

Biological Assessment of

Purdom Electric Generating Plant

Wakulla County

NPDES #FL0025526

Sampled July 1995

November 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: Purdom Electric Generating Plant
County: Wakulla
NPDES Number: FL0025526
State Permit Expiration Date: 1 May 1996

Toxics Sampling Inspection (**XSI**)

Date Sampled: 31 July 1995

Results: No organic pollutants were detected in the effluent. No metals were found above Class III water quality standards.

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: 31 July 1995

Results: The sample of effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the bannerfin shiner, *Cyprinella leedsi*. The effluent total residual chlorine did not exceed the facility's permit limits.

Impact Bioassessment Inspection (**IBI**)

Date Sampled: 31 July 1995

Results: Measures of macroinvertebrate community health suggested no adverse effects caused by the Purdom discharge. In the dip net samples, taxa richness and Florida Index values were similar at both the reference and test sites. Many of the taxa common to both sites, such as *Corophium* sp., *Gammarus* sp., *Neritina reclivata*, and *Cyathura polita*, are usually found in low salinity estuaries. There did not appear to be any distinct changes in the invertebrate community structure that could be associated with the discharge. The phytoplankton data indicated the discharge was not exerting any negative effects on the St. Marks River. The phytoplankton taxa richness, Shannon-Weaver Diversity Index, and chlorophyll *a* were virtually identical at the test and reference sites. There were no undesirable amounts of planktonic algal biomass in the river.

Water Quality Inspection (**WQI**)

Date Sampled: 31 July 1995

Results: The total coliform bacteria in the effluent exceeded Class III water quality standards (Rule 62-302.530(7) FAC). The Purdom Generating Plant had a negligible effect on the nutrient levels of the St. Marks River; test site concentrations were low to average for a Florida stream. The Algal Growth Potential (AGP) value at the reference site (8.5 mg dry wt/L) was slightly higher than both the test site (7.7 mg dry wt/L) and the effluent (7.4 mg dry wt/L). These values slightly exceeded the 5 mg dry wt/L "problem threshold".

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide the basis for specific condition recommendations for permit renewal.

Introduction

The Tallahassee S. O. Purdom Electric Generating Plant is located on State Road 363, on the St. Marks River in Wakulla County (see maps in Appendix). The plant is a seven unit, oil fired, steam-turbine electrical generating station. Wastewater at this facility consists of boiler blowdown, air preheater wash, demineralized waste, and condenser cooling water. Wastewater accumulates in holding ponds, where it is neutralized by additions of lime, caustic, and magnesium hydroxide. It then undergoes mixing, flocculation, and sedimentation before the supernatant is discharged into the Class III St. Marks River. During the month of September, 1995, the daily maximum for Units 1-5 was 36 MGD, while the daily average was 8.5 MGD.

State permit limits at the 001 outfall are as follows: temperature (95 °F (35 °C) maximum and 90 °F (32.2 °C) as a monthly average) and total residual chlorine (0.01 mg/L as a daily maximum). In addition to the above permit limits, the 002 outfall has limits for copper (30 µg/L maximum), iron (1000 µg/L maximum), and pH (6.0 to 8.5 SU).

The facility consistently meets all state permit limits for the specified parameters, and has had no reported violations. A bioassessment conducted in August, 1990, concluded that the facility was having no adverse effects on the receiving water biota.

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	16	16
Florida Index	4	3
EPT Index	0	0
% Contribution of Dominant Taxon	33	29
% Diptera	4.8	22.1
% Isopoda	1.9	1.0
% Oligochaeta	9.5	31.7
%Coleoptera	0	1.0
% Polychaeta	4.8	0
% Gastropoda	22.0	7.7
% Amphipoda	56.2	36.5
% Other	1.0	0
% Predators	4.8	13.5
% Above Surface Deposit Feeders	9.1	9.6
% Below Surface Deposit Feeders	9.5	31.7
% Filter Feeders	33.3	7.2
% Scrapers	21.9	6.3
% Scavengers	10	15.9
% Shredders	0.5	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	13	7
Florida Index	4	2
Shannon-Weaver Diversity	2.1	1.7
EPT Index	2	0
% Amphipoda	53.8	21.7
% Isopoda	1.7	58.7
% Diptera	0.3	0.7
% Decapoda	0	2.8
% Ephemeroptera	0.6	0
% Gastropoda	43.1	14.7
% Coleoptera	0.3	1.4
% Other	0.2	0
% Predators	2.7	1.4
% Above Surface Deposit Feeders	2.8	1.8
% Scrapers	43.5	16.1
% Shredders	0	0.4
Phytoplankton Algae		
Number of Taxa	17	17
Shannon-Weaver Diversity	3.6	3.6
Algal Density (#/mL)	493	644
Chlorophyll a (µg/L)	1.4	1.5A
% Blue-green	4.2	7.8
% Green	16.7	4.7
% Diatoms	77.1	84.4
% Other	2.1	3.1
Algal Growth Potential (mg dry wt/l)	8.5	7.7

