

Biological Assessment of

Town of Baldwin WWTP

Duval

NPDES #FL0027812

Sampled February 2000

December 2000

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Town of Baldwin WWTP
County:	Duval
NPDES Permit Number:	FL0027812
Permit Expiration:	November 13, 2000

Toxics Sampling Inspection **(XSI)**

Date Sampled: February 14, 2000

Results: Aluminum cadmium, copper, iron, lead, magnesium, nickel, and zinc were detected in the effluent at levels that complied with Class III water quality standards. Atrazine was detected in the effluent at a level less than the minimum quantitation limit and greater than the minimum detection limit.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: February 14, 2000

Results: The effluent sample was not toxic to the vertebrate *Cyprinella leedsi* or to the invertebrate *Ceriodaphnia dubia* during the 48-hour acute and chronic bioassays.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: February 14 & 15, 2000

Results: Qualitative macroinvertebrate data indicates that the test site is in the "good" category with 25 SCI points, and the control site is in the "excellent" category with 27 SCI points. Macroinvertebrate measures like the Florida Index, the EPT Index, and the % contribution of dominant taxa showed moderate improvement in the invertebrate communities at the test site compared to the control site. The periphyton data indicated degraded community conditions at the test site compared to the control site. For example, chlorophyll *a* increased by 200%, and AGP increased by 1625% at the test site compared to the control site, indicating nutrient enrichment at the test site due to the addition of effluent. Periphyton taxa richness decreased by 19% at the test site.

Water Quality Inspection **(WQI)**

Date Sampled: February 14, 2000

Results: Most nutrient concentrations were considerably higher at the test site compared to the control site. Test site levels of total phosphorus (2.1 mg/L), ortho-phosphate (1.9 mg/L), and nitrate+nitrite concentrations (17.0 mg/L) were higher than 95% of other typical Florida streams. The control site dissolved oxygen value (3.2 mg/L) failed to comply with Class III water quality standards (Rule 62-302.530(31) FAC).

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Town of Baldwin WWTP is in Duval County, Florida and is a 0.4 MGD domestic wastewater treatment plant (see locus map in the Appendix). Activities at this facility include extended aeration of wastewater with influent screening and grit removal, flow equalization, clarification, filtration, UV disinfection, and post aeration with discharge to surface waters. In addition to treating domestic wastewater, the facility accepts leachate from a nearby landfill. The effluent is intermittently discharged into a drainage ditch that flows into Class III Deep Creek, a tributary of St. Marys River. The mean flow during this survey was 0.196 MGD (See Facility Summary in the Appendix).

State permit limits for the effluent are listed in Table 1. A Florida Department of Environmental Protection (FDEP) review of the monthly operating reports from the Baldwin WWTP indicated several permit violations in the past year. In January 1999, there was a monthly average violation for total nitrogen (2.13 mg/L). In July 1999, there were monthly average violations for CBOD (9.5 mg/L), TSS (31.5 mg/L), and total nitrogen (4.89 mg/L). In October 1999, there was a monthly average violation for fecal coliforms (700 #/100 ml).

Methods

The purpose of this investigation was to determine the effects of the Baldwin WWTP wastewater discharge on the receiving waters in Deep Creek. The Baldwin WWTP was last inspected on June 30, 1999. To establish discharge effects, a comparison of biological community health was made between a control and test site. The control site was located in a drainage ditch 183 meters above the Point Of Discharge (POD) (see Map in Appendix). The test site was located in the same drainage ditch 183 meters below the POD. A Habitat Assessment was performed in situ establishing comparability between sites. Supplemental physical and chemical data were also collected from the effluent site and field sites. Effluent from the Baldwin WWTP was analyzed for nutrients, metals, and semi-volatile organics. Data for this report were collected on February 14 and 15, 2000.

Using the invertebrate species, *Ceriodaphnia dubia*, and the vertebrate species, *Cyprinella leedsi*, as test organisms, acute screening toxicity bioassays were conducted on an effluent sample. Bacterial populations were analyzed for total and fecal coliforms.

Benthic macroinvertebrate communities from all field sites were evaluated. Quantitative invertebrate collections were done using Hester-Dendy multiplate samplers incubated for 28 days. For qualitative measurements, the invertebrates were collected from different substrate types such as snags, leaf packs and aquatic vegetation using 20 discrete dip-net sweeps.

Sampling for periphyton was conducted at the two sites by incubating glass microscope slides in a standard periphytometer for 28 days. Phytoplankton were sampled by subsurface grabs. Chlorophyll *a* was determined for both phy-

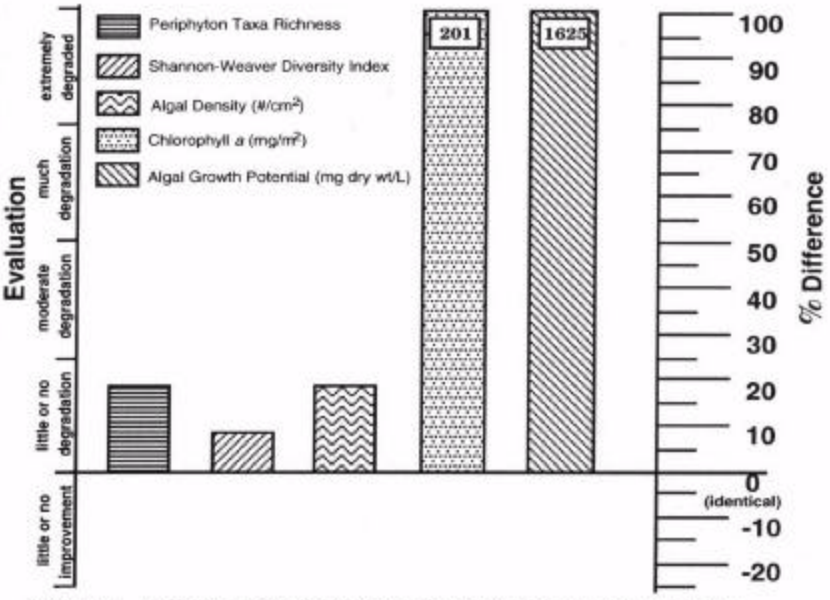


Figure 1. Effect of discharge on the periphyton community.

