

Biological Assessment of

Punta Gorda WWTP

Charlotte County

NPDES #FL0039055

Sampled August 1998

March 1999

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: Punta Gorda WWTP
County: Charlotte
NPDES Number: FL0039055
Permit Expiration Date: 21 September 1999

Toxics Sampling Inspection (XSI)

Date Sampled: 31 August 1998

Results: Iron was detected in the effluent (32.30 µg/L) at a level that exceeded Class III water quality standards (Rule 62-302.530(39) FAC). No organic pollutants were detected in the effluent.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 31 August 1998

Results: The effluent sample was not toxic to the fish, *Cyprinella leedsi* and *Menidia beryllina,* or to the invertebrates, *Ceriodaphnia dubia* and *Americamysis bahia,* during 48-hour static, screening bioassays.

Impact Bioassessment Inspection (IBI)

Date Sampled: 31 August 1998

Results: The changes in phytoplankton and macroinvertebrate community health may be attributed to the elevated conductivity, iron, and total phosphorus levels in the effluent and at the test site. There were slight declines in macroinvertebrate taxa richness, the Florida Index, the EPT Index, and the composite SCI score at the test site compared to the control site. The SCI decreased slightly from 23 points at the control site to 21 points at the test site, placing the sites in the middle and lower range of the "good" category, respectively. The test site phytoplankton community saw similar reductions in taxa richness and diversity and increases in algal density and chlorophyll *a* as a result of the facility's input.

Water Quality Inspection (WQI)

Date Sampled: 31 August 1998

Results: The extremely high conductivity levels at the test site (2,113 µmhos/cm) exceeded Class III water quality standards (Rule 62-302.530(23) FAC). Effluent total nitrogen, ammonia, total phosphorus, and ortho-phosphate appeared to contribute to nutrient enrichment at the test site, relative to the control site. For example, total phosphorus increased from 0.021 mg/L at the control site to 0.47 mg/L at the test site, exceeding values found in 80% of Florida's streams. AGP values at the control test sites did not exceed the 5 mg dry wt/L "problem threshold".

This Biological Assessment was prepared by DEP staff to provide information to be used in reviewing an NPDES permit renewal application for the subject facility. This assessment will be used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The Punta Gorda Wastewater Treatment Plant is located in Charlotte County, Florida (see maps in the Appendix). This 3.2 MGD Type I wastewater treatment plant discharges chlorinated effluent to a 525-acre spray irrigation site with an underdrain discharge that allows effluent to drain into perimeter ditches around the spray system. The perimeter discharge flows intermittently into the Class III Myrtle Slough, which flows into Shell Creek and ultimately into the Peace River. The flow during the survey was 1.5 MGD.

State permit limits for the Punta Gorda WWTP are listed in Table 1. According to the Facility Summary (Appendix), the plant has continuously violated conductivity/chloride standards for Class III waters. In addition, Punta Gorda's Discharge Monitoring Reports (DMRs) for September, 1993, through January, 1995, indicate effluent violations of total suspended solids; DMRs for January, March, April, and June through October, 1993, and July and September, 1994, document effluent violations of dissolved oxygen concentrations; DMRs for September through December, 1993, list violations of the maximum fecal coliform bacteria levels; and DMRs for February and March, 1994, indicate maximum pH effluent violations

In July, 1996, the DEP South District sampled macroinvertebrates in Myrtle Slough. The results indicated a 47% reduction in species richness, a 55% reduction in the Florida Index, and a 39% reduction in Shannon-Weaver diversity compared to earlier sampling results in Myrtle Slough. These reductions were thought to be a result of the chronic discharges of high conductivity/chlorides contained in the facility's effluent.

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 the East Branch of Myrtle Slough at County Road 74) and a test site (located in the West Branch of Myrtle Slough at County Road 74 downstream of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. The effluent was analyzed for nutrients, metals, and for organic constituents (base neutral and acid extractables, and pesticide extractables). Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening toxicity bioassays, using the invertebrates, *Ceriodaphnia dubia* and *Americamysis bahia*, and the fish, *Cyprinella leedsi* and *Menidia beryllina*, as test organisms, were performed on an effluent sample.

Benthic macroinvertebrate communities were evaluated at control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip-net sweeps. Normally, additional invertebrate collections would be made using Hester-Dendy multiplate samplers that are incubated for 28 days. However, due to time constraints, the samplers were not set out.

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 Stream Condition Index (SCI). For a discussion of each of these measures see the *Explanation of Measurements of Community Health* in the Appendix.

Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities. Normally, periphyton would be sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days. In this case, the periphytometers were not set out. *Selenastrum capricornutum* was used as the test organism for the algal growth potential tests. All field and laboratory biological methods were carried out following Biology Section Standard Operating Procedures (SOP's). The latest version of the SOP's can be viewed on our web site: 'www.dep.state.fl.us/labs/sops.htm'.

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, the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the control site minus test site divided by the

Table 1. Effluent limits and summary of chemistry data.

