

Biological Assessment of

City of Baldwin Wastewater Treatment Plant

Duval County

NPDES #FL0027812

Sampled August 1994

January 1995

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: City of Baldwin WWTP
County: Duval
NPDES Number: FL0027812
State Permit Expiration Date: 31 May 1995

Toxics Sampling Inspection (XSI)

Date Sampled: 22 August 1994

Results: No organic priority pollutants or metals were detected in the effluent at levels exceeding Class III standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 22 August, 1994

Results: The sample of effluent was not toxic to the fish, *Cyprinella leedsi*, or to the invertebrate, *Ceriodaphnia dubia*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 22 August 1994

Results: Measures of macroinvertebrate health indicated that the discharge was not affecting the community to any great degree. Taxa richness, the Florida Index, and the EPT index were largely unchanged by the discharge. The Stream Invertebrate Index for Florida score was 27 at both sites, placing them in the low range of the unimpaired category. Periphyton density increased by 826% between the reference and test site, while the diatom to blue-green ratio decreased by 63.2%. These changes suggest that the facility is exerting negative effects on the receiving water periphyton community, probably related to nutrient enrichment from the discharge.

Water Quality Inspection (WQI)

Date Sampled: 22 August 1994

Results: Total coliform bacteria violations occurred at the test and reference sites, as well as in the effluent (Rule 62-302.530(7) FAC). Fecal coliform violations were found in the effluent and at the test site only (Rule 62-302.530(6) FAC). The facility also exceeded its fecal coliform permit limit. The facility was responsible for nutrient enrichment at the test site. Effluent concentrations of ortho-phosphate (2.1 mg/L), total phosphorus (2.1 mg/L), and nitrate-nitrite (19 mg/L) were elevated. Test site concentrations of these parameters (*e.g.*, nitrate-nitrite of 5.1 mg/L, ortho-phosphate of 0.57 mg/L) were considerably higher than those found at the upstream site, as well as exceeding those found in 90% to 95% of all other Florida streams. Algal growth potential corresponded with nutrient levels, and was extraordinarily high in the effluent, 276.3 mg dry wt/L. Algal growth potential increased dramatically at the test site (48.4 mg dry wt/L) when compared to the reference site (7.4 mg dry wt/L). While AGP at both sites exceeded the 5 mg dry wt/L "problem threshold", the increase at the test site demonstrates the influence from the discharge. Dissolved oxygen was low at the reference site (1.8 mg/L), somewhat higher at the test site (3.2 mg/L), but less than the water quality standard at both sites (Rule 62-302.560(31) FAC).

Introduction

The City of Baldwin Wastewater Treatment Plant is located in western Duval County (see maps in Appendix). Treatment at this 0.40 MGD capacity extended aeration facility consists of screening, comminution, surge stabilization, filtration, ultraviolet disinfection, and post-aeration. The plant continuously discharges into an unnamed Class III tributary of Deep Creek, which flows to the St. Marys River.

Permit limits are as follows: flow (0.200 MGD annual average), BOD (3.2 mg/L as an annual average, 4.0 mg/L as a monthly average, 4.8 mg/L as a weekly average, 6.4 mg/L maximum), TSS (20 mg/L as an annual average, 30 mg/L as a monthly average, 45 mg/L as a weekly average, 60 mg/L maximum), total ammonia (0.7 mg/L as an annual average, 0.9 mg/L as a monthly average, 1.0 mg/L as a weekly average, 1.4 mg/L maximum), temperature (less than 86 °F), pH (6.0 to 7.5 S.U.'s), dissolved oxygen (7.0 mg/L minimum), and fecal coliforms (200 organisms/100 mL average, 800 organisms/100 mL maximum). Although the lower capacity rating of 0.200 MGD was allowed initially to provide a reduced operator attendance time, the plant flows have been increasing to 0.200 MGD and higher. When the permit comes up for renewal in May, 1995, it is expected that the city will request that the permitted flow be changed to the full rated design capacity of 0.400 MGD. Special permit conditions allow for ultraviolet disinfection, with a chlorine gas backup system. During the past year, the facility has had no permit violations or plant disturbances reported.

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 reference site (located in the unnamed tributary approximately 100 yds above the outfall) and a test site (located approximately 100 yds below the discharge) (see maps in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	36	32
Florida Index	8	10
SIIF	27	27
EPT Index	3	2
% Contribution of Dominant Taxon	6.5	19.2
% Diptera	45	48.5
% Amphipoda	9.6	11.1
% Ephemeroptera	4.8	7.0
% Oligochaeta	6.5	9.1
% Gastropoda	17.1	6.1
% Pelecypoda	0	12.1
% Other	16.4	6.1
% Predators	21.7	10.7
% Above Surface Deposit Feeders	16.6	29.5
% Below Surface Deposit Feeders	6.5	9.4
% Suspension Feeders	9.7	20.9
% Scrapers	20.3	9.9
% Shredders	5.8	11.8
% Scavengers	5.7	6.8
% Parasites	3.7	1.0
Periphyton Algae		
Number of Taxa	17	18
Shannon-Weaver Diversity	3.7	3.5
Algal Density (#/sq. mm)	46.9	426.0
Chlorophyll a (mg/sq. m)	0.49	0.57
Diatom/Diatom + B-G Abundance Ratio	0.95	0.35
% Blue-green	3.4	63.1
% Green	17.2	2.6
% Diatoms	68.9	34.2
% Other	10.5	0.1
Algal Growth Potential (mg dry wt/l)	7.4	48.4

were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test site samples. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple natural substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Hester-Dendy multiplate samplers were exposed at the time of recovery. Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for the periphyton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

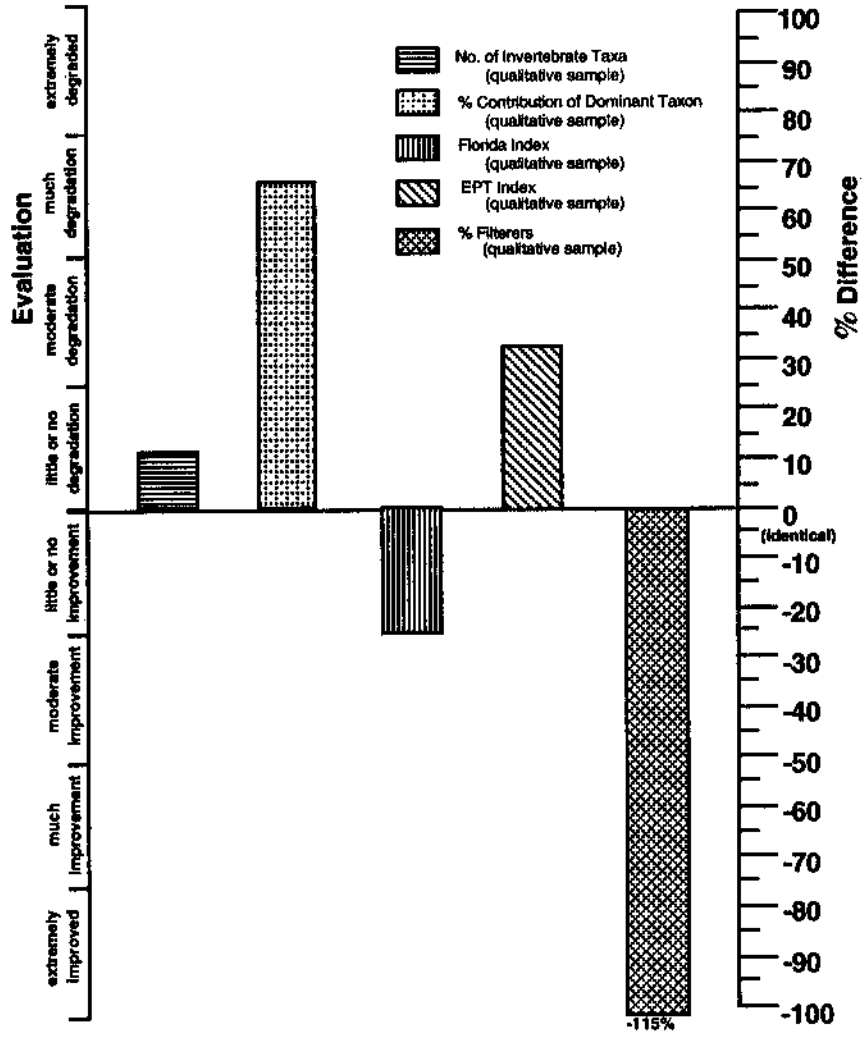
Explanation of Measurements of Community Health

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: It is generally accepted that taxa richness is among the most robust measures of benthic community health. Anthropogenic stress has a tendency to reduce the number of different types of invertebrates present in a system. Algal taxa richness may increase with moderate nutrient enrichment, compared to an oligotrophic natural background, but become reduced with extreme nutrient enrichment or toxicity.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable, in that they represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Such scores may be associated with organic/nutrient enrichment and decreased dissolved oxygen. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is also associated with disturbance.

Numbers of pollution sensitive taxa: Unpolluted sites have characteristic numbers and types of



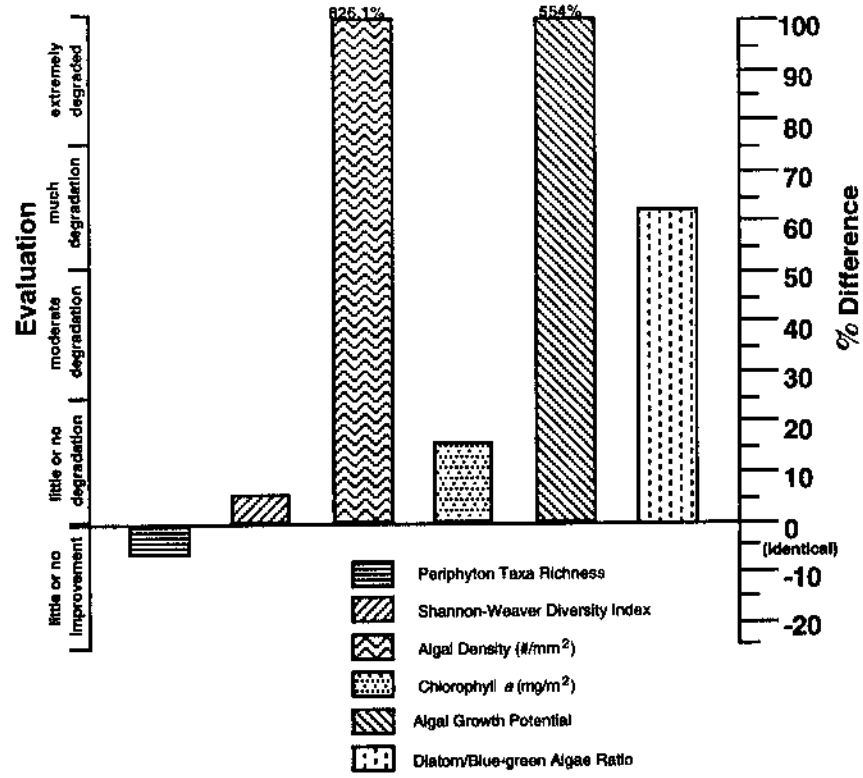
Effect of discharge on the benthic macroinvertebrate community.

taxa which are sensitive to anthropogenic stress. These organisms become rare or absent as the intensity or duration of the disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*e.g.*, around 20 or more in the Panhandle, around 15 or more in the Peninsula). Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* 1990), Lenat (1993), Farrell (1992), Chang *et al.* 1992), and Whitmore (1989), are used as appropriate.

Ephemeroptera/Plecoptera/Trichoptera Index: To calculate the index, one simply sums the number of EPT taxa present at a station. Higher EPT scores (*e.g.*, 7 or more in the Panhandle, 4 or more in the Peninsula) are associated with healthier systems, while lower scores indicate stressed conditions.

Community structure: A system is generally considered degraded if a substantial shift in the proportions of the major taxonomic groups (*e.g.*, mayflies, riffle beetles, etc.) is observed when compared to a reference site. 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.

Algal biomass: The density of algal cells and the chlorophyll *a* concentration are used as estimators of biomass. A system has traditionally been considered nutrient stressed when biomass exceeds problem threshold levels, often resulting in visible algal blooms, nuisance scums, and low dissolved oxygen from the decomposition of the decaying algal tissue. 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.



Effect of discharge on the algal community.

Trophic composition/feeding guilds: Undisturbed aquatic systems possess characteristic proportions of organisms using various functional feeding strategies, and human disturbance shifts these established feeding strategies. In Florida for example, pollution is known to reduce the numbers of filter-feeders and shredders.

The Stream Invertebrate Index for Florida (SIIF) is a composite metric which is based upon the macroinvertebrate communities found at Florida Eco-regional reference sites sampled with dip net sweeps (EA Engineering 1994). The SIIF assigns 5, 3, or 1 point(s) to a variety of invertebrate parameters, depending on how closely that parameter approaches the expected Eco-regional reference condition. Five points is the best score for metrics which are particularly strong at discriminating between healthy and impaired sites (see SIIF calculation table in Appendix). The following parameters are used in calculating the SIIF for the Panhandle: taxa richness, EPT Index, % contribution of the dominant taxa, % Diptera, Florida Index, % suspension feeders/filterers, and % shredders (EA Engineering 1994). In the Panhandle, 23-29 SIIF points indicates no impairment, 15-22 points indicates moderate impairment, and 7-14 points is clear evi-

dence of severe degradation. In the Florida Peninsula, these same parameters, along with the number of crustacean and mollusk taxa and the % of crustacean and mollusk taxa, are used to calculate the SIIF. In the Peninsula, 27-33 SIIF points indicates no impairment, 17-26 points indicates moderate impairment, and 9-16 points is clear evidence of severe degradation. Although the SIIF is based on samples collected during the summer, similar relationships should apply in other seasons.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Tim McKelvey, Mike Hollingsworth, and Jeff Martin (DEP Northeast District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Landon Ross, Vicki Whiting, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Bioassessment Review Committee, consisting of Jan Mandrup-Poulsen, Wayne Magley, and Mike Tanski, as well as District representatives.

Results and Discussion

Habitat quality ratings at the reference site (upstream of discharge = 93 points) and at the test site (downstream of discharge = 97 points), were comparable. Both sites had adequate in-stream substrates, similar width (0.5 to 0.6 meters), and substantial water velocity (0.5 m/sec). Dissolved oxygen was low at the reference site (1.8 mg/L), somewhat higher at the test site (3.2 mg/L), but both were less than the water quality standard (Rule 17-302.560(31) FAC). Water at both sites was slightly acidic (pH = 6.0 at the reference site and 6.5 at the test site). Conductivity was lower at the reference site (97.4 µmhos/cm) than at the test site (228 µmhos/cm).

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*. No mortality occurred during the two 48 hour bioassays (Appendix).

No organic pollutants were detected in the effluent. Of the metals analyzed for, zinc (20 µg/L), copper (10 µg/L), and iron (22 µg/L) were detected in the outfall at concentrations above their respective practical quantitation limits. At a hardness of 144.4 mg $CaCO_3$, none of these concentrations represents a violation of Class III standards or permit limits.

Total coliform bacteria were measured at 3,000 organisms/100 mL at the reference site, and 5,000 organisms/100 mL at the test site, both representing violations of Class III water quality standards (Rule 62-302.530(7) FAC). Fecal coliforms were within acceptable levels at the reference site (300 organisms/100 mL), but in violation of standards at the test site (1,700 organisms/100 mL). The effluent was in violation of both fecal and total coliform water quality standards (with 1700 organisms/100 mL and 16,000 organisms/100 mL, respectively), and appeared to be contributing to the test site violations (Rule 62-302.530(6) FAC). The facility also exceeded its permit limit for fecal coliforms.

The facility was responsible for nutrient enrichment at the test site. Effluent concentrations of orthophosphate (2.1 mg/L), total phosphorus (2.1 mg/L), and nitrate-nitrite (19 mg/L) were elevated. Test site concentrations of these parameters (*e.g.*, nitrate-nitrite of 5.1 mg/L, ortho-phosphate of 0.57 mg/L) were considerably higher than those found at the upstream site, as well as exceeding those found in 90% to 95% of representative Florida streams (see Table of Typical Water Quality Values in Appendix).

Algal growth potential (AGP) corresponded with nutrient levels, and was extraordinarily high in the effluent, 276.3 mg dry wt/L. Algal growth potential increased dramatically at the test site (48.4 mg dry wt/L) when compared to the reference site (7.4 mg dry wt/L). While

AGP at both sites exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987), the increase at the test site demonstrates the influence from the discharge.

Measures of macroinvertebrate health indicated that the discharge was not affecting the community to any great degree. The figure on p. 2 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the control.

In the dip net samples, macroinvertebrate taxa richness (36 taxa at the reference site, 32 at the test site), the Florida Index (8 at the reference, 10 at the test site), and EPT index (3 at the reference, 2 at the test site) were largely unchanged by the discharge. Suspension feeders increased from 9.7% of the population at the reference site, to 20.9% at the test site (indicating improvement). The % contribution of the dominant taxon was somewhat higher at the test site (19.2%, up from 6.5% at the reference site), although the absolute value was not high enough to suggest an imbalanced population. The Stream Invertebrate Index for Florida score was 27 at both sites, placing them in the low range of the unimpaired category.

The figure on p. 3 represents changes in the periphyton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Periphyton taxa richness, diversity, and chlorophyll *a* were mostly unchanged between sites. Algal density, however, increased by 826% between the reference and test site, while the diatom to blue-green algae ratio decreased by 63.2%. The upstream community was largely dominated by diatoms, while cyanophytes were most numerous at the test site. These changes suggest that the facility is exerting negative effects on the receiving water periphyton community, probably related to nutrient enrichment from the discharge.

Conclusions

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*. No organic pollutants were detected in either effluent. The metals detected in the effluents did not violate Class III standards or permit limits.

Dissolved oxygen was low at the reference site (1.8 mg/L), somewhat higher at the test site (3.2 mg/L), but less than the water quality standard at both sites (Rule 62-302.560(31) FAC).

Total coliform bacteria violations occurred at the test and reference sites, as well as in the effluent (Rule 62-302.530(7) FAC). Fecal coliform violations were found in the effluent and at the test site only (Rule 62-302.530(6) FAC). The facility also exceeded its fecal coliform permit limit.

The facility was responsible for nutrient enrichment at the test site. Effluent concentrations of orthophosphate (2.1 mg/L), total phosphorus (2.1 mg/L), and nitrate-nitrite (19 mg/L) were elevated. Test site concentrations of these parameters (*e.g.*, nitrate-nitrite of 5.1 mg/L, ortho-phosphate of 0.57 mg/L) were considerably higher than those found at the upstream site, as well as exceeding those found in 90% to 95% of typical Florida streams.

Algal growth potential was extraordinarily high in the effluent (276.3 mg dry wt/L), and increased dramatically at the test site (48.4 mg dry wt/L) when compared to the reference site (7.4 mg dry wt/L). While AGP at both sites exceeded the 5 mg dry wt/L "problem threshold", the increase at the test site demonstrates the influence from the discharge.

Measures of macroinvertebrate health indicated that the discharge was not affecting the community to any great degree. Taxa richness, the Florida Index, and the EPT index were largely unchanged by the discharge. The Stream Invertebrate Index for Florida score was 27 at both sites, placing them in the low range of the unimpaired category.

Periphyton density increased by 826% between the reference and test site, while the diatom to blue-green ratio decreased by 63.2%. These changes suggest that the facility is exerting negative effects on the receiving water periphyton community, most likely related to nutrient enrichment from the discharge.

