

Biological Assessment of

Camp Blanding Wastewater Treatment Plant

Clay County

NPDES #FL0022853

Sampled April and June 1991

October 1991

Biology Section
Division of Technical Services

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger: Camp Blanding Wastewater Treatment Plant
County: Clay
NPDES Number: FL0022853
State Permit Expiration Date:

Toxics Sampling Inspection (XSI)	
Date Sampled:	22 April 1991
Results:	Aluminum (341 µg/L), Barium (8 µg/L), Iron (226 µg/L), and Zinc (24 µg/L) These levels are below ambient criteria. No organic priority pollutants or pesticides above detection limit.

Compliance Biomonitoring Inspection (CBI)	
Date Sampled:	22 April 1991
Results:	Not acutely toxic to *Ceriodaphnia dubia* or *Pimephales promelas*.

Impact Bioassessment Inspection (IBI)	
Date Sampled:	3 June 1991
Results:	Benthic macroinvertebrate and periphyton communities were healthy in the vicinity and not affected by addition of effluent.

Water Quality Inspection (WQI)	
Date Sampled:	22 April 1991
Results:	Effluent nutrients as follows: T-PO_4 (0.57 mg P/L), O-PO_4 (0.29 mg P/L), NH_3 (0.041 mg N/L), NO_2NO_3 (1.5 mg N/L), TKN (0.98 mg N/L). Receiving water nutrients mostly at lower levels or undetected. Algal Growth Potential below the 5 mg dry wt/L problem threshold at both control and test sites. Violation of total coliform bacteria standard in effluent.

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

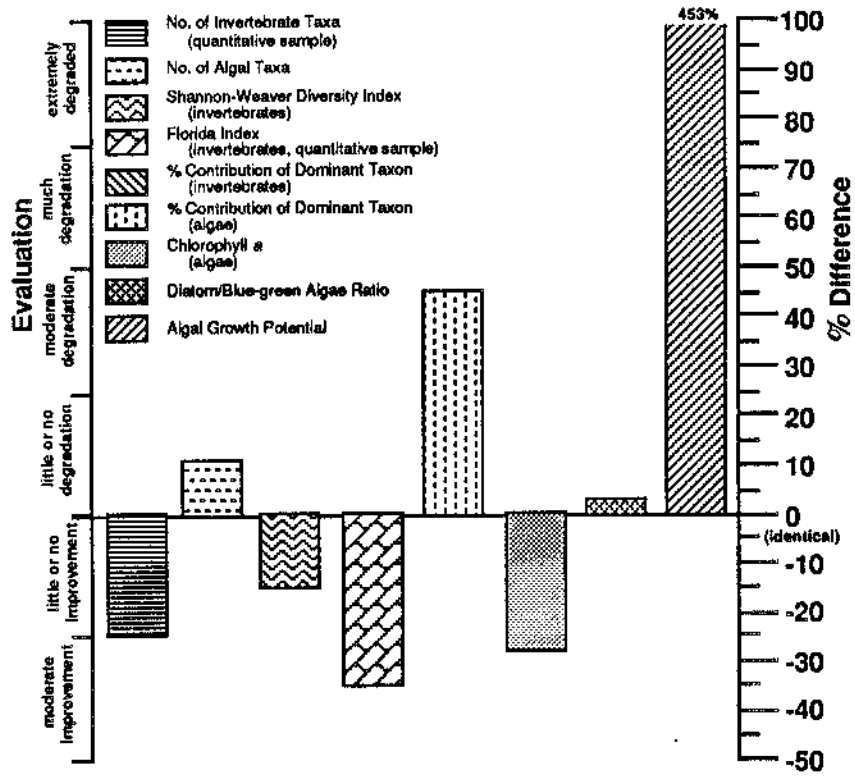
The Camp Blanding Wastewater Treatment Plant is located east of Starke in Clay County, Florida. Treatment of sewage consists of grit removal, aeration, clarification, and chlorination. Although the facility is permitted for 0.9 MGD, it usually receives about half this amount. Chlorinated effluent travels 7000 ft to the outfall in the South Fork of Black Creek, which flows east to the St. Johns River (see map in Appendix). A review of the monthly operating reports and the recent DER inspection indicated that the plant has been in compliance with permit limitations for the past three years.

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 Black Creek, 50 yards upstream of the facility) and a test site (the area down gradient of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia*

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	52	29
Florida Index	34	23
% Contribution of Dominant Taxon	19.2	29.8
% Coleoptera	29.7	41.8
% Trichoptera	15.8	26.4
% Diptera	36.8	21.2
% Ephemeroptera	2.3	0
% Odonata	4.5	4.8
% Malacostraca	3.8	0
% Other	7.1	5.8
% Predators	19.3	13.1
% Collector-Gatherers	32.2	30.3
% Collector-Filterers	21.3	24.5
% Scrapers	18.5	20.5
% Shredders	8.7	11.9
Macroinvertebrate Hester-Dendy		
Number of Taxa	28	35
Florida Index	17	23
Shannon-Weaver Diversity	3.1	3.6
% Trichoptera	35.1	23.2
% Diptera	49.8	39.0
% Coleoptera	9.3	30.5
% Ephemeroptera	3.2	2.1
% Acarina	1.6	1.6
% Oligochaeta	0.5	1.6
% Other	0.5	2.0
% Predators	21.7	18.5
% Collector-Gatherers	26.7	32.6
% Collector-Filterers	36.0	26.1
% Scrapers	6.4	16.5
% Shredders	9.1	5.8
Periphyton Algae		
Number of Taxa	9	8
% Contribution of Dominant Taxon	64.0	93.4
Chlorophyll a (mg/sq. m)	13.3	9.4
Diatom/B-G Abundance Ratio	98.5	95.2
% Blue-green	1.5	4.7
% Green	0.8	0.3
% Diatoms	97.7	94.9
Algal Growth Potential (mg dry wt/l)	.08	3.7



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

and *Pimephales promelas* 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). Both study sites and the effluent were sampled for metals and nutrients. 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 (Ross 1990). These were incubated for 6 weeks instead of the standard 28 days due to field accessability problems. Periphyton was sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 6 weeks (Ross 1990). Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller et al. (1978).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. 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. 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. The determination of the Quantitative Stability 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, Florida Index and the diatom to blue-green algae ratio 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*, and algal growth potential are measured as the test site minus control site divided by the control.

