

Biological Assessment of

Jacksonville Suburban Utilities–Monterey Wastewater Treatment Facility

Duval County

NPDES #FL0023604

Sampled August 1994

January 1995

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Jacksonville Suburban Utilities - Monterey WWTF
County Duval
NPDES Number: FL0023604
State Permit Expiration Date: 15 May 1995

Toxics Sampling Inspection (XSI)

Date Sampled: 29 August 1994

Results: No organic constituents or unacceptable concentrations of metals were detected in the effluent.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 29 August 1994

Results: The sample of effluent was not toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 29 August 1994

Results: Fewer pollution sensitive macroinvertebrate taxa were found at the test sites, compared to the reference site. This may be due to salinity and habitat differences seen between the reference and test sites, or to characteristics of the discharge. It should be noted that taxa richness was depressed at all sites, including the reference station. In a system with such a variety of potential sources of pollution, it is difficult to isolate the contribution from any one discharge. Shannon-Weaver diversity was decreased by 85% at test site 1, a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). Measurements of the phytoplankton community indicated no major differences between the reference and test sites. Chlorophyll *a* was elevated at all three stations: 20.0 µg/L at the reference site, 13.9 µg/L at test site 1, and 23.0 µg/L at test site 2. These levels are higher than those found in 80% to 95% of other Florida estuaries. This is related to the nutrient enrichment in this part of the St. Johns River, which is the result of many point and non-point sources.

Water Quality Inspection (WQI)

Date Sampled: 29 August 1994

Results: While the Monterey effluent was relatively high in some nutrients, it did not appear to cause additional enrichment of the receiving waters. In fact, nutrient concentrations at the reference site were equal to, or slightly higher than, both test sites. However, concentrations of nutrients were higher than average for a Florida estuary at all stations. Nitrate-nitrite concentrations (0.3 mg/L at the reference site and 0.24 mg/L at both test sites) were especially elevated, and were higher than those found in 90% of other Florida estuaries. This nutrient enrichment is probably more attributable to the many sources of pollution found in this area (*i.e.*, urban and agricultural runoff, a variety of point source discharges) than to this particular facility alone. This facility is, however, a contributor. Algal growth potential at each station was above the "problem threshold" of 10 mg dry wt/L for marine waters.

Introduction

Jacksonville Suburban Utilities–Monterey Wastewater Treatment Facility is located on Harris Street in Jacksonville, Duval County, Florida (see maps in Appendix). Treatment at this privately owned facility consists of two parallel "Sanitaire" 1.5 MGD conventional activated sludge wastewater facilities, with chlorination and sulfur dioxide dechlorination prior to discharge into the Class III St. Johns River. The 16 inch diameter outfall pipe extends 222.5 meters into the river, and has 130 diffusing ports. The facility has a "high rate diffuser" mixing zone, which achieves a dilution ratio of 100 to 1. This zone begins 40 meters from the eastern shoreline of the river, extends 182 meters along the axis of the diffuser pipe, and has a width of 7.6 meters. This covers approximately 1,383 square meters in area. This mixing zone allows the facility to dilute its effluent to 30% of full strength before testing for compliance with the LC_{50} toxicity limit.

Permit limits are as follows: BOD (45 mg/L as a weekly average, 30 mg/L as a monthly average, 20 mg/L as an annual average), TSS (45 mg/L as a weekly average, 30 mg/L as a monthly average, 20 mg/L as an annual average), fecal coliforms (average of ≤ 200 organisms/100 mL, maximum of ≤ 800 organisms/100mL).

There have been no reports of facility mishaps. A review of Monthly Operating Report data showed that the facility has been within permit conditions for the past year. However, the MOR data did show that the facility's design flow capacity (3.0 MGD) was twice exceeded, shortly before this study. Flow during the inspection was 2.122 MGD. Overall, the plant has been operating satisfactorily (see Appendix).

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 three miles north of Exchange Island) and two test sites bracketing the discharge (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1993). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site 1	Test Site 2
Macroinvertebrate Ponar			
Number of Taxa	8	4	6
Shannon-Weaver Diversity	2.3	.34	2.34
% Polychaeta	22.3	95.8	38.4
% Cirripedia	8.1	0	15.4
% Amphipoda	9.5	0	15.4
% Cumacea	3.4	0	0
% Mysidacea	42.6	0	0
% Oligocheata	13.5	0	15.4
% Other	.7	4.2	15.4
% Above surface deposit feeders	2.5	2.1	15.5
% Below surface deposit feeders	13.5	0	7.5
% Shredders	2.5	0	8.1
% Predators/Carnivores	23	97.9	43.5
% Collector-Filterers	56.1	0	23
% Scavengers	2.4	0	2.5
Phytoplankton Algae			
Number of Taxa	13	15	11
Density (org/mL)	87,778	56,436	55,021
Shannon-Weaver Diversity	2.31	2.17	2.04
Chlorophyll a (µg/L)	19.96	13.85	22.99
% Blue-green	19.1	9.7	10.5
% Green	3.4	6.8	8.8
% Diatoms	74.2	83.5	77.2
% Other	3.37	0	3.51
Algal Growth Potential (mg dry wt/l)	11.8	11.0	10.4

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 via three Ponar grabs per site (Ross 1990). Phytoplankton was sampled at reference and test sites by subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* with the freshwater effluent, and *Dunaliella tertiolecta* with saline receiving waters, followed Miller *et al.* (1978) and EPA (1974).