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Chemistry summary table for the City of Baldwin WWTP

	Effluent	Reference Site	Test Site
Organic Constituents			
	none detected		
Metals (ug/L)			
Aluminum	100 U		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	10 A		
Chromium	10 U		
Iron	22 A		
Lead	10 U		
Mercury	0.1 U		
Nickel	5 U		
Silver	0.05 U		
Zinc	20		
Nutrients (mg/L)			
Ortho-phosphate	2.1	0.043	0.57
Total phosphorus	2.1	0.17	0.78
Ammonia	0.02 U	0.094	0.079
Nitrate+Nitrite	19	0.02 U	5.1
TKN	0.84	1.3	1.6
Other Parameters			
Habitat Assessment		93	97
D.O. (mg/L)	6.3	1.8	3.2
pH (SU's)	7.4	6.0	6.5
Conductivity (µmhos/cm)	547	97.4	228
Temperature (°C)	28.9	25.3	25.9
AGP (mg dry wt/L)	276.3	7.4	48.4
Bioassay Fish	not toxic		
Bioassay Invertebrate	not toxic		
Fecal coliform (org/100 mL)	1700	300	1700
Total coliform (org/100 mL)	16,000	3000	5000
TSS (mg/L)	1 U	20	8
BOD5 (mg/L)	2 U	2	2 U
Turbidity (NTU's)	9.5	31.7	73.2
Hardness (mg CaCO3)	144.4		

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

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

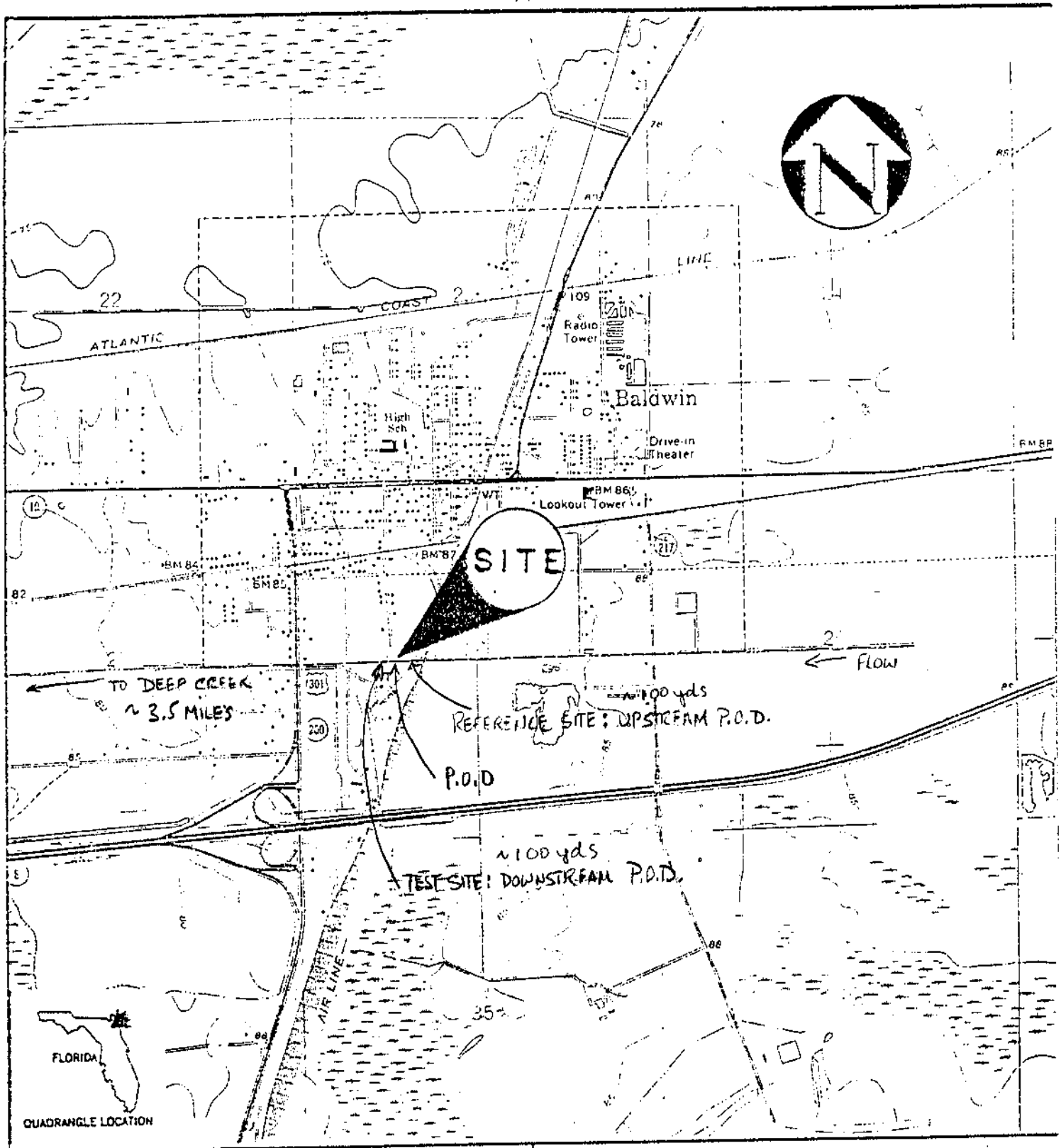
Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates



Reference:

Baldwin Quadrangle, Florida; 1964
Topographic Map
U.S. Geological Survey

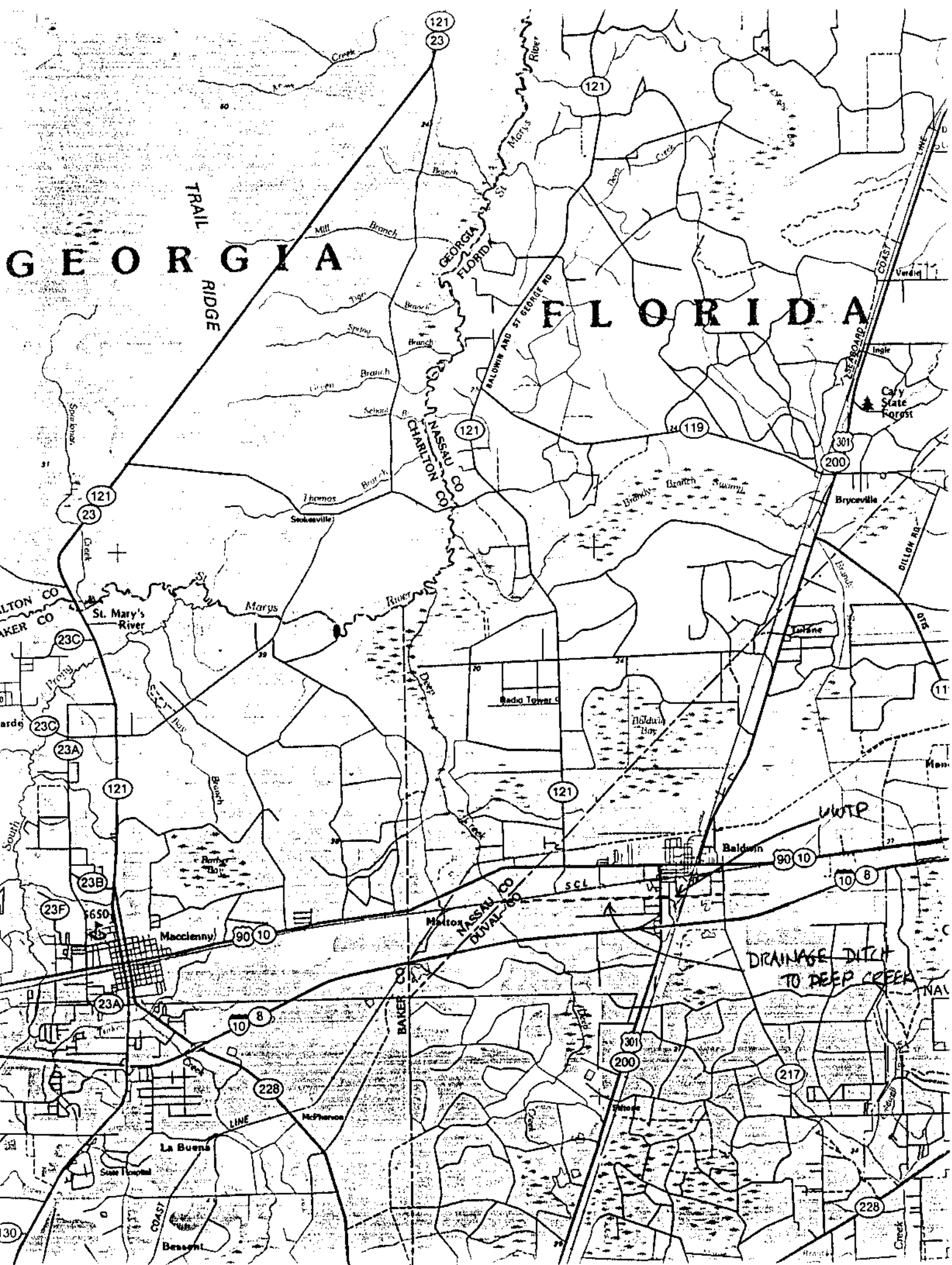
LAW ENGINEERING
TESTING COMPANY

Jacksonville, Florida

SITE LOCATION MAP

Sewage Treatment Plant Additions
Baldwin, Florida

DRAWN: WRW	DATE: 11/6/86	SCALE:
CHECKED: TES	JOB NO: J-2734B	1"=2000'


GEORGIA
FLORIDA
TRAIL RIDGE
GEORGIA FLORIDA
NASSAU CO
CHARLTON CO
BAKER CO
DUVAL CO
St. Mary's River
Mill Branch
Spring Branch
Thomas Branch
Seaboard Coast Line
Baldwin and St George Rd
Dillon Rd
Cary State Forest
Bryceville
Seaboard Coast Line
Baldwin
Macclenny
Maltox
Tolane
Boykin Tower
Baldwin Bay
Barber Bay
La Buena
State Hospital
McPherson
Bessent
Ingle
Verdie
Deep Creek
WWTP
DRAINAGE DITCH TO DEEP CREEK
121
23
23C
23A
23B
23F
10
8
90
301
200
119
217
228
130

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: TOWN OF BALDWIN WWTP	Prepared by: JEFF MARTIN Date: 5/23/94	
Location (attach detailed map):	County: DUVAL	District: NE
Federal Permit # FL0027812 and expiration date:	State GMS # and 3116 mo6085 State expiration date: May 31, 1995	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Serves the Town of Baldwin

Description of treatment process:
0.400 MGD extended aeration wastewater treatment facility with dewatering screen, comminutor, surge tank, filtration, ultraviolet disinfection and post aeration. Permit flow limited to 0.200MGD