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 (approximately 200 meters upstream of the discharge in the St. Marks River) and a test site (also in the St. Marks River, approximately 50 meters downstream from the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays using the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *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). Additionally, nutrient analyses were performed on effluent, reference, and test sites. 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 substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Unfortunately, only two of the three Hester-Dendy replicates incubated at the test site were recovered. Phytoplankton communities were analyzed for chlorophyll *a* and identified for community structure (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

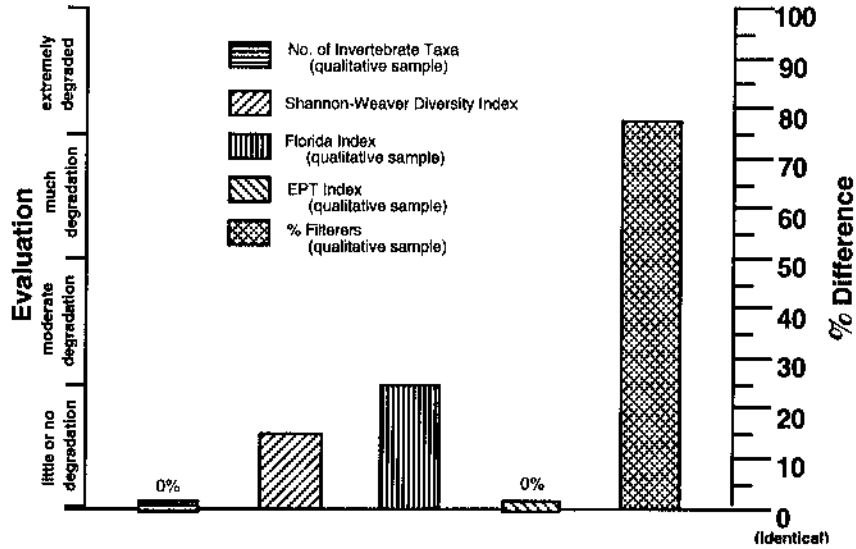
Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

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

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

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



Effect of discharge on the benthic macroinvertebrate community.

sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

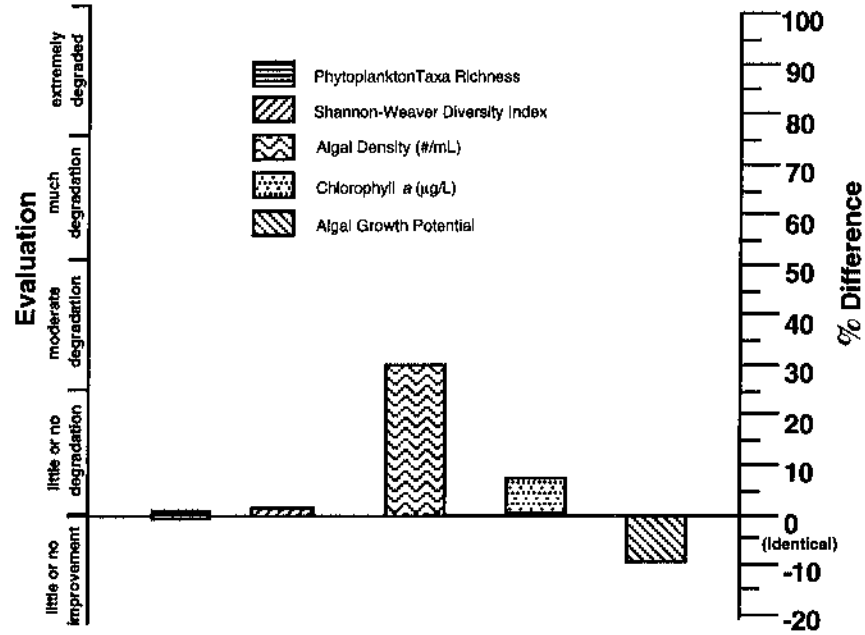
Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered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

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

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

The Stream Condition Index for Florida (SCI) is a composite macroinvertebrate metric (EA Engineering 1994). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SCI calculation table in Appendix).

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.



Effect of discharge on the algal community.

The following personnel were involved in this investigation: Teresa Dunn and Glenn Butts (DEP Northwest District) and Melva Campos, Michael Corrigan, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Tina Mikulski, Edward Miller, Elizabeth Miller, Liz Mould, Joe North, Tobin Rader, Bart Richard, Landon Ross, Jennifer Sparapani, Lisa Tamburello, and Vicki Whiting (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality at the reference site scored 115 points, which was higher than that of the test site, at 96 points. This was predominantly due to the slower velocity at the test site (which was situated in a cove near the outfall), compared with the reference site. The in-stream substrates sampled at both stations were aquatic vegetation and silt. Rock was an additional habitat sampled at the test site, while sand was sampled at the reference site. Dissolved oxygen at both the reference and test sites was 5.4 mg/L, complying with Class III Water Quality Standards. The pH was slightly above neutral at both sites (7.3 SU at the reference site and 7.4 SU at the test site). The

conductivity at the test site (240 µmhos/cm) was slightly higher than that of the reference site (212 µmhos/cm). Water temperature in the effluent (26.2 °C) and at the test site (26.5 °C) showed compliance with permit limits.

