

Biological Assessment of

Mid-County Services WWTP

Pinellas County

NPDES #FL0034789

Sampled August 1999

September 2000

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:	Mid-County Services WWTP
County:	Pinellas
NPDES Number:	FL0034789
Permit Expiration Date:	April 23, 2005

Toxics Sampling Inspection (**XSI**)

Date Sampled: August 02, 1999

Results: The metals cadmium, copper, iron, nickel, and zinc were detected in the effluent at levels that complied with Class III water quality standards. The herbicide atrazine, an organic pollutant, was detected at a non-problem level.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: August 02, 1999

Results: A 48-hour bioassay toxicity test performed on an effluent sample indicated that the effluent was not toxic to the vertebrate, *Cyprinella leedsi*, or the invertebrate, *Ceriodaphnia dubia*.

Impact Bioassessment Inspection (**IBI**)

Date Sampled: August 05, 1999

Results: Quantitative measures of macroinvertebrate community health showed some degradation at the test site compared to the control site. The test site had a decrease in the number of taxa, a reduction in Florida Index, and a decrease in diversity. Some of the qualitative measures were also lower but the composite Stream Condition Index at each site was 23 points, placing them in the good category.

Water Quality Inspection (**WQI**)

Date Sampled: August 02, 1999

Results: The effluent fecal coliform result (15 counts/100 ml) did not comply with the permit limit of "non-detectable." There was a significant increase in the ortho-phosphate concentration at the test site compared to the control site. All other nutrients were comparable between the two sites. The AGP value at the test site was 11.4 mg dry wt/L and exceeded the 5 mg dry wt/L "problem threshold". The effluent AGP was 7.6 mg dry wt/L. These results indicate that the Mid-County effluent may be contributing to nutrient enrichment in Curlew Creek.

Biological assessments are prepared by DEP staff to provide information used in reviewing NPDES permit renewal applications for the subject facility. This assessment is used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The Mid-County Wastewater Treatment Plant is located in Pinellas County, Florida (see map in the Appendix). The plant is a municipal, Type I, advanced wastewater treatment facility discharging filtered, chlorinated, and finally reclaimed dechlorinated water. The facility is a domestic wastewater treatment plant for the city of Clearwater, Florida (see Facility Summary in Appendix). The Mid-County plant effluent is discharged through a 12–inch pipe that extends approximately 50 feet from the facility into Curlew Creek, a Class III freshwater stream which flows into Clearwater Harbor. The design flow of the facility's system is 0.9 MGD. Mean flow of the system as of July 1999, was 0.81 MGD.

State permit limits for the plant are listed in Table 1. Review of the facility's monthly operating reports found that the plant failed routine and follow-up chronic toxicity tests during 1997 and 1998 (see Facility Summary in Appendix).

Methods

The purpose of this investigation was to determine the effects of the Mid-County plant discharge on the receiving water in Curlew Creek. A comparative assessment of biological community health was made between the control site located approximately 33 meters upstream of the discharge in Curlew Creek and the test site also in Curlew Creek approximately 33 meters downstream of the discharge. A habitat assessment was performed in situ to establish site comparability. Supplemental physical and chemical data was collected from the effluent and both study sites. Samples for this report were collected on two separate occasions, August 2 and August 5, 1999. The effluent sample was analyzed for nutrients, metals, and organic constituents (Extractable Base/Neutral and Acids, and pesticide extractables).

Acute toxicity bioassay screening was performed on an effluent sample using an invertebrate species *Ceriodaphnia dubia* and the vertebrate *Cyprinella leedsi* as test organisms. Bacterial populations were analyzed for total and fecal coliforms.

Benthic macroinvertebrates were evaluated at the control site and the test site. Invertebrate species were collected from different substrate types such as snags, leaf packs, and aquatic vegetation using discrete dip-net sweeps. Additional invertebrate collections were made using Hester-Dendy multiplate samplers incubated for 28 days.

Phytoplankton were sampled at each site by taking subsurface grabs and Chlorophyll-*a* was determined for phytoplankton communities. *Selenastrum capricornutum* was used as the test organism for Algal Growth Potential (AGP) tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). Connect to the FDEP web site at "http://www.dep.state.fl.us/labs/sops.htm" to read these SOP's.

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 brief review of each of these measures, see *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, and the % filter-feeders are measured as the control site minus test site divided by the control site. The percent differences between sites involving % contribution, algal density, Chlorophyll-*a*, and algal growth potential are measured as the test site minus control site divided by the control site.

The following personnel were involved in this investigation, Wendy Hershfeld (DEP SW District); Ken Espy, Marshall Faircloth, Russell Frydenborg, Michael Heyn, Joy Jackson, Vicki McGee, Elizabeth Miller, Urania Quintana, Johnny Richardson, Julie Riley, Lisa Homann, 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, and Michael Tanski, as well as District representatives.

Table 1. Effluent limits and summary of chemistry data.

Mid-County Services WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)				
Atrazine	-	0.058 I	-	-
Metals (µg/L)				
Aluminum	≤ 1500 **	50 U	-	-
Arsenic	≤ 50 **	8 U	-	-
Cadmium	≤ 1.88 **b	0.096 I	-	-
Chromium	≤ 351 **b	0.60 U	-	-
Copper	≤ 20.5 **b	3.0 I	-	-
Iron	≤ 1000 **	86 A	-	-
Lead	≤ 7.22 **b	0.250 U	-	-
Mercury	≤ 0.012 **	0.10 U	-	-
Nickel	≤ 272 **b	2.0 I	-	-
Selenium	≤ 5.0 **	1.20 U	-	-
Silver	≤ 0.07 **	0.0300 U	-	-
Zinc	≤ 183 **b	28 I	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	1.1	0.063	0.24
Total phosphorus	2.0 *	1.1 A	0.25	0.31
Ammonia	-	0.038	0.037	0.020
Nitrate+Nitrite	-	0.020 U	0.26	0.21
TKN	-	0.79 A	0.82	0.68
Organic Nitrogen	-	0.752	0.783	0.66
Total Nitrogen	6.0 *	0.79	1.08	0.89
General Phys-Chem Parameters				
Habitat Assessment	-	-	70	67
D.O. (mg/L)	≥ 5.0 *	6.6	5.8	6.2
pH (SU)	6.0 - 8.5 *	7.0	7.2	7.1
Conductivity (µmhos/cm)	**	807	396	471
Temperature (°C)	-	31.2	27.5	27.9
C.B.O.D., 5 day (mg/L)	10 *	2	2	2
Turbidity (NTU)	-	0.8	10	2.1
TSS (mg/L)	10.0 *	1	30	2
Flow (MGD)	0.9	0.81	-	-
Hardness (mg $CaCO_3$)	-	190	-	-
AGP (mg dry wt/L)	-	7.6	1.8	11.4
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	NOEC **	Not Toxic	-	-
Bioassay - Invertebrate	NOEC **	Not Toxic	-	-
Microbiology (# counts/100mL)				
Fecal Coliforms	Non-detectable *	15	75 Z	75 Z
Total Coliforms	-	40 A	50 Z	50 Z

* Permit limit
** Class III water quality standard
b - Value is calculated based on hardness
A - Value reported is the mean of two or more determinations
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit
U - Material analyzed for but not detected; value reported is the minimum detection limit
Z - Colonies were too numerous to count (TNTC)
NOEC - A no observed effect concentration less than 100% effluent will constitute a violation of this permit

Results

Chemical and biological results for this report are presented in Tables 1-2.

