

Biological Assessment of

Gold Kist Inc. – Poultry Division

Suwannee County

NPDES # FL0001465

Sampled December 1999 & January 2000

June 2001

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Gold Kist Inc. – Poultry Division
County:	Suwannee
NPDES Permit Number:	FL0001465
Permit Expiration:	October 26, 2003

Toxics Sampling Inspection **(XSI)**

Date Sampled: December 13,1999

Results: Copper, iron, and nickel were detected in the effluent at levels that complied with Class III standards. No organic constituents were detected in the effluent.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: December 13,1999

Results: The effluent sample did not indicate toxicity using the fish *Cyprinella leedsi* and the invertebrate *Ceriodaphnia dubia* during the 48-hour acute bioassay.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: December 13,1999 & January 12, 2000

Results: The qualitative dip net samples from December 1999 did not indicate adverse effects on the macroinvertebrate communities due to the discharge. The SCI scores were 23 at the control site and 25 at the test site; placing each site in the "good" category. The quantitative Hester-Dendy results from January 2000, however, showed significant decreases in taxa richness (56% lower), Florida Index (23% lower), and the EPT Index (33% decline) from the control site to the test site. Diveristy increased significantly (27%) due to a reduction in the dominant taxon at the test site; however, the dominant taxon at both sites was the pollution-sensitive trichopteran, *Hydroptila* sp. There were some decreases in periphyton taxa richness (31%) and diversity (28%) from the control site to the test site. The periphyton chlorophyll *a* was very high at both study sites, 43.8 mg/m2 and 20.7 mg/m2, at the control and test sites, respectively.

Water Quality Inspection **(WQI)**

Date Sampled: December 13,1999 & January 12, 2000

Results: Effluent conductivity was 1,545 µmhos/cm and exceeded the Class III water quality standard of 1275 µmhos/cm (Rule 62-302.530(23) FAC). The test site conductivity level was similar to the control site. Fecal and totals coliforms complied with Class III water quality standards at all sites. Nutrients were elevated throughout the study area, however, there were significant increases in nitrate+nitrite, total phosphorus and ortho-phosphate at the test site compared to the control site in both the December and January samples. Extremely high levels of nitrate+nitrite (87.0 and 48 mg/L in December and January, respectively), total phosphorus (12.0 and 13.0 mg/L, in December/January) and ortho-phosphate (11.0 and 12.0 mg/L, December/January) nutrients in the effluent appear to be responsible for the increases measured at the test site. The AGP values at the test site (68.9 mg dry wt/L) and the control site (45.7 mg dry wt/L) significantly exceeded the 5.0 mg dry wt/L "problem threshold". The effluent AGP was extremely elevated in the December sampling (101.5 mg dry wt/L).

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

Introduction

The Gold Kist, Inc.-Poultry Division is a poultry processing and rendering plant located in Suwannee County on Highway 90, in the City of Live Oak, Florida (see map in Appendix). Wastewater is generated by the processing of poultry and poultry by-products, poultry hatchery operations, sanitary wastewater, equipment wastewater, and storm water. Treatment at this facility includes the use of primary and secondary screening, flow equalization, chemical coagulation/flocculation, dissolved air flotation, anaerobic stabilization, activated sludge, secondary clarification, stabilization, pH adjustment, sand filtration, and chlorination/dechlorination (see Facility Summary in Appendix). Sludge is aerobically digested by activated sludge processes and then land applied. The effluent is continuously discharged via an 18 inch steel pipe approximately 20 feet from the bank into the Class III Suwanee River, an Outstanding Florida Waterbody. Design flow of the discharge is 1.70 MGD; mean flow during December 1998 through October 1999 was approximately 1.04 MGD.

State permit limits for the effluent are listed in Table 1. Florida Department of Environmental Protection (FDEP) review of the monthly operating reports from the Gold Kist facility indicated two plant upsets that resulted in permit violations. The first plant upset occurred on January 23, 1999 as a result of a split seam in a pressurization tank. Forty-thousand gallons of process wastewater were released as a result. The second plant upset occurred on October 28, 1999 when an electrical problem reduced the chlorine feed into the chlorine contact chamber and resulted in a permit exceedance of effluent concentrations for fecal coliforms and BOD_5. A Compliance Sampling Inspection (CSI) on August 2, 1999 indicated the following: elevated levels of nitrate (99 mg/L), TKN (2.2 mg/L), ammonia (0.062 mg/L), and fecal coliforms (4000 # counts/100 ml). Sampling conducted by Gold Kist in October 1999 verified the elevated levels of nitrate (see Facility Summary in Appendix).

Methods

The purpose of this investigation was to determine the effects of the Gold Kist discharge on the receiving waters in the Suwannee River. To establish discharge effects, a comparison of biological community health was made between two field sites: the control site located in the Suwannee River 100 meters upstream of the facility POD (Point of Discharge) and a test site in the Suwannee River 100 meters below the POD. A Habitat Assessment was performed in situ establishing comparability between sites. Supplemental physical and chemical data were also collected from the effluent and field sites. Effluent from the Gold Kist facility was analyzed for nutrients, metals, volatile organics, and semi-volatile organics.

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

The entire suite of effluent analytes (metals, organics, nutrients, bioassays, and general/physical parameters) were collected on December 13, 1999. However, the original Hester-Dendy multiplate samplers and periphyton racks were lost and subsequently redeployed at both study sites and collected on January 12, 2000. Nutrient data from both study sites and the effluent was also collected on January 12, 2000.

Benthic macroinvertebrate communities from all field sites were evaluated. Quantitative invertebrate collections using Hester-Dendy multiplate samplers were incubated for 28 days. For qualitative measurements, the invertebrates were collected from different substrate types such as snags, leaf packs and aquatic vegetation using discrete dip-net sweeps. Sampling for periphyton was conducted at the two sites by incubating glass microscope slides in a standard periphytometer for 28 days.

Phytoplankton were sampled by subsurface grabs. Chlorophyll *a* was determined for both phytoplankton and periphyton communities using laboratory spectrophotometer analyses. Algal Growth Potential (AGP) was measured via response of the test algae *Selenastrum capricornutum*. All field and laboratory methods for FDEP investigations are carried out following the Bureau of Laboratory's Standard Operating Procedures (SOP's), which may be reviewed at www.myflorida.com and navigating through: Environment>Learn>Scientific Services>Laboratories>Library.