Receiving waters: Ditch to Deep Creek to St Marys River	Classification: Class III
Design Flow: 0.400 MGD	Actual Mean Flow: 0.191 MGD

Discharge is: (Continuous) Intermittent Seasonal Rainfall dependent
Other (describe)

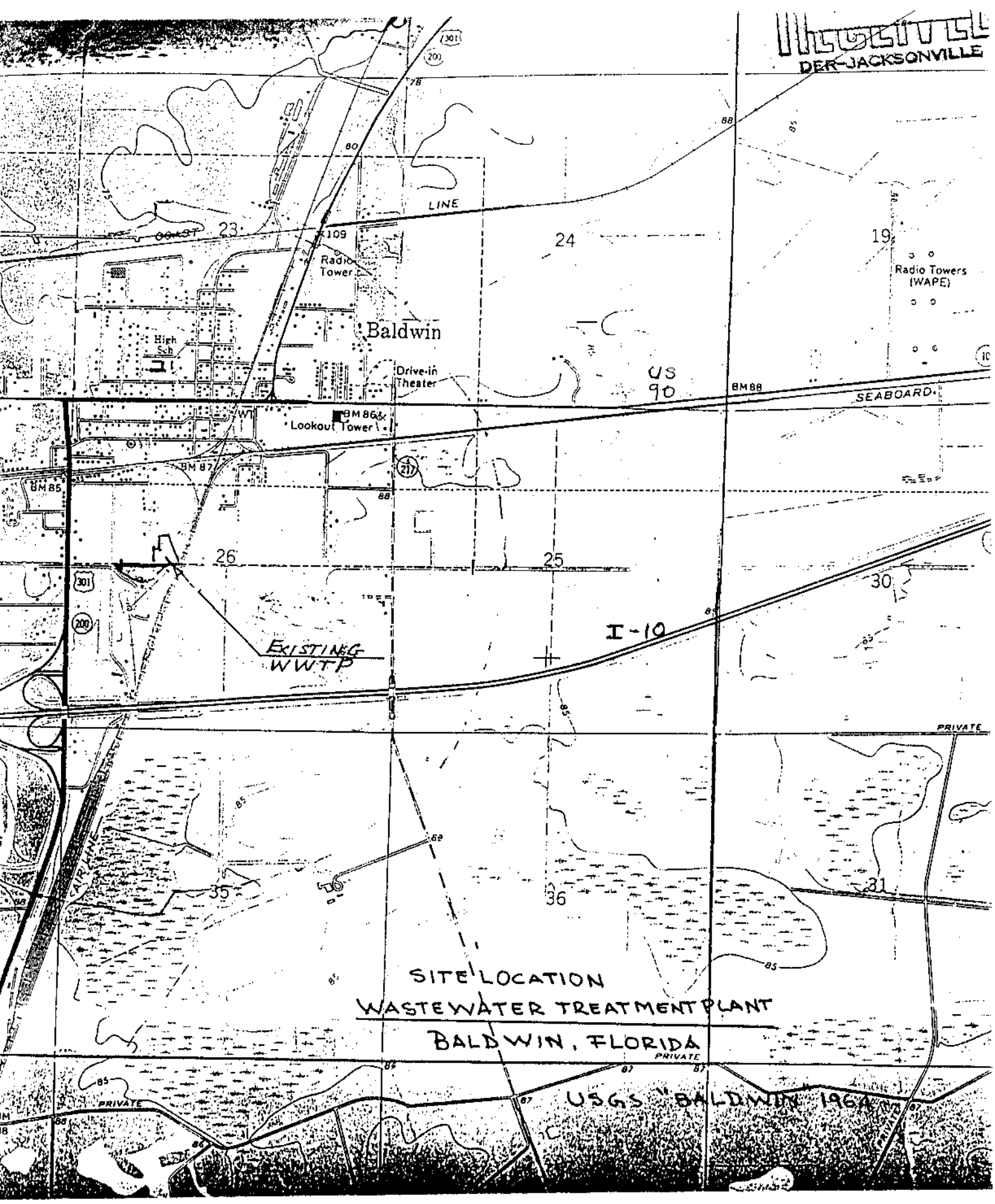
therefore, the best time to sample is:

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

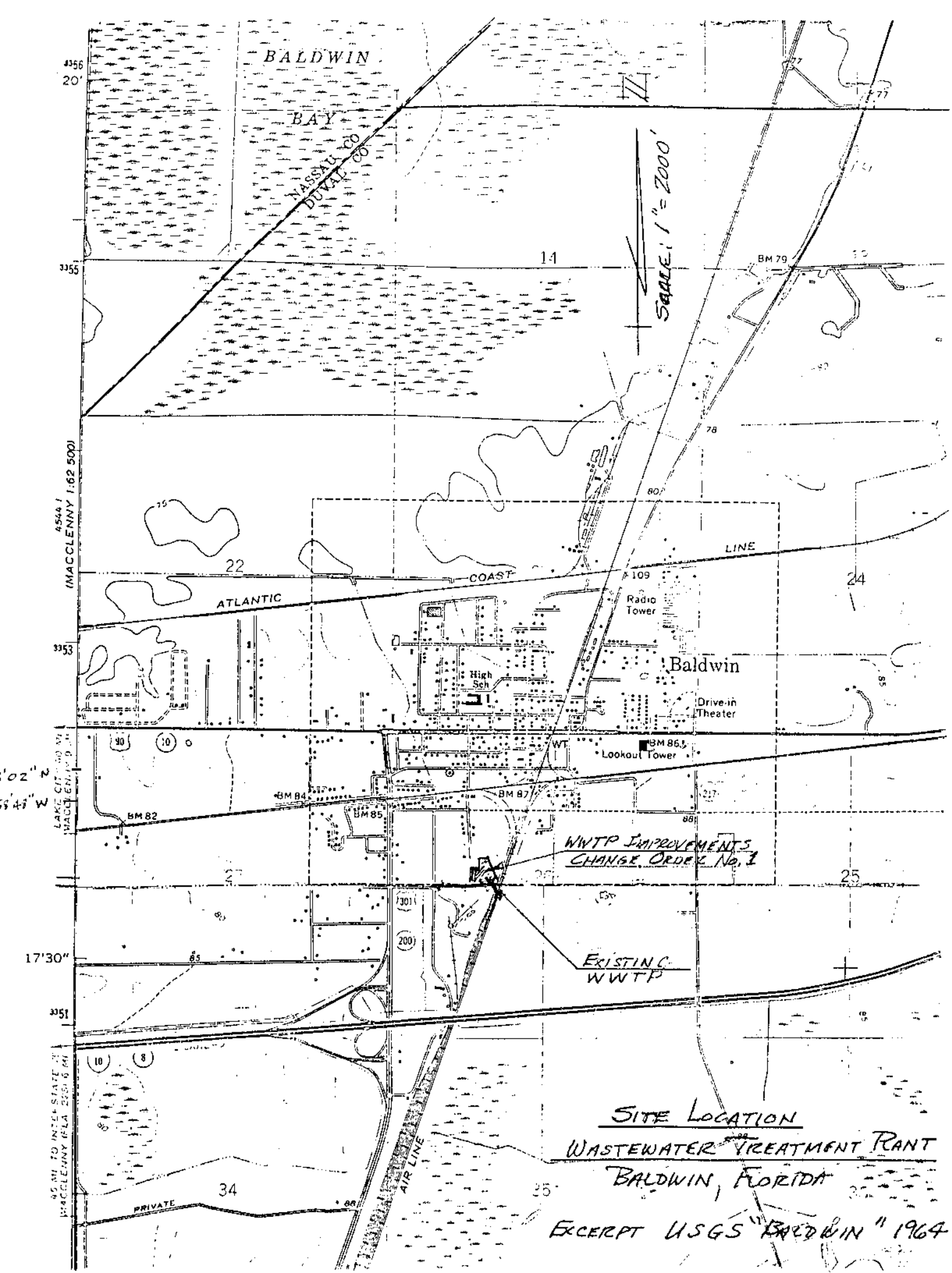
List effluent limits:

Parameter	Limit (units) mg/L ANNUAL
BOD_5	3.2
TSS	20
Total Ammonia	0.7
D.O.	7.0 min
Temperature	< 86° F
Fecal Coliform	≤ 200 per 100ml

Describe special permit conditions and permit modifications:
Special criteria for ultraviolet disinfection.



ILN TO CAWYERS



SITE LOCATION

WASTEWATER TREATMENT PLANT

BALDWIN, FLORIDA

EXCERPT USGS "BALDWIN" 1964

Florida Department of Environmental Regulation
Northeast District • Suite B200, 7825 Baymeadows Way • Jacksonville, Florida 32256-7577
Lawton Chiles, Governor
Carol M. Browner, Secretary

NOTICE OF PERMIT MODIFICATION

February 19, 1992

Honorable Marvin E. Godbold, Jr.
Mayor, Town of Baldwin
Post Office Box 54
Baldwin, Florida 32234

Subject: Town of Baldwin Wastewater Facility (WWF): Modification of Effluent Limitations In Operation Permit No. DO16-170729

Dear Mayor Godbold:

The effluent limitations contained in Operation Permit No. DO16-170729 Specific Condition No. 11 are hereby modified as follows:

1. The maximum limit for effluent pH is increased from 7.3 to 7.5.

2. The maximum allowable annual average for total ammonia nitrogen [(NH_3 + NH_4^+)-N] is decreased from 0.8 mg/l to 0.7 mg/l. Maximum allowable limitations for monthly average, weekly average and the one (1)-time grab sample are also decreased in accordance with Florida Administrative Code (FAC) Rule 17-600.740(1)(b)2.

The effluent limitations for pH and total ammonia nitrogen are modified in accordance with information submitted (on your behalf) by Mr. David Bolam, P.E. on September 10 and October 16, 1991. The Department is authorized by FAC Rule 17-4.080 and Section 403.061(14) Florida Statutes (FS) to modify the subject operation permit. Note that all permit conditions are in effect and fully enforceable. Please (1) replace Permit Page 6 of 7 with the enclosed, amended page and (2) attached this Notice of Permit Modification to your copy of Operation Permit No. DO16-170729.

