

Biological Assessment of

Aloha Utilities - Seven Springs WWTP

Pasco County

Permit Number #FLA012752

Sampled May 2000

November 2001

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Aloha Utilities - Seven Springs WWTP
County:	Pasco
Permit Number:	FLA012752
Permit Expiration:	March 22, 2004

Toxics Sampling Inspection **(XSI)**

Date Sampled: May 15, 2000

Results: Aluminum, cadmium, chromium, copper, iron, lead, nickel and zinc were all detected in the effluent at levels that complied with Class III water quality standards. No organic constituents were detected in the effluent.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: May 15, 2000

Results: The 48-hour acute bioassay test did not indicate toxicity to the fish *Cyprinella leedsi* or to the invertebrate *Ceriodaphnia dubia*.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: May 15, 2000

Results: The periphyton and phytoplankton algal communities appeared degraded as a result of the increased nutrients at the test site compared to the control site. Periphyton taxa richness (55% reduction) and diversity (40% reduction) at the test site indicated an imbalance in the natural populations of aquatic flora (Rule 62-302.530(48)(b) FAC). In the quantitative macroinvertebrate samples similar results were measured: taxa richness decreased 56% and diversity was 58% lower at the test site compared to the control site. These alterations represent an imbalance of the natural fauna (Rule 62-302.530(48)(b) FAC) as well as a violation of the Biological Integrity Criterion (Rule 62-302.530(11) FAC). The qualitative macroinvertebrate results also indicated impairment at the test site compared to the control site. The composite SCI score went from an overall rating of "good" at the control site (with 23 points) to a rating of "severely degraded" at the test site (with only 9 points).

Water Quality Inspection **(WQI)**

Date Sampled: May 15, 2000

Results: The dissolved oxygen decreased from 2.9 mg/L at the control site to 1.8 mg/L at the test site, both failed to meet the Class III water quality standard (Rule 62-302.530 (31) FAC). The effluent receives extensive aeration as part of the treatment process and may explain the elevated dissolved oxygen value in the effluent sample (14.9 mg/L). Effluent pH was 9.6 SU and exceeded the Class III surface water quality (Rule 62-302.530 (52) FAC). The effluent was discharging at a rate of 1.4 MGD, which exceeded the design flow of 1.2 MGD. The effluent un-ionized ammonia value (0.077 mg/L) exceeded the Class III standard of 0.02 mg/L (Rule 62-302.530(3) FAC).

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Aloha Utilities - Seven Springs Wastewater Treatment Plant is a private, domestic wastewater treatment plant located south of State Road 54 on Seven Springs Boulevard in Pasco County, Florida (see map in the Appendix). Treatment involves extended aeration with filtration and high level disinfection. Primary disposal of the effluent is to a restricted-access spray site, with a seasonal discharge into an unnamed Class III stream flowing through Duck Slough, a tributary to the Anclote River. The design flow of the wastewater system for Aloha Utilities is 1.2 MGD (Million Gallons/Day). The mean flow during this survey period was approximately 1.4 MGD, exceeding the design flow.

Aloha Utilities is not a NPDES facility and it is under consent order to cease discharging to Duck Slough via an unnamed creek to the Class III Anclote River by September 2001. State permit limits for the effluent are listed in Table 1, and a Florida Department of Environmental Protection (FDEP) review of monthly operating reports for the past year from Aloha Utilities indicates the facility has maintained compliance with permit limits and Rule 62-302 (see Facility Summary in Appendix).

Methods

The purpose of this investigation was to determine the effects of the Aloha Utilities Wastewater discharge on the unnamed stream flowing through Duck Slough. Duck Slough is an extensive wetland area with a complicated drainage pattern of multiple, meandering, unnamed streams that ultimately flow into the Anclote River (see map of study area in the Appendix). The Aloha Utilities discharge is the beginning of the unnamed stream. The unnamed stream, while also draining a small portion of Duck Slough, flows west for approximately 1,000 meters before forming a confluence with two other unnamed streams; the combined water volume flows southwest to the Anclote River.

To establish discharge effects, a comparison of biological community health was made between two field-designated sites. A control site was located on a second unnamed stream, approximately 100 meters upstream of the confluence with the unnamed receiving-water stream. A test site in the unnamed receiving-water stream was established approximately 480 meters downstream of the Aloha Utilities Point of Discharge (POD).

Habitat assessments were performed *in situ* to establish comparability between sites. Supplemental physical and chemical data were also collected from the effluent site and field sites. Effluent from Aloha Utilities was analyzed for nutrients, metals, volatile organics and semivolatile organics. Data for this report were collected on May 15, 2000.

Using the invertebrate species, *Ceriodaphnia dubia*, and the fish species, *Cyprinella leedsi*, as test organisms, acute screening toxicity bioassays were conducted on an effluent sample. Additionally, bacterial populations were analyzed for total and fecal coliforms.

Benthic macroinvertebrate communities from both study sites were evaluated quantitatively and qualitatively. Hester-Dendy multiplate samplers were used for quantitative collection of invertebrates. Qualitative collections used 20 discrete dip-net sweeps to sample the invertebrates from different substrate types such as snags, leaf packs, and aquatic vegetation. Sampling for periphyton was conducted at the two sites by incubating glass microscope slides in a standard periphytometer for 28 days. Phytoplankton algae were sampled at both study sites by subsurface grabs. Chlorophyll *a* was determined for both phytoplankton and periphyton communities using laboratory spectrophotometer analyses. Algal Growth Potential (AGP) was measured via response of the test organism *Selenastrum capricornutum*. All field and laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's), which may be viewed at http://www8.myflorida.com/environment/search/science/laboratories/index.html.

Several measurements of macroinvertebrate and algal community health have been used to determine the effects of the discharge on those community assemblages in the receiving water. These measurements include; algal biomass, community composition, functional feeding groups, habitat assessment, taxa richness, Ephemeroptera-Plecoptera-Trichoptera (EPT) Index, Florida Index, Stream Condition Index (SCI), and Shannon-Weaver Diversity Index. For a brief review of each of these measurements, see *Explanation of Measurements of Community Health* in the Appendix.

The Florida Department of Environmental Protection personnel involved in this investigation were: Eddie Hughes, Charles Kovach and David MacColeman as well as other representatives from the DEP Southwest District. Staff from the Central Biology and Chemistry Laboratory in Tallahassee analyzed the samples and data and drafted the report. The report was reviewed by the Point Source Studies Review Committee, which consisted of Dr. Wayne Magley, Michael Tanski, and Chuck Ziegmont.

Results and Discussion

Habitat assessment scores placed the control site in the "poor" category with 37 points and the test site in the "sub-optimal" category with 90 points, a difference of 53 points (see Habitat Assessment Field Sheets in Appendix). This dissimilarity between sites is caused by differences in every primary and secondary habitat parameter between sites. The four param-

eters that account for the greatest cumulative loss of habitat assessment points at the control site were the loss of riparian vegetation along the streams banks (-13 points), diminished substrate availability (-12 points), habitat smothering (-8 points) and artificial channelization (-8 points) (see Habitat Assessment Field Sheets in Appendix).

The control site substrate was characterized as being relatively unproductive habitat, having severe sediment deposition with 87.5% of the substrate consisting of mud/muck/silt. The remaining habitats (12.5%) consisted of aquatic vegetation and undercut banks or exposed roots. At the test site, 52% of the substrate consisted of mud/muck/silt, 20% was woody debris/snags, 16% was aquatic vegetation and 12% was leaf packs/mats.

Conductivity values at all study sites appeared elevated but were within Class III water quality standards (Table 1). Dissolved oxygen was lower at the test site (1.8 mg/L) than the control site (2.9 mg/L), both sites failed to meet the Class III criteria for dissolved oxygen (> 5.0 mg/L), a violation of Rule 62-302.530 (31) FAC. The low dissolved oxygen may be to the result of the high levels of nutrients and algal populations in the samples from these sites. The effluent dissolved oxygen was considerably higher (14.9 mg/L), probably due to the extensive aeration of the treated effluent. The pH ranged from 7.5 SU at the control site to 7.1 SU at the test site. The effluent pH was 9.6 SU and exceeded the state criteria for Class III surface water quality (Rule 62-302.530 (52) FAC).

Field observations noted that the effluent was discharging at a rate of 1.4 MGD, exceeding the design flow (1.2 MGD) of the discharge by 0.2 MGD (see Facility Summary, and Physical/Chemical Characterization Field Data sheets in the Appendix).

Aluminum, cadmium, chromium, copper, iron, lead, nickel and zinc were all detected in the effluent at levels that complied with Class III water quality standards (Table 1). No organic constituents were detected in the effluent.

There was no acute toxicity observed during the 48-hour acute bioassay tests with the fish, *Cyprinella leedsi* or the invertebrate, *Ceriodaphnia dubia* (see Bioassay Data Sheets in Appendix). Microbiology results complied with Class III water quality standards (Table 1).

Biological Oxygen Demand (BOD) is a measure of the relative oxygen requirements of wastewaters. Carbonaceous Biological Oxygen Demand (CBOD) is also a measure of the relative oxygen requirements of wastewaters but differs from BOD in that the nitrogenous demand for oxygen is inhibited. BOD values were elevated at both the control site (6.0 mg/L) and the test site (6.0 mg/L). The effluent BOD was 16.0 mg/L. The CBOD results were the same at the control and test sites (5.0 mg/L) and the effluent CBOD was 10.0 mg/L. Turbidity results at the control site (3.5 NTU) and the test site (3.8 NTU) complied with Class III water quality standards. However, the effluent turbidity (14.6 NTU) indicates the potential for suspended material in the effluent to settle onto natural benthic substrates (Table 1).

The Algal Growth Potential (AGP) test measures the bioavailable nutrients within a system. Raschke and Shultz (1987) found that AGP values above 5 mg dry wt/L represent a "problem threshold" for a freshwater system and indicates nutrient enrichment in the system. The AGP values at the control site (11.3 mg dry wt/L) and test site (28.0 mg dry wt/L) were above the "problem threshold". The test site level was 60% higher than the control site level and suggests that the effluent is contributing to the already nutrient enriched conditions in this portion of the receiving water. The effluent AGP value was 42.8 mg dry wt/L.

The concentrations of TKN, total nitrogen, and ammonia in the test site sample were significantly higher than the levels in the control site sample (Table 1). TKN and ammonia at the test site were greater than 90% of other typical Florida streams. By comparison, the control site values exceeded the 70th and 10th percentile for TKN and ammonia, respectively (see Table 1 and *Typical Values for Selected Parameters in Florida Waters* in the Appendix). The effluent levels of TKN (3.6 mg/L) and nitrate+nitrite (2.3 mg/L) appear to have caused the increases of these nutrients at the test site. The concentration of unionized ammonia in the effluent (0.077 mg/L) exceeded the Class III water quality standard of 0.02 mg/L (Rule 62-302.530 (3) FAC).

Periphyton taxa richness was 55% lower at the test site (19) compared to the control site (42), and Shannon-Weaver diversity at the test site (2.55) was 40% lower compared to the control site (4.27). Algal density and chlorophyll *a* were significantly lower at the test site compared to the control site in spite of the elevated nutrients at this site (Table 2). Test site algal density (96,788 # counted/cm^2) was an order of magnitude lower than the control site algal density (2,005,808 # counted/cm^2) and chlorophyll *a* (2.6 mg/m^2) was only 15% of the control site chlorophyll *a* value (17.0 mg/m^2). These differences suggest algal growth inhibition, possibly from the high levels of effluent un-ionized ammonia.

Phytoplankton taxa richness was 52% lower at the test site (18 taxa) compared to the control site (37 taxa). Shannon-Weaver diversity at the test site (3.34) was 78% lower than the control site (4.29). Diatoms made up 39% of the control site community and were completely absent from the test site. Bluegreen algae was nearly 40% higher at the test site compared to the control site (Table 2). Phytoplankton biomass was similar between the control and test sites. These results suggest an imbalance in the aquatic flora at the test site (Rule 62-302.530(48)(b) FAC) and appear to be

Table 1. Effluent limits and summary of chemistry data.

Aloha Utilities - Seven Springs WWTP	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)				
None Detected	-	-	-	-
Metals (µg/L)				
Aluminum	1500 **	290 I	-	-
Arsenic	50 **	4.0 U	-	-
Cadmium	1.4 *a	0.052 I	-	-
Chromium	260.5 *a	0.74 I	-	-
Copper	15.0 *a	10.4	-	-
Iron	1000 **	54.0 A	-	-
Lead	4.5 *a	0.26 I	-	-
Nickel	199.9 *a	1.6 I	-	-
Selenium	5.0 *	1.2 U	-	-
Silver	0.07 *	0.03 U	-	-
Zinc	134.5 *a	19.4 A	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	0.068	0.95	0.90
Total phosphorus	-	0.38	1.1	0.91 A
Ammonia	-	0.083	0.024	0.82
Un-ionized Ammonia	0.02 **	0.077	0.0006	0.0082
Nitrate+Nitrite	-	2.3	0.006 I	0.004 U
TKN	-	3.6	1.3	2.3 A
Organic Nitrogen	-	3.52	1.28	1.48
Total Nitrogen	-	5.9	1.306	2.304
General Phys-Chem Parameters				
Habitat Assessment	-	-	37	90
DO (mg/L)	> 5.0 **	14.91	2.93	1.8
pH (SU)	6.0-8.5 **	9.6	7.5	7.1
Conductivity (µmhos/cm)	≤ 1275 **	866	959	972
Temperature (°C)	-	30.7	27.1	27.8
Turbidity (NTU)	≤ 29 **	14.6	3.5	3.8
Residue, nonfiltered (mg/L)	-	30 A	2	4
BOD 5day (mg/L)	-	16	6	6
CBOD, 5 day (mg/L)	-	10	5	5
Flow (MGD)	1.2	1.4	-	-
Hardness (mg $CaCO_3$)	-	132.4	-	-
AGP (mg dry wt/L)	-	42.8	11.3	27.9
Toxicity (48-hour static, screening bioassay)				
Bioassay - Fish	NOEC **	100 L	-	-
Bioassay - Invertebrate	NOEC **	100 L	-	-
Microbiology (# counts/100ml)				
Fecal Coliforms	≤ 800 **	60 AK	15 AK	50 AK
Total Coliforms	≤ 2,400 **	150 AK	490	290

A - Value is the mean of two or more determinations
I - Value is < the MQL, and ≥ the MDL
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
U - Analyzed for but not detected; value is the MDL
NOEC - A No Observed Effect Concentration < 100% effluent will constitute a violation of this permit

* Permit limit
** Class III water quality standard
a - Value is based on hardness

a result of the elevated nutrient from the effluent.

Despite the fact that the test site received a significantly higher habitat assessment score compared to the control site, the qualitative dipnet results showed significant impairment at the test site compared to the control site (Table 3). The control site SCI score (23 points) placed it in the "good" category, while the test site score (9 SCI points) was placed in the "severely degraded" category. All seven SCI parameters indicated significantly diminished conditions at the test site relative to the control site (see SCI Worksheet in Appendix). The most significant differences at the test site compared to the control site were in the total number of taxa (58% lower) and the number of chironomid taxa (90% lower). The control site received 3 EPT Index points while the test site received no EPT Index points. Similarly, the Florida Index went from 4 points at the control site to 0 points at the test site. The percent contribution of the dominant taxa was significant higher at the test site (73%) relative to the control site (36%). These results support the previous assertion that the Aloha Utilities effluent is adversely affecting the biological communities in the receiving waters and is causing an imbalance in natural populations of aquatic flora and fauna (Rule 62-302.530(48)(b) FAC).