Table 1. Effluent limits and summary of chemistry data.

Baldwin WWTP	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
Atrazine	-	0.053 I	-	-
Metals (µg/L)				
Aluminum	≤ 1500 **	77 I	-	-
Arsenic	≤ 50 **	4.0 U	-	-
Cadmium	≤ 1.66 a	0.54	-	-
Chromium	309 a	0.70 U	-	-
Copper	17.97 a	9.6	-	-
Iron	1000 **	52	-	-
Lead	5.93 a	0.33 I	-	-
Magnesium	-	13.5	-	-
Mercury	0.012 **	-	-	-
Nickel	238.62 a	2.3 I	-	-
Selenium	5.0 **	1.2 U	-	-
Silver	0.07 **	0.030 U	-	-
Zinc	160.52 a	64	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	2.0	0.13	1.9
Total phosphorus	-	2.2	0.27	2.1
Ammonia	1.4 *	0.013 I	0.042	0.021
Un-ionized ammonia	0.02 **	0.00	0.00	0.00
Nitrate+nitrite	-	21 J	0.028	17
TKN	-	0.92	0.96	1.2
Organic Nitrogen	-	0.907	0.918	1.179
Total Nitrogen	-	21.92	0.988	18.2
General Phys-Chem Parameters				
Habitat Assessment Score	-	-	67	86
DO (mg/L)	> 7.0 *	10.2	3.2	9.3
pH (SU)	6.0 - 7.5 *	6.5	6.3	7.0
Conductivity (µmhos/cm)	1275 **	597	691	559
Temperature (°C)	30.0 *	19.6	16.9	19.7
CBOD, 5 day (mg/L)	6.4 *	2 K	3	2 K
Flow (MGD)	0.4 *	0.196	-	-
TSS (mg/L)	60 *	1	7	7
Turbidity (NTU)	-	0.3	7.5	1.7
Hardness (mg $CaCO_3$)	-	163.21	-	-
AGP (mg dry wt/L)	-	97.8	8.5	146.7
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	-	Not Toxic	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-
Microbiology (# counts/100ml)				
Fecal Coliforms	800 *	220	950	580
Total Coliforms	≤ 1000 **	700	3700 J	6080 J

* Permit limit
** Class III water quality standard
a - Value is calculated based on hardness
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit
J - Estimated value
K - Actual value is known to be less than value given
U - Material analyzed for but not detected; value reported is the minimum detection limit

toplankton and periphyton communities using laboratory spectrophotometer analyses. Algal Growth Potential (AGP) is measured via algal response of the test organism *Selenastrum capricornutum*. All field and laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's), which may be reviewed at floridadep.org/labs/sops.htm.

Nine measurements of macroinvertebrate and algal community health have been used to determine the effects of the discharge on those community assemblages in the receiving water. These measurements are: algal biomass; community composition; functional feeding groups; habitat assessment; taxa richness; Ephemeroptera-Plecoptera-Trichoptera (EPT) Index; Florida Index; Stream Condition Index (SCI); and Shannon-Weaver Diversity Index. For a brief review of each of these measurements, see Explanation of Measurements of Community Health in the Appendix.

For graphical purposes, the percent difference for: diatom to blue-green algae ratio, diversity index, number of taxa, EPT Index, Florida Index, and % filter-feeders is calculated as the control site minus the test site divided by the control site. The percent difference for algal density, algal growth potential, and chlorophyll *a* is calculated as the test site minus the control site divided by the control site.

The Florida Department of Environmental Protection personnel involved in this investigation were from the Northeast District: Pat O'Connor and Chris Mason and from the Central Biology Laboratory in Tallahassee: Lisa Bowman,

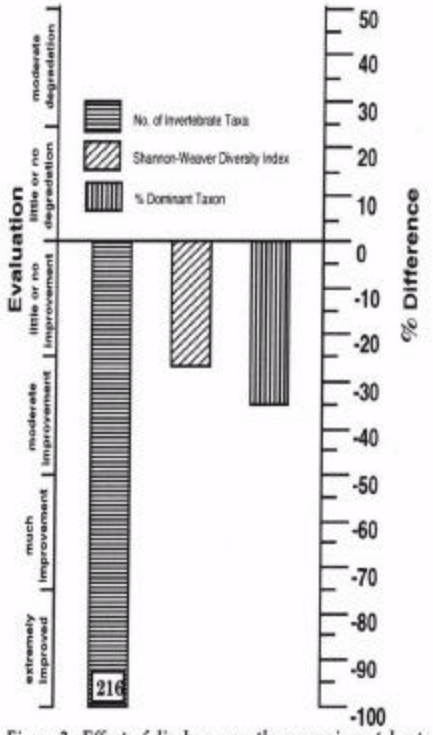


Figure 2. Effect of discharge on the macroinvertebrate community.

Scott Bryan, Rob Buda, Frank Butera, Melva Campos, Maosen Chen, Meiqin Chen, Darlene Ellis, Ken Espy, Marshall Faircloth, Shannon Gerardi, Mike Heyn, Joy Jackson, Isaura Lorenzo-Perez, Edwin Loschi, Elizabeth Miller, Chelsea Paparigian, Della Parker-Hanson, Urania Quintana, Johnny Richardson, Julie Riley, Gitta Schmitt, Karla Whiddon, and Steve Wolfe. The Point Source Studies Review Committee reviewed this report: Dr. Wayne Magley, Michael Tanski, Chuck Ziegmont, and District representatives.

Results

Habitat Assessment scores placed the control site (with 67 points) in the "marginal" category and the test site (with 86 points) in the "suboptimal" category (see Habitat Assessment Data Sheets in Appendix). The control site had a lower primary and secondary score compared to the test site. The water velocity at the control site was significantly slower (<0.01 m/s) than that of the test site (0.3 m/s) and accounted for much of the difference in the scores between the two sites. The remaining results are in Tables 1-3.