The effluent was not acutely toxic to the test organisms, *Ceriodaphnia dubia* and *Cyprinella leedsi*. The effluent's total residual chlorine (not detected at 0.03 mg/L) was below the facility's permit limit (Appendix).

No organic priority pollutants were detected in the effluent. Of the metals analyzed for, only iron (250 µg/L), aluminum (160 µg/L), and copper (5 µg/L) were found in the effluent. At a calculated hardness of 120 mg $CaCO_3$/L, none of these metals were above Class III water quality standards or the facility's permit limits.

Fecal coliform bacteria were measured at 210 organisms/100 mL at the reference site, 290 organisms/100 mL at the test site, and 380 organisms/100 mL in the effluent. Total coliforms were measured at 2000 organisms/100 mL at the reference site, 1700 organisms/100 mL at the test site, and 2600 organisms/100 mL in the effluent. The total coliform bacteria in the effluent represented a violation of Class III water quality standards (Rule 62-302.530(7) FAC).

The Purdom Generating Facility had a negligible effect on the nutrient levels of the St. Marks test site. The concentrations of nitrate-nitrite (0.096 mg/L at both the reference and test sites), total phosphorus (0.058 mg/L at the reference site and 0.075 mg/L at the test site) and ammonia (0.036 mg/L at both sites) were all low to average for a typical Florida stream (see table of typical water quality values in Appendix). The concentrations of TKN and orthophosphate at the test site were similarly unaffected by the plant's discharge.

The Algal Growth Potential (AGP) value at the reference site (8.5 mg dry wt/L) was slightly higher than those at the test site (7.7 mg dry wt/L) and in the effluent. (7.4 mg dry wt/L). These values slightly exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Measures of macroinvertebrate community health suggested no adverse effects caused by the Purdom discharge. 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 reference.

Despite a reduced sampling effort (a lost Hester-Dendy) at the test site, Shannon-Weaver diversity there was still within 19% of the reference site value. Since one of the artificial substrate replicates was not recovered from the test site, dip net samples will be emphasized in determining potential biological effects.

In the dip net samples, taxa richness was identical (with 16 taxa) at both sites. The Florida Index at the reference site (with a value of 4) was only one more than that of the test site (with 3 FI points). The EPT Index at both sites was zero. The reduced Florida Index and EPT scores at both sites may be attributed to the estuarine conditions in the area. Because this portion of the St. Marks River is subject to fluctuating salinity, conditions will often be inhospitable to the strictly freshwater taxa which comprise both the EPT and Florida Indices. Although fewer filter feeders were found at the test site (7.2 %) than at the reference site (33.3 %), filter-feeders were moderately well represented downstream of the discharge. Many of the taxa common to both sites, such as *Corophium* sp., *Gammarus* sp., *Neritina reclivata*, and *Cyathura polita*, are usually found in low salinity estuaries. Several species of freshwater chironomids and oligochaetes were also collected at both sampling sites. There did not appear to be any distinct changes in the invertebrate community structure that could be associated with the discharge.

The Figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Although periphyton is the preferred community for detecting water quality changes in flowing waters, only phytoplankton data were available (periphyton racks were lost). The phytoplankton data indicated the discharge was not exerting any negative effects on the St. Marks River. The phytoplankton taxa richness (17 taxa at each site), Shannon-Weaver Diversity Index (3.6 at both sites), and chlorophyll *a* (approximately 1.5 µg/L at both stations) indicated no change from the reference to test sites. Algal density was slightly higher at the test site, but the absolute values were quite low, indicating no undesirable amounts of algal biomass in the river.

Conclusions

The sample of effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the bannerfin shiner, *Cyprinella leedsi*. The effluent total residual chlorine did not exceed the facility's permit limits.

No organic pollutants were detected in the effluent. No metals were found above Class III fresh water quality standards.

The total coliform bacteria in the effluent exceeded Class III water quality standards (Rule 62-302.530(7) FAC). This is not attributable to process cooling water.

The Purdom Generating Plant facility had a negligible effect on the nutrient levels of the St. Marks test site, which were low to average for a Florida stream.

The Algal Growth Potential (AGP) value at the reference (8.5 mg dry wt/L) was slightly higher than both the test site (7.7 mg dry wt/L) and the effluent (7.4 mg dry wt/L). These values slightly exceeded the 5 mg dry wt/L "problem threshold".