All quantitative measures of macroinvertebrate health indicated significant degradation at the test site compared to the control site (Table 3). The percent dominant taxon (46% higher), taxa richness (56% lower), and the Florida and EPT indices (100% lower) at the test site compared to the control site were indicative of impariment. These alterations also represent imbalances to the natural populations of aquatic fauna (Rule 62-302.530 (48)(b) FAC). Further, diversity was 58% lower at the test site (1.36) compared to the control site (3.25), a violation of the Biological Integrity Criterion for Class III waters (Rule 62-302.530(11) FAC). The differences in the algal and benthic communities between the study sites appear to be the result of the elevated nutrients and un-ionized ammonia levels in the effluent and test site samples.

Table 2. Community structure of control and test sites.

Aloha Utilities - Seven Springs WWTP	Control Site	Test Site
Periphyton Algae		
Number of Taxa	42	19
Shannon-Weaver diversity	4.27	2.55
Chlorophyll *a* (mg/m2)	17.0	2.6
Algal Density (#/cm2)	2,005,808	96,788
Diatom/Diatom + B-G Ratio	0.95	0.96
%Blue-green	4.7	3.5
% Diatoms	88.6	94.7
Phytoplankton Algae		
Number of Taxa	37	18
Shannon-Weaver diversity	4.29	3.34
Chlorophyll *a* (µg/L)	1.0 U	1.0 U
Algal Density (#/mL)	2,987	2,467
% Blue-green	5.6	45.3
% Green	43.5	35.3
% Diatoms	38.5	0.0
AGP (mg dry wt/L)	11.3	28.0

A - Value is the mean of two or more determinations

U - Analyzed for but not detected; value is the minimum detection lim

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Table 3. Community structure of control and test sites.

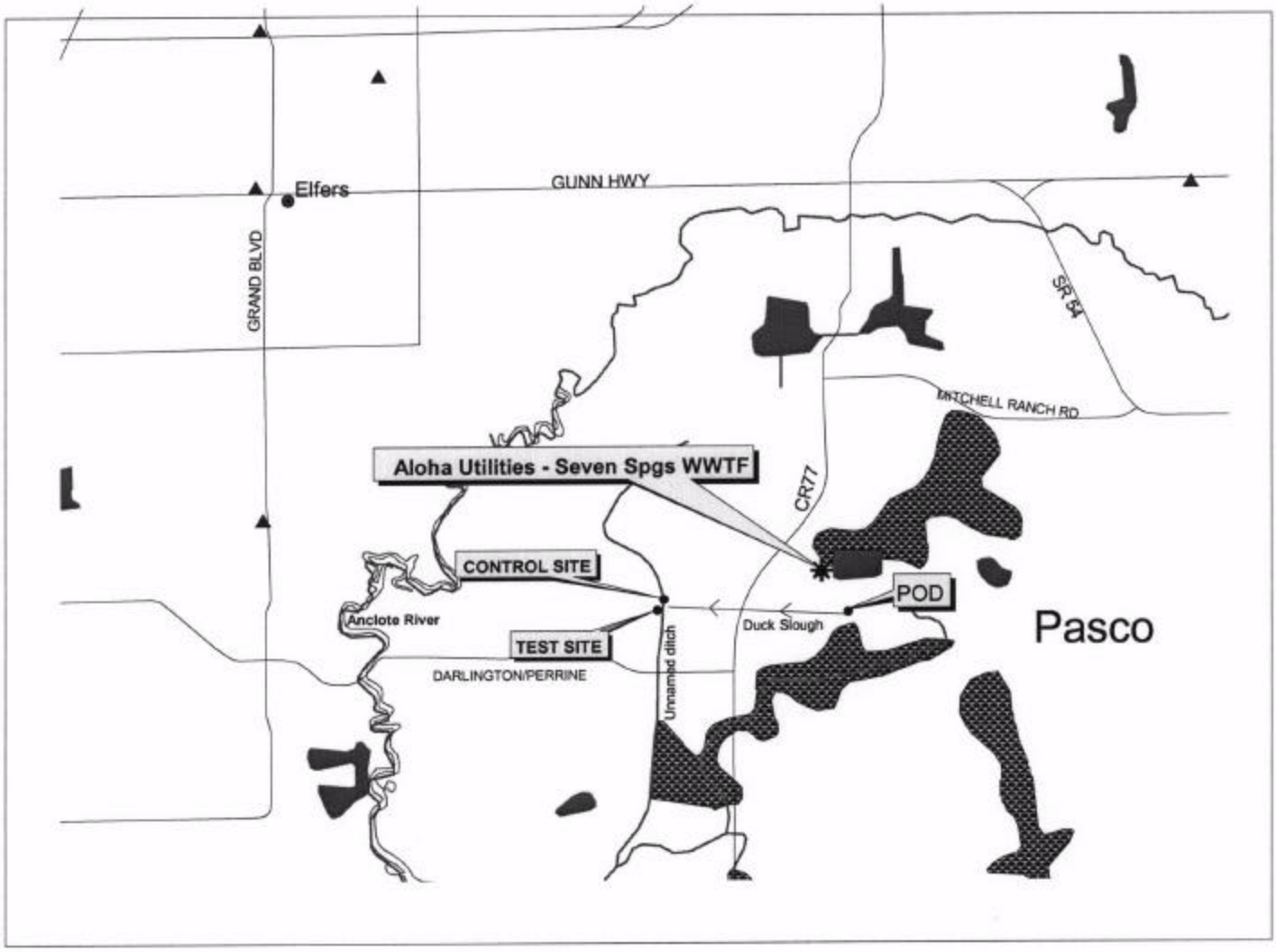
Aloha Utilities - Seven Springs WWTP	Control Site	Test Site
Macroinvertebrate Qualitative		
% Dominant Taxon	36.1	73.0
Number of Taxa	31	13
Florida Index	4	0
SCI	23	9
EPT Index	3	0
Community Composition		
% Amphipoda	36.1	73.0
% Chironomidae	3.3	0.0
% Diptera	25.6	2.9
% Ephemeroptera	3.0	0.0
% Gastropoda	8.9	7.5
% Oligochaeta	4.7	9.8
% Orthocladiinae	21.0	2.3
% Pelecypoda	4.4	0.0
% Planariidae	10.5	6.3
% Trichoptera	0.9	0.0
% Zygoptera	5.8	0.0
Functional Feeding Groups		
% Burrowing Deposit Feeders	2.1	5.2
% Predators	24.2	9.8
% Surface Deposit Feeders	37.2	44.0
% Suspension Feeders/Filterers	5.6	0.0
% Scrapers	10.0	2.3
% Shredders	18.8	36.5
Macroinvertebrate Hester-Dendy		
% Dominant Taxon	29.1	75.3
Number of Taxa	32	14
Florida Index	8	0
Shannon-Weaver Diversity	3.25	1.36
EPT Index	4	0
Community Composition		
% Diptera	48.0	2.3
% Ephemeroptera	7.4	0.0
% Gastropoda	10.1	17.8
% Trichoptera	0.4	0.0
% Other	3.4	3.5
Functional Feeding Groups		
% Predators	5.5	1.9
% Surface Deposit Feeders	42.8	40.3
% Suspension Feeders	15.8	0.0
% Scrapers	13.7	17.8
% Shredders	19.5	38.3

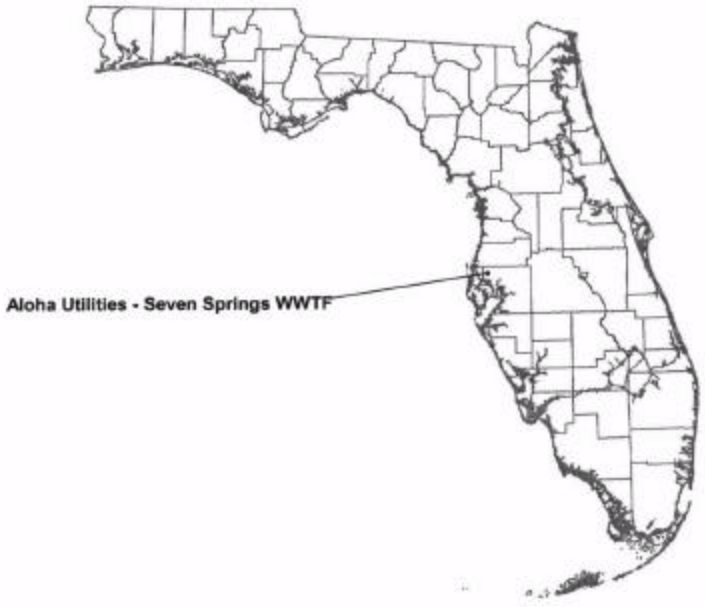
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Aloha Utilities - Seven Springs WWTF





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Explanation of Measurements of Community Health

Different measurements of macroinvertebrate and algal community health are used to determine the biotic effects of a discharge. The measurements are briefly discussed here.