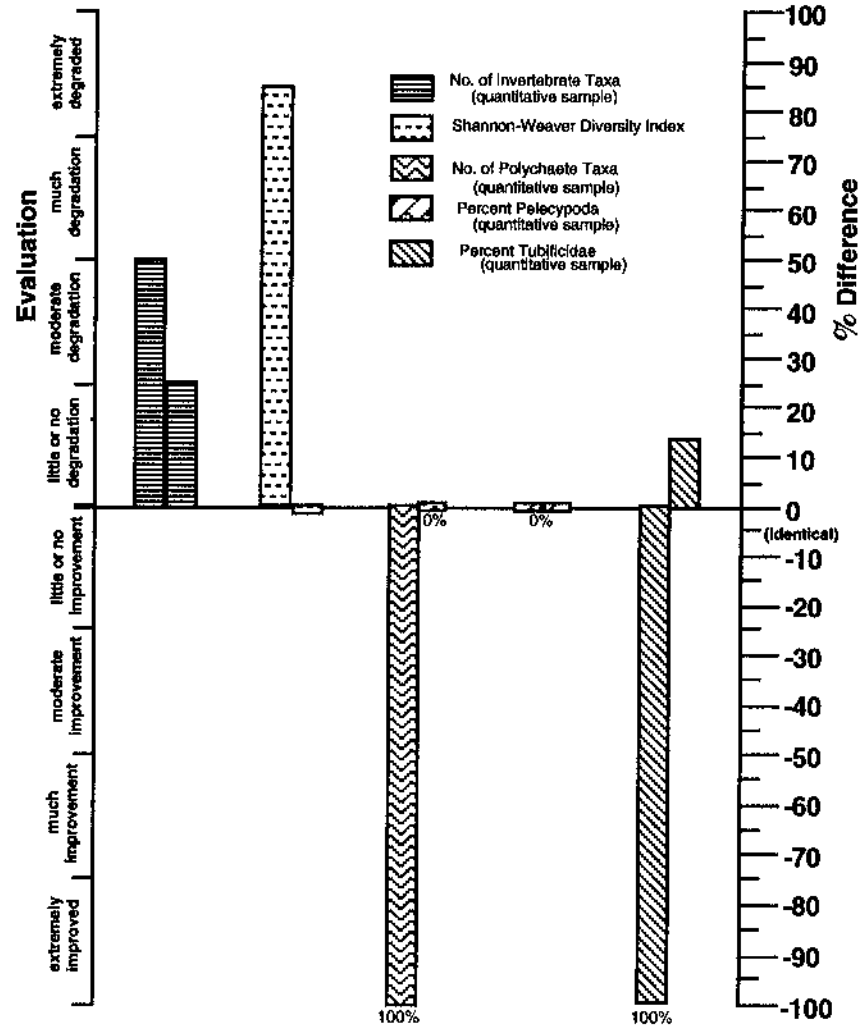
Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

Taxa richness: It is generally accepted that taxa richness is among the most robust measures of benthic community health. Anthropogenic stress has a tendency to reduce the number of different types of invertebrates present in a system. Algal taxa richness may increase with moderate nutrient enrichment, compared to an oligotrophic natural background, but becomes reduced with extreme nutrient enrichment or toxicity.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable, in that they represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Such scores may be associated with organic/nutrient enrichment and decreased dissolved oxygen. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is also associated with disturbance.

Numbers of pollution sensitive taxa: Unpolluted sites have characteristic numbers and types of taxa which are sensitive to anthropogenic stress. These organisms become rare or absent as the intensity or duration of the disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Flor-



Effect of discharge on the benthic macroinvertebrate community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

ida Index score is considered healthy (*e.g.*, around 20 or more in the Panhandle, around 15 or more in the Peninsula). Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* 1990), Lenat (1993), Farrell (1992), Chang *et al.* 1992), and Whitmore (1989), are used as appropriate.

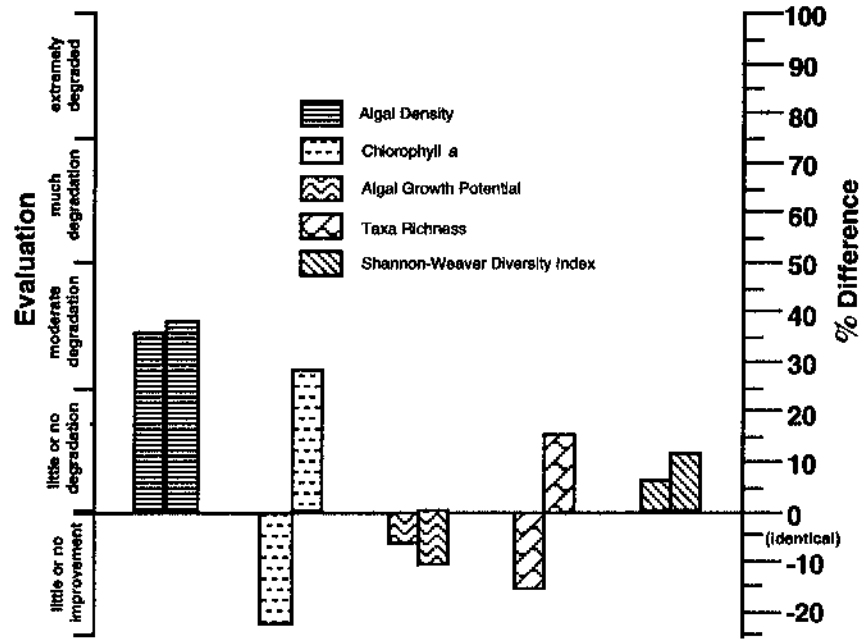
Ephemeroptera/Plecoptera/Trichoptera Index: To calculate the index, one simply sums the number of EPT taxa present at a station. Higher EPT scores (*e.g.*, 7 or more in the Panhandle, 4 or more in the Peninsula) are associated with healthier systems, while lower scores indicate stressed conditions.

Community structure: A system is generally considered degraded if a substantial shift in the proportions of the major taxonomic groups (*e.g.*, mayflies, riffle beetles, etc.) is observed when compared to a reference site. 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.

Algal biomass: The density of algal cells and the chlorophyll *a* concentration are used as estimators of biomass. A system has traditionally been considered nutrient stressed when biomass exceeds problem threshold levels, often resulting in visible algal blooms, nuisance scums, and low dissolved oxygen from the decomposition of the decaying algal tissue. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.

