Florida
Department of Environmental Protection

Biological Assessment of

Golden Gem Growers, Inc.

Lake County

NPDES #FL0001066

Sampled March 1993

August 1993

Biology Section
Division of Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: Golden Gem Growers, Inc.
County: Lake
NPDES Number: FL0001066
State Permit Expiration Date: 15 July 1992

Toxics Sampling Inspection (XSI)

Date Sampled: 8 March 1993

Results: Organic pollutants, including valencene (34 µg/L), alkyl sub. benzenes (12 µg/L), total extractable petroleum hydrocarbons (830 µg/L), and other unidentifiable organics (37 µg/L) were detected in the discharge. The level of petroleum hydrocarbons is cause for concern, as short chain aliphatics can be toxic to aquatic organisms at concentrations as low as 500 µg/L. Iron (52 µg/L) and zinc (10 µg/L) were measured in the effluent, but neither metal value was in excess of water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 8 March 1993

Results: The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Notropis leedsi*, exposed to the full strength sample.

Impact Bioassessment Inspection (IBI)

Date Sampled: 8 March 1993

Results: Macroinvertebrates indicated that the test site was grossly degraded. Species richness was extremely low (4) and the Florida Index was zero at the test site. Only pollution tolerant forms, including the sludge worms, *Limnodrilus hoffmeisteri*, *Dero lodeni*, and *Tubifex tubifex*, were found below the discharge. The facility violated Rule 17-302.510(q) FAC, which prohibits the discharge of substances which result in the dominance of nuisance species. Phytoplankton algae results also indicated that the test site was very disturbed. The very few taxa found downstream of the Golden Gem discharge, including *Lyngbya* sp. and *Oscillatoria* sp., were pollution tolerant nuisance blue-green algae. This is further evidence that the discharge was in violation of Rule 17-302.510(q) FAC, dominance of nuisance species. A past history of organic enrichment (extremely high BODs) and continuing thermal pollution were the factors contributing to the exceptionally poor biological health at the test site.

Water Quality Inspection (WQI)

Date Sampled: 8 March 1993

Results: Extremely high temperature (37° C or 98.6° F) at the test site indicated that the facility violated Rule 17-302.520(1)(a) FAC, which prohibits temperature increases in receiving waters that cause substantial harm to aquatic life or vegetation (dominance of nuisance species, see above). An abundant growth of sulfur reducing bacteria (*e.g.*, *Sphaerotilus* sp.) which was observed at the test site, is generally associated with inadequately treated organic waste. Nutrient enrichment was not a problem with this facility during this particular survey. Nutrient levels at the test site was near the median concentrations for Florida stream systems. The algal growth potential of all the samples were below the 5 mg algal dry wt/L "problem threshold".

Introduction

Golden Gem Growers, Inc., a processor of citrus products, is located in Umatilla, Lake County, Florida (see maps in Appendix). The facility produces citrus concentrate from approximately 3,375 tons of raw fruit per day. The strong waste, consisting of citrus pulp and peels, