Florida

Department of Environmental Protection

Biological Assessment of

Magnolia Springs Apartments

Wastewater Treatment Plant

Clay County

NPDES #FL0028568

Sampled October 1993

March 1994

Biology Section

Division of Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Magnolia Springs Apartments
County: Clay
NPDES Number: FL0028568
State Permit Expiration Date: 20 September 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 11 October 1993

Results: No organic priority pollutants were detected in the effluent sample, and no metals detected in excess of ambient standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 11 October 1993

Results: Not toxic to the test organisms, *Ceriodaphnia dubia* or *Cyprinella leedsi* .

Impact Bioassessment Inspection (IBI)

Date Sampled: 11 October 1993

Results: In both Hester-Dendy and dip net samples, fewer taxa were recovered below the discharge. Shannon-Weaver diversity decreased slightly at the test site, and the Florida Index was extremely low throughout the study area. Moderate degradation in macroinvertebrate populations was indicated below the discharge, with increases in the proportions of pollution-tolerant dipterans and oligochaete worms. The stress observed in the macroinvertebrate communities may be due to the increased nutrient or BOD loading from the effluent. This in turn led to low dissolved oxygen (below Class III standards) and possibly organic enrichment at the downstream station. Phytoplankton taxa richness decreased by 50% at the test site, and the community shifted from one co-dominated by chlorophytes and cyanophytes to a predominantly (80%) blue-green population. It is likely that phytoplankton are being exported from the facility's polishing ponds to the creek. Periphyton communities were nearly identical in terms of community structure and biomass.

Water Quality Inspection (WQI)

Date Sampled: 11 October 1993

Results: Total residual chlorine in the effluent violated permit limits and Class III standards, Rule 17-302.530(19) FAC. The permit limit for flow was exceeded, at 0.082 MGD. Dissolved oxygen at the test site was 3.9 mg/L, due to the elevated effluent BOD, a violation of Rules 17-302.530(31) FAC and 17-302.530(12) FAC. Fecal coliform bacteria violations (Rule 17-320.530(6) FAC) occurred in the effluent and at both study sites, also in violation of the facility's permit limit for fecal coliforms. Total coliforms were above Class III standards in the effluent and below the discharge, violating Rule 17-320.530(7) FAC. Concentrations of all nutrient compounds were extremely high in the effluent, and unionized ammonia violated Class III standards, Rule 17-302.530(3) FAC. At the test site, levels of NH_3 and TKN were greater than 95% and 85%, respectively, of typical stream systems in Florida. Phosphorus-containing compounds, and NO_2NO_3 were also above average compared to typical streams. Effluent AGP was extraordinarily high, and AGP of the test site was more than four times the "problem threshold".

Introduction

The Magnolia Springs Apartments Wastewater Treatment Plant is a privately owned and operated facility located on US Highway 17 North, near Green Cove Springs, in Clay County. This facility, with a design capacity of 0.078 MGD, treats domestic waste with extended aeration. Chlorinated effluent is discharged into two polishing ponds, and exits through an underground pipe to an effluent ditch. This ditch flows into an unnamed creek and, ultimately, to the St. Johns River. At the time of this investigation, the facility was discharging at a rate of 0.082 MGD.

Permit limits are as follows: flow (0.078 MGD annual average), BOD and TSS (20 mg/L annual average, 30 mg/L monthly average, 60 mg/L one time maximum), TKN (12 mg/L annual average), pH (6.0 to 8.5 S.U.'s), fecal coliform bacteria (200 organisms/100 mL annual average, 800 organisms/100 mL single grab), and chlorine residual (maximum of 0.01 mg/L at discharge).

This facility has a history of non-compliance with certain permit parameters, incomplete monitoring records, and poor maintenance (see Facility Summary in Appendix). According to former compliance inspections and Monthly Operating Reports, the annual flow limit was exceeded three times between September, 1992, and June, 1993. A December, 1991, inspection found violations in the monthly BOD limit, single sample TSS limit, and fecal coliform levels. At that time,

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	31	17
Florida Index	1	0
% Contribution of Dominant Taxon	36.7	36.8
% Diptera	21.7	56.0
% Gastropoda	42.5	5.3
% Oligochaeta	15.3	32.5
% Pelecypoda	12.1	4.3
% Odonata	2.2	0.5
% Coleoptera	2.2	0.5
% Other	3.9	1.0
% Scrapers	44.0	5.3
% Above Surface Deposit Feeders	17.1	36.9
% Below Surface Deposit Feeders	15.6	33.0
% Shredders	4.9	18.7
% Suspension Feeders	13.4	4.4
% Predator/Carnivores	4.4	1.7
% Parasites	0.7	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	31	27
Florida Index	0	4
Shannon-Weaver Diversity	3.6	3.0
% Diptera	53.9	75.5
% Gastropoda	33.5	0.8
% Oligochaeta	7.8	21.9
% Coleoptera	3.1	1.8
% Other	1.7	0
% Above Surface Deposit Feeders	36.8	64.7
% Scrapers	38.5	1.0
% Below Surface Deposit Feeders	8.9	23.4
% Suspension Feeders	10.4	2.7
% Shredders	2.2	6.5
% Predator/Carnivores	2.4	1.6
% Other	0.8	0.2
Periphyton Algae		
Number of Taxa	26	27
% Contribution of Dominant Taxon	26.2	15.8
Chlorophyll a (mg/sq. m)	0.15	0.53
Diatom/Diatom + B-G Abundance Ratio	0.58	0.51
% Blue-greens	40.5	42.1
% Greens	2.4	7.0
% Diatoms	54.8	43.9
% Other	2.4	7.0

Major characteristics of community structure of control and test sites (continued).

Phytoplankton Algae		
Number of Taxa	14	7
% Contribution of Dominant Taxon	15	20
Diatom/Diatom + B-G Abundance Ratio	0.22	0
% Blue-greens	35	80
% Greens	40	20
% Diatoms	10	0
% Euglenophytes	15	0
Algal Growth Potential (mg dry wt/l)	0.8	23.9

thick deposits of solids were found floating in the ponds, and total residual chlorine was inadequately monitored. The following year (December, 1992), thick solids were again floating in the settling ponds, and several maintenance problems were documented. Similar conditions were found during the inspection performed for the present study (Appendix). Three violation letters have been issued since April 17, 1989, for inadequate monitoring records, inadequate discharge monitoring reports, and heavy solids in ponds. Although Magnolia Springs Apartments has responded and corrected when each notice of violation or deficiency was issued, consistent violations in permit parameters and the potential lack of monitoring are cause for concern.

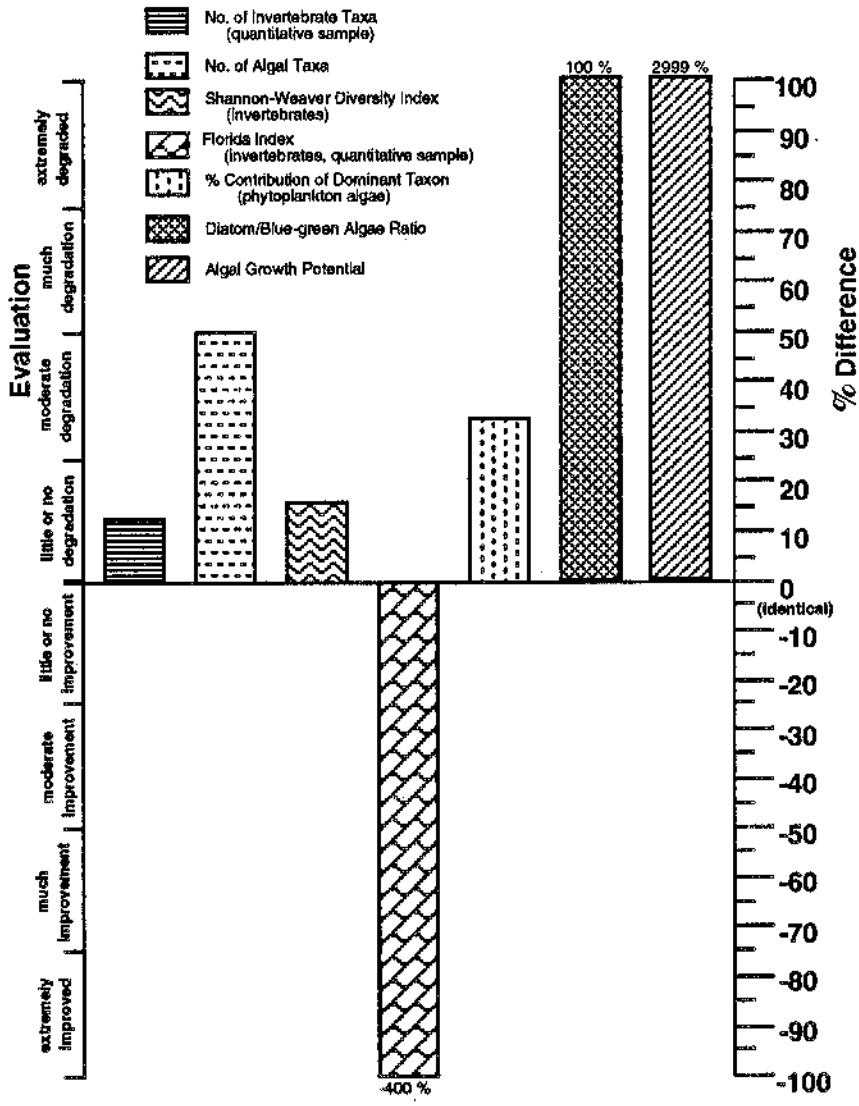
Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located approximately 100 yards upstream of the Magnolia Springs Apartments discharge, where influence from the facility should be minimal) and a test site (approximately 100 yards downstream of the discharge) (see maps in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory..