Discussion

Because of intermittent effluent toxicity problems, Mid-County Wastewater Treatment Plant was required by USEPA to conduct toxicity reduction evaluations. In 1993, FDEP Technical Services Division noted that the effort by the facility to locate and reduce the intermittent effluent toxicity appeared to be successful. At that time, Technical Services Division also changed the Mid-County discharge permit from twice a month acute toxicity testing to twice a year toxicity testing. A Fifth Year Inspection was conducted at this facility in June 1998. In the interval of time between the 1993 inspection and the June 1998 inspection, the facility had several toxicity problems. The 48-hour toxicity test analyzed in June 1998 was invalidated. Effluent sample results from that inspection indicated no organic compounds or metals at problem levels. In August 1999, an inspection was conducted to substantiate any previous findings.

Habitat quality was considered "marginal" with scores of 70 points at the control site and 67 points at the test site (see Habitat Assessment Data Sheets in the Appendix). The sites lost points in all categories but were especially poor in the stability of the banks, and the amount and quality of the riparian zone. The in situ physical and chemical measurements were very similar between the study sites (see the Physical/Chemical Data Sheets

Table 2. Community structure of control and test sites.

Mid-County Services WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
% Dominant Taxon	15.8	21.8
EPT Index	4	2
Florida Index	7	7
Number of Taxa	21	17
SCI	23	23
Community Composition		
% Amphipoda	8.3	3.2
% Coleoptera	16.5	27.6
% Diptera	33.8	31.4
% Ephemeroptera	1.5	1.3
% Gastropoda	9.0	6.4
% Odonata	18.8	5.1
% Oligochaeta	2.3	0.0
% Pelecypoda	0.0	1.3
% Plecoptera	0.0	0.0
% Trichoptera	7.5	21.8
% Other	2.3	1.9
Functional Feeding Groups		
% Burrowing Deposit Feeders	2.3	0.0
% Predators	36.8	22.1
% Surface Deposit Feeders	22.6	26.3
% Suspension Feeders/Filterers	6.0	23.1
% Scrapers	18.0	19.6
% Shredders	12.8	9.0
Macroinvertebrate Hester-Dendy		
Number of Taxa	38	28
Florida Index	16	12
Shannon-Weaver Diversity	3.6	3.1
EPT Index	2	1
Community Composition		
% Coleoptera	28.2	42.2
% Diptera	46.5	33.5
% Ephemeroptera	0.5	0.0
% Gastropoda	4.1	2.6
% Trichoptera	18.1	19.0
% Other	2.6	2.7
Functional Feeding Groups		
% Predators	13.6	13.1
% Surface Deposit Feeders	34.4	33.7
% Suspension Feeders	19.1	19.4
% Scrapers	18.5	23.7
% Shredders	12.7	9.4
Phytoplankton Algae		
Number of Taxa	28	21
Shannon-Weaver diversity	3.78	3.69
Chlorophyll *a* (µg/L)	3.25 I	1.00 U
Algal Density (#/mL)	525	205
% Blue-green	18.3	14.3
% Green	21.4	33.3
% Diatoms	53.4	39.1
AGP (mg dry wt/L)	1.8	11.4

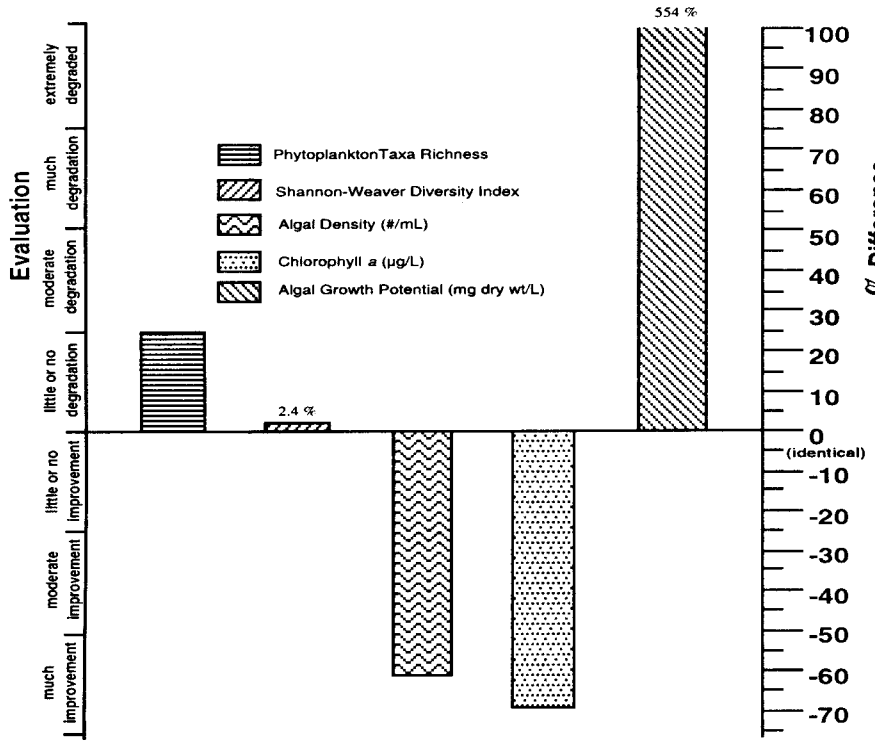


Figure 1. Effect of discharge on the phytoplankton community.

in the Appendix). Dissolved oxygen was above the 5 mg/L Class III standard at both sites and the pH was neutral (Table 1). The conductivity was slightly lower at the control site (396 µmhos/cm) compared to the test site (473 µmhos/cm).

Cadmium, copper, iron, nickel, and zinc were all detected in the effluent at levels above the detection limits (Table 1). None of these compounds was in excess of Class III water quality standards. The herbicide, atrazine, an organic pollutant, was detected at a non-problem level. The effluent fecal coliform result (15 counts/100ml) did not comply with the permit limit of "non-detectable" (see Facility Summary in Appendix). Fecal and total coliforms were detected at both the control and test sites, but a precise concentration could not be determined because the results were reported as "too numerous to count" (Table 1). Consequently, effluent contributions to fecal and total coliform levels at the study sites could not be evaluated.

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

There was a significant increase in ortho-phosphate at the test site relative to the control site (Table 1). The test site level of ortho-phosphate exceeded levels found in over 70% of other typical Florida streams while the control site exceeded only 40% of the same levels (see *Typical Values for Selected Parameters in Florida Waters* in Appendix). The concentration of ortho-phosphate in the effluent (1.1 mg/L) appeared to be responsible for the significant increase in this portion of Curlew Creek. There was a 24% increase in total phosphorus at the test site compared to the control site. However, the control site level was already greater than levels found in 70% of other Florida streams, which indicates sources of total phosphorus in the receiving waters in addition to the effluent. Other nutrient levels were lower at the test site compared to the control site (Table 1).