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

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

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

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

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

Algal Growth Potential: Evaluates nutrient conditions based on the premise that "maximum yield is proportional to the amount of a nutrient available" (RL Raschke and Schultz, 1987) using *Duniella tertiolecta* for marine water systems and *Selenastrum capricornutum* Printz for freshwater systems.

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

Habitat Assessment: Seven attributes known to have potential effects on the stream biota are scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points), Suboptimal (70-104 points), Marginal (35-69 points), and Poor (0-34 points).

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. This 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.

Ephemeroptera-Plecoptera-Trichoptera (EPT) Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida (Barbour *et al.* 1996). This index assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).

Typical Values for Selected Parameters in Florida Waters

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

Aloha Utilities - Seven Springs WWTP

Percentile Distribution STREAMS (1617 stations)

Control Site

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	**3.25**	3.40	3.52	3.76	3.90	**3.25**
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	**31.00**	37.00	53.00	**31**
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	**29.00**	**32.00**	**31**
Phytoplankton Chlorophyll *a*	0.22	0.52	**0.94**	**1.60**	3.02	4.63	6.72	9.87	14.68	27.35	48.70	**1.0**
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	**17.00**	39.51	60.85	**17**
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	**1.26**	**1.49**	1.93	2.80	**1.3**
Ammonia	0.02	**0.02**	**0.04**	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**.024**
NO2-NO3	**<0.01**	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**.006**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	**0.74**	**1.51**	**1.1**
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	**0.59**	**1.37**	**0.95**
Turbidity	0.60	0.90	1.20	1.45	2.10	**2.80**	**3.60**	4.50	6.65	10.45	16.30	**3.5**

Test Site

H-D Diversity	**0.84**	**2.12**	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	**1.36**
Qualitative Taxa Richness	9.00	**12.00**	**17.00**	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00	**13**
H-D Taxa Richness	6.00	6.50	9.00	11.50	**13.00**	**15.00**	17.00	21.50	26.00	29.00	32.00	**14**
Phytoplankton Chlorophyll *a*	0.22	0.52	**0.94**	**1.60**	3.02	4.63	6.72	9.87	14.68	27.35	48.70	**1.0**
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	**2.16**	**2.94**	6.45	10.51	17.00	39.51	60.85	**2.6**
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	**1.93**	**2.80**	**2.3**
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	**>0.60**	**0.82**
NO2-NO3	**<0.01**	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**0.004**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	**0.74**	**1.51**	**0.91**
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	**0.59**	**1.37**	**0.90**
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	**3.60**	**4.50**	6.65	10.45	16.30	**3.8**

Units: Phytoplankton Chlorophyll *a* (•g/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates. A percentile rank increase for parameters above the bold line indicates healthy conditions. A percentile rank increase for parameters below the bold line indicates unhealthy conditions.

Aloha Utilities - Seven Springs WWTP Stream Condition Index (SCI)

Control Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	**31**	≥26	25-14	<14	**5**
EPT Index	**3**	≥4	3-2	<2	**3**
# Chironomid Taxa	**10**	≥7	6-4	<4	**5**
% Contribution of Dominant Taxon	**36**	≤29	30-64	>64	**3**
% Diptera	**25**	-	≤37	>37	**3**
Florida Index	**4**	≥7	6-4	<4	**3**
% Suspension feeders/Filterers	**5**	-	≥7	<7	**1**
Total Score		**Peninsula**			**23**
Interpretation of Scores		Excellent			26-32
		Good			**20-25**
		Poor			13-19
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Peninsula (April 1996)

Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	**13**	≥26	25-14	<14	**1**
EPT Index	**0**	≥4	3-2	<2	**1**
# Chironomid Taxa	**1**	≥7	6-4	<4	**1**
% Contribution of Dominant Taxon	**73**	≤29	30-64	>64	**1**
% Diptera	**3**	-	≤37	>37	**3**
Florida Index	**0**	≥7	6-4	<4	**1**
% Suspension feeders/Filterers	**0**	-	≥7	<7	**1**
Total Score		**Peninsula**			**9**
Interpretation of Scores		Excellent			26-32
		Good			20-25
		Poor			13-19
		Severely Degraded			**7-12**

Summer Index Period: Stream Condition Index (SCI) for Florida Peninsula (April 1996)

Facility Summary Sheet
for
Seven Springs WWTP (Aloha Utilities) 5th Year Inspection

Facility Name: Seven Springs WWTP

Date Summary Prepared: May 31, 2000

Location: South of SR-54 on Seven Springs Blvd. County: Pasco District: SW District

Federal Permit #:
Expiration Date:

State GMS #: FLA012752
Expiration Date: 3/22/2004

Facility Type: Domestic waste, private

Function of Facility:
Domestic wastewater plant.

Description of treatment process:
Extended aeration with filters and high level disinfection. Primary disposal to restricted access system spray site and seasonal discharge to Duck Slough.

Receiving waters: Duck Slough via unnamed creek to Anclote River.

Classification: Class III fresh water

Design Flow: 1.2 mgd Mean Flow: 1.4 mgd Flow during survey: ~1.4 mgd

Discharge is: Seasonal

If facility has a mixing zone, give details (size, parameters affected, etc.):
This facility has **no mixing zone.**

List effluent limits (if necessary, attach relevant paperwork):

Parameter	Limit(units)
Flow	
CBOD	
TSS	Report Only (all parameters)
Nitrogen, Total as N	
Phosphorus, Total as P	
Total Residual Chlorine (TRC)	
Dissolved Oxygen	

Describe special permit conditions and permit modifications:
Facility is not a NPDES facility and is under CFS to cease discharge by September 2001.

Description of permitted outfall(s):
New permit attached (pertinent sections)

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:
N/a – case report attached.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:
See attached – FYI of 10/93 – field notes and results.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:
N/a

Additional information:
This facility is specifically cited in CFI to cease discharge by 9/20001. Testing and bioassessments needed to determine impact to receiving stream.

Staff contributing to this review:

Eddie Hughes	Biologist
Dave MacColeman	Inspector and Engineer

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE / NAME	STORET STATION NUMBER	DATE (M/D/Y)	TIME	RECEIVING BODY OF WATER
	TBD	5/15/00	1100 HRS	UNNAMED DITCH TO DUCK SLOUGH

REMARKS	COUNTY	LOCATION	FIELD ID/NAME
	PASCO	UPSTREAM @ SEVEN SPRINGS WWTP	SEVEN SPRINGS WWTP

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
20				80			

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

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

Width of riparian vegetation (m) on least buffered side: 0 — *List & map dominant vegetation on back*

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

High Water Mark: 1.0 (m above present water level) + 1.0 (present depth in m) = 2.0 (m above bed)

Typical Width (m)/Depth (m)/Velocity (m/sec) Transect: m wide
<0.01 m/s — 1.2 m deep; <0.01 m/s — 1 m deep; <0.01 m/s — 1.2 m deep

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

SEDIMENT/SUBSTRATE

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

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

Sediment Deposition: Sludge: ☐ Sand smothering: none / slight / moderate / severe Silt smothering: none / slight / moderate / severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	87.5		
Aquatic Vegetation	10			Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	2.5						

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	0.5	27.1	7.49	2.93	0.959			VOB
Bottom								