Measures of macroinvertebrate community health suggested no adverse effects caused by the Purdom discharge. In the dip net samples, taxa richness and Florida Index values were similar at both the reference and test sites. Many of the taxa common to both sites, such as *Corophium* sp., *Gammarus* sp., *Neritina reclivata*, and *Cyathura polita*, are usually found in low salinity estuaries. There did not appear to be any distinct changes in the invertebrate community structure that could be associated with the discharge.

The phytoplankton data indicated the discharge was not exerting any negative effects on the St. Marks River. The phytoplankton taxa richness, Shannon-Weaver Diversity Index, and chlorophyll *a* were virtually identical at the test and reference sites. There were no undesirable amounts of planktonic algal biomass in the river.

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Chemistry summary table for

Purdom Power Plant.	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
none detected			
Metals (ug/L)			
Aluminum	160 I		
Arsenic	10 U		
Cadmium	0.1 U		
Chromium	10 U		
Copper	5 I		
Iron	250 A		
Lead	10 U		
Mercury	0.10 U		
Nickel	4 U		
Selenium	30 U		
Silver	0.050 U		
Zinc	10 U		
Nutrients (mg/L)			
Ortho-phosphate	0.040 I	0.039 I	0.042 I
Total phosphorus	0.063 A	0.058	0.075
Ammonia	0.029	0.036 A	0.036
Nitrate+Nitrite	0.10	0.096 A	0.096
TKN	0.35 A	0.32	0.34
General Phys-Chem Parameters			
Habitat Assessment		115	96
D.O. (mg/L)	5.8	5.4	5.4
pH (SU)	7.4	7.3	7.4
Conductivity (µmhos/cm)	240	212	240
Temperature (°C)	26.2	23.7	26.5
Residual Chlorine (mg/L)	0.03 U		
Total Suspended Solids (mg/L)	3	3 A	10
Hardness (mg CaCO3)	120		
Algal Growth Potential (mg dry wt/L)	7.4	8.5	7.7
Toxicity			
Bioassay Fish	Not Toxic		
Bioassay Invertebrate	Not Toxic		
Microbiological Communities (org/100 mL)			
Fecal coliform	380	210	290 A
Total coliform	2600	2000	1700 A
Escherichia coli	200	120	210 A

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

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

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

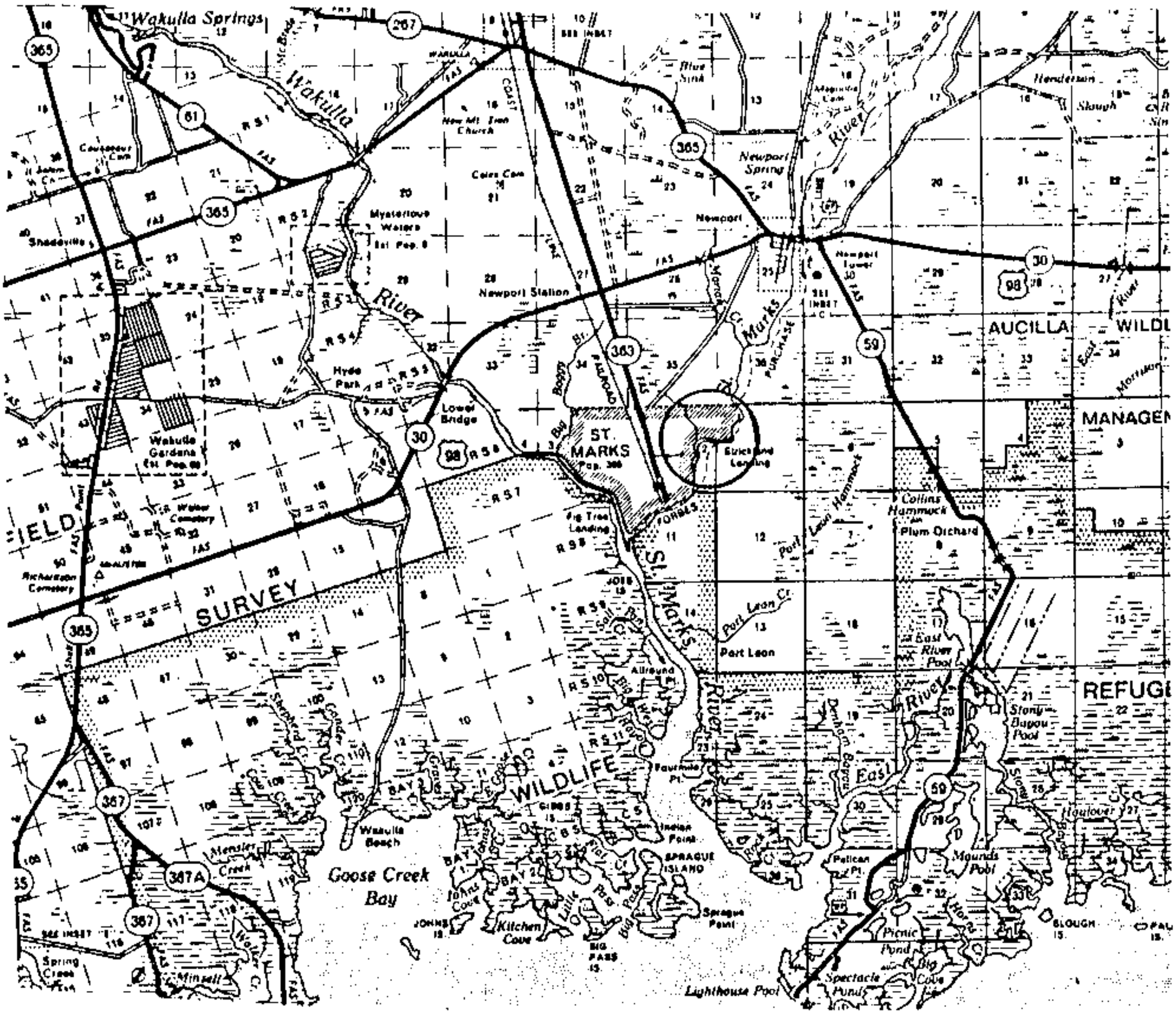
Typical Values for Selected Parameters in Florida Waters