Discussion

The conductivity values appeared elevated at both study sites; however, the control site value (691 µmhos/cm) exceeded that of the test site (559 µmhos/cm) a possible indication of non-point sources of pollution. The effluent conductivity was 597 µmhos/cm. The water temperature at the test site (19.7°C) was several degrees higher than that of the control site (16.9°C). The effluent water temperature was 19.6°C and appears to be the source of this increase (see Table 1 and Physical/Chemical Characterization Field Data sheets in the Appendix). Dissolved Oxygen (DO) increased from 3.2 mg/L at the control site to 9.3 mg/L at the test site. The effluent DO was (10.2 mg/L). The control site dissolved oxygen value does not comply with the Class III water quality standards (Rule 62-302.530(31) FAC).

The metals aluminum, cadmium, copper, iron, lead, magnesium, nickel, and zinc were all detected in the effluent at levels that complied with class III water quality standards (Table 1). Atrazine was detected in the effluent at a level less than the minimum quantitation limit and greater than the minimum detection limit.

The effluent sample was not toxic either to the vertebrate *Cyprinella leedsi* or to the invertebrate *Ceriodaphnia dubia*, using the 48-hour acute bioassay test (Appendix). All CBOD measurements were 3 mg/L or less (Table 1) and complied with permit limits and state Class III water standards. Control site fecal coliform counts (950 # counts/100ml) exceeded permit limits and Class III standards (Rule 62-302.530(6) FAC). Total coliform count at both the test site and the control site exceeded Class III standards; but because the laboratory report was an estimated the results are not a violation.

With the exception of ammonia all of the test site nutrient concentrations were greater than those at the control site (Table 1). Control site levels of orthophosphate fell between the 60th-70th percentile; the other control site nutrients were below the 50th percentile of nutrients compared to other Florida streams (see *Typical Values for Selected Parameters in Florida Waters* in Appendix). On the other hand, several of the test site nutrients (ortho-phosphate, total phosphorus, and nitrate+nitrite) were greater than 95% of all other typical Florida streams. Effluent total phosphorus (2.2 mg/L), ortho-phosphate (2.0 mg/L), and nitrate+nitrite concentrations (21.0 mg/L) were elevated and appear to be responsible for the increase nutrients measured at the test site (Table 1). Algal Growth Potential (AGP) measures the bioavailable nutrients within a system. Raschke and

Table 2. Community structure of control and test sites.

Baldwin WWTP	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	15	15
Shannon-Weaver diversity	3.3	3.4
Chlorophyll *a* (µg/L)	1	1
Algal Density (#/mL)	6,965	885
% Blue-green	45.8	25.5
% Green	18.8	33.3
% Diatoms	10.4	17.7
Periphyton Algae		
Number of Taxa	26	21
Shannon-Weaver diversity	3.67	3.41
Chlorophyll *a* (mg/m2)	5.4	16.3
Algal Density (#/cm2)	465,897	375,510
Diatom/(Diatom + B-G) Ratio	0.88	0.89
%Blue-green	10.6	10.4
% Diatoms	78.21	82.96
AGP (mg dry wt/L)	8.5	146.7

Shultz (1987) found that a "problem threshold" exists at AGP values greater than 5 mg dry wt/L and implies a nutrient enriched system. Control site AGP (8.5 mg dry wt/L) exceeded the 5 mg dry wt/L "problem threshold" by 41% while the test site AGP (146.7 mg dry wt/L) was nearly 30 times higher than the "problem threshold," indicating extreme nutrient enrichment from the effluent in this portion of the receiving water. The effluent AGP was (97.8 mg dry wt/L).

In the periphyton community measures, there was an indication of some degradation at the test site compared to the control site. For example, taxa richness decreased by 19% and the Shannon-Weaver diversity decreased by 7% from the control site to the test site (Figure 1). Chlorophyll *a* was 200% higher at the test site (16.3 mg/m2) compared to the control site (5.4 mg/m2) level, a further indication of extreme nutrient enrichment at the test site. The phytoplankton community measures were not significantly different between the two study sites (Table 2).

The increased water velocity at the test site may have been responsible for the slightly improved conditions at the test site compared to the control site in the qualitative macroinvertebrate communities. The test site had slightly higher EPT and Florida Index values (3 and 9 points, respectively) compared to the control site (1 and 6 points, respectively). The control site received 27 Stream Condition Index points placing it into the "excellent" category, the test site received 25 Stream Condition Index points placing it into the "good" category (see SCI Worksheet in Appendix).

Several of the quantitative community measures were extremely improved at the test site compared to the control site (Table 3). For example, taxa richness increased 216% and the Florida Index was 633% higher at the test site compared to the control site (Figure 2). There were also increases in the EPT Index and Shannon-Weaver diversity from the test site to the control site. Two pollution-tolerant groups, dipterans and oligochaetes made up 93.6% of the community at the control site while the test site had a more even distributed community with some pollution-sensitive taxa present (Table 3).

The nutrient and algae community data suggests that the effluent is contributing to eutrophication of the receiving waters. Meanwhile, the additional flow from the discharge currently appears to be having a beneficial effect on the macroinvertebrate communities. However, increased nutrients over time can cause shifts in macroinvertebrate communities as are currently being seen in the algae communities.

