


Biological Assessment of

# Northeast Florida State Hospital Wastewater Treatment Plant

Baker County

NPDES #FL0033758

Sampled November 1994

April 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: N. E. Florida State Hospital WWTP
County: Baker
NPDES Number: FL0033758
State Permit Expiration Date: 16 August, 1995

### Toxics Sampling Inspection (XSI)

Date Sampled: 31 October, 1994

Results: No organic pollutants were detected in the effluent. Silver (0.39 ug/L) was detected in the outfall at a concentration above the Class III water quality standard (Rule 62-302.530(60) FAC).

### Compliance Biomonitoring Inspection (CBI)

Date Sampled: 31 October, 1994

Results: The sample of effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or the bannerfin shiner, *Cyprinella leedsi*.

### Impact Bioassessment Inspection (IBI)

Date Sampled: 1 November, 1994 & 22 November, 1994

Results: Substantial declines in the Florida Index and the EPT Index between the reference and test sites indicated that the discharge was negatively affecting the community. The reference site SIIF score indicated "no impairment", whereas the test site SIIF value was in the "moderate impairment" category. Many species sensitive to pollution, including the stonefly, *Luectra* sp., the mayfly, *Stenonema smithae*, and the caddisflies, *Chimarra* sp. and *Phylocentropus* sp., were relatively common at the reference site, but were absent from the test site. In summary, the macroinvertebrate data suggest that the discharge is degrading the biota of John Rowe Branch, resulting in an imbalance of aquatic fauna, prohibited by Rule 62-302.530(48)(b) FAC.

### Water Quality Inspection (WQI)

Date Sampled: 31 October, 1994

Results: Total coliform bacteria violations occurred at the test site (3000 organisms/100 mL) and in the effluent (9000 organisms/100 mL) (Rule 62-302.530(7) FAC). Fecal coliform violations were not found in the effluent or at the study sites. The facility was responsible for nutrient enrichment at the test site. Test site concentrations of nitrate-nitrite (0.34 mg/L) and ortho-phosphate (0.52 mg/L) were considerably higher than those found at the reference site, as well as exceeding those found in 80% to 90% of typical Florida streams. Algal Growth Potential (AGP) was quite elevated in the effluent (77.7 mg dry wt/L). AGP increased dramatically (by 11,366%) at the test site (34.4 mg dry wt/L) when compared to the reference site (0.3 mg dry wt/L). The AGP at the test site exceeded the 5 mg dry wt/L "problem threshold". The effluent pH (8.6 S.U.'s) was in violation of the facility's permit, and the calculated unionized ammonia value (0.08 mg/L) exceeded the Class III standard for freshwaters, Rule 62-302.530(3) FAC.

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 Northeast Florida State Hospital Wastewater Treatment Plant is located in Baker County on State Road 121, Florida (see map in Appendix). This 0.3 MGD facility utilizes high rate trickling filters with primary and secondary clarifiers. Chlorinated effluent is discharged to a holding pond for storage before it is pumped to an overland flow field. Effluent is then collected through a series of concrete ditches and discharged into the headwaters of John Rowe Branch, a Class III tributary of the South Prong of the St. Mary's River. The plant has been operating at approximately half of its designed capacity (0.13 MGD).

State permit limits are as follows: flow (0.3 MGD annual average), BOD (5 mg/L annual average), TSS (5 mg/L annual average), total nitrogen (6 mg/L annual average), TKN (5 mg/L annual average), dissolved oxygen (5.1 mg/L minimum), pH (6.0 to 8.5 S.U.'s), total residual chlorine (minimum of 0.5 mg/L for disinfection, maximum of 0.01 mg/L at discharge), and fecal coliform bacteria (maximum of 200 organisms/100 mL (see Facility Summary in Appendix).

This facility has had numerous permit violations in the past year, including exceeding residual chlorine, BOD, TSS, and fecal coliform bacteria limits. Leaks in the overland flow field walls prevent portions of the wastewater from being completely treated. In October, 1994, the Dept. of Health and Rehabilitative Services indicated that they are preparing a budget proposal to replace the entire facility with an extended aeration treatment plant.

## 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 (Caulkins Creek at Hamp-Register Road) and a test site (John Rowe Branch down-

*Major characteristics of community structure of control and test sites.*

| | Reference Site | Test Site |
|---|---|---|
| **Macroinvertebrate Qualitative** | | |
| Number of Taxa | 40 | 30 |
| Florida Index | 23 | 17 |
| SIIF | 25 | 19 |
| EPT Index | 9 | 5 |
| % Contribution of Dominant Taxon | 11.1 | 30.3 |
| % Oligochaeta | 5.6 | 4.2 |
| % Diptera | 37.0 | 48.6 |
| % Ephemeroptera | 13.0 | 1.4 |
| % Trichoptera | 19.4 | 3.5 |
| % Odonata | 3.7 | 7.0 |
| % Coleoptera | 13.9 | 33.1 |
| % Other | 6.9 | 10.4 |
| % Predators | 20.4 | 13.1 |
| % Above Surface Deposit Feeders | 27.5 | 22.6 |
| % Below Surface Deposit Feeders | 5.6 | 4.3 |
| % Suspension Feeders | 22.7 | 40.3 |
| % Scrapers | 13.0 | 17.6 |
| % Shredders | 9.7 | 1.3 |
| % Parasites | 0 | 0.2 |
| % Scavengers | 1.2 | 0.6 |
| **Macroinvertebrate Hester-Dendy** | | |
| Number of Taxa | 30 | 32 |
| Florida Index | 28 | 14 |
| Shannon-Weaver Diversity | 3.9 | 4.0 |
| EPT Index | 9 | 3 |
| % Oligochaeta | 1.1 | 6.3 |
| % Diptera | 33.0 | 76.3 |
| % Ephemeroptera | 53.7 | 10.0 |
| % Trichoptera | 6.9 | 0 |
| % Odonata | 2.1 | 3.8 |
| % Other | 3.2 | 3.7 |
| % Predators | 6.7 | 19.6 |
| % Above Surface Deposit Feeders | 38.2 | 36.4 |
| % Below Surface Deposit Feeders | 1.1 | 7.5 |
| % Suspension Feeders | 23.3 | 27.2 |
| % Scrapers | 14.9 | 7.8 |
| % Shredders | 15.7 | 0.5 |
| % Other | 0.2 | 0.3 |
| **Algal Growth Potential (mg dry wt/l)** | 0.3 | 34.4 |

stream from the discharge) (see map in Appendix). 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 *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 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 20 discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Although periphyton was sampled at both reference and test sites, holding times for analyses were exceeded by one week and the samples were not preserved, thereby invalidating the results. 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). Due to low pH at the reference site, the Algal Growth Potential samples from this site were adjusted using sodium hydroxide.

## 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 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 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.

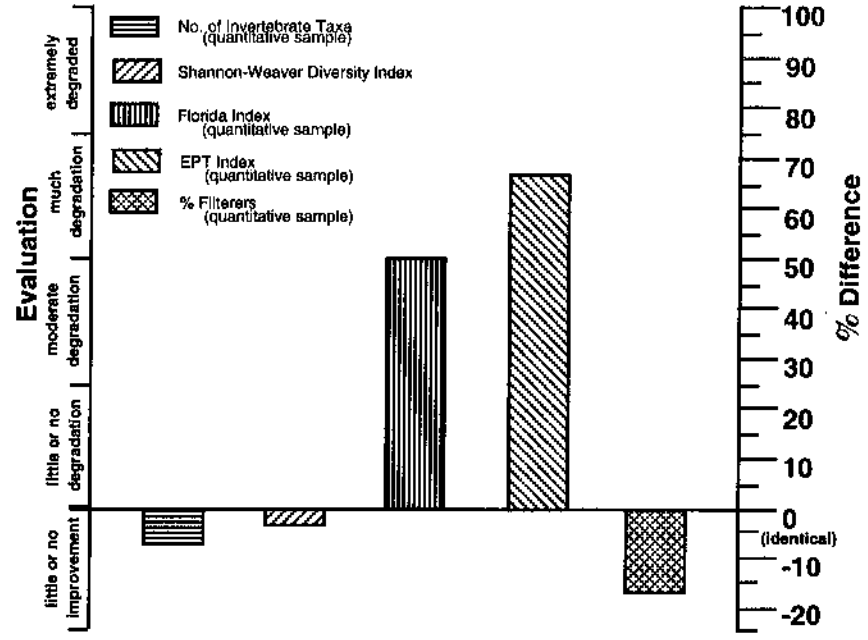
Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

The Stream Invertebrate Index for Florida (SIIF) is a composite macroinvertebrate metric (EA Engineering 1994). The SIIF assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SIIF 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 ra-

tio, 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 and Mike Hollingsworth (DEP Northeast District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Tina Mikulski, Edward Miller, Elizabeth Miller, Urania Quintana, Tobin Rader, Landon Ross, Jennifer Sparapani, David Whiting, Vicki Whiting, Greg Wynn, and David Young (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.