The following personnel were involved in this investigation: Scott Bulgrin (DER Northeast District)

and Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandy McClure (Tallahassee Biology Laboratory).

Results and Discussion

Habitat quality at both the control and test sites was similar, with scores of 96 and 91, respectively (Appendix). The control site scored slightly higher for bottom substrate and riparian zone vegetation quality, but both of these areas of Black Creek can be considered to have excellent habitat characteristics. Both sites were naturally channelized deep aquifer fed streams, with extensive canopy cover. The upstream station had slightly higher dissolved oxygen (6.5 mg/L compared to 6.0 mg/L downstream) and pH (7.65 and 6.8 at control and test sites, respectively, Appendix). Besides the input of effluent from the WWTP, an unnamed stream enters the South Fork of Black Creek between the control and test sites.

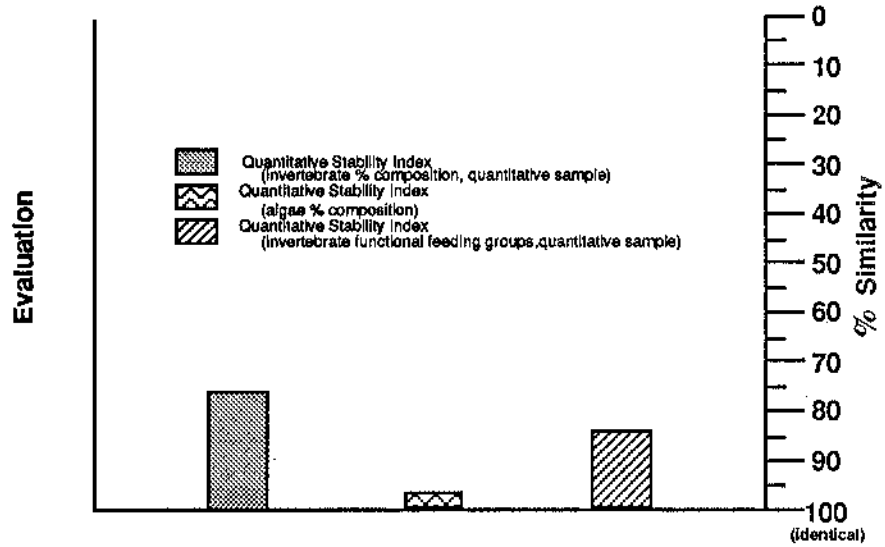
Some mortality of *Ceriodaphnia dubia* occurred during the 48 hour static acute bioassay; 15% of the organisms died. None of the fish, *Pimephales promelas*, appeared to suffer any acute effects from the effluent sample (Appendix). No organic priority pollutants or pesticides were found above their detection limits (Appendix). The following metals were measured in the effluent: aluminum (341 µg/L), barium (8 µg/L), iron (226 µg/L), and zinc (24 µg/L) (Appendix). These levels do not violate ambient standards. Most of these same metals were found above and below the facility (at lower concentrations), except that zinc was not detected at the downstream site. At the control station, mercury was detected, but could not be measured below the detection limit of 0.2 µg/L (Appendix).

Nutrient concentrations were fairly low for an effluent sample (Appendix). Total and ortho-phosphorus were 0.57 and 0.29 mg/L, respectively. Nitrogen-containing compounds were: NH_3 (0.041 mg/L), NO_2NO_3 (1.5 mg/L), and TKN (0.98 mg/L). At the downstream site, the same nutrients were detected at lower concentrations, except for NH_3, which was also 0.041 mg/L. Above the outfall, NO_2NO_3 and the phosphorus compounds were not detected, and levels of the other nutrients were very low (Appendix).

Algal growth potential (AGP) was higher at the downstream site compared to the control, increasing from 0.08 to 3.7 mg dry wt/L. While this represents a 453 % change (which would normally indicate extreme enrichment), AGP at both stations was below the problem threshold of 5.0 mg dry wt/L established by Raschke and Schultz (1987). This low AGP is not surprising, given the levels of bioavailable nutrients measured at the control and test sites.

Bacteriological samples were collected at discharge, control, and test sites, and were analyzed at the Northeast District laboratory (Appendix). The effluent contained 3800 organisms/100 ml of total coliform bacteria, a violation of FAC 17-302.560(5), ambient bacteriological standards. Total and fecal coliforms were well below standards at the two surface water stations.

Quantitative measures (via Hester-Dendy samplers) of benthic macroinvertebrate community health showed no degradation below the discharge in Black Creek (see Table and Figures). The figure on 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 figure on this page sum-



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

marizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

The number of taxa, Florida Index, and Shannon-Weaver diversity were higher at the test site. The quantitative stability indices for percent composition and functional feeding groups further emphasize the similarity of macroinvertebrate communities at these two stations (*i.e.*, lack of effects from the discharge).

Qualitative measures (sampled with the dip net) of the macroinvertebrate community indicated some moderate decreases in species richness and Florida Index below the outfall (see Table). Although more taxa were collected upstream using this sampling method, both sites supported an appreciable population of pollution-sensitive organisms. Additionally, trophic relationships and community composition were very comparable at both sites.

All measures of periphyton community health and stability, with one exception, indicated that the test site was not affected by the discharge (see Figures and Table). Both areas of Black Creek were strongly dominated by diatoms, particularly *Eunotia pectinalis*. This organism, which was more abundant proportionally at the test site, is very common in acidic streams of low mineral content, and is considered cosmopolitan. While excessive numerical dominance of a single type of organism is usually associated with disturbance, in this specific circumstance, it may not be a particularly meaningful metric. First, the organism in question (*Eunotia pectinalis*) is often dominant in pristine situations (*e.g.*, the upper Suwannee River) (FDER 1985b). Furthermore, all other metrics concerning periphyton health indicated that clean conditions prevailed downstream of the discharge.

Conclusions

The Camp Blanding discharge was not acutely toxic to the fish or invertebrate tested. No harmful concentrations of metals were measured in the effluent, nor were organic priority pollutants or pesticides found above detection limits.

Nutrient concentrations were relatively low in the effluent sample. These results, coupled with algal growth potential data, demonstrate that no enrichment problems exist in Black Creek as a result of the discharge.

Bacteriological standards for total coliforms were violated, with 3800 organisms/100 ml measured in the effluent, although bacterial levels at the upstream and downstream sites were well below standards.

The Camp Blanding discharge was not harmful to the benthic macroinvertebrate community in the South Fork of Black Creek. Our data showed that a healthy, diverse, and generally pollution-sensitive population of macroinvertebrates existed above and below the outfall. Likewise, the periphyton community was not adversely affected by the discharge.