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

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

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

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

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

Weather Conditions/Notes:
SUNNY, CLEAR SKIES
BREEZY

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

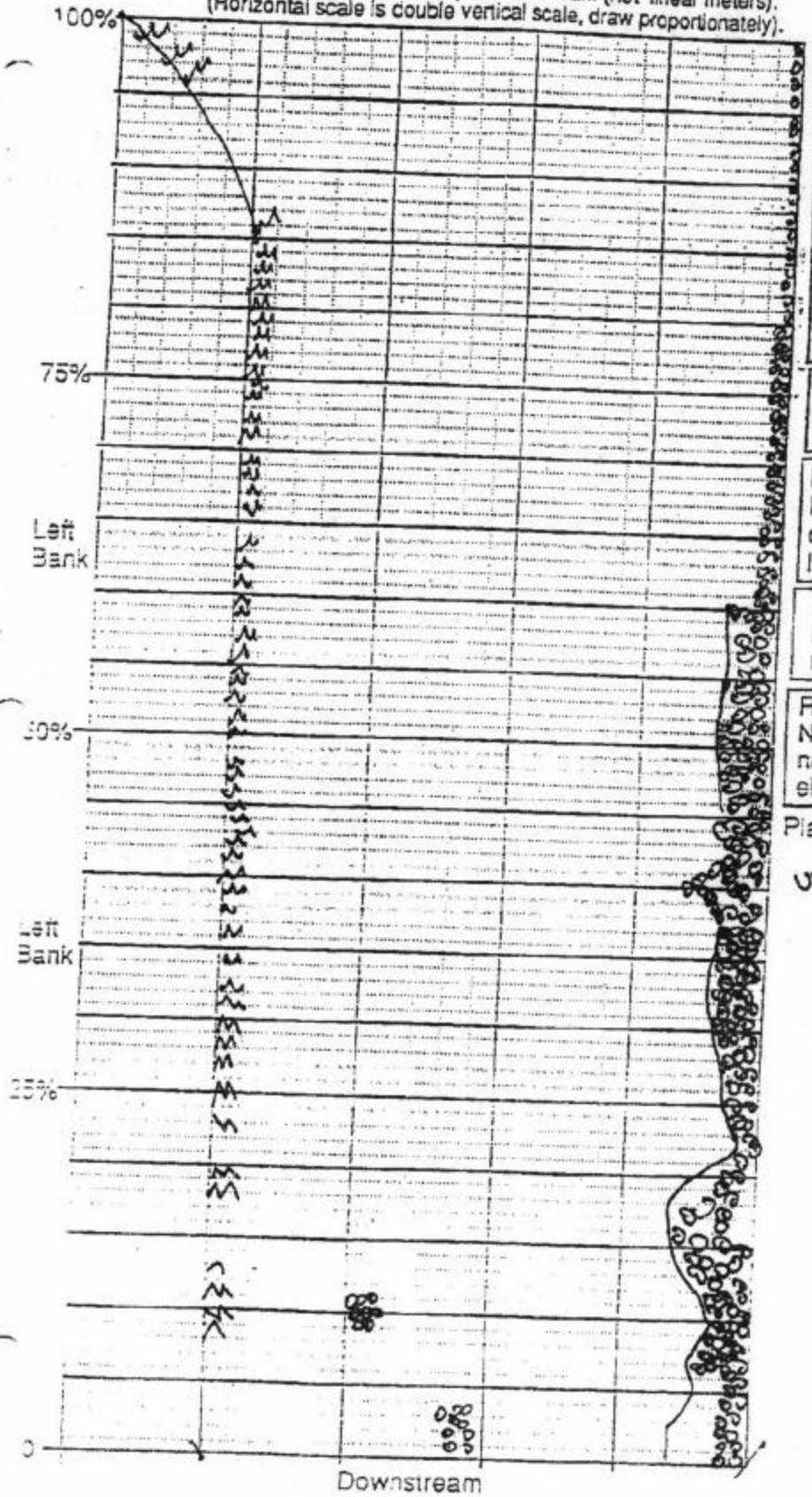
SAMPLING TEAM: EDDIE HUGHES | CHARLES KOVACH

SIGNATURE:

DATE: 5/15/00

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundanc

- S Snags
- R Roots/undercut banks
- LP Leaf Packs (or mats)
- M Macrophytes
- _____
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where san or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

UPSTREAM

SEVEN SPRINGS WWTP

5/15/00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	TBD	5/15/00	UNNAMED STREAM TO DUCK SLOUGH

REMARKS:	COUNTY:	LOCATION:	FIELD (NAME):
	PASCO	UPSTREAM SEVEN SPRINGS WWTP	SEVEN SPRINGS WWTP

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [6]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 (6)	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [7]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 (7) 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity [1]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.06 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 (1)
Habitat Smothering [1]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 (1)
Primary Score [15]				
Secondary Habitat Components **Artificial Channelization** [2]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 (2) 1
Bank Stability Right Bank [4] Left Bank [6]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 (4)	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [1] Left Bank [3]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities (3) 2 (1)
Riparian Zone Vegetation Quality Right Bank [1] Left Bank [5]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. (5) 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 (1)
Secondary Score [22]				

TOTAL SCORE [37]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
5/15/00	EDDIE HUGHES	for EDDIE HUGHES

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-19-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y)	TIME	RECEIVING BODY OF WATER:
	TBD	5/15/00	1300 HRS	UNNAMED DITCHES TO DUCK SLOUGH

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	PASCO	DOWN STREAM @ SEVEN SPRINGS WWTP	SEVEN SPRINGS WWTP

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40						60	

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

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

Width of riparian vegetation (m) on east buffered side: 3

List & map dominant vegetation on back

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

Artificially Impounded ☑ yes

High Water Mark: 0.1 (m above present water level) + 0.2 (deepest depth in m) = ____ (m upper limit)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect: 2 m wide

0.01 m/s	0.01 m/s	0.01 m/s
0.1 m deep	0.3 m deep	0.1 m deep

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	20			Sand			
Leaf Packs or Mats	12			Mud/Muck/Silt	52		
Aquatic Vegetation	16			Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots							

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	0.15	27.80	7.08	1.84	0.972			VOB
Bottom								