AGP comparisons between the study sites indicated eutrophication in Curlew Creek at the test site.

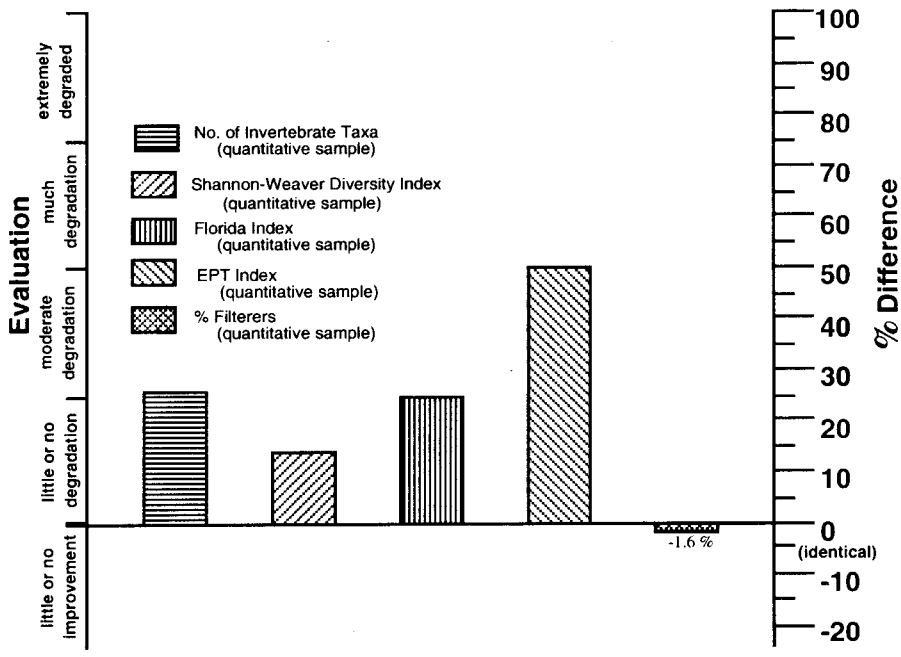


Figure 2. Effect of discharge on the macroinvertebrate community.

The AGP value at the control site was below the 5 mg dry wt/L "problem threshold" (Raschke and Shultz 1987) while the test site concentration (11.4 mg dry wt/L) exceeded this level. This is the level above which the negative consequences associated with nutrient enrichment (D.O. depletion, algal blooms, fish kills) are probable. Effluent AGP was 7.6 mg dry wt/L.

Changes in the phytoplankton community occurred below the discharge. While some measures of algal health indicated degradation, others indicated improvement (Table 2). Taxa richness and the diatom proportion were lower by 25% and 14%, respectively, at the test site compared to the control site, indicating degradation at the test site. Algal density and chlorophyll *a*, on the other hand, indicated improved conditions at the test site (Figure 1).

Some measures of macroinvertebrate community health showed impairment at the test site compared to the control site (Table 2). For example, taxa richness declined by 19% between the control site and the test site. And there was a 50% decline in the EPT Index from the control site to the test site as shown in Figure 2, which represents quantitative data. There was no change, however, in either the Florida Index or the Stream Condition Index. The SCI scores, with 23 points each, placed both sites in the "good" category. The quantitative measures also indicated some degradation at the test site compared to the control site (Figure 2). Taxa richness declined by 26%, the Florida Index by 25%, the EPT Index by 50%, and the Shannon-Weaver diversity was 14% lower at the test site compared to the control site.

The data indicate that the Mid-County WWTP may be contributing to an imbalance of the aquatic fauna at the test site in Curlew Creek. When compared to the Fifth Year Inspection report completed in March 1999, most of the quantitative measures were either the same or improved in the current survey (FDEP 1999). For example, there was an increase in diversity and the Florida Index and no difference in taxa richness or the EPT Index at the test sites. There was very little difference in the qualitative samples with the exception of a decrease in taxa richness in the August 1999 samples.

References

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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.

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Locus Map

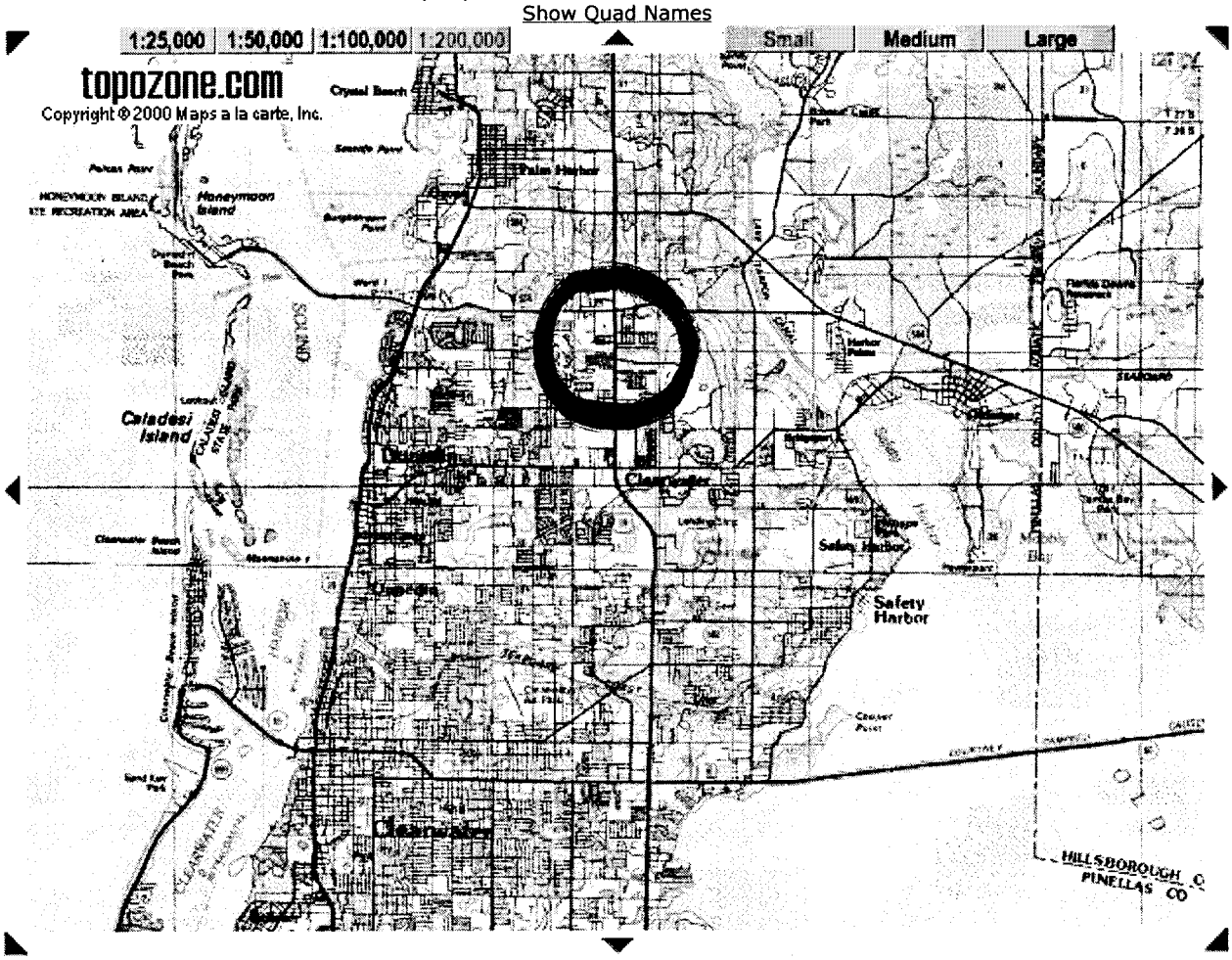
Sampling Locations for MidCounty Services