Literature Cited

American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th ed. New York, N.Y. 1268 pp.

Florida Department of Environmental Regulation. 1985. Quality assurance manual for performing acute toxicity tests. 2nd edition. Fla. Dept. Environmental Regulation, Biology Section, Tallahassee. 53 pp.

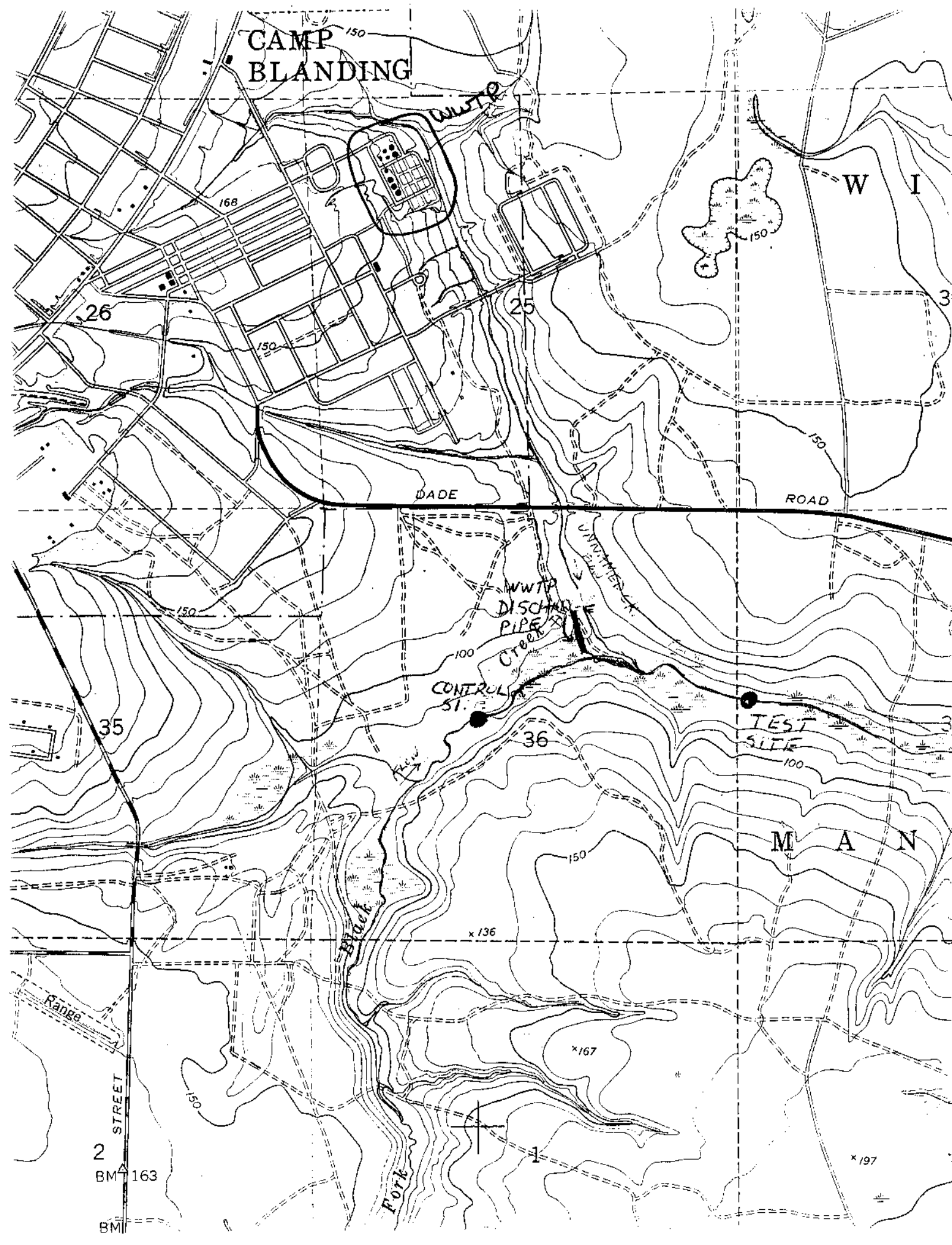
Florida Department of Environmental Regulation. 1985b. Limnology of the Suwanne River. Fla. Dept. Environmental Regulation, Biology Section, Tallahassee. 407 pp.

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. U. S. Environ. Prot. Agency, EPA-600/9-78-018. 126 pp.

Peltier, W. H. and C. I. Weber. 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 3rd edition. EPA/600/4-85/013. U. S. EPA, Cincinnati, Ohio. 216 pp.

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.


CAMP BLANDING
WATER
168
150
26
25
W I
3
DADE ROAD
UNNAMED CREEK
NWWTP DISCHARGE PIPE
Creek
100
CONTROL ST.
35
36
TEST SITE
M A N
x136
Black
Fork
Range
STREET
2
BM 163
BM
1
x167
x197

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

SUBMITTING AGENCY CODE: EC21	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
SUBMITTING AGENCY NAME: Fla. D.E.R. Northeast District		06/03/91	South Fork of Black Creek to St. Johns River

REMARKS:	LOCATION:	FIELD ID/NAME:
Hot Sunny 90°	Black Creek upstream SC yds of Camp Blanding WWTP discharge	

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 28	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 30	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 15	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 9	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 9	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		TOTAL SCORE
5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	96

COMMENTS: Pristine creek, no man-made impacts. Water level slightly high.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06/03/91	SCOTT BULGRIN	Scott Bulgrin

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

SUBMITTING AGENCY CODE: EC 31	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
SUBMITTING AGENCY NAME: FDER D.E.R. N.E. Area Panama		06/03/91	Black Creek

REMARKS: Hot Sunny 90°	LOCATION: Black Creek Downstream 50 yds of Camp Blanding Road	FIELD ID/NAME:

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 24	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 30	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 15	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 9	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: 5	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: 91

COMMENTS: Pristine Area / No man-made impacts

ANALYSIS DATE:	ANALYST:	SIGNATURE:
06/03/91	SCOTT BOLGRIN	Scott Bolgrin

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): 06/03/91	RECEIVING BODY OF WATER: [illegible]
REMARKS: Pristine Area of non-point impacts	LOCATION: Black Creek Upstream 50 yds of Camp Blanding [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
100						

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

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

Point-Source Pollution (list location and describe): None

Estimated Stream Width (range, m): 30	Estimated Stream Depth (range, m): 1 [illegible]		yes
High Water Mark (m above bed): 2 C	Velocity (range, m/s): [illegible]	Impounded [ ] / Channelized [X]	

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	[illegible]
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	
Sand:	CC	Mud/Muck (organic):	[illegible]

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	23 C	[illegible]	Secchi Depth (m):	[illegible]
Mid-depth	23 C	[illegible]	pH (SU):	[illegible]
Bottom	23 C	[illegible]	Conductivity (µmho/cm):	[illegible]
			Other Parameters:	

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

Water Odors (check box): Normal: [X] Sewage: [ ] 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): [ ] Clear: [X] Other: [ ] _____

Weather Conditions: Hot Sunny 90° Humid

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
6/[illegible]/91	SCOTT [illegible]	[illegible]

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 8031	STORET STATION NUMBER:	DATE (M/D/Y): 06/03/91	RECEIVING BODY OF WATER: South Fork of Black Creek to St. Johns River
SUBMITTING AGENCY NAME: Fla D.E.R. NorthEast District			

REMARKS: Pristine Area No Man Made - impacts	LOCATION: Black Creek Downstream 2 50yds from Camp Blanding WWTP Discharge	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
100						

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

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

Point-Source Pollution (list location and describe): Camp Blanding WWTP Discharge

Estimated Stream Width (range, m): 3.0	Estimated Stream Depth (range, m): 1.0	Impounded [ ] yes
High Water Mark (m above bed): 2.0	Velocity (range, m/s): 0.3	Channelized [X] NATURAL

Canopy Cover % (check box): Open: [ ] Lightly Shaded: [ ] Moderately Shaded: [ ] Heavily Shaded: [X] 85%

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:	30
Sand:	60	Mud/Muck (organic):	10

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	28.1	6.0	Secchi Depth (m):	0.6L
Mid-depth	27.9	5.9	pH (SU):	6.80
Bottom	27.7	5.9	Conductivity (µmho/cm):	75
			Other Parameters:	

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

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

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

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

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

Weather Conditions: Hot Sunny 90° Humid

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

ANALYSIS DATE: 06/03/91	ANALYST: SCOTT Bulgrin	SIGNATURE: Scott L. Bulgrin

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CAMP BLANDING
Address/City:
County: CLAY
Contact/District: SCOTT BULGRIN / NE
NPDES Permit #: **Outfall #:**

Sample Collection: Date 4-22-91 Time 1430
Test Beginning: Date 4-23-91 Time 1110
Test Ending: Date 4-25-91 Time 0834
Test Organism: C. DUBIA
Life Stage/Age: <24 HRS

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

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7;9@9	8.7@23	1500@23.9	21.9@23.9
24 hr	7@7;9@9	8.7@23	1401@24.3	20@24.1
48 hr	7@7;9@9	8.9@21.5	1386@24.0	21@23.8

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
CONTROL	A	5	5	5	9.0	8.9	10.1	6.6	8.2	7.4	21.0	22.3	21.5	156	162	161
CONTROL	B	5	5	5												
CONTROL	C	5	5	5												
CONTROL	D	5	5	5												
100%	A	5	5	5	LB 8.0	8.5	10.8	7.4	8.0	8.3	21.0	22.1	21.5	155	166	164
100%	B	5	4	4	10.1											
100%	C	5	5	4												
100%	D	5	5	4												
Measured/Loaded by:		MF	MF	MF	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	MF
Recorded by:		MF	MF	MF	LB	MF	MF	MF	MF	MF	LB	MF	MF	LB	MF	MF

Investigators' Signatures

Kim Pearce
Randall Faircloth
Lynn Burton

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl:					
Lab Tot. Resid. Cl:			CC	Hach	MF
Alkalinity:	127	62	57	Hach	MF
Hardness:	128	70	70	Hach	MF
Total Ammonia:	0.0	0.0	0.0	Hach	MF

Ammonia meter slope:

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CAMP BLANDING
Address/City:
County: CLAY
Contact/District: SCOTT BULGRIN / NE
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 4-22-91 Time 1430
Test Beginning: Date 4-23-91 Time 1110
Test Ending: Date 4-25-91 Time 0830
Test Organism: KP ~~N. LECIDUS~~ P. PROMELAS
Life Stage/Age: 13 DAYS

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

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.9@9	8.7@23	1394@24.3@1389	21.9@23.9
24 hr	7@7.9@9	8.7@23	1401@24.3	20@24.1
48 hr	7@7.9@9	8.9@21.5	1386@24.0	21@23.8

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
CONTROL	76	5	5	5	8.7	8.1	~~8.9~~	7.6	7.9	8.2	20.5	21.4	20.5	237	~~244~~	
CONTROL	7	5	5	5	8.9	8.2	10.2	7.7	7.9	8.2				LB Hole	239	244
100%	23	5	5	5	11.3	8.0	10.0	7.5	8.0	8.1	22.0	21.3	20.5	Hole		
100%	20	5	5	5	11.4	8.1	10.1	7.5	7.9	8.0				166	168	168
Measured/Loaded by		MF	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF
Recorded by		MF	MF	MF	LB	MF	MF	LB	MF	MF	LB	MF	MF	LB	MF	MF

Investigators' Signatures

Kim Pearce
Michael Faulkner
Lynn Burton

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:	127	[illegible]	57	[illegible]	MF
Hardness:	124	70	70	[illegible]	MF
Total Ammonia:	0.0	0.0	0.0	[illegible]	MF

Ammonia meter slope: _____

Sample ID: 17896/91-APR-23-22-01 Matrix: W-EFFLUENT
Location: Camp Blanding WWTP
Field ID:
Collected: 22-APR-1991 14:30 By: Scott Bulgrin
Authorized: 21-MAY-1991 By: Liang T. Lin
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-BNA
base-neutral-acid water analysis
Analyzed: 1-MAY-1991 By: Laura Harrison
Authorized: 15-MAY-1991 By: Laura Harrison