References

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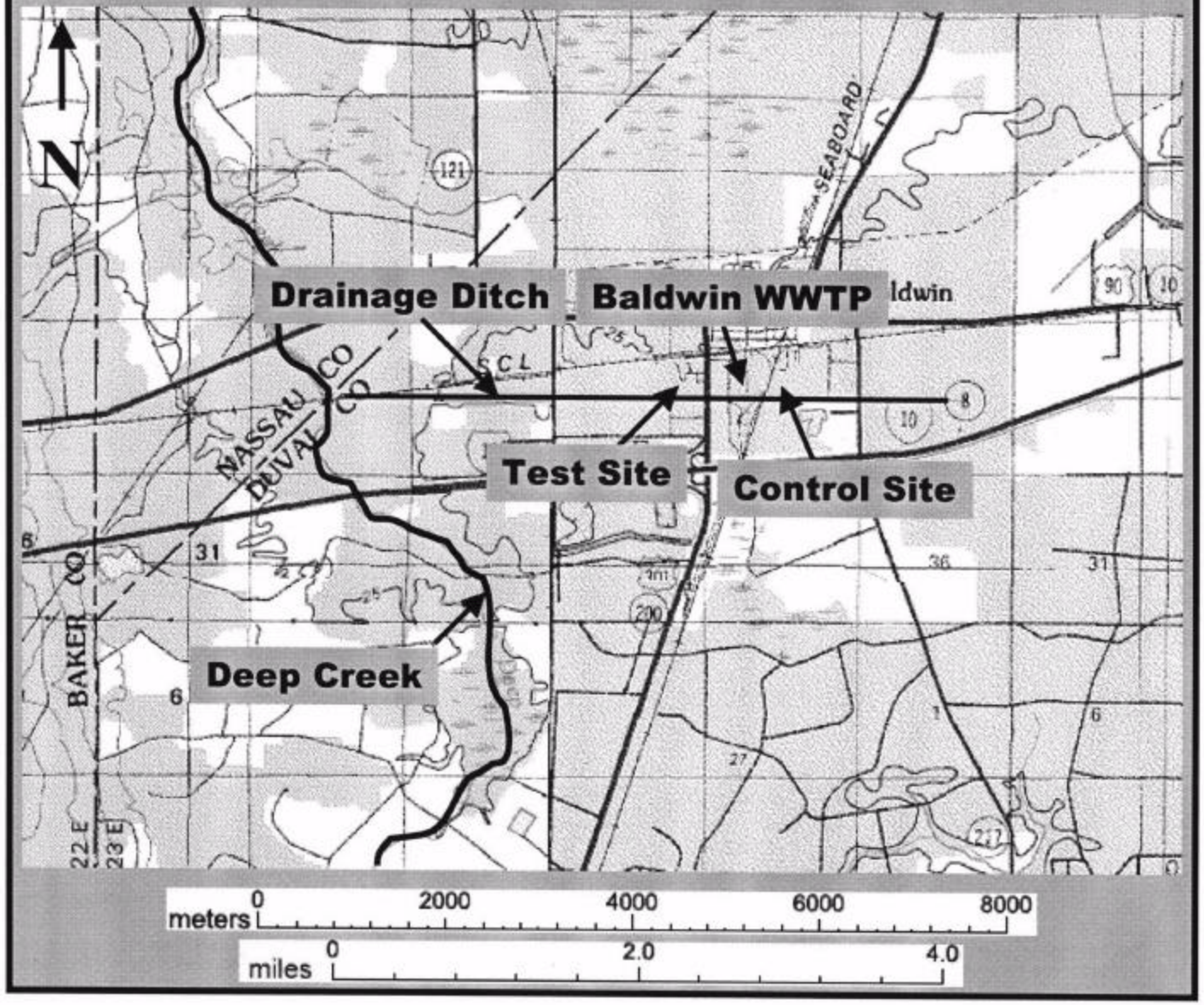
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Table 3. Community structure of control and test sites.

Baldwin WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
% Dominant Taxon	25.7	34.7
EPT Index	1	3
Florida Index	6	9
Number of Taxa	22	21
Stream Condition Index	27	25
Community Composition		
% Amphipoda	3.0	0.0
% Coleoptera	3.0	19.4
% Diptera	48.5	51.0
% Ephemeroptera	0.0	4.1
% Gastropoda	13.9	6.1
% Oligochaeta	5.9	4.1
% Pelecypoda	25.7	0.0
% Plecoptera	0.0	0.0
% Trichoptera	0.0	14.3
Functional Feeding Groups		
% Burrowing Deposit Feeders	1.0	4.1
% Predators	7.9	12.8
% Surface Deposit Feeders	21.3	34.2
% Suspension Feeders/Filterers	34.2	9.2
% Scrapers	13.9	17.9
% Shredders	4.0	18.9
Macroinvertebrate Hester-Dendy		
Number of Taxa	12	38
Florida Index	3	22
Shannon-Weaver Diversity	3.01	3.87
EPT Index	1	3
Community Composition		
% Coleoptera	3.2	4.8
% Diptera	61.3	35.5
% Ephemeroptera	0.0	3.0
% Gastropoda	0.0	16.9
% Oligochaeta	32.3	0.0
% Trichoptera	0.0	29.7
Functional Feeding Groups		
% Predators	0.0	17.8
% Surface Deposit Feeders	54.8	11.0
% Suspension Feeders	6.5	0.0
% Scrapers	1.6	20.8
% Shredders	1.6	4.0

Baldwin WWTP



Explanation of Measurements of Community Health

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

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

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

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

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

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress.

Typical Values for Selected Parameters in Florida Waters

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

Baldwin WWTP **Percentile Distribution** (1617 stations)

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
ControlSite											
Ortho-phosphate	0.01	0.01	0.03	0.04	0.05	0.08	**>0.11**	**<0.17**	0.27	0.59	1.37
Total Phosphorus	**>0.02**	**<0.03**	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ammonia	0.02	0.02	**~0.04**	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
Nitrate+nitrite	0.01	0.01	**>0.03**	**<0.05**	0.07	0.10	0.14	0.20	0.32	0.64	1.05
TKN	0.30	0.39	0.56	0.73	**>0.87**	**<1.00**	1.11	1.26	1.49	1.93	2.80
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	**>6.65**	**<10.45**	16.30
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
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
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
Test Site											
Ortho-phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	**>>1.37**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	**>1.51**
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	**~0.20**	0.34	0.60
Nitrate+nitrite	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	**>>1.05**
TKN	0.30	0.39	0.56	0.73	*0.87*	1.00	**>1.11**	**<1.26**	1.49	1.93	2.80
Turbidity	0.60	**>0.90**	**<1.20**	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
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
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**
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**

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.