Map target is 28.0381°N, 82.7422°W - UTM Zone 17, N 3102475, E 328744

Exact center of display is UTM Zone 17, N 3099816, E 329184

Show Quad Names

1:25,000 | 1:50,000 | 1:100,000 | 1:200,000 | Small | Medium | Large



Show Quad Names

meters 0 4000 8000 12000 16000

miles 0 4.0 8.0

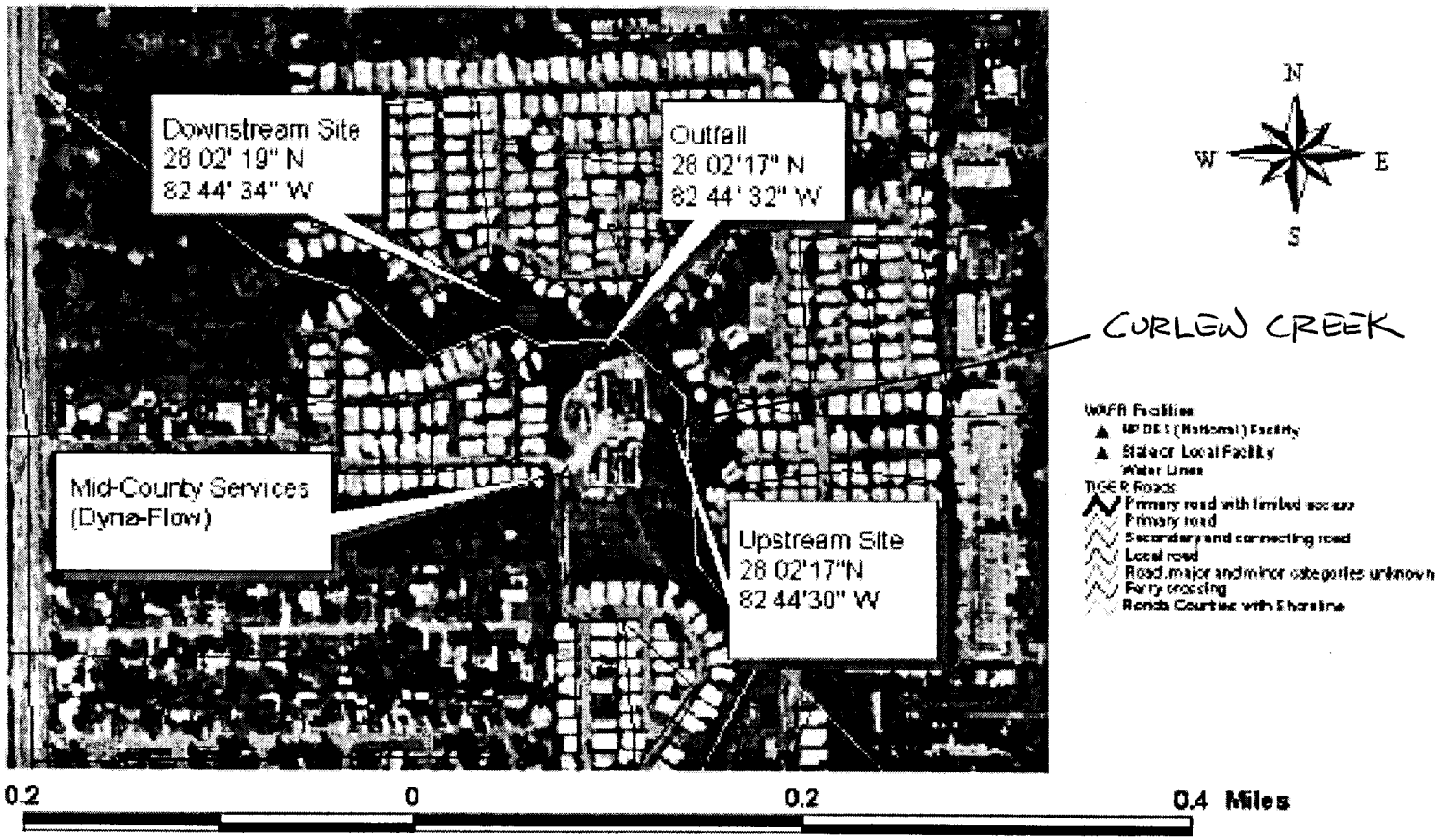
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Sampling Locations for MidCounty Services



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)

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

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

Facility Summary Sheet for Mid County Services WWTP's FYI-5

Facility Name: Mid County Services WWTP Date Summary Prepared: 12/21/99

Federal Permit: FL0034789 Expires Sept 30, 1999 State GMS 4052P01064 Expires March 1, 1999

Location: 2299 Spanish Vista Drive, Clearwater County: Pinellas District: SW District

Facility Type: Municipal Function of Facility: Domestic wastewater treatment plant

Description of Treatment Process: A Type I advanced wastewater treatment plant discharging filtered, chlorinated and then de-chlorinated reclaimed water.

Receiving Waters: Curlew Creek and then into Clearwater Harbor.

Classification: Class III Fresh Water

Design Flow: 0.9 mgd Mean Flow: 0.81 mgd (as of July 1999) Flow during survey:

The Discharge is Continuous: yes

State Pemit Effluent Limits:

Parameter	Unit	Minimum	Maximum	Type Sample	Frequency
Flow	mgd	-	0.9 aa	Recorder	Continuous
pH	SU	6.00	8.50	Recorder	Continuous
CBOD5	mg/L	-	5 aa	16-hr fpc	Weekly
TSS	mg/L	-	5 aa	16-hr fpc	Weekly
Total Nitrogen	mg/L	-	3 aa	16-hr fpc	Weekly
Total Phosphorus	mg/L	-	1 aa	16-hr fpc	Weekly
TRC	mg/L	-	0.01	grab	Hourly
Fecal coliform	#/100	0	non-detectable	grab	Daily/5week

aa denotes annual average
16-hr fpc denotes flow proportional composite over 16 hours
TRC denotes total residual chlorine

Federal Permit Effluent Limits:

Parameter	Annual Ave	Monthly Ave	Daily Max	Type Sample	Frequency
Flow (mgd)	Report	Report	Report	Recorder	Continuous
CBOD5 (mg/L)	5	6.25	10	16-hr composite	Weekly
TSS (mg/L)	5	6.25	10	16-hr composite	Weekly
Total P (mg/L)	1	1.25	2	16-hr composite	Weekly
Total N (mg/L)	3	3.75	6	16-hr composite	Weekly
Fecal Coli #/100 ml	-	-	Below detection limit	Grab	Weekly
TRC (mg/L)	-	-	0.01	Grab	Weekly
DO (mg/L)	-	-	Shall not be less than 5 mg/l	Grab	Weekly
pH (SU)	shall not be less than 6.0 SU nor greater than 8.5 SU				

Total P denotes total phosphorus
Total N denotes total nitrogen

Does this facility have a mixing zone: No

Description of permitted outfall:
The effluent is discharged from the facility via 12" pipe that extends approximately 50 feet and then flows into Curlew Creek. The pipe is not submerged.