Storet#	Analyte	Value	Units
34205	Acenaphthene	2 U	ug/L
34200	Acenaphthylene	2 U	ug/L
39330	Aldrin	3 U	ug/L
34220	Anthracene	2 U	ug/L
34526	Benzo(a)anthracene	2 U	ug/L
34230	Benzo(b)fluoranthene	2 U	ug/L
34242	Benzo(k)fluoranthene	2 U	ug/L
34247	Benzo(a)pyrene	4 U	ug/L
34521	Benzo(g,h,i)perylene	5 U	ug/L
34292	Benzyl butyl phthalate	2 U	ug/L
	a-BHC	3 U	ug/L
39337	b-BHC	3 U	ug/L
39340	d-BHC	3 U	ug/L
	g-BHC	3 U	ug/L
39120	Benzidine	25 U	ug/L
34273	Bis(2-chloroethyl)ether	2 U	ug/L
34278	Bis(2-chloroethoxy)methane	2 U	ug/L
34283	Bis(2-chloroisopropyl)ether	2 U	ug/L
39100	Bis(2-ethylhexyl)phthalate	2 U	ug/L
34636	4-Bromophenyl phenyl ether	2 U	ug/L
34581	2-Chloronaphthalene	2 U	ug/L
34641	4-Chlorophenyl phenyl ether	2 U	ug/L
34320	Chrysene	2 U	ug/L
39310	4,4'-DDD	3 U	ug/L
39320	4,4'-DDE	3 U	ug/L
39300	4,4'-DDT	3 U	ug/L
34556	Dibenzo(a,h)anthracene	5 U	ug/L
39110	Di-n-butyl phthalate	2 U	ug/L
34536	1,2-Dichlorobenzene	2 U	ug/L
34566	1,3-Dichlorobenzene	2 U	ug/L
34571	1,4-Dichlorobenzene	2 U	ug/L
34631	3,3'-Dichlorobenzidine	5 U	ug/L
39380	Dieldrin	3 U	ug/L
34336	Diethylphthalate	2 U	ug/L
34341	Dimethylphthalate	2 U	ug/L
34611	2,4-Dinitrotoluene	2 U	ug/L
34626	2,6-Dinitrotoluene	2 U	ug/L

Continued on Page 3

17896/91-APR-23-22-01/W-BNA Continued from Page 2

Storet#	Analyte	Value	Units
34596	Di-n-octyl phthalate	2 U	ug/L
34361	Endosulfan-I	3 U	ug/L
34356	Endosulfan-II	3 U	ug/L
34351	Endosulfan-sulfate	3 U	ug/L
39390	Endrin	3 U	ug/L
34366	Endrin-aldehyde	3 U	ug/L
34376	Fluoranthene	2 U	ug/L
34381	Fluorene	2 U	ug/L
39410	Heptachlor	3 U	ug/L
39420	Heptachlor-epoxide	3 U	ug/L
39700	Hexachlorobenzene	2 U	ug/L
34391	Hexachlorobutadiene	2 U	ug/L
34396	Hexachloroethane	2 U	ug/L
34386	Hexachlorocyclypentadiene	5 U	ug/L
34403	Indeno(1,2,3-cd)pyrene	5 U	ug/L
34408	Isophorone	2 U	ug/L
34696	Naphthalene	2 U	ug/L
34447	Nitrobenzene	2 U	ug/L
34438	N-Nitrosodimethylamine	2 U	ug/L
34428	N-Nitrosodi-n-propylamine	2 U	ug/L
34433	N-Nitrosodiphenylamine	2 U	ug/L
34671	PCB-1016	1.0E+03 U	ug/L
39488	PCB-1221	1.0E+03 U	ug/L
39492	PCB-1232	1.0E+03 U	ug/L
39496	PCB-1242	1.0E+03 U	ug/L
39500	PCB-1248	1.0E+03 U	ug/L
39504	PCB-1254	1.0E+03 U	ug/L
39508	PCB-1260	1.0E+03 U	ug/L
	PCB-1262	1.0E+03 U	ug/L
34461	Phenanthrene	2 U	ug/L
34469	Pyrene	2 U	ug/L
39400	Toxaphene	1.0E+03 U	ug/L
34551	1,2,4-Trichlorobenzene	2 U	ug/L
34462	4-Chloro-3-methyl phenol	2 U	ug/L
34586	2-Chlorophenol	2 U	ug/L
34601	2,4-Dichlorophenol	2 U	ug/L
34606	2,4-Dimethylphenol	2 U	ug/L
34616	2,4-Dinitrophenol	15 U	ug/L
34657	2-Methyl-4,6-dinitrophenol	15 U	ug/L
34591	2-Nitrophenol	2 U	ug/L
34646	4-Nitrophenol	15 U	ug/L
39032	Pentachlorophenol	5 U	ug/L
34694	Phenol	2 U	ug/L
34621	2,4,6-Trichlorophenol	2 U	ug/L

Comments (1)
(2)
(3)
(4)
(5)
(6)

Sample ID: 17898/91-APR-23-23-01 Matrix: W-EFFLUENT
Location: Camp Blanding WWTP
Field ID:
Collected: 22-APR-1991 14:30 By: Scott Bulgrin
Authorized: 31-MAY-1991 By: Liang T. Lin
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-PEST-CL
Chlorinated pesticide in water and waste
Analyzed: 14-MAY-1991 By: Adrian Niculescu
Authorized: 30-MAY-1991 By: Adrian Niculescu

Storet#	Analyte	Value	Units
39330	Aldrin	0.01 U	ug/L
39337	Alpha-BHC	0.01 U	ug/L
39338	Beta-BHC	0.01 U	ug/L
34259	Delta-BHC	0.01 U	ug/L
39340	Gamma-BHC	0.01 U	ug/L
39350	Chlordane	0.2 U	ug/L
39460	Chlorobenzilate	N	ug/L
39360	DDD-p,p'	0.02 U	ug/L
39365	DDE-p,p'	0.02 U	ug/L
39370	DDT-p,p'	0.05 U	ug/L
39380	Dieldrin	0.02 U	ug/L
	Endosulfan I	0.01 U	ug/L
	Endosulfan II	0.01 U	ug/L
34351	Endosulfan sulfate	0.05 U	ug/L
39390	Endrin	N	ug/L
34366	Endrin aldehyde	0.01 U	ug/L
39410	Heptachlor	0.01 U	ug/L
39420	Heptachlor epoxide	0.01 U	ug/L
39430	Isodrin	0.01 U	ug/L
39480	Methoxychlor	0.02 U	ug/L
	PCNB	0.05 U	ug/L
39400	Toxaphene	0.5 U	ug/L

Comment (1):
(2):