Punta Gorda WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)				
	-	None Detected	-	-
Metals (µg/L)				
Aluminum	1,500 **	82 I	-	-
Arsenic	50 **	20 U	-	-
Cadmium	3.58 **b	0.06 I	-	-
Chromium	686 **b	10 U	-	-
Copper	41.3 **b	1.4 I	-	-
Iron	1,000**	3,230 A	-	-
Lead	20 **b	0.25 A	-	-
Mercury	0.012 **	0.1 U	-	-
Nickel	544 **b	6.0 U	-	-
Selenium	5.0 **	30 U	-	-
Silver	0.07 **	0.07 I	-	-
Zinc	366 **b	17 I	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	0.16 A	0.004 UQ	0.076 Q
Total phosphorus	-	1.0 I	0.021 I	0.47
Ammonia	0.70 *a	0.13 A	0.019 I	0.11
Nitrate+Nitrite	-	0.024 I	0.004 U	0.024
TKN	-	1.5	0.92	1.7
Total Nitrogen	-	1.52	0.92	1.7
General Phys-Chem Parameters				
Habitat Assessment	-	-	151	141
D.O. (mg/L)	≥ 1.5 *	3.9	5.6	4.1
pH (SU)	6.0 - 8.5 *	6.9	7.3	7.0
Conductivity (µmhos/cm)	**	2,235	95	2,113
Temperature (°C)	-	28.3	29.6	28.4
C.B.O.D., 5 day (mg/L)	7.5 *c	6.1	-	-
T.S.S. (mg/L)	30 c	13.7		
Flow (MGD)	3.2	1.5	-	-
Hardness (mg $CaCO_3$)	-	431.8	-	-
AGP (mg dry wt/L)	-	2.8	0.3	1.8
Toxicity (48-hour static, screening bioassays)				
C. leedsi	-	Not Toxic	-	-
M. beryllina	-	Not Toxic	-	-
C. dubia	-	Not Toxic	-	-
A. bahia	-	Not Toxic	-	-

a - Daily maximum
b - Hardness based
c - Monthly average
* Permit limit
** Class III water quality standard
A - Value is the mean of two or more determinations
I - Value is < the practical quantitation limit, and ≥ the minimum detection limit
Q - Sample held beyond normal holding time
U - Analyzed for but not detected; value reported is the minimum detection limit

control site. The percent differences between sites involving 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: Andrew Barienblock, Ford Walton, Bob Rutter, (DEP South District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Scott Lashbrook, Michael Heyn, Elizabeth Miller, Urania Quintana, Johnny Richardson, Lisa Tamburello, Steve Wolfe, David Whiting, and Vicki Whiting (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.

Results

The results for this facility are presented in Table 1 and Table 2.

Discussion

Conductivity increased over 2,000% at the test site (2,113 µmhos/cm) compared to the control site (95 µmhos/cm). The extremely high conductivity level at the test site exceeded Class III water quality standards (Rule 62-302.530(23) FAC).

Iron (3,230 µg/L) was detected in the effluent at a level that exceeded Class III water quality standards (Rule 62-302.530(39) FAC). All other metals were in compliance.

Effluent total nitrogen, ammonia, total phosphorus, and orthophosphate appeared to contribute to

Table 2. Community structure of control and test sites.

Punta Gorda WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	20	19
Florida Index	10	7
SCI	25	21
EPT Index	6	1
% Dominant Taxon	39	42
Community Composition		
% Amphipoda	0	24
% Coleoptera	17	17
% Diptera	55	13
% Ephemeroptera	18	1
% Gastropoda	1	42
% Odonata	3	2
% Trichoptera	5	0
% Other	2	1
Functional Feeding Groups		
% Predators	5	5
% Burrowing Deposit Feeders	1	1
% Surface Deposit Feeders	24	16
% Suspension Feeders/Filterers	44	21
% Scrapers	16	50
% Shredders	6	3
Phytoplankton Algae		
Number of Taxa	16	13
Shannon-Weaver Diversity	3.4	2.9
Chlorophyll *a* (µg/L)	1.00 U	2.27 I
Algal Density (#/mL)	718	3,270
% Blue-green	3	5
% Green	49	41
% Cryptophyceae	29	20
% Dinophyceae	14	0
% Diatoms	1	33
AGP (mg dry wt/L)	0.3	1.8

I - Value reported is < the practical quantitation limit, and ≥ the MDL.

U - Analyzed for but not detected; value reported is the MDL.

the nutrient enrichment at the test site (Table 1). For example, total phosphorus increased over 2,000% from the control site (0.021 mg/L) to the test site (0.47 mg/L), exceeding values found in 80% of Florida's streams (see *Typical Values for Selected Parameters in Florida Waters* in Appendix). AGP values at both the control site and the test site were below the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Figure 1 represents changes in the algae community. Phytoplankton taxa richness declined by 19% and the diversity declined 15% from the control site to the test site (Table 2). Diatoms mac up 33% of the community at the t site and only 1% at the control site. Dinophyceae made up 14% of the community control site and were not found at the test site. Algal density increased dramatically from 718 cells/ml at the control site to 3,270 cells/ml at the test site. Chlorophyll *a* was undetected at the control site and 2.27 µg/L at the test site, which was less than the minimum quantitation limit, but greater than or equal to the minimum detection limit. These changes in the phytoplankton algal community may be due to the elevated nutrients at the test site.

Figure 2 represents changes in the benthic macroinvertebrate community. Habitat quality was "optimal" at both the control and test sites (see Habitat Assessment Field Data Sheets in Appendix). Most of the macroinvertebrate community measures were slightly lower at the test site, probably as a result of the facility's discharge (Table 2). Slight declines were measured in the Florida Index and total number of taxa. The EPT Index decreased significantly from 6 taxa at the control site to only 1 taxa at the test site, a decline of 83%. The SCI score decreased from 23 points at the control site to 21 points at the test site, placing the sites in the middle and lower range of the "good" category, respectively.

The community composition at the test site changed a great deal from that of the control site (Table 2). For example, gastropods made up 42% of the community at the test site and only 1% of the control site.

Estuarine amphipods, such as *Corophium* sp. and *Melita* sp., made up 24% of the test site community and were completely absent from the control site. Suspension feeders, normally indicators of good water quality, made up 44% of the community at the control site and only 21% of the test community. These changes in community composition can probably be attributed to the elevated conductivity levels at the test site.

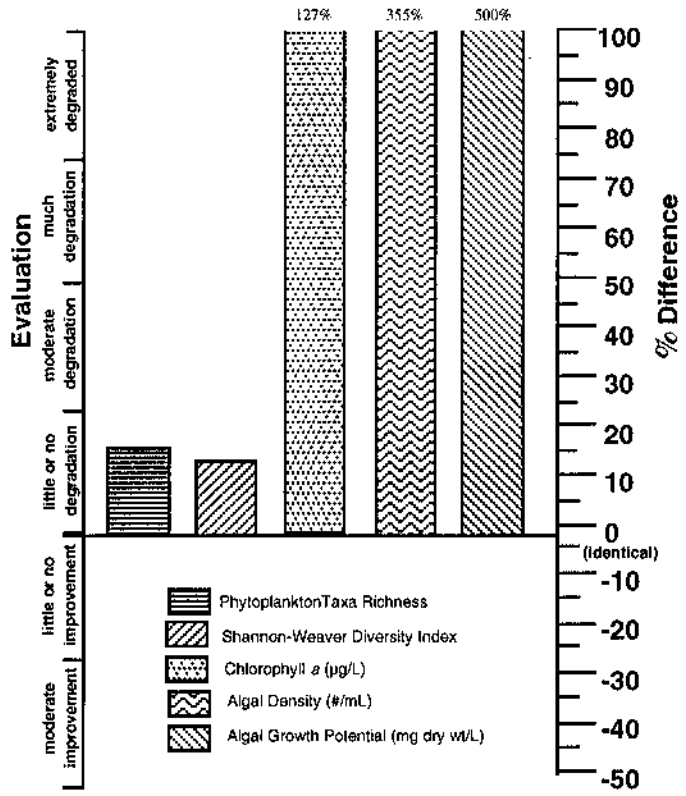


Figure 1. Effect of discharge on the algal community.

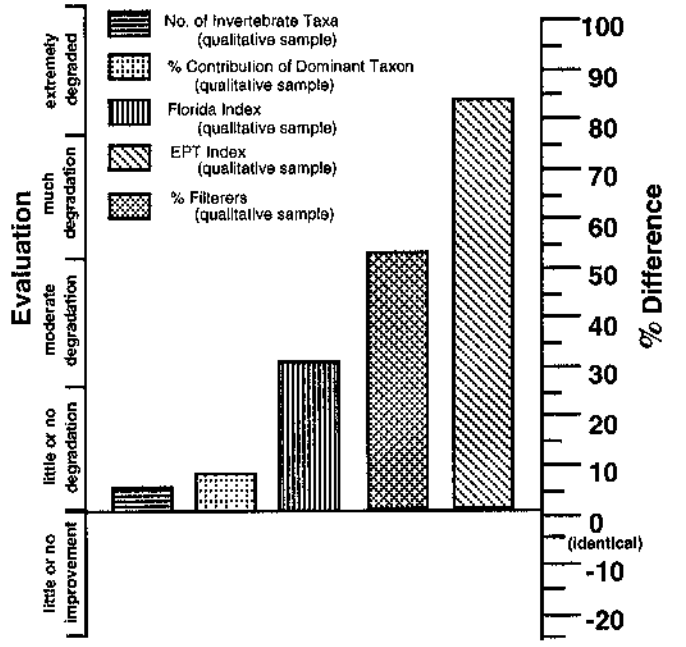


Figure 2. Effect of discharge on the benthic ommunity.

Literature Cited

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

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

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

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

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

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

Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Explanation of Measurements of Community Health

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

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

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

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa.

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

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

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation.

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

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

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

Typical Values for Selected Parameters in Florida Waters

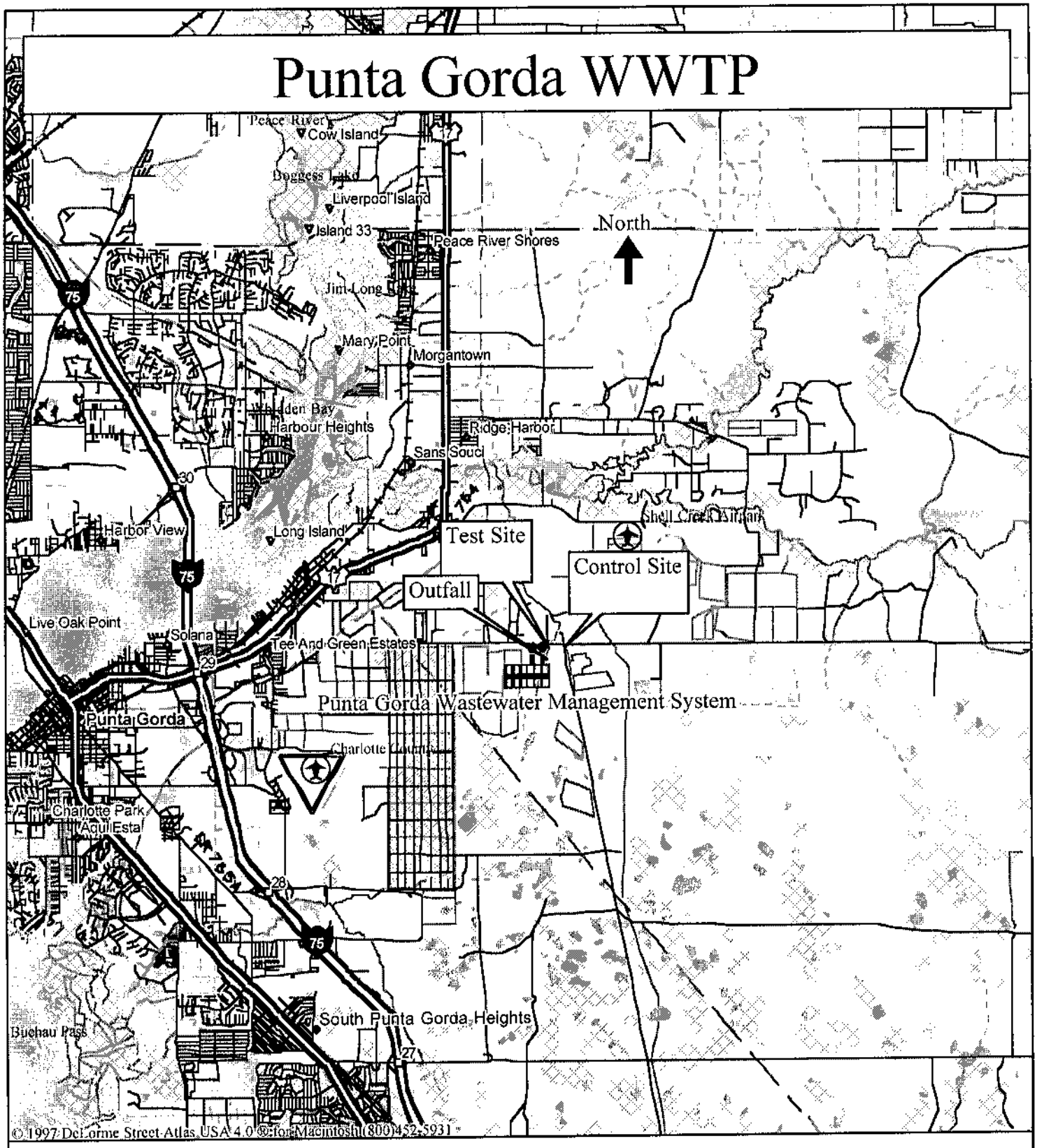
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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

Punta Gorda WWTP



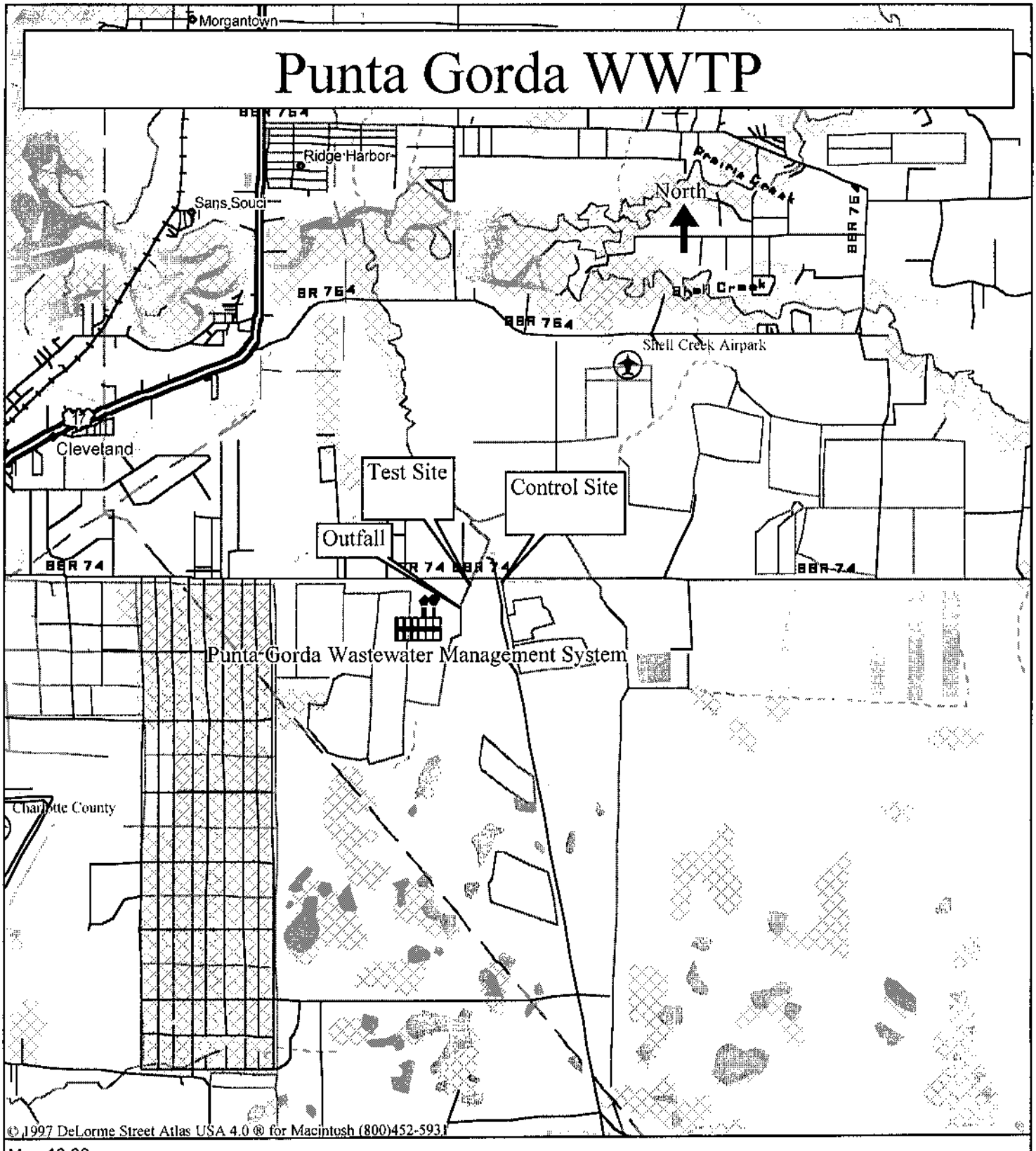
Mag 12.00
Mon Dec 28 10:55 1998
Scale 1:125,000 (at center)

2 Miles

2 KM

Local Road
Major Connector
State Route
Trail
Interstate/Limited Access
US Highway
Rest Area with facilities
Utility/Pipe
Railroad
County Seat

Punta Gorda WWTP



Mag 13.00
Mon Dec 28 11:02 1998
Scale 1:62,500 (at center)

1 Miles

2 KM

Local Road
Major Connector
State Route
Trail
Interstate/Limited Access
US Highway
Utility/Pipe
Railroad
Small Town
Airfield

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Punta Gorda WWTP		Date Summary Prepared: 8-17-98
Location (attach detailed map):	County: Charlotte	District: South
Federal Permit # FL0039055 and expiration date: 9AD 95-025	State GMS # and OGC Case W-164 State expiration date: 1-31-98	Facility Type: I Industrial Municipal Federal Agricultural Other (list):

Function of facility: Facility is a Municipal domestic wastewater treatment facility

Description of treatment process: Extended aeration treatment process with chlorinated effluent land applied via restricted access spray irrigation. Surface water discharge from underdrains below the spray irrigation system.

Receiving waters: Myrtle Slough	Classification: I II (III)	
Design Flow: 3.2 MGD	Mean Flow:	Flow during survey: ≈ 1.5 MGD

Discharge is: Continuous (Intermittent) Seasonal Rainfall dependent
Other (describe) Discharge is dependent on ground water levels underdrains beneath the spray field drain water which is then pumped by gravity feed to Myrtle Slough.
therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):
No mixing zone. However, there is a site specific Alternative Criteria for Dissolved Oxygen 1.5 mg/L limit

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

Parameter	Limit (units)
See attached CO & NPDES Permit	
However facility is not meeting the requirements of Grizzle-Egg - Rasmussen given a permit to do upgrade. The most recent indication is that the facility will be required to abandon this discharge due to numerous problems.	not meeting the requirements due to the fact facility

Describe special permit conditions and permit modifications:
See above

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Punta Gorda WTP
(Facility)

Description of permitted outfall(s):
The permitted outfall D001 is a combination of gravity flow and pump discharge. Underdrains below the spray irrigation system allow effluent to drain into perimeter ditches around the spray system. The effluent flows to Myrtle Slough by gravity. In the event that water levels in the perimeter ditch are too high effluent is pumped by a discharge pumping facility

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:
Continuously violating conductivity/chloride standards
for class III waters Chlorides Avg 3500

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
In July of 1996 the South District Biological Section conducted Macroinvertebrate sampling in Myrtle Slough. The results of this study indicated that there has been a 47% reduction in species richness, a 55% reduction in the Florida Index, and a 39% reduction in the Shannon-Weaver diversity. These changes are thought to be a result of the chronic discharge of high conductivity/chlorides contained in the facility effluent. Therefore, the Department has requested that the surface water discharge be moved to a more compatable area or eliminated. Studies have indicated that there is no compatible area for direct discharge therefore elimination of the discharge is required.

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):

(Biologist)

Andrew Bannbach (Inspector)

(Engineer)

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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: 21020553 NEW STATION	DATE (M/D/Y): 8-31-98	TIME: 1245	RECEIVING BODY OF WATER: SHELL CREEK

REMARKS:	COUNTY: CHARLOTTE	LOCATION: PUNTA GORDA WWTP REFERENCE STREAM – MYRTLE SLOUGH, EAST BRANCH @ CR74	FIELD ID/NAME: DW-083198-4

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		50					

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: 10 — List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 2.0 (m above present water level) + 1.0 (present depth in m) = 3.0 (m above bed)

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

m wide			
	m/s	m/s	m/s
	m deep	m deep	m deep

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10 ✓	4 IIII		Sand 37	✓	4 IIII	
Leaf Packs or Mats	3 ✓	4 IIII		Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble	40 ✓	4 IIII		Other:			
Undercut banks/Roots	10 ✓	4 IIII		*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								0.9 VOB
Mid-depth 1'		29.6	7.3	5.0	93			
Bottom								

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

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☑ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes: LOWER THAN NORMAL WATER LEVEL

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

SAMPLING TEAM: WALTON / RUTTER	SIGNATURE: aswalton	DATE: 8-31-98

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:
	NEW STATION	8-31-98	SHOAL CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
		PUNTA GORDA WWTP REFLOW STREAM – MYRTLE SLOUGH, EAST BRANCH @ CR 74	DW-083198-4

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components				
Substrate Diversity [20]	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 [20]	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 [20]	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 [20]	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
Primary Score [80]				
Secondary Habitat Components				
Artificial Channelization [20]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [9] Left Bank [9]	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 [8] Left Bank [5]	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 [10] Left Bank [10]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 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 [71]				

TOTAL SCORE [151]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8-31-98	WALTON/RUTTER	alWalton

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:
	25-02-0529	8-31-98	1100	SHELL CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CHARLOTTE	PUNTA GORDA WWTP - TEST STREAM - MYRTLE SLOUGH, WEST BRANCH @ CR 74	DW-083198-3

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)
25		75					

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: 20

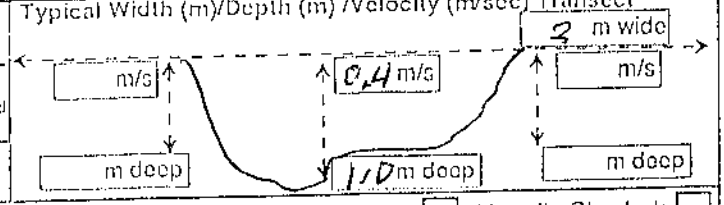
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 1.25 (m above present water level) + 1.0 (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)	✓15	4 IIII		Sand	✓73	4 IIII	
Leaf Packs or Mats	✓5	4 IIII		Mud/Muck/Silt			
Aquatic Vegetation	✓2	4 IIII		Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	✓5	4 IIII					

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								0.2
Mid-depth/'		28.4	7.0	4.1	2113			
Bottom								

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

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☑ → Opaque: ☑

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:
water level went up while sampling
as did turbidity ... odor

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

SAMPLING TEAM: WALTON / RUTTER

SIGNATURE: aSWalton

DATE: 8-31-98

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:
	25-02-0529		SHELL CREEK

REMARKS:	COUNTY:	LOCATION: PUNTA GORDA WWTP-TEST STREAM - MYRTLE SLOUGH, WEST BRANCH @ CR 74	FIELD ID/NAME: DW-083198-3

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity [19]	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 [14]	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 [20]	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 [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
Primary Score [71]				
Secondary Habitat Components Artificial Channelization [20]	No artificial channelization or dredging. Stream with normal, sinuous pattern (20) 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [9] Left Bank [7]	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 [10] Left Bank [10]	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 [8] Left Bank [8]	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 [70]				

[141] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08-31-98	WALTON	aswalton

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Punta Gorda WWTP
County: Charlotte
Contact / District: A.S. Walton / South
NPDES Permit #: FL00 39055
LIMS Sample #: 342764 **LIMS Job #:** TLH-1998-09-01-01
sample log 9/15/98 DW

Sample Collection: Date 8/31/98 Time 10:45
Test Beginning: Date 9-1-98 Time 1530
Test Ending: Date 9-3-98 Time 1500
Organism Batch #: 38 **Diluent Batch #:** 39
Organism Age: <24 hours SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

Remarks:

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 4
Incubator #1 Temperature Range = 23.5°C – 24.7°C
Room Temperature Range = 24.9°C – 26.0°C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Control A	A	5	5	5	8.2		8.0	24.5		25.2	7.4		7.5	2.70		2.00
Control B	B	5	5	5			8.0			25.2			7.6			1.80
Control C	C	5	5	5			8.0			25.2			7.6			1.85
Control D	D	5	5	5			8.0			25.2			7.6			1.90
100% A	A	5	5	5	7.7		8.4	24.5		25.1	7.5		7.7	2.75		2.55
100% B	B	5	4 im	3 im			8.4			25.2			7.7			2.40
100% C	C	5	5	5			8.5			25.3			7.7			2.92
100% D	D	5	5	5			8.5			25.3			7.7			2.98
measured by:		FW	FW	DAW	FW		DAW	FW		DAW	FW		DAW	FW		DAW
recorded by:		DAW	FW	DAW	FW		CH	MF		CH	MF		CH	MF		CH

Investigators' Signatures
Marshall Faircloth
Tyson Swanbeck
David M. Wainright
Candace Hess

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NM	NM	NM	NM
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR/100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	—	72	181	Hach	DAW	FW
Hardness (mg/L as $CaCO_3$):	—	91	449	Hach	DAW	FW
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	FW	FW
Salinity:	—	—	1.4‰	YSI	FW	FW

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Punta Gorda WWTP
County: Charlotte
Contact / District: A.S. Walton / South
NPDES Permit #: FL0039055
LIMS Sample #: 342761 LIMS Job #: TLH-1998-09-01-01
sample log 9/1/98 ow
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 4
Incubator #3 Temperature Range = 25.0°C - 25.5°C.
Room Range = 24.9°C - 26.0°C.

Sample Collection: Date 8/31/98 Time 10:45
Test Beginning: Date 9-1-98 Time 1530
Test Ending: Date 9-3-98 Time 1500
Organism Batch #: 66 Diluent Batch #: well H_2O
Organism Age: 9 days SRT toxicant batch #: NA
Test organism: Cyprinella leedsi
Remarks:

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 24 h	UNCORRECTED 48 h
Control A	E1	5	5	5	8.0	8.0	8.5	24.4	25.0	25.1	7.7	7.3	7.2	0.25	0.26	0.26
Control B	E2	5	5	5	8.0	8.0	8.5	24.4	25.0	25.5	7.8	7.6	7.4	0.26	0.27	0.29
Control C	E3	5	5	5	8.0	8.0	8.5	24.3	25.3	25.6	7.7	7.3	7.2	0.26	0.27	0.28
Control D	E4	5	5	5	8.0	8.1	8.6	24.0	25.7	25.9	7.7	7.3	7.5	0.26	0.27	0.29
100% A	E5	5	5	5	7.5	8.0	8.4	24.7	25.2	25.8	7.9	7.4	7.1	2.71	2.73	2.90
100% B	E6	5	5	5	7.5	8.0	8.4	24.8	25.0	26.3	7.9	7.3	7.4	2.81	2.86	3.02
100% C	E7	5	5	5	7.5	8.0	8.4	24.8	25.2	26.0	7.9	7.4	7.1	2.88	2.89	3.02
100% D	E8	5	5	5	7.5	8.0	8.5	24.4	25.5	26.1	7.9	7.4	7.4	2.83	2.90	3.07
measured by:		FW	FW	CH	FW	FW	DAW	FW	FW	DAW	FW	FW	DAW	FW	FW	DAW
recorded by:		DAW	FW	CH	MF	FW	CH	MF	FW	CH	MF	FW	CH	MF	FW	CH

Investigators' Signatures
Marshall Faircloth
Daniel R. Warrington
Courtney Head

Water Quality Parameters	Salt Water / (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NM	NM	NM	NM
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR 700	CH	FW
Alkalinity (mg/L as $CaCO_3$):	124	—	161	Hach	DAW	FW
Hardness (mg/L as $CaCO_3$):	115	—	449	Hach	DAW	FW
Total ammonia (mg/L as N):	<0.017	—	<0.017	orion	FW	FW
Salinity:	—	—	1.4‰	YSI	FW	FW

reviewer

form updated 5/22/98

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Punta Gorda WWTP
County: Charlotte
Contact / District: A.S. Walton / South
NPDES Permit #: FL0039055
LIMS Sample #: 342764 LIMS Job #: TLH-1998-0901-01
sample log 9/15/98 ow
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 34 of 4
MF Inverrit Test # 9-1-98

Sample Collection: Date 8/31/98 Time 10:45
Test Beginning: Date 9-1-98 Time 1530
Test Ending: Date 9-3-98 Time 1500
Organism Batch #: 33 Diluent Batch #: 31
Organism Age: 11 days SRT toxicant batch #: NA
Test organism: Menidia beryllina

Incubator #3 Temperature Range = 25.0°C - 25.5°C.
Room Range = 24.9°C - 26.0°C.

Remarks: Cont ASW = Control prepared by the dilution of aged 20‰ 40 fathom artificial saltwater to 2.4‰ salinity.
Cont 40F = Control prepared by adding 40 fathoms Seasalts to well water to reach a salinity of 2.4‰.
100% to 2.4‰ prepared by adding 40 fathom SeaSalts to 100% sample.

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Cont ASW A	A1	5	5	5	8.2	8.2	8.4	24.8	24.9	24.9	7.5	6.6	6.9	4.24	4.24	4.59
Cont ASW B	A2	5	5	5	8.2	8.2	8.4	24.5	24.7	24.8	7.7	6.7	7.0	4.35	4.46	4.59
Cont ASW C	A3	5	5	5	8.2	8.2	8.4	24.6	24.8	24.9	7.9	7.0	7.0	4.37	4.53	4.61
Cont ASW D	A4	5	5	5	8.2	8.2	8.4	24.5	24.8	24.9	8.0	7.0	7.5	4.35	4.50	4.72
Cont 40F A	A5	5	5	5	8.2	8.2	8.4	24.6	24.9	24.8	7.7	7.0	7.3	4.38	4.49	4.54
Cont 40F B	A6	5	5	5	8.2	8.2	8.4	24.6	25.1	24.8	7.7	6.9	7.5	4.38	4.49	4.64
Cont 40F C	A7	5	5	5	8.2	8.2	8.4	24.6	25.0	24.6	7.7	6.9	7.4	4.39	4.52	4.61
Cont 40F D	A8	5	5	5	8.2	8.2	8.4	24.6	24.9	24.3	7.7	7.0	7.4	4.33	4.52	4.58
100% to 2.4‰ A	A9	5	5	5	7.6	8.2	8.5	25.0	24.9	24.4	7.6	7.0	7.5	4.40	4.40	4.53
100% to 2.4‰ B	A10	5	5	5	7.6	8.2	8.4	25.0	24.9	24.3	7.6	7.1	7.5	4.40	4.37	4.50
100% to 2.4‰ C	A11	5	5	5	7.6	8.2	8.5	25.0	25.0	24.5	7.6	7.0	7.7	4.40	4.46	4.61
100% to 2.4‰ D	A12	5	5	5	7.6	8.2	8.5	25.0	25.2	24.7	7.6	6.9	7.6	4.41	4.49	4.63
measured by:		DAW	DAW	CH	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW
recorded by:		FW	DAW	CH	FW	FW	CH	FW	FW	CH	FW	FW	CH	FW	FW	CH

Investigators' Signatures

Marshall Faircloth
Tonia Walton
Brian T. Wanninkhof
Century Hall

reviewer

form updated 5/22/98

Water Quality Parameters	Salt Water ASW / 40F	Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):				NM	NM	NM	NM
Lab Total Residual Cl2 (mg/L):	<0.03/NM		—	<0.03	DR-700	CH	FW
Alkalinity (mg/L as $CaCO_3$):	131/132		—	181	Hach	DAW	FW
Hardness (mg/L as $CaCO_3$):	NM		—	449	Hach	DAW	FW
Total ammonia (mg/L as N):	<0.017/<0.017		—	<0.017	Orion	FW	FW
Salinity:	2.4‰/2.4‰		—	1.4‰	YSI	FW	FW

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Punta Gorda WWTP
County: Charlotte
Contact / District: A.S. Walton / South
NPDES Permit #: FL0039055
LIMS Sample #: 342764 LIMS Job #: TLH-1998-09-01-01
sample log 9/15/98 DW
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 4 of 4
Incubator #3 Temperature range = 25.0°C-25.5°C. Room range = 24.9°C-26.0°C.

Sample Collection: Date 8/31/98 Time 1045
Test Beginning: Date 9-1-98 Time 1530
Test Ending: Date 9-7-98 Time 1508
Organism Batch #: 230 Diluent Batch #: 31
Organism Age: 4days SRT toxicant batch #: NA
Test organism: Americamysis bahia

Remarks: Control ASW = aged 40 fathoms artificial seawater diluted with well water to 10‰ salinity. Control 40f = well water with 40 fathoms artificial seasalts added to a salinity of 10‰. 100% to 10‰ = 100% sample with 40 f seasalts added to a salinity of 10‰.

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control ASW A	A13	5	5	5	8.4	8.2	8.3	24.7	25.2	26.0	7.2	5.8	6.6	4.34	16.19	17.8
Control ASW B	A14	5	5	5	8.4	8.2	8.3	24.7	25.0	26.0	7.2	5.8	6.6	4.35	16.81	17.7
Control ASW C	A15	5	5	5	8.4	8.2	8.3	24.7	24.9	25.8	7.2	6.0	6.7	4.37	16.75	17.6
Control ASW D	A16	5	5	5	8.4	8.2	8.3	24.8	24.8	25.5	7.3	6.3	6.7	4.35	16.79	17.5
Control 40f A	A17	5	5	5	8.3	8.2	8.3	24.6	24.7	25.7	7.3	6.4	7.0	4.38	16.68	17.6
Control 40f B	A18	5	5	5	8.3	8.1	8.2	24.5	24.5	25.6	7.4	6.3	6.8	4.38	16.66	17.5
Control 40f C	A19	5	5	5	8.3	8.1	8.2	24.5	24.4	25.5	7.4	6.4	6.8	4.39	16.60	17.7
Control 40f D	A20	5	5	5	8.3	8.2	8.3	24.7	24.3	25.5	7.4	6.4	6.7	4.33	16.57	17.5
100% to 10‰ A	A21	5	5	5	7.9	8.1	8.3	25.0	24.4	25.9	7.2	6.5	6.9	4.40	16.60	18.1
100% to 10‰ B	A22	5	5	5	7.9	8.1	8.3	24.6	24.4	26.0	7.1	6.4	6.8	4.40	16.53	18.0
100% to 10‰ C	A23	5	5	5	7.9	8.1	8.3	24.6	24.3	26.0	7.0	6.4	6.6	4.40	16.33	17.3
100% to 10‰ D	A24	5	5	5	7.9	8.1	8.3	24.6	24.3	25.7	7.1	6.4	6.7	4.41	16.52	17.8
														16.12		
														16.62		
														16.67		
														16.56		
														16.33		
														16.45		
														16.40		
														16.51		
														16.34		
														16.55		
														16.63		
														16.62		
measured by:		DAW	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW	MF	DAW	DAW
recorded by:		FW	DAW	DAW	FW	FW	CH	FW	FW	CH	FW	FW	CH	FW	FW	CH