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



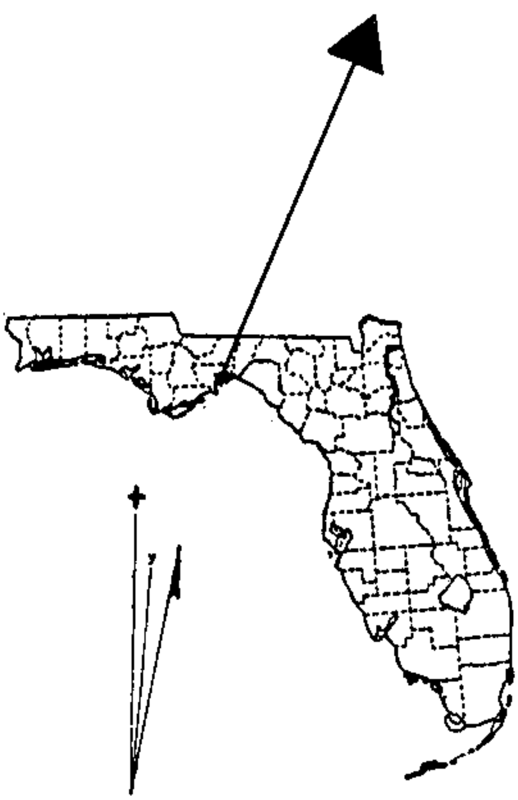


Figure 1. Portions of St. Marks, Wakulla County, Florida, including location of Purdom Power Plant.

Facility Summary

Facility Name: Purdom Generating Station **Date Summary Prepared:** 9/25/95

Location map: (Attached) **County:** Wakulla **District:** Northwest
State Road 363
St. Marks, FL 32301

NPDES Permit # FL0025526 **Expiration date:** 9/30/97
State GMS # 1065M02695 **Expiration date:** 5/01/96
Facility Type: Industrial

Function of facility: This facility is permitted to operate a seven unit steam-turbine electrical generating station with wastewater discharges into the St. Marks River.

Description of treatment process: Wastewater from the boiler blowdown, air preheater wash, demineralized waste, and condenser cooling water is discharged into the river after pre-treatment in holding ponds. It is treated with a lime, caustic, and magnesium hydroxide addition consisting of mixing, flocculation, and sedimentation. Disposal of non-hazardous sludge is taken to the Industrial Wastewater Processing Site in Jacksonville, FL and the remaining sludge (filter cake) goes to Geowaste in Valdosta, GA.

Receiving waters: St. Marks River - Apalachee Bay **Classification:** III

Design Flow: Not specified in permit
Mean Flow: 8.5 MGD* (September 1995)
Flow during survey:

*Units 1-5 (cooling water)

Discharge is: Continuous*. Most of the effluent flow is derived from Outfall 001 and/or Outfall 002, which primarily discharge cooling waters.

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

List effluent limits (attach relevant paperwork):

Parameter	Frequency	Limit (units)
Outfall 001:		
Temperature	Continuous	90 °F (Monthly Avg.) 95 °F (Max.)
Chlorine Residual	Daily	0.01 (mg/L)
Outfall 002:		
Temperature	Continuous	90 °F (Monthly Avg.) 95 °F (Max.)
Chlorine Residual	Daily	0.01 mg/L
Copper	One per Quarter	0.03 mg/L
Iron	One per Quarter	1 mg/L
pH	Daily	6.0 - 8.5 SU

Outfall 005:		
Copper	One per Quarter	0.03 mg/L
Iron	One per Quarter	1 mg/L
pH	Daily*	6.0 - 8.5 SU
Oil & Grease	One per Week*	5 mg/L
T.S.S.	One per Week*	30 mg/L (Monthly Avg.) 100 mg/L (Max.)
Outfall 006:		
Oil & Grease	One per Week*	5 mg/L
T.S.S.	One per Week*	30 mg/L (Monthly Avg.) 100 mg/L (Max.)
pH	Daily*	6.0 - 8.5 SU

* The sampling frequency for Outfalls 005 & 006 is currently undergoing permit revision to be taken "once per discharge".