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.* snags, leaf packs, vegetation) using 20 discrete dip net sweeps. Additionally, Hester-Dendy multiplate samplers were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Phytoplankton was sampled at both reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for periphyton and phytoplankton 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 in this report. 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



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

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 (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups).

For graphical purposes, the percent differences between the reference 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 reference site minus test site divided by the reference site. The percent differences between sites involving the percent contribution of dominant taxon and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Scott Bulgrin, Lindy Payne, and Ken Kohn (DEP Northeast District), Chris Barge, Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Elizabeth Miller, Kim Pearce, Urania Quintana, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality was very similar at the two study stations, with the reference site scoring 80 points, and the test site receiving 78 points (Appendix). This shady, tree canopied stream had a variety of excellent habitat available for macroinvertebrate colonization and success, with adequate amounts of snags and other woody debris, as well as leaf packs and leaf mats. Water velocity was favorable for macroinvertebrate success (up to 0.2 m/sec) at both sites. The pH varied from 6.9 S.U.'s at the control site to 6.0 S.U.'s at the test site. Specific conductance was similar at both study areas (180 and 200 µmhos/cm at reference and test sites, respectively). Mid-depth dissolved oxygen was 5.4 mg/L at the reference site and 3.9 mg/L at the test site. D.O. at the test site was in violation of Class III standards (Rule 17-302.530(31) FAC).

Total residual chlorine in the effluent was 0.02 mg/L, a violation of permit limits and Class III wa-

ter quality standards, Rule 17-302.530(19) FAC. Effluent BOD was elevated (13 mg/L). Although this BOD was within permit limits, it was the major factor contributing to the D.O. violation at the receiving water station, which is a violation of Rule 17-302.530(12) FAC.

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included non-problem levels of iron (181 µg/L) and zinc (13 µg/L).

The sample of final effluent was not toxic to the test organisms, *Ceriodaphnia dubia* or *Cyprinella leedsi*. No mortality occurred during the 48 hour static acute toxicity bioassays (Appendix).

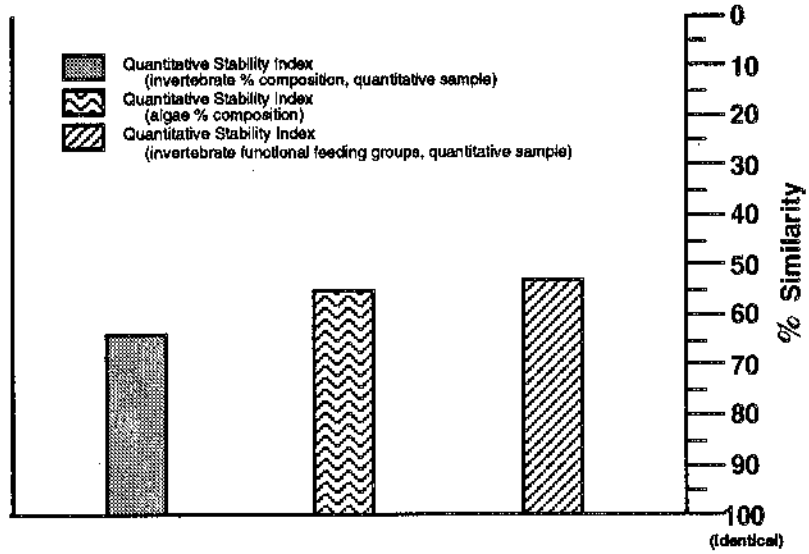
Total and fecal coliform bacteria were extremely elevated in the effluent: 90,000 organisms/100 mL and 14,000 organisms/100 mL, respectively. This fecal coliform level exceeds the facility's limit, as well as the Class III standard, Rule 17-320.530(6) FAC. Fecal coliforms were also above the Class III standard at both study sites: 2400 organisms/100 mL and 1700 organisms/100 mL at reference and test sites, respectively. A substantial increase in total coliforms occurred below the discharge (from 2400 organisms/100 mL at the reference site to 22,000 organisms/100 mL at the test site), obviously due to the influence of the effluent. Both the effluent and test site total coliform levels violated Rule 17-320.530(7) FAC.

Nutrient concentrations were high in the effluent: ortho-phosphate (1.2 mg/L), total phosphorus (1.5 mg/L), ammonia (6.7 mg/L), nitrate-nitrite (2.2 mg/L), and TKN (8.5 mg/L). Un-ionized ammonia present in the discharge was 0.03 mg/L, a violation of Class III freshwater standards, Rule 17-302.530(3) FAC. The effects of the addition of this enriched effluent were easily discernible in waters from the test site. Concentrations of ammonia (0.68 mg/L) and TKN (1.7 mg/L) were greater than 95% and 85%, respectively, of typical freshwater stream systems in Florida (see Table of Typical Water Quality Values in Appendix). Phosphorus-containing compounds, and nitrate-nitrite were also above average, higher than 61-67% of other Florida streams. Nutrient levels at the reference site were all below average for a typical Florida stream.

Algal growth potential (AGP) results were clearly associated with the nutrient concentrations of the effluent, reference, and test sites. Effluent AGP was an extraordinarily high 387.1 mg dry wt/L. A "problem threshold" of 5 mg dry wt/L was established by Raschke and Schultz (1987) to predict the likelihood of the detrimental consequences of nutrient enrichment, such as excessive macrophyte growth, algal blooms, lowered D.O., and fish kills. Test site AGP (23.9 mg dry wt/L) was more than four times this level, while reference site AGP (0.8 mg dry wt/L) corresponded with the low nutrient levels found there.

Although some measures of benthic macroinvertebrate community health were not too dissimilar at the study sites, deleterious community shifts associated with the discharge were noted. The figure on p. 3 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference. The figure on this page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation. The relative or average abundance of each individual taxon appears in the Appendix.

Taxa richness in Hester-Dendy samples was fairly high, with 31 taxa at the reference site, and 27 at the test site. Conversely, Florida Index was very low at both sites, with scores of 0 at the reference site



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

and 4 at the test site. This is far below the 20 Florida Index points expected for a North Florida stream, and may be related to depressed D.O. conditions. Shannon-Weaver diversity decreased by 16% at the test site, from 3.6 to 3.0. Samples collected with sweep nets yielded similar results, except that a more dramatic decrease in taxa richness occurred from the reference site (31) to the test site (17). Florida Index was also low in these samples, 1 and 0 at reference and test sites, respectively.

Macroinvertebrate community shifts were observed downstream of the discharge, both in Hester-Dendy and dip net samples. Above the discharge, gastropods dominated the dip net population, and were second most numerous in Hester-Dendy samples (particularly *Amnicola dalli johnsoni*). The benthic assemblages at the downstream site consisted primarily of the pollution-tolerant dipterans, *Dicrotendipes simpsoni* (on artificial substrates), and *Chironomus* sp. and *Goeldichironomus holoprasinus* (on both sample types). These three organisms are well known for their tolerance to organic enrichment and/or low dissolved oxygen levels (Hudson *et al.* 1990). Proportions of oligochaetes were also increased at the test site in both sets of samples, another indication of stressed conditions. Quantitative Stability Indices for percent composition and functional feeding groups also demonstrated these adverse changes in benthic macroinvertebrate communities.