Baldwin WWTP Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	22	**≥18**	17-9	<9	5
EPT Index	1	-	**≥3**	**<3**	1
# Chironomid Taxa	3	≥4	**3-2**	<2	3
% Contribution of Dominant Taxon	25.74	**≤37**	38-69	>69	5
% Diptera	48.51	-	**≤67**	>67	3
Florida Index	6	**≥6**	5-3	<3	5
% Suspension feeders/Filterers	34.16	**≥25**	25-13	<13	5
Total Score		**Northeast**			**27**
Interpretation of Scores		Excellent			26-31
		Good			**20-25**
		Poor			14-19
		Severely Degraded			7-13

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

Baldwin WWTP Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Value**	5	3	1	**Score**
Total Number of Taxa	21	**≥18**	17-9	<9	5
EPT Index	4	-	**≥3**	<3	3
# Chironomid Taxa	3	≥4	**3-2**	<2	3
% Contribution of Dominant Taxon	34.69	**≤37**	38-69	>69	5
% Diptera	51.02	-	**≤67**	>67	3
Florida Index	9	**≥6**	5-3	<3	5
% Suspension feeders/Filterers	9.18	≥25	25-13	**<13**	1
Total Score		**Northeast**			**25**
Interpretation of Scores		Excellent			26-31
		Good			**20-25**
		Poor			14-19
		Severely Degraded			7-13

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	19010049	2/14/00	1430	DEEP CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD NAME:
RAIN, T Storms IN AM	Duval	Town of Baldwin WWTP Ditch 200yds Above Pod	Control Site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specify)
6	60	6	2	15		1	10%

Local Watershed Erosion: None: ☐ Slight: ☐ Moderate: ☒ Heavy:

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☐ Moderate potential: ☒ Obvious sources:

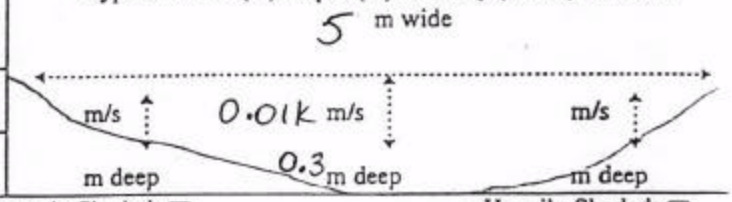
Width of riparian vegetation (m) on least buffered side: 3

List & map dominant vegetation on back

Artificially Channelized ☐ NO none
Artificially Impounded ☒ YES

High Water Mark: 0.6 + 0.3 = 0.9
(m above present water level) (present depth in m) (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 (Silt smothering:) none Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	1	5	DIPNET	Sand			
Leaf Packs or Mats	5	5	DIPNET	Mud/Muck/Silt	89	5	DIPNET
Aquatic Vegetation	5	5	DIPNET	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				Draw aerial view sketch of habitats found in 100 m section.			

Water Quality	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Time		Secchi (m)
Top								
Mid-depth	0.15	16.9	6.27	3.24	691	1430		
Bottom								

System Type: Stream: ☒ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☒ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☐

Color: Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes: RAIN T Storms IN AM

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

Sampling Team: MASON, O'CONNOR

Signature: [signature]

Date: 2/14

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:
	19010049	2/14/00	DEEP CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
RAIN T STORMS IN AM	DUVAL	Ditch 200yds ABOVE POD TOWN of BALDWIN WWTP	Control Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [12]	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 [8]	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 [3]	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 [6]	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 [29]				
Secondary Habitat Components **Artificial Channelization** [6]	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 [5] Left Bank [5]	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 [5] Left Bank [3]	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 [7] Left Bank [7]	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 [38]				

TOTAL SCORE [67]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/14/00	O'CONNOR	Robert O'Connor

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:
	19010050	2/14/00	DEEP CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
RAIN IN AM	DUVAL	Ditch 200 yds below POD	TEST SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [12]	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 [10]	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 [10]	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 [9]	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 [41]	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** [9]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [7] 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 [8] Left Bank [4]	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 [5] Left Bank [5]	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 [45]				

[86] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/14/00	PAT O'CONNOR	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5/21/98)

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE:	TIME:	RECEIVING BODY OF WATER:
	19010050	2/14/00	1620	DEEP CREEK

REMARKS: 1" RAIN ON 2/13/00	COUNTY:	LOCATION:	FIELD NAME:
	DUVAL	TOWN of BALDWIN WWTP Ditch 200 yds below POD	TEST SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commericial	Industrial	Other (specif
6	60	6	2	15		1	10%

Local Watershed Erosion: None: ☐ Slight: ☐ Moderate: ☒ Heavy:

Local Watershed NPS Pollution: No evidence: ☐ Slight: ☐ Moderate potential: ☐ Obvious sources:

Width of riparian vegetation (m) on least buffered side: 6 m

List & map dominant vegetation on back

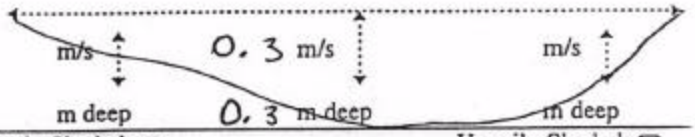
Artificially Channelized ☐ NO

Artificially Impounded ☒ YES none

High Water Mark: 0.6 + 0.3 = 0.9
(m above present water level) (present depth in m) (m above bed)

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

1.0 m wide



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 Silt smothering: none Other: ☐

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	4	5	D.P.N.E.T	Sand	38	1	D.P.N.E.T
Leaf Packs or Mats	8	5	D.P.N.E.T	Mud/Muck/Silt	49	3	D.P.N.E.T
Aquatic Vegetation	1	5	D.P.N.E.T	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				Draw aerial view sketch of habitats found in 100 m section.			

Water Quality	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):	Time		Secchi (m)
Top	0.1							
Mid-depth	0.15	19.7	7.02	9.3	559	1620		0.3L
Bottom								

System Type: Stream: ☒ 1st - 2nd order Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

Water Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils: None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity: Clear: ☒ Slightly Turbid: ☐ Turbid: ☐ Opaque: ☐

Color: Tannic: ☐ Green (algae): ☐ Clear: ☒ Other: ☐

Weather Conditions/Notes:
Cloudy, T Storms in AM

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

Sampling Team: O'Connor, Mason

Signature:

Date: 2/14/

Copy —

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Town of Baldwin WWTF		Date Summary Prepared: February 18, 2000
Location (attach detailed map): See attached map	County: Duval	District: Northeast
Federal Permit # FL0027812 and expiration date: November 13, 2000	State GMS # and State expiration date:	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility:
Wastewater treatment

Description of treatment process:
this facility is permitted as a 0.400 MGD extended aeration wastewater treatment plant with a bas screen, Flow equalization, clarification, filtration, ultra violet disinfection, post aeration, with discharge to a ditch that flows into Deep Creek to the St. Mary's River.

