

Biological Assessment of
Town of Callahan Sewage Treatment Plant
Nassau County
NPDES #FL0038407
Sampled 24 September, 1990

February, 1991

Biology Section
Division of Administrative and Technical Services

Introduction

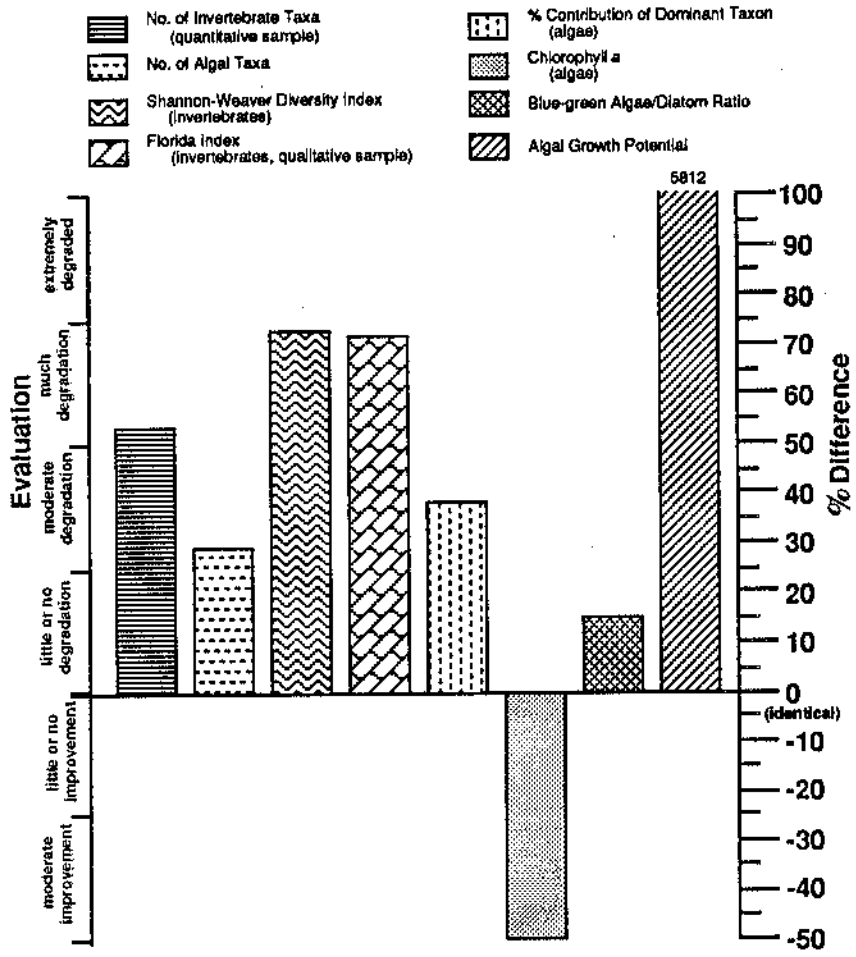
Biological, chemical, and toxicological data concerning the Town of Callahan STP discharge were collected between 24 September and 22 October, 1990. Analysis of these samples will aid in evaluating the facility's permit criteria.

The plant, located in Nassau County, has a design capacity of 0.3 MGD and an average flow of 0.15 MGD. Treatment of sewage includes screening, rotating biological contactor, clarification, and chlorination. Chlorinated effluent is discharged to Alligator Creek which flows into Mills Creek and thence into Boggy Creek and the Nassau River. During sample collection, district biologists have noted a large population of gastropods (*Physella* sp.) living in the chlorine contact chamber. When these snails die, the shells are either skimmed off the surface or discharged into the creek, and significant amounts were found in sediments downstream of the discharge. The fact that such a large population of *Physella* can become established in the chlorine contact chamber suggests that chlorination is intermittent, which should be addressed.

Prior to the present sampling, this facility has been found to be in compliance with most permit parameter limits. Between April 1987 and March 1990, the pH was measured below the NPDES permit limit of 6.5 seven times. Also, fecal coliform bacteria were not always consistently monitored, but this problem appears to have been rectified.

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	48	17
Florida Index	7	2
% Contribution of Dominant Taxon	12.4	42.2
% Diptera	37.2	81.9
% Ephemeroptera	12.4	0
% Odonata	10.9	4.8
% Coleoptera	10.1	5.4
% Oligochaeta	10.1	1.8
% Gastropoda	5.4	1.2
% Other	13.9	4.9
% Collector-Gatherers	41.7	61.7
% Predators	30.6	13.5
% Shredders	4.5	23.7
% Scrapers	14.2	1.3
% Collectors-Filterers	8.4	0
% Parasites	0.5	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	15	7
Florida Index	0	2
Shannon-Weaver Diversity	3.3	0.9
% Diptera	52.1	99.0
% Oligochaeta	20.8	0.1
% Odonata	10.3	0.9
% Malacostraca	7.4	0
% Gastropoda	5.9	0
% Ephemeroptera	3.0	0
% Other	0.5	0
% Collector-Gatherers	70.8	61.8
% Shredders	7.8	37.1
% Predators	11.7	0.9
% Scrapers	8.3	0.1
% Collector-Filterers	1.3	0
Periphyton Algae		
Number of Taxa	28	20
% Contribution of Dominant Taxon	24.5	33.8
Chlorophyll *a* (mg/mm^2)	20.8	10.3
Blue-green/Diatom Abundance Ratio	0.20	0.23
% Blue-green	16.1	11.4
% Green	3.1	39.3
% Diatoms	80.8	49.3
Algal Growth Potential (mg dry wt/l)	2.4	141.9

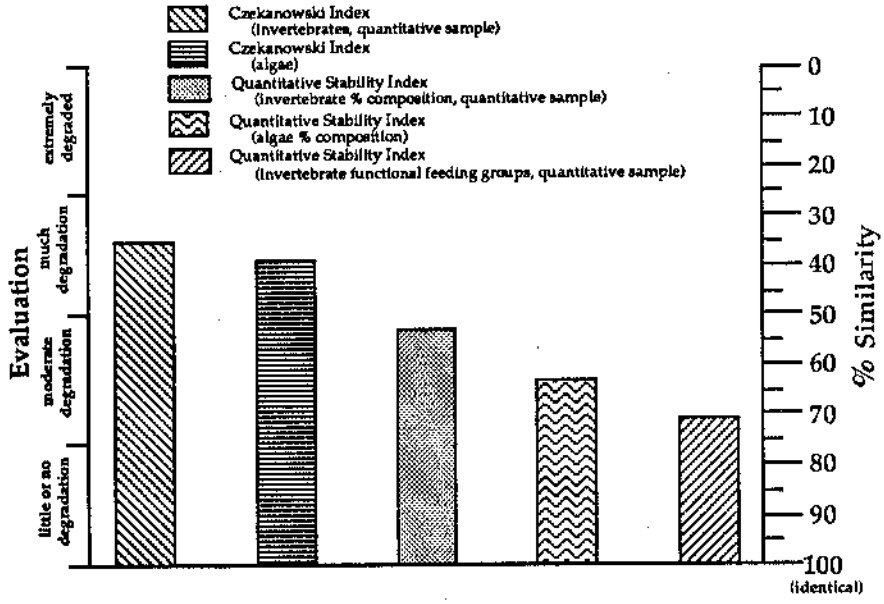


Effect of discharge on receiving stream
(measured as difference between control and test sites).

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site, located in Alligator Creek about one half mile upstream of the plant, and a test site (the area down gradient of 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 *Notropis leedsi* as test organisms were performed on an effluent sample (Peltier and Weber 1985, FDER 1985). The effluent was analyzed for organic constituents (base neutrals, acid extractables and pesticide extractables) and metals. Additionally, nutrient analyses were performed on effluent, and waters from control and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at control and test sites. Collection methods consisted of a timed (one hour per site) multi-substrate (*e.g.*, snags, vegetation, sediment) semi-quantitative effort. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Periphyton was sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Bacterial populations were analyzed for total



Effect of discharge on receiving stream
(measured as similarity between control and test sites).