Trophic composition/feeding guilds: Undisturbed aquatic systems possess characteristic proportions of organisms using various functional feeding strategies, and human disturbance shifts these established feeding strategies. In Florida for example, pollution is known to reduce the numbers of filter-feeders and shredders.

The Stream Invertebrate Index for Florida (SIIF) is a composite metric which is based upon the macroinvertebrate communities found at Florida Eco-regional reference sites sampled with dip net sweeps (EA Engineering 1994). The SIIF assigns 5, 3, or 1 point(s) to a variety of invertebrate parameters, depending on how closely that parameter approaches the expected Eco-regional reference condition. Five points is the best score for metrics which are particularly strong at discriminating between healthy and impaired sites (see SIIF calculation table in Appendix). The following parameters are used in calculating the SIIF for the Panhandle: taxa richness, EPT Index, % contribution of the dominant taxa, % Diptera, Florida Index, % suspension feeders/filterers, and % shredders (EA Engineering 1994). In the Panhandle, 23-29 SIIF points indicates no impairment, 15-22 points indicates moderate impairment, and 7-14 points is clear evidence of severe degradation. In the Florida Peninsula, these same parameters, along with the number of crustacean and mollusk taxa and the % of crustacean and mollusk taxa, are used to calculate the SIIF. In the Peninsula, 27-33 SIIF points indicates no impairment, 17-26 points indicates moderate impairment, and 9-16 points is clear evidence of severe degradation. Although the SIIF is based on sam-



Effect of discharge on the algal community.

The left bar for each parameter shows differences between the reference site and test site 1. The right bar shows differences between the reference site and test site 2.

ples collected during the summer, similar relationships should apply in other seasons.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Lee Banks, Mike Hollingsworth, and Tim McKelvey (DER Northeast District) and Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Tina Mikulski, Ed Miller, Liz Miller, Jack Taylor, David Whiting, Vicki Whiting, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

The study area was situated in a low salinity portion of the St. John's River. Numerous pollution sources are present in this area, which is subject to tidally induced flow reversals. Habitat quality was better at the reference site (with 67 points) than at the test site 1 (with 32 points) or at test 2 (with 34 points). Land use near the test sites was predominantly residential or industrial, while the reference site was mostly forested, with some recreational land uses. The study sites were similar with respect to many physical/chemical parameters, such as salinity (between 1 and 4 ppt), temperature (near 29 °C), pH (between 7.5 and 7.8 S.U.'s), dissolved oxygen (between 7.7 and 8.5mg/L). Water clarity was very similar at each site, with Secchi depth measurements of between 0.6 m and 0.7 m. Conductivity was higher at the reference site (7530 µmhos/cm) than at test sites 1 and 2 (with 3630 and 2480 µmhos/cm, respectively). Substrate at the reference site was primarily composed of sand, shell/rock, clay, and detritus, while substrate at the test sites was composed of sand and clay (with some shell at test site 1) (Appendix).

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included calcium (63.1 mg/L), iron (31 µg/L), magnesium (23.3 mg/L), and zinc (22 µg/L). None of these concentrations of metals represents a violation of Class III standards for marine waters.

The sample of 100% effluent was not toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

While the Monterey effluent was relatively high in some nutrients (*e.g.*, total phosphorus was 3.2 mg/L and nitrate-nitrite was 7.1 mg/L), it did not appear to cause additional enrichment of the receiving waters (see Chemistry Summary Table). In fact, nutrient concentrations at the reference site were equal to, or slightly higher than, those at both test sites. However, concentrations of nutrients were higher than average for a Florida estuary at all stations (see Table of Typical Water Quality Values in Appendix). Nitrate-nitrite concentrations (0.3 mg/L at the reference site and 0.24 mg/L at both test sites) were especially elevated, and were higher than those found in 90% of other Florida estuaries. This nutrient enrichment is probably more attributable to the many sources of pollution found in this area (*i.e.*, urban and agricultural runoff, a variety of point source discharges) than to this particular facility alone.

Algal growth potential was somewhat elevated at each site, as would be expected with the given nutrient concentrations. Algal growth potential (AGP) of the effluent was 36.1 mg dry wt/L. Reference site AGP was 11.8 mg dry wt/L, while waters from test sites 1 and 2 yielded 11.0 and 10.4 mg dry wt/L, respectively. These levels are slightly higher than the "problem threshold" of 10 mg dry wt/L for marine waters, above which cultural eutrophication and its consequences are likely to occur (Ron Raschke, US EPA, personal communication).

Quantitative measures of benthic macroinvertebrate community health suggested moderate degradation associated with the discharge at test site 1 (see table and figures). The figure on p. 2 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.

Macroinvertebrate taxa richness was lower at test site 1 (with 4 taxa) than at the reference site (with 9 taxa), a reduction of 55%.

Taxa richness at test site 2 (with 6 taxa) was reduced by 25% compared to the reference site. Shannon-Weaver diversity was highest at test site 2 (3.4), intermediate at the reference site (3.0), and lowest at test site 1 (0.34). The 85% decrease in diversity between the reference site and test site 1 is a violation of the biological integrity criterion (Rule 62-302.530(11) FAC).

The community structure at the two test sites was dissimilar to that of the reference site. *Mysidopsis bigelowi*, an organism generally indicative of healthy conditions, was the most numerous taxon at the reference site (with 42.6% of the total population). It is noteworthy that this species was absent at both test sites. Similarly, the sensitive cumacean, *Almyracuma proximoculi,* was present at the reference site, yet absent from both test sites. Amphipods, including the moderately sensitive *Corophium* sp. and *Synchelidium americanum,* made up 9.5% of the total population at the reference site, along with polychaetes (22.3%), oligochaetes (13.5%), and other groups. In contrast, both test sites were dominated by the pollution tolerant polychaete, *Streblospio benedicti* (95.8% and 38.4% at test sites 1 and 2, respectively). Test site 2, however, also included two sensitive amphipods (*Corophium* sp. and *Synchelidium americanum*), as well as dipterans (15.4%), oligochaetes (15.4%), and cirripeds (15.4%). One additional polychaete taxon, and no tubifid oligochaetes were found at test site 1, compared to the reference site. This shows up as "improvement" on the graph, but the absolute changes were so minor as to render this a graphing artifact.