List permit violations (from DMR data or other source) and plant upsets within the past year: There have been no excursions reported in Purdom's DMR's for the past year. The facility only submits DMR's due to the similar permit requirements of both EPA and the state.

Describe previous impact bio-assessments, WQBEL's and previous or current enforcement actions: The latest bioassay on file was performed in November 1994. The effluent was not toxic to the test organisms, and there are no pending or existing enforcement actions against the permittee.

Discuss comparability of MOR/DMR results to past FDEP results and whether there are trends (improving, declining) in the data set: The DMR results appear to be consistent with the sampling results taken during FDEP inspections. No definite trends can be identified within the data set.

Additional information:

Staff contributing to this review (signature)

Nikki Kilburn (Coop) — Biologist

Inspector

Other

Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7/31/95		St. Marks River

REMARKS:	LOCATION:	FIELD ID/NAME:
Reference Site	200 M above outfall	Purdom Gen. Station

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
79		5	5	10		1	

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: 10 m

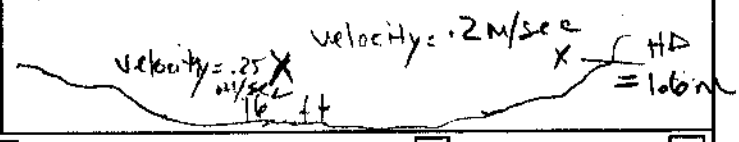
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ ☐ ☒ Back

Artificially Impounded ☐ yes — recent, severe | some recovery | mostly recovered, more sinuous

High Water Mark (m above bed): 1 m

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



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)	2			Sand	33	2	
Leaf Packs or Mats	1			Mud/Muck/Silt	33	2	
Aquatic Vegetation	30	16		Other:			
Rock or Shell Rubble	0			Other:			
Shorezone (Roots/Veg.)	1			***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.1 m	23.7	7.32	5.37	212			1.6 m
Mid-depth	1.0 m	22.6		5.3	210			
Bottom	2.0 m	22.5		5.27	210			

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

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

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

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

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

Weather Conditions/Notes:
DO 2.23 @ 24.4°C
Cond 19.9 mS @ ground wtr.
pH cal 4.00 @ 3.99; 7.00 @ 6.99
Clear, Sunny 83°F

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Liz Miller, Vicki [illegible]		

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7/31/95	St Mark's River

REMARKS:	LOCATION:	FIELD ID/NAME:
Reference Site	200 M above outfall	Purdom Gen. Sta

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover [13]	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 [18]	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 [20]	Less than 20% of habitats affected by sand or silt accumulation (20) 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability [20]	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 [9]	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 [20]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. (20) 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

[ ] **TOTAL SCORE**

Comments

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/31/95	LKI / VW / MC	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		7/31/95	10:50	St Mark's River

REMARKS:	LOCATION:	FIELD ID/NAME:
Test Site	50M below outfall	Purdom Gen Sta.

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
80		5	4	5		1	

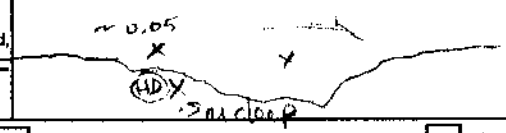
Local Watershed Erosion (check box): None [X] Slight [ ] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [X] Some potential sources [ ] Obvious sources [ ]

Width of riparian vegetation (m) on least buffered side: 10m

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)



Artificially Channelized [ ] no [ ] recent, severe [X] some recovery [ ] mostly recovered, more sinuous

Artificially Impounded [ ] yes

High Water Mark (m above bed): 1m

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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	60	0	
Leaf Packs or Mats				Mud/Muck/Silt	8	2	Surface
Aquatic Vegetation	30	1	Surface	Other:			
Rock or Shell Rubble	2	2	Surface	Other:			
Shorezone (Roots/Veg.)				Draw aerial view sketch of habitats found in 100 m section			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top		26.5	7.58	5.4	240			to floor
Mid-depth								
Bottom	1<1m	26.5		5.5	240			

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

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [ ] Green (algae): [ ] Clear: [X] Other: [ ]

Weather Conditions/Notes:

1 hr - tent + Elk was on its side

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[ ]	[X]	[ ]
Fish	[ ]	[ ]	[X]	[ ]
Aquatic Macrophytes	[ ]	[ ]	[ ]	[X]
Iron/sulfur Bacteria	[X]	[ ]	[ ]	[ ]

SAMPLING TEAM:	SIGNATURE:	DATE:
Liz Kuller, Vicki Wetting, Nigel Corrigan		7-31-95