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

The Florida Department of Environmental Protection personnel involved in this investigation from the Northeast District were: Pat O'Connor and Heather Wehry; from the Central Biology Laboratory in Tallahassee: Scott Bryan, Rob Buda, Melva Campos, Maosen Chen, Meiqin Chen, Darlene Ellis, Ken Espy, Marshall Faircloth, Shannon Gerardi, Mike Heyn, Joy Jackson, Isaura Loren-

zo-Perez, Edwin Loschi, Elizabeth Miller, Chelsea Paparigian, Della Parker-Hanson, Urania Quintana, Johnny Richardson, Julie Riley, Gitta Schmitt, Karla Whiddon and Steve Wolfe. The Point Source Studies Review Committee: Dr. Wayne Magley, Michael Tanski, Chuck Ziegmont and District representatives reviewed this report.

Results and Discussion

Copper (3.4 mg/L), iron (12.0 mg/L), and nickel (1.9 mg/L) were detected in the effluent at levels that complied with Class III water quality standards (Table 1). No organic constituents were detected in the effluent (Table 1).

Dissolved oxygen, water temperature and pH values at the test and the control sites were within normal expected ranges and complied with Class III water quality standards (Table 1). The effluent conductivity (1,545 µmhos/cm) exceeded the Class III standard of 1,275 µmhos/cm and does not comply with Rule 62-302.530(23) FAC (see Physical/Chemical Characterization Field Data sheets in the Appendix). However, the effluent appeared to have only a negligible effect on the conductivity at the test site (314 µmhos/cm) compared to the control site (289 µmhos/cm).

Biological Oxygen Demand and total suspended solids complied with Class III water quality standards and the facility's permit limits (Table 1). Fecal and total coliform counts were in compliance with Class III standards and permit limits at the study sites and in the effluent sample (Table 1).

No toxicity was indicated during the 48-hour acute bioassay test performed on the effluent sample using the vertebrate *Cyprinella leedsi* and the invertebrate *Ceriodaphnia dubia* (see Bioassay Bench Sheets in Appendix).

The December sampling indicated most of the nutrient concentrations (nitrate+nitrite, total phosphorus and ortho-phosphate) were greater at the test site compared to those at the control site (Table 1). For example, the control site (0.51 mg/L) nitrate+nitrite value although elevated to the 80-90 percentile of typical Florida streams, the test site was greater than 95% of other Florida streams (2.1 mg/L) (see Typical Values for Selected Parameters in Florida Waters). Similarly, total phosphorus increased 124% from the control site (0.17 mg/L) to the test site (0.38 mg/L) and ortho-phosphate increased 143% from the control site (0.14 mg/L) to the test site (0.34 mg/L).

As in the December sampling, the nutrient results from January showed elevated levels of nitrate+nitrite, total phosphorus and ortho-phosphate at the test site compared to the control site (Table 1). Nitrate+nitrite was 50% higher, total phosphorus was 40% higher and ortho-phosphate was 70% higher at the test site compared to the control site. Extremely high levels of nutrients in the effluent appear to have caused the increases measured at the test site. For example, nitrate+nitrite (87.0 and 48 mg/L in December and January, respectively), total phosphorus (12.0 and 13.0 mg/L, in December/January) and ortho-phosphate (11.0 and 12.0 mg/L, December/January) were all extremely elevated and appear responsible for the further nutrient enrichment at the test site.

AGP measures the bioavailable nutrients within a system. Raschke and Shultz (1987) found that AGP above 5 mg dry wt/L creates a "problem threshold" for a freshwater system and implies nutrient enrichment. For both the December and January sampling events, AGP greatly exceeded the problem threshold at the control and test sites, indicating nutrient enrichment from the discharge as well as non-point sources in the watershed (Table 2). In December, the effluent AGP was extremely elevated (101.5 mg dry wt/L), however, in January, it was very low (0.2 mg dry wt/L) and may indicate algal growth inhibition.

There were some alterations in the periphyton community between the control and test sites (Table 2). For example, taxa richness decreased 31% and diversity declined 28% from the control site to the test site. Chlorophyll *a* values were extremely high at both sites but over twice as high at the control site (43.8mg/m^2) compared to the test site (20.7 mg/ m^2). The phytoplankton communities did not appear significantly different between the study sites (Table 2).

The nutrient, AGP, and periphyton data indicate that although there are elevated levels of nutrients in the watershed due to other sources upstream of the facility (e.g., dairies, springs, and other point sources), the Gold Kist facility appears to be contributing additional nutrient enrichment to the Suwannee River. A previous FDEP (1995) bioassessment indicated no obvious additional nutrient enrichment associated with the Gold Kist effluent. However, due to drought conditions (the Suwannee River was approximately 2 meters below normal stage levels during this sampling event), the additional nutrients from the facility were beginning to present a problem.

Habitat Assessment scores were nearly identical at the control and test sites with 155 points and 157 points, respectively and were considered "optimal" (see Habitat Assessment Field Data Sheets in the Appendix). The in-stream substrates sampled at both stations included snags, leaf packs, rock rubble, undercut banks/roots and sand.

Macroinvertebrate qualitative sampling from December showed only minor differences among the control and test sites (Table 3). All metrics indicated healthy invertebrate communities between the study sites. There was a large number of taxa (42) at both study sites; as well as high Florida Index values at the control (18 points) and test sites (21 points). The control site received a SCI score of 23 and the test site received a

Table 1. Effluent limits and summary of chemistry data.