Persons whose substantial interests are affected by this Permit Modification have a right, pursuant to Section 120.57, Florida Statutes, to petition for an administrative determination (hearing) on it. The petition must conform to the requirements of Florida Administrative Code (FAC) Chapter 17-103 and FAC Rule 28-5.201 (copies attached) and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within fourteen (14) days of receipt of this Notice. Failure to file a petition within the fourteen (14) days constitutes a waiver of any right such person has to an administrative determination (hearing) pursuant to Section 120.57, Florida Statutes. This Permit Modification is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with this paragraph or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition and conforms to FAC Rule 17-103.070. Upon timely filing of a petition or a request for an extension of time this Permit Modification will not be effective until further Order of the Department.

...able Marvin E. Godbold, Jr.
...own of Baldwin
WWF

I.D. NUMBER: 3116M06085
PERMIT/CERTIFICATION: DO16-170729
DATE OF ISSUE: June 25, 1990
EXPIRATION DATE: May 31, 1995
AMENDED: February 3, 1992

SPECIFIC CONDITIONS:

11. The monitoring requirements and effluent limitations for this WWF are as follows:

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
FLOW	0.200 MGD (b)	Daily, 5/Week	(d)	Effluent
BOD_5	(a)	Every Two(2) Weeks	Composite (f)	Influent & Effluent (e)
TSS	(a)	Every Two(2) Weeks	Composite (f)	Influent & Effluent
$[NH_3 + NH_4^+]$-N	(a)	Every Two(2) Weeks	Composite (f)	Effluent
pH Units	6.0 to 7.5	Daily, 5/Week	Hourly (g)	Effluent
DO	Min. 7.0 mg/l	Daily, 5/Week	Grab (c)	Effluent
Temp.	Less than 86 °F	Daily, 5/Week	Grab	Effluent
Fecal Coliform	Avg. $\leq$200/100 ml Max. 800/100 ml	Quarterly	Grab	Effluent

(a) Effluent Limits, Maximum (mg/l)

	Annual average	Monthly average	Weekly average	One time grab max.
BOD_5	3.2	4.0	4.8	6.4
TSS	20	30	45	60
$[NH_3 + NH_4^+]$-N	0.7	0.9	1.0	1.4

(b) Annual average daily flow shall not exceed value shown.
(c) Grab samples will be collected during periods of minimal wastewater facility pollutant removal efficiencies, or maximum organic loading in the effluent.
(d) Flow rate is determined by recording flow meter and totalizer.
(e) Effluent shall be sampled following postaeration and prior to discharge to an unnamed drainage ditch (which flows into Deep Creek).
(f) An eight(8)-hour, flow proportioned composite sample is required for five(5)-day biochemical oxygen demand (BOD_5), total suspended solids (TSS) and total ammonia nitrogen ($[NH_3+NH_4^+]$-N).
(g) Effluent pH shall be measured on an hourly basis during the period of required operator attendance or by a continuous measuring device.

Florida Department of Environmental Regulation

Northeast District • 3426 Bills Road • Jacksonville, Florida 32207 • 904-798-42

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Ernest Frey, Deputy Assistant Secret

PERMITTEE:

Honorable Marvin E. Godbold, Jr.
Mayor, Town of Baldwin
P.O. Box 54
Baldwin, Florida 32234-0054

I.D. Number: 3116M06085
Permit/Cert Number: D016-170729
Date of Issue: June 25, 1990
Expiration Date: May 31, 1995
County: Duval
Lat/Long: 30°17'40"N/81°58'00"W
Section/Township/Range
Project: Town of Baldwin
Wastewater Facility (WWF)

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-3, 17-4, 17-600, 17-602, 17-604 and 17-19. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of a 0.400 MGD extended aeration wastewater facility with dewatering screen, comminutor, surge tank (to provide flow equalization), tertiary filtration, ultraviolet (UV) disinfection and postaeration, discharging to an unnamed drainage ditch to Deep Creek to St. Marys River; with sludge treated by aerobic digestion, polymer mixing, drying beds, and landfill disposal; serving the Town of Baldwin.

Located at 800 South Main Street, Baldwin, Duval County, Florida.

In accordance with the application received September 25, 1989 (including all construction drawings) and amended November 3, 1989, Janaury 16, 1990 and April 30, 1990.

PERMITTEE:

Honorable Marvin E. Godbold, Jr.
Town of Baldwin
WWF

I.D. NUMBER: 0116M06085
PERMIT/CERT NUMBER: DO16-170729
DATE OF ISSUE: June 25, 1990
EXPIRATION DATE: May 31, 1995

SPECIFIC CONDITIONS:

1. During the period of operation allowed by this permit, the permittee shall furnish one copy of the monthly operations report on the operation of the pollution control facility. Such report shall also contain information on the daily quantities of waste sludge generated at the source, type and degree of its treatment and the site of its ultimate disposal. Reports shall be submitted on a monthly basis to the Department; for the purposes of this permit, the Department shall mean (1) the State of Florida Department of Environmental Regulation (DER), 3426 Bills Road, Jacksonville, Florida 32207 and (2) the City of Jacksonville Bio-Environmental Services Division (BESD), 421 West Church Street, Suite 412, Jacksonville, Florida 32202.

2. Waste sludge or other solid waste shall not be discharged into waters either directly or indirectly and the same shall be disposed of in a manner approved by DER.

3. The effluent from this source shall be adequately treated by the UV unit at all times so as to provide a basic level of disinfection as required by Florida Administrative Code (FAC) Rule 17-600.440(4).

4. The personnel in charge of the operation, supervision or maintenance of the treatment facilities shall meet the requirements of FAC Rule 17-602. Sampling and monitoring of this facility will be in accordance with FAC Rule 17-601.

5. The discharge authorized by this permit shall be consistent at all times with the water quality of standards set forth in FAC Rule 17-3.

6. No additional connection shall be made to this facility without prior approval of the Department.

7. The permit holder shall also comply with county, municipal, federal or other state regulations.

8. An Operation and Maintenance Manual for this facility shall be available at the facility for use by operation and maintenance personnel and for inspection by the Department in accordance with FAC Rule 17-600.720(2).

9. A copy of these permit conditions shall be forwarded by the Permittee to the lead operator and/or the utility company who is charged to maintain and operate this facility, if other than the owner, so as to comply with General Condition No. 12 above.

10. Waste sludge disposal shall be in accordance with FAC Rule 17-7, Part IV. Sludge which has not been analyzed pursuant to FAC Rule 17-7.54(2) shall be disposed of at permitted or exempt solid waste disposal sites pursuant to FAC Rule 17-7.03(2), or as otherwise provided in FAC Rule 17-7.54(6).

Permittee:

Honorable Marvin E. Godbold, Jr.
Town of Baldwin
WWF

I. D. Number: 3116M06085
Permit/Certification: D016-170729
Date of Issue: June 25, 1990
Expiration Date: May 31, 1995

SPECIFIC CONDITIONS:

11. The monitoring requirements and effluent limitations for the Town of Baldwin WWF are as follows:

PARAMETER	EFFLUENT LIMIT	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow	0.400 MGD (b)	Daily, 5/Week	Recording Flow Meter & Totalizer	Influent
BOD_5	(a) mg/l	Every Two(2) Weeks	Composite(e)	Influent/ Effluent (d)
TSS	(a) mg/l	Every Two(2) Weeks	Composite	Influent/ Effluent
NH_3-N	(a) mg/l	Every Two(2) Weeks	Composite	Effluent
pH units	6.0 to 7.3	Daily, 5/Week	Hourly (f)	Effluent
Dissolved Oxygen	Min. 7.0 mg/l	Daily, 5/Week	Grab (c)	Effluent
Temperature	Less than 86°F	Daily, 5/Week	Grab	Effluent
Fecal Coliform	Avg ≤ 200/100 ml Max. 800/100 ml	Quarterly	Grab	Effluent

(a) Effluent Limits, Maximum (mg/l)

	annual average	monthly average	weekly average	one time grab max
BOD_5	3.2	4.0	4.8	6.4
TSS	20	30	45	60
NH_3-N	0.8	1.0	1.20	1.6

(b) Annual average daily flow shall not exceed value shown.
(c) Grab samples will be collected during periods of minimal wastewater facility pollutant removal efficiencies, or maximum organic loading in the effluent.
(d) Effluent shall be sampled after postaeration and prior to its discharge to the unnamed drainage ditch (which flows into Deep Creek).
(e) An eight(8)-hour, flow proportioned composite sample is required for five(5)-day biochemical oxygen demand (BOD_5), total suspended solids (TSS) and ammonia nitrogen (NH_3-N).
(f) Effluent pH shall be measured on an hourly basis during the period of required operator attendance or by a continuous measuring device.

Permittee:

Honorable Marvin E. Godbold, Jr.
Town of Baldwin
WWF

I.D. Number: 3116MO6085
Permit/Certification Number: DO16-170729
Date of Issue: June 25, 1990
Expiration Date: May 31, 1995

SPECIFIC CONDITIONS:

12. The UV Monitoring System shall be monitored on a daily basis, five (5) times per week. Maintenance shall be performed on a regular basis to ensure that the UV treatment unit does not fall below the manufacturer's recommended factor of safety.

13. The complete manufacturer's operation and maintenance manual for the UV disinfection unit shall always be a permanent part of the WWF Operation and Maintenance Manual.

14. Until further notice from the Department, effluent dissolved oxygen (D.O.) content and temperature (in degrees Farenheit) following postaeration shall be recorded on DER Form 17-1.205(7) [effective November 30, 1982], Page 1 of 2, as follows:

    a. D.O. shall be recorded in the column spaces beneath the heading "CHLORINE RESIDUAL (ppm)"

    b. Temperature shall be recorded in the column spaces beneath the heading "TOTAL P (mg/l)".

    c. Column headings shall be appropriately revised to indicate that data for D.O. and temperature is being recorded.

15. The Town of Baldwin WWF Master Plan for Regional Sewerage Development shall be submitted to BESD within 180 days following issuance of Operation Permit No. DO16-170729.