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

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

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

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

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

Weather Conditions/Notes: Sunny, breezy

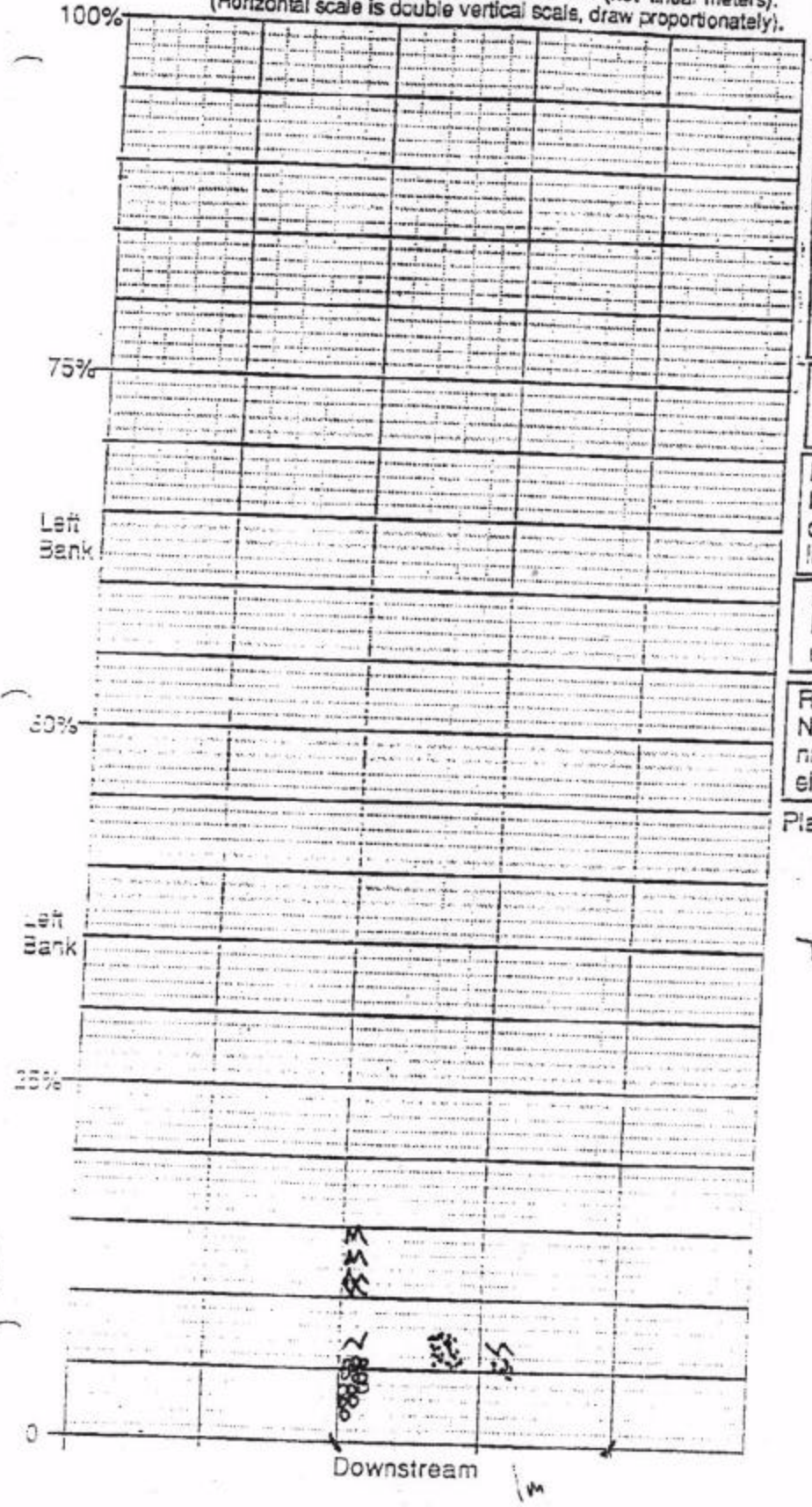
Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☑	☐
Fish	☐	☐	☐	☑
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM: EDDIE HUGHES / CHARLES KOVACH SIGNATURE: [signature] DATE: 5/15/00

* - CHECK FIELD DATA SHEET (copied here from back) PHOTOCOPY — ORIGINAL SENT W/ KATHY KEE FAX

Site Map / Habitat Sketch

Length of grid represents 100m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundanc

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- _____
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where san or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered o eliminated.

Plants observed/other notes:

Impassable upstream/downstream

DOWNSTREAM

SEVEN SPRINGS WWTP

5/15/00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	TBD	5/15/00	UNNAMED DITCHES TO DUCK SLOUGH

REMARKS:	COUNTY:	LOCATION:	FIELD DNAME:
	PASCO	DOWNSTREAM @ SEVEN SPRINGS WWTP	SEVEN SPRINGS WWTP

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [13]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 (13) 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [19]	Greater than 30% productive habitat present at site. 20 (19) 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity [3]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring > 1 m/sec 5 4 (3) 2 1
Habitat Smothering [9] [4]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 (9) 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score [44]				
Secondary Habitat Components **Artificial Channelization** [10]	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected (10) 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank [5] Left Bank [8]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. (8) 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. (5) 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank [2] Left Bank [2]	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 (2)
Riparian Zone Vegetation Quality Right Bank [9] Left Bank [10]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. (10) (9)	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 3 inches or less. 3 2 1
Secondary Score [46]				

[90] TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
5/15/00	EDDIE HUGHES	for EDDIE HUGHES



FIELD DATA SHEET

PHYSICOCHEMICAL MEASUREMENTS

FILL OUT ONE FORM PER PROJECT, PER DAY

PROJECT NAME (same as on COC): Seven Springs WWTP (Aloha Utilities)

SAMPLER SIGNATURE(S) (same as on COC): hughes

SAMPLE DATE (YEAR/MONTH/DAY): 2000 - MAY - 15

To be filled out by district Chem Lab staff or Pr... QAO

DATA VALIDATED BY:

DATE VALIDATED:

DATE ENTERED INTO LMS:

METER/MODEL USED: Quanta Hydrolab

NO TRAILING ZEROS ALLOWED AFTER DATA VALUES (e.g., use 6 rather than 6.0)

METER READINGS FOR THESE PARAMETERS SHOULD BE TAKEN AT WATER SAMPLE DEPTH

Parame er Codes ---------->			N/A	N/A	82903	4192	78	299	405	94	402	10	480	900	See 3 bele
			hours	volts	meters	meters	meters	mg/L	st.units	umhos/cm	umhos/cm	deg. C	ppt	mg/L	mg/L
Field ID Number	Station/Sample Location	STORET Station #	Sample Time	Battery Reading	Total Depth	Sample Depth	See 1 below Secchi Depth	DO	pH	Specific Conductance corrected (Hydrolab)	Specific Conductance uncorrected (YSI)	Temp.	Salinity	Hardness	Chlorir
	Outfall		1420	4.4	0.7	0.35	0.30	14.41 D	9.69	1	D	30.62 D	D	D	
	Field Blank		1420					D		1866	D	D	D	D	
	Upstream		10:20	4.4	1m	0.5m	VOB	2.93 D	7.49	5	959 D	27.1 D	D	D	
	Downstream		13:20	4.4	.3	.15	VOB	1.81 D	7.44	.972	D	2.28 D	D	D	
	Site 1		1055	4.4	0.3	0.15	VOB	3.47 D	7.39	965	D	26.36 D	D	D	
	Site 2		1100	4.4	0.2	0.1	VOB	4.64 D	7.62	1962	D	27.61 D	D	D	
								D			D	D	D	D	
								D		?	D	D	D	D	

EXAMPLE BELOW

From COC	Lake Doop, L4P	24040018	1350	15.01	4	0.5	4	9.37	4.45	141	.....	18.5	.....	.....	.....

...k is visible on bottom, either leave blank or write VOB. If obscured by vegetation before reaching the bottom, either leave blank or write OBV.
...ode varies by type of field test performed.

FL DEP SW District Chemistry Laboratory
3804 Coconut Palm Drive
Tampa, FL 33619
ph # 813-744-6100 DEP CompQAP # 880078

Project: SEVEN SPRINGS WWTP Type: OTH Requested By: HUGHES

Site	Date	Time	Depth	Log	Samplers
OUTFALL	05/15/00	1400		25947	HUGHES
NOTE: 2000-05-15-13					
UPSTREAM	05/15/00	1020		25948	HUGHES
DOWNSTREAM	05/15/00	1320		25949	HUGHES
SITE 1	05/15/00	1055		25950	HUGHES
NOTE: HESTER-DENDY					

Code	Parameter	Units	Site ID OUTFALL	Site ID UPSTREAM	Site ID DOWNSTREAM	Site ID SITE 1
29	Log Number	LOG	25947	25948	25949	25950
82079	TURBIDITY	NTU	14.6	3.5	3.8	
530	RESIDUE, NONFILT.	mg/l	30A	2	4	
310	BOD5	mg/l	16	6	6	
314	CBOD5	mg/l	10	5	5	
31616	FECAL COLIFORM	#/100ml	60AK	15K	50K	
31501	TOTAL COLIFORM	#/100ml	150AK	490	290	

A denotes mean, B counts unacceptable, J estimate, K less than
L greater than, OO data lost, P too numerous to count, Q out of
holding time, T value below detection limit, U not detected

Aug 07 00 12:41p FDEP 813 7403906 p.3

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seven Springs - ALOHA UTILITIES
County: PASCO
Contact / District: Charles Kovach / SW-DIST
NPDES Permit #: ~~FL00~~ FL0 12752
LIMS Sample #: 455957 **LIMS Job #:** TH2000-05-16-12-01