Gold Kist Inc.	Effluent Limits	Effluent Samples	Control Site	Test Site	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)		(sampled 12/13/1999)			(sampled 01/12/2000)		
None Detected	-	-	-	-	-	-	-
Metals (µg/L)							
Aluminum	1500 **	50 U	-	-	-	-	-
Arsenic	50.0 **	4.0 U	-	-	-	-	-
Cadmium	4.81 b	0.040 U	-	-	-	-	-
Chromium	934.2 b	0.70 U	-	-	-	-	-
Copper	56.97 b	3.4 A	-	-	-	-	-
Iron	1000 **	12 I	-	-	-	-	-
Lead	33.11 b	0.25 U	-	-	-	-	-
Nickel	747.87 b	1.9 I	-	-	-	-	-
Selenium	5.0 **	1.2 U	-	-	-	-	-
Silver	0.07 **	0.030 U	-	-	-	-	-
Zinc	503.97 b	10.0 U	-	-	-	-	-
Nutrients (mg/L)							
Ortho-phosphate	-	11.0	0.14	0.34	12 A	0.10	0.17
Total phosphorus	-	12.0	0.17	0.38	13 A	0.15	0.21
Un-ionized Ammonia	0.02 *	0.0001 c	-	-	0.0004 c	-	-
Ammonia	-	0.053 A	0.040	0.019 I	0.12 A	0.019 I	0.019 I
Nitrate+Nitrite	-	87.0 A	0.50	2.1	48	0.48	0.72
TKN	15.0 *	2.2	0.24 J	0.26 J	1.4 J	0.21	0.21
Organic Nitrogen	-	2.147 c	0.2 c	0.241 c	1.28 c	0.19 c	0.19 c
Total Nitrogen	-	89.2 c	0.74 c	2.36 c	49.4 c	0.69 c	0.93 c
General Phys-Chem Parameters							
Habitat Assessment	-	-	155	157	-	-	-
DO (mg/L)	> 5.0 **	9.0	6.3	6.5	9.3	6.6	7.0
pH (SU)	6.0<8.5 *	6.7	7.1	7.4	6.9	7.3	7.4
Conductivity (µmhos/cm)	1275 **	1545	289	314	1469	320	325
Temperature (°C)	-	20.7	19.3	19.5	19.2	18.6	18.7
BOD, 5 day (mg/L)	24.3 *	8.0	2.0 K	2.0 K	2 J	2.0 K	2.0 K
Flow (MGD)	report	1.04 a	-	-	-	-	-
Oil and Grease	5.0 *	5.0 K	-	-	-	-	-
TSS (mg/L)	? 46.2	9.0	1.0	1.0	2	1.0	1.0
AGP (mg dry wt/L)	-	101.5	45.7	68.9	0.2	37.3	21.8
Microbiology (# counts/100 ml)							
Fecal Coliforms	200 *	10 B	-	-	-	40 B	47 B
Total Coliforms	2400 **	50 K	-	-	-	97	150
Toxicity (48-hour acute bioassay)							
Bioassay - Fish	NOEC	Not Toxic	-	-	-	-	-
Bioassay - Invertebrate	NOEC	Not Toxic	-	-	-	-	-

A - Value is the mean of two or more determinations
I - Value reported is <MQL and ? MDL
J - Estimated value
K - Actual value is known to be less than value given
U - Not detected; value reported is the MDL
NOEC - No observed effect concentration.

* Permit limit
** Class III water quality standard
a - Annual average
b - Value is hardness based
c - Value is calculated

Table 2. Algal community structure of study sites.

Gold Kist Inc. (sampled 1/12/2000)	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	10	12
Shannon-Weaver diversity	2.31	2.5
Chlorophyll *a* (µg/L)	1.28	1.6
Algal Density (#/mL)	2,412	2,809
% Blue-green	9.4	19.7
% Green	46.2	42.7
% Diatoms	21.8	20.0
Periphyton Algae		
Number of Taxa	16	11
Shannon-Weaver diversity	2.93	2.12
Chlorophyll *a* (mg/m2)	43.8	20.7
Algal Density (#/cm2)	840,364	576,870
Diatom/Diatom + B-G Ratio	0.104	0.194
%Blue-green	10.1	18.9
% Diatoms	86.11	78.3

SCI score of 25 placing both sites in the "good" category (see SCI worksheet in Appendix). The pollution-tolerant amphipod *Hyalella azteca* was the dominant taxon at both sites with 45% contribution at the test site and 39% contribution at the control site. Overall, the qualitative macroinvertebrate communities were very similar between the study sites during the December sampling event and did not indicate an adverse affect at the test site as a result of the effluent (Table 3).

Macroinvertebrate quantitative sampling during January, unlike the December sampling, showed significant differences among the community structure at the test site compared to the control site (Table 3). For example, the number of taxa decreased by 56%; the Florida Index decreased by 23% and the EPT Index decreased 33% at the test site compared to the control site. Shannon-Weaver diversity increased significantly at the test site (3.63) relative to the control site (2.65) due to a 40% increase in dominant taxon at the control site. The dominant taxon at both study sites was the pollution-sensitive trichopteran, *Hydroptila* sp. Although the 40% reduction in *Hydroptila* sp. at the test site increases the diversity value at this site it nevertheless indicates a trend toward a reduction in the sensitive taxa at the test site.

There appear to be significant differences in the macroinvertebrate communities between the December qualitative samples and the January quantitative samples. The elevated nutrients at the test site may be causing a shift toward a more pollution-tolerant community. Concurrent sampling of all parameters will be essential in future inspections in order to distinguish temporal and hydrological differences from actual effluent effects.

Literature Cited

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Table 3. Community structure of control and test sites.

Gold Kist Inc. (sampled 12/13/1999)	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	42	42
Florida Index	18	21
SCI	23	25
EPT Index	4	6
% Dominant Taxon	39.4	44.9
Community Composition		
% Amphipoda	39.4	44.9
% Coleoptera	2.1	5.4
% Diptera	16.2	22.7
% Ephemeroptera	0.0	0.5
% Gastropoda	5.3	4.3
% Isopoda	0.0	6.0
% Pelecypoda	4.0	3.2
% Plecoptera	0.0	0.0
% Trichoptera	4.0	7.6
% Other	1.9	1.0
Functional Feeding Groups		
% Burrowing Deposit Feeders	1.3	0.5
% Predators	31.8	9.7
% Surface Deposit Feeders	28.3	38.4
% Suspension Feeders/Filterers	8.5	8.9
% Scrapers	6.0	6.5
% Shredders	21.1	24.6
Macroinvertebrate Hester-Dendy		
Number of Taxa	45	25
Florida Index	30	22
Shannon-Weaver Diversity	2.65	3.63
EPT Index	12	8
% Dominant Taxon	57.4	17.1
Community Composition		
% Coleoptera	0.1	0.2
% Diptera	23.0	38.6
% Ephemeroptera	9.0	10.1
% Gastropoda	1.0	0.7
% Trichoptera	65.1	41.2
Functional Feeding Groups		
% Predators	9.6	4.3
% Surface Deposit Feeders	12.2	21.7
% Suspension Feeders	16.7	46.3
% Scrapers	3.0	5.7
% Shredders	0.5	4.7