The figure on p. 3 represents changes in the algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Phytoplankton taxa richness increased from the reference site (13 taxa), to 15 taxa at test site 1. Conversely, it decreased slightly to 11 taxa at test site 2. Algal diversity decreased from 2.3 at the reference site, to 2.2 and 2.0 at the test sites 1 and 2, respectively. The phytoplankton assemblage found in this portion of the St. Johns River was dominated by diatoms (greater than 74% of the population) at all three receiving water stations. Chlorophytes and cyanophytes were also well represented, along with a few euglenophytes and pyrrhophytes. Chlorophyll *a* was elevated at all three stations: 20.0 µg/L at the reference site, 13.9 µg/L at test site 1 and 23.0 µg/L at test site 2. These levels are higher than those found in 80% to 95% of other Florida estuaries. This is related to the nutrient enrichment in this part of the St. Johns River, which, as stated earlier, is the result of many point and non-point sources.

Conclusions

No organic priority pollutants were detected in the effluent sample. Metals found in the discharge above quantitation limits included calcium (63.1 mg/L), iron (31 µg/L), magnesium (23.3 mg/L), and zinc (28 µg/L). None of these concentrations of metals represents a violation of Class III standards for marine waters.

The sample of 100% effluent was not toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi.* No significant mortality occurred in either test.

While the Monterey effluent was relatively high in some nutrients, it did not appear to cause additional enrichment of the receiving waters. In fact, nutrient concentrations at the reference site were equal to, or slightly higher than, both test sites. However, concentrations of nutrients were higher than average for a Florida estuary at all stations. Nitrate-nitrite concentrations (0.3 mg/L at the reference site and 0.24 mg/L at both test sites) were especially elevated, and were higher than those found in 90% of other Florida estuaries. This nutrient enrichment is more attributable to the many sources of pollution found in this area (*i.e.*, urban and agricultural runoff, a variety of point source discharges) than to this particular facility alone. This facility is, however, a contributor.

Algal growth potential was 36.1 mg dry wt/L in the effluent, and slightly above the problem threshold at all three study sites.

Fewer pollution sensitive macroinvertebrate taxa were found at the test sites, compared to the reference site. This may be due to salinity and habitat differences seen between the reference and test sites, or to characteristics of the discharge. It should be noted that taxa richness was depressed at all sites, including the reference station. In a system with such a variety of potential sources of pollution, it is difficult to isolate the contribution from any one discharge. Shannon-Weaver diversity was decreased by 85% at test site 1, a violation of the biological integrity criterion (Rule 62-302.530(11) FAC).

Measurements of the phytoplankton community indicated no major differences between the control and test sites. The phytoplankton assemblage found in this portion of the St. Johns River was dominated by diatoms (greater than 74% of the population) at all three receiving water stations. Chlorophyll *a* was elevated at all three stations: 20.0 µg/L at the reference site, 13.9 µg/L at test site 1 and 23.0 µg/L at test site 2. These levels are higher than those found in 80% to 95% of other Florida estuaries. This is related to the nutrient enrichment in this part of the St. Johns River, which, as stated earlier, is the result of many point and non-point sources.

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.

Chang, S., F. W. Steimle, R. N. Reid, S. A. Fromm, V. S. Zdanowicz, and R. A. Pikanowski. 1992. Association of benthic macrofauna with habitat types and quality in the New York Bight. Mar. Ecol. Prog. Ser. 89: 237-251.

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

Environmental Protection Agency. 1974. Marine algal assay procedure: Bottle test. Nat'l Environ. Res. Center, Office of Res. and Dev., U.S. EPA, Corvallis, Oregon. 43 p.

Farrell, D. H. 1992. A community based metric for marine benthos. Fla. Dept. Environ. Reg. SW Dist. Office. unpublished rept. 15 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.

Hulbert, J. L. 1990. A proposed lake condition index for Florida. North Amer. Benth. Soc. 38th Ann. Mtg., Blacksburg, VA, 11 p.

Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. J. N. Am. Benthol. Soc. 12(3): 270-290.

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.

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

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

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 pp.

Whitmore, T. J. 1989. Florida diatom assemblages as indicators of trophic state and pH. Limnol. Oceanogr. 34(5): 882-895.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Monterey WWF	Prepared by: KATHLEEN GERARDS Date: 10/24/94.	
Location (attach detailed map): 5802 Harris Street Jacksonville, Fl.	County: DUVAL	District: N.E.
Federal Permit # FL0023604 and expiration date: September 30, 1995.	State GMS # and 3116P01316 State expiration date: MAY 15, 1995	Facility Type: DW Industrial Municipal Federal Agricultural Other (list): Private.

Function of facility: WASTEWATER Treatment.

Description of treatment process:
This facility is permitted as a 3.0 MGD Conventional activated sludge wastewater facility, consisting of Two (2) parallel Sanitaire 1.5 MGD Conventional activated sludge wastewater facilities, utilizing Common chlorination and sulfur dioxide (SO_2) dechlorination prior to discharge to the St. Johns River.

Receiving waters: St. Johns River.	Classification: ~~III~~. as per 17-3, FAC.
Design Flow: 3.0 MGD	Actual Mean Flow: 2.122~~3~~ MGD.