List permit violations and plant upsets that occurred within past 3 years: The facility has been failing routine and follow-up chronic toxicity tests during 1997 and 1998.

Describe previous impact bioassessments, WQBELs, and previous and current enforcement actions: A MNI was conducted by the facility in 1991. In August 30, 1994, TS recommended the issuance of the NPDES permit.

The facility was required by EPA administrative order, 92-023, to conduct a TRE due to intermittent effluent toxicity. In 1993, the DEP received a copy of the TRE POS. On September 9, 1993, TS noted that the effort by the facility to locate and reduce effluent toxicity appeared to be successful as effluent toxicity appeared to be reduced. On December 29, 1993, TS reduced the DEP permit required acute toxicity testing frequency from twice a month to biannually.

A Fifth Year Inspection was conducted at this facility on June 1, 1998. The results indicated that no organic compounds or metals were detected at levels that violated surface water quality standards. The 48-hour acute toxicity test was invalidated . The macroinvertebrate and phytoplankton communities in Curlew Creek were not impacted by the effluent at the time of the sampling event. The nutrient levels at the test site were higher than those at the control site and this was associated with the effluent nutrient levels.

A second FYI-5 was conducted in August 1999 due to the present intermittent toxicity at the facility and to repeat the 48-hour acute DEP conducted.

Discuss comparability of MOR/DMR results to past DEP results and whether there are trends in the data set:

Staff contributing to this review:

Wendy Hershfeld (Biologist)
Andrea Grainger (Biologist)
Joe Squitieri (Inspector)

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:
		8/5/99	1100	Curlew Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
Water Quality was collected on 8/2/99	Pinellas	FY1-5 UPSTREAM - Mid County Services	25191

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)
	—	—	—	88	10	2	

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

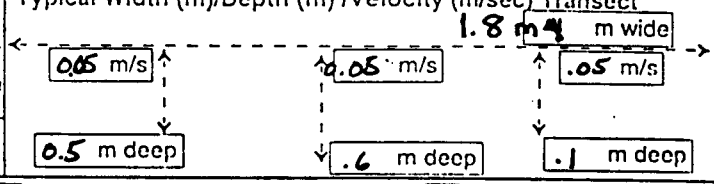
Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☑

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

Artificially Channelized ☐ no ☐ ☐ ☑ Artificially Impounded ☑ yes (recent, severe; some recovery; mostly recovered more sinuous)

High Water Mark: 4 (m above present water level) + .6 (present depth in m) = 4.6 (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)	9%	5	Dip Net	Sand	43%	3	Dip Net
Leaf Packs or Mats	0			Mud/Muck/Silt	4%	2	Dip Net
Aquatic Vegetation	17%	5	Dip Net	Other: Art. Substrate	6.5%	5	Dip Net
Rock or Shell Rubble	0			Other:			
Undercut banks/Roots	2%	5	Dip 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 0.1	0.1	27.53	7.18	5.65	0.396			VOB
Mid-depth	0.25	27.54	7.18	5.75	0.396			
Bottom	0.5	27.54	7.19	5.79	0.398			

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:
28°02'17"N
082°44'30"W
18ft. Elevation

Dip Net Method
SOP# BA-7
EPA/444/4-89-001

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Wendy Hershfeld	Wendy E. Hershfeld	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		8/5/99	Curlew Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
WQ samples collected on 8/2/99	Pinellas	FY1-5 UPSTREAM- Mid County Services	

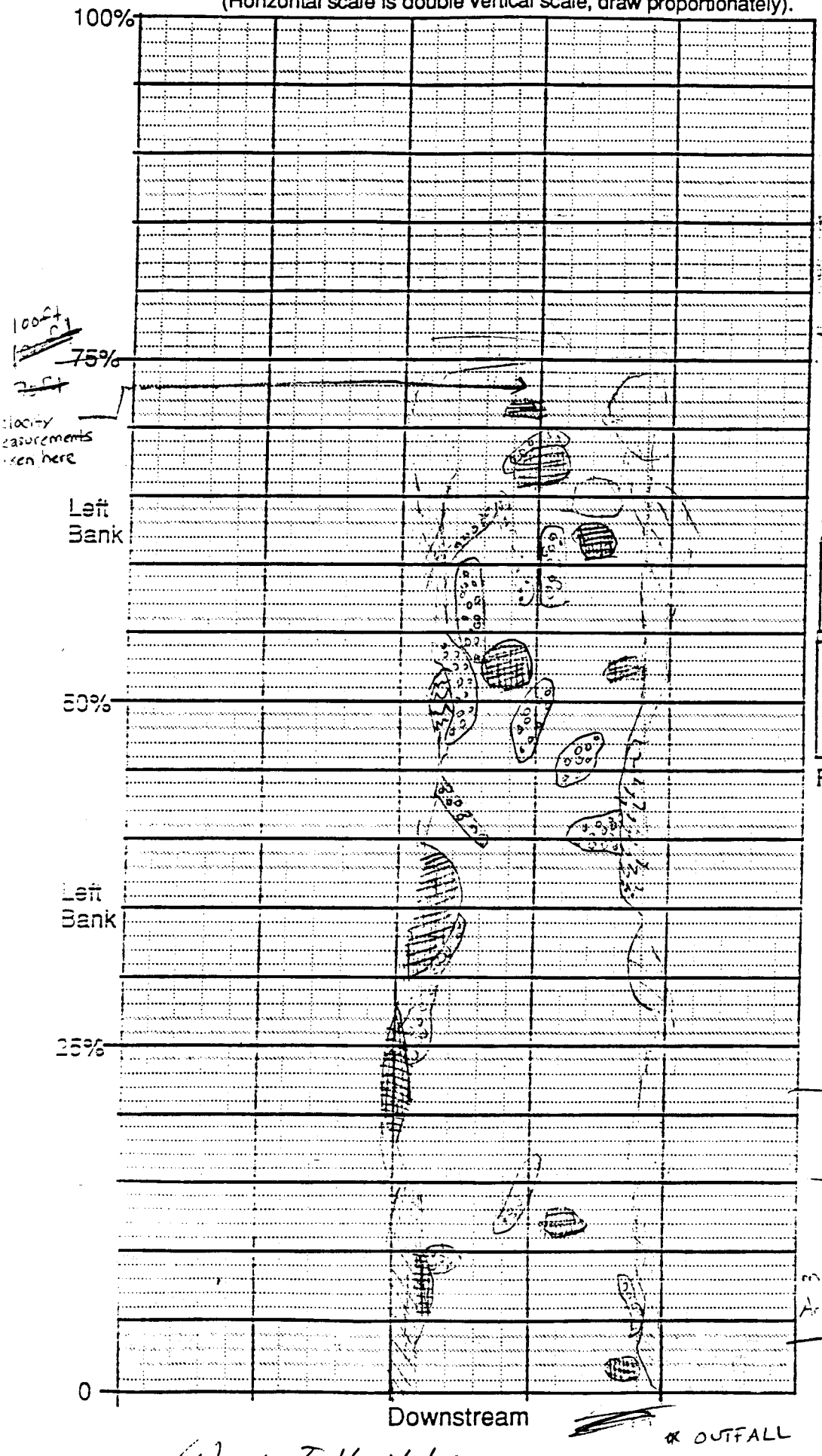
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [11]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 (11)	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [11]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 (11)	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity [7]	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
Habitat Smothering [11]	Less than 20% of habitats affected by sand or silt accumulation	20%-50% of habitats affected by sand or silt accumulation	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent
Primary Score [40]	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** [15]	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
Bank Stability Right Bank [2] Left Bank [3]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width (WEH) 2 Right Bank [4] Left Bank [42]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [4] Left Bank [2]	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. 10 9	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. 8 7 6	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. 5 4	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. 3 2 1
Secondary Score [30]				