Stream Condition Index

Gold Kist - Control Site (Dec. 13, 2000)

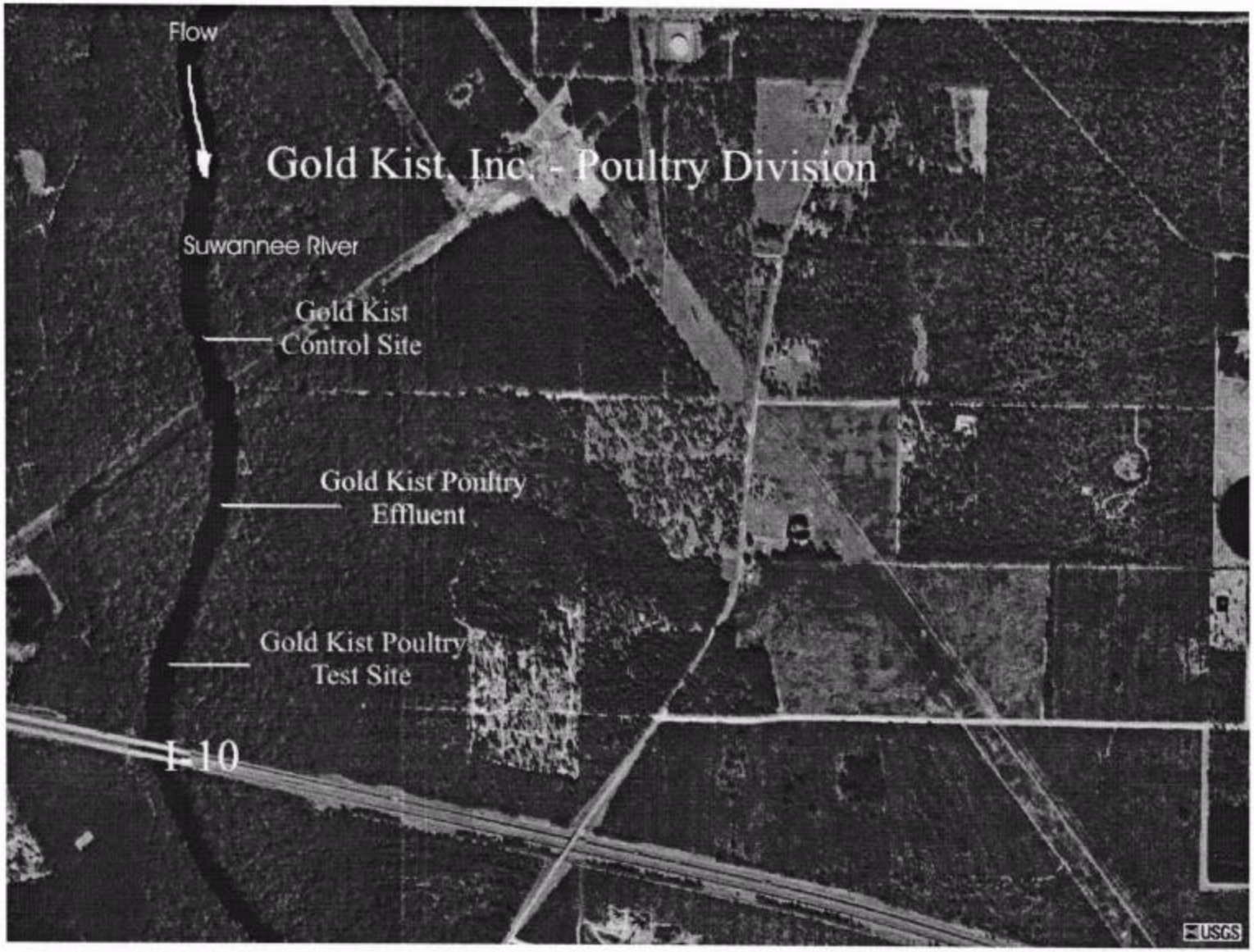
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	**42**	≥18	17-9	<9	**5**
EPT Index	**4**	-	≥3	<3	**3**
# Chironomid Taxa	**2**	≥4	3-2	<2	**3**
% Contribution of Dominant Taxon	**39**	≤37	38-69	>69	**5**
% Diptera	**16**	-	≤67	>67	**1**
Florida Index	**18**	≥6	5-3	<3	**5**
% Suspension feeders/Filterers	**9**	≥25	25-13	<13	**1**
Total Score		**Northeast**			**23**
Interpretation of Scores		Excellent			26-31
		Good			**20-25**
		Poor			14-19
		Severely Degraded			7-13

Winter Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

Gold Kist - Test Site (Dec. 13, 2000)

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	**42**	≥18	17-9	<9	5
EPT Index	**6**	-	≥3	<3	3
# Chironomid Taxa	**4**	≥4	3-2	<2	5
% Contribution of Dominant Taxon	**45**	≤37	38-69	>69	3
% Diptera	**23**	-	≤67	>67	3
Florida Index	**21**	≥6	5-3	<3	5
% Suspension feeders/Filterers	**9**	≥25	25-13	<13	1
Total Score		**Northeast**			**25**
Interpretation of Scores		Excellent			26-31
		Good			**20-25**
		Poor			14-19
		Severely Degraded			7-13

Winter Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)


Flow
Gold Kist, Inc. - Poultry Division
Suwannee River
Gold Kist
Control Site
Gold Kist Poultry
Effluent
Gold Kist Poultry
Test Site
I-10
USGS

Explanation of Measurements of Community Health

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

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

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

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

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

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

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

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

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

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. This index, assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy.