***Effect of discharge on the benthic macroinvertebrate community.***

## Results and Discussion

Habitat quality ratings at the reference and test sites were comparable, scoring 136 and 128 points, respectively. Although the in-stream substrates (snags, leaf packs, and undercut banks) and water velocities (0.3 m/sec) were the same at both sites, the streams differed in their depth and width. The reference stream was 1 meter deep and 2 meters wide, while the test site was 0.4 meters deep and 1.5 meters wide. Dissolved oxygen at the reference site (6.0 mg/L) was somewhat higher than at the test site (5.4 mg/L), but both were within water quality standards. Water at both sites was acidic, with the reference site having a much lower pH (4.2 S.U.'s, which is typical of a blackwater stream) than that measured at the test site (6.6 S.U.'s). The effluent, with a pH of 8.6 SU's, appeared to be responsible for the increased pH of the test site. The pH of the effluent was also in violation of the facility's permit. Conductivity was lower at the reference site (50.6 µmhos/cm) than at the test site (210 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 acute bioassays (Appendix).

No organic pollutants were detected in the effluent. Of the metals analyzed for, silver (0.39 µg/L) was detected in the outfall at a concentration above Class III water quality standards (Rule 62-302.530(60) FAC). No other metals were present at levels above quantitation limits.

Total coliform bacteria was measured at 500 organisms/100 mL at the reference site and 3,000 organisms/100 mL at the test site. The test site value represents a violation of Class III water quality standards (Rule 62-302.530(7) FAC). Fecal coliforms were within acceptable levels at both the reference site (130 organisms/100 mL) and the test site (330 organisms/100 mL). The effluent (9,000 organisms/100 mL) was in violation of the total coliform water quality standard and appeared to be contributing to the test site violation. The effluent did not exceed the permit limit for fecal coliforms (80 organisms/100 mL).

The facility was responsible for nutrient enrichment at the test site. Effluent concentrations of orthophosphate (1.9 mg/L), total phosphorus (1.8 mg/L), and nitrate-nitrite (3.4 mg/L) were elevated. Test site concentrations of these param-

eters (*e.g.*, ortho-phosphate 0.52 mg/L, total phosphorus 0.51 mg/L, nitrate-nitrite of 0.34 mg/L) were considerably higher than those found at the reference site, as well as exceeding those found in 80% to 90% of typical Florida streams (see Table of Typical Water Quality Values in Appendix). Although the ortho-phosphate value was 0.01 mg/L higher than the total phosphorus value, this is within the uncertainty associated with these measurements. Unionized ammonia in the effluent (0.08 mg/L, calculated from total ammonia, pH, temperature, and salinity) exceeded the Class III standard for freshwaters, Rule 62-302.530(3) FAC.

Algal Growth Potential (AGP) was quite elevated in the effluent (77.7 mg dry wt/L). AGP increased dramatically (by 11,366%) at the test site (34.4 mg dry wt/L) when compared to the reference site (0.3 mg dry wt/L). The AGP at the test site exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Several measures of macroinvertebrate health indicated that the discharge was negatively affecting the community. The figure on p. 3 indicates the degree of difference between the invertebrate populations of the reference and test sites. Larger differences (higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference.

In the Hester-Dendy samples, macroinvertebrate taxa richness (30 taxa at the reference site, 32 at the test site) and the Shannon-Weaver Diversity Index (3.9 at the reference site, 4.0 at the test site) were largely unchanged by the discharge. In contrast, the Florida Index (28 at the reference site, 14 at the test site), and the EPT Index (9 at the reference, 3 at the test site) showed large declines at the test site. The % suspension feeders was similar between sites (23.3 % of the population at the reference site and 27.2 % at the test site).

Results of dip net samples corresponded to the Hester-Dendys, in that the Florida Index and the EPT Index decreased by 26% and 44.4%, respectively, at the test site, compared to the reference site. Unlike the artificial substrate results, taxa richness also declined by 25% at the test site in the qualitative samples. The reference site SIIF score indicated "no impairment", whereas the test site SIIF value was in the "moderate impairment" category (see Appendix). Many species sensitive to pollution, including the stonefly, *Luectra* sp., the mayfly, *Stenonema smithae*, and the caddisflies, *Chimarra* sp. and *Phylocentropus* sp., were relatively common at the reference site, but were absent from the test site. In summary, the macroinvertebrate data suggest that the discharge is degrading the biota of John Rowe Branch, resulting in an imbalance of aquatic fauna, which is prohibited by Rule 62-302.530(48)(b) FAC.

## 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 the effluent. Silver (0.39 µg/L) was detected in the outfall at a concentration which violated the Class III water quality standard (Rule 62-302.530(60) FAC).

The effluent pH (8.6 SU's) was in violation of the facility's permit. Unionized ammonia in the effluent (0.08 mg/L) violated the Class III standard, Rule 62-302.530(3) FAC.

Total coliform bacteria violations occurred at the test site (3,000 organisms/100 mL) and in the effluent (9,000 organisms/100 mL) (Rule 62-302.530(7) FAC). Fecal coliform violations were not found in the effluent, or at the test or reference sites.

The facility was responsible for nutrient enrichment at the test site. Test site concentrations of nitrate-nitrite (0.34 mg/L) and ortho-phosphate (0.52 mg/L were considerably higher than those found at the reference site, as well as exceeding those found in 80% to 90% of typical Florida streams.

Algal Growth Potential (AGP) was quite elevated in the effluent (77.7 mg dry wt/L). AGP increased dramatically (by 11,366%) at the test site (34.4 mg dry wt/L) when compared to the reference site (0.3 mg dry wt/L). The AGP at the test site exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987).

Substantial declines in the Florida Index and the EPT Index between the reference and test sites indicated that the discharge was negatively affecting the community. The reference site SIIF score indicated "no impairment", whereas the test site SIIF value was in the "moderate impairment". Many species sensitive to pollution, including the stonefly, *Luectra* sp., the mayfly, *Stenonema smithae*, and the caddisflies, *Chimarra* sp. and *Phylocentropus* sp., were relatively common at the reference

site, but were absent from the test site. In summary, the macroinvertebrate data suggest that the discharge is degrading the biota of John Rowe Branch, resulting in an imbalance of aquatic fauna, which is prohibited by Rule 62-302.530(48)(b) FAC.

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**Chemistry summary table for**

| Northeast Florida State Hospital WWTP | Effluent | Reference Site | Test Site |
|---|---|---|---|
| **Organic Constituents (ug/L)** | | | |
| None Detected | | | |
| **Metals (ug/L)** | | | |
| Aluminum | 100 U | | |
| Arsenic | 0.5 U | | |
| Cadmium | 0.08 U | | |
| Copper | 1 U | | |
| Chromium | 3 I | | |
| Iron | 74 | | |
| Lead | 2 U | | |
| Mercury | 0.1 U | | |
| Nickel | 2 I | | |
| Selenium | 1 U | | |
| Silver | 0.39 A | | |
| Zinc | 11 I | | |
| **Nutrients (mg/L)** | | | |
| Ortho-phosphate | 1.90 | 0.01 Q | 0.52 |
| Total phosphorus | 1.80 | 0.01 | 0.51 |
| Total Ammonia | 0.30 A | 0.02 A | 0.07 A |
| Unionized Ammonia | 0.08 | | |
| Nitrate+Nitrite | 3.40 | 0.04 I | 0.34 |
| TKN | 1.0 | 0.9 | 1.1 |
| **General Phys-Chem Parameters** | | | |
| Habitat Assessment | | 136 | 128 |
| D.O. (mg/L) | 12.9 | 6.0 | 5.4 |
| pH (SU's) | 8.6 | 4.2 | 6.6 |
| Conductivity (µmhos/cm) | 494 | 50.6 | 210 |
| Temperature (°C) | 27.5 | 20.2 | 21.2 |
| Total Suspended Solids (mg/L) | 5 | 3 | 4 |
| Biological Oxygen Demand, 5 day (mg/L) | 2 | < 2 | < 2 |
| Turbidity (NTU's) | 1.3 | 3.0 | 4.3 |
| Color (PCU's) | 60 | 300 | 250 |
| Hardness (mg CaCO3) | 117.9 | | |
| Algal Growth Potential (mg dry wt/L) | 77.7 | 0.3 | 34.4 |
| **Toxicity** | | | |
| Bioassay Fish-Dechlorinated | Not toxic | | |
| Bioassay Invertebrate-Dechlorinated | Not toxic | | |
| **MIcrobiological Communities (org/100 mL)** | | | |
| Fecal coliform | 80 | 130 | 330 |
| Total coliform | 9000 | 500 | 3000 |