Both phytoplankton (free-water) and periphyton (attached) algal populations were sampled for this bioassessment. Under normal circumstances, the target algal population in streams is the periphyton. In this particular case, however, the effluent is routed to holding ponds prior to discharge, which could result in a sizable phytoplankton population being exported to the stream. Although both algal types are reported and discussed, the phytoplankton data was used to illustrate the comparisons of reference and test sites.

Phytoplankton density was very low at both study stations, probably related to the canopy cover and tannic nature of the creek. Taxa richness was reduced by 50% from reference (14) to test site (7) (see list in Appendix). Four algal divisions were represented above the discharge, with the chlorophyte, *Gloeocystis* sp., and the cyanophyte, *Chroococcus* sp., each comprising 15% of the population. Five of the seven taxa identified from the test site were cyanophytes, making up 80% of the algal assemblage. The Quantitative Stability Index for percent composition (55%) corresponded to the community shift noted between the two populations. Chlorophyll *a* samples were invalidated during the analysis.

Periphyton communities at the two study sites were very similar, dominated by diatoms and blue-green algae. Taxa richness was nearly identical (26 and 27 taxa at reference and test sites, respectively). Chlorophyll *a* was well below average throughout the receiving creek.

Conclusions

Total residual chlorine in the effluent was 0.02 mg/L, a violation of permit limits and Class III water quality standards, Rule 17-302.530(19) FAC. Effluent BOD was elevated (13 mg/L). Although this BOD was within permit limits, it was a major factor contributing to the D.O. violation at the receiving water station, which is a violation of Rule 17-302.530(12) FAC. At the time of this investigation, the facility was discharging at 0.082 MGD, exceeding the permit limit of 0.078 MGD. Because the permit limit is an annual average, this single measurement does not represent a violation.

The sample of final effluent from the Magnolia Springs Apartments WWTP was not toxic to the test organisms, *Ceriodaphnia dubia* or *Cyprinella leedsi*. No mortality occurred during the 48 hour static acute toxicity bioassay.

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included non-problem levels of iron (181 µg/L) and zinc (13 µg/L).

Fecal coliform bacteria violations (Rule 17-320.530(6) FAC) occurred in the effluent (14,000 organisms/100 mL), at the reference site (2400 organisms/100 mL), and at the test site (1700 organisms/100 mL). The facility's permit was also violated by this concentration of fecal coliform bacteria. Total coliforms were also well above the legal limit in the effluent (90,000 organisms/100 mL) and below the discharge (22,000 organisms/100 mL), in violation of Rule 17-320.530(7) FAC. While some other source of fecal coliforms was present at the upstream site, the concentrations of total coliform bacteria provide a clear link from the plant discharge to the receiving waters.

Concentrations of all effluent nutrient compounds analyzed were very high. Un-ionized ammonia present in the discharge was 0.03 mg/L, a violation of Class III freshwater standards, Rule 17-302.530(3) FAC. The effects of the addition of this enriched effluent were easily discernible in waters from the test site. At the test site, levels of ammonia (0.68 mg/L) and TKN (1.7 mg/L) were greater than 95% and 85%, respectively, of typical freshwater stream systems in Florida. Phosphorus-containing compounds, and nitrate-nitrite were also above average, higher than 61-67% of other Florida streams. Nutrient levels at the reference site were all below average for a typical Florida stream.

Algal growth potential (AGP) results were clearly associated with the nutrient concentrations of the effluent, reference, and test sites. Effluent AGP was an extraordinarily high 387.1 mg dry wt/L, and AGP of the test site was more than four times the "problem threshold", at 23.9 mg dry wt/L. Reference site AGP was low, corresponding with the low nutrient levels (0.8 mg dry wt/L).

Similar trends in benthic macroinvertebrate community structure were noted in both Hester-Dendy and dip net samples. Fewer taxa were recovered from the test site than the reference, particularly in dip net samples. Shannon-Weaver diversity decreased by 16% at the test site, from 3.6 to 3.0. Florida Index, however, was extremely low throughout the study area, and no clear pattern of change was apparent.

Moderate degradation in macroinvertebrate populations, as shown by a shift towards the dominance of pollution tolerant taxa, was observed downstream of the discharge in both Hester-Dendy and dip net samples. The proportions of pollution-tolerant dipterans (*i.e., Dicrotendipes simpsoni, Chironomus* sp., and *Goeldichironomus holoprasinus)* and oligochaete worms were substantially increased below the discharge. The stress observed in the macroinvertebrate communities may be due to the increased nutrient or BOD loading from the effluent. This in turn led to low dissolved oxygen (below Class III standards) and possibly organic enrichment at the downstream station.

Phytoplankton taxa richness was 50% at the test site, compared to the reference site. The community shifted from one co-dominated by chlorophytes and cyanophytes, to a predominantly (80%) bluegreen population. It is possible that phytoplankton are being exported from the facility's polishing ponds to the creek, as the organisms present are commonly found in enriched lentic systems.

Periphyton communities at the two study sites were very similar, dominated by diatoms and bluegreen algae. Taxa richness and community composition were nearly identical. Chlorophyll *a* was well below average throughout the receiving creek.

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 p.

Hudson, P. L., D. R. Lenat, B. A. Caldwell, and D. Smith. 1990. Chironomidae of the Southeastern United States: A checklist of species and notes on biology, distribution, and habitat. U. S. Fish Wildl. Serv., Fish. Wildl. Res. 7. 46 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 p.

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

Weber, C. I. 1991. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 p.

Chemistry summary table for Magnolia Springs Apartments

	Effluent	Control Site	Test Site
Organic Constituents (ug/L)			
None Detected			
Metals (ug/L)			
Aluminum	101 I		
Antimony	15 U		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	15 U		
Chromium	10 U		
Iron	181		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Selenium	30 U		
Silver	0.08 U		
Zinc	13		
Nutrients (mg/L)			
Ortho-phosphate	1.2	0.065	0.15
Total phosphorus	1.5	0.1	0.19
Ammonia	6.7	0.058	0.68
Nitrate+Nitrite	2.2	0.029 I	0.15
TKN	8.5	0.93	1.7
Other Parameters			
Habitat Assessment		80	78
Flow (MGD)	0.082		
D.O. (mg/L)	4.4	5.4	3.9
pH (SU's)	6.8	6.9	6.0
Conductivity (µmhos)	425	180	200
BOD (mg/L)	13	2 K	2 K
TSS (mg/L)	5	2	4
Turbidity (mg/L)	1.6	2.3	2.2
Total Residual Chlorine (mg/L)	0.02		
Temperature (°C)	27.0	22.0	20.5
AGP (mg dry wt/L)	387.1	0.8	23.9
Bioassay Fish	Not Toxic		
Bioassay Invertebrate	Not Toxic		
Fecal coliform (org/100 mL)	14,000	2,400	1,700
Total coliform (org/100 mL)	90,000	2,400	22,000

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

K - Actual value is known to be less than value given

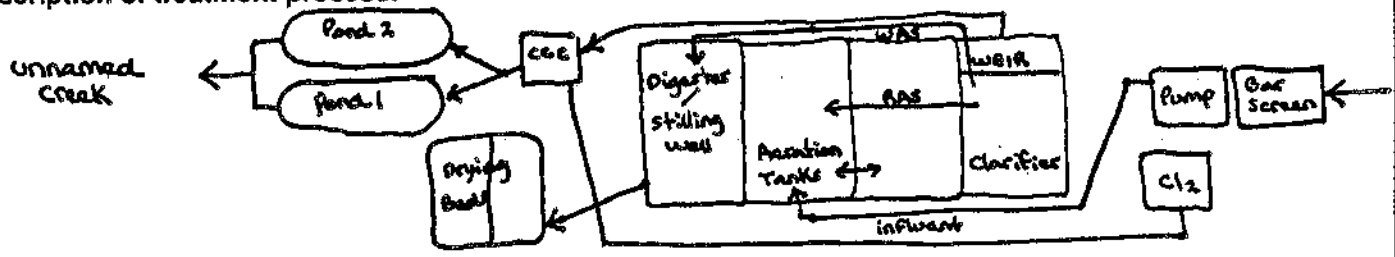
U - Material analyzed for but not detected; value reported is the minimum detection limit

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Magnolia Springs Apartments Wastewater Treatment Plant		Date Summary Prepared: October 18, 1993
Location (attach detailed map): US Highway 17 North Green Cove Springs, FL	County: CLAY LAT/LONG: 30°00'45"N/81°41'58"W	District: NE DISTRICT
Federal Permit # FL0028568 and expiration date: July 31, 1994	State GMS # and 3110P00295 State expiration date: 0010-165902 September 20, 1994	Facility Type: Industrial Municipal Federal Agricultural Other (list):

Function of facility: To operate a extended aeration sewage treatment plant with chlorinated effluent disposal to two (2) polishing ponds.