Sample ID: 17884/91-APR-23-19-01 Matrix: W-EFFLUENT
Location: Camp Blanding WWTP
Field ID:
Collected: 22-APR-1991 14:30 By: Scott Bulgrin
Authorized: 26-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: AG-G-W
Silver in water by furnace AA
Analyzed: 6-JUN-1991 By: Jack Merritt
Authorized: 13-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01077	Silver	0.1 U	ug/L

Analysis ID: CD-G-W
Cadmium by graphite furnace for water samples
Analyzed: 10-JUN-1991 By: Jack Merritt
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01027	Cadmium	0.3 U	ug/L

Analysis ID: HG-H-W
Mercury by cold vapor using hydride sys.-water
Analyzed: 1-MAY-1991 By: Laurie Roughton
Authorized: 3-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
71900	Mercury	0.2 U	ug/L

Analysis ID: SE-G-W
Selenium in water by furnace AA
Analyzed: 14-JUN-1991 By: Kate Brackett
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01147	Selenium	3 U	ug/L

17884/91-APR-23-19-01 Continued from Page 2

Analysis ID: W-ICP-23
ICP multielement analysis for water samples
Analyzed: 17-MAY-1991 By: Kate Brackett
Authorized: 26-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01106	Aluminum	341	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	8	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	3 U	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	5 U	ug/L
01045	Iron	226	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	30 U	ug/L
01077	Silver	10 U	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	24	ug/L
Comment	NONE		

Sample ID: 17885/91-APR-23-19-02 Matrix: W-SURF-FRH
Location: Black Creek Downstream of Camp Blanding Discharg
Field ID:
Collected: 22-APR-1991 16:40 By: Scott Bulgrin
Authorized: 26-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

17885/91-APR-23-19-02 Continued on Page 4

17885/91-APR-23-19-02 Continued from Page 3

Analysis ID: AG-G-W
Silver in water by furnace AA
Analyzed: 6-JUN-1991 By: Jack Merritt
Authorized: 13-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01077	Silver	0.1 U	ug/L

Analysis ID: CD-G-W
Cadmium by graphite furnace for water samples
Analyzed: 10-JUN-1991 By: Jack Merritt
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01027	Cadmium	0.3 U	ug/L

Analysis ID: HG-H-W
Mercury by cold vapor using hydride sys.-water
Analyzed: 1-MAY-1991 By: Laurie Roughton
Authorized: 3-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
71900	Mercury	0.2 U	ug/L

Analysis ID: SE-G-W
Selenium in water by furnace AA
Analyzed: 14-JUN-1991 By: Kate Brackett
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01147	Selenium	3 U	ug/L

17885/91-APR-23-19-02 Continued on Page 5

17885/91-APR-23-19-02 Continued from Page 4

Analysis ID: W-ICP-23
ICP multielement analysis for water samples
Analyzed: 17-MAY-1991 By: Kate Brackett
Authorized: 26-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01106	Aluminum	280 A	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	7	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	3 U	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	20 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	5 U	ug/L
01045	Iron	210 A	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	30 U	ug/L
01077	Silver	10 U	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	5 U	ug/L
Comment	NONE		

Sample ID: 19295/91-JUN-04-04-01 Matrix: W-SURF-FRH
Location: Black Creek 50yds upstream of Camp Blanding
Field ID: WWTP Discharge
Collected: 3-JUN-1991 14:00 By: Scott Bulgrin
Authorized: 18-JUL-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: AG-G-W
Silver in water by furnace AA
Analyzed: 5-JUL-1991 By: Kate Brackett
Authorized: 9-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01077	Silver	0.2 U	ug/L

Analysis ID: CD-G-W
Cadmium by graphite furnace for water samples
Analyzed: 2-JUL-1991 By: Kate Brackett
Authorized: 8-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01027	Cadmium	0.2 U	ug/L

Analysis ID: HG-H-W
Mercury by cold vapor using hydride sys.-water
Analyzed: 12-JUN-1991 By: Laurie Roughton
Authorized: 13-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
71900	Mercury	0.2 K	ug/L

Analysis ID: SE-H-W
Selenium in water by hydride method
Analyzed: 8-JUL-1991 By: Kate Brackett
Authorized: 17-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01147	Selenium	5 U	ug/L

 Continued on Page 3

19295/91-JUN-04-04-01 Continued from Page 2

Analysis ID: W-ICP-23
ICP multielement analysis for water samples
Analyzed: 14-JUN-1991 By: Jack Merritt
Authorized: 15-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01106	Aluminum	NR	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	6	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	5 U	ug/L
01045	Iron	158	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 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	9 T	ug/L
Comment	NONE		

********** END OF REPORT **********

Sample ID: 17892/91-APR-23-21-01 Matrix: W-EFFLUENT
Location: Camp Blanding WWTP
Field ID:
Collected: 22-APR-1991 14:30 By: Scott Bulgrin
Authorized: 19-JUL-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-NH3
Analysis for ammonia in water
Analyzed: 13-JUN-1991 By: Jin-Chaun Liu
Authorized: 19-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00610	Ammonia-N	0.041 A	mg N/L

Analysis ID: W-NO2NO3
Analysis for nitrite+nitrate in water
Analyzed: 10-MAY-1991 By: Jin-Chaun Liu
Authorized: 19-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00630	NO2NO3-N	1.5 A	mg N/L

Analysis ID: W-TKN
TKN for water sample
Analyzed: 9-JUL-1991 By: John Montana
Authorized: 16-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00625	N_KJEL_TOT	0.98 A	mg N/L

Analysis ID: W-TP
Analysis for total phosphorus in water
Analyzed: 15-JUL-1991 By: John Montana
Authorized: 15-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00665	Total-P	0.57	mg P/L

Sample ID: 19293/91-JUN-04-02-01 Matrix: W-SURF-FRH
Location: Black Creek 50yds upstream of Camp Blanding
Field ID: WWTP Discharg
Collected: 3-JUN-1991 14:00 By: Scott Bulgrin
Authorized: 15-JUL-1991 By: ----------
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-NH3
Ammonia analysis of water by Method 350.1
Analyzed: 13-JUN-1991 By: Jin-Chaun Liu
Authorized: 15-JUL-1991 By: ----------

Storet#	Analyte	Value	Units
00610	Ammonia-N	0.050 A	mg N/L

Analysis ID: W-NO2NO3
Nitrite + nitrate analysis of water by Method 353.2
Analyzed: 10-JUN-1991 By: Foster Parks Kirby
Authorized: 15-JUL-1991 By: ----------