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

Q - Sample held beyond normal holding time

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

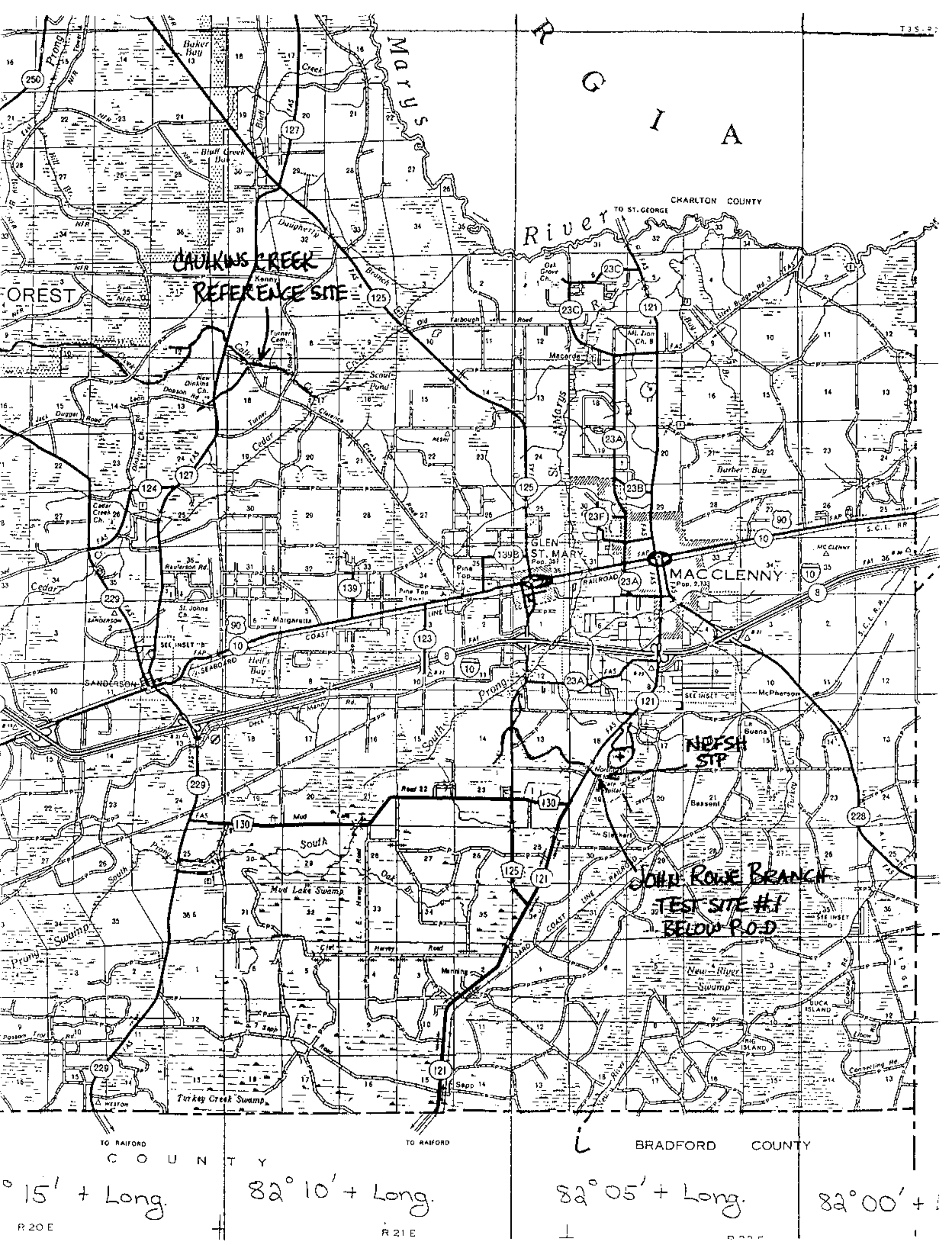
# Typical Values for Selected Parameters in Florida Waters

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

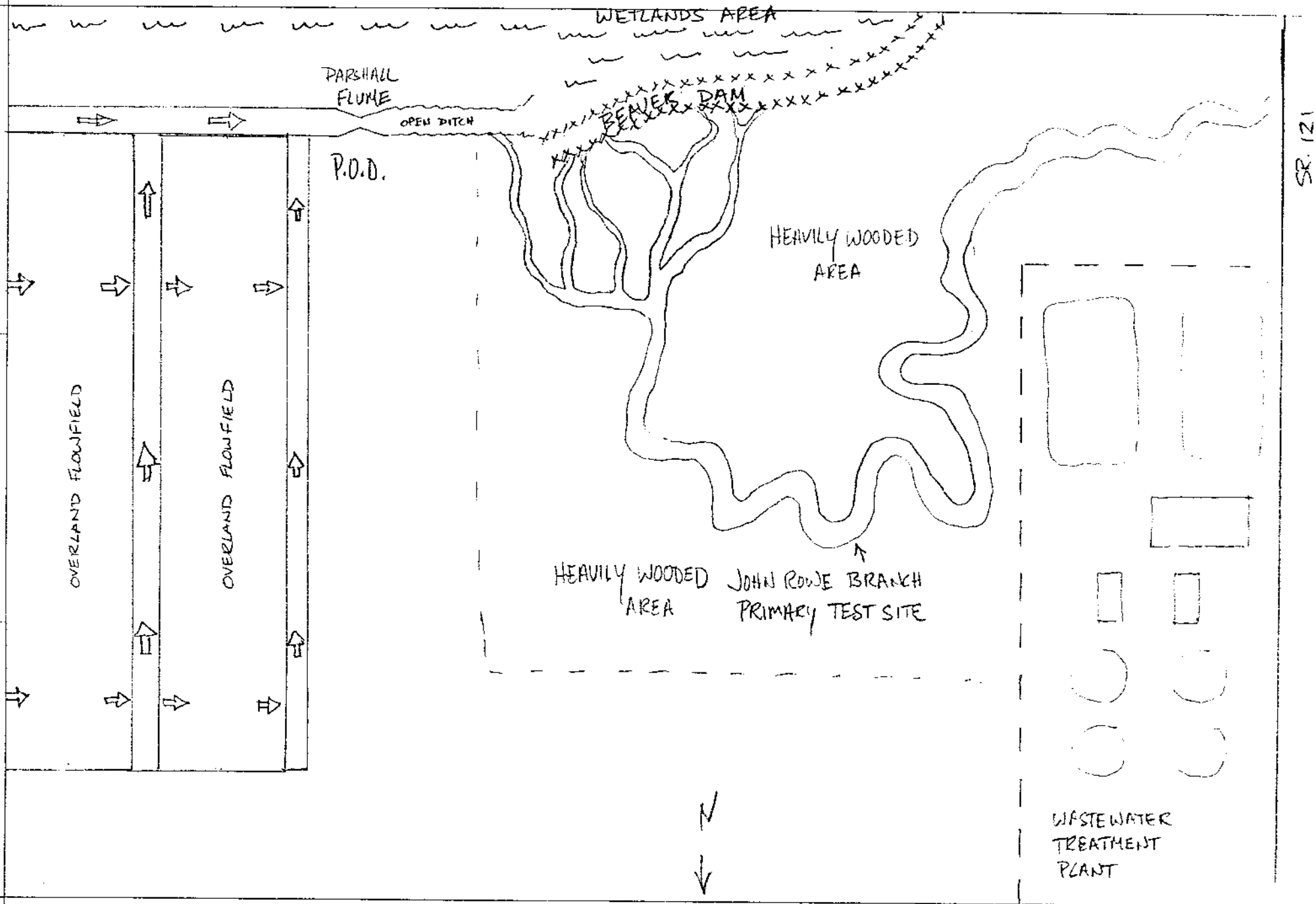
## Percentile Distribution

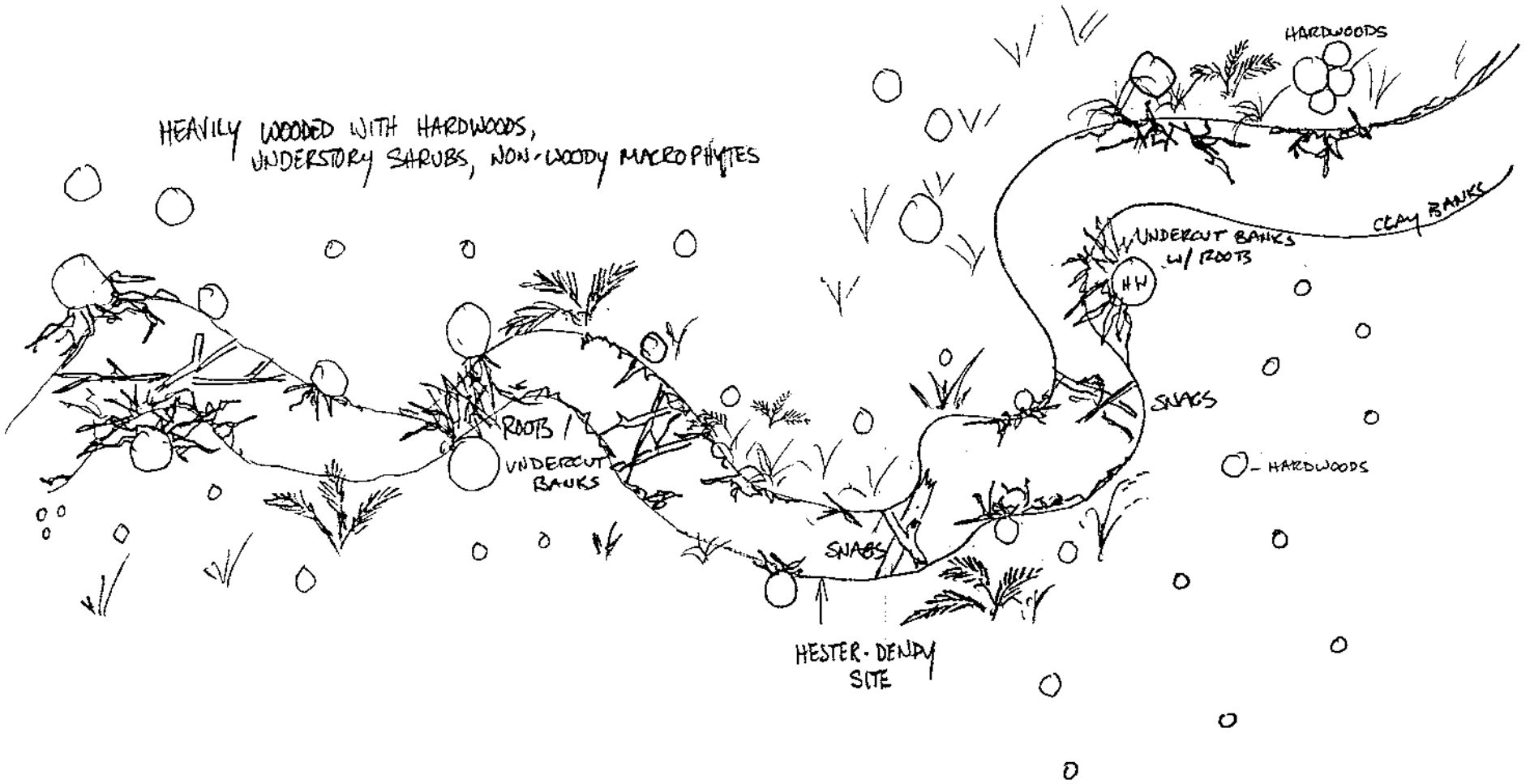
| Parameter | 5% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 95% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STREAMS** (1617 stations) | | | | | | | | | | | |
| Phytoplankton Chlorophyll *a* | 0.22 | 0.52 | 0.94 | 1.60 | 3.02 | 4.63 | 6.72 | 9.87 | 14.68 | 27.35 | 48.70 |
| Periphyton 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