16. The Department reserves the right to modify this operation permit to expand disinfection and associated monitoring requirements should there be fecal coliform [illegible] limits.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to S120.52 , Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.
S. M. Marquerio 7/13/90
Clerk Date

Issued this 11 day of July 19 90

CITY OF JACKSONVILLE
DEPARTMENT OF HEALTH, WELFARE AND
BIO-ENVIRONMENTAL SERVICES

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

BAW

James L. Manning P. E.
Deputy Director

Ernest E. Frey, P.E.
Deputy Assistant Secretary

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (V2)

SUBMITTING AGENCY CODE: 2031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 19010049	DATE (M/D/Y): 08/22/94	RECEIVING BODY OF WATER: Deep Creek

REMARKS: water level low, turbid	LOCATION: Town of Baldwin STP Ditch above P.O.D	FIELD ID/NAME: Reference Site

Habitat Parameter	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover [16]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 18 17 (16)	20% to 40% snags, logs tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity [13]	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 (13) 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization [15]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern (15) 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition [7]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 (8) 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability [15]	Stable. No evidence of erosion or bank failure Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. (15) 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width [14]	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 (14) 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality [13]	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 14 (13) 12 11	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[0] Add 5 points if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.

Comments

[93] **TOTAL SCORE**

ANALYSIS DATE: 08/22/94	ANALYST: Hollingsworth	SIGNATURE: Mike Holly

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 037 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 19010049	DATE (M/D/Y): 08/22/94	TIME	RECEIVING BODY OF WATER: Deep Creek

REMARKS: water level low, water turbid, ~~oily~~	LOCATION: Town of Baldwin STP Ditch above P.O.D.	FIELD ID/NAME: Reference Site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
	30			50		20	

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

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

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

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values): see attached

Artificially Channelized ☐ no ☐ ☐ ☐ recent, severe / some recovery / mostly recovered, more obvious

Artificially Impounded ☑ yes

High Water Mark (m above bed): 1.0 m

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)	25	5	dipnet	Riffles			
Leaf Packs or Mats	45	5	dipnet	Sand			
Aquatic Vegetation	20	5	dipnet	Mud/Muck/Silt	10	~~dipnet~~ 5	dipnet
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):	velocity		Secchi (m):
Top	.5							
Mid-depth	↓	25.3	6.04	1.8	97.4	.5m/sec		
Bottom	↓							

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

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

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

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

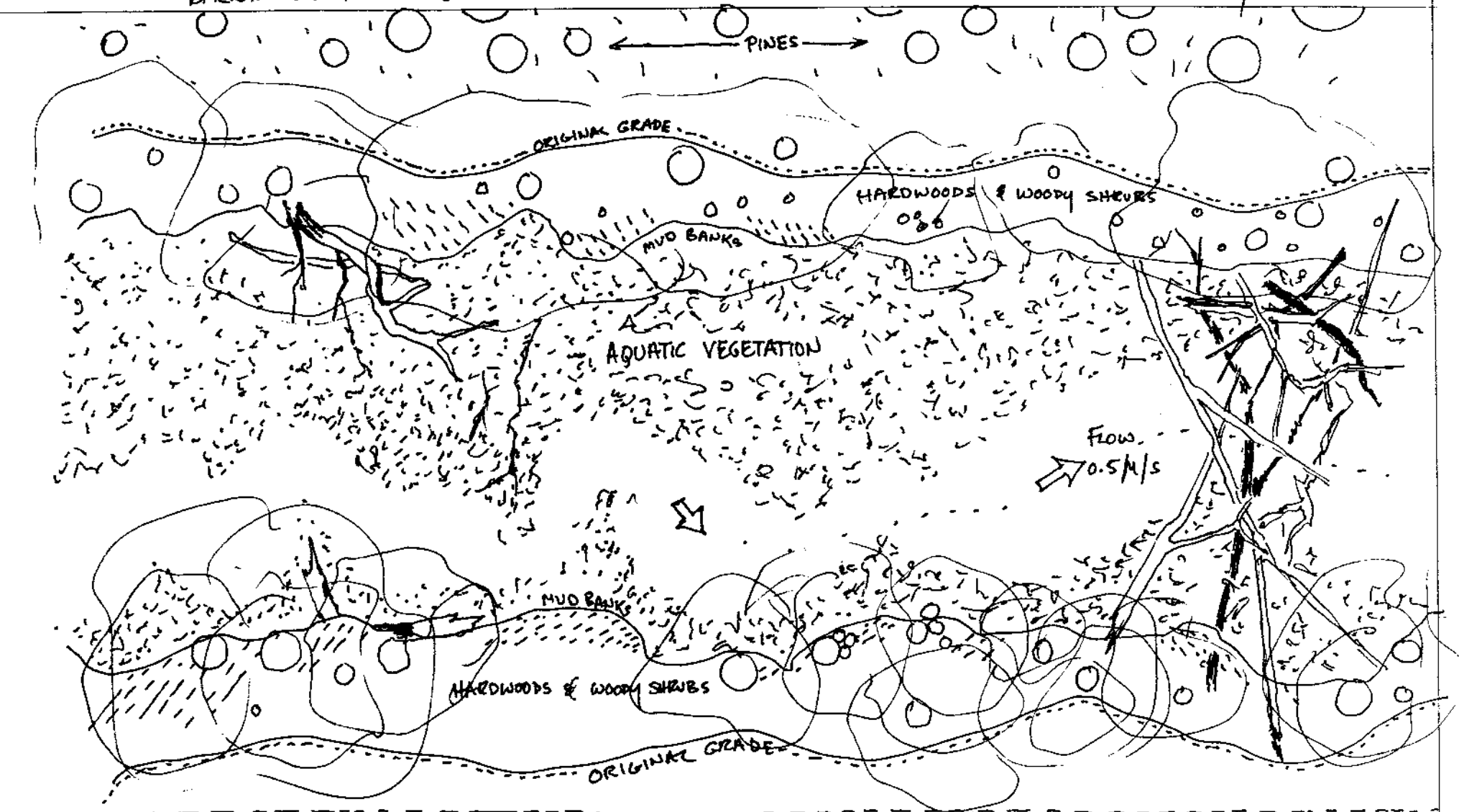
Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐ _____

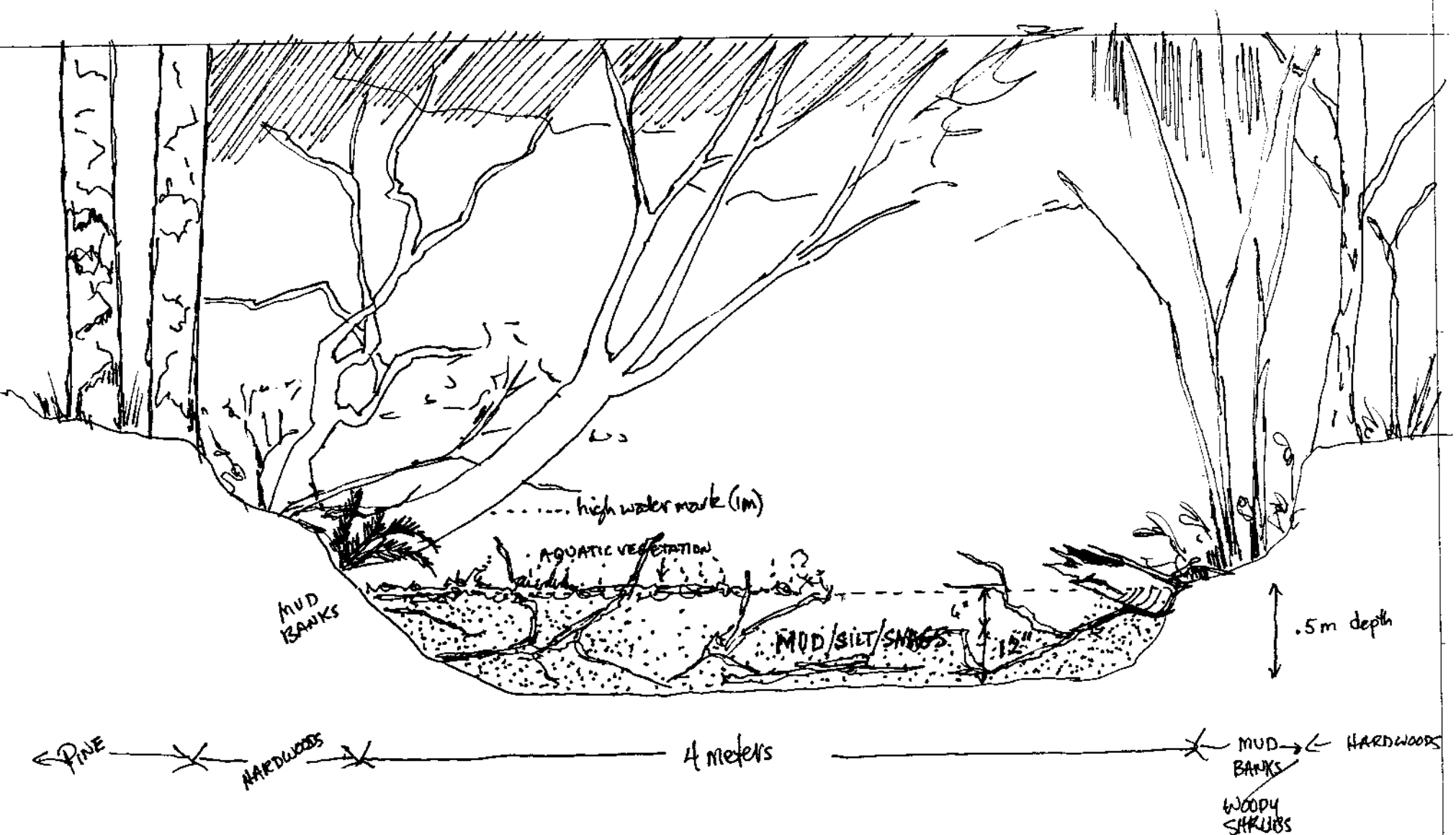
Weather Conditions/Notes: Cloudy, hot, humid – only one heater density recovered, two above water level.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Hollingsworth / McKelvey	Mike Hollyn	08/22/94

BALDWIN STP DISCHARGE DITCH ABOVE P.O.D. – AUGUST 22, 1994 Jim McKelvey





BALDWIN STP DISCHARGE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (V2)