Investigators' Signatures
Marshall Faircloth
Dawn Albrecht

(A) Wrote conductivity for menidia by mistake. Correct readings are below the incorrect readings. FW 9/14/98

Water Quality Parameters	Salt Water Well Water ASW/40f	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NM	NM	NM	NM
Lab Total Residual Cl2 (mg/L):	<0.03/NM	—	<0.03	DR-100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	156/139	—	181	Hach	DAW	FW
Hardness (mg/L as $CaCO_3$):	NM/NM	—	449	Hach	DAW	FW
Total ammonia (mg/L as N):	<0.017/<0.017	—	<0.017	ORION	FW	FW
Salinity:	10‰/10‰	—	1.4‰	YSI	FW	FW

reviewer form updated 5/22/98

Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	20	≥26	25-14	<14	3
EPT Index	6	≥4	3-2	<2	5
# Chironomid Taxa	5	≥7	6-4	<4	3
% Contribution of Dominant Taxon	39	≤29	30-64	>64	3
% Diptera	55	-	≤37	>37	1
Florida Index	10	≥7	6-4	<4	5
% Suspension feeders/Filterers	44	-	≥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)

Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	19	≥26	25-14	<14	3
EPT Index	1	≥4	3-2	<2	1
# Chironomid Taxa	6	≥7	6-4	<4	3
% Contribution of Dominant Taxon	42	≤29	30-64	>64	3
% Diptera	13	-	≤37	>37	3
Florida Index	7	≥7	6-4	<4	5
% Suspension feeders/Filterers	21	-	≥7	<7	3
Total Score		**Peninsula**			**21**
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 (#/mL) for Punta Gorda WWTP, collected via subsurface grabs in receiving water, on 31 August, 1998.

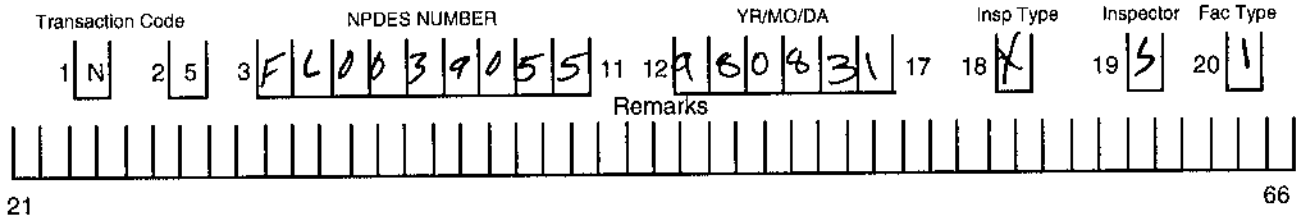
	Control Site	Test Site
Bacillariophyceae		
Centrales sp.	–	145
Cyclotella sp.	–	781
Eunotia sp.	–	29
Gomphonema sp.	–	29
Mastogloia sp.	8	–
Nitzschia sp.	–	87
Chlorophyceae		
Chlamydomonas sp.	39	347
Chlorella sp.	54	–
Chlorococcum sp.	23	–
Chlorogonium sp.	–	58
Crucigenia sp.	15	–
Dunaliella sp.	–	289
Mougeotia sp.	15	–
Oocystis sp.	77	87
Scenedesmus sp.	54	116
Staurastrum sp.	15	–
Tetraedron sp.	8	–
Undetermined Chlorophyceae	31	434
Undetermined Chlorophyta	23	–
Chrysophyceae		
Mallomonas sp.	–	29
Synura sp.	23	–
Cyanophyceae		
Dactylococcopsis sp.	15	174
Microcystis sp.	8	–
Cryptophyceae		
Chroomonas sp.	15	29
Cryptomonas sp.	123	434
Undetermined Cryptophyceae	69	203
Dinophyceae		
Undetermined Dinophyceae	100	–

Benthic macroinvertebrate taxa list for Punta Gorda WWTP, collected via 20 discrete dip net sweeps in Myrtle Slough, on 31 August, 1998.

	Control Site	Test Site
Amphipoda		
Corophium sp.	–	27
Melita sp.	–	7
Undetermined Amphipoda	–	1
Undetermined Corophiidae	–	4
Coleoptera		
Dubiraphia vittata	–	1
Elmidae	5	–
Hydrophilidae	1	–
Microcylloepus pusillus	8	5
Pelocoris sp.	–	1
Pelonomus obscurus	–	1
Stenelmis sp.	10	21
Diptera		
Ablabesmyia rhamphe grp.	1	5
Asheum beckae	–	3
Chironomidae	1	2
Cryptochironomus sp.	1	–
Dicrotendipes simpsoni	–	1
Dicrotendipes sp.	–	1
Palpomyia/Bezzia grp.	1	–
Polypedilum convictum grp.	11	1
Polypedilum illinoense grp.	6	6
Simulium sp.	54	1
Tanytarsus sp. C Epler	–	1
Tanytarsus sp. T Epler	1	–
Tanytarsus sp.	1	–
Ephemeroptera		
Baetidae	10	–
Caenis sp.	1	1
Choroterpes basalis	2	–
Labiobaetis sp.	3	–
Leptophlebiidae	3	–
Stenonema exiguum	6	–
Gastropoda		
Pyrogophorus platyrachis	–	67
Undetermined Gastropoda	1	1
Odonata		
Argia sp.	3	1
Ischnura sp.	1	2
Oligochaeta		
Eclipidrilus sp.	1	–
Undetermined Oligochaeta	–	2

Trichoptera		
Cheumatopsyche sp.	6	–
Oecetis persimilis	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)