Description of treatment process:



Receiving waters: Unnamed Creek to the St. Johns River	Classification: I II (III)	
Design Flow: 0.078 MGD	Mean Flow: 0.078 MGD AVG over 9 month (Dec 1992 - Aug 1993)	Flow during survey: 0.082 MGD High flow due to rainfall

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

therefore, the best time to sample is: Anytime

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

No Mixing Zone For This Facility

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

Parameter	Limit (units)
See Attached Sheets A. State Permit B. NPDES Permit	

Describe special permit conditions and permit modifications:

No toxicity testing in State or Federal Permit.

Federal permit also states

1) The pH of the effluent shall not be less than 6.0 standard units nor greater than 8.5 standard units.

2) The arithmetric mean of the fecal coliform values collected during an annual period, shall not exceed 200 colonies per 100 ml of effluent sample. Any one sample shall not exceed 800 fecal coliform colonies per 100 ml of effluent sample.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Magnolia Springs Apts WWTP
(Facility)

FACILITY SUMMARY

Description of permitted outfall(s):

Magnolia Springs Apts. WWTP effluent exits the polishing ponds through a underground pipe which drains into an effluent ditch (about 0.5 ft deep, 2 Ft across, 15 Ft long). From the effluent ditch the water flows into an unnamed creek which flows into the ST. Johns River.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:

The USEPA issued a Notice of Violation Letter in February 20, 1992 that the Daily maximum Total Residual Chlorine (TRC) was not reported for October through December 1991. Magnolia Springs Apts. responded and corrected.

Review of the MOR data show the following deficiencies:

Sept., Oct. 1990 - TKN not reported
Sept. 1992 - Flow reported 0.081 MGD capacity design 0.078 MGD
April 1993 - TKN not reported
February 1993 - Flow reported 0.0792 MGD capacity design 0.078 MGD
June 1993 - Flow reported 0.0890 MGD capacity design 0.078 MGD
Permit DO10-165902 has a 0.078 MGD flow annual average

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

December 10, 1991, a Compliance Evaluation Inspection (CEI) by USEPA and FLDER found the following: - the permittee is not performing the total residual chlorine (TRC) monitoring in accordance with NPDES conditions, - Heavy solids in ponds.

From August 1989 to July 1990, no TKN values were reported or run for the MOR's. Magnolia Springs Apts. was notified and corrected starting August 1990.

No previous impact bioassessments or WQBEL's have been performed on Magnolia Springs Apts.

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

December 15, 1992 a Compliance Evaluation Inspection (CEI) by USEPA and FLDER found the following:
- No alarms, detectors, or fans for chlorine storage room, - Heavy solids floating in settling basin, - Heavy biological growth on effluent weir, - Ponds were being cleaned at time of inspection, - Bar screen had been recently cleaned.

Magnolia Springs Apartments corrected and responded to deficiencies in February 1993.

December 4, 1991 a Compliance Sampling Inspection (CSI) by FLDER found the following:
- The effluent exceeded the monthly BOD limit of 30 mg/L (39 mg/L sampled), the one-time TSS limit of 60 mg/L (86 mg/L sampled) and the fecal coliform one-time max of 800 (1,700 per 100 ml), - The polishing ponds were full of solids, - The influent bar screen was full of debris.

Magnolia Springs Apartments corrected and responded to deficiencies in January 1992.

July 19, 1990 a Compliance Evaluation Inspection (CEI) by FLDER found deficiencies and were corrected August 1990

Additional information:

The only significant enforcement action against Magnolia Springs Apts. WWTP occured in a "NOTICE of Intent to Deny" their permit in 1991.

USEPA has issued Notice of Violation Letters in January 23, 1992, September 13, 1990, and April 17, 1989 for monitoring records, DMR's, and heavy solids in ponds. Magnolia Springs Apts. responded and corrected.

Although Magnolia Springs Apts. has responded and corrected the problems when notified, these deficiencies and infractions continue to occur regularly. More frequent inspections may be needed.

Staff contributing to this review (signature):

SCOTT Bulgrin	Scott Bulgrin	(Biologist
Lindy Payne	Lindy Payne	ES I [redacted]
Ken Kohn	Ken Kohn	OW (Engineer
		(
		(
		(

A. STATE PERMIT EFFLUENT LIMITS

PERMITTEE:

Magnolia Springs Apartments STP

I.D. Number: 3110P00295
Permit Number: D010-165902
Date of Issue: September 20, 1989
Expiration Date: September 20, 1994

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

PARAMETER	ANNUAL AVERAGE	MINIMUM FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION
Flow (mgd)	0.078	Daily, 5/week	Elapsed Time Meter	Influent or Effluent
*BOD_5 (mg/l)	20	Monthly	Grab	Influent and Effluent
*TSS (mg/l)	20	Monthly	Grab	Influent and Effluent
TKN (mg/l)	12	Monthly	Grab	Effluent
pH Units	6.0 - 8.5	Daily, 5/week	Grab	Effluent
Chlorine Residual(mg/l)	0.5 Minimum 1.0 Maximum	Daily, 5/week	Grab	Effluent
Fecal Coliform no./100 (ml)	200	Quarterly	Grab	Effluent

* or 90% removal, whichever is more stringent.

	ANNUAL	MONTHLY	WEEKLY	ONE TIME MAXIMUM
BOD_5	20	30**	45**	60**
TSS	20	30**	45**	60**

** Rule 17-6.180

13. The sludge shall be sampled after final treatment in accordance with 17-7.540(2)(e) FAC but prior to utilization or disposal for the parameters listed below every 12 months. A copy of the analyses shall be submitted with the monthly operation report for the following parameters:

Total Nitrogen	- %	dry weight
Total Phosphorus	- %	dry weight
Total Potassium	- %	dry weight
Total Solids	- %	dry weight
Cadmium	mg/kg	dry weight
Copper	mg/kg	dry weight
Lead	mg/kg	dry weight
Nickel	mg/kg	dry weight
Zinc	mg/kg	dry weight
pH	standard units	

B. NPDES Permit Effluent Limits.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Final

1. These limitations are to be achieved by the effective date of the permit, and shall remain in effect until permit expiration for outfall Serial Number 001 - Treated Domestic Wastewater. Such discharge shall be limited and monitored by the permittee as specified below:

PARAMETERS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	Annual Average	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sampling Point
Flow, MGD	Report	Report	----	5/Week	Flow Meter	Effluent
Biochemical Oxygen Demand (5 Day), mg/l	20	30	60	1/2 weeks	Grab	Effluent
Total Suspended Solids, mg/l	20	30	60	1/2 Weeks	Grab	Effluent
pH, Standard Units	(See Item 7 on Page I-2)			5/Week	Grab	Effluent
Fecal Coliform, N/100 ml	(See Item 8 on Page I-2)			1/Quarter	Grab	Effluent
Total Residual Chlorine, mg/l	(See Item 9, Page I-3 for interim and final effluent limits and approved testing procedures. See Page I-4 for compliance schedule and compliance dates.)			1/2 weeks	Grab	Effluent

Florida Department of
Environmental Protection

Northeast District
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7577

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

November 8, 1993

CERTIFIED - RETURN RECEIPT

Ms. Helen Underwood, Manager
Magnolia Springs Apartments
U.S. Highway 17 North, #16
Green Cove Springs, Florida 32043

Dear Ms. Underwood:

Clay County - Domestic Waste
Magnolia Springs WWTP

On October 11, 1993, compliance sampling, bioassay, toxics, water quality and impact bioassay inspections were conducted at the above referenced wastewater treatment plant. Enclosed is a copy of the inspection report for the facility. The results of the bioassay, toxics, water quality and impact bioassay will be made available in the near future when we receive them. During the course of the inspection, the following observations were noted:

1. A high level alarm bell or telemetry system needs to be installed on the on-site lift station. This may not be necessary if there is adequate detention time within the wet well and frequent enough inspections so that a problem would be detected and corrected before any overflows would occur.