Sample Collection: Date 5/15/00 Time 14:00
Test Beginning: Date 5/16/00 Time 14:10
Test Ending: Date 5/18/00 Time 13:40
Organism Batch #: 25 **Diluent Batch #:** #14
Organism Age: 24 hrs SRT toxicant batch #: —

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

Test organism: C. dubia

Remarks:
Sample original DO was 15.5 and pH of 9.8.
Sample was aerated 1 hour. Brought DO down to 8.6.
Sample aliquot pH adjusted to 7.0

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	24 h	48 h
Cont.	A	5	5	5	8.4	—	8.3	23.7	—	~~23.1~~	8.6	—	~~8.6~~	190	—	255
	B	5	5	5	—	—	8.3	—	—	~~25.2~~	—	—	~~8.1~~	—	—	245
	C	5	5	5	—	—	8.3	—	—	~~24.3~~	—	—	~~8.2~~	—	—	220
	D	5	5	5	—	—	8.4	—	—	24.7	—	—	8.0	—	—	220
100%	A	5	5	5	~~8.4~~	—	8.5	25.2	—	24.6	8.1	—	8.0	935	—	1170
	B	5	5	5	—	—	8.4	—	—	24.5	—	—	7.9	—	—	1195
	C	5	5	5	—	—	8.4	—	—	24.5	—	—	7.8	—	—	1170
	D	5	5	5	—	—	8.5	—	—	24.5	—	—	8.1	—	—	1170
100% (pH adjusted)	A	5	5	5	7.7	—	8.3	24.3	—	24.5	8.2	—	8.0	975	—	1270
	B	5	5	5	—	—	8.3	—	—	24.4	—	—	8.0	—	—	1260
	C	5	5	5	—	—	8.3	—	—	24.4	—	—	8.1	—	—	1185
	D	5	5	5	—	—	8.3	—	—	24.4	—	—	8.0	—	—	1235
measured by:		~~DH~~	~~DH~~	SG	SG	—	SG	~~SG~~ KL	—	SG	SG	—	SG	SG	—	SG
recorded by:		~~DH~~ SG	~~DH~~	SG	KL	—	SG	~~KL~~ KL	—	SG	KL	—	SG	KL	—	SG

* (SH) 48 hrs
Temp. °C
24.8 | 8.
24.8 | 8.
24.9 | 8.2
9.5 = Cl pH
SH
5/16

Investigators' Signatures
Shannon Gerard
K R Lovett
Billie Parker-Flowers
A H Wolfe
reviewer

Temperature Range °C 24.5°-25.5°C
Incubator # 3 ~~24.5°-26.0°C~~
Room B246 24.5°-26.0°C

WP = wrong place

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			N/A	N/A	N/A	SG
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR 100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):		86	130	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):		86	127	Hach	SG	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DPH	SG
Salinity:		≈0	≈0	ysi	DPH	SG

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Seven Springs - AQUA UTILITIES
County: PASCO
Contact / District: Charles Kovach | SW - DIST
NPDES Permit #: FL00 FL0 12752
LIMS Sample #: 455957 LIMS Job #: RH2000-05-16-12-01

Sample Collection: Date 5/15/00 Time 14:00
Test Beginning: Date 5/16/00 Time 14:10
Test Ending: Date 5/18/00 Time 13:30
Organism Batch #: 37 Diluent Batch #: Well
Organism Age: 11 days SRT toxicant batch #: —
Test organism: C. leedsi

sample log —
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks: Sample original DO was 15.5, aerated for 1 hr. and brought down to 8.6. Sample original pH was 9.8. Aliquot sample pH adjusted down to 7.0.

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	24 h	48 h
Cont. A	A9	5	5	5	8.0	8.2	8.4	23.5	25.0	24.9	8.4	8.3	8.1	250	305	265
B	A10	5	5	5	8.0	8.3	8.5	23.7	24.8	24.4	8.3	8.1	8.0	250	245	240
C	A11	5	5	5	8.0	8.3	8.5	23.7	24.5	24.4	8.4	8.1	8.1	250	260	240
D	A12	5	5	5	8.0	8.3	8.4	23.7	24.3	24.2	8.4	8.2	8.0	250	280	245
100% A	A13	5	5	5	9.3	8.6	8.7	23.4	24.7	24.7	8.6	8.3	8.5	915	955	1000
B	A14	5	5	5	9.3	8.8	8.6	23.4	24.6	25.7	8.7	8.2	7.3	920	935	1025
C	A15	5	5	5	9.3	8.8	8.4	23.5	24.5	25.2	8.6	8.3	6.7	930	955	1010
D	A16	5	5	5	9.4	8.9	8.7	23.1	24.5	25.3	8.4	7.9	7.8	950	970	1025
100% A	A17	5	5	5	7.5	8.1	8.4	24.4	24.7	24.5	8.3	8.3	8.6	975	975	1025
B	A18	5	5	5	7.5	8.1	8.1	24.5	24.5	24.4	8.5	8.3	7.5	985	985	1010
C	A19	5	5	5	7.4	7.6	8.0	24.4	24.5	24.6	8.4	8.2	7.2	985	975	1020
D	A20	5	5	5	7.4	8.0	7.9	24.6	24.7	24.4	8.5	8.3	7.0	985	995	1020
measured by:		AW	DH	SG	SG	DPH	SG	SG	DH	SG	SG	DH	SG	SG	DPH	SG
recorded by:		DH	DH	SG	KL	DH	SG	KL	DH	SG	KL	DH	SG	KL	DPH	SG

(pH adjusted)

Investigators' Signatures
Shannon Gerard
Dillard Hinson
AH Wolfe
reviewer

Temperature Range °C
Incubator # 3 24.5° - 25.5°C
Room B246 24.5° - 26.0°C

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			N/A	N/A	N/A	SG
Lab Total Residual Cl2 (mg/L):			<0.03	DR100	DPH	SG
Alkalinity (mg/L as $CaCO_3$):			130	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):			127	Hach	SG	SG
Total ammonia (mg/L as N):			<0.017	Dewe	DPH	SG
Salinity:			≈0	Ysi	DPH	SG

form updated 3/3/99

Periphyton taxa list and densities (#/cm^2) for Aloha Utilities-Seven Springs WWTP, collected via glass microscope slides in receiving water, on 15 May 2000.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	–	–
Achnanthes exigua	127957	1785
Achnanthes lanceolata	20750	–
Amphora sp.	–	–
Bacillaria paradoxa	20750	–
Caloneis bacillum	6917	–
Capartogramma crucicula	–	–
Cocconeis placentula	235164	26776
Cyclotella sp.	121040	–
Encyonema evergladianum	–	397
Eunotia sp.	269747	12495
Eunotia arcus	–	–
Eunotia glacialis	–	793
Gomphonema sp.	–	8529
Gomphonema augur	–	397
Gomphonema parvulum	48416	29751
Gyrosigma sp.	13833	–
Melosira sp.	6917	–
Navicula capitata capitata	79541	793
Navicula cryptocephala	6917	–
Navicula cryptotenella	20750	1785
Navicula cuspidata	–	–
Navicula elginensis	65708	5157
Navicula minima	100290	1388
Navicula pupula	6917	–
Navicula radiosa	6917	397
Navicula viridula	6917	–
Nitzschia sp.	48416	397
Nitzschia amphibia	148707	–
Nitzschia gracilis	72624	–
Nitzschia palea	186748	397
Stauroneis anceps	–	–
Synedra sp.	41499	397
Synedra rumpens familaris	114124	–
Chlorophyceae		
Chlamydomonas sp.	3458	–
Chlorella sp.	–	198
Chlorococcum sp.	–	–

Periphyton taxa list and densities (#/cm^2) for Aloha Utilities-Seven Springs WWTP, collected via glass microscope slides in receiving water, on 15 May 2000.