Storet#	Analyte	Value	Units
00630	NO2NO3-N	0.04 U	mg N/L

Analysis ID: W-TKN
Total Kjeldahl Nitrogen in water samples by Method 351.2
Analyzed: 24-JUN-1991 By: John Montana
Authorized: 27-JUN-1991 By: ----------

Storet#	Analyte	Value	Units
00625	N_KJEL_TOT	0.49	mg N/L

Analysis ID: W-TP
Total Phosphorous in water samples by Method 365.4
Analyzed: 26-JUN-1991 By: John Montana
Authorized: 2-JUL-1991 By: ----------

Storet#	Analyte	Value	Units
00665	Total-P	0.05 U	mg P/L

Sample ID: 17893/91-APR-23-21-02 Matrix: W-SURF-FRH
Location: Black Creek Downstream of Camp Blanding Discharg
Field ID:
Collected: 22-APR-1991 16:40 By: Scott Bulgrin
Authorized: 19-JUL-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-NH3
Analysis for ammonia in water
Analyzed: 13-JUN-1991 By: Jin-Chaun Liu
Authorized: 19-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00610	Ammonia-N	0.041 A	mg N/L

Analysis ID: W-NO2NO3
Analysis for nitrite+nitrate in water
Analyzed: 13-MAY-1991 By: Jin-Chaun Liu
Authorized: 19-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00630	NO2NO3-N	0.14 A	mg N/L

Analysis ID: W-TKN
TKN for water sample
Analyzed: 7-JUL-1991 By: John Montana
Authorized: 16-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00625	N_KJEL_TOT	0.18	mg N/L

 Continued on Page 4

17893/91-APR-23-21-02 Continued from Page 3

Analysis ID: W-TP
Analysis for total phosphorus in water
Analyzed: 15-JUL-1991 By: John Montana
Authorized: 15-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00665	Total-P	0.11	mg P/L

Sample ID: 17888/91-APR-23-20-01 Matrix: W-EFFLUENT
Location: Camp Blanding WWTP
Field ID:
Collected: 22-APR-1991 14:30 By: Scott Bulgrin
Authorized: 12-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-CL
Analysis for chloride in water
Analyzed: 17-MAY-1991 By: Jin-Chaun Liu
Authorized: 12-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00940	Chloride	7.1 A	mg Cl/L

Analysis ID: W-F
Analysis for fluoride in water
Analyzed: 15-MAY-1991 By: John Montana
Authorized: 30-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00951	Fluoride	0.1 U	mg F/L

Analysis ID: W-PO4
Orthophosphate analysis for water samples
Analyzed: 3-JAN-1980 By: Tim Fitzpatrick
Authorized: 12-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
70507	O-Phosphate-P	0.29 A	mg P/L

Analysis ID: W-SO4
Analysis for sulfate in water
Analyzed: 17-MAY-1991 By: Jin-Chaun Liu
Authorized: 12-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00945	Sulfate	13 A	mg SO4/L

Sample ID: 17889/91-APR-23-20-02 Matrix: W-SURF-FRH
Location: Black Creek Downstream of Camp Blanding Discharg
Field ID:
Collected: 22-APR-1991 16:40 By: Scott Bulgrin
Authorized: 12-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-CL
Analysis for chloride in water
Analyzed: 24-MAY-1991 By: LENA HARRIS
Authorized: 12-JUN-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00940	Chloride	6.0 A	mg Cl/L

Analysis ID: W-F
Analysis for fluoride in water
Analyzed: 15-MAY-1991 By: John Montana
Authorized: 30-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00951	Fluoride	0.1 U	mg F/L

Analysis ID: W-PO4
Orthophosphate analysis for water samples
Analyzed: 3-JAN-1980 By: Tim Fitzpatrick
Authorized: 12-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
70507	O-Phosphate-P	0.074 A	mg P/L

 Continued on Page 4

Sample ID: 19294/91-JUN-04-03-01 Matrix: W-SURF-FRH
Location: Black Creek 50yds upstream of Camp Blanding
Field ID: WWTP Discharge
Collected: 3-JUN-1991 14:00 By: Scott Bulgrin
Authorized: 18-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

Analysis ID: W-PO4
Orthophosphate analysis for water samples
Analyzed: 4-JUN-1991 By: Tim Fitzpatrick
Authorized: 18-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
70507	O-Phosphate-P	0.02 U	mg P/L

********** END OF REPORT **********

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

SAMPLE ID NO.: 91310 DATE: 1991/04/22
SAMPLE SOURCE: CAMP BLANDING WWTP TIME: 1430
STATION NUMBER: SAMPLER: BULGRIN/CALHOUN/KENNEDY
STATION LOCATION: EFFLUENT AT CCC AT WEIR
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: MODULE 1141
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: 6.84 Conductivity: 160 Dissolved oxygen: 9.30 Temperature(C): 21.4
Secchi: Total depth(ft.):

WEATHER CONDITIONS:

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: 1991/04/25
All vaules reported in #/100mL

Total coliform (MF)	: 3800M	Total coliform (MPN):	
Fecal coliform (MF)	: 280	Fecal coliform (MPN):	
Fecal strep (MF)	:	Fecal strep (MPN):	
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 growth
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. range

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: 1991/04/26

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

SAMPLE ID NO.: 91312 DATE: 1991/04/22
SAMPLE SOURCE: BLACK CREEK TIME: 1640
STATION NUMBER: SAMPLER: BULGRIN/CALHOUN/KENNEDY
STATION LOCATION: DOWNSTREAM OF CAMP BLANDING DISCHARGE
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: MODULE 1141
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: 6.73 Conductivity: 70 Dissolved oxygen: 7.9 Temperature(C): 21.4
Secchi: Total depth(ft.): 2.0

WEATHER CONDITIONS:

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: 1991/04/25
All vaules reported in #/100mL

Total coliform (MF)	: 1,130Te	Total coliform (MPN):	
Fecal coliform (MF)	: 430	Fecal coliform (MPN):	
Fecal strep (MF)	:	Fecal strep (MPN):	
Heterotrophic Plate #/mL	:	Enterococci (MF)	: 210e

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

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: 1991/04/26

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENT REGULATION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY SUITE 2008
JACKSONVILLE, FL 32256-7577