2. A break was noted in the on-site potable water line next to the influent bar screen.

3. There appeared to be an excessive amount of gritty material and food waste in the aeration tank and return sludge. Increased cleaning of the grit chamber should be considered.

4. Straggler floc and grease were noted in the clarifier.

5. There was a high amount of settled solids in the ponds.

6. The effluent fecal coliform result collected after the ponds was 14,000 fecal coliforms per 100 ml, which exceeded the limit of 800 fecal coliforms per 100 ml referenced in Specific Condition No. 2 of the permit.

7. The effluent $CBOD_5$ and TSS results from the pond were within permit limits.

8. The WWTP was not operating in the extended aeration mode as required by your permit. The contact stabilization mode was being used.

9. There was no record of the residuals stabilization. A record of the solids retention time in the digester needs to be maintained. A minimum of 15 days solids retention needs to be provided prior to residuals disposal. Provide the location for residuals disposal and the contract hauler.

10. A reduced pressure zone backflow preventer is required on the potable water line to the facility.

11. The past four months of monthly operation reports indicated that the design capacity of the facility of 0.078 mgd has been exceeded. Please provide the date when the elapsed timer was last calibrated. An effluent flow meter with a totalizer and recorder should be provided for more reliable flow measurement. Compare the flows with the potable water consumption.

12. The alligator in the ponds needs to be removed. Please contact the Florida Game and Freshwater Fish Commission for assistance. Rule 17-600.400(2)(b) FAC requires facilities to be designed to discourage the entry of animals as well as unauthorized persons.

Within 14 days from receipt of this letter, provide a written response addressing the actions that have been or will be taken in order to comply with the Department's regulations.

If you have any questions concerning this matter, please contact me at (904) 448-4330, extension 342.

Sincerely,

Ken Kohn
Environmental Engineer

KK:jf-6/27
Enclosure

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

WASTEWATER COMPLIANCE INSPECTION REPORT

FACILITY AND INSPECTION INFORMATION

@ = OPTIONAL

Name and Physical Location of Facility	GMS ID:	County	Entry Date/Time
Magnolia Springs Apartment	3110P00295	Clay	10-11-93 / 10:30 a.m.
		Phone	@ Exit Time/Date: 10-11-93 / 12:00 p.m.

Name(s) of Field Representatives(s)	Title	Phone
Tom Ryan	Operations	Enviro Systems
Mike Christopher		

Name and Address of Permittee or Designated Representative	Title	Phone	@ Operator Certification #:
Helen Underwood US 17 North #16 Green Cove Springs, FL 32043	Manager		

Inspection Type: C | S | I Samples Taken (Y/N): @ Sample ID#: Samples Split (Y/N):

☒ Domestic ☐ Industrial Were Photos Taken (Y/N)? @ Log Book Volume: @ Page:

In Compliance With Permit Conditions (Y/N): N

Recommended Actions: Non compliance Letter

Name (s) and Signature(s) of Inspector(s)	District Office/Phone Number	Date
Ken Kolb / Ken Kolb	NED/904-448-4330 x 342	11-5-93
@ Signature of Reviewer	District Office/Phone Number	Date
C. H. Hourist	NED 904-448-4330 x 316	11-8-93

FACILITY COMPLIANCE AREAS EVALUATED

S=Satisfactory; M=Marginal; U=Unsatisfactory; Blank=Not Evaluated; *See Comments

S	1. Permit: # 0010-165902	S	6. Sampling	U	11. Effluent
N	2. Compliance Schedule	S	7. Self-Monitoring Program		12. Groundwater
N	3. Pretreatment	M	8. Facility Site Review	M	13. Disposal Method
M	4. Records & Reports	M	9. Flow Measurement		14. Residuals Management
N	5. Laboratory	S	10. Operation & Maintenance		15. Other

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N	2 5 3 F L 0 0 2 8 5 6 8 11	12 9 3 1 0 1 1 17	18 S X	19 S	20 2