Receiving waters: Deep Creek to St. Mary's River.	Classification: I II (III)	
Design Flow: 0.400 MGD	Mean Flow:	Flow during survey:

Discharge is: (Continuous) Intermittent Seasonal Rainfall dependent
Other (describe) Effluent wet well fills up before flow is discharged.
therefore, the best time to sample is: there is a very short time period (2-5 min) before discharge. This also varies with the time of day / night.

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

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

Parameter	Limit (units) Annual	Monthly	Weekly	Single
$CBOD_5$ (mg/L)	3.2	4.0	—	—
TSS (mg/L)	20	30	45	60
Fecal Coliforms (no./100 mL)	200	200		800
NH_3-N (mg/L)	0.7	0.9	1.0	1.4
Dissolved Oxygen (mg/L)	minimum of 7.0			

Describe special permit conditions and permit modifications:
See attached monitoring requirements in Section I.A.1. of permit FL0027812 for nutrients/others that include: Total nitrogen, total phosphorous, TKN, TSS, $CBOD_5$, NH_3-N, Temperature, pH, fecal coliforms

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Town of Baldwin. WWTF. (Facility)

FACILITY SUMMARY

Description of permitted outfall(s):

There is a 10" outfall diffusser pipe that discharges flow over a 20' length approximately 4 feet below the surface.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: the following monthly average violations were recorded on the DMRs.

Oct. 1999: Fecal Coliform violation = 700 no/100 ml

July 1999: $CBOD_5$ = 9.5 TSS = 31.5 $T\text{-}NH_4$ = 4.89 mg/L.

JAN. 1999. $T\text{-}NH_4$ = 2.13 mg/L

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

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

Sample results that were recorded on the DMRs are consistent with results obtained by the department.

Additional information:

the facility accepts leachate from a landfill. therefore, the concentration and type of waste ~~that~~ the plant receives may vary considerably.

Staff contributing to this review (signature):

	(Biologist)
Kathleen A. Gerard.	(Inspector)
Kathleen A. Gerard.	(Engineer)
	( )
	( )
	( )

I. RECLAIMED WATER AND EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Surface Water Discharge

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D001 to a ditch which drains to Deep Creek and then to the St. Mary's River. Such discharge shall be limited and monitored by the permittee as specified below:

[62-600, 6-8-93] [62-601, 5-31-93] [62-650, 11-27-89] [62-302, 1-5-93] [62-610.860, 4-2-90]

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow	mgd	Maximum	0.400	--	--	--	Daily, 5 days per week	Flow meter & totalizer	EFF-1	See Item I.A.2
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	Maximum	3.2	4.0	4.8	6.4	Every two weeks	8 hour, flow proportioned composite	EFF-1	
Total Suspended Solids	mg/L	Maximum	20	30	45	60	Every two weeks	8 hour, flow proportioned composite	EFF-1	
Fecal Coliform Bacteria	See Permit Condition I. A. 6						Every two weeks	Grab	EFF-1	
pH	std. units	Range	-	-	-	6.0 to 7.5	Daily, 5 days per week	Grab or continuous	EFF-1	See Item I.A.4
Temperature	o F	Maximum	--	--	--	86.0	Every two Weeks	Grab at time of sample collection	EFF-1	
NH3-N Total	mg/L	Maximum	0.7	0.9	1.0	1.4	Every two Weeks	8 hour, flow proportioned composite	EFF-1	

I.A.1 Continued

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Dissolved Oxygen	mg/L	Minimum	--	--	--	7.0	Daily, 5 days per week	Grab or instrument	EFF-1	
Nutrient Monitoring	See Permit Condition I. A. 10						--	--	EFF-1	

2. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I. A.1 and as described below:

Monitoring Location Site Number	Description of Monitoring Location
EFF-1	Effluent, after final treatment and prior to discharge to the ditch

3. The annual average daily flow to Outfall D001 shall not exceed 0.400 mgd

4. Hourly measurement for pH during the period of required operator attendance may be substituted for continuous measurement. *[Chapter 62-601, Figure 2, Footnotes 1 and 2, 5-31-93]*

5. A parshall flume, a continuous flowmeter and totalizer shall be utilized to measure flow. *[62-601.200(17) and .500(6), 5-31-93]*

6. The arithmetic mean of the monthly fecal coliform values collected during an annual period shall not exceed 200 per 100 mL of effluent sample. The geometric mean of the fecal coliform values for a minimum of 10 samples of effluent each collected on a separate day during a period of 30 consecutive days (monthly), shall not exceed 200 per 100 mL of sample. No more than 10 percent of the samples collected during a period of 30 consecutive days shall exceed 400 fecal coliform values per 100 mL of sample. Any one sample shall not exceed 800 fecal coliform values per 100 mL of sample. *[62-600.440(4)(c), 6-8-93]*

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: ~~Batt~~ City of Baldwin WWTP
County: Duval
Contact / District: Pat O'Connor / NE-DIST
NPDES Permit #: FL0027812
LIMS Sample #: 434437 **LIMS Job #:** TLH 2000-02-15-25-01
sample log
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Sample Collection: Date 2/14/00 Time 1200
Test Beginning: Date 2/15/00 Time 1530
Test Ending: Date 2/17/00 Time 1530
Organism Batch #: 10 **Diluent Batch #:** Well
Organism Age: 11 days SRT toxicant batch #: N/A
Test organism: C. leedsi
Remarks: 2/25/00 DPH LC50 7/100%

*8.1 f.o. (56)