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). Sediment from control and test sites was analyzed for grain size and percent organic matter (Ross 1990).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa, Shannon-Weaver Diversity Index, and chlorophyll *a* are well known. Others are briefly explained here. 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 (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. An elevated blue-green algae to diatom ratio (calculated by dividing the number of individuals in the Cyanophyta by the number of individuals in the Bacillariophyta) is often indicative of nutrient enriched conditions. Czekanowski's Similarity Index is a multivariate ordination procedure which compares organism abundance and taxonomic structure between sites. The determination of the Quantitative Similarity Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

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

The following personnel were involved in this investigation: Scott Bulgrin (DER Northeast District) and Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandra McClure (Tallahassee Biology Laboratory).

Results and Discussion

Habitat quality at the control site was 13% more suitable than that of the test site, mostly due to greater channelization downstream (Appendix). However, the two sites were still comparable (less than 25% difference). The physical-chemical characterization indicated that with the exception of the upstream site being more heavily shaded, stream width, depth, and velocity were similar at both sites. Dissolved oxygen was very low at the control site (only 2.5 mg/l at the surface), but above 5.5 mg/l downstream of the discharge (Appendix).

Sediment samples collected above and below the facility's discharge did not indicate any notable differences in grain size or organic matter content (Appendix).

The effluent sample did not cause any mortality to the invertebrate, *Ceriodaphnia dubia*, or the bannerfin shiner, *Notropis leedsi*, in 48 hour static acute toxicity tests (Appendix).

All effluent organic constituents determined from a single grab sample were below detection limits, except for the tentative identification of a C_5 aliphatic compound at a concentration of < 10 µg/l (Appendix). The following metals were measured in the effluent sample: barium (31 µg/l), iron (88 µg/l), and zinc (13 µg/l). None of these concentrations was high enough to pose a threat to receiving water biota. These same metals were detected at the control and test sites, but concentrations were also too low to cause problems (Appendix). However, silver was found at the downstream site at 0.3 µg/l, a violation of Class III Standards (0.07 µg/l).

Nutrients were measured in the effluent, and at both the control and test sites. Extraordinarily high levels of bioavailable nitrogen and phosphorus were found in the effluent and at the test site. Nitrate-nitrite was undetected at the control station, but was 3.9 µg/l and 4.2 µg/l at the discharge point and downstream site, respectively. Similarly, orthophosphorus was very low upstream of the plant (0.32 µg/l), but was excessive in the effluent (6.5 µg/l) and at the test site (6.6 µg/l) (Appendix).

As would be expected from these abnormally high nutrient concentrations, the algal growth potential

(AGP) exploded at the downstream station, increasing from 2.4 mg dry wt/l to 141.9 mg dry wt/l. According to Raschke and Schultz (1987), at AGP values over 5 mg dry wt/l the undesirable consequences of nutrient enrichment (*e.g.*, algal blooms, D.O. sags, fish kills) are likely.

Samples for analysis of total and fecal coliform were collected on several occasions between September 28 and November 19, 1990. Results were highly variable and numerous violations of bacteriological criteria occurred for single grab samples (17-302.560(5) FAC). Total coliforms exceeded 2400 organisms/100 ml three times in the effluent, four times downstream, and twice at the upstream station. Fecal coliforms exceeded 800 organisms/100 ml four times at the downstream site and once at the control station (Appendix). This suggests that other sources of bacteria are present in addition to the microbiological contamination caused by the effluent.

Virtually all quantitative and qualitative measures of community health indicated that the test site was very degraded (see table and figures). The upper left figure (p. 2) indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the control. The lower right figure on the same page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

The number of invertebrate taxa decreased downstream of the discharge by 66%. Shannon-Weaver diversity was extremely reduced at the test site, by 73%. This is a violation of the biological integrity criterion (17-302.560(7)FAC). Two taxa present in very high numbers at the downstream site were chironomid midges, *Chironomus decorus* grp. and *Goeldichironomus holoprasinus*. According to Beck and Beck (1969), these organisms are very tolerant of organic pollution, and are known to create a serious nuisance when they emerge as adults (interpreted here as a violation of 17-302.510(3)(q)FAC, "Dominance of Nuisance Species"). Additionally, the extreme shift in benthic macroinvertebrate community structure toward the domination of pollution resistant dipterans (occurring in both qualitative and Hester-Dendy samples) violates 17-302.560(19)FAC, "Imbalances in Aquatic Fauna". Stressed conditions in the benthic macroinvertebrate community were further emphasized by Czekanowski's Similarity Index and the Quantitative Stability Indices for percent composition and functional feeding groups.

The periphyton community downstream of the discharge was degraded compared to the control site. Upstream, diatoms dominated (80.8%) while chlorophytes (mainly *Protoderma* sp.) comprised the majority at the test site. While not much is known about the ecological preferences of this particular green alga, it is evident that conditions were favorable for it to outcompete the diatom fraction, which usually dominates in stream systems. This alteration in periphyton community structure can be considered a violation of 17-302.560(19)FAC, "Imbalances in Aquatic Flora". The number of periphyton taxa (see taxa list in Appendix) decreased downstream by 29%, another consequence of water quality deterioration. Surprisingly, chlorophyll *a* was higher upstream of the discharge. This may have been due to some characteristic of the discharge (*e.g.*, intermittanant chlorine pulses) which proved lethal to the sensitive portion of the periphyton community, thereby reducing biomass.

Conclusions

The Town of Callahan STP discharge was very detrimental to the receiving waters in Alligator Creek. Excessively high concentrations of bioavailable nitrogen and phosphorus resulted in an enormous algal growth potential downstream, indicating severe nutrient enrichment. Violations of bacteriological criteria occurred in the effluent, as well as upstream and particularly downstream of the discharge.

Although the discharge was not acutely toxic to *Ceriodaphnia dubia* or *Notropis leedsi* in bioassay tests, the benthic macroinvertebrate and periphyton communities downstream of the plant suffered severe degradation. Violations of several biologically oriented water quality standards occurred, including biological integrity, imbalances in aquatic flora and fauna, and dominance of nuisance species. In addition, the concentration of silver in the downstream site was in violation of its Class III standard criterion.

Literature Cited

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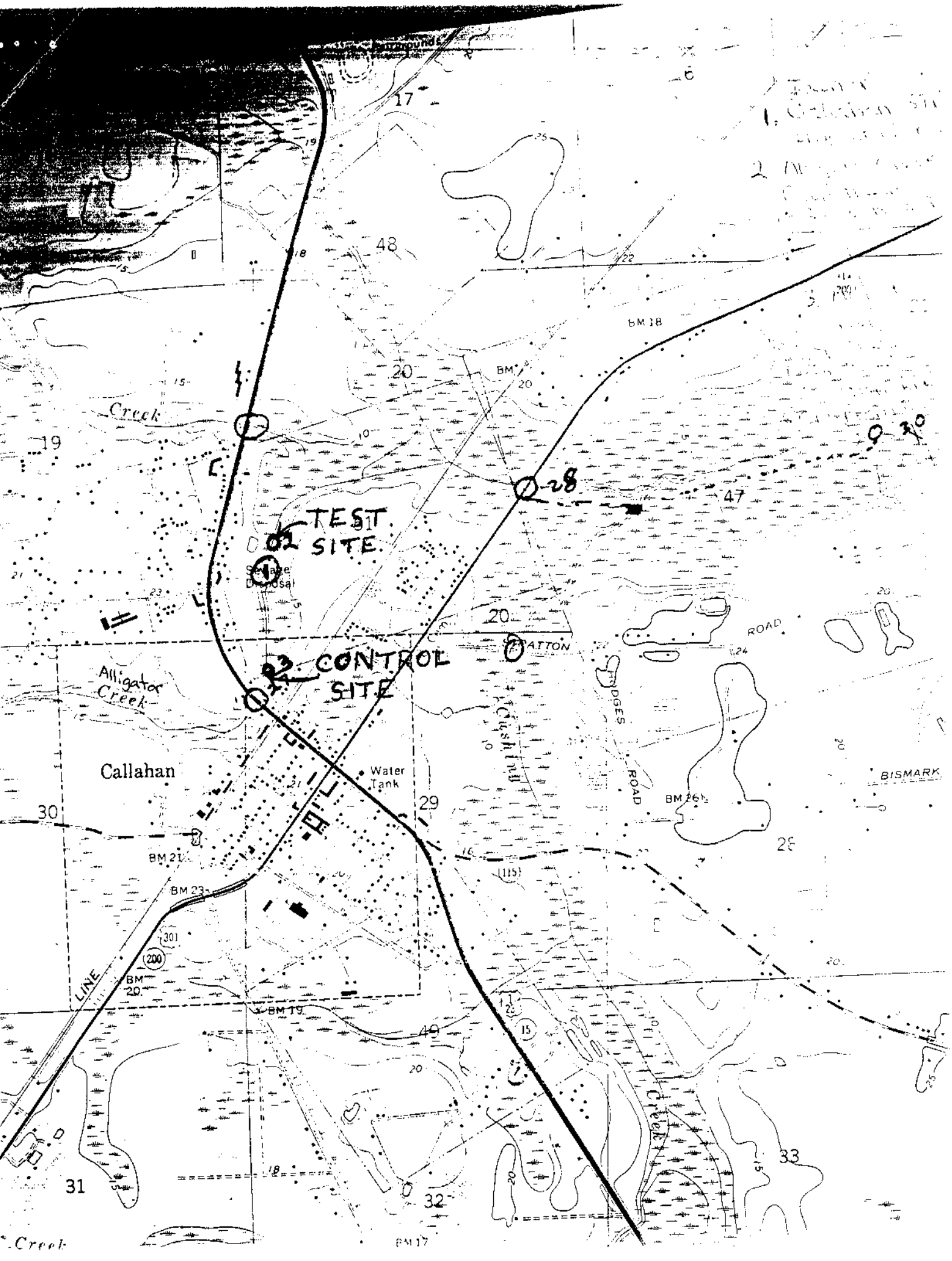
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TEST SITE
CONTROL SITE
Callahan
Alligator Creek
Water Tank
Seepage Disposal
Cushman
Creek
ROAD
BISMARK
BM 18
BM 21
BM 23
BM 19
LINE
17
48
20
19
47
28
30
29
31
32
33
49