CAULKINS CREEK
REFERENCE SITE
NEFSH
STP
JOHN ROWE BRANCH
TEST SITE #1
BELOW P.O.D.
GLEN ST. MARY
MACCLENNY
SANDERSON
CHARLTON COUNTY
BRADFORD COUNTY
COUNTY
TO RAIFORD
TO ST. GEORGE
River
Marys
FOREST
Mud Lake Swamp
Turkey Creek Swamp
New River Swamp
McPherson
82° 15' + Long.
82° 10' + Long.
82° 05' + Long.
82° 00' +
R 20 E
R 21 E


WETLANDS AREA
PARSHALL FLUME
OPEN DITCH
BEAVER DAM
P.O.D.
OVERLAND FLOWFIELD
OVERLAND FLOWFIELD
HEAVILY WOODED AREA
HEAVILY WOODED AREA
JOHN ROUSE BRANCH PRIMARY TEST SITE
WASTEWATER TREATMENT PLANT
N
SR. 121



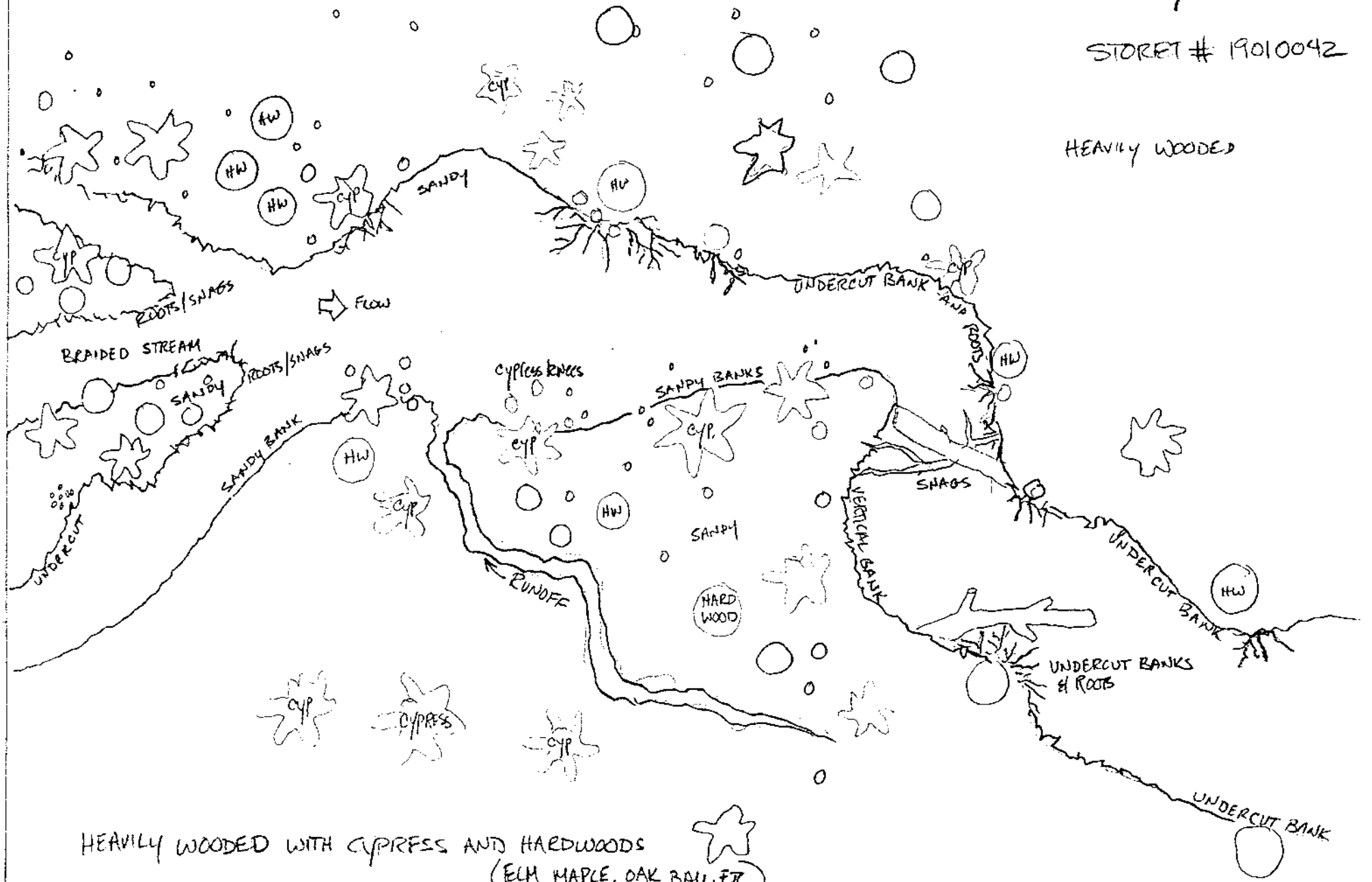

JOHN ROWE BRANCH BELOW P.O.D., PRIMARY TEST SITE

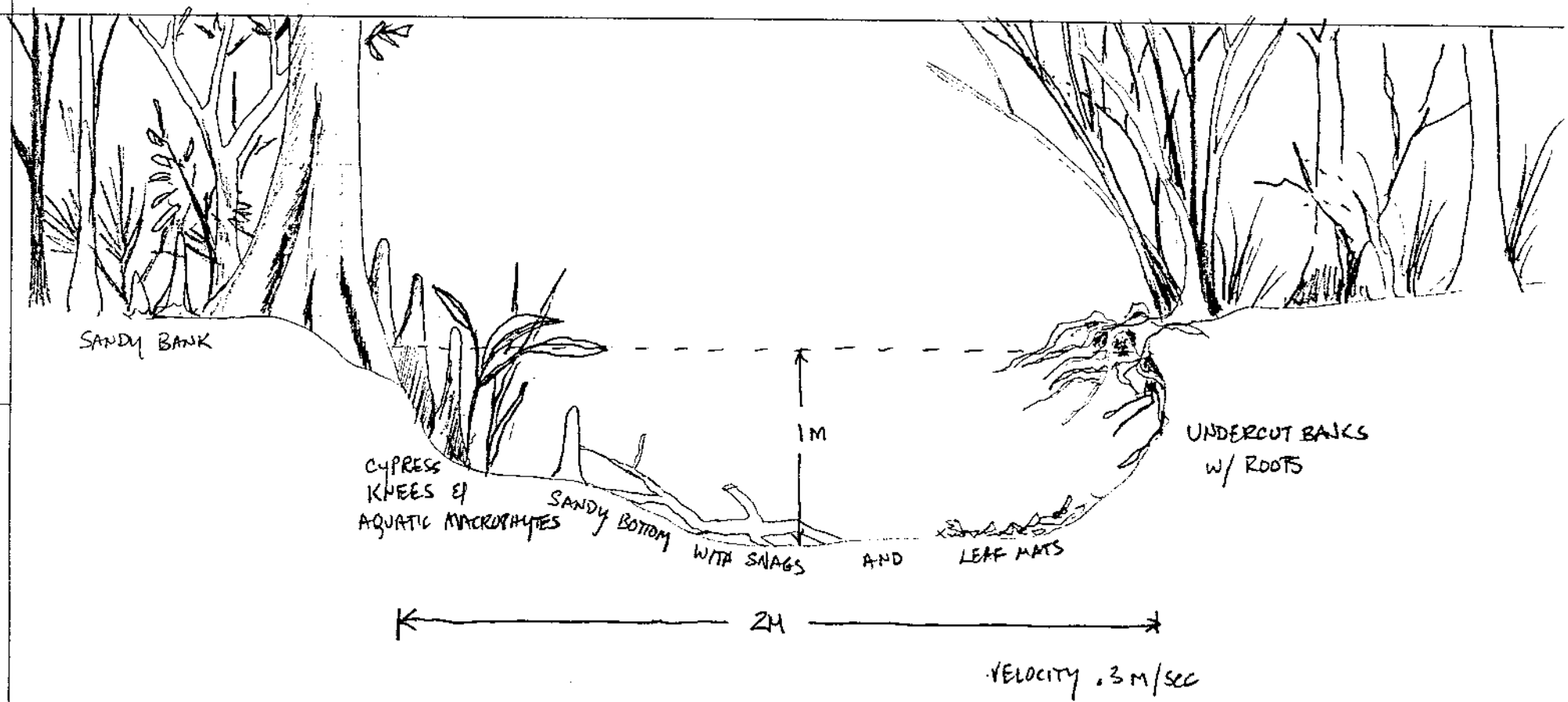
ENTIRE AREA SUBJECT TO SEVERE FLOODING & SCOURING