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	24 h	48 h
Cont. A	C17	5	5	5	8.0	8.4	8.5	24.4	24.4	25.0	7.9	8.3	8.2	260	280	275
B	C18	5	5	5	8.0	8.2	8.5	24.4	24.6	25.4	7.9	8.3	8.2	250	265	275
C	C19	5	5	5	8.0	8.3	8.5	24.4	24.6	24.9	8.0	8.3	8.3	250	265	270
D	C20	5	5	5	8.0	8.3	8.5	24.4	24.2	24.6	8.0	8.3	8.3	250	270	270
100% A	C21	5	5	5	7.6	8.0	8.2	24.4	24.8	24.9	8.4	8.3	8.3	615	625	670
B	C22	5	5	5	7.6	8.0	8.2	24.4	24.8	25.1	8.4	8.4	8.3	615	630	660
C	C23	5	4 10	4	7.6	8.0	8.2	24.4	25.4	24.9	8.4	8.4	8.2	620	635	655
D	C24	5	5	5	7.6	8.0	8.2	24.3	25.5	24.8	8.4	8.2	8.3	620	645	655
measured by:		DPH	DPH	DPH	MF	DPH	SG	MF	DPH	SG	MF	DPH	SG	MF	DPH	SG
recorded by:		MF	DPH	DPH	SG	SG	DPH	SG	SG	DPH	SG	SG	DPH	SG	SG	DPH

Investigators' Signatures
J. Hunt-Hutchinson
Marshall Faircloth
Shannon Gerardo

Temperature Range °C
Incubator # 3 25.5°-26.0°C
Room B246 24.0-26.0°C

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			N/A	N/A	N/A	SG
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):	128		96	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	120		162	Hach	SG	SG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	DPH	SG
Salinity:	0		0	Ysi	SG	SG

A. F. Wolfe
reviewer
form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Baldwin WWTP
County: Duval
Contact / District: Pat O'Connor / NE-DIST
NPDES Permit #: FL0027812
LIMS Sample #: 434437 LIMS Job #: TLH 2000-02-05-25-01

Sample Collection: Date 2/14/00 Time 1200
Test Beginning: Date 2/15/00 Time 1530
Test Ending: Date 2/17/00 Time 1530
Organism Batch #: 8 Diluent Batch #: PMW #4
Organism Age: 24 hrs. SRT toxicant batch #: N/A
Test organism: C. dubia

sample log
Test Type: (Screening) Definitive
(Static) Static Renewal I Flow-through
Test Number: 1 of 2

Remarks: 2/25/00 DPH LC50 >100%

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
Cont.	A	5	5	5	8.2	—	8.4	23.7	—	24.7	8.1	—	8.5	175	—	220
	B	5	5	5	—	—	8.4	—	—	24.7	—	—	8.5	—	—	200
	C	5	5	5	—	—	8.4	—	—	24.6	—	—	8.5	—	—	200
	D	5	5	5	—	—	8.4	—	—	24.5	—	—	8.5	—	—	210
100%	A	5	4 IM	4	7.7	—	8.5	22.5	—	24.7	8.3	—	8.6	580	—	1690
	B	5	5	5	—	—	8.5	—	—	24.7	—	—	8.6	—	—	1690
	C	5	5	5	—	—	8.5	—	—	24.7	—	—	8.6	—	—	1685
	D	5	5	5	—	—	8.5	—	—	24.6	—	—	8.6	—	—	1670
measured by:		DPH	DPH	MF	MF	--	SG	MF	—	SG	MF	—	SG	MF	—	SG
recorded by:		SG	DPH	DPH	SG	—	DPH	SG	—	DPH	SG	—	DPH	SG	—	DPH

Investigators' Signatures
William Nichols
Shannon Gerardi
Marshall Faircloth

Temperature Range °C
Incubator # 2 25.5° – 26.5°C
Room B246 24.0° – 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):			N/A	N/A	N/A	SG
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):		80	96	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):		77	162	Hach	SG	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Descw-	DPH	SG
Salinity:		0	0	YSI	SG	SG

Steven H. Lehe
reviewer

form updated 3/3/99

Periphyton taxa list and densities (#/cm^2) for Baldwin WWTF collected via glass microscope slides in Deep Creek, on February 14,15, 2000.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	1302	2782
Achnanthes exigua	1302	16690
Achnanthes lanceolata	20822	8345
Amphora sp.	–	1391
Caloneis sp.	1302	2782
Cocconeis sp.	2603	–
Cocconeis placentula	–	9736
Cyclotella sp.	1302	–
Cymbellaceae	–	1391
Diploneis oblongella	–	57022
Eunotia sp.	35138	27816
Eunotia flexuosa	16918	–
Eunotia glacialis	–	6954
Gomphonema sp.	9110	1391
Gomphonema affine	6507	1391
Gomphonema gracile	–	2782
Gomphonema parvulum	36439	1391
Navicula sp.	2603	1391
Navicula minima	7809	6954
Navicula mutica	10411	1391
Navicula radiosa	2603	–
Nitzschia sp.	5206	1391
Nitzschia amphibia	1302	–
Nitzschia nana	1302	–
Nitzschia palea	18220	1391
Synedra sp.	–	1391
Chlorophyceae		
Characium sp.	1302	1391
Chlamydomonas sp.	1302	2782
Chlorella sp.	1302	–
Oedogonium sp.	2603	–
Scenedesmus sp.	–	1391
Selenastrum sp.	1302	2782
Stigeoclonium sp.	5206	–
Ulothrix sp.	7809	–
Undetermined Chlorophyceae	5206	4173
Cyanophycaea		
Anabaena sp.	1302	–

Periphyton taxa list and densities (#/cm^2) for Baldwin WWTF collected via glass microscope slides in receiving water, on February 14,15, 2000.

	Control Site	Test Site
Cyanophycaea		
Chroococcus sp.	3904	–
Chroococcus minutus	1302	–
Lyngbya sp.	2603	1391
Oscillatoria sp.	3904	8345
Synechococcus sp.	11713	9736

Phytoplankton taxa list and densities (#/cm^2) for Baldwin WWTF collected via glass microscope slides in Deep Creek, on February 14,15, 2000.