[70] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/5/99	Wendy E. Hershfeld	Wendy E. Hershfeld

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundanc

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- Artificial Substrate
-
-

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where san or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

42 [illegible]

Total percentages (upstream + downstream)
For

Snags = 7.0%
roots = 2.2%
macrophytes = 16%
Art substrate = 8.2%

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:
		8/5/99	1000	Curlew Creek

REMARKS	COUNTY:	LOCATION:	FIELD ID/NAME:
Water quality was collected on 8/5/99.	Pinellas	FY1-5 Downstream - Mid-County Services	25192

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)
—	—	—	—	88	10	2	—

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

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

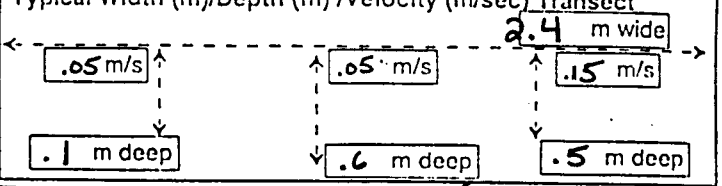
Width of riparian vegetation (m) on least buffered side: *List & map dominant vegetation on back*

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

Artificially Impounded ☑ yes

High Water Mark: 2 (m above present water level) + 0.6 (present depth in m) = 2.6 (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)	5.3%	5	Dip Net	Sand	49%	3	Dip Net
Leaf Packs or Mats	0			Mud/Muck/Silt	3%	2	Dip Net
Aquatic Vegetation	16%	5	Dip Net	Other: Art. substrate	9.5%	5	Dip Net
Rock or Shell Rubble	0			Other:			
Undercut banks/Roots	2.2%	5	Dip 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 0.1	0.1	27.85	7.05	6.16	0.473			VOB
Mid-depth	0.25	27.85	7.14	6.15	0.471			
Bottom 0.5	0.5	27.83	7.17	6.12	0.470			

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:
28° 02' 19"N
082° 44 34" W
18 foot elevation
Dip Net Method
SOP # BA-7
EPA/444/4-89-001

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Wendy Hershfeld	Wendy E. Hershfeld	8/5/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		8/5/99	Curlew Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
WQ samples collected 8/2/99	Pinellas	FY1-5 Downstream - Mid County Services	

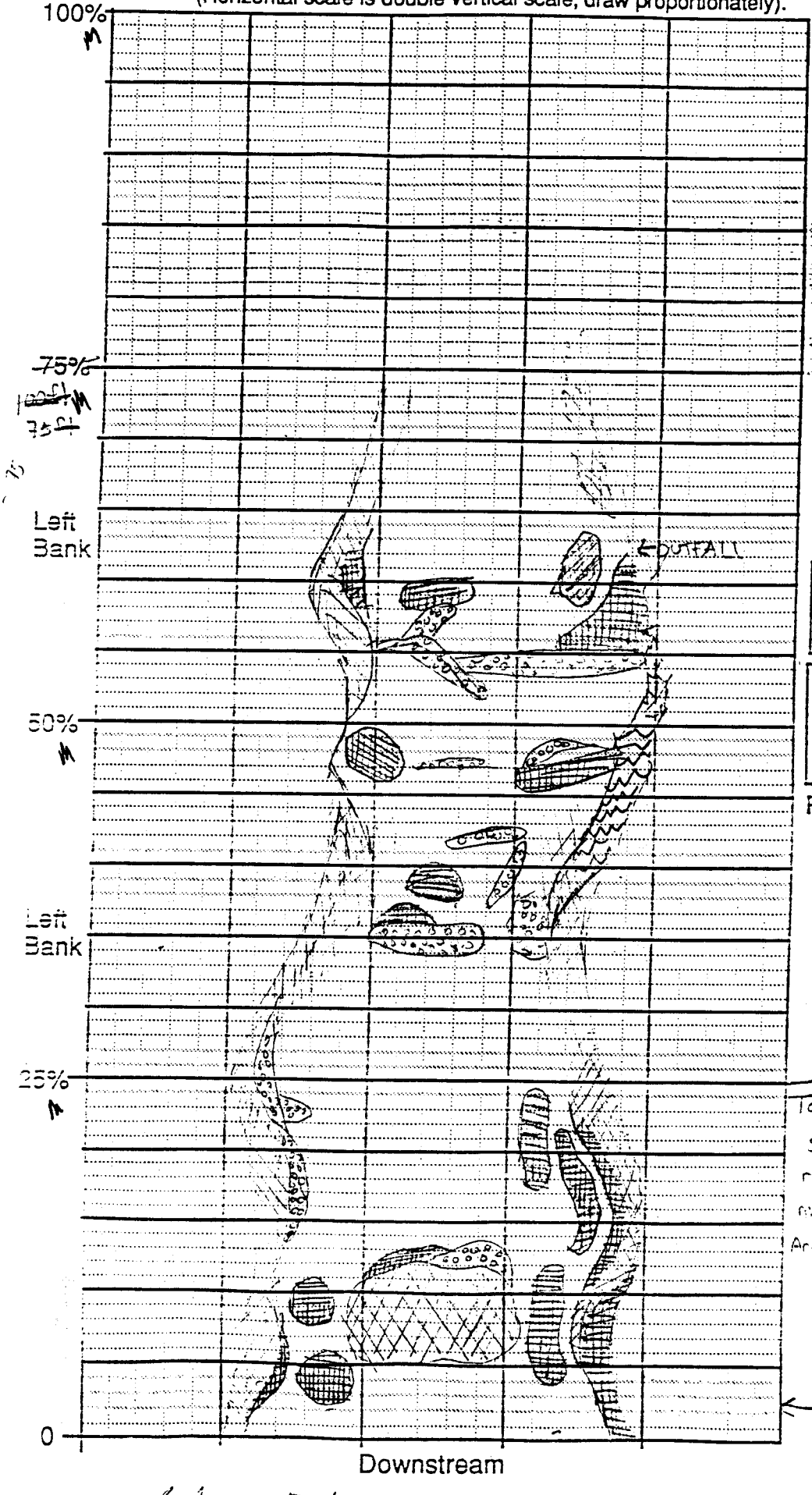
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [11]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 (11)	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [11]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 (11)	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity [8]	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
Habitat Smothering [8]	Less than 20% of habitats affected by sand or silt accumulation	20%-50% of habitats affected by sand or silt accumulation	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent
Primary Score [38]	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** [10]	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
Bank Stability Right Bank [3] Left Bank [4]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 (4)	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. (3) 2 1
Riparian Buffer Zone Width Right Bank [2] Left Bank [2]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 (2) 1
Riparian Zone Vegetation Quality Right Bank [4] Left Bank [4]	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. 10 9	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. 8 7 6	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. 5 (4)	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. 3 2 1
Secondary Score [29]				