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

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):
the outfall has a high rate diffuser mixing zone, in order to achieve a dilution ratio of 100 to 1 in order to allow toxicity testing with effluent diluted to 30% of full strength as stated in 17-4.244 FAC. (See additional information)

List effluent limits: STATE

Parameter	Limit (units)			
	Annual Avg.	Monthly Avg.	Weekly Avg.	
CBOD5	20	30	45	mg/l
TSS	20	30	45	mg/l.
Fecal coliforms	Avg. ≤ 200 /100 ml max. 800 /100 ml.			

Describe special permit conditions and permit modifications:
DC16-188943 was issued March 5, 1991 and expired March 1, 1993. for the Construction and Operation of a high rate, diffuse effluent Toxicity mixing zone.

DO16-170728 issued August 15, 1990 expires May 15, 1995. This is the operation permit for the 3.0 MGD STP.

Monterey WWTF
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

ONE outfall to the ST. JOHNS RIVER. ~~Outfall has high rate diffuser.~~ LOCATION: EAST BANK of the ST. JOHNS RIVER approximately 1/4 mile north of MATTHEWS Bridge. cont. →

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: ↳ outfall extends 730 feet and is 16 inches ID Diameter ductile iron pipe. Receiving water bottom at point of discharge is - 11. feet, M

(Continued under additional information)

VERY GOOD Effluent Quality.

Descri

2. The mixing zone shall (1) begin forty (40) meters from the eastern shoreline of the St. Johns River and extend 182 meters along the axis of the diffuser pipe and (2) have a width of 7.6 meters (approximately 3.8 meters on either side of the diffuser pipe) and (3) cover approximately 1,383 square meters in area.

The mixing zone shall serve the existing Monterey Wastewater Facility which (1) is located at (a) 5802 Harris Street, Jacksonville, Duval County, Florida and (b) Latitude 30°19'45" North and Longitude 81°36'10" West and (2) discharges treated effluent to the St. Johns River.

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

This is usually a very satisfactory rated plant ~~that~~ that has a very good quality of effluent as stated on MORS AND previous inspections by the Department.

Addition

The Outfall Consists of:

1. A ductile iron outfall pipe 222.5 meters in length and 0.41 meter in diameter, containing 130 ports (with each port 0.0254 meter in diameter) that are spaced 1.4 meters apart. Each port will be angled thirty degrees (30°) up from the horizontal and staggered from side to side along the diffuser pipe. The diffuser shall (1) have two (2) concrete 0.2 meter butt piles installed every 12.2 meters throughout the length of the outfall and (2) to be approximately perpendicular to the shoreline of the St. Johns River, with port depth varying from a minimum of three (3) meters to a maximum of 3.7 meters.

Florida Department of Environmental Regulation

Northeast District • Suite 200, 7825 Baymeadows Way • Jacksonville, Florida 32256-7577 • 904-448-4300

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Ernest Frey, Deputy Assistant Secretary

PERMITTEE:

Philip Heil, Vice President
Jacksonville Suburban Utilities Corporation
644 Cesery Boulevard, Suite 108
Jacksonville, Florida 32211

I.D. Number: 3116P01316
Permit/Cert Number: DC16-188943
Date of Issue: March 5, 1991
Expiration Date: March 1, 1993
County: Duval
Lat/Long: 30°19'45"N/81°36'10"W
Section/Township/Range
Project: Monterey Wastewater Facility (WWF) Mixing Zone

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-3, 17-301, 17-302, 17-4, 17-600, 17-601, 17-602, and 17-604. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction and operation of a high rate, diffuser effluent toxicity mixing zone, to include the following:

1. A ductile iron outfall pipe 222.5 meters in length and 0.41 meter in diameter, containing 130 ports (with each port 0.0254 meter in diameter) that are spaced 1.4 meters apart. Each port will be angled thirty degrees (30°) up from the horizontal and staggered from side to side along the diffuser pipe. The diffuser shall (1) have two (2) concrete 0.2 meter butt piles installed every 12.2 meters throughout the length of the outfall and (2) to be approximately perpendicular to the shoreline of the St. Johns River, with port depth varying from a minimum of three (3) meters to a maximum of 3.7 meters.

2. The mixing zone shall (1) begin forty (40) meters from the eastern shoreline of the St. Johns River and extend 182 meters along the axis of the diffuser pipe and (2) have a width of 7.6 meters (approximately 3.8 meters on either side of the diffuser pipe) and (3) cover approximately 1,383 square meters in area.

Recycled Paper

PERMITTEE:

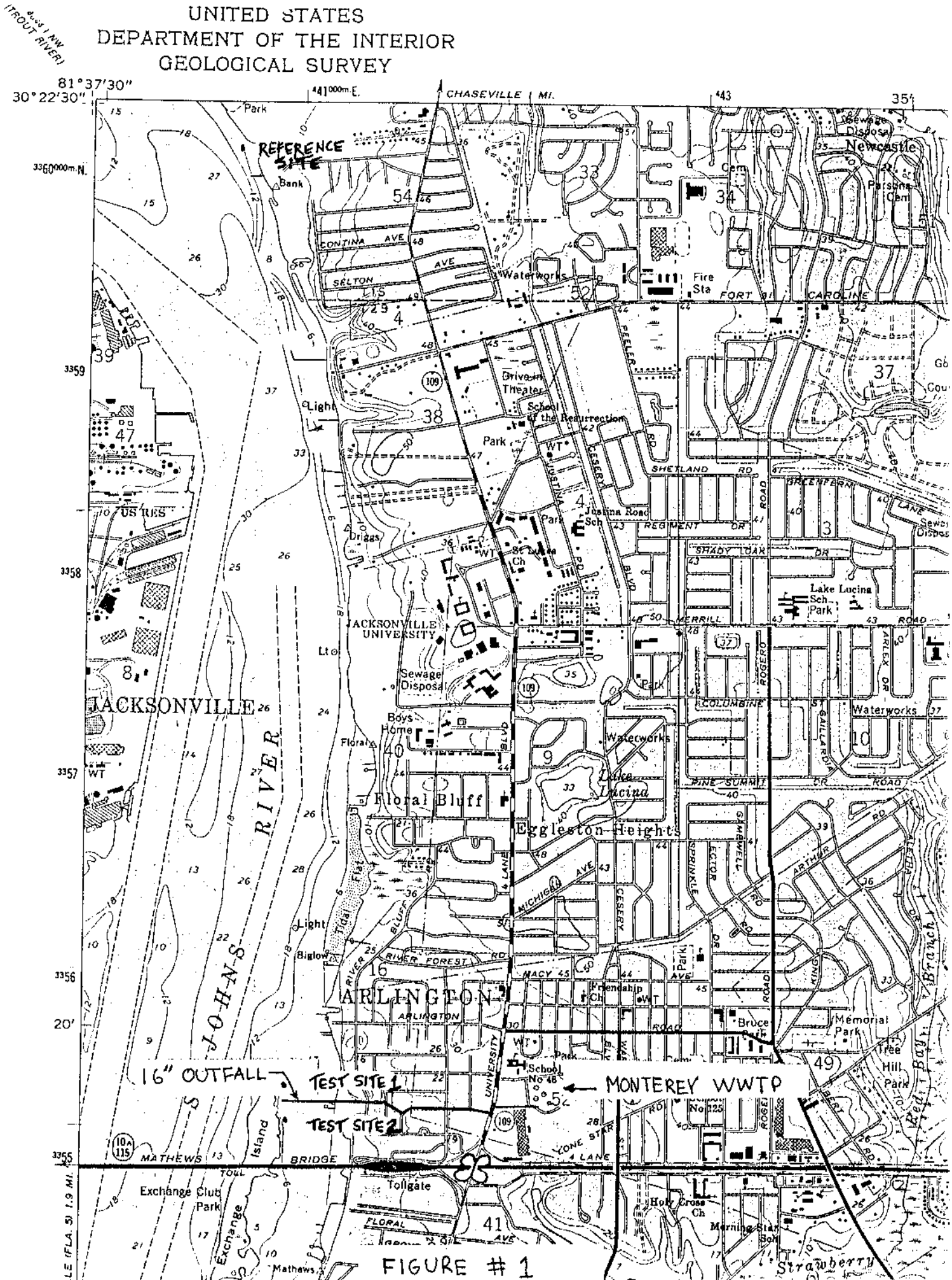
Philip Heil
Monterey WWF

I.D. Number: 3116P01316
Permit/Cert Number: DC16-188943
Date of Issue: March 5, 1991
Expiration Date: March 1, 1993

The mixing zone shall serve the existing Monterey Wastewater Facility which (1) is located at (a) 5802 Harris Street, Jacksonville, Duval County, Florida and (b) Latitude 30°19'45" North and Longitude 81°36'10" West and (2) discharges treated effluent to the St. Johns River.

The outfall pipe/diffuser pipe and mixing zone shall be located in the St. Johns River; the outfall pipe/diffuser pipe shall be constructed so as to extend the existing Monterey Wastewater Facility effluent outfall pipe.

In accordance with the application (including but not limited to the engineering calculations, drawings and specifications) received October 31, 1990.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
81°37'30"
30°22'30"
441000m.E.
CHASEVILLE 1 MI.
REFERENCE SITE
Bank
Park
Newcastle
Sewage Disposal
Parsons Cem
CONTINA AVE
SELTON AVE
Waterworks
Fire Sta
FORT CAROLINE
PEELER
Drive-in Theater
School of the Resurrection
Light
Park
WT
SHETLAND RD
BRIEMPARK LANE
Justina Road Sch
REGIMENT DR
SHADY OAK DR
Lake Lucina Sch Park
MERRILL ROAD
US RES
Driggs
St Luke Ch
JACKSONVILLE UNIVERSITY
Lt
Sewage Disposal
JACKSONVILLE
JOHNS RIVER
Boys Home
Floral
Waterworks
COLUMBINE
Lake Lucina
PINE SUMMIT DR ROAD
Floral Bluff
Eggleston Heights
Light
Tidal Flat
Biglow
RIVER FOREST RD
MACY
ARLINGTON
Friendship Ch
Bruce Park
Memorial Park
Hill
Red Bay Branch
16" OUTFALL
TEST SITE 1
TEST SITE 2
MONTEREY WWTP
School No 48
MATHEWS BRIDGE
Island
Exchange Club Park
Tollgate
Holy Cross Ch
Morning Star Bapt
Strawberry
Mathews
FIGURE # 1

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 20030524	DATE (M/D/Y): 08/29/94	RECEIVING BODY OF WATER:

REMARKS: Tide incoming	LOCATION: St. Johns River South of Lions Club Boat Ramp	FIELD ID/NAME: Reference Site

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations — 9	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed — 28	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation — 5	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations — 7	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action — 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 8-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type — 8	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE 67

COMMENTS:

ANALYSIS DATE: 08/29/94	ANALYST: Hollingsworth/Banks	SIGNATURE: Mike Holy

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 20030524	DATE (M/D/Y): 08/29/94	TIME: 1530	RECEIVING BODY OF WATER:

REMARKS: Tide incoming surface algae bloom 3 drops/Rep 3 Replicates	LOCATION: St. Johns River South of Lions Club Boat Ramp	FIELD ID/NAME: Reference Site

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Surrounding Land-Use (specify relative percent in each category): Boat Ramp/Park

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
95							5

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

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

Width of riparian vegetation (m) on least buffered side: >18

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

0.1 m/sec

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

Artificially Impounded ☐ yes

High Water Mark (m above bed): 5.0

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)				~~Riffles~~ Detritus	5		Penan
Leaf Packs or Mats				Sand	65		
Aquatic Vegetation				~~Mud/Muck/Silt~~ Clay	15		
Rock or Shell Rubble				Other: Shell/Rock	15		
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	0.9	29.9	7.62	7.80	7530			0.6
Mid-depth	2.2	28.9	7.44	7.02	8860			
Bottom	4.4	28.9	7.42	6.98	8990			