Remarks

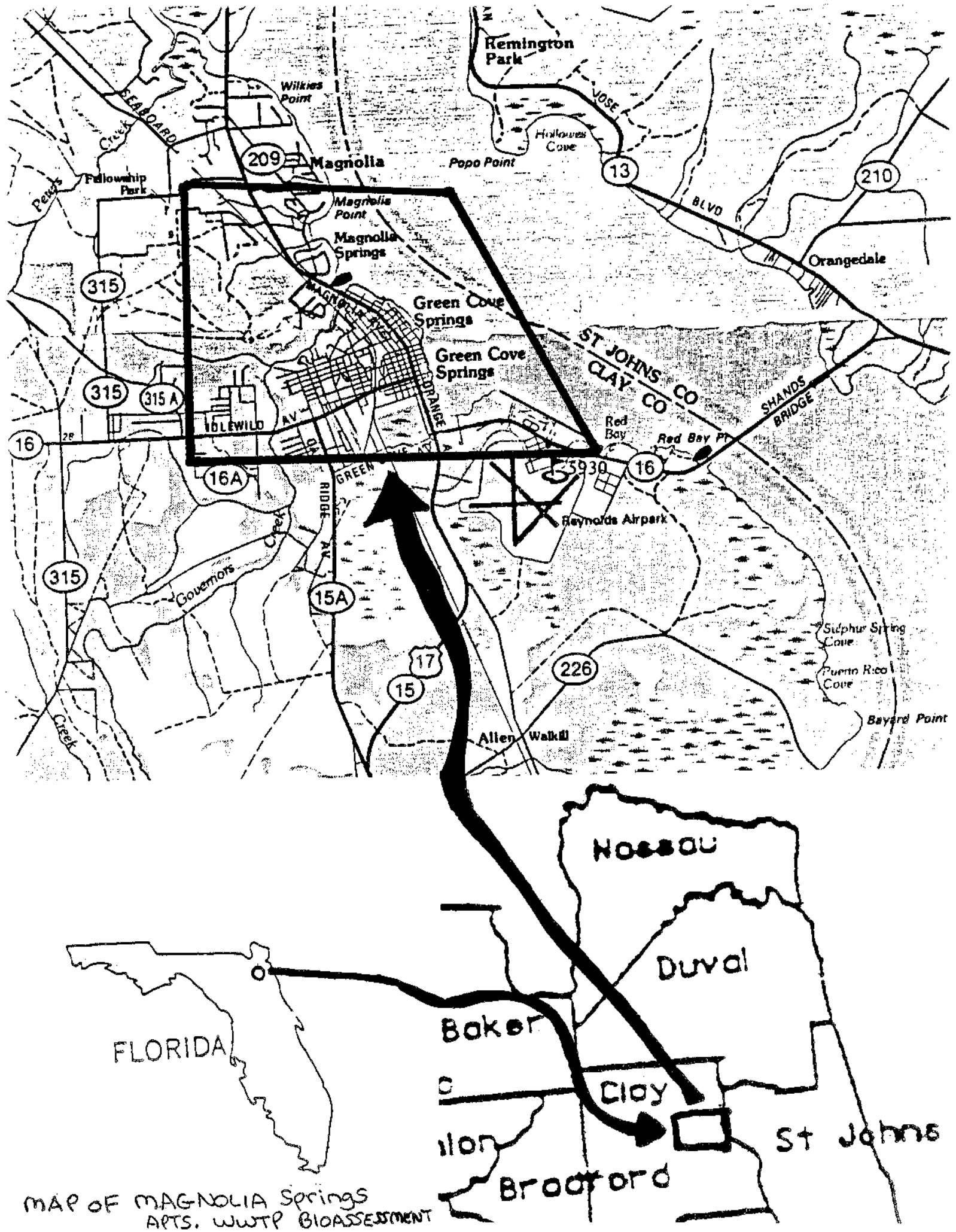
21 66

Inspection Type (Field 18): A=PAI, B=CBI, C=CEI, S=CSI, X=XSI, R=RI

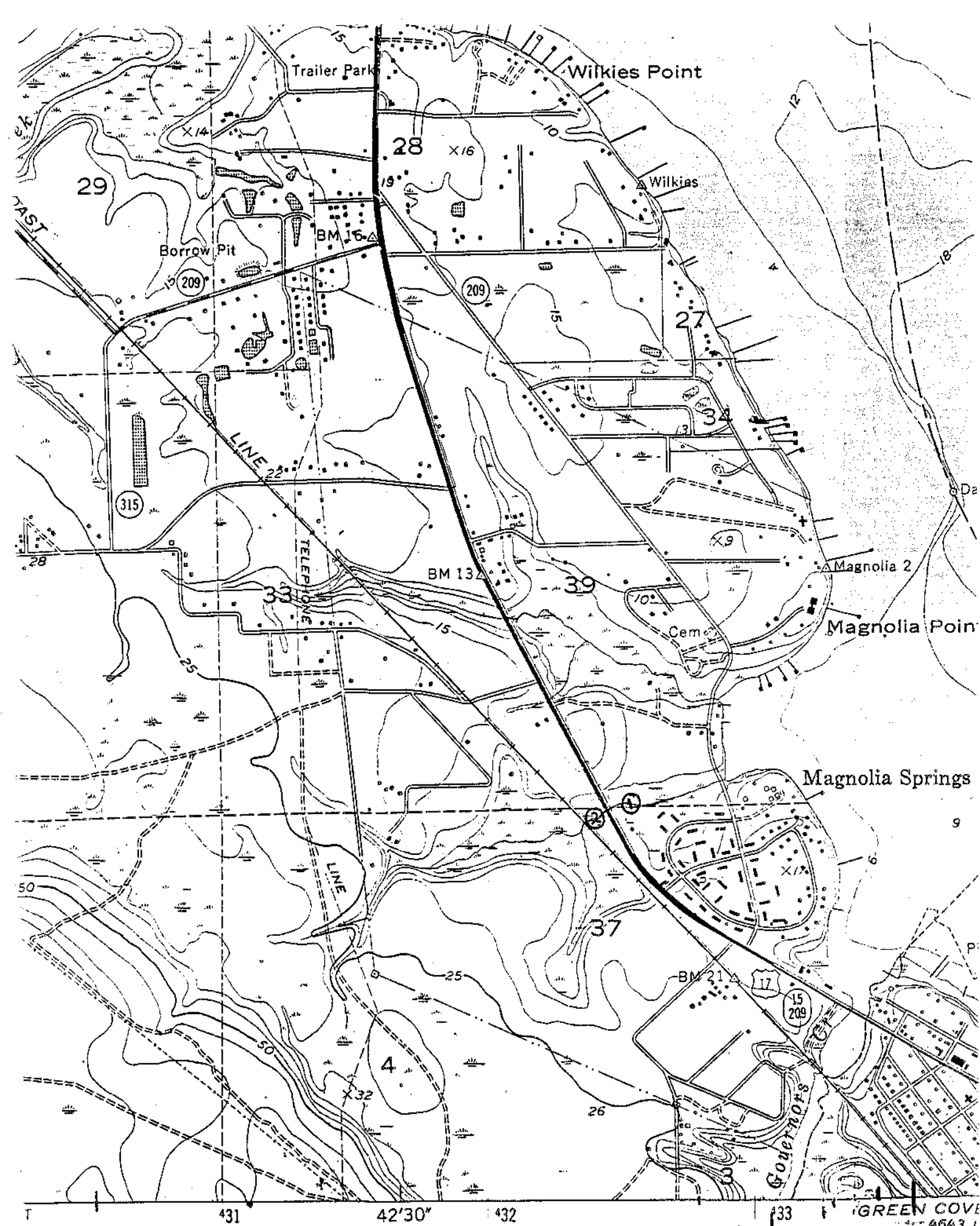
Inspector Code (Field 19): S=State, J=Joint EPA/State-EPA Lead, T=Joint State/EPA-State Lead

Facility Type (Field 20): 1=Municipal (Publicly Owned), 2=Industrial and Privately Owned Domestic, 3=Agricultural, 4=Federal

Every other field is self explanatory.



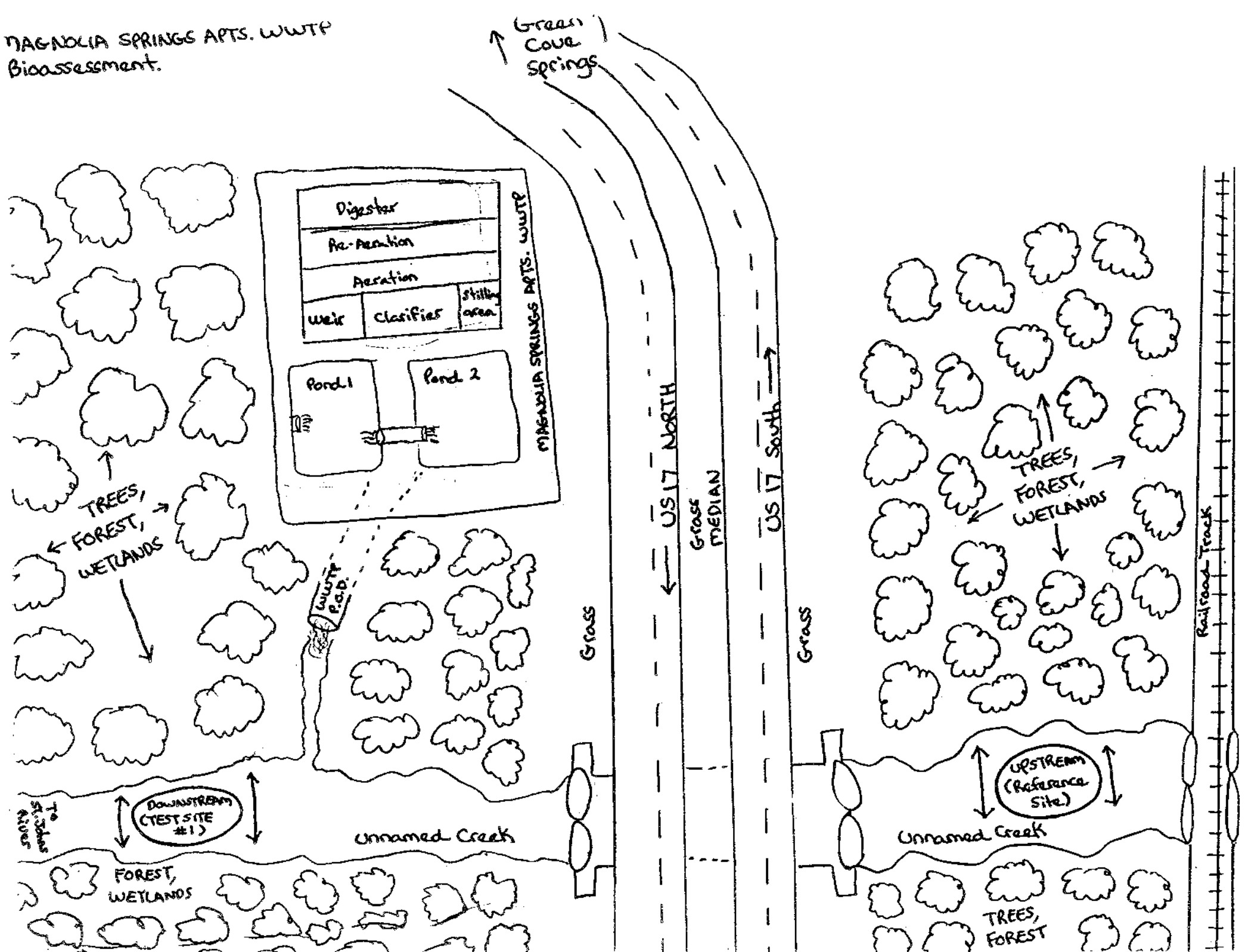
MAP OF MAGNOLIA SPRINGS APTS. WWTP BIOASSESSMENT



① Unnamed Creek Downstream of Magnolia Springs Apts. WWTP Discharge

② Unnamed Creek Upstream of Magnolia Springs Apts. WWTP Discharge

MAGNOLIA SPRINGS APTS. WWTP
Bioassessment.