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		7/31/95	St. Mark's River

REMARKS:	LOCATION:	FIELD ID/NAME:
Test site	50M beloW outfall	Purdom Gin Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Bottom Substrate/ Available Cover 13	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 5	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 20	Less than 20% of habitats affected by sand or silt accumulation (20) 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability 20	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 8	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 15	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 20 19 18 17 16	50% to 80% of riparian zone is vegetated, but one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. (15) 14 13 12 11	25% to 50% of riparian zone is vegetated, but one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated. Poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

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

Comments

91 **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7-31-95	[illegible]	[illegible]

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: S.O. Purdom Generating
County: Wakulla
Contact / District: Vicki Whiting
NPDES Permit #: FL0025526
LIMS Sample #: 112285 (sample log 8/3) **LIMS Job #:** 95-Jul-31-16-01

Sample Collection: Date 7/31/95 Time 1030
Test Beginning: Date 8/1/95 Time 1000
Test Ending: Date 8/3/95 Time 1245
Organism Batch #: 37 **Diluent Batch #:** 31
Organism Age: <24hrs
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	25.3 @ 25.1	8.3 @ 24.9 °C	102.8 @ 102.1 100.2 @ 100.0 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.2 @ 25.2	8.3 @ 25.0 °C	102.6 @ 102.1 142.4 @ 141.2 @ 25.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.3	8.3 @ 24.6 °C	104.3 @ 102.1 99.5 @ 100.0 @ 24.7 °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	3	8.2		8.1	23.8		24.1	8.3		7.8	175		180
Control	B	5	5	5			8.1			24.0			7.8			190
Control	C	5	5	5			8.2			24.1			7.9			190
Control	D	5	5	5			8.2			24.3			8.0			185
100%	A	5	5	5	7.7		8.3	23.3		24.2	7.7		7.9	220		235
100%	B	5	5	5			8.3			24.1			7.9			230
100%	C	5	5	5			8.3			24.1			7.9			235
100%	D	5	5	5			8.3			24.3			7.9			240
Measured/Loaded by:		TM	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TR	MF	JRS	DW		DW	DW		DW	DW		DW	DW		DW

Investigators' Signatures

Tobin C. Rader

Jennifer Sarrapochiello

reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):					
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	TR
Alkalinity (mg/L as $CaCO_3$):		70	95	hach	LM
Hardness (mg/L as $CaCO_3$):		90	120	hach	LM
Total ammonia (mg/L as N):		<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Meter Slope: -57.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: S.O. Purdom Generating
County: Wakulla
Contact / District: Vicki Whiting
NPDES Permit #: FL0025526
LIMS Sample #: 112285 **LIMS Job #:** 95-JUL-21-16-02

Sample Collection: Date 7/31/95 Time 10:30
Test Beginning: Date 8/1/95 Time 12:30
Test Ending: Date 8/3/95 Time 12:45
Organism Batch #: 30 **Diluent Batch #:** well
Organism Age: 12 days old

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	25.3 @ 25.4	8.3 @ 24.9 °C	102.8 @ 102.1
	9.0 @ 9.0			1002 @ 1000 @ 25.3 °C
24 hr	7.0 @ 7.0	25.2 @ 25.2	8.3 @ 25.0 °C	102.6 @ 102.1
	9.0 @ 9.0			1424 @ 1412 @ 25.0 °C
48 hr	7.0 @ 7.0	24.2 @ 24.3	8.3 @ 24.6 °C	104.3 @ 102.1
	9.0 @ 9.0			995 @ 1000 @ 24.7 °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	B 11	5	5	5	7.8	8.2	8.2	24.9	23.7	24.1	8.8	7.8	7.4	250	250	255
Control B	B 12	5	5	5	7.8	8.2	8.2	25.1		24.0	8.7	7.8	7.4	250	250	250
Control C	B 13	5	5	5	7.8	8.2	8.2	25.1		24.0	8.9	7.9	7.5	255	250	250
Control D	B 14	5	5	5	7.8	8.2	8.2	25.1		23.7	8.7	8.0	7.5	250	250	250
100% A	B 15	5	5	5	7.6	8.0	8.1	22.6	23.8	24.4	7.8	7.3	7.3	220	230	240
100% B	B 16	5	5	3 (2)	7.6	8.0	8.1	22.5		24.3	7.7	7.4	7.2	220	230	235
100% C	B 17	5	5	5	7.6	7.9	8.1	22.5		24.2	7.8	7.5	7.4	220	230	235
100% D	B 18	5	5	5	7.6	7.9	8.1	22.4		24.0	7.7	7.5	7.3	220	230	235
Measured/Loaded by:		DW	JDS	JDS	TM	JDS	JS	TM	JDS	JS	TM	JDS	JS	TM	JDS	JS
Recorded by:		TR	JDS	JDS	DW	MF	DW	DW	MF	DW	DW	MF	DW	DW	MF	DW

Investigators' Signatures

Tina M. Hulsey

Tom G. Rueter

Jennifer Smith

Jennifer Spraquel

reviewer

form updated 5/05/95

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):					
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):	125		95	Hach	LM
Hardness (mg/L as $CaCO_3$):	125		120	Hach	LM
Total ammonia (mg/L as N):	<0.017		<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -57.5 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

Benthic macroinvertebrate taxa list for Purdom Generating Station collected via 20 dip net sweeps in the St. Marks River on 31 July, 1995.