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

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

Typical Values for Selected Parameters in Florida Waters

Gold Kist Inc. (Dec. 13) **Percentile Distribution** (1617 stations) **STREAMS**

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured	
Control Site													
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	-	
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**	**42**	
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	-	
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	-	
TKN	**≤0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.24**	↑
Ammonia	0.02	0.02	**0.04**	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.040**	↓
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	**0.32**	**0.64**	1.05	**0.50**	↑
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	**0.13**	**0.18**	0.25	0.39	0.74	1.51	**0.17**	↑
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	**0.11**	**0.17**	0.27	0.59	1.37	**0.14**	↑
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	-	
Test Site													
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	-	
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**	**42**	
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	-	
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	-	
TKN	**≤0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.26**	
Ammonia	**≤0.02**	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.019**	
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	**≥1.05**	**2.1**	
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	**0.25**	**0.39**	0.74	1.51	**0.38**	
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	**0.27**	**0.59**	1.37	**0.34**	
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	-	

Units: Phytoplankton Chlorophyll *a* (µg/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates. A percentile rank increase for parameters above the bold line indicates healthy conditions. A percentile rank increase for parameters below the bold line indicates unhealthy conditions (Adapted from Joe Hand, FDER, personal communication, 1991. Data was collected between 1980 and 1989).

Typical Values for Selected Parameters in Florida Waters

Gold Kist Inc. (Jan. 12)	Percentile Distribution (1617 stations)											STREAMS
Parameter	**5%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**95%**	**Measured**
Control Site												
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	**3.52**	**3.76**	3.90	**2.65**
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**	**45**
Phytoplankton Chlorophyll *a*	0.22	0.52	**0.94**	**1.60**	3.02	4.63	6.72	9.87	14.68	27.35	48.70	**1.28**
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**	**43.8**
TKN	**<0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.21**
Ammonia	**<0.02**	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.019**
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	**0.32**	**0.64**	1.05	**0.48**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	**0.13**	**0.18**	0.25	0.39	0.74	1.51	**0.15**
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	**0.08**	**0.11**	0.17	0.27	0.59	1.37	**0.10**
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	-
Test Site												
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	**3.52**	**3.76**	3.90	**3.63**
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	**25**
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	**1.60**	3.02	4.63	6.72	9.87	14.68	27.35	48.70	**1.60**
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	**20.7**
TKN	**<0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.21**
Ammonia	**<0.02**	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.019**
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	**0.64**	**1.05**	**0.72**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	**0.18**	**0.25**	0.39	0.74	1.51	**0.21**
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	**0.17**	0.27	0.59	1.37	**0.17**
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	-

Units: Phytoplankton Chlorophyll *a* (µg/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates. A percentile rank increase for parameters above the bold line indicates healthy conditions. A percentile rank increase for parameters below the bold line indicates unhealthy conditions (Adapted from Joe Hand, FDER, personal communication, 1991. Data was collected between 1980 and 1989).

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: Gold Kist, Inc.		**Prepared By:** Heather Wehry **Date:** 12/9/99
Location: (See Attached Map)	**County:** 61- Suwannee	**District:** Northeast
Federal Permit No.: FL0001465 **Expiration Date:** 10/26/2003	**State GMS #:** N/A **State Expiration Date:** N/A	**Facility Type:** Industrial
Function of Facility: Chicken processing plant		
Description of treatment process: Treatment consists of primary and secondary screening, flow equalization, chemical coagulation/flocculation, dissolved air flotation, anaerobic stabilization, activated sludge, secondary clarification, stabilization, pH adjustment, sand filtration, and chlorination/dechlorination. Sludge from the activated sludge process is aerobically digested and land applied. Wastewater is generated from poultry processing, by-products processing, the hatchery, sanitary wastewater, equipment washwater, and storm water.		
Receiving Waters: Suwannee River		**Classification:** Class III – Fresh Water
Design Flow: 1.7 MGD (average)	**Mean Flow:** 1.04 MGD (12/98 – 10/99)	**Flow during survey:**
Discharge is: *Continuous* Intermittent Seasonal Rainfall Dependent Other		
Facility Mixing Zone Details: There are no mixing zones for this facility.		

List effluent limits:

Parameter	Limit	Describe special permit conditions and permit modifications:
Flow (MGD)	Report monthly average and daily max	
BOD5 – Influent	Report Daily Maximum	
BOD5 – Effluent (mg/l)	15.0 Annual Avg. 18.0 Monthly Max. 24.3 Daily Max	
BOD5 – Effluent (lbs/day)	156 Monthly Avg. 211 Daily Max.	
TSS – Influent (mg/l)	Report Daily Max.	
TSS – Effluent (mg/l)	20.0 Annual Avg. 25.5 Monthly Avg. 46.2 Daily Max.	
TSS – Effluent (lbs/day)	221 Monthly Avg. 401 Daily Max.	
TKN (mg/l)	10.0 Monthly Avg. 15.0 Daily Max.	

TKN (lbs/day)	87 Monthly Avg. 130 Daily Max.	
Total Ammonia as N (mg/l)	Report Daily Max.	
Temperature (°C)	Report Daily Max.	
Unionized Ammonia as NH_3 (mg/l)	0.02 Daily Max.	
Oil and Grease (mg/l)	5.0 Monthly Avg. 5.0 Daily Max.	
Total Residual Chlorine (mg/l)	0.01 Daily Max.	
Fecal Coliform (#/100ml)	200 Daily Max.	
pH (s.u.)	6.0 < pH <8.5	
Acute Toxicity		96-hour definitive static acute toxicity test on test species Ceriodaphnia dubia and Cyprinella leedsi.

Description of permitted outfall: Wastewater discharges through an 18 inch steel pipe, which discharges approximately 20 feet from the shore line of the Suwannee River.

List permit violations (MOR data) and plant upsets that occurred at the plant within the past year:

The facility has experienced 2 plant upsets since October 1998. Abnormal event 264, which occurred on January 23, 1999, resulted from a seam split in a pressurization tank, releasing approximately 40,000 gallons of process wastewater onto the ground. The majority of the wastewater flowed back the process wastewater wet well. Production was shut down while modifications were be made to the wastewater system. Abnormal event 298, which occurred on October 28, 1999, resulted from a reduction in the chlorine feed to the chlorine contact chamber. An electrical problem caused the reduction of the chlorine feed problem, which resulted in a high fecal coliform sample that was collected on October 29, 1999.

