 @ 24.3	8.1 @ 25.7 °C	105.3 @ 101.2 100.5 @ 100.4 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.1 @ 25.7 °C	101.2 @ 101.0 100.8 @ 100.4 @ 25.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.1	8.3 @ 24.5 °C	106.2 @ 101.0 101.7 @ 100.4 @ 25.5 °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	D1	5	5	5	8.0	8.3	8.4	26.2	24.8	24.8	7.6	7.4	7.3	260	254	260
Control B	D2	5	5	5	8.0	8.3	8.4	26.2	25.0	25.7	7.6	7.5	7.5	260	258	270
Control C	D3	5	5	5	8.0	8.3	8.3	26.2	25.5	25.5	7.6	7.5	7.3	260	263	265
Control D	D4	5	5	5	8.0	8.3	8.4	26.2	25.4	25.3	7.6	7.5	7.3	260	260	260
100% A	D5	5	5	5	7.8	8.1	8.3	27.2	26.0	25.3	7.8	7.6	7.4	365	365	370
100% B	D6	5	5	5	7.8	8.1	8.3	27.3	25.8	25.4	7.8	7.5	7.3	365	360	360
100% C	D7	5	5	5	7.8	8.1	8.3	27.3	24.8	25.4	7.8	7.6	7.4	365	353	370
100% D	D8	5	5	5	7.8	8.1	8.3	27.2	24.8	25.1	7.8	7.7	7.3	365	355	360
Measured/Loaded by:		ND	KJ	KJ	MF	KJ	KJ	MF	KJ	KJ	MF	KJ	KJ	MF	KJ	KJ
Recorded by:		MF	KJ	KJ	ND	KR	KJ	ND	KR	CW	ND	KR	CW	ND	KR	CW

Investigators' Signatures
Marshall Faircloth
Kerri Johnson
Kellie Ralston

Water Quality Parameters (Salt Water / Well Water / 20% Min Water) — Parameter entries verified by MF

	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	0.27	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L): <0.03	0.06	DR100	KR
Alkalinity (mg/L as $CaCO_3$): 125	110	Hach	ND
Hardness (mg/L as $CaCO_3$): 130	110	Hach	ND
Total ammonia (mg/L as N): <0.017	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -56.1 Ammonia Blank: <0.017
Control Salinity: 0 ppt Sample Salinity: 0 ppt

reviewer form updated 4/01/96

Avon Park Correctional WWTP - Reference Site

Summer Index Period: Stream Condition Index (SCI) for Florida (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	22	≥ 31	30-16	<16		≥ 26	25-14	<14	3	≥ 22	21-12	<12	
EPT Index	1	≥ 7	6-4	<4		≥ 4	3-2	<2	1	-	≥2	<2	
# Chironomid Taxa	10	≥9	8-5	≤5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	21	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	29	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	3	≥ 16	15-8	<8		≥7	6-4	<4	1	≥ 8	7-4	<5	
% Suspension feeders/Filterers	18	≥ 12	11-6	<6		-	≥7	<7	3	-	≥7	<7	
Total Score		Panhandle				Peninsula			(21)	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-32	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Avon Park Correctional WWTP - Test Site

Summer Index Period: Stream Condition Index (SCI) for Florida (April 1996)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle 5	Panhandle 3	Panhandle 1	Score	Peninsula 5	Peninsula 3	Peninsula 1	Score	Northeast 5	Northeast 3	Northeast 1	Score
Total Number of Taxa	32	≥ 31	30-16	<16		≥ 26	25-14	<14	5	≥ 22	21-12	<12	
EPT Index	2	≥ 7	6-4	<4		≥ 4	3-2	<2	3	-	≥2	<2	
# Chironomid Taxa	9	≥9	8-5	≤5		≥7	6-4	<4	5	≥7	6-4	<4	
% Contribution of Dominant Taxon	23	≤22	23-61	>61		≤29	30-64	>64	5	≤31	32-66	>66	
% Diptera	14	-	≤50	>50		-	≤37	>37	3	-	≤47	> 47	
Florida Index	4	≥ 16	15-8	<8		≥7	6-4	<4	3	≥ 8	7-4	<5	
% Suspension feeders/Filterers	5	≥ 12	11-6	<6		-	≥7	<7	1	-	≥7	<7	
Total Score		Panhandle				Peninsula			(25)	Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-32	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Periphyton taxa list and densities (#/cm^2) for Avon Park, collected via glass microscope slides in the Rim Canal, on 30 October, 1997.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes affinis	–	725
Achnanthes exigua	13172	26840
Achnanthes hungarica	–	2902
Achnanthes hustedtii	3874	9067
Achnanthes lanceolata dubia	–	725
Achnanthes lanceolata elliptica	775	2176
Achnanthes minutissima	4649	15596
Achnanthes sp.	3874	2902
Anomoeneis vitrea	775	6529
Cocconeis placentula	25181	1451
Cocconeis sp.	–	1451
Cyclotella sp.	–	2176
Cymbella aspera	–	1451
Cymbella minuta	775	–
Eunotia pectinalis minor	3874	–
Eunotia sp.	22857	15596
Gomphonema gracile	775	–
Gomphonema grunowii	1550	2902
Gomphonema parvulum	1550	725
Gomphonema sp.	775	–
Gomphonema turris	17046	6529
Hantzschia amphioxys	775	–
Navicula confervacea	21307	–
Navicula cryptocephala	775	1451
Navicula exigua	775	–
Navicula lanceolata	775	–
Navicula minima	26731	51503
Navicula radiosa	1550	–
Navicula sp.	1550	–
Nitzschia amphibia	4649	2902
Nitzschia filiformis	2324	–
Nitzschia fonticola	775	1451
Nitzschia palea	12397	5803
Nitzschia sp.	3099	2902
Pennales	10847	16321
Pinnularia sp.	2324	2176
Synedra sp.	2324	725
Synedra ulna	775	–
Chlorophyceae		
Ankistrodesmus sp.	387	–