STORET # 19010064

CAULKINS CREEK, REFERENCE SITE FOR NORTHEAST FLORIDA STATE HOSPITAL 5TH YEAR, 1994

STORET # 19010042

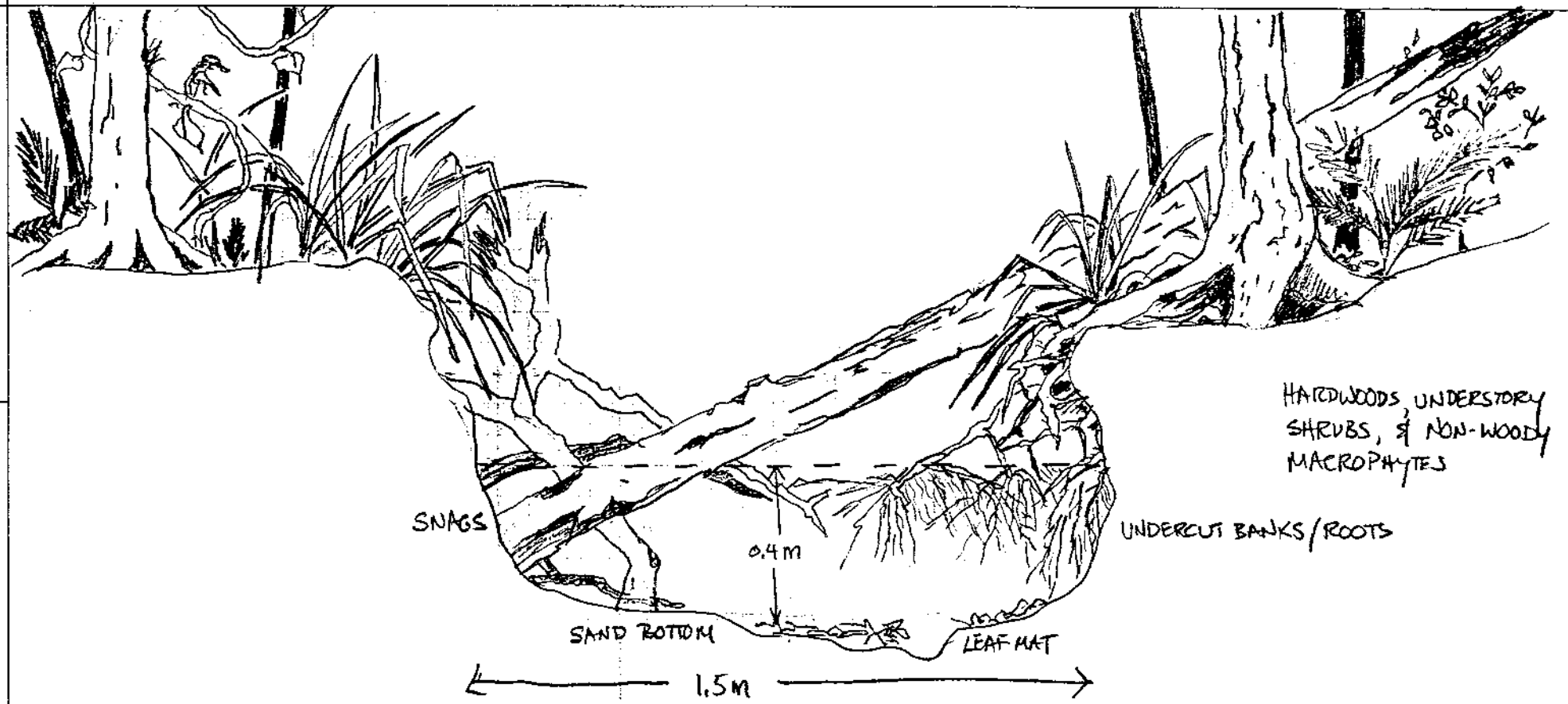





CAULKINS CREEK, REFERENCE SITE FOR NORTHEAST FLORIDA STATE HOSPITAL, 1994

STORET # 19010042

National Brand
42-382 100 SHEETS EYE-EASE 5 SQUARE
42-389 200 SHEETS EYE-EASE 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE




JOHN ROWE BRANCH BELOW P.O.D.

PRIMARY TEST SITE

STORET # 19010064

VELOCITY .3 m/sec

Made in U.S.A.
42-361 50 SHEETS EYE-EASE® 5 SQUARE
42-382 100 SHEETS EYE-EASE® 5 SQUARE
42-389 200 SHEETS EYE-EASE® 5 SQUARE
42-392 100 RECYCLED WHITE 5 SQUARE
42-399 200 RECYCLED WHITE 5 SQUARE
National Brand

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
# FACILITY SUMMARY

| | | |
|---|---|---|
| Facility Name: Northeast State Hospital | Prepared by: Kristen Smeltzer<br>Date: 10-31-94 | |
| Location (attach detailed map): | County Baker | District Northeast |
| Federal Permit # FL0033758 and expiration date: Aug. 31, 1997 | State GMS # and 3102S00027<br>State expiration date: August 14, 1995 | Facility Type: Industrial<br>Municipal Federal Agricultural<br>Other (list): State Agency |

Function of facility: State Hospital for Mentally Disabled. Hospital can hold 1400 patients, only has around 550 at this time with 1100 staff.

Description of treatment process: 300,000 gpd high rate trickling filter with primary and secondary clarifiers, a chlorine contact chamber, which is discharged to a lined holding pond. The stored water is pumped to an overland flow field. The effluent is collected from the field through a series of concrete ditches and discharged to the John Rowe Branch.

| | |
|---|---|
| Receiving waters: John Rowe Branch | Classification: |
| Design Flow: 0.300 MGD | Actual Mean Flow: 130,000 gpd |

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

therefore, the best time to sample is: daytime during normal flow

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

List effluent limits:

| Parameter | Limit (units) |
|---|---|
| BOD5 | 5 mg/l |
| TSS | 5 mg/l |
| TN | 6 mg/l |
| TKN | 5 mg/l |
| DO | 5.1 mg/l |
| pH | 6.0 - 8.5 |
| Fecal Coliform | 200 #/100 mL |
| Chlorine | 0.5 mg/l minimum<br>0.01 mg/l max |

Describe special permit conditions and permit modifications:

Has a groundwater monitoring plan for 3 wells because of overland flow field.

# 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

CERTIFIED-RETURN RECEIPT
June 9, 1992

Mr. K. E. Lecas, Assistant Administrator
for Administrative Services
Northeast Florida State Hospital
Highway 121 South
Macclenny, Florida 32063

Dear Mr. Lecas:

Baker County - Domestic Waste
Northeast Florida State Hospital WWTP

Enclosed is modified Permit Number DO02-176339 to operate the subject wastewater treatment facility, issued pursuant to Section(s) 403.087, Florida Statutes (F.S.).

Specific Condition number 12 has been modified to clarify the effluent limitations as follows:

12. The monitoring requirements and effluent limitations for this plant are as follows:

| PARAMETER | EFFLUENT LIMIT | MINIMUM FREQUENCY | SAMPLE TYPE | SAMPLE LOCATION |
|---|---|---|---|---|
| Flow (mgd) | 0.3 Annual Average | Daily, 5/week | See (A) | Influent or Effluent |
| $BOD_5$ (mg/l) | 5 Annual Average | Every 2 weeks | 8-hour composite | Influent & Effluent |
| TSS (mg/l) | 5 Annual Average | Every 2 weeks | 8-hour composite | Influent & Effluent |
| TN (mg/l) | 6 Annual Average | Every 2 weeks | 8-hour composite | Effluent |
| TKN (mg/l) | 5 Annual Average | Every 2 weeks | 8-hour composite | Effluent |
| DO (mg/l) | 5.1 Minimum | Daily, 5/week | Grab | Effluent |
| pH Units | 6.0 Minimum 8.5 Maximum | Daily, 5/week | Grab | Effluent |
| Chlorine *** Residual(mg/l) | 0.5 Minimum Less than 0.01 | Daily, 5/week | Grab | Contact chamber Effluent |
| Fecal Coliform no./100 (ml) | 2400 200 | Quarterly Quarterly | Grab Grab | Flow fld sprinklr Effluent |

(A) Recording flowmeter and totalizer required.
*** See Specific Condition #14.