The following effluent violations have occurred since November 1998:

Date	Parameter	Violations
October 1999	Fecal Coliform	Effluent concentration (daily max) = 240 col/100ml
October 1999	BOD5	Effluent concentration (daily max) = 214 lbs/day

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: A Compliance Sampling Inspection conducted on August 2, 1999 indicated elevated levels of nitrate in the Gold Kist effluent. The sample result for nitrate from the CSI was 99 mg/l. The associated TKN and ammonia results were 2.2 mg/l and 0.062 mg/l, respectively. Subsequent sampling during the month of October 1999 by the facility confirmed the elevated nitrate levels. Other effluent parameters of concern are fecal coliform and total residual chlorine. The fecal coliform sample collected during the August 2, 1999 CSI indicated a coliform concentration of 4000 col. 100ml.

Discuss MOR trends to prior data; is the trend improving or declining: The facility has recently been requested to sample nitrate. The developing trend from the initial results indicate very high

concentrations of nitrate in the effluent. Also, several questions have arisen regarding the sample location for fecal coliform and total residual chlorine. As a result, trends may develop for these two parameters as the sampling locations are altered.
Additional Information: N/A

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: NED DEP	STORET STATION NUMBER: 21010018	DATE (M/D/Y): 12/13/99	TIME 1100	RECEIVING BODY OF WATER: SUWANNEE RIVER

REMARKS: SUWANNEE R. STAGE VERY LOW Discharge Pipe Erased	COUNTY: Suwannee	LOCATION: SUWANNEE RIVER 100 m ABOVE GOLDKIST POD	FIELD ID/NAME: Control Site 21010018

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40	30	10	10	3		2	

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

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

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

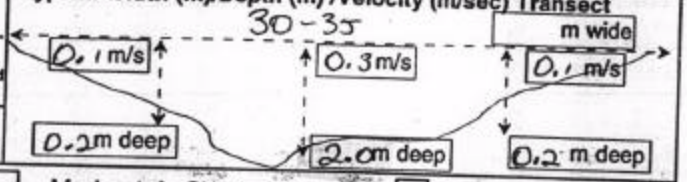
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☐ some recovery ☐ mostly recovered

Artificially Impounded ☐ yes more sinuous

High Water Mark: 6.0 (m above present water level) + 2.0 (present depth in m) = 8.0 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



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)	2	4	DipNet	Sand	50	4	DipNet
Leaf Packs or Mats	2	4	DipNet	Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble	45	4	DipNet	Other:			
Undercut banks/Roots	1	4	DipNet				

Draw aerial view sketch of habitats found in 100 m section

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.0	19.28	7.10	6.25	289			2.0L
Bottom								

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

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

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

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

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

Weather Conditions/Notes:
RAIN, OVER CAST

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

SAMPLING TEAM: O'CONNOR, MAHER

SIGNATURE: Patrick W Maher

DATE: 12/15/99

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: DEP NED	STORET STATION NUMBER: 21FLA20019 21010018	DATE (M/D/Y): 12/13/99	RECEIVING BODY OF WATER: SUWANNEE RIVER

REMARKS: SUWANNEE R. STAGE VERY LOW DISCHARGE PIPE EXPOSED	COUNTY: SUWANNEE	LOCATION: SUWANNEE RIVER 100 M ABOVE Gold Kist P.O.D.	FIELD ID/NAME: Control Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 20	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability 20	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity 16	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering 19	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score 75				
Secondary Habitat Components **Artificial Channelization** 20	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1
Secondary Score 80				

155 TOTAL SCORE

ANALYSIS DATE: 12/13/99	ANALYST: O'CONNOR	SIGNATURE: Robert O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: DEP/NED	STORET STATION NUMBER: 21020072 ~~21010072~~	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		12/13/99	1230	SUWANNEE RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
SUWANNEE R. STAGE VERY LOW DISCHARGE PIPE EXPOSED	SUWANNEE	SUWANNEE RIVER 100 M DOWN GOLDKIST P.O.D.	TEST SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
45	30	10	7	3	1	4	

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

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

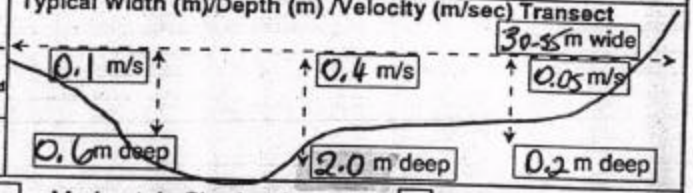
Width of riparian vegetation (m) on least buffered side: >18 | *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: 6.0 (m above present water level) + 2.0 (present depth in m) = 8.0 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



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)	2	4	DPNEP	Sand	40	4	DPNEP
Leaf Packs or Mats	2	4	DPNEP	Mud/Muck/Silt			
Aquatic Vegetation			~~DPNEP~~	Other:			
Rock or Shell Rubble	55	4	DPNEP	Other:			
Undercut banks/Roots	1	4	DPNEP	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.0	19.53	7.41	6.54	314			2.0L
Bottom								

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

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

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

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

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

Weather Conditions/Notes:

RAIN OVER CAST

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

SAMPLING TEAM: O'CONNOR MAHAR | SIGNATURE: [signature] | DATE: 12/13/99

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: NED DEP	STORET STATION NUMBER: 21010072 ~~21020072~~	DATE (M/D/Y): 12/13/99	RECEIVING BODY OF WATER: SUWANNEE RIVER

REMARKS: SUWANNEE R. STAGE VERY LOW DISCHARGE PIPE ELASED	COUNTY: SUWANNEE	LOCATION: SUWANEE RIVER 100m below Goldkist P.O.D.	FIELD ID/NAME: TEST SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 20	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability 20	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity 18	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering 19	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score 77				
Secondary Habitat Components **Artificial Channelization** 20	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 m to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1
Secondary Score 80				

TOTAL SCORE 157

ANALYSIS DATE: 12/13/00	ANALYST: O'CONNOR	SIGNATURE: Patrick O'Connor

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Goldkist Poultry
County: Suwannee
Contact / District: Heather Mabry / NorthEast
NPDES Permit #: FL00
LIMS Sample #: 422402 LIMS Job #: TLH-1999-12-14-39
sample log 12-20-99 AF
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 12/13/99 Time 1300
Test Beginning: Date 12/14/99 Time 1345
Test Ending: Date 12/16/99 Time 1315
Organism Batch #: 62 Diluent Batch #: 52
Organism Age: 24 hrs. SRT toxicant batch #: MA
Test organism: C. dubia