[67] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/5/99	Wendy E. Hershfeld	Wendy E. Hershfeld

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundanc

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- Artificial substrate (tiro: conor

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where san: or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eiiminated.

Plants observed/other notes:

Total percent areas (upstream - downstream)

Snags = 4.0%

roots: 2.2%

Artificial substrate = 2.2%

Velocity measurements taken here

Wendy E Hubbell

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mid County Services
County: Pinellas
Contact / District: SW DISTRICT
NPDES Permit #: FL0034789
LIMS Sample #: 398845 LIMS Job #: TLH-1999-08-03-04
sample log 8/18/99 DW MF
Test Type: (Screening) / Definitive
~~Static~~ / Static Renewal / Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 8/4/99 Time 12:00
Test Beginning: Date 8/3/99 Time 1200
Test Ending: Date 8/5/99 Time 1350
Organism Batch #: 38 Diluent Batch #: 31
Organism Age: 24hours SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

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	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 48 h
Ctl	A	5	5	5	7.7		8.2	25.6		25.3	7.8		7.6	170		230
Ctl	B	5	5	5			8.2			25.4			7.6			200
Ctl	C	5	5	5			8.2			25.7			7.6			185
Ctl	D	5	5	5			8.2			25.7			7.6			185
100%	A	5	5	5	7.3		8.4	25.6		25.6	7.4		7.6	805		835
100%	B	5	5	5			8.4			25.6			7.6			870
100%	C	5	5	5			8.4			25.7			7.6			870
100%	D	5	5	5			8.4			25.7			7.6			850
measured by: loaded		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
recorded by:		MF	MF	MF	DW		FW	DW		MF	DW		FW	DW		FW

Investigators' Signatures

Marshall Faircloth

Jeanne Mockler

Jeff Wolfe

reviewer

form updated 3/3/99

Temperature Range °C
Incubator # 2 25.0 - 26.0°C
Room 25.0 - 26.0°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not Measured			
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR-100	DW	MF
Alkalinity (mg/L as $CaCO_3$):		75	180	Hach	~~MF~~ CH	MF
Hardness (mg/L as $CaCO_3$):		85	190	Hach	CH	MF
Total ammonia (mg/L as N):		<0.017	<0.017	Orion 95-12	MF	MF
Salinity:		0	0	YCT	CH	MF

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mid County Services
County: Pinellas
Contact / District: SW FB DISTRICT
NPDES Permit #: FL0034789
LIMS Sample #: 398845 **LIMS Job #:** JLH-1999-08-03-04
sample log 8/18/99 DW MF
Test Type: ~~Screening~~ I Definitive
~~Static~~ I Static Renewal I Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 8/2/99 Time 12:00
Test Beginning: Date 8/3/99 Time 1430
Test Ending: Date 8/5/99 Time 1350
Organism Batch #: 58 **Diluent Batch #:** Well H2O
Organism Age: 11 DAYS SRT toxicant batch #: N/A
Test organism: Cyprinella leedsi

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
CTLA	E15	5	5	5	7.6	8.1	8.2	25.2	24.8	25.0	7.7	7.3	7.7	250	250	260
CTLB	E16	5	5	5	7.6	8.1	8.2	25.2	24.5	24.1	7.8	7.5	7.7	250	250	260
CTLC	E17	5	5	5	7.6	8.1	8.2	25.2	24.2	24.5	7.8	7.5	7.6	255	250	260
CTLD	E18	5	5	5	7.6	8.1	8.2	25.2	24.1	24.8	7.9	7.6	7.7	255	250	260
100%A	E19	5	5	5	7.3	7.9	8.2	25.4	24.7	24.7	7.4	7.0	7.7	820	870	860
100%B	E20	5	5	5	7.3	8.0	8.2	25.3	24.6	24.7	7.4	7.0	7.7	835	820	855
100%C	E21	5	5	5	7.3	8.0	8.2	25.3	24.4	24.6	7.4	7.1	7.7	835	825	850
100%D	E22	5	5	5	7.3	8.0	8.2	25.3	24.1	24.6	7.4	7.2	7.7	840	835	860
measured by:		MF	CH	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
recorded by:		MF	CH	MF	DW	CH	FW	DW	CH	FW	DW	CH	FW	DW	CH	FW

24hr. measured by CH recorded by MF. MF 8/4/99

Investigators' Signatures

Temperature Range °C
Incubator # 3 24.0-25.5°C
Room 25.0-26.0°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			not measured			
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-100	DW	MF
Alkalinity (mg/L as $CaCO_3$):	130	+8 MF working stock	180	Hach	CH	MF
Hardness (mg/L as $CaCO_3$):	130		190	Hach	CH	MF
Total ammonia (mg/L as N):	<0.017		<0.017	Nessler test	MF	MF
Salinity:	0		0	YCI	CH	MF

reviewer

Form updated 3/3/99

Mid-County Services WWTP - Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	21	≥26	25-14	<14	3
EPT Index	4	≥4	3-2	<2	5
# Chironomid Taxa	2	≥7	6-4	<4	1
% Contribution of Dominant Taxon	15.8	≤29	30-64	>64	5
% Diptera	33.8	-	≤37	>37	3
Florida Index	7	≥7	6-4	<4	5
% Suspension feeders/Filterers	6.0	-	≥7	<7	1
Total Score		**Peninsula**			**23**
Interpretation of Scores		**Excellent**			26-32
		Good			20-25
		Poor			13-19
		Severely Degraded			7-12

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

Mid-County Services WWTP - Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	17	≥26	25-14	<14	3
EPT Index	2	≥4	3-2	<2	3
# Chironomid Taxa	2	≥7	6-4	<4	1
% Contribution of Dominant Taxon	21.8	≤29	30-64	>64	5
% Diptera	31.4	-	≤37	>37	3
Florida Index	7	≥7	6-4	<4	5
% Suspension feeders/Filterers	23.1	-	≥7	<7	3
Total Score		**Peninsula**			**23**
Interpretation of Scores		**Excellent**			26-32
		Good			20-25
		Poor			13-19
		Severely Degraded			7-12