SUBMITTING AGENCY CODE: 3e 31 SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 19010050	DATE (M/D/Y): 08/22/94	RECEIVING BODY OF WATER: Deep Creek
REMARKS: Water level low and more turbid	LOCATION: Town of Baldwin STP Ditch below P.O.D.	FIELD ID/NAME: Test Site	

Habitat Parameter	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 18	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs (partially decayed), undercut banks, rubble, or other stable habitat. 20 19 (18) 17 16	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable. 5 4 3 2 1
Water Velocity 13	Max. observed: >0.25 m/sec. but < 2 m/sec 20 19 18 17 16	Max. observed; 0.1 to 0.25 m/sec 15 14 (13) 12 11	Max. observed; 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec 5 4 3 2 1
Artificial Channelization 15	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern (15) 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Deposition 8	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of (50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 (8) 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability 15	Stable. No evidence of erosion or bank failure Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. (15) 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods 10 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width 14	Width of native vegetation (least buffered side) greater than 18 m 20 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 (14) 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality 14	Over 80% of streambank surfaces consist of native plants, including trees understory shrubs, or non-woody macrophytes. Plants growing naturally. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. Some disruption in community evident. 15 (14) 13 12 11	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

97 **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/22/94	Hollingsworth	Mike Hollingsworth

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Tax	STORET STATION NUMBER: 19010050	DATE (M/D/Y): 08/22/94	TIME: 1030	RECEIVING BODY OF WATER: Deep Creek

REMARKS: Water level lower and more turbid.	LOCATION: Town of Baldwin STP Ditch below P.O.O.	FIELD ID/NAME: Test Site

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
	30			50		20	

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

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

Width of riparian vegetation (m) on least buffered side: > 18m

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

see attached

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

Artificially Impounded ☑ yes

High Water Mark (m above bed): 1.0m

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)	35	5	dipnet	Riffles			
Leaf Packs or Mats	5545	5	dipnet	Sand			
Aquatic Vegetation	10	5	dipnet	Mud/Muck/Silt	10	5	dipnet
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):	Velocity		Secchi (m):
Top	0.6							
Mid-depth		25.9	6.47	3.17	228	.5m/s		
Bottom								

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

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

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:
Mostly Cloudy, Humid, & Hot (90°+F)
one slide w/ periphyton rack lost.

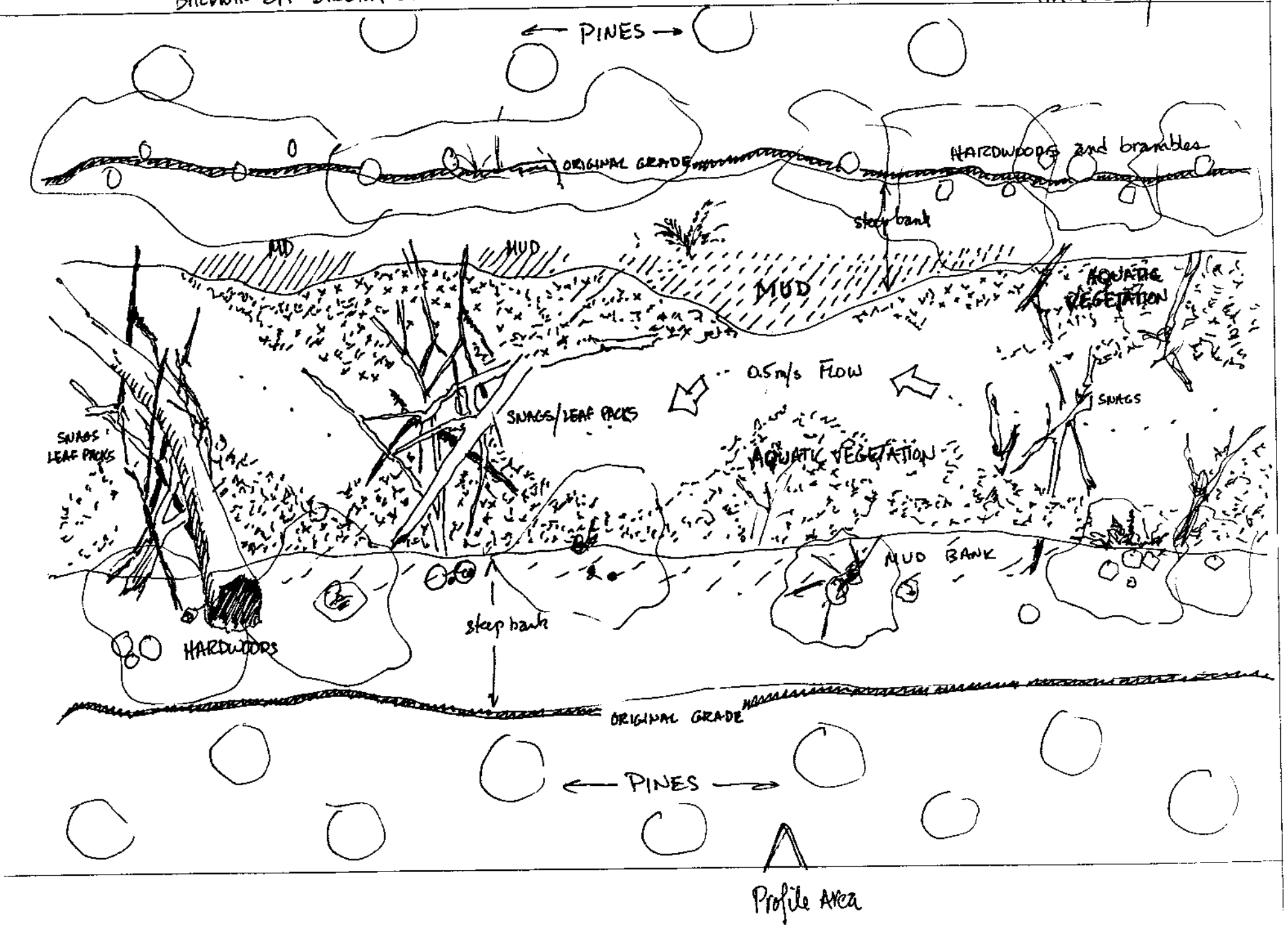
Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☑	☐	☐
Fish	☐	☐	☑	☐
Aquatic Macrophyt	☐	☐	☑	☐
Iron/sulfur Bacteria	☐	☐	☑	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
Hollingsworth / McKelvey	Mike Holl	08/22/94

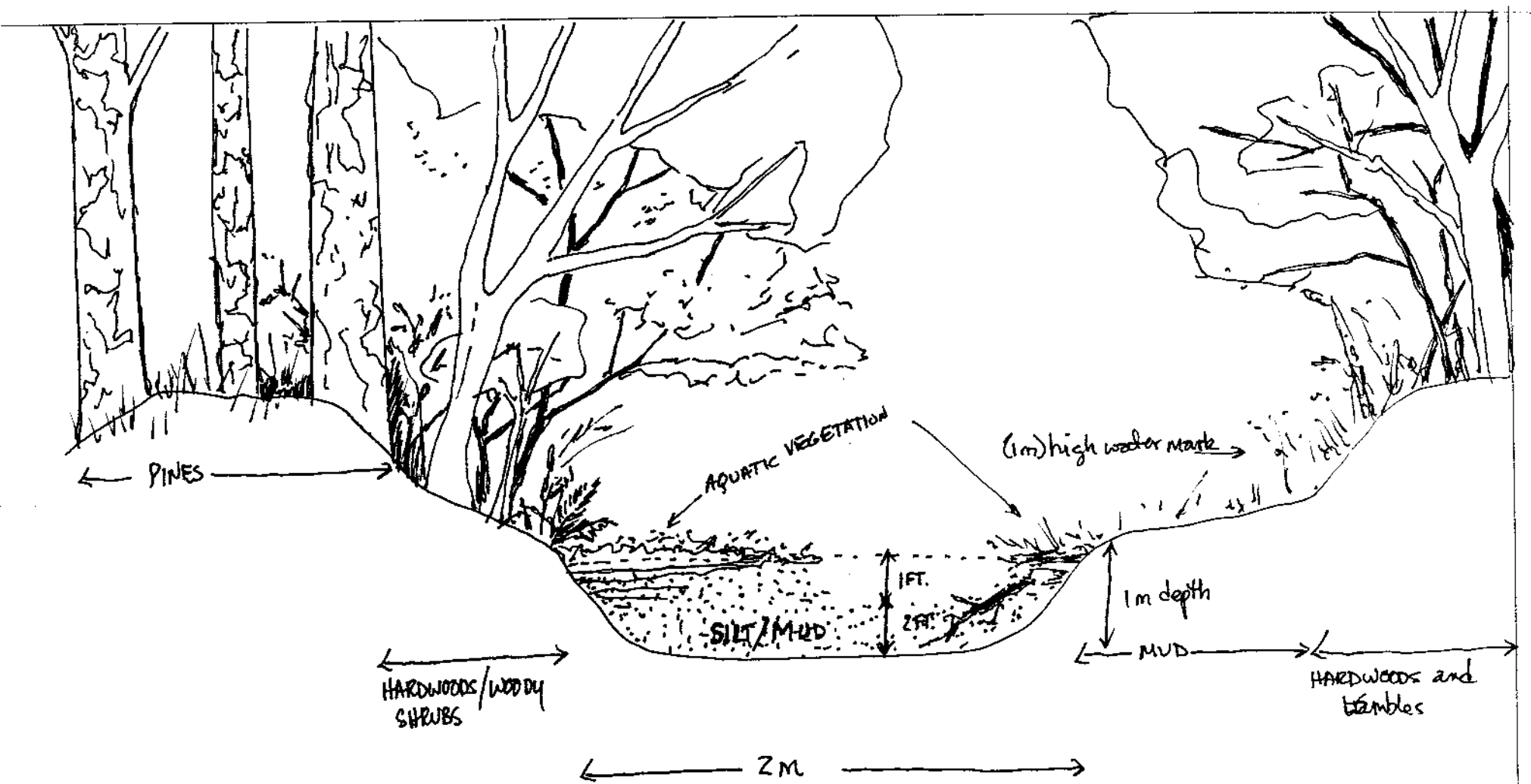
National Brand

BALDWIN STP DISCHARGE DITCH BELOW P.O.D. – AUGUST 22, 1994

TIM MCKECUEY



National Brand



BALDWIN STP DISCHARGE DITCH BELOW P.O.D. — AUGUST 22, 1994 TIM MCKELVEY

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Baldwin
County:
Contact / District:
NPDES Permit #: FL00
LIMS Sample #: 86690 **LIMS Job #:** 94-AUG-23 14