SAMPLE ID NO.: 91372 DATE: 1991/06/03
SAMPLE SOURCE: BLACK CREEK TIME: 1400
STATION NUMBER: SAMPLER: BULGRIN
STATION LOCATION: 50 YARDS UPSTREAM OF CAMP BLANDING WWTP
Fixed monitoring: Special Project: Dredge & Fill:
Intensive Survey: Response Operation:
Other: MODULE 1141
PARAMETERS PERFORMED
Natural Substrate: Qualitative: Sediment(grain size):
Bacteria: X Other:

FIELD MEASURMENTS
ph: 7.65 Conductivity: 40 Dissolved oxygen: 6.5 Temperature(C): 28.6
Secchi: 0.6L Total depth(ft.): 2.0

WEATHER CONDITIONS: HOT, 90'S

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: 1991/06/05
All vaules reported in #/100mL

Total coliform (MF)	: 280T	Total coliform (MPN):	
Fecal coliform (MF)	: 30e	Fecal coliform (MPN):	
Fecal strep (MF)	:	Fecal strep (MPN):	
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 growth
C: Confluent (Heavy) n-c growth
e: Estimate count outside acpt. range

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: 1991/06/07

Taxa list for Camp Blanding Wastewater Treatment Plant, collected via Hester-Dendy multiplate samplers on 3 June 1991.

	Control Site	Test Site
Acarina		
Atractides sp.	2	–
Hygrobates sp.	4	3
Undetermined oribatid sp.	1	1
Coleoptera		
Ancyronyx variegata	10	4
Dineutus sp.	–	2
Stenelmis sp.	21	64
S. convexula	9	3
S. hungerfordi	–	3
Diptera		
Conchapelopia sp.	6	1
Cricotopus bicinctus	–	1
Hemerodromia sp.	73	44
Meropelopia sp.	1	–
Palpomyia grp. sp.	1	2
Pentaneura inconspicua	–	1
Polypedilum convictum grp.	2	3
P. fallax grp.	1	–
P. scalaenum	1	1
Parametriocnemus sp.	4	2
Rheocricotopus robacki	112	27
Rheotanytarsus distinctissimus grp.	8	7
R. exiguus grp.	–	5
Simulium sp.	–	1
Thienemaniella fusca	2	–
T. xena	2	–
Undetermined dipteran pupa	3	1
Ephemeroptera		
Leptophlebia bradleyi	–	2
Stenonema exiguum	13	–
S. mexicanum integrum	–	2
S. smithae	1	1
Megaloptera		
Corydalus cornutus	–	2
Oligochaeta		
Eclipidrilus sp.	–	1
Nais communis	1	–
Slavina appendiculata	1	3
Plecoptera		
Acroneuria arenosa	1	–
A. mela	1	1
Leuctra sp.	–	2

Trichoptera		
Cheumatopsyche sp.	23	9
Chimarra sp.	119	38
Cyrnellus sp.	2	2
C. fraternus	–	1
Hydropsyche sp.	–	1
Lype diversa	–	2
Oecetis sp.	–	3
Undetermined trichopteran pupa	1	8

Taxa list for Camp Blanding Wastewater Treatment Plant, collected via timed qualitative methods (dip net) above and below the discharge on 3 June 1991.

	Control Site	Test Site
Coleoptera		
Ancyronyx variegata	3	–
Dineutus sp.	–	1
D. discolor	1	1
Stenelmis sp.	51	62
S. convexula	24	23
Diptera		
Cricotopus/Orthocladius grp. sp.	1	–
Cryptochironomus sp.	1	–
Djalmabatista sp.	1	–
Hemerodromia sp.	14	12
Palpomyia grp. sp.	1	–
Pentaneura inconspicua	–	1
Polypedilum convictum grp.	22	6
P. illinoense	11	–
Parametriocnemus sp.	7	3
Paratanytarsus sp.	1	–
Undetermined dipteran pupa	–	1
Rheocricotopus robacki	6	2
Rheotanytarsus distinctissimus grp.	14	3
R. exiguus grp.	6	2
Simulium sp.	1	2
Stenochironomus sp.	4	10
Stelechomyia perpulchra	1	1
Tanytarsus sp.	2	–
Thienemaniella xena	1	1
Tribelos sp.	3	–
Tvetenia discoloripes grp. sp.	1	–
Ephemeroptera		
Baetis propinquus	4	–
Stenonema exiguum	2	–
Gastropoda		
Campeloma limum	2	–
Micromenetus sp.	1	–
M. dilatatus	1	–
Physella heterostropha pomila	1	–
Hemiptera		
Gerris sp.	–	2
Microvelia sp.	2	–
Lepidoptera		
Undetermined pyralid sp.	3	8
Undetermined lepidopteran	1	–
Malacostraca		
Procambarus sp.	10	–

Megaloptera		
Corydalus cornutus	–	1
Odonata		
Argia sp.	–	2
A. sedula	2	–
Boyeria vinosa	2	–
Dromogomphus spinosus	4	5
Enallagma sp.	–	2
E. cardenium	1	–
Hetaerina sp.	1	–
H. titia	1	–
Progomphus sp.	1	1
Oligochaeta		
Eclipidrilus sp.	–	1
Lumbriculus inconstans	3	–
Undetermined tubificid w/o capilliform setae	1	–
Pelecypoda		
Sphaerium or *Musculium* sp.	3	–
Plecoptera		
Acroneuria mela	1	–
Trichoptera		
Cheumatopsyche sp.	19	33
Chimarra sp.	10	10
Hydropsyche sp.	1	–
Micrasema sp.	2	–
Neotrichia sp.	1	–
Oecetis sp.	–	4
O. cinerascens	4	2
Phylocentropus sp.	1	–
Polycentropus sp.	1	–
Undetermined trichopteran pupa	2	–
Triaenodes sp.	1	6

Periphyton taxa list and abundances for Camp Blanding Wastewater Treatment Plant, Clay County, Florida, collected 3 June, 1991.

	Control Site	Test Site
Diatoms		
Achnanthes hustedtii	293	–
Cocconeis placentula	–	5
Cymbella minuta	29	–
Eunotia elegans	103	–
E. exigua	806	–
E. pectinalis	2477	1563
Frustulia rhomboides	73	5
Navicula radiosa	–	5
Pinnularia braunii	–	11
Chlorophyta		
Cladophora sp.	15	–
Desmidium sp.	–	5
Euastrum sp.	15	–
Cyanophyta		
Gloeocapsa sp.	–	53
Microcystis sp.	59	–
Phormidium sp.	–	26

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0022853		910422		X	5	4

Remarks

21 66

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI - RI Optional)

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0022853		910422		B	5	4

Remarks

21 66