Characium sp.	–	725
Chlorococcum sp.	–	363
Closterium sp.	387	–
Cosmarium sp.	2712	1088
Dichotomococcus sp.	1162	29379
Oedogonium sp.	8135	2902
Scenedesmus sp.	775	–
Stigeoclonium sp.	3099	1451
Ulothrix sp.	387	–
Cyanophyceae		
Gloeocapsa sp.	387	–
Lyngbya sp.	387	1451
Microcystis sp.	387	–
Oscillatoria sp.	387	2539
Spirulina sp.	387	–

Phytoplankton taxa list and densities (#/mL) for Avon Park, collected via subsurface grabs in the Rim Canal, on 4 August, 1997.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	10	4
Eunotia sp.	3	16
Gomphonema sp.	–	4
Gyrosigma sp.	3	–
Melosira sp.	40	–
Navicula sp.	3	12
Nitzschia sp.	23	29
Pennales	20	25
Pinnularia sp.	–	12
Skeletonema sp.	33	–
Synedra sp.	–	4
Chlorophyceae		
Carteria sp.	3	–
Chlamydomonas sp.	10	4
Undetermined Chlorophyceae	184	4
Closterium sp.	–	8
Desmidium sp.	43	–
Elakatothrix sp.	3	–
Oocystis sp.	–	16
Pandorina sp.	3	–
Pleurotaenium sp.	3	–
Scenedesmus sp.	7	4
Chrysophyceae		
Characiopsis sp.	–	4
Cryptophyceae		
Chroomonas sp.	7	–
Cryptomonas sp.	13	–
Cyanophyceae		
Anabaena sp.	7	4
Calothrix sp.	–	4
Chroococcus sp.	7	–
Undetermined Cyanophyceae	–	4
Dactylococcopsis sp.	10	21
Lyngbya sp.	–	8
Oscillatoria sp.	57	25
Scytonema sp.	7	–
Synechococcus sp.	7	–
Euglenophyceae		
Euglena sp.	17	16
Lepocinclis sp.	3	–
Phacus sp.	–	4
Trachelomonas sp.	–	4

Benthic macroinvertebrate taxa list for the Avon Park Correctional WWTP, collected via Hester-Dendy artificial substrates in the Rim Canal, on 30 October, 1997. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	–	2
Coleoptera		
Dubiraphia sp.	4	–
Dubiraphia vittata	4	–
Decapoda		
Cambarus sp.	2	–
Diptera		
Ablabesmyia mallochi	6	6
Ablabesmyia rhamphe grp.	20	16
Asheum beckae	10	–
Chironomidae	16	10
Chironomus sp.	71	36
Cryptochironomus sp.	2	–
Dicrotendipes modestus	30	8
Dicrotendipes simpsoni	46	12
Dicrotendipes sp.	10	2
Glyptotendipes sp.	20	–
Goeldichironomus amazonicus	2	–
Goeldichironomus holoprasinus	2	2
Goeldichironomus natans	2	–
Goeldichironomus sp.	–	8
Kiefferulus sp.	38	8
Labrundinia becki	12	14
Labrundinia sp.	2	–
Microtendipes pedellus grp.	40	24
Nilothauma sp.	–	2
Parachironomus carinatus	–	2
Parachironomus supparilis	2	–
Paramerina sp.	–	4
Polypedilum halterale grp.	14	–
Polypedilum scalaenum grp.	2	–
Polypedilum sp.	2	–
Stenochironomus sp.	2	–
Tanytarsus sp.	16	34
Tanytarsus sp. A Epler	6	–
Tanytarsus sp. C Epler	6	–
Tanytarsus sp. G Epler	2	2
Tanytarsus sp. L Epler	8	2
Tanytarsus sp. O Epler	2	–
Tanytarsus sp. T Epler	56	22
Tribelos atrum	12	–