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: SC 21 SUBMITTING AGENCY NAME: Fla. DER Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 09/24/90	RECEIVING BODY OF WATER: Upstream

REMARKS: QUAL Data TAKEN	LOCATION: Upstream of Callahan STP Effluent Discharge	FIELD ID/NAME:

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 12	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 7	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 10	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 8	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 8	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 0	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 45

COMMENTS: Description / Photos of Vegetation, notes forthcoming with Hester Dorney organisms

ANALYSIS DATE: 09/24/90	ANALYST: SCOTT BULGRIN	SIGNATURE: Scott E Bulgrin

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: SC 31 SUBMITTING AGENCY NAME: Fla. D.E.R. W. District	STORET STATION NUMBER:	DATE (M/D/Y): 09/24/90	RECEIVING BODY OF WATER: Alligator Creek Downstream of STP 20 yds

REMARKS: FINAL DATA TAKEN	LOCATION: Downstream of Cedarbrook STP effluent discharge ~20 yds	FIELD ID/NAME:

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 10	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 7	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 5	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 7	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 10	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 0	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 37

COMMENTS: Description / Photos of Vegetation, notes forthcoming with Hester Darby organisms

ANALYSIS DATE:	ANALYST:	SIGNATURE:
09/24/90	SCOTT BULGRIN	Scott E. Bulgrin

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: Fla D.E.R. Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 10/6/96	RECEIVING BODY OF WATER: Alligator Creek
REMARKS: Low water levels, marsh grass less than [illegible]	LOCATION: Alligator Creek upstream ½ mile from confluence STP 200 ft from C-23 [illegible]	FIELD ID/NAME:	

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
✓ 40			✓ 10	✓ 50		

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

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

Point-Source Pollution (list location and describe): Stormwater from [illegible] Commercial, Residential and Residential

Estimated Stream Width (range, m): 2-6	Estimated Stream Depth (range, m): 1-6		yes
High Water Mark (m above bed): 5	Velocity (range, m/s): 0.2-1	Impounded ☐ / Channelized ☒	

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☐ Moderately Shaded: ☒ Heavily Shaded: ☒

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☒ Sand: ☒ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	
Sand:	70	Mud/Muck (organic):	30

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	27.4	3.5	Secchi Depth (m):	1.6
Mid-depth	27.4	3.4	pH (SU):	6.7
Bottom	27.4	3.4	Conductivity (µmho/cm):	
			Other Parameters:	

Stream Type (check box): Blackwater: ☒ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☒

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

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

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

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

Weather Conditions: Sunny 90°

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/6/96	SCOTT BULGRIN	Scott Bulgrin

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: Fla. D.E.R. Northeast District	STORET STATION NUMBER:	DATE (M/D/Y): 10/08/90	RECEIVING BODY OF WATER: Alligator Creek to Mill Cr. into the Nassau River

REMARKS: Creek Downstream Too clogged with vegetation to sample	LOCATION: Alligator Creek Downstream of Callahan STP Effluent Discharge ~20 yds	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
X						

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

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

Point-Source Pollution (list location and describe): NPDES # FL0038407 Town of Callahan Sewage Treatment Plant

Estimated Stream Width (range, m): 2.0	Estimated Stream Depth (range, m): 1.0	yes
High Water Mark (m above bed): 0.5	Velocity (range, m/s): 0.20	Impounded [ ] Channelized [X]

Canopy Cover % (check box): Open: [ ] Lightly Shaded: [X] Moderately Shaded: [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [X] Sand: [X] Shell: [X] Other: [X] DETRITUS

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell	20 Dead Gastropod SNAIL SHELLS	Coarse Organic Debris:	10 DETRITUS
Sand:	20	Mud/Muck (organic):	50

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	27.7	5.6	Secchi Depth (m):	0.6L
Mid-depth	27.7	5.5	pH (SU):	7.41
Bottom	27.7	5.5	Conductivity (µmho/cm):	N/A
			Other Parameters:	

Stream Type (check box): Blackwater: [ ] Deep Aquifer Fed: [ ] Surficial Aquifer Fed: [ ] Alluvial: [ ] Other: [ ] _____

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

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

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

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

Weather Conditions: Sunny, 80°

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[ ]	[X]	[ ]
Fish	[ ]	[ ]	[X]	[ ]
Aquatic Macrophytes	[ ]	[ ]	[ ]	[X]
Iron/sulfur Bacteria	[X] NOT SEEN	[ ]	[ ]	[ ]

ANALYSIS DATE: 10/08/90	ANALYST: SCOTT BULGRIN	SIGNATURE: Scott Bulgrin

LAB ID: 2a

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
BIOLOGY LABORATORY SEDIMENT BENCH SHEET

SUBMITTING AGENCY CODE: 8031 SUBMITTING AGENCY NAME: NE Dist.	STORET STATION NUMBER:	DATE (M/D/Y): 9/24/90	RECEIVING BODY OF WATER:	DEPTH, FEET: 2

REMARKS:	LOCATION: Alligator Crk, downstream of STP	FIELD ID/NAME:

Aliquot #1

Sediment Wet Weight: (for 2 aliquot method of wet sieving) (a) _____

Sediment Dry Weight (105°C): (for 1 aliquot method of wet or dry sieving, or for calculating dry wt. of aliquot #2) (b) 30.12

Aliquot #2

Sediment Wet Weight: (for 2 aliquot method of wet sieving) (c) _____

Aliquot #3 (for % organics)

Crucible Weight: (d) 51.80

Crucible + Dry Sediment (105°C) Wt.: (e) 85.74

Crucible + Ashed Sediment (550°C) Wt.: (f) 85.02

Percent Organics Calculation:

Sediment Dry (105°C) Weight: (e) - (d) = 85.74 − 51.80 = (g) 33.94

Sediment Ash (550°C) Weight: (f) - (d) = 85.02 − 51.80 = (h) 33.22

$$\text{Percent Organics} = \frac{((g) - (h)) \times 100}{(g)} = \frac{(33.94 - 33.22) \times 100}{33.94} = 2.12\%$$

Size Fraction Determination:

Dry Weight Calculation: (for 2 aliquot method of wet sieving)

$$\frac{(b)}{(a)} \times (c) = \frac{\quad}{\quad} \times \quad = (i)$$

weight (gms.) of material retained by:

			% composition (divide 1st column by (n) [dry sieve] or by (b) [wet sieve; 1 aliquot] or by (i) [wet sieve; 2 aliquot], and multiply by 100)
#10 sieve	(>2.0 mm)	(j) 0.47	1.56
#35 sieve	(0.5-2.0 mm)	(k) 2.20	7.30
#60 sieve	(0.25-0.5 mm)	(l) 10.11	33.57
#120 sieve	(0.125-0.25 mm)	(m) 15.60	51.79
#230 sieve	(0.063-0.125 mm)	(n) 1.02	3.39
Pan (dry sieve only)	(<0.063 mm)	(o) _____	
Total (dry sieve) (j) + (k)...+ (o))		(p) _____	
Total Retained (wet sieve) (j) + (k)...+ (n))		(q) 29.40	
Wet sieve fines ((b) - (q)) [1 aliquot method], or ((i) - (q)) [2 aliquots]	(<0.063 mm)	0.72	2.39
Wet sieve coarse fraction (after fines removal)	(>0.063 mm)	29.66	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/2/90	L Burton/R Hall	Lynn Burton RJ Hall

LAB ID: 1a

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
BIOLOGY LABORATORY SEDIMENT BENCH SHEET

SUBMITTING AGENCY CODE: 9031 SUBMITTING AGENCY NAME: NE Dist.	STORET STATION NUMBER:	DATE (M/D/Y): 9/24/90	RECEIVING BODY OF WATER:	DEPTH, FEET: 2

REMARKS:	LOCATION: Alligator Crk, upstream of STP - City of Callahan	FIELD ID/NAME:

Aliquot #1

Sediment Wet Weight: (for 2 aliquot method of wet sieving) (a) _____

Sediment Dry Weight (105°C): (for 1 aliquot method of wet or dry sieving, or for calculating dry wt. of aliquot #2) (b) 25.65

Aliquot #2

Sediment Wet Weight: (for 2 aliquot method of wet sieving) (c) _____

Aliquot #3 (for % organics)

Crucible Weight: (d) 51.86

Crucible + Dry Sediment (105°C) Wt.: (e) 83.65

Crucible + Ashed Sediment (550°C) Wt.: (f) 83.23

Percent Organics Calculation:

Sediment Dry (105°C) Weight: (e) - (d) = 83.65 − 51.86 = (g) 31.79

Sediment Ash (550°C) Weight: (f) - (d) = 83.23 − 51.86 = (h) 31.37

Percent Organics: $\frac{((g) - (h)) \times 100}{(g)} = \frac{(31.79 - 31.37) \times 100}{31.79} =$ 1.32%

Size Fraction Determination:

Dry Weight Calculation: (for 2 aliquot method of wet sieving)

$\frac{(b)}{(a)} \times (c) = \frac{\quad}{\quad} \times \quad =$ (i) _____

weight (gms.) of material retained by:

				% composition (divide 1st column by (n) [dry sieve] or by (b) [wet sieve; 1 aliquot] or by (l) [wet sieve; 2 aliquot], and multiply by 100)
#10 sieve	(>2.0 mm)	(j) ~~.308~~ .31		1.21
#35 sieve	(0.5-2.0 mm)	(k) 3.56		13.88
#60 sieve	(0.25-0.5 mm)	(l) 7.38		28.77
#120 sieve	(0.125-0.25 mm)	(m) 11.35		44.25
#230 sieve	(0.063-0.125 mm)	(n) 1.11		4.33
Pan (dry sieve only)	(<0.063 mm)	(o) _____		
Total (dry sieve) ((j) + (k)...+ (o))		(p) _____		
Total Retained (wet sieve) ((j) + (k)...+ (n))		(q) 23.71		
Wet sieve fines ((b) - (q)) [1 aliquot method], or ((i) - (q)) [2 aliquots]	(<0.063 mm)	1.94		7.56
Wet sieve coarse fraction (after fines removal)	(>0.063 mm)	24.08		

ANALYSIS DATE: 10/12/90	ANALYST: L. Burton / R Hotel	SIGNATURE: Lyn Burton RH Hull

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: City (Town) of Callahan STP
Address/City: Brandies Avenue
County: Nassau
Contact/District:
NPDES Permit #: FL0038407 **Outfall #:**

Sample Collection: Date 9/24/90 Time 1100
Test Beginning: Date 9/25/90 Time 1100
Test Ending: Date 9/27/90 Time 1115
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hours

Test Number: 1 of 2 **Test Type:** (Screening) | Definitive
Static | Static Renewal | Flow-through

Remarks: 0 hr. parameters taken on Rep. vials.

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.9	8.8@21°C	1343@23°C	21@22.2
24 hr	7@7.9	9.0@21°C	1349@23.2°	21@23.9°C
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control		5	6	6												
Control		5	5	5												
Control		5	5	5												
Control		5	5	5												
100%		5	5	5												
100%		5	5	5												
100%		5	5	5												
100%		5	5	5												
Control					9.0		8.3	8.1		8.1	20.8		21.2	322		334
100%					9.6		8.5	7.6		8.3	21.0		21.2	702		736
Measured/Loaded by:		LB	LB	MF	MF		SMF	MF		SMF	MF		SMF	MF		SMF
Recorded by:		LB	LB	MF	LB		LB	LB		LB	LB		LB	LB		LB

Investigators' Signatures

Marshall Fairbell
Lyn Burton
Sandra Gibson

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.33	Hach	SB
Lab Tot. Resid. Cl2:			0.0	Hach	RBF
Alkalinity:	116	97	165	Hach	LB
Hardness:	118	117	265	Hach	LB
Ammonia:	0.0	0.0	0.5 10	Orion	MF

Ammonia mean slope: -59.7

Sample Source: City of Callahan STP
Address/City: Brandies Avenue
County: NASSAU
Contact/District:
NPDES Permit #: FL0038407 Outfall #:

Sample Collection: Date 9/24/90 Time 1100
Test Beginning: Date 9-25-90 Time 1045
Test Ending: Date 9.27.90 Time 1115
Test Organism: Mysidopsis bahia
Life Stage/Age: 16 days

Test Number: 2 of 2 Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	1198	5	5	5	9.0	7.9	8.0	7.6	7.9	7.9	21.2	21.0	21.0			
control	16	5	5	5	9.0	7.8	8.6	7.6	7.9	7.9				235		237
100%	98	5	5	5	10.3	8.2	7.9	7.4	7.9	8.0	21.2	21.0	21.0			
100%	183	5	5	5	10.3	8.2	7.6	7.4	7.9	8.0				764		767

Monitored/Loaded by: MF MF MH MF CB SMC MF CB SMC MF CB SMC MF SMC
Recorded by: MF MF SMC CB SMC LB CB SMC LB LB SMC LB LB LB

Investigators' Signatures
Marshall Faircloth
Alan Bentley
Sandy McCorkle

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:		97 MF			
Hardness:					
Total Ammonia:					

Ammonia meter slope:

Sample Number: 90-SEP-25-04-01 Sample Status: Authorized by Liang T. Lin
Sample Location: Town of Callahan STP, Brandies Ave, Nassau County,FL Matrix: Effluent
Field ID: Organics bottle #1&2 Storet Station Number:
Date/Time Collected: 24-SEP-1990 11:20:24.52
Comments:

Sample Number: 90-SEP-25-04-01 Test status: Authorized by Laura Harrison
Analysis Id: W-BNA Analysis Description: base-neutral-acid water analysis