Administration 448-4300
Air 448-4310
Waste Management 448-4320

Water Facilities 448-4330
Water Management 448-4340
FAX 448-4366


Recycled Paper

The attached chart below summarizes the permit violations which have occurred in the last year. A summary of the limits is listed at the top portion of the chart. Only the parameters which exceeded the permit limits are listed.

The annual average Fecal Coliform count from October 1993 through September 1994 is 541 per 100 mL which exceeds the permitted limit of 200 per 100 mL.

The annual average TSS from October 1993 through September 1994 is 4.8 mg/l which is close to but does not exceed the permitted limit of 5 mg/l.

| Limits | BOD5 | | TSS | | Fecal | | pH | deCl2 |
|---|---|---|---|---|---|---|---|---|
| Annual | 5.00 | | 5.00 | | 200 | | | |
| Monthly | 6.25 | | 6.25 | | | | | |
| Weekly | 7.50 | | 7.50 | | | | | |
| Maximum | 10.00 | | 10.00 | | 800 | | 8.5 | 0.01 |
| | | | | | | | | |
| Month | BOD5 | violations | TSS | violations | Fecal | violations | pH | deCl2 |
| | | | | | | | | |
| 10/05/93 | | | 6.00 | A | | | | |
| 10/21/93 | | | 8.00 | A, M, W | 1600 | A, M | | |
| Oct-93 | | | 7 | A,M | 801 | A, M | | |
| 11/09/93 | | | 8.00 | A, M, W | 1600 | A, M | | |
| Nov-93 | | | 6 | A | 801 | A, M | | |
| 12/08/94 | | | | | 500 | A | | |
| 12/20/93 | | | 8 | A, M, W | 500 | A | | |
| Dec-93 | | | | | | | | 1.30 |
| Jan-94 | | | | | | | | 0.3 |
| 02/11/94 | 8.00 | A, M, W | 16.00 | A, M, W, M | | | | |
| 02/14/94 | | | | | 900 | A, M | | |
| 02/23/94 | | | | | 500 | A | | |
| Feb-94 | | | 10.00 | A, M, W | 700 | A | | 0.50 |
| 03/15/94 | | | 6.00 | A | 1600 | A, M | | |
| Mar-94 | | | | | 811 | A, M | | 0.30 |
| 04/07/94 | | | | | 220 | A | | |
| Apr-94 | | | | | | | | 0.50 |
| 06/02/94 | | | 6.00 | A | 500 | A | | |
| 06/16/94 | | | 6.00 | A | 1600 | A, M | | |
| 06/29/94 | | | | | 500 | A | | |
| Jun-94 | | | | | 866 | A, M | | 0.60 |
| 07/14/94 | | | | | 900 | A, M | | |
| 07/26/94 | | | | | 900 | A, M | | |
| Jul-94 | | | | | 900 | A, M | | 0.10 |
| 08/11/94 | | | | | 1600 | A, M | | |
| Aug-94 | | | | | 865 | A, M | | 0.10 |
| 09/08/94 | | | | | 1600 | A, M | | |
| 9/21/94 | | | | | 220 | A | | |
| Sep-94 | | | | | 910 | A, M | | 0.10 |

# STATE OF FLORIDA
## DEPARTMENT OF ENVIRONMENTAL PROTECTION

## PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

| SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax | STORET STATION NUMBER: 19010042 | DATE (M/D/Y): ~~10/31/94~~ 11/1/94 | TIME: 1130 | RECEIVING BODY OF WATER: Cedar Creek / St. Marys River |
|---|---|---|---|---|

| REMARKS: NE Fla. State Hospital 5th Year Survey Reference Site AS to be collected 11/22/94 | LOCATION: Caulkins Creek off Hampe-Register Road | 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) |
|---|---|---|---|---|---|---|---|
| 40% | 20% | 40% | | | | | |

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: > 18

***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): 2m, .3m/sec, Avg

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 5m

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) | 20 | 5 | dipnet | Sand | 50 | 5 | dipnet |
| Leaf Packs or Mats | 15 | 5 | dipnet | Mud/Muck/Silt | | | |
| Aquatic Vegetation | | | | Other: | | | |
| Rock or Shell Rubble | | | | Other: | | | |
| Undercut Banks/Roots | 15 | 5 | dipnet | *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 | | | | | | | | |
| Mid-depth | .5 | 20.2 | 4.15 | 6.01 | 506 | | | .4 |
| Bottom | 1 | | | | | | | |

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: Partly Cloudy, Breezy, Mild

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

| SAMPLING TEAM: | SIGNATURE: | DATE: |
|---|---|---|
| Hollingsworth / Mckelvey | Mike Holl | 10/31/94 |

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

| SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax | STORET STATION NUMBER: 19010042 | DATE (M/D/Y): 11/1/94 | RECEIVING BODY OF WATER: Cedar Creek / St. Marys River |
|---|---|---|---|

| REMARKS: NE Fla. State Hospital 5th Year Survey Reference Site AS to be collected 11/22/94 | LOCATION: Caulkins Creek off Hamp-Register Road | FIELD ID/NAME: REFERENCE SITE |
|---|---|---|

| Habitat Parameter | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Bottom Substrate/ Available Cover **20** | 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 **17** | 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 **20** | No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16 | May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11 | Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6 | Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1 |
| Deposition **18** | Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16 | 20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11 | Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6 | Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1 |
| Bank Stability **16** | 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 **20** | 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 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 |

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

Comments

**136** TOTAL SCORE

| ANALYSIS DATE: | ANALYST: Mike Hollingsworth | SIGNATURE: Mike Hollingsworth |
|---|---|---|

# STATE OF FLORIDA
## DEPARTMENT OF ENVIRONMENTAL PROTECTION

## PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

| SUBMITTING AGENCY CODE: 8021 / SUBMITTING AGENCY NAME: DEP Jax | STORET STATION NUMBER: 19010064 | DATE (M/D/Y): 10/31/94 | TIME: 1225 | RECEIVING BODY OF WATER: St. Marys River, S. Prong |
|---|---|---|---|---|

| REMARKS: 5th Year Survey Test Site NS not collected until 11/21/94 | LOCATION: John Rowe Branch below STP POD NE Fla. State Hospital | FIELD ID/NAME: PRIMARY 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) |
|---|---|---|---|---|---|---|---|
| 40 | 40 | | 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: > 18

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

High Water Mark (m above bed): 1.3 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) | 30 | 5 | dipnet | Sand | 30 | 5 | dipnet |
| Leaf Packs or Mats | 10 | 5 | dipnet | Mud/Muck/Silt | | | |
| Aquatic Vegetation | | | | Other: | | | |
| Rock or Shell Rubble | | | | Other: | | | |
| Undercut Banks/Roots | 30 | 5 | dipnet | *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): | TURB. NTU | | Secchi (m): |
|---|---|---|---|---|---|---|---|---|
| Top | | | | | | | | 0.3 |
| Mid-depth | 0.2 | 21.22 | 6.59 | 5.41 | 210 | 4.9 | | |
| Bottom | 0.4 | | | | | | | |

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:
Cloudy & Mild temps 75-80°F

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

| SAMPLING TEAM: | SIGNATURE: | DATE: |
|---|---|---|
| Hollingsworth / McKelvey | Mike Hollingsworth | 10/31/94 |

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

| SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax | STORET STATION NUMBER: 19010064 | DATE (M/D/Y): 10/31/94 | RECEIVING BODY OF WATER: St. Marys River, South Prong |
|---|---|---|---|

| REMARKS: 5th Year Survey Test Site; AS not collected unit: 1 11/21/94 | LOCATION: John Rowe Branch below STP POD NE Fla. State Hospital | FIELD ID/NAME: |
|---|---|---|

| Habitat Parameter | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Bottom Substrate/ Available Cover **20** | 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 **15** | 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 **20** | No artificial channelization or dredging. Stream with normal, sinuous pattern (20) 19 18 17 16 | May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11 | Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6 | Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1 |
| Deposition **18** | Less than 20% of habitats affected by sand or silt accumulation 20 19 (18) 17 16 | 20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11 | Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6 | Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1 |
| 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 **20** | 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 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.