Sample Collection: Date 8-22-94 Time 1400
Test Beginning: Date 8-23-94 Time 1330
Test Ending: Date 8-25-94 Time 1400
Organism Batch #: 34 **Diluent Batch #:** well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 2 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.3 @ 24.3°C	104.5 @ 101.1 1051 @ 1047 @ 24.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	8.3 @ 24.2°C	10.6 @ 101.1 1047 @ 1047 @ 24.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.2	8.5 @ 23.2°C	105 @ 101.1 1035 @ 1047 @ 24.6 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control A	390	5	5	5	7.7	8.2	8.3	23.8	23.7	23.6	9.1	8.3	8.4	245	245	245
Control B	57	5	5	5	7.7	8.2	8.3			23.5	9.1	8.4	8.5	245	245	245
100% A	891	5	5	5	7.5	8.0	8.1	23.7	23.6	24.0	9.3	8.3	8.2	535	525	535
100% B	79	5	5	5	7.5	8.0	8.1			23.8	9.4	8.3	8.2	535	525	535
Measured/Loaded by:		TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF
Recorded by:		TM	MF	MF	MF	MF	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM

Investigators' Signatures

Tobin C Rabe
Marshall Faircloth
Terri McKibben

	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
	Water Quality Parameters				
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03		0.04	DR-100	TM
Alkalinity:	125		100	Hach	TR
Hardness:	120		135	Hach	TR
Total Ammonia:					

Sample Source: City of Cantonment
County:
Contact / District:
NPDES Permit #: FL00
LIMS Sample #: 86690 LIMS Job #: 94-AUG-23-14

Sample Collection: Date 8 22 24 Time 1400
Test Beginning: Date 8 23 24 Time 1330
Test Ending: Date 8-25-24 Time 1400
Organism Batch #: 31 Diluent Batch #: 33
Organism Age: <24 hrs
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) Definitive
(Static) Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.2 @ 24.3°C	104.5 @ 101.1 105.1 @ 1047 @ 24.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	5.3 @ 24.2 °C	106 @ 101.1 1047 @ 1017 @ 24.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.2	8.5 @ 23.2 °C	105 @ 101.1 1035 @ 1047 @ 24.6 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control	A	5	5	5	8.1		8.2	23.8		23.8	8.6		8.5	170		175
Control	B	5	5	5			8.2			23.8			8.5			175
Control	C	5	5	5		-	8.2			23.8			8.5			175
Control	D	5	5	5			8.2			24.0			8.5			180
100%	A	5	5	5	7.7		8.3	23.1		23.9	9.2		8.6	510		540
100%	B	5	5	5			8.3			24.0			8.6			540
100%	C	5	5	5			8.3			24.1			8.5			540
100%	D	5	5	5			8.3			24.0			8.5			540
Measured/Loaded by:		TM	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	MF	MF	MF		TM	MF		TM	MF		TM	MF		TM

Investigators' Signatures

Robin C. Reden
Marshall Faircloth
Tina M. Kubsch

Reviewer

form updated 4/27/94

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not Measured		
Lab Total Residual Cl2:	<0.03	<0.03	0.04	DR-120	TM
Alkalinity:	125	70	100	Hach	TR
Hardness:	120	80	135	Hach	TR
Total Ammonia:	<0.017	<0.017	<0.017	orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.4 Ammonia Blank: 20.017 Control Salinity: ____ ppt Sample Salinity: ____ ppt

Baldwin

Ref

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft Version 1994)								
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**				**Peninsula (75b, c, d)**			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31	16–30	0–15		≥ 27	14–26	0–13	5
EPT Index	≥ 7	4–6	0–3			≥ 4	0–3	1
% Contribution of Dominant Taxon		≤ 20	> 20			≤ 37	> 37	3
Florida Index	≥ 18	9–17	0–8		≥ 7	4–6	0–3	5
% Diptera		≤ 38	> 38			≤ 32	> 32	1
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6		≥ 8	4–7	0–3	5
% Shredders		≥ 10	0–9			≥ 13	0–12	1
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	3
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	3
Total Score	**Panhandle**				**Peninsula**			27
Interpretation of Score	**No Impairment**			**29-23**	**No Impairment**			**33-27**
	Moderate Impairment			**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation			**14-7**	**Severe Degradation**			**16-9**

Test

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft Version 1994)								
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**				**Peninsula (75b, c, d)**			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31	16–30	0–15		≥ 27	14–26	0–13	5
EPT Index	≥ 7	4–6	0–3			≥ 4	0–3	1
% Contribution of Dominant Taxon		≤ 20	> 20			≤ 37	> 37	3
Florida Index	≥ 18	9–17	0–8		≥ 7	4–6	0–3	5
% Diptera		≤ 38	> 38			≤ 32	> 32	1
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6		≥ 8	4–7	0–3	5
% Shredders		≥ 10	0–9			≥ 13	0–12	1
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	3
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	3
Total Score	**Panhandle**				**Peninsula**			27
Interpretation of Score	**No Impairment**			**29-23**	**No Impairment**			**33-27**
	Moderate Impairment			**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation			**14-7**	**Severe Degradation**			**16-9**

Macroinvertebrate taxa list for City of Baldwin WWTP, collected via 20 dip net sweeps in an unnamed tributary of Deep Creek, on 22 August 1994.

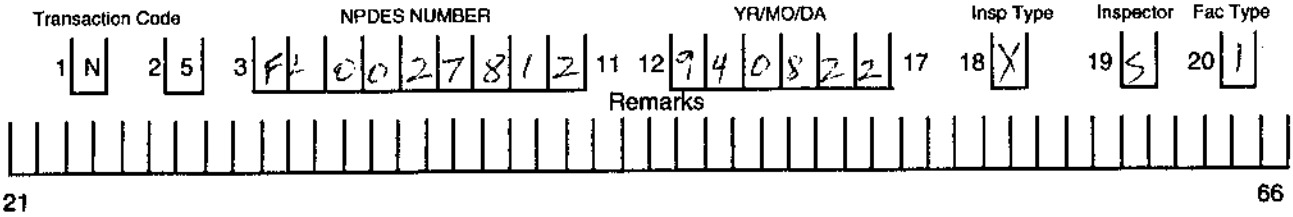
	Reference Site	Test Site
Amphipoda		
Hyalella azteca	6	11
Coleoptera		
Agabus sp.	1	–
Dineutus sp.	–	1
Decapoda		
Procambarus sp.	1	–
Diptera		
Ablabesmyia mallochi	1	2
Ablabesmyia rhamphe grp.	–	1
Asheum beckae	–	1
Undetermined Chironomidae	–	1
Chironomus sp.	4	19
Clinotanypus sp.	1	–
Cryptochironomus sp.	2	1
Dicrotendipes modestus	1	–
Undetermined Empididae	–	2
Goeldichironomus carus	1	–
Goeldichironomus natans ?	2	–
Kiefferulus sp.	1	1
Larsia decolorata	1	–
Nanocladius sp.	–	1
Undetermined Orthocladinae	1	–
Palpomyia grp. sp.	–	1
Parachironomus carinatus	1	–
Pentaneura inconspicua	–	1
Polypedilum illinoense	2	4
Polypedilum tritum	3	–
Paratanytarsus sp. A Epler	2	4
Undetermined dipteran pupae	–	2
Rheotanytarsus distinctissimus grp.	3	5
Rheotanytarsus exiguus grp.	–	1
Stenochironomus sp.	–	1
Tanytarsus sp. F Epler	1	–
Tanypus sp.	1	–
Ephemeroptera		
Caenis sp.	3	7
Gastropoda		
Undetermined Ancylidae	4	–
Hebetancyclus excentricus	1	–
Micromenetus dilatatus	5	–
Micromenetus sp.	–	4
Physella sp.	1	1

Pomacea paludosa	–	1
Hemiptera		
Abedus sp.	2	–
Hirudinea		
Batracobdella phalera	–	1
Undetermined Erpobdellidae	1	–
Philobdella sp.	1	–
Odonata		
Calopteryx maculata	1	–
Undetermined Gomphidae	1	–
Ischnura hastata	–	1
Undetermined Libellulidae	1	–
Orthemis ferruginea	–	1
Undetermined Odonata	–	1
Undetermined Zygoptera	–	1
Oligochaeta		
Dero trifida	1	–
Eclipidrilus palustris	1	–
Haber speciosus	–	1
Limnodrilus hoffmeisteri	1	5
Lumbriculus sp.	–	3
Lumbriculus variegatus	1	–
Pelecypoda		
Undetermined Pisidiidae	–	12
Trichoptera		
Cheumatopsyche sp.	1	–

Periphyton taxa list and densities (#/mm^2) for City of Baldwin STP collected via glass microscope slides in an unnamed tributary of Deep Creek on 22 August, 1994.

	Reference Site	Test Site
Bacillariophyta		
Achnanthes exigua	–	11
Achnanthes linearis	5	11
Bacillaria paradoxa	–	11
Cocconeis placentula	2	11
Cyclotella meneghiniana	2	–
Eunotia sp.	6	22
Eunotia curvata	2	–
Eunotia naegelii	–	11
Eunotia pectinalis	2	11
Gomphonema parvulum	2	11
Navicula minima	6	–
Navicula pupula v. *rectangularis*	–	11
Nitzschia amphibia	2	11
Nitzschia palea	2	–
Pinnularia sp.	–	11
Pinnularia biceps	3	11
Chlorophyta		
Chlamydomonas sp.	–	11
Oedogonium sp.	2	–
Schroederia sp.	6	–
Chrysophyta		
Dinobryon sp.	2	–
Cryptophyta		
Cryptomonas sp.	3	–
Cyanophyta		
Anabaena sp.	–	11
Chroococcus sp.	2	78
Gloeocapsa sp.	–	22
Merismopedia sp.	1	–
Microcystis sp.	–	45
Plectonema sp.	–	112

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)