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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP NE DISTRICT	STORET STATION NUMBER: 20030427	DATE (M/D/Y): 10/11/93	RECEIVING BODY OF WATER: Unnamed Creek to St. Johns River
REMARKS: Site about 20 yds upstream of US 17 South before railroad tracks.	LOCATION: Unnamed Creek upstream of Magnolia Springs Pipts, WWTP Discharge		FIELD ID/NAME: (Reference Site)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover **22**	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 **19**	Max. observed: >0.3 m/sec. but < 1 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, or spate occurring; > 2 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 **10**	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.	**80**

COMMENTS: NO Aquatic Vegetation, could be due to highly shaded area. water, tanin in color. Bottom mainly mud with sand, Lots of snags. Area above railroad tracks floodplain

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/11/93	SCOTT BULGRIN	Scott Bulgrin

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP NE DISTRICT	STORET STATION NUMBER: 20030428	DATE (M/D/Y): 10/11/93	RECEIVING BODY OF WATER: Effluent ditch to Unnamed Creek to St. Johns River
REMARKS: Site about 20 yds downstream of effluent ditch and about 100 yds downstream of US17 North	LOCATION: Unnamed Creek Downstream of Magnolia Springs Apts. WWTP Discharge.		FIELD ID/NAME: (TEST SITE #1)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	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 19	Max. observed: >0.3 m/sec. but < 1 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, or spate occurring; > 2 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 10	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.	78

COMMENTS: No Aquatic Vegetation, could be due to highly shaded area. water, Tannin in color, Bottom mainly mud with Sand. Lots of snags.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
10/11/93	SCOTT BULGRIN	Scott Bulgrin

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP NE DISTRICT	STORET STATION NUMBER: 20030427	DATE (M/D/Y): 10/11/93	TIME: 1330	RECEIVING BODY OF WATER: Unnamed Creek to St. Johns River

REMARKS: Site about 20 yds upstream of US17 South before railroad tracks. Unnamed Creek has tidal influence	LOCATION: Unnamed Creek upstream of Magnolia Springs Apts. WWTP discharge	FIELD ID/NAME: (Reference Site)

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category): 1 mile area: Transportation

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
75			10	10		5

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

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

Point-Source Pollution (list location and describe): STORMWATER RUNOFF US 17 (road) Railroad Tracks

Estimated System Width (range, m): 2.5 - 3.0	Estimated System Depth (range, m): 0.3 - 1.3	Impounded ☐ yes ☐ no
High Water Mark (m above bed): 0.3 above surface	Velocity (range, m/s): 0.15 - 0.2	Channelized ☐ yes ☐ no

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	65	12	Dip Net	Riffles			
Leaf Packs	2	2	Dip Net	Sand	5	1	DIP NET
Aquatic Vegetation				Mud/Muck/Silt	8	1	DIP NET
Rock or Shell Rubble				Benthic leaf mats	15	2	DIP NET
Undercut Banks/Roots	5	2	Dip Net	Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):	Salinity		Secchi (m):
Top	0.5	22	6.93	5.5	180	0		0.9L
Mid-depth	1.0	22	6.93	5.4	180	0		
Bottom	2.0	22	6.93	5.2	180	0		

System Type : Stream: ☒ (Sand Bottomed / Sand Bot w/ Spring / Swamp & Bog / Calcareous / Alluvial / Misc.) 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: Sunny 80° Outgoing tidal influence at time of study.

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

SAMPLING TEAM: Lindy Payne, SCOTT BULGRIN	SIGNATURE: Lindy Payne, Scott Bulgrin	DATE: 10/11/93

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FL DEP NE DISTRICT	STORET STATION NUMBER: 20030428	DATE (M/D/Y): 10/11/93	TIME: 1040	RECEIVING BODY OF WATER: Effluent ditch to unnamed Creek to St. Johns River

REMARKS: Site about 20 yds downstream of Magnolia Springs Apts. WWTP effluent ditch. Unnamed Creek has tidal influence	LOCATION: Unnamed Creek downstream of Magnolia Springs Apts. WWTP Discharge	FIELD ID/NAME: (TEST SITE #1)

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category): 1 mile area — Transportation

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
75			10	10		5

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

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

Point-Source Pollution (list location and describe): Magnolia Springs Apts. WWTP; STORMWATER Runoff US 17 (road) Railroad Tracks

Estimated System Width (range, m): 2.5 - 3.0	Estimated System Depth (range, m): 0.3 - 1.3	Impounded: yes ☐ / no ☐
High Water Mark (m above bed): 0.3	Velocity (range, m/s): 0.15 - 0.2	Channelized: yes ☐ / no ☐

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	50	10	Dip Net	Riffles			
Leaf Packs	5	2	Dip Net	Sand	15	2	Dip Net
Aquatic Vegetation				Mud/Muck/Silt	15	2	Dip Net
Rock or Shell Rubble				Benthic leaf mats	10	2	Dip Net
Undercut Banks/Roots	5	2	Dip Net	Other:			

WATER QUALITY

	Depth (ft):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):	Salinity		Secchi (m):
Top	1.0	21.0	6.03	4.2	200	0		0.9L
Mid-depth	1.5	20.5	6.03	3.9	200	0		
Bottom	3.0	20.5	6.03	3.8	220	0		

System Type : Stream: ☒ (Sand Bottomed / Sand Bot w/ Spring / Swamp & Bog / Calcareous / Alluvial / Misc.) 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: Sunny 80° outgoing tidal influence at time of study.

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

SAMPLING TEAM: Lindy Payne, SCOTT BULGRIN	SIGNATURE: Lindy Payne / Scott Bulgrin	DATE: 10/11/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Magnolia Springs Apartments WWTP
Location: US 17 South Green Cove Springs
County: Clay
Contact/District: S. Bridges NE
NPDES Permit #: FL0028568 **Outfall #:**

Sample Collection: Date 10/11/93 Time 1230
Test Beginning: Date 10/12/93 Time 1200
Test Ending: Date 10/14/93 Time 1200
Organism Batch #: 113 **Diluent Batch #:** 26
Organism Age: <24 hours
Test Organism: Ceriodaphnia dubia

63572 93-OCT-12-19 entered 10/14/93

Test Type: ~~Screening~~ | Definitive
Static | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 23.0	8.4 @ 23.3	1005 @ 1,000 9650 @ 10,000 @ 24.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.1	8.5 @ 23.3	990 @ 1,000 9460 @ 10,000 @ 23.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.0 @ 24.1	8.3 @ 24.0	995 @ 1,000 9550 @ 10,000 @ 23.9 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control	A	5	5	5	8.3		8.3	23.2		22.7	8.6		8.4	160		190
Control	B	5	5	5			8.3			22.7			8.4			200
Control	C	5	5	5			8.3			23.5			8.1			195
Control	D	5	5	5			8.3			24.1			8.0			200
100%	A	5	5	5	7.4		8.4	23.4		23.1	7.1		8.2	345		365
100%	B	5	5	5			8.4			23.1			8.3			355
100%	C	5	5	5			8.4			23.8			8.2			395
100%	D	5	5	5			8.5			24.0			8.3			395
Measured/Loaded by:		TM	TM	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TM	TM	TM	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Tina M. Knowles
Tobin G. Rader
Randall Faircloth

Reviewer

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.02	—	LP
Lab Total Residual Cl2:	<0.03	<0.03	0.04	DR-100	TM
Alkalinity:	125	70	115	Hach	TR
Hardness:	120	80	95	Hach	TR
Total Ammonia:	← not measured →				

Water Quality Parameters

Ammonia Meter #98136 Ammonia Meter Slope: n/m Ammonia Blank: n/m Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Magnolia Apartments WWTP
Location: 1317 North Green Cove Springs
County: Clay
Contact/District: S. Bulgin / NE
NPDES Permit #: FL00 28568 Outfall #:
930CT1219 63572

Sample Collection: Date 10-11-93 Time 1230
Test Beginning: Date 10-12-93 Time 1200
Test Ending: Date 10-14-93 Time 1200
Organism Batch #: 42 Diluent Batch #: Well
Organism Age: 9 days old
Test Organism: Cyprinodon variegatus

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

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	22.9 @ 23.0	8.4 @ 23.3	1005 @ 1,000
	9.0 @ 9.0			9650 @ 10,000 @ 24.3 °C
24 hr	7.0 @ 7.0	23.0 @ 23.1	8.5 @ 23.3	990 @ 1,000
	9.0 @ 9.0			9460 @ 10,000 @ 23.7 °C
48 hr	7.0 @ 7.0	24.0 @ 24.1	8.3 @ 24.0	995 @ 1,000
	9.0 @ 9.0			9550 @ 10,000 @ 23.9 °C

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm))		
		0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control A	390	5	5	5	7.8	8.3	8.3	23.0	22.9	23.5	9.0	8.7	8.7	240	245	250
Control B	333	5	5	5	7.8	8.3	8.3			23.4	8.9	8.8	8.5	240	240	245
100% A	25	5	5	5	7.3	7.9	8.1	23.9	23.0	23.2	7.2	8.3	8.2	400	390	390
100% B	44	5	5	5	7.3	7.9	8.1			23.2	7.2	8.2	8.1	400	390	390
Measured/Loaded by:		TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM
Recorded by:		TR	TM	TM	TR	TM	TR	TR	TM	TR	TR	TM	TR	TR	TM	TR

Investigators' Signatures

Tina Mikulski
Robin C. Rader
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.02	—	LP
Lab Total Residual Cl2:	<0.03	<0.03	0.04	DR-100	TM
Alkalinity:	125	70	115	Hach	TR
Hardness:	120	80	95	Hach	TP
Total Ammonia:	← not measured →				

Ammonia Meter #98136 Ammonia Meter Slope: n/m Ammonia Blank: n/m Control Salinity: 0 ppt Sample Salinity: 0 ppt

Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

Benthic macroinvertebrate taxa list for Magnolia Springs Apartments, collected via Hester-Dendy artificial substrates above and below the discharge in the unnamed receiving waters, on 11 October, 1993.