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	6.8	–	8.2	24.5	–	23.7	7.2	–	7.1	165	–	230
	B	5	5	5	–	–	8.2	–	–	23.6	–	–	7.5	–	–	210
	C	5	5	5	–	–	8.3	–	–	23.6	–	–	7.6	–	–	200
	D	5	5	5	–	–	8.3	–	–	23.6	–	–	7.7	–	–	205
100%	A	5	5	5	7.2	–	8.8	24.7	–	23.5	7.9	–	7.8	1440	–	1720
	B	5	5	5	–	–	8.8	–	–	23.4	–	–	7.9	–	–	1760
	C	5	5	5	–	–	8.8	–	–	23.5	–	–	7.9	–	–	1750
	D	5	5	5	–	–	8.8	–	–	23.5	–	–	8.0	–	–	1840
measured by:		MF	SG	SG	CH	–	CH	CH	–	CH	CH	–	CH	CH	–	CH
recorded by:		SG	SG	SG	SG	–	SG	SG	–	SG	SG	–	SG	SG	–	SG

Investigators' Signatures
Shannon Gerard
marshall Swindell
Century Hall

Temperature Range °C
Incubator # 2 23.5°-26.5°C
Room 324 24.5°-25.5°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.003	—	Heather Mabry	DF
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR-100	CH	SG
Alkalinity (mg/L as $CaCO_3$):		86	305	Hach	CH/SG	SG
Hardness (mg/L as $CaCO_3$):		85	649	Hach	CH/SG	SG
Total ammonia (mg/L as N):		<0.017	~~3.64~~ <0.017	Dower	MF	SG
Salinity:		0	0	YSI	MF	SG

A.H. Wolfe
reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Goldrist Poultry
County: Suwannee
Contact / District: Heather Wehry / Northeast
NPDES Permit #: FL00
LIMS Sample #: 422402 LIMS Job #: TLH-1999-12-14-34
sample log 12-20-99 MF
Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 12/15/99 Time 1300
Test Beginning: Date 12/14/99 Time 1345
Test Ending: Date 12/16/99 Time 1315
Organism Batch #: 96 Diluent Batch #: WELL
Organism Age: 14 DAYS SRT toxicant batch #: NA
Test organism: C. leedsi

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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Control A	C1	5	5	5	7.8	8.3	8.4	24.5	25.6	23.5	7.0	7.1	7.9	245	290	280
B	C2	5	5	5	7.8	8.3	8.4	24.3	24.8	24.0	7.3	7.1	7.6	245	270	265
C	C3	5	5	5	7.8	8.3	8.4	24.3	24.9	24.4	7.3	7.0	7.6	245	280	295
D	C4	5	5	5	7.9	8.3	8.4	24.3	24.9	24.2	7.5	6.9	7.6	245	270	270
100% A	C5	5	5	5	7.3	8.1	8.4	25.0	24.5	24.6	7.8	6.2	7.7	1595	1570	1645
B	C6	5	5	5	7.3	8.1	8.4	25.0	24.9	24.1	8.0	6.4	7.3	1600	1660	1660
C	C7	5	5	5	7.3	8.1	8.4	25.0	24.8	23.9	8.0	6.2	7.3	1600	1650	1675
D	C8	5	5	5	7.3	8.1	8.5	25.0	24.8	23.5	8.0	6.3	7.6	1600	1665	1680
measured by:		MF	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH
recorded by:		CH	CH	CH	SG	CH	SG	SG	CH	SG	SG	CH	SG	SG	CH	SG

Investigators' Signatures
Shannon Gerard
Marshall Faircloth
Courtney Head

Temperature Range °C
Incubator # 3 23.5° - 25.0°C
Room B246 24.5° - 25.5°C

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.003	—	Heather Wehry	MF
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-100	CH	SG
Alkalinity (mg/L as $CaCO_3$):	133		305	Hach	CH/SG	SG
Hardness (mg/L as $CaCO_3$):	130		649	Hach	CH/SG	SG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	MF	SG
Salinity:	0		0	YSI	MF	SG

AHubley
reviewer

form updated 3/3/99

Benthic macroinvertebrate taxa list for Gold Kist Inc, collected via 20 discrete dip net sweeps in the Suwannee River, on 13 December 1999.

	Control Site	Test Site
Acarina		
Arrenurus sp.	4	1
Hydrodroma sp.	4	–
Krendowskia sp.	–	1
Mideopsis sp.	41	3
Torrenticola sp.	1	–
Unionicola sp.	1	–
Amphipoda		
Hyalella azteca	74	42
Coleoptera		
Berosus sp.	1	–
Dubiraphia sp.	3	–
Dubiraphia vittata	–	1
Microcylloepus sp.	–	3
Peltodytes sexmaculatus	1	1
Stenelmis sp.	–	1
Decapoda		
Procambarus sp.	1	–
Undetermined Decapoda	–	1
Diptera		
Ablabesmyia mallochi	2	1
Chironomus sp.	1	1
Cladopelma sp.	1	1
Coelotanypus concinnus	2	–
Coelotanypus scapularis	–	2
Cricotopus bicinctus	3	1
Cryptochironomus	–	1
Dicrotendipes modestus	7	4
Dicrotendipes neomodestus	2	1
Dicrotendipes simpsoni	1	–
Labrundinia pilosella	–	1
Larsia decolorata	–	1
Nanocladius sp.	1	1
Palpomyia / Bezzia grp.	2	1
Polypedilum halterale grp.	1	1
Polypedilum scalaenum	–	1
Pseudochironomus sp.	2	7
Rheotanytarsus distinctissimus grp.	1	1

Benthic macroinvertebrate taxa list for Gold Kist Inc, collected via 20 discrete dip net sweeps in the Suwannee River, on 13 December 1999.