Storet Number	Analyte	Result	Units
34205	Acenaphthene	10 U	ug/L
34200	Acenaphthylene	10 U	ug/L
39330	Aldrin	10 U	ug/L
34220	Anthracene	10 U	ug/L
34526	Benzo(a)anthracene	10 U	ug/L
34230	Benzo(b)fluoranthene	10 U	ug/L
34242	Benzo(k)fluoranthene	10 U	ug/L
34247	Benzo(a)pyrene	10 U	ug/L
34521	Benzo(g,h,i)perylene	15 U	ug/L
34292	Benzyl butyl phthalate	10 U	ug/L
	a-BHC	10 U	ug/L
39337	b-BHC	10 U	ug/L
39340	d-BHC	10 U	ug/L
	g-BHC	10 U	ug/L
39120	Benzidine	10 U	ug/L
34273	Bis(2-chloroethyl)ether	10 U	ug/L
34278	Bis(2-chloroethoxy)methane	15 U	ug/L
34283	Bis(2-chloroisopropyl)ether	15 U	ug/L
39100	Bis(2-ethylhexyl)phthalate	10 U	ug/L
34636	4-Bromophenyl phenyl ether	10 U	ug/L
34581	2-Chloronaphthalene	10 U	ug/L
34641	4-Chlorophenyl phenyl ether	10 U	ug/L
34320	Chrysene	10 U	ug/L
39310	4,4'-DDD	10 U	ug/L
39320	4,4'-DDE	10 U	ug/L
39300	4,4'-DDT	10 U	ug/L
34556	Dibenzo(a,h)anthracene	15 U	ug/L
39110	Di-n-butyl phthalate	10 U	ug/L
34536	1,2-Dichlorobenzene	10 U	ug/L
34566	1,3-Dichlorobenzene	10 U	ug/L
34571	1,4-Dichlorobenzene	10 U	ug/L
34631	3,3'-Dichlorobenzidine	10 U	ug/L
39380	Dieldrin	10 U	ug/L
34336	Diethylphthalate	10 U	ug/L
34341	Dimethylphthalate	10 U	ug/L
34611	2,4-Dinitrotoluene	10 U	ug/L
34626	2,6-Dinitrotoluene	10 U	ug/L
34596	Di-n-octyl phthalate	10 U	ug/L
34361	Endosulfan-I	10 U	ug/L

Continued

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
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N/A - Not applicable NR - Not requested

Cont. from previous page for Sample Number: 90-SEP-25-04-01 Analysis_id: W-ENA

34356	Endosulfan-II	10 U	ug/L
34351	Endosulfan-sulfate	10 U	ug/L
39390	Endrin	10 U	ug/L
34366	Endrin-aldehyde	10 U	ug/L
34376	Fluoranthene	10 U	ug/L
34381	Fluorene	10 U	ug/L
39410	Heptachlor	10 U	ug/L
39420	Heptachlor-epoxide	10 U	ug/L
39700	Hexachlorobenzene	15 U	ug/L
34391	Hexachlorobutadiene	10 U	ug/L
34396	Hexachloroethane	60 U	ug/L
34386	Hexachlorocyclypentadiene	10 U	ug/L
34403	Indeno(1,2,3-cd)pyrene	10 U	ug/L
34408	Isophorone	10 U	ug/L
34696	Naphthalene	10 U	ug/L
34447	Nitrobenzene	10 U	ug/L
34438	N-Nitrosodimethylamine	50 U	ug/L
34428	N-Nitrosodi-n-propylamine	10 U	ug/L
34433	N-Nitrosodiphenylamine	15 U	ug/L
34671	PCB-1016	10 U	ug/L
39488	PCB-1221	10 U	ug/L
39492	PCB-1232	10 U	ug/L
39496	PCB-1242	10 U	ug/L
39500	PCB-1248	10 U	ug/L
39504	PCB-1254	10 U	ug/L
39508	PCB-1260	10 U	ug/L
	PCB-1262	10 U	ug/L
34461	Phenanthrene	10 U	ug/L
34469	Pyrene	10 U	ug/L
39400	Toxaphene	10 U	ug/L
34551	1,2,4-Trichlorobenzene	10 U	ug/L
34462	4-Chloro-3-methyl phenol	15 U	ug/L
34586	2-Chlorophenol	15 U	ug/L
34601	2,4-Dichlorophenol	15 U	ug/L
34606	2,4-Dimethylphenol	15 U	ug/L
34616	2,4-Dinitrophenol	30 U	ug/L
34657	2-Methyl-4,6-dinitrophenol	30 U	ug/L
34591	2-Nitrophenol	15 U	ug/L
34646	4-Nitrophenol	50 U	ug/L
39032	Pentachlorophenol	15 U	ug/L
34694	Phenol	15 U	ug/L
34621	2,4,6-Trichlorophenol	15 U	ug/L

Comments (1): Tentative identification of an
(2): C5 aliphatic compound <10 ug/L.
(3):
(4):
(5):
(6):

A - Value reported is the mean of two or more determinations
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L - Actual value is known to be greater than value given
N - Not analyzed for this compound
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U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-03
Sample Location: Callahan SIP, Nassau
Field ID: Callahan SIP
Date/Time Collected: 24-SEP-1990 11:00:16.19
Comments:

Sample Status: Authorized by Tim Fitzpatrick
Matrix: Effluent
Storet Station Number:

Sample Number: 90-SEP-25-01-03
Analysis Id: W-ICP-23

Test status: Authorized by Tim Fitzpatrick
Analysis Description: ICP multielement analysis for water samples

Storet Number	Analyte	Result	Units
01106	Aluminum	NR	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	31 A	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	NR	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	10 U	ug/L
01045	Iron	88 A	ug/L
01051	Lead	NR	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	6 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	NR	ug/L
01077	Silver	NR	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	13	ug/L
	COMMENT	NONE	

Sample Number: 90-SEP-25-01-03
Analysis Id: AG-G-W

Test status: Authorized by Jack Merritt
Analysis Description: Silver in water by furnace AA

Storet Number	Analyte	Result	Units
01077	Silver	0.2 K	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-03 Test status: Authorized by Jack Merritt
Analysis Id: HG-H-W Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.2 U	ug/L

Sample Number: 90-SEP-25-01-03 Test status: Authorized by Jack Merritt
Analysis Id: PB-G-W Analysis Description: Lead by furnace AA in water

Storet Number	Analyte	Result	Units
01051	Lead	3 U	ug/L

Sample Number: 90-SEP-25-01-03 Test status: Authorized by Jack Merritt
Analysis Id: CD-G-W Analysis Description: Cadmium by graphite furnace for water samples

Storet Number	Analyte	Result	Units
01027	Cadmium	0.2 K	ug/L

Sample Number: 90-SEP-25-01-03 Test status: Authorized by Jack Merritt
Analysis Id: SE-G-W Analysis Description: Selenium in water by furnace AA

Storet Number	Analyte	Result	Units
01147	Selenium	4 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-02
Sample Location: Alligator Creek, Nassau
Field ID: Upstream
Date/Time Collected: 24-SEP-1990 14:00:16.19
Comments:

Sample Status: Authorized by Tim Fitzpatrick
Matrix: Fresh Surf Water
Storet Station Number:

Sample Number: 90-SEP-25-01-02
Analysis Id: W-ICP-23

Test status: Authorized by Tim Fitzpatrick
Analysis Description: ICP multielement analysis for water samples

Storet Number	Analyte	Result	Units
01106	Aluminum	NR	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	65	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	NR	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	10 U	ug/L
01045	Iron	128	ug/L
01051	Lead	NR	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	6 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	NR	ug/L
01077	Silver	NR	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	2	ug/L
	COMMENT	NONE	

Sample Number: 90-SEP-25-01-02
Analysis Id: AG-G-W

Test status: Authorized by Jack Merritt
Analysis Description: Silver in water by furnace AA

Storet Number	Analyte	Result	Units
01077	Silver	0.2 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-02 Test status: Authorized by Tim Fitzpatrick
Analysis Id: HG-H-W Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.1 U	ug/L

Sample Number: 90-SEP-25-01-02 Test status: Authorized by Jack Merritt
Analysis Id: PB-G-W Analysis Description: Lead by furnace AA in water

Storet Number	Analyte	Result	Units
01051	Lead	3 U	ug/L

Sample Number: 90-SEP-25-01-02 Test status: Authorized by Jack Merritt
Analysis Id: CD-G-W Analysis Description: Cadmium by graphite furnace for water samples

Storet Number	Analyte	Result	Units
01027	Cadmium	0.2 K	ug/L

Sample Number: 90-SEP-25-01-02 Test status: Authorized by Jack Merritt
Analysis Id: SE-G-W Analysis Description: Selenium in water by furnace AA

Storet Number	Analyte	Result	Units
01147	Selenium	4 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-01
Sample Location: Alligator Creek, Nassau
Field ID: Downstream
Date/Time Collected: 24-SEP-1990 12:10:16.19
Comments:

Sample Status: Authorized by Tim Fitzpatrick
Matrix: Fresh Surf Water
Storet Station Number:

Sample Number: 90-SEP-25-01-01
Analysis Id: W-ICP-23

Test status: Authorized by Tim Fitzpatrick
Analysis Description: ICP multielement analysis for water samples