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:

PC & Hot; sea breeze

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Hollingsworth / Banks	Mike Holly	08/29/94

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 20030523	DATE (M/D/Y): 08/29/94	RECEIVING BODY OF WATER: St. Johns River

REMARKS: Some Junctas in littoral zone	LOCATION: St. Johns River 100yds South of Monterey STP POD	FIELD ID/NAME: Test Site 1

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 1	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 13	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 5	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 1	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 9	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 3	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	~~Anaerobic mud~~ 0-3 points clay

TOTAL SCORE: 32

COMMENTS:

ANALYSIS DATE: 08/29/94	ANALYST: Hollingsworth / Banks	SIGNATURE: Mike Holl

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 2003052.3	DATE (M/D/Y): 08/26/14	TIME: 1135	RECEIVING BODY OF WATER: St. Johns River

REMARKS: surface algae bloom 3 drops/rep; 3 reps	LOCATION: St. Johns River 100 yds South of Monterey STP POD	FIELD ID/NAME: Test Site 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				95		5	

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

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

Width of riparian vegetation (m) on least buffered side: 0

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

0.5 m/sec

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

Artificially Impounded ☑ yes Maintenance Dredging

High Water Mark (m above bed): 5.0

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)				~~Riffles~~ Shell	3		Ponar
Leaf Packs or Mats				Sand	2		
Aquatic Vegetation				Mud/Muck/Silt			
Rock or Shell Rubble				Other: clay	95		
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	0.2	28.5	7.53	7.65	3630			0.6
Mid-depth	2.1	28.5	7.53	7.64	3670			
Bottom	4.2	28.5	7.51	7.64	3770			

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:

PC & Hot!! No Wind

tide outgoing

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

SAMPLING TEAM: Hollingsworth / Banks	SIGNATURE: Mike Holl	DATE: 08/26/14

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 20030638	DATE (M/D/Y): 08/29/94	RECEIVING BODY OF WATER: St. Johns River

REMARKS: tide incoming, algae bloom	LOCATION: St Johns River at North Tip of Exchange Island	FIELD ID/NAME: Test Site 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 1	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 13	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 5	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 1	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 9	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 5	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE 34

COMMENTS:

ANALYSIS DATE: 08/29/94	ANALYST: Hollingsworth/Banks	SIGNATURE: Mike Holl

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 5)

SUBMITTING AGENCY CODE: 5031 / SUBMITTING AGENCY NAME: DEP Jax	STORET STATION NUMBER: 20030638	DATE (M/D/Y): 08/21/94	TIME	RECEIVING BODY OF WATER: St. Johns River

REMARKS: green surface algae, tide incoming, power drops 3/rep 3 reps	LOCATION: St Johns River at North Tip of Exchange Island	FIELD ID/NAME: Test Site 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
				95		5	

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

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

Width of riparian vegetation (m) on least buffered side: 0

List & map dominant vegetation on back

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect (draw cross-section & provide at least 3 velocity & depth values)

0.1/m/Sec

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

Artificially Impounded ☑ yes

High Water Mark (m above bed): 5.0

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)				Riffles			
Leaf Packs or Mats				Sand	60		Ponar
Aquatic Vegetation				Mud/Muck/Silt			
Rock or Shell Rubble				Other:	40		
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	0.8	28.9	7.75	8.48	2480			0.7
Mid-depth	1.8	28.9	7.64	8.46	2680			
Bottom	3.6	29.2	7.65	8.45	3020			

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:

PC + Hot; no wind

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

SAMPLING TEAM: Hollingsworth / Banks	SIGNATURE: Mike Holl	DATE: 08/29/94

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Jax Monterey STP
County: Duval
Contact / District: T McKelvey / NE
NPDES Permit #: FL00
LIMS Sample #: 87377 **LIMS Job #:** 94-AUG-30-37-01

Sample Collection: Date 08/29/94 Time 1010
Test Beginning: Date 08/30/94 Time 1330
Test Ending: Date 09/01/94 Time 1340
Organism Batch #: 32 **Diluent Batch #:** 33
Organism Age: <24 hr
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.3 @ 24.3 °C	1042 @ 101.1 1041 @ 1047 @ 24.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.0	8.2 @ 24.7 °C	1052 @ 101.1 1045 @ 1047 @ 24.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 24.0	8.4 @ 23.9 °C	106 @ 101.1 1045 @ 1047 @ 24.6 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h*	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 48 h
Control	A	5	5	5	8.3	8.4		23.6		23.4	8.4		8.5	170		210
Control	B	5	5	5		8.4				23.3			8.6			215
Control	C	5	5	5		8.4				23.4			8.6			200
Control	D	5	5	5		8.4				23.5			8.6			190
100%	A	5	5	5	7.6		8.5	23.4		23.5	8.4		8.6	835		925
100%	B	5	5	5			8.5			23.5			8.6			870
100%	C	5	5	5			8.5			23.0			8.6			1030
100%	D	5	5	5			8.5			23.3			8.7			960
					*-extended 48 hrs											
					in 24 hr stat TM											
Measured/Loaded by:		TM	MF	TM	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		TM	TR	TM	DW		TM	DW		TM	DW		TM	DW		TM

Investigators' Signatures

Tina Mikulski

Marshall Faircloth

Robin G. Rader

Reviewer

form updated 4/27/94

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.04	—	TMcK
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	JM
Alkalinity:	125	75	135	Hach	JM
Hardness:	120	85	280	Hach	JM
Total Ammonia:	<0.017	0.08	0.155	ORION	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.4 Ammonia Blank: <0.017 Control Salinity: ( ) ppt Sample Salinity: ( ) ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: JAX Monterey STP
County: Duval
Contact / District: T. McKelvey / NE
NPDES Permit #: FL00
LIMS Sample #: 87377 **LIMS Job #:** 94-AUG-30-37-01