	Control Site	Test Site
Bacillariophyceae		
Cymbellaceae sp.	–	9
Diatomaceae	37	–
Diploneis sp.	–	9
Gomphonema sp.	109	–
Nitzschia sp.	37	9
Pennales	182	52
Chlorophyceae		
Chlamydomonas sp.	218	52
Chlorophyceae	327	78
Golenkinia sp.	73	–
Scenedesmus sp.	–	9
Selenastrum sp.	37	9
Chrysophyceae		
Mallomonas sp.	–	9
Cryptophyceae		
Chroomonas sp.	37	9
Cryptomonas sp.	399	35
Undetermined Cryptophyceae	327	44
Cyanophyceae		
Anabaena sp.	37	–
Chroococcaceae	73	–
Dactylococcopsis sp.	145	–
Lyngbya	254	9
Microcystis sp.	–	9
Oscillatoria sp.	399	52
Spirulina sp.	–	9
Synechococcus sp.	690	35
Euglenophyceae		
Lepocinclis sp.	37	–
Trachelomonas sp.	73	9

Benthic macroinvertebrate taxa list for Baldwin WWTF, collected via 20 discrete dip net sweeps in Deep Creek, on February 14,15, 2000.

	Control Site	Test Site
Amphipoda		
Crangonyx sp.	1	–
Undetermined Amphipoda	1	–
Coleoptera		
Dubiraphia vittata	–	4
Dytiscidae	1	–
Elmidae	–	1
Microcylloepus pusillus	–	2
Neoporus sp.	1	–
Stenelmis sp.	–	3
Diptera		
Ablabesmyia mallochi	1	2
Ablabesmyia rhamphe grp.	–	1
Clinohelea	1	–
Corynoneura	1	–
Kiefferulus	2	–
Larsia	1	–
Nanocladius	1	–
Paratanytarsus dissimilis	6	2
Pentaneura inconspicua	–	1
Polypedilum illinoense grp.	2	17
Polypedilum scalaenum grp.	–	1
Polypedilum tritum	3	–
Sciomyzidae	–	1
Tanypus sp.	1	–
Tanytarsus	2	–
Tanytarsus sp. A Epler	1	–
Tanytarsus sp. G Epler	4	–
Tanytarsus sp. L Epler	3	–
Tribelos sp.	1	–
Undetermined Chironomidae	–	3
Ephemeroptera		
Caenis sp.	–	2
Gastropoda		
Ancylidae	4	1
Hebetancylus excentricus	1	–
Micromenetus dilatatus	–	1
Physella sp.	1	2
Undetermined Gastropoda	1	–

Benthic macroinvertebrate taxa list for Baldwin WWTF, collected via 20 discrete dip net sweeps in Deep Creek, on February 14,15, 2000.

	Control Site	Test Site
Odonata		
Enallagma sp.	–	1
Oligochaeta		
Bratislavia unidentata	–	1
Dero sp.	1	–
Dero digitata complex	1	–
Haber speciosus	1	–
Limnodrilus hoffmeisteri	1	1
Nais sp.	–	1
Pelecypoda		
Undetermined Pelecypoda	13	–
Trichoptera		
Cheumatopsyche sp.	–	5
Nectopsyche pavida	–	1
Oecetis sp. E Floyd	–	2

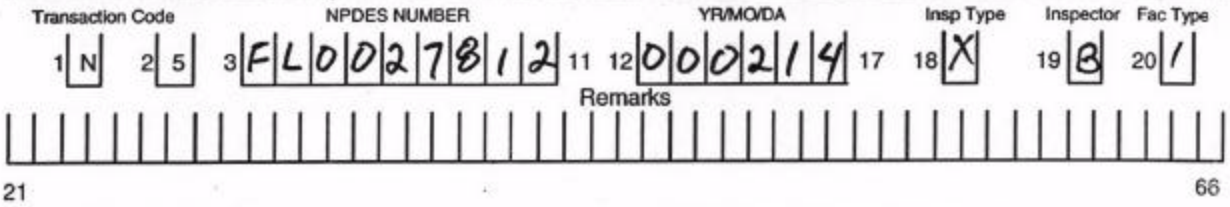
Benthic macroinvertebrate taxa list for Baldwin WWTF, collected via Hester-Dendy artificial substrates in Deep Creek, on February 14,15, 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Coleoptera		
Dubiraphia sp.	–	3
Elmidae	–	2
Microcylloepus sp.	–	2
Stenelmis sp.	2	20
Diptera		
Ablabesmyia mallochi	–	16
Anopheles sp.	2	–
Chironomidae	–	15
Chironomus sp.	12	2
Corynoneura sp.	2	3
Cricotopus bicinctus	–	2
Cricotopus trifasciatus	–	2
Goeldichironomus sp.	–	2
Goeldichironomus holoprasinus	2	–
Kiefferulus sp.	6	–
Paratanytarsus dissimilis	–	56
Paratanytarsus sp. C Epler	–	32
Pentaneura inconspicua	–	23
Polypedilum illinoense grp.	2	24
Polypedilum scalaenum grp.	–	4
Polypedilum tritum	–	2
Rheotanytarsus sp.	–	2
Rheotanytarsus exiguus grp.	–	2
Tanytarsus sp.	2	2
Tanytarsus sp. C Epler	–	2
Tanytarsus sp. G Epler	2	–
Tanytarsus sp. T Epler	–	3
Tribelos jucundus	–	2
Ephemeroptera		
Caenis sp.	–	16
Gastropoda		
Ancylidae	–	10
Ferrissia sp.	–	2
Hebetancylus excentricus	–	8
Laevapex fuscus	–	3
Laevapex peninsulae	–	7
Micromenetus dilatatus	–	2

Benthic macroinvertebrate taxa list for Baldwin WWTF, collected via Hester-Dendy artificial substrates in Deep Creek, on February 14,15, 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Gastropoda		
Physella sp.	–	49
Undetermined Gastropoda	–	11
Hirundinea		
Hirudinea	–	3
Isopoda		
Lirceus sp.	–	2
Lepidoptera		
Lepidoptera	–	2
Nemertea		
Prostoma rubrum	–	6
Odonata		
Argia sp.	–	8
Argia moesta	–	3
Argia tibialis	–	21
Calopteryx maculata	–	2
Coenagrionidae	–	7
Enallagma sp.	–	3
Oligochaeta		
Dero digitata complex	10	–
Haber speciosus	2	–
Nais sp.	3	–
Pelecypoda		
Pelecypoda	2	–
Trichoptera		
Cheumatopsyche sp.	–	122
Hydropsyche sp.	–	4
Hydropsychidae	–	23
Nectopsyche pavida	–	3
Oecetis sp.	–	6

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)