Storet Number	Analyte	Result	Units
01106	Aluminum	NR	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	35	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	NR	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	10 U	ug/L
01045	Iron	163	ug/L
01051	Lead	NR	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	6 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	NR	ug/L
01077	Silver	NR	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	17	ug/L
	COMMENT	NONE	

Sample Number: 90-SEP-25-01-01
Analysis Id: AG-G-W

Test status: Authorized by Jack Merritt
Analysis Description: Silver in water by furnace AA

Storet Number	Analyte	Result	Units
01077	Silver	0.3 A	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-01-01 Test status: Authorized by Jack Merritt
Analysis Id: HG-H-W Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.2 U	ug/L

Sample Number: 90-SEP-25-01-01 Test status: Authorized by Jack Merritt
Analysis Id: PB-G-W Analysis Description: Lead by furnace AA in water

Storet Number	Analyte	Result	Units
01051	Lead	3 U	ug/L

Sample Number: 90-SEP-25-01-01 Test status: Authorized by Jack Merritt
Analysis Id: CD-G-W Analysis Description: Cadmium by graphite furnace for water samples

Storet Number	Analyte	Result	Units
01027	Cadmium	0.2 K	ug/L

Sample Number: 90-SEP-25-01-01 Test status: Authorized by Jack Merritt
Analysis Id: SE-G-W Analysis Description: Selenium in water by furnace AA

Storet Number	Analyte	Result	Units
01147	Selenium	4 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-02-01
Sample Location: Alligator Creek, Nassau
Field ID: Downstream
Date/Time Collected: 24-SEP-1990 12:10:47.29
Comments:

Sample Status: Authorized by Bill Coppenger
Matrix: Fresh Surf Water
Storet Station Number:

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: TURBIDITY Analysis Description: Turbidity test for water samples

Storet Number	Analyte	Result	Units
00076	Turbidity	4.8	NTU

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-CL Analysis Description: Analysis for chloride in water

Storet Number	Analyte	Result	Units
00940	Chloride	59 A	mg Cl/L

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Bill Coppenger
Analysis Id: W-F Analysis Description: Analysis for fluoride in water

Storet Number	Analyte	Result	Units
00951	Fluoride	0.54 A	mg F/L

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	Orthophosphate-P	6.6 A	mg P/L

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-SO4 Analysis Description: Analysis for sulfate in water

Storet Number	Analyte	Result	Units
00945	Sulfate	110 A	mg SO4/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-02-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TSS Analysis Description: Total suspended solids

Storet Number	Analyte	Result	Units
00530	TSS	8	mg/L

Sample Number: 90-SEP-25-02-02 Sample Status: Authorized by Yuh-Hsu Pan
Sample Location: Alligator Creek, Nassau Matrix: Fresh Surf Water
Field ID: Upstream Storet Station Number:
Date/Time Collected: 24-SEP-1990 14:00:47.29
Comments:

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: TURBIDITY Analysis Description: Turbidity test for water samples

Storet Number	Analyte	Result	Units
00076	Turbidity	1.4	NTU

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-CL Analysis Description: Analysis for chloride in water

Storet Number	Analyte	Result	Units
00940	Chloride	26 A	mg Cl/L

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-F Analysis Description: Analysis for fluoride in water

Storet Number	Analyte	Result	Units
00951	Fluoride	0.76 A	mg F/L

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	Orthophosphate-P	0.32 A	mg P/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-SO4 Analysis Description: Analysis for sulfate in water

Storet Number	Analyte	Result	Units
00945	Sulfate	110 A	mg SO4/L

Sample Number: 90-SEP-25-02-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TSS Analysis Description: Total suspended solids

Storet Number	Analyte	Result	Units
00530	TSS	2	mg/L

Sample Number: 90-SEP-25-02-03 Sample Status: Authorized by Tim Fitzpatrick
Sample Location: Callahan SIP, Nassau Matrix: Effluent
Field ID: Callahan SIP Storet Station Number:
Date/Time Collected: 24-SEP-1990 11:00:47.29
Comments:

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: TURBIDITY Analysis Description: Turbidity test for water samples

Storet Number	Analyte	Result	Units
00076	Turbidity	5.0	NTU

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-CL Analysis Description: Analysis for chloride in water

Storet Number	Analyte	Result	Units
00940	Chloride	47 A	mg Cl/L

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Tim Fitzpatrick
Analysis Id: W-F Analysis Description: Analysis for fluoride in water

Storet Number	Analyte	Result	Units
00951	Fluoride	0.51 A	mg F/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	Orthophosphate-P	6.5 A	mg P/L

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-SO4 Analysis Description: Analysis for sulfate in water

Storet Number	Analyte	Result	Units
00945	Sulfate	120 A	mg SO4/L

Sample Number: 90-SEP-25-02-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TSS Analysis Description: Total suspended solids

Storet Number	Analyte	Result	Units
00530	TSS	6	mg/L

Sample Number: 90-SEP-25-02-04 Sample Status: Authorized by Bill Coppenger
Sample Location: Alligator Creek / Callahan STP Matrix: Trip Blank
Field ID: Trip Blank Storet Station Number:
Date/Time Collected: 24-SEP-1990 08:20:47.29
Comments:

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: TURBIDITY Analysis Description: Turbidity test for water samples

Storet Number	Analyte	Result	Units
00076	Turbidity	0.03	NTU

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-CL Analysis Description: Analysis for chloride in water

Storet Number	Analyte	Result	Units
00940	Chloride	1.0 U	mg Cl/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Bill Coppenger
Analysis Id: W-F Analysis Description: Analysis for fluoride in water

Storet Number	Analyte	Result	Units
00951	Fluoride	0.050 U	mg F/L

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	Orthophosphate-P	0.050 U	mg P/L

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-SO4 Analysis Description: Analysis for sulfate in water

Storet Number	Analyte	Result	Units
00945	Sulfate	2.0 U	mg SO4/L

Sample Number: 90-SEP-25-02-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TSS Analysis Description: Total suspended solids

Storet Number	Analyte	Result	Units
00530	TSS	1 U	mg/L

End of Report

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-03-01
Sample Location: Alligator Creek, Nassau
Field ID: Downstream
Date/Time Collected: 24-SEP-1990 12:10:08.04
Comments:

Sample Status: Authorized by Bill Coppenger
Matrix: Fresh Surf Water
Storet Station Number:

Sample Number: 90-SEP-25-03-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	4.9 A	mg P/L

Sample Number: 90-SEP-25-03-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N KJEL TOT	2.2 A	mg N/L

Sample Number: 90-SEP-25-03-01 Test status: Authorized by Bill Coppenger
Analysis Id: W-NO2NO3 Analysis Description: Analysis for nitrite+nitrate in water

Storet Number	Analyte	Result	Units
00630	NO2NO3-N	4.2 A	mg N/L

Sample Number: 90-SEP-25-03-01 Test status: Authorized by Bill Coppenger
Analysis Id: W-NH3 Analysis Description: Analysis for ammonia in water

Storet Number	Analyte	Result	Units
00610	Ammonia-N	0.37 A	mg N/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-03-02 Sample Status: Authorized by Bill Coppenger
Sample Location: Alligator Creek, Nassau Matrix: Fresh Surf Water
Field ID: Upstream Storet Station Number:
Date/Time Collected: 24-SEP-1990 14:00:08.04
Comments:

Sample Number: 90-SEP-25-03-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	0.29 A	mg P/L

Sample Number: 90-SEP-25-03-02 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N KJEL TOT	0.82 A	mg N/L

Sample Number: 90-SEP-25-03-02 Test status: Authorized by Bill Coppenger
Analysis Id: W-NO2NO3 Analysis Description: Analysis for nitrite+nitrate in water

Storet Number	Analyte	Result	Units
00630	NO2NO3-N	0.020 U	mg N/L

Sample Number: 90-SEP-25-03-02 Test status: Authorized by Bill Coppenger
Analysis Id: W-NH3 Analysis Description: Analysis for ammonia in water

Storet Number	Analyte	Result	Units
00610	Ammonia-N	0.010 U	mg N/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-03-03 Sample Status: Authorized by Bill Coppenger
Sample Location: Callahan STP, Nassau Matrix: Effluent
Field ID: Callahan STP Storet Station Number:
Date/Time Collected: 24-SEP-1990 11:00:08.04
Comments:

Sample Number: 90-SEP-25-03-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	4.7 A	mg P/L

Sample Number: 90-SEP-25-03-03 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N KJEL TOT	2.4 A	mg N/L

Sample Number: 90-SEP-25-03-03 Test status: Authorized by Bill Coppenger
Analysis Id: W-NO2NO3 Analysis Description: Analysis for nitrite-nitrate in water

Storet Number	Analyte	Result	Units
00630	NO2NO3-N	3.9 A	mg N/L

Sample Number: 90-SEP-25-03-03 Test status: Authorized by Bill Coppenger
Analysis Id: W-NH3 Analysis Description: Analysis for ammonia in water

Storet Number	Analyte	Result	Units
00610	Ammonia-N	0.37 A	mg N/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-SEP-25-03-04 Sample Status: Authorized by Bill Coppenger
Sample Location: Alligator Creek / Callahan STP Matrix: Trip Blank
Field ID: Trip Blank Storet Station Number:
Date/Time Collected: 24-SEP-1990 08:20:08.04
Comments:

Sample Number: 90-SEP-25-03-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total-P	0.034 T	mg P/L

Sample Number: 90-SEP-25-03-04 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TKN Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N KJEL TOT	0.29 A	mg N/L

Sample Number: 90-SEP-25-03-04 Test status: Authorized by Bill Coppenger
Analysis Id: W-NO2NO3 Analysis Description: Analysis for nitrite+nitrate in water

Storet Number	Analyte	Result	Units
00630	NO2NO3-N	0.020 U	mg N/L

Sample Number: 90-SEP-25-03-04 Test status: Authorized by Bill Coppenger
Analysis Id: W-NH3 Analysis Description: Analysis for ammonia in water

Storet Number	Analyte	Result	Units
00610	Ammonia-N	0.010 U	mg N/L

End of Report

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

Bacteriological Analysis of Environmental Waters*

County: Nassau Address: D.E.R., 7825 Baymeadows Way, Jax 32256-7577

Collector: Bulgrin Location: Callahan STP

Date Collected: 9/24/90 Date Rec'd: 9/24/90 Date Reported: 9/28/90

Lab. No.	Station No.	Total Coliform MPN/MF**	Fecal Coliform MPN/MF**	Fecal Strep. MPN/MF**	Entero-cocci MF	E. Coli. MF
3357	Callahan STP 1		900 (MF)			
3358	" " 2		300 (MF)			
3359	Alligator Creek Downstream 1	24,000 (MPN)	300 (MPN)			
3360	" " " 2	22,000 (MPN)	1,700 (MPN)			
3361	" Upstream 1	900 (MPN)	220 (MPN)			
3362	" " 2	1,700 (MPN)	800 (MPN)			

*All results reported as MPN or MF value per 100 ml.
**Method used is that which is circled.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91018 DATE: 1990/10/08
SAMPLE SOURCE: [redacted] TIME: 1200
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: Conductivity: Dissolved oxygen: Temperature(C):
Secchi: Total depth(ft.):

WEATHER CONDITIONS: WARM AND PARTLY CLOUDY

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted] Total coliform (MPN):
Fecal coliform (MPN):
Fecal strep (MPN):
Fecal strep (MF) :
Heterotrophic Plate #/mL :
Enterococci (MF) :

MF : Membrane Filter
MPN: Most Probable Number (Tubes)
M : Moderate non-coliform growth
T: Too Numerous To Count n-c growt
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/17

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

NORTHEAST DISTRICT
RECEIVED
OCT 16 1990
DER-JACKSONVILLE

Bacteriological Analysis of Environmental Waters*

County Nassau Address D.E.R. 7528 Baymeadows Way Suite 200B Jax 32256

Collector Bulgrin Location Callahan

Date Collected 10/8/90 Date Rec'd 10/8/90 Date Reported 10/15/90

Lab. No.	Station No.	Total Coliform MPN/MF**	Fecal Coliform MPN/MF**	Fecal Strep. MPN/MF**	Entero-cocci MF	E. Coli. MF
3442	Callahan STP#1		170 (MF)			
3443	" " #2		170 (MF)			
3444	Alligator Ck. D #1	>160,000	2400 (MPN)			
3445	" D #2	90,000	11,000 (MPN)			
3446	" U #1	17,000	800 (MPN)			
3447	" U #2	13,000	2,200 (MPN)			

*All results reported as MPN or MF value per 100 ml.
**Method used is that which is circled.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91043 DATE: [redacted]
SAMPLE SOURCE: [redacted] TIME: 1030
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]GE
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
[redacted]
Secchi: Total depth(ft.):

WEATHER CONDITIONS: HEAVY RAIN, HIGH FLOW

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted]
Fecal strep (MF) : Total coliform (MPN):
Heterotrophic Plate #/mL : Fecal coliform (MPN):
Fecal strep (MPN):
Enterococci (MF) :

MF : Membrane Filter T: Too Numerous To Count n-c growt
MPN: Most Probable Number (Tubes) C: Confluent (Heavy) n-c growth
M : Moderate non-coliform growth e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/30

DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91074 DATE: 1990/11/05
SAMPLE SOURCE: [redacted] TIME: 1315
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: PSC
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

[redacted]

[redacted]: Total depth(ft.):

WEATHER CONDITIONS: SUNNY, 70 DEG. F.

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/11/
All vaules reported in #/100mL

[redacted]

Total coliform (MPN):
Fecal coliform (MPN):
Fecal strep (MPN):
Fecal strep (MF) :
Heterotrophic Plate #/mL :
Enterococci (MF) :

MF : Membrane Filter
MPN: Most Probable Number (Tubes)
M : Moderate non-coliform growth
T: Too Numerous To Count n-c growt
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/11/08

DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91093 DATE: 1990/11/09
SAMPLE SOURCE: [redacted] TIME: 1100
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: Conductivity: Dissolved oxygen: Temperature(C):
Secchi: Total depth(ft.):

WEATHER CONDITIONS: CLEAR AND MILD

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/11/
All vaules reported in #/100mL
[redacted] (MF) Total coliform (MPN):
[redacted] Fecal coliform (MPN):
Fecal strep (MF) : Fecal strep (MPN):
Heterotrophic Plate #/mL : Enterococci (MF) :

MF : Membrane Filter T: Too Numerous To Count n-c growt
MPN: Most Probable Number (Tubes) C: Confluent (Heavy) n-c growth
M : Moderate non-coliform growth e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/11/21

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91020 DATE: 1990/10/08
SAMPLE SOURCE: [redacted] TIME: 1400
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: Conductivity: Dissolved oxygen: Temperature(C):
Secchi: Total depth(ft.):

WEATHER CONDITIONS: WARM AND PARTLY CLOUDY

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted]
Total coliform (MPN):
Fecal coliform (MPN):
Fecal strep (MPN):
Enterococci (MF) :
Fecal strep (MF) :
Heterotrophic Plate #/mL :

MF : Membrane Filter
MPN: Most Probable Number (Tubes)
M : Moderate non-coliform growth
T: Too Numerous To Count n-c growt
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/17

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91045 DATE: 1990/10/22
SAMPLE SOURCE: [redacted]EK TIME: 1200
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]E
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
[redacted]

WEATHER CONDITIONS: HEAVY RAIN, HIGH FLOW

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted]e Total coliform (MPN):
[redacted] Fecal coliform (MPN):
Fecal strep (MF) : Fecal strep (MPN):
Heterotrophic Plate #/mL : Enterococci (MF) :

MF : Membrane Filter T: Too Numerous To Count n-c growt
MPN: Most Probable Number (Tubes) C: Confluent (Heavy) n-c growth
M : Moderate non-coliform growth e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/30

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91019 DATE: 1990/10/08
SAMPLE SOURCE: [redacted] TIME: 1230
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: Conductivity: Dissolved oxygen: Temperature(C):
Secchi: Total depth(ft.):

WEATHER CONDITIONS: WARM AND PARTLY CLOUDY

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted]
Fecal strep (MF) :
Heterotrophic Plate #/mL :
Total coliform (MPN):
Fecal coliform (MPN):
Fecal strep (MPN):
Enterococci (MF) :

MF : Membrane Filter
MPN: Most Probable Number (Tubes)
M : Moderate non-coliform growth
T: Too Numerous To Count n-c growt
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/17