	Reference Site	Test Site
Polychaeta		
Hobsonia florida	5	–
Oligochaeta		
Aulodrilus pigueti	–	1
Dero trifida	–	4
Eclipidrilus sp.	1	–
Ilyodrilus templetoni	1	–
Limnodrilus hoffmeisteri	7	28
Lumbriculus variegatus	1	–
Gastropoda		
Hydrobiidae	–	2
Littoridinops sp.	4	–
Neritina reclivata	19	6
Isopoda		
Cyathura polita	1	1
Uromunna reynoldsi	1	–
Amphipoda		
Corophium sp.	35	6
Crangonyx sp.	4	–
Gammarus sp.	20	31
Amphipoda	–	1
Odonata		
Enallagma sp.	1	–
Coleoptera		
Stenelmis sp.	–	3
Chironomidae		
Ablabesmyia rhamphe grp.	3	–
Clinotanypus sp.	–	1
Cryptotendipes sp.	–	3
Nanocladius sp.	–	1
Palpomyia/bezzia grp.	1	3
Polypedilum illinoense	1	–
Procladius sp.	–	9
Tanypus sp.	–	1
Tanytarsus sp.	–	2
Tanytarsus sp. G Epler	–	1
Chironomidae	–	2

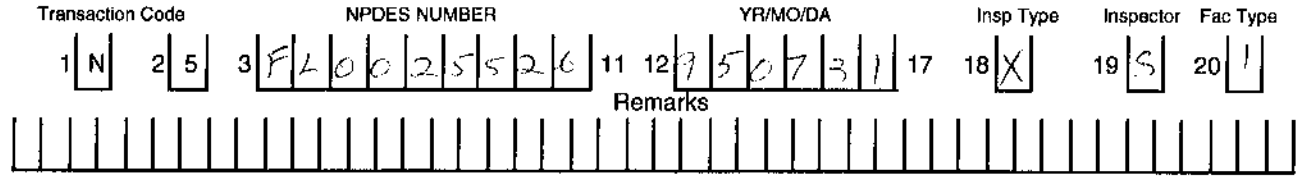
Benthic macroinvertebrate taxa list for Purdom Generating Station, collected via Hester Dendy artificial substrates in the St. Marks River on 31 July, 1995. Densities, in number/m ^{2}, represent the mean of three replicates at the reference site and the mean of two replicates at the test site.

	Reference Site	Test Site
Gastropoda		
Littoridinops sp.	228	–
Micromenetus sp.	19	–
Neritina reclivata	153	83
Physella sp.	3	–
Isopoda		
Caecidotea sp.	3	–
Uromunna reynoldsi	13	333
Amphipoda		
Crangonyx sp.	45	16
Gammarus sp.	458	107
Decapoda		
Rhithropanopeus harrisii	–	16
Ephemeroptera		
Stenonema exiguum	3	–
Stenacron floridense	3	–
Odonata		
Enallagma sp.	3	–
Coleoptera		
Ectopria sp.	–	8
Macronychus sp.	3	–
Diptera		
Chironomus sp.	–	4
Chironomidae	3	–

Phytoplankton taxa list and densities (#/mL) for Purdom Generating Station collected via subsurface grabs in the St. Marks River on 31 July, 1995.

	Reference Site	Test Site
Cyanophyceae		
Lyngbya sp.	–	10
Oscillatoria sp.	–	20
Rhabdoderma sp.	–	10
Cyanophyceae	21	10
Bacillariophyceae		
Achnanthes sp.	21	50
Achnanthes hustedtii	–	30
Achnanthes lanceolata dubia	21	10
Bacillaria sp.	10	–
Cocconeis placentula	92	50
Coscinodiscus sp.	10	–
Cyclotella sp.	41	30
Eunotia sp.	10	10
Gomphonema sp.	–	10
Gyrosigma sp.	10	–
Melosira sp.	10	10
Navicula radiosa	–	20
Navicula sp.	82	131
Navicula viridula	–	20
Nitzschia acicularis	10	–
Nitzschia sp.	10	50
Synedra sp.	21	30
Pennales	31	91
Chlorophyceae		
Cylindrocystis sp.	10	10
Gloeocystis sp.	21	–
Scenedesmus sp.	10	–
Schroederia sp.	10	–
Chlorophyceae	31	20
Dinophyceae		
Gymnodinium sp.	10	10
Cryptophyceae		
Cryptomonas sp.	–	10

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)