**128** TOTAL SCORE

Comments

| ANALYSIS DATE: | ANALYST: Hollingsworth | SIGNATURE: Mike Hollingsworth |
|---|---|---|

# FDEP Biology Section — Acute Bioassay Bench Sheet

**Sample Source:** Northeast Florida State Hospital
**County:**
**Contact / District:** Mike Hollingsworth / Northeast
**NPDES Permit #:** FL0033758
**LIMS Sample #:** 92813 **LIMS Job #:** 94-NOV-01-21

**Sample Collection:** Date 10/31/94 Time 1405
**Test Beginning:** Date 11/1/94 Time 1130
**Test Ending:** Date 11/3/94 Time 1250
**Organism Batch #:** 42 **Diluent Batch #:** 42
**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<br>9.0 @ 9.0 | 22.4 @ 22.5 | 8.6 @ 22.7 °C | ~~102.0~~ 112.0* @ ~~102.0~~ 102.6<br>1007 @ 1047 @ 24.7 °C |
| 24 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.0 @ 22.1 | 8.6 @ 22.4 °C | 111.8 @ 102.6<br>1014 @ 1017 @ 23.1 °C |
| 48 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.4 @ 22.5 | 8.5 @ 23.0 °C | ____ @ ____<br>____ @ ____ @ ____ °C |

*Wrote in wrong place. JRS 11/1/94

| Conc. | Chamber # | Number Live 0 hr | Number Live 24 h | Number Live 48 h | pH 0 hr | pH 24 h | pH 48 h | Temperature (°C) 0 hr | Temperature (°C) 24 h | Temperature (°C) 48 h | D.O. (mg/L) 0 hr | D.O. (mg/L) 24 h | D.O. (mg/L) 48 h | UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr | 24 h | 48 h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | 5 | 5 | 5 | 8.3 | | 8.3 | 23.0 | | 23.2 | 8.1 | | 8.1 | 170 | | 170 |
| Control | B | 5 | 5 | 5 | | | 8.3 | | | 23.2 | | | 8.0 | | | 175 |
| Control | C | 5 | 5 | 5 | | | 8.3 | | | 23.0 | | | 8.1 | | | 180 |
| Control | D | 5 | 5 | 5 | | | 8.3 | | | 22.6 | | | 8.2 | | | 190 |
| 100% | A | 5 | 5 | 5 | 8.6 | | 8.6 | 21.6 | | 23.0 | 8.4 | | 8.3 | 440 | | 480 |
| 100% | B | 5 | 5 | 5 | | | 8.6 | | | 23.0 | | | 8.1 | | | 480 |
| 100% | C | 5 | 5 | 5 | | | 8.6 | | | 22.7 | | | 8.2 | | | 515 |
| 100% | D | 5 | 5 | 5 | | | 8.6 | | | 22.3 | | | 8.4 | | | 550 |
| Recorded by: | | TR | TR | MF | TR | | MF | TR | | MF | TR | | MF | TP | | MF |
| Measured/Loaded by: | | TR | TR | MF | TR | | JLS | TR | | JLS | TR | | JLS | TP | | JLS |

**Investigators' Signatures**

Marshall Fauntleh
Jennifer Spraggins
Tina Mikulasko

Reviewer

| 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 | Bromine | TR |
| Alkalinity (mg/L as $CaCO_3$): | | 75 | 135 | Hach | TR |
| Hardness (mg/L as $CaCO_3$): | | 82 | 120 | Hach | TR |
| Total ammonia (mg/L as N): | | <0.017 | <0.017 | Amm | MF |

Ammonia Meter #98136 Meter Slope: −57.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 10/05/94

# FDEP Biology Section — Acute Bioassay Bench Sheet

**Sample Source:** Northeast Florida State Hospital
**County:** —
**Contact / District:** Mike Hollingsworth / Northeast
**NPDES Permit #:** FL00 33758
**LIMS Sample #:** 92813 **LIMS Job #:** 9/- NOV-01-21
entered 11/08/94

**Sample Collection:** Date 10/31/94 Time 1405
**Test Beginning:** Date 11/1/94 Time 1245
**Test Ending:** Date 11/3/94 Time 1145
**Organism Batch #:** 44 **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<br>9.0 @ 9.0 | 22.4 @ 22.5 | 8.6 @ 22.7 °C | 112.0 @ 102.6<br>1007 @ 1047 @ 24.7 °C |
| 24 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.0 @ 22.1 | 8.6 @ 22.4 °C | 111.0 @ 102.6<br>1014 @ 1047 @ 23.8 °C |
| 48 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.4 @ 22.5 | 8.5 @ 23.0 °C | 110.6 @ 102.6<br>1016 @ 1047 @ 23.7 °C |

| Conc. | Chamber # | Number Live 0 hr | Number Live 24 h | Number Live 48 h | pH 0 hr | pH 24 h | pH 48 h | Temperature (°C) 0 hr | Temperature (°C) 24 h | Temperature (°C) 48 h | D.O. (mg/L) 0 hr | D.O. (mg/L) 24 h | D.O. (mg/L) 48 h | UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr | 24 h | 48 h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control A | 210 | 5 | 5 | 5 | 7.9 | 8.3 | 8.4 | 23.0 | 22.4 | 22.3 | 8.3 | 8.2 | 8.2 | 245 | 245 | 250 |
| control B | 688 | 5 | 5 | 5 | 7.9 | 8.3 | 8.4 | | | 22.2 | 8.3 | 8.1 | 8.3 | 245 | 245 | 250 |
| Control C | 142 | 5 | 5 | 5 | 7.9 | 8.3 | 8.4 | | | 22.2 | 8.3 | 8.1 | 8.2 | 245 | 240 | 245 |
| Control D | 17 | 5 | 5 | 5 | 7.9 | 8.3 | 8.4 | | | 22.3 | 8.3 | 8.2 | 8.3 | 245 | 250 | 250 |
| 100% A | 24 | 5 | 5 | 5 | 8.6 | 8.4 | 8.4 | 22.1 | 23.0 | 22.7 | 8.9 | 8.1 | 8.0 | 460 | 475 | 470 |
| 100% B | 128 | 5 | 5 | 5 | 8.6 | 8.4 | 8.4 | | | 22.6 | 8.9 | 8.0 | 8.0 | 460 | 475 | 475 |
| 100% C | 326 | 5 | 5 | 5 | 8.6 | 8.4 | 8.4 | | | 22.8 | 8.9 | 8.0 | 8.0 | 460 | 475 | 475 |
| 100% D | 50 | 5 | 5 | 5 | 8.6 | 8.4 | 8.4 | | | 22.7 | 8.9 | 8.0 | 8.1 | 460 | 475 | 475 |
| Recorded by: | | TR | TR | MF | TR | TR | MF | TR | TR | MF | TR | TR | MF | TR | TR | MF |
| Measured/Loaded by: | | TR | TR | JLS | TR | TM | JLS | TR | TM | JLS | TR | TM | JLS | TR | TM | JLS |

**Investigators' Signatures**

Reviewer

| 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 | DR-100 | TR |
| Alkalinity (mg/L as $CaCO_3$): | 120 | | 130 | Hach | TR |
| Hardness (mg/L as $CaCO_3$): | 125 | | 100 | Hach | TR |
| Total ammonia (mg/L as N): | <0.017 | — | <0.017 | orion | MF |

Ammonia Meter #98136 Ammonia Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

HOSPITAL

REFERENCE SITE

| Calculation & Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft 1994) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Macroinvertebrate Dip Net (20 sweeps of most productive substrates)** | **Panhandle (65, 75a)** | | | | | **Peninsula (75b, c, d)** | | | |
| | Value | 5 | 3 | 1 | Score | 5 | 3 | 1 | Score |
| Number of Taxa | 40 | ≥ 31 | 16–30 | 0–15 | 5 | ≥ 27 | 14–26 | 0–13 | |
| EPT Index | 9 | ≥ 7 | 4–6 | 0–3 | 5 | | ≥ 4 | 0–3 | |
| % Contribution of Dominant Taxon | 11.1 | | ≤ 20 | > 20 | 1 | | ≤ 37 | > 37 | |
| Florida Index | 23 | ≥ 18 | 9–17 | 0–8 | 5 | ≥ 7 | 4–6 | 0–3 | |
| % Diptera | 37.0 | | ≤ 38 | > 38 | 1 | | ≤ 32 | > 32 | |
| % Suspension feeders/ Collector-Filterers | 22.7 | ≥ 12 | 7–11 | 0–6 | 5 | ≥ 8 | 4–7 | 0–3 | |
| % Shredders | 9.72 | | ≥ 10 | 0–9 | 3 | | ≥ 13 | 0–12 | |
| % Crustacean+Mollusks (Peninsula only) | | – | – | – | | | ≥ 16 | 0–15 | |
| # Crustacean+Mollusks (Peninsula only) | | – | – | – | | | ≥ 4 | 0–3 | |
| Total Score | **Panhandle** | | | | 25 | **Peninsula** | | | |
| 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 SITE

| Calculation & Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft 1994) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Macroinvertebrate Dip Net (20 sweeps of most productive substrates)** | **Panhandle (65, 75a)** | | | | | **Peninsula (75b, c, d)** | | | |
| | Value | 5 | 3 | 1 | Score | 5 | 3 | 1 | Score |
| Number of Taxa | 30 | ≥ 31 | 16–30 | 0–15 | 3 | ≥ 27 | 14–26 | 0–13 | |
| EPT Index | 5 | ≥ 7 | 4–6 | 0–3 | 3 | | ≥ 4 | 0–3 | |
| % Contribution of Dominant Taxon | 30.3 | | ≤ 20 | > 20 | 3 | | ≤ 37 | > 37 | |
| Florida Index | 17 | ≥ 18 | 9–17 | 0–8 | 3 | ≥ 7 | 4–6 | 0–3 | |
| % Diptera | 48.6 | | ≤ 38 | > 38 | 1 | | ≤ 32 | > 32 | |
| % Suspension feeders/ Collector-Filterers | 40.3 | ≥ 12 | 7–11 | 0–6 | 5 | ≥ 8 | 4–7 | 0–3 | |
| % Shredders | 1.29 | | ≥ 10 | 0–9 | 1 | | ≥ 13 | 0–12 | |
| % Crustacean+Mollusks (Peninsula only) | | – | – | – | | | ≥ 16 | 0–15 | |
| # Crustacean+Mollusks (Peninsula only) | | – | – | – | | | ≥ 4 | 0–3 | |
| Total Score | **Panhandle** | | | | 19 | **Peninsula** | | | |
| 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** |