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 200B
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91044 DATE: 1990/10/22
SAMPLE SOURCE: [redacted] TIME: 1040
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: [redacted]
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: POINT SOURCE COMPLIANCE
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

[redacted]
ph: [redacted] Conductivity: [redacted] Dissolved oxygen: [redacted] Temperature(C): [redacted]
Secchi: [redacted] Total depth(ft.): [redacted]

WEATHER CONDITIONS: HEAVY RAIN, HIGH FLOW

The following were analyzed by: Date out:
Sample depth (ft.) :
Species Diversity Index:
Quantitative # of taxa :
Density (#/m2) :
Qualitative # of taxa :
Florida Biotic Index :

The following were analyzed by: MIKE HOLLINGSWORTH Date out: 1990/10/
All vaules reported in #/100mL
[redacted]
Fecal strep (MF) :
Heterotrophic Plate #/mL :
Total coliform (MPN):
Fecal coliform (MPN):
Fecal strep (MPN):
Enterococci (MF) :

MF : Membrane Filter
MPN: Most Probable Number (Tubes)
M : Moderate non-coliform growth
T: Too Numerous To Count n-c growt.
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. ra

The following were analyzed by: Date out:
Sediment particle size % weight
Sample depth (ft.):
>2.0mm :
1.0 - 2.0mm :
0.5 - 2.0mm :
0.25 - 0.5mm :
0.125 - 0.5mm :
0.125 - 0.25mm :
0.0625 - 0.125mm :
<0.0625mm :
Sediment organic :

COMMENTS:

Approved By : LEE BANKS Date: 1990/10/30

Macroinvetebrate taxa list collected via timed (one hour), qualitative methods (dip net, etc.), from Alligator Creek, above and below the Callahan STP discharge, on October 10, 1990.

	Control Site	Test Site
Coleoptera		
Agasicles hygrophila	+	–
Ancyronyx variagata	+	–
Undetermined carabidae sp.	–	+
Hydroporus sp.	+	–
Peltodytes muticus	+	+
Peltodytes sexmaculata	–	+
Stenelmis sp.	+	–
Tropisternus blatchleyi	–	+
Diptera		
Ablabesmyia idei	+	–
Asheum beckae	+	–
Chironomus decorus grp.	+	+
Cladotanytarsus sp.	+	–
Clinotanypus sp.	+	–
Culicoides sp.	+	–
Dicrotendipes modestus	+	–
Goeldichironomus holoprasinus	+	+
Odontomesa sp.	–	+
Palpomyia grp. sp.	+	–
Parachironomus sp.	+	–
Paracladopelma prob.*undine*	+	–
Polypedilum illinoense	+	–
Procladius bellus	+	–
Undetermined dipteran pupae	–	+
Tanytarsus sp.	+	–
Undetermined tanypod sp.	+	–
Tanypus carinatus	+	–
Ephemeroptera		
Caenis diminuta	+	–
Gastropoda		
Ferrissia hendersoni	+	–
Undetermined hydrobiid	+	–
Micromenetus sp.	+	–
Physella heterostropha pomila	+	–
Pseudosuccinia columella	+	+
Hemiptera		
Abedus immaculatus	–	+
Belostoma testaceum	–	+
Metrobates sp.	+	–
Notonecta irrorator	+	–
Undetermined hemiptera sp.	–	+
Hirudinea		

Helobdella triserialis	+	−
Macrobdella ditetra	−	+
Lepidoptera		
Undetermined noctuidae sp.	−	+
Undetermined pyralidae sp.	−	+
Malacostraca		
Asellus sp.	+	−
Palaemonetes paludosus	+	−
Procambarus sp.	+	−
Odonata		
Argia sp.	+	−
Enallagma civile	+	−
Epitheca princeps	−	+
Ischnura posita	−	+
Libellula sp.	+	−
Pachydiplax longipennis	+	+
Perithemis tenera seminole	+	−
Oligochaeta		
Dero digitata	+	−
Dero nivea	+	−
Eclipidrilus palustris	+	−
Nais simplex	+	−
Undetermined tubificid w/o capilliform setae	+	+
Pelecypoda		
Corbicula manilensis	+	−
Musculium lacustre	+	−
Pisidium sp.	+	−
Undetermined unionidae	+	−
Platyhelminthes		
Dugesia tigrina	+	−
Total	**48**	**19**

Macroinvertebrate taxa list for Callahan Sewage Treatment Plant, Nassau County, Florida, collected from Hester-Dendy samplers above and below the discharge on October 22, 1990.

	Control Site	Test Site
Diptera		
Asheum beckae	+	–
Chironomus decorus grp.	+	+
Dicrotendipes simpsoni	+	–
Goeldichironomus holoprasinus	+	+
Parachironomus alatus	+	–
Undetermined dipteran pupae	+	+
Tanytarsini type I	+	–
Ephemeroptera		
Caenis hilaris	+	–
Gastropoda		
Micromenetus dilatus	+	–
Physella heterostropha pomila	+	–
Pseudosuccinia columella	+	+
Malacostraca		
Hyalella azteca	+	–
Odonata		
Argia sp.	–	+
Pachydiplax longipennis	+	+
Perithemis tenera seminole	–	+
Oligochaeta		
Dero digitata	+	–
Dero nivea	+	–
Total	**15**	**7**

Periphyton taxa list for Town of Callahan Sewage Treatment Plant, Nassau County, Florida, collected 22 October, 1990.

	Control Site	Test Site
Diatoms		
Achnanthes exigua	+	+
Achnanthes hauckiana	+	–
Achnanthes lanceolata	+	+
Achnanthes lanceolata v. *dubia*	+	+
Achnanthes linearis	+	+
Bacillaria paradoxa	+	–
Cocconeis placentula	+	+
Gomphonema affine	+	–
Gomphonema parvulum	+	+
Gomphonema truncatum	+	–
Gyrosigma spencerii	+	–
Navicula auriculata	+	–
Navicula biconica	–	+
Navicula constans	+	–
Navicula exigua	–	+
Navicula pupula v. *rectangularis*	–	+
Navicula radiosa	+	+
Navicula rhynchocephala	+	–
Nitzschia acuta	+	–
Nitzschia amphibia	+	+
Nitzschia fonticola	+	+
Nitzschia linearis	+	–
Nitzschia obtusa	–	+
Nitzschia palea	+	+
Nitzschia sp. 3 (Prasad)	+	–
Nitzschia thermalis	+	–
Rhopalodia gibba	+	–
Rhopalodia gibba v. *ventricosa*	+	–
Surirella tenera v. *nervosa*	+	–
Chlorophyta		
Characium sp.	–	+
Protoderma sp.	+	+
Cyanophyta		
Anabaena sp.	–	+
Lyngbya sp. 1	–	+
Lyngbya sp. 2	+	+
Oscillatoria sp.	+	–
Rhabdoderma sp.	–	+
Total	**28**	**20**

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger:	**Town of Callahan Sewage Treatment Plant**
County:	**Nassau**
NPDES Number:	**FL0038407**
State Permit Expiration Date:	**April 8, 1991**

Toxics Sampling Inspection **(XSI)**	
Date Sampled:	9-24-90
Results:	Concentration of silver (0.3 µg/l) at downstream site is in violation of its numeric criterion (Class III Standard, 0.07 µg/l). Concentrations of metals in the effluent are as follows: barium (31 µg/l), iron (88 µg/l), and zinc (13 µg/l), which are not in high enough concentrations to harm biota. No organic priority pollutants detected in the effluent sample.

Compliance Biomonitoring Inspection **(CBI)**	
Date Sampled:	9-24-90
Results:	No toxicity to *Notropis leedsi* or *Ceriodaphnia dubia*

Impact Bioassessment Inspection **(IBI)**	
Date Sampled:	9-24-90
Results:	Macroinvertebrate community very degraded. Violations of Bacteriological Criteria, Biological Integrity Criteria, Imbalances in Aquatic Flora and Fauna, and Dominance of Nuisance Species were attributed to this discharge. Excessively high NO_2NO_3 and O-PO_4 resulted in an extremely elevated Algal Growth Potential, indicating severe nutrient enrichment problems.

Water Quality Inspection **(WQI)**	
Date Sampled:	
Results:	

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