Sample Collection: Date 08/29/94 Time 1010
Test Beginning: Date 08/30/94 Time 1330
Test Ending: Date 09/01/94 Time 1350
Organism Batch #: 35 **Diluent Batch #:** well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.7 @ 23.8	8.3 @ 24.3 °C	104.2 @ 101.1 1041 @ 1047 @ 24.5 °C
24 hr	7.0 @ 7.0 7.0 @ 7.0	24.1 @ 24.0	8.2 @ 24.7 °C	105.2 @ 101.1 1045 @ 1047 @ 24.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 24.0	8.4 @ 23.9 °C	106 @ 101.1 1045 @ 1047 @ 24.6 °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	A 86	5	5	5	7.8	8.3	8.4	23.8	23.4	23.8	8.5	8.5	8.4	245	250	250
Control B	3	5	5	5	7.8	8.3	8.4			23.8	8.5	8.5	8.4	245	250	250
100% A	120	5	5	5	7.4	8.0	8.2	23.1	23.4	23.7	8.1	8.4	8.2	865	865	870
100% B	18	5	5	5	7.4	8.0	8.2			23.7	8.1	8.4	8.3	865	875	880
Measured/Loaded by:		MF	TM	TM	MF	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM	MF
Recorded by:		TM	TR	TM	OW	TR	TM	OW	TR	TM	OW	TR	TM	OW	TR	TM

Investigators' Signatures

Tina Mikulski
Marshall Faircloth
Robin C. Hader
Reviewer

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.04	—	TMK
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	22-100	TM
Alkalinity:	125	75	135	Hach	TM
Hardness:	120	85	280	Hach	TM
Total Ammonia:	<0.017	0.08	0.155	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.4 Ammonia Blank: <0.017 Control Salinity: ( ) ppt Sample Salinity: ( ) ppt

Form updated 4/27/94

Chemistry summary table for Monterey WWTF

	Effluent	Reference Site	Test Site 1	Test Site 2
Organic Constituents (ug/L)				
none detected				
Metals (ug/L)				
Aluminum	100 U			
Arsenic	10 U			
Cadmium	0.08 U			
Calcium (mg/L)	63.1			
Copper	5 U			
Chromium	10 U			
Iron	31			
Magnesium (mg/L)	23.3			
Lead	10 U			
Mercury	0.1 U			
Nickel	5 U			
Selenium	30 U			
Silver	0.1 U			
Zinc	22			
Nutrients (mg/L)				
Ortho-phosphate	1.5	0.1	0.08	0.07 A
Total phosphorus	3.2	0.16	0.15 A	0.14
Ammonia	0.04	0.07	0.04	0.03
Nitrate+Nitrite	7.1	0.3	0.24	0.24
TKN	1.1	1.7	1.7	1.6 A
Other Parameters				
Habitat Assessment		67	32	34
D. O. (mg/L)	8.0	7.8	7.7	8.5
pH (SU's)	7.0	7.6	7.5	7.8
Specific Conductance (µmhos/cm)	930	7530	3630	2480
Temperature (°C)	29.5	29.9	28.5	28.9
Algal Growth Potential (mg dry wt/L)	36.1	11.8	11.0	10.4
BOD5 (mg/L)	< 2	1.05	1.25	1.5
TSS (mg/L)	< 2	37	25	20
Bioassay Fish	Not Toxic			
Bioassay Invertebrate	Not Toxic			
Total coliform bacteria (org/100mL)	500	220	1,300	300
Fecal coliform bacteria (org/100mL)	110	110	130	170

A - Value reported is the mean of two or more determinations

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

Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

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

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

Benthic macroinvertebrate taxa list for Monterey WWTF, collected via Ponar grab samples in the St. Johns River, on 29 August, 1994. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site 1	Test Site 2
Amphipoda			
Corophium sp.	37	–	12
Orchestia sp.	12	–	–
Synchelidium americanum	125	–	12
Cirripedia			
Balanus improvisus	150	–	25
Cumacea			
Almyracuma proximoculi	62	–	–
Diptera			
Polypedilum scalaenum grp.	–	–	25
Isopoda			
Cyathura polita	–	62	–
Mysidacea			
Mysidopsis bigelowi	786	–	–
Nemertina			
Undetermined Nemertean sp.	12	12	–
Oligochaeta			
Undetermined Tubificidae	250	–	25
Polychaeta			
Streblospio benedicti	412	1709	62
Undetermined Nereidae	–	12	–
Total	**1846**	**1795**	**161**

Phytoplankton taxa list and densities (#/mL) for Monterey WWTF, collected via subsurface grabs in the St. Johns River, on 29 August, 1994.

	Reference Site	Test Site 1	Test Site 2
Bacillariophyta			
Amphora sp.	–	548	–
Coscinodiscus sp.	986	–	–
Cyclotella sp.	6904	2192	1931
Melosira sp.	–	548	5792
Nitzschia sp.	1973	3288	965
Nitzschia constricta	1973	548	–
Nitzschia reversa	1973	–	–
Pleurosigma sp.	–	548	–
Skeletonema sp.	51,286	36,163	33,785
Surirella sp.	–	548	–
Unidentified diatom sp.	–	2740	–
Chlorophyta			
Dunaliella sp.	–	–	2896
Gloeocystis sp.	1973	1644	965
Scenedesmus sp.	986	2192	–
Stigeocolonium sp.	–	–	965
Cyanophyta			
Aphanothece sp.	986	548	965
Chroococcus sp.	8876	3288	965
Lyngbya sp.	–	1096	–
Lyngbya contorta	2959	–	1931
Merismopedia sp.	3945	–	1931
Microcystis sp.	–	548	–
Euglenophyta			
Unknown Euglenophyte sp.	–	–	1931
Pyrrhophyta			
Gymnodinium sp.	2959	–	–

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	FL0023604		940824		B	S	2

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	FL0023604		940824		X	S	2

Remarks

21 66