	Control Site	Test Site
Chlorophyceae		
Closterium dianae brevius	3458	–
Coelastrum sp.	6917	–
Cosmarium sp.	–	–
Cosmarium subtransiens	–	–
Crucigenia sp.	3458	–
Mougeotia sp.	10375	–
Pediastrum biradiatum	–	–
Pediastrum obtusum	6917	–
Pediastrum tetras	6917	–
Pteromonas sp.	34583	–
Scenedesmus sp.	6917	–
Scenedesmus bijuga	10375	–
Scenedesmus quadricauda	20750	–
Selenastrum sp.	10375	198
Stigeoclonium sp.	3458	–
Ulothrix sp.	6917	–
Chrysophyceae		
Dinobryon sp.	–	1388
Cyanophyceae		
Anabaena sp.	3458	–
Chroococcaceae	–	397
Dactylococcopsis sp.	6917	–
Lyngbya sp.	13833	198
Merismopedia minima	3458	–
Microcystis sp.	3458	–
Oscillatoria sp.	44958	2380
Synechococcus sp.	17291	397

Phytoplankton taxa list and densities (#/mL) for Aloha Utilities-Seven Springs WWTP, collected via water bottle grab in receiving water, on 15 May 2000.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes exigua	19	–
Achnanthes lanceolata	19	–
Aulacoseira granulata angustissima	19	–
Bacillaria paradoxa	56	–
Cocconeis placentula	74	–
Cyclotella sp.	148	–
Cymbella minuta silesiaca	19	–
Eunotia sp.	148	–
Gomphonema parvulum	37	–
Gyrosigma sp.	19	–
Melosira sp.	19	–
Navicula capitata capitata	19	–
Navicula cryptotenella	37	–
Navicula cuspidata	19	–
Navicula minima	19	–
Navicula pupula	37	–
Nitzschia sp.	19	–
Nitzschia amphibia	93	–
Nitzschia gracilis	19	–
Nitzschia palea	186	–
Synedra sp.	74	–
Synedra rumpens familaris	–	37
Synedra ulna	19	–
Chlorophyceae		
Ankistrodesmus falcatus	–	35
Carteria sp.	56	–
Chlamydomonas sp.	37	–
Chlorella sp.	19	18
Chlorogonium sp.	37	–
Coelastrum sp.	–	18
Cosmarium sp.	56	18
Kirchneriella sp.	–	35
Pediastrum sp.	19	–
Pteromonas sp.	501	–
Scenedesmus sp.	19	18
Scenedesmus quadricauda	37	35
Selenastrum sp.	315	231
Spermatozoopsis sp.	–	35
Staurastrum sp.	19	–

Phytoplankton taxa list and densities (#/mL) for Aloha Utilities-Seven Springs WWTP, collected via Water bottle grab in receiving water, on 15 May 2000.

	Control Site	Test Site
Chlorophyceae		
Tetraedron minimum sp.	19	–
Undetermined Chlorophyceae	167	461
Chrysophyceae		
Cryptomonas sp.	223	355
Cryptophyceae		
Undetermined Cryptophyceae	93	53
Cyanophyceae		
Anabaena sp.	–	18
Chroococcaceae	–	53
Chroococcus sp.	–	18
Dactylococcopsis sp.	56	177
Lyngbya sp.	–	71
Merismopedia sp.	37	53
Oscillatoria sp.	74	408
Synechococcus sp.	–	319
Dinophyceae		
Glenodinium sp.	37	18
Euglenophyceae		
Lepocinclis sp.	19	–
Phacus sp.	–	18

Benthic macroinvertebrate taxa list for Aloha Utilities-Seven Springs WWTP, collected via 20 discrete dip net sweeps in receiving water, on 15 May 2000.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	155	127
Diptera		
Ceratopogon sp.	2	–
Chironomidae	4	–
Chironomus sp.	1	4
Cryptochironomus sp.	1	–
Dasyhelea sp.	1	–
Dicrotendipes modestus	3	–
Einfeldia natchitocheae	1	–
Monopelopia boliekae	2	–
Odontomyia sp.	1	–
Palpomyia / bezzia sp. grp.	2	–
Parachironomus directus	24	–
Polypedilum illinoense grp.	6	–
Procladius sp.	8	–
Pseudochironomus richardsoni	47	–
Tanytarsus sp. G Epler	7	–
Thaumaleidae	–	1
Ephemeroptera		
Caenis sp.	9	–
Callibaetis sp.	4	–
Gastropoda		
Ancylidae	–	4
Hydrobiidae	–	9
Micromenetus sp.	2	–
Planorbella sp.	1	–
Planorbidae	25	–
Pyrogophorus platyrachis	5	–
Undetermined Gastropoda	5	–
Hemiptera		
Belostoma sp.	–	1
Hirudinea		
Gloiobdella elongata	4	3
Helobdella stagnalis	–	2
Helobdella triserialis	4	–
Odonata		
Coenagrionidae	13	–
Enallagma sp.	2	–
Enallagma basidens	7	–

Benthic macroinvertebrate taxa list for Aloha Utilities-Seven Springs WWTP, collected via 20 discrete dip net sweeps in receiving water, on 15 May 2000.

	Control Site	Test Site
Odonata		
Ischnura sp.	3	–
Oligochaeta		
Aulodrilus pigueti	2	–
Dero digitata complex	3	2
Dero pectinata	–	2
Limnodrilus hoffmeisteri	4	7
Nais communis complex	–	1
Pristina aequiseta	3	–
Pelecypoda		
Sphaeriidae (mollusca)	19	–
Planaridae		
Planariidae	45	11
Trichoptera		
Hydroptilidae	1	–
Oxyethira sp.	3	–

Benthic macroinvertebrate taxa list for Aloha Utilities-Seven Springs WWTP, collected via Hester-Dendy artificial substrates in receiving water, on 15 May 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Acariformes		
Piona sp.	4	–
Amphipoda		
Hyalella azteca	520	1214
Coleoptera		
Scirtes sp.	–	10
Collembola	–	10
Decapoda		
Palaemonetes sp.	2	–
Diptera		
Ablabesmyia rhamphe grp.	18	–
Asheum beckae	24	–
Atrichopogon sp.	–	4
Chironomidae	63	–
Chironomus sp.	2	30
Dicrotendipes sp.	2	–
Dicrotendipes modestus	266	–
Dicrotendipes simpsoni	260	–
Endochironomus nigricans	12	–
Glyptotendipes sp.	163	2
Goeldichironomus sp.	2	–
Goeldichironomus carus	2	–
Odontomyia sp.	–	2
Parachironomus sp.	2	–
Parachironomus directus	2	–
Polypedilum illinoense grp.	2	–
Procladius sp.	6	–
Stenochironomus sp.	2	–
Tanytarsus limneticus	2	–
Tanytarsus sp. G Epler	26	–
Tanytarsus sp. L Epler	2	–
Ephemeroptera		
Baetidae	2	–
Caenis sp.	127	–
Callibaetis floridanus	4	–
Gastropoda		
Ancylidae	–	36
Ferrissia sp.	2	159
Ferrissia hendersoni	–	42
Hebetancylus excentricus	–	32
Hydrobiidae	–	2

Benthic macroinvertebrate taxa list for Aloha Utilities-Seven Springs WWTP, collected via Hester-Dendy artificial substrates in receiving water, on 15 May 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Micromenetus sp.	54	–
Micromenetus floridensis	26	–
Planorbidae	89	–
Pyrogophorus platyrachis	2	16
Undetermined Gastropoda	8	2
Hemiptera		
Corixidae	2	–
Hirudinea		
Desserobdella phalera	6	–
Helobdella fusca	12	–
Helobdella stagnalis	–	22
Helobdella triserialis	18	24
Undetermined Hirudinea	16	6
Odonata		
Coenagrionidae	18	2
Enallagma sp.	8	–
Pelecypoda		
Sphaeriidae	4	–
Trichoptera		
Hydroptilida sp.	2	–
Orthotrichia sp.	2	–
Oxyethira sp.	4	–

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

1	2	3	11	12	17	18	19	20
Transaction Code		~~NPDES~~ NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FLA0127552		000315		X	S	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		~~NPDES~~ NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FLAG127552		000315		B	S	1

Remarks

21 66