	Control Site	Test Site
Diptera *con't*		
Rheotanytarsus exiguus grp.	1	1
Tanytarsus sp. C Epler	1	–
Tanytarsus sp. L Epler	2	–
Tanytarsus sp.	–	2
Thienemanniella sp. B Epler	1	–
Undetermined Chironomidae	4	1
Ephemeroptera		
Tricorythodes albilineatus	–	1
Gastropoda		
Amnicola sp.	–	1
Ancylidae sp.	–	2
Campeloma floridense	1	–
Elimia floridensis	–	1
Elimia sp.	2	–
Hydrobiidae sp.	1	–
Micromenetus sp.	1	–
Physella sp.	3	1
Pyrogophorus sp.	1	–
Undetermined Gastropoda	3	1
Viviparus sp.	1	–
Isopoda		
Caecidotea sp.	–	6
Odonata		
Argia sp.	1	–
Oligochaeta		
Bratislavia unidentata	–	1
*Limnodrilus hoffmeister*i	3	–
Pelecypoda		
Corbicula fluminea	1	–
Corbicula manilensis	–	1
Rangia sp.	–	1
Rangia cuneata	1	–
Sphaeriidae (mollusca)	6	2
Trichoptera		
Cheumatopsyche sp.	–	1
Hydropsyche sp.	–	1
Hydroptila sp.	5	4
Nectopsyche exquisita	1	–
Oecetis sp.	1	2
Polycentropus sp.	2	1

Benthic macroinvertebrate taxa list for Gold Kist Inc, collected via Hester-Dendy artificial substrates in the Suwannee River, on 12 January 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Acarina		
Atractides sp.	2	–
Lebertia sp.	2	–
Oribatei sp.	–	2
Sperchon sp.	8	–
Amphipoda		
Hyalella azteca	17	47
Coleoptera		
Stenelmis sp.	3	2
Diptera		
Ablabesmyia mallochi	8	–
Ceratopogonidae	2	–
Corynoneura sp. B Epler	4	2
Cricotopus bicinctus	–	6
Cricotopus sp.	3	–
Dicrotendipes modestus	–	2
Hemerodromia sp.	2	2
Labrundinia pilosella	2	–
Parakiefferiella sp.	2	–
Pentaneura inconspicua	6	–
Polypedilum convictum grp.	–	2
Polypedilum halterale grp.	2	–
Pseudochironomus sp.	3	–
Rheocricotopus sp.	2	–
Rheopelopia sp.	106	15
Rheotanytarsus distinctissimus grp.	114	28
Rheotanytarsus exiguus grp.	45	77
Rheotanytarsus sp.	17	4
Simuliidae sp.	3	–
Simulium sp.	17	13
Tanytarsus sp. A Epler	17	–
Tanytarsus sp. C Epler	8	–
Tanytarsus sp. T Epler	2	–
Tanytarsus sp.	6	–
Thienemanniella sp. B Epler	2	23
Thienemanniella sp.	–	2
Tvetenia sp.	82	41
Undetermined Chironomidae	97	7

Benthic macroinvertebrate taxa list for Gold Kist Inc, collected via Hester-Dendy artificial substrates in the Suwannee River, on 12 January 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Ephemeroptera		
Caenis sp.	48	2
Callibaetis floridanus	3	–
Isonychia sp.	2	2
Stenonema exiguum	44	53
Stenonema sp.	3	2
Tricorythodes albilineatus	115	–
Gastropoda		
Ancylidae sp.	10	–
Micromenetus dilatatus	6	–
Micromenetus floridensis	3	–
Physella sp.	2	–
Undetermined Gastropoda	4	–
Viviparus georgianus	–	4
Odonata		
Calopteryx sp.	–	2
Oligochaeta		
Nais communis complex	4	–
Nais communis	3	–
Slavina appendiculata	2	–
Stylaria lacustris	3	–
Plannaria		
Undetermined Plannaria	1	–
Plecoptera		
Attaneuria ruralis	3	2
Neoperla sp.	2	–
Pelecypoda		
Pelecypoda sp.	–	2
Trichoptera		
Cheumatopsyche sp.	6	45
Chimarra sp.	113	68
Hydropsyche sp.	57	20
Hydropsychidae	3	4
Hydroptila sp.	1339	97
Neureclipsis sp.	2	–
Undetermined Trichoptera	19	–

Periphyton taxa list and densities (#/cm^2) for Gold Kist Inc, collected via glass microscope slides in the Suwannee River, on 12 January 2000.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	5836	1361
Achnanthes exigua sp.	10213	1361
Achnanthes lanceolata	64195	46259
Cymbellaceae sp.	1459	–
Diploneis ovalis	164863	152381
Eunotia sp.	29180	–
Fragilaria sp.	14590	–
Mastogloia smithii	–	1361
Navicula sp.	16049	6803
Navicula minima	7295	–
Navicula peregrina	7295	–
Navicula pupula	2918	–
Navicula viridula	8754	–
Nitzschia sp.	1459	1361
Nitzschia palea	1459	–
Synedra sp.	–	14966
Chlorophyceae		
Scenedesmus sp.	–	2721
Scenedesmus incrassatulus	–	1361
Scenedesmus quadricauda	1459	–
Selenastrum sp.	11672	4082
Tetraedron muticum	2918	–
Cyanophyceae		
Chroococcaceae sp.	1459	2721
Oscillatoria sp.	10213	8164
Synechococcus sp.	30639	43538
Diatomaceae	26262	–

Phytoplankton taxa list and densities (#/cm^2) for Gold Kist Inc, collected via glass microscope slides in the Suwannee River, on 12 January 2000.

	Control Site	Test Site
Bacillariophyceae		
Cymbellaceae	5	–
Diploneis sp.	23	17
Fragilaria sp.	59	47
Gomphonema sp.	–	9
Melosira sp.	68	81
Navicula sp.	14	–
Nitzschia sp.	–	22
Pennales	95	85
Chlorophyceae		
Carteria sp.	–	5
Selenastrum sp.	82	136
Spermatozoopsis sp.	272	243
Undetermined Chlorophyceae	476	460
Cryptophyceae		
Cryptomonas sp.	–	5
Cyanophyceae		
Dactylococcopsis sp.	–	22
Lyngbya sp.	5	–
Oscillatoria sp.	18	9
Synechococcus sp.	91	247
Diatomaceae	–	22

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

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0001465		12/13/99		X	S	2

Remarks

21 66

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

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0001465		12/13/99		B	S	2

Remarks

21 66