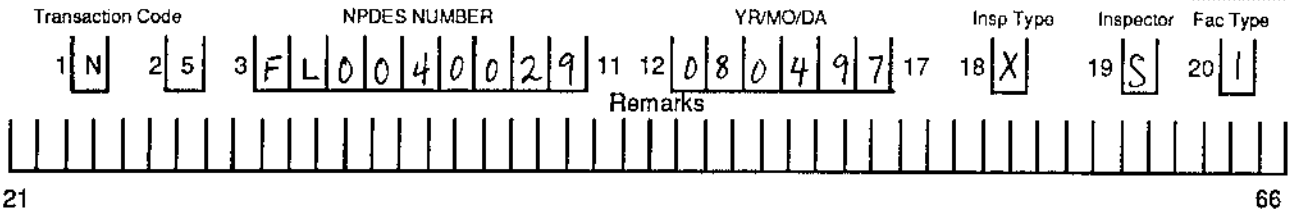
Tribelos fuscicornis	153	58
Tribelos sp.	6	–
Zavreliella marmorata	2	6
Ephemeroptera		
Caenis sp.	42	99
Gastropoda		
Ancylidae	6	4
Hebetancylus excentricus	36	8
Micromenetus dilatatus avus	–	6
Micromenetus floridensis	12	10
Micromenetus sp.	16	–
Physella sp.	–	2
Physidae	–	2
Planorbidae	–	4
Undetermined Gastropoda	–	4
Odonata		
Enallagma sp.	4	2
Gomphidae	–	4
Libellulidae	8	6
Trichoptera		
Orthotrichia sp.	–	2

Benthic macroinvertebrate taxa list for the Avon Park Correctional WWTP, collected via 20 discrete dip net sweeps in the Rim Canal, on 30 October, 1997.

	Control Site	Test Site
Coleoptera		
Dubiraphia sp.	24	32
Undetermined Elmidae	3	–
Collembola		
Undetermined Collembola	1	–
Decapoda		
Palaemonetes paludosus	–	2
Undetermined Decapoda	–	2
Diptera		
Ablabesmyia rhamphe grp.	1	–
Asheum beckae	–	1
Clinotanypus sp.	6	1
Dicrotendipes modestus	–	2
Goeldichironomus holoprasinus	1	2
Goeldichironomus sp.	–	2
Labrundinia becki	1	–
Labrundinia sp. B Epler	1	–
Microtendipes pedellus grp.	8	–
Monopelopia boliekae	–	1
Parachironomus sp.	–	1
Polypedilum halterale grp.	7	2
Polypedilum illinoense grp.	–	4
Tanytarsus sp.	1	–
Tanytarsus sp. L Epler	1	–
Tanytarsus sp. O Epler	1	–
Tanytarsus sp. T Epler	9	4
Ephemeroptera		
Caenis sp.	5	18
Callibaetis floridanus	–	1
Gastropoda		
Undetermined Ancylidae	8	3
Micromenetus floridensis	–	4
Micromenetus sp.	6	6
Pseudosuccinea columella	–	1
Undetermined Gastropoda	2	1
Hemiptera		
Microvelia sp.	–	1
Rheumatobates sp.	–	5
Lepidoptera		
Undetermined Pyralidae	–	1
Nemertina		
Prostoma rubrum	2	1

Odonata		
Undetermined Coenagrionidae	–	1
Undetermined Corduliidae	–	1
Enallagma sp.	–	2
Libellula semifasciata	2	–
Undetermined Libellulidae	–	2
Oligochaeta		
Aulodrilus pigueti	–	1
Dero digitata	1	–
Eclipidrilus palustris	1	–
Limnodrilus hoffmeisteri	18	9
Pristinella osborni	–	1
Pelecypoda		
Corbicula sp.	3	–
Undetermined Sphaeriidae	11	4
Undetermined Pelecypoda	3	–
Trombidiformes		
Arrenurus sp.	–	1
Krendowskia sp.	–	13
Neumania sp.	–	3
Piona sp.	–	1
Sperchon sp.	–	1

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)