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

Phytoplankton taxa list and densities (#/cm^2) for Mid-County Services WWTP, collected via glass microscope slides in Curlew Creek, on 02 August, 1999.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	2	2
Capartogramma crucicula	1	0
Cyclotella sp.	3	4
Eunotia sp.	0	1
Mastogloia sp.	1	0
Melosira sp.	2	0
Navicula capitata	1	1
Navicula sp.	4	0
Nitzschia sp.	18	12
Pennales sp.	4	1
Synedra sp.	2	0
Undetermined Diatomaceae	0	2
Chlorophyceae		
Chlamydomonas sp.	2	1
Schroederia setigera	0	1
Tetraedron minimum	1	0
Characium sp.	3	2
Oocystis sp.	1	6
Chodatella subsalsa	0	1
Treubaria sp.	0	1
Pediastrum biradiatum	0	1
Scenedesmus sp.	2	3
Scenedesmus quadricauda	3	2
Scenedesmus bijuga	0	1
Scenedesmus denticulatus	1	0
Scenedesmus incrassatulus	1	2
Closterium sp.	1	0
Staurastrum mamillatum	1	0
Undetermined Chlorophyceae	2	1
Cryptophyceae		
Chroomonas sp.	2	0
Cryptomonas sp.	2	6
Cyanophyceae		
Oscillatoria sp.	1	0
Anabaena sp.	1	0
Aphanocapsa sp.	1	1
Chroococcus sp.	1	0
Synechococcus sp.	1	0
Rhabdoderma sp.	0	1
Dactylococcopsis sp.	8	6
Dermocarpa sp.	1	0

Euglenophyceae		
Euglena sp.	1	0
Trachelomonas sp.	1	0
Undetermined Euglenophyceae	0	1

Benthic macroinvertebrate taxa list for Mid-County Services WWTP, collected via Hester-Dendy artificial substrates in Curlew Creek, on 05 August, 1999. Densities, in number/m^2, represent the mean of three replicates.

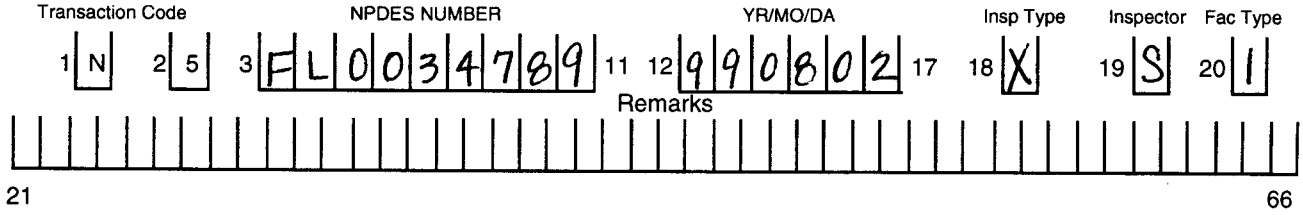
	Control Site	Test Site
Acariformes		
Hygrobates sp.	1	1
Amphipoda		
Hyalella azteca	2	4
Coleoptera		
Microcylloepus pusillus	41	60
Stenelmis sp.	59	76
Undetermined Elmidae	37	81
Diptera		
Asheum beckae	7	2
Chironomus sp.	5	4
Cricotopus bicinctus grp.	2	–
Cryptochironomus sp.	–	1
Dicrotendipes modestus	2	2
Dicrotendipes neomodestus	2	–
Dicrotendipes sp.	–	1
Glyptotendipes sp.	1	1
Goeldichironomus carus	1	–
Goeldichironomus natans	1	–
Nanocladius sp.	3	–
Paratanytarsus dissimilis	1	–
Paratanytarsus sp.	1	–
Pentaneura inconspicua	36	38
Polypedilum convictum grp.	22	30
Polypedilum halterale grp.	1	–
Polypedilum illinoense grp.	27	14
Polypedilum scalaenum grp.	7	3
Polypedilum sp.	1	–
Rheotanytarsus distinctissimus grp.	2	–
Rheotanytarsus exiguus grp.	1	1
Stenochironomus sp.	64	47
Tanytarsus sp. C Epler	1	–
Tanytarsus sp.	2	–
Thienemanniella sp. A Epler	9	–
Thienemanniella sp. D Epler	4	10
Thienemanniella sp.	5	–
Undetermined Chironomidae	26	24
Ephemeroptera		
Caenis sp.	3	–
Gastropoda		
Ferrissia sp.	–	1
Pyrogophorus platyrachis	1	–

Undetermined Ancylidae	19	12
Undetermined Gastropoda	1	–
Undetermined Hydrobiidae	1	1
Undetermined Planorbidae	–	1
Odonata		
Argia sedula	–	3
Argia sp.	3	1
Enallagma	1	1
Undetermined Coenagrionidae	1	1
Oligochaeta		
Bratislavia unidentata	–	1
Dero digitata complex	2	–
Dero lodeni	–	1
Dero pectinata	2	–
Haber speciosus	–	1
Nais communis complex	–	2
Pristina aequiseta	1	–
Pristina leidyi	1	–
Pristina sp.	1	–
Pristina synclites	1	–
Pristinella osborni	1	1
Slavina appendiculata	1	–
Undetermined Naididae	1	–
Pelecypoda		
Corbicula fluminea	–	1
Trichoptera		
Cheumatopsyche sp.	78	84
Undetermined Hydropsychidae	10	9
Undetermined Trichoptera	–	4

Benthic macroinvertebrate taxa list for Mid-County Services WWTP, collected via 20 discrete dip net sweeps in Curlew Creek, on 05 August, 1999.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	10	2
Undetermined Amphipoda	1	3
Coleoptera		
Microcylloepus pusillus	6	32
Stenelmis sp.	7	9
Undetermined Elmidae	9	2
Collembola		
Undetermined Collembola	1	–
Diptera		
Ablabesmyia rhamphe grp.	–	1
Chironomus sp.	–	1
Larsia sp.	1	–
Paracladopelma sp.	–	1
Pentaneura inconspicua	15	19
Polypedilum convictum grp.	2	11
Polypedilum illinoense grp.	20	12
Polypedilum scalaenum grp.	1	–
Undetermined Chironomidae	6	4
Ephemeroptera		
Caenis sp.	2	2
Gastropoda		
Melanoides sp.	5	8
Planorbella sp.	1	–
Pyrogophorus platyrachis	5	–
Undetermined Hydrobiidae	1	2
Hemiptera		
Rhagovelia sp.	2	3
Odonata		
Argia sp.	2	1
Enallagma sp.	4	2
Ischnura sp.	1	–
Undetermined Coenagrionidae	18	5
Oligochaeta		
Limnodrilus hoffmeisteri	3	–
Pelecypoda		
Corbicula sp.	–	2
Trichoptera		
Cheumatopsyche sp.	5	34
Nectopsyche tavara	1	–
Undetermined Hydropsychidae	3	–
Undetermined Hydroptilidae	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)