	Reference Site	Test Site
Amphipoda		
Hyalella azteca	3	–
Coleoptera		
Ancyronyx variagata	–	1
Dineutus sp.	3	3
Hydrocanthus sp.	–	5
Hydroporus/Hygrotus sp.	–	4
Hydroporus sp.	10	–
Diptera		
Asheum beckae	1	9
Chironomus sp.	14	88
Corynoneura sp.	–	2
Dicrotendipes sp.	1	–
Dicrotendipes simpsoni	75	246
Goeldichironomus holoprasinus	2	88
Kiefferulus sp.	4	24
Microtendipes pedellus grp.	8	–
Palpomyia grp. sp.	–	1
Parachironomus sp.	1	–
Pentaneura inconspicua	–	2
Tanytarsus sp.	–	2
Tanytarsus sp. A Epler	1	–
Tanytarsus sp. B Epler	1	–
Tanytarsus sp. G Epler	1	–
Tanytarsus sp. L Epler	11	2
Tanytarsus sp. O Epler	30	3
Tanytarsus sp. T Epler	24	29
Tribelos fuscicorne	1	–
Tribelos jucundum	1	–
Zavreliella marmorata	–	2
Undetermined dipteran pupa	53	47
Gastropoda		
Amnicola dalli johnsoni	81	–
Hebetancyclus excentricus	–	4
Micromenetus dilatatus	13	–
Physella sp.	1	1
Spilochlamys gravis	46	–
Undetermined ancylid	1	1

Hemiptera		
Undetermined hemipteran	1	–
Odonata		
Ischnura sp.	1	–
Undetermined corduliid	1	–
Oligochaeta		
Bratislava unidentata	–	1
Dero digitata	–	1
Dero pectinata	–	18
Dero trifida	32	129
Nais communis	–	4
Nais elinguis	–	5
Pristina leidyi	1	–
Platyhelminthes		
Dugesia sp.	1	–

Benthic macroinvertebrate taxa list for Magnolia Springs Apartments collected via 20 discrete dip net sweeps in the unnamed receiving waters, on 11 October, 1993.

	Reference Site	Test Site
Coleoptera		
Dubiraphia sp.	4	–
Helobata sp.	1	–
Hydrobiomorpha casta	–	1
Hydroporus sp.	2	–
Diptera		
Chironomus sp.	30	77
Dicrotendipes simpsoni	6	–
Goeldichironomus sp.	2	8
Goeldichironomus holoprasinus	13	28
Kiefferulus sp.	3	–
Odontomesa sp.	–	1
Tribelos jucundum	13	–
Undetermined dipteran pupa	1	3
Gastropoda		
Amnicola dalli johnsoni	115	–
Hebetancyclus excentricus	12	1
Littoridinops monroensis	–	10
Micromenetus dilatatus	3	–
Planorbella sp.	1	–
Planorbella duryi	2	–
Hemiptera		
Belostoma testaceum	–	2
Hirudinea		
Helobdella fusca	2	–
Helobdella stagnalis	1	–
Isopoda		
Asellus sp.	5	–
Megaloptera		
Sialis sp.	4	–
Odonata		
Epitheca sepia	4	–
Pachydiplax longipennis	2	1
Perithemis tenera seminole	1	–

Oligochaeta		
Aulodrilus pigueti	1	–
Dero lodeni	3	2
Dero pectinata	–	3
Dero trifida	4	30
Eclipidrilus palustris	4	–
Haemonais waldvogeli	1	13
Limnodrilus hoffmeisteri	27	18
Pristina leidyi	–	1
Tubifex tubifex	7	–
Undetermined enchytraeid	1	1
Pelecypoda		
Sphaerium or *Musculium* sp.	38	9

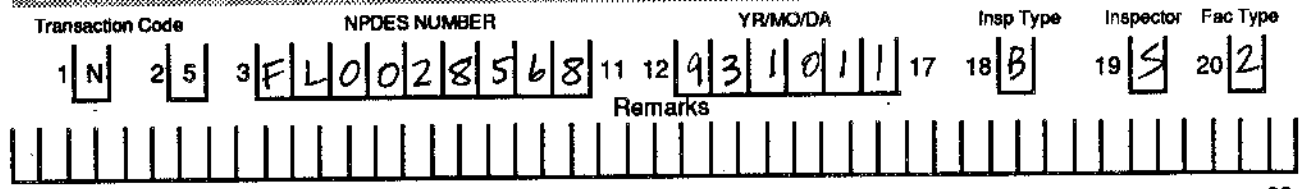
Phytoplankton taxa list and densities (#/mL) for Magnolia Springs Apartments, collected via subsurface grabs above and below the discharge in the unnamed receiving waters on 11 October, 1993.

	Reference Site	Test Site
Diatoms		
Navicula sp.	70	–
Synedra sp.	70	–
Chlorophyta		
Ankistrodesmus sp.	70	148
Arthrodesmus sp.	70	–
Carteria sp.	70	–
Gloeocystis sp.	209	–
Kirchneriella sp.	70	–
Oocystis sp.	–	74
Staurastrum sp.	70	–
Cyanophyta		
Anabaena sp.	140	–
Chroococcus sp.	209	148
Lyngbya sp.	70	222
Microcystis sp.	70	222
Oscillatoria sp.	–	148
Spirulina sp.	–	148
Euglenophyta		
Euglena sp.	140	–
Phacus sp.	70	–
Total	1398	1110

Periphyton taxa list and densities (#/mm^2) for Magnolia Springs Apartments, collected via glass microscope slides above and below the discharge in the unnamed receiving waters on 11 October, 1993.

	Reference Site	Test Site
Diatoms		
Achnanthes exigua	3.3	3.2
A. hauckiana	3.3	–
A. hungarica	–	9.4
A. hustedtii	3.3	–
Bacillaria paradoxa	3.3	6.3
Cocconeis placentula	3.3	–
Cyclotella meneghiniana	3.3	3.2
Eunotia sp.	3.3	–
E. exigua	3.3	3.2
E. gracilis	–	3.2
E. pectinalis	3.3	3.2
Fragilaria brevistriata	3.3	3.2
F. vaucheriae	3.3	–
Frustulia rhomboides	3.3	–
F. rhomboides v. *capitata*	–	3.2
Navicula cocconeiformis	–	3.2
N. cryptocephala	3.3	3.2
N. minima	3.3	3.2
N. placentula	–	3.2
N. pupula	3.3	3.2
N. viridula	6.5	3.2
Nitzschia amphibia	3.3	3.2
N. ignorata	3.3	–
N. palea	3.3	15.7
Pinnularia legumen	3.3	–
Stauroneis anceps	3.3	–
Synedra ulna	3.3	3.2
Chlorophyta		
Rhizocolonium sp.	–	3.2
Scenedesmus sp.	3.3	3.2
Staurastrum sp.	–	3.2
Stigeocolonium sp.	–	3.2
Chrysophyta		
Dinobryon sp.	–	12.6
Cyanophyta		
Aphanothece sp.	–	15.7
Chroococcus sp.	35.7	18.9
Lyngbya sp.	9.7	12.6
Oscillatoria sp.	9.7	28.3
Euglenophyta		
Euglena sp.	3.3	–
Total	137.5	180.3

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



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