Benthic macroinvertebrate taxa list for N.E. Florida State Hospital WWTP, (Baker county) collected via Hester-Dendy artificial substrates in Caulkins Creek (reference site) on 11 November, 1994, and John Rowe Branch (test site) on 21 November, 1994. Densities, in number/$m^2$, represent the mean of three replicates.

| | Reference Site | Test Site |
|---|---|---|
| **Acarina** | | |
| *Sperchonopsis* sp. | – | 1 |
| **Amphipoda** | | |
| *Hyalella azteca* | – | 1 |
| **Coleoptera** | | |
| *Ancyronyx variagata* | 1 | – |
| *Macronychus* sp. | – | 1 |
| *Microcylloepus pusillus* | – | 1 |
| **Diptera** | | |
| *Ablabesmyia* sp. | – | 1 |
| *Ablabesmyia mallochi* | 1 | 5 |
| *Ablabesmyia rhamphe* grp. | – | 3 |
| *Conchapelopia* sp. | – | 1 |
| *Corynoneura* sp. | – | 8 |
| *Cryptochironomus* sp. | – | 2 |
| *Hemerodromia* sp. | 3 | 23 |
| *Nanocladius* sp. | – | 1 |
| *Polypedilum convictum* grp. | 3 | – |
| *Polypedilum illinoense* | 1 | 1 |
| *Paratanytarsus* sp. A Epler | – | 1 |
| *Rheotanytarsus distinctissimus* grp. | 1 | 8 |
| *Rheotanytarsus exiguus* grp. | 13 | 17 |
| *Simulium* sp. | 4 | – |
| *Stenochironomus* sp. | 1 | – |
| *Tanytarsus* sp. | 3 | 2 |
| *Tanytarsus* sp. L Epler | 18 | 20 |
| *Thienemanniella* sp. | – | 1 |
| *Tribelos* sp. | – | 1 |
| *Tribelos jucundum* | 1 | – |
| Undetermined Dipteran pupa | 13 | 27 |
| **Ephemeroptera** | | |
| *Baetisca* sp. | – | 1 |
| *Leptophlebia bradleyi* | 1 | – |
| *Leptophlebia intermedia* | 1 | – |
| *Paraleptophlebia volitans* | 29 | – |
| *Stenonema exiguum* | 21 | – |
| *Stenonema smithae* | 26 | – |
| *Stenacron* sp. | 23 | 8 |
| *Stenacron interpunctatum* | – | 6 |
| Undetermined Leptophlebiidae | – | 2 |

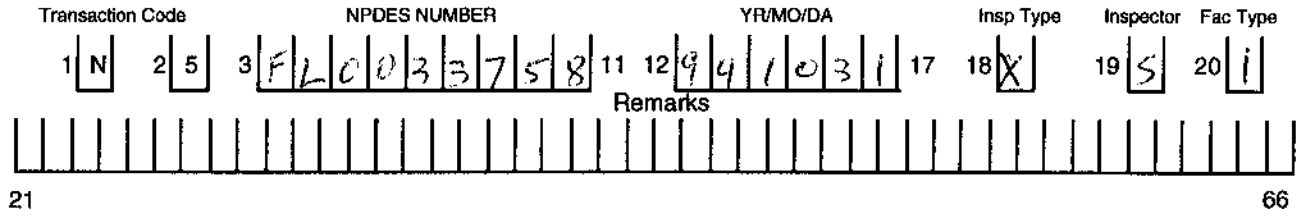
| | | |
|---|---|---|
| **Gastropoda** | | |
| Undetermined Ancylidae | – | 1 |
| **Hirudinea** | | |
| *Batracobdella paludosa* | – | 1 |
| **Isopoda** | | |
| Undetermined Isopoda | 1 | – |
| **Megaloptera** | | |
| *Corydalus cornutus* | 3 | – |
| *Nigronia serricornis* | 1 | – |
| **Odonata** | | |
| *Argia* sp. | 1 | – |
| *Argia tibialis* | 2 | 3 |
| *Boyeria vinosa* | 1 | – |
| *Ischnura* sp. | – | 2 |
| Undetermined Corduliidae | – | 1 |
| **Oligochaeta** | | |
| *Limnodrilus hoffmeisteri* | 2 | – |
| *Nais communis* | – | 2 |
| *Slavina appendiculata* | – | 8 |
| **Trichoptera** | | |
| *Chimarra* sp. | 9 | – |
| *Hydropsyche* sp. | 2 | – |
| *Hydropsyche decalda* | 1 | – |
| *Nyctiophalax* sp. | 1 | – |

Benthic macroinvertebrate taxa list for N.E. Florida State Hospital WWTP (Baker county), collected via 20 discrete dip net sweeps in Caulkins Creek (reference site) and John Rowe Branch (test site), on 1 November, 1994.

| | Reference Site | Test Site |
|---|---|---|
| **Acarina** | | |
| *Hydrodroma* sp. | 36 | – |
| **Amphipoda** | | |
| *Hyalella azteca* | 144 | 72 |
| **Coleoptera** | | |
| *Ancyronyx variagata* | 72 | 72 |
| *Dubiraphia* sp. | – | 576 |
| *Dubiraphia vittata* | 36 | – |
| *Microcylloepus pusillus* | 432 | – |
| *Stenelmis* sp. | – | 2664 |
| *Stenelmis hungerfordi* | – | 72 |
| **Decapoda** | | |
| *Procambarus* sp. | – | 72 |
| **Diptera** | | |
| *Ablabesmyia mallochi* | – | 72 |
| *Clinotanypus* sp. | 36 | – |
| *Coelotanypus* sp. | – | 72 |
| *Conchapelopia* sp. | 180 | – |
| *Hemerodromia* sp. | 36 | 144 |
| *Labrundinia* sp. | – | 72 |
| *Labrundinia pilosella* | 72 | 144 |
| *Microtendipes pedellus* grp. | 36 | – |
| *Orthocladinae genus* F Epler | 36 | – |
| *Palpomyia/Bezzia* grp. sp. | 108 | – |
| *Parachironomus* sp. | – | 72 |
| *Phaenopsectra obediens* grp. | 36 | – |
| *Polypedilum illinoense* | 72 | – |
| *Polypedilum scalaenum* grp. | – | 72 |
| *Polypedilum tritum* | 36 | – |
| *Parametriocnemus* sp. | 36 | – |
| *Paratanytarsus* sp. A Epler | – | 144 |
| *Rheotanytarsus* sp. | – | 72 |
| *Rheotanytarsus distinctissimus* grp. | – | 576 |
| *Rheotanytarsus exiguus* grp. | 252 | 3096 |
| *Simulium* sp. | 144 | – |
| *Stenochironomus* sp. | 36 | – |
| *Tanytarsus* sp. | 72 | – |
| *Tanytarsus* sp. L Epler | 36 | – |
| *Thienemanniella* sp. | 144 | – |
| *Tribelos* sp. | 36 | – |
| *Tribelos jucundum* | – | 216 |
| Undetermined Dipteran pupa | 36 | 216 |

| | | |
|---|---|---|
| **Ephemeroptera** | | |
| *Caenis* sp. | – | 72 |
| *Eurylophella temporalis* | 36 | – |
| *Isonychia* sp. | 36 | – |
| *Stenonema smithae* | 324 | – |
| *Stenacron* sp. | – | 72 |
| Undetermined Leptophlebiidae | 108 | – |
| **Megaloptera** | | |
| *Sialis* sp. | 36 | – |
| **Odonata** | | |
| *Argia* sp. | 108 | 288 |
| *Calopteryx* sp. | – | 72 |
| *Ischnura* sp. | – | 360 |
| Undetermined Zygoptera | 36 | – |
| **Oligochaeta** | | |
| *Aulodrilus pigueti* | – | 72 |
| *Limnodrilus hoffmeisteri* | – | 360 |
| *Lumbriculus variegatus* | 36 | – |
| Undetermined Enchytraeidae | 180 | – |
| **Pelecypoda** | | |
| Undetermined Pisidiidae | – | 72 |
| **Plecoptera** | | |
| *Leuctra* sp. | 72 | – |
| **Trichoptera** | | |
| *Cheumatopsyche* sp. | – | 144 |
| *Chimarra* sp. | 144 | – |
| *Hydropsyche* sp. | 72 | – |
| *Oecetis* sp. | – | 144 |
| *Oecetis cinerascens* | 324 | – |
| *Oxyethira* sp. | – | 72 |
| *Phylocentropus* sp. | 144 | – |
| *Triaenodes* sp. | 36 | – |
| Undetermined Trichopteran | 36 | – |

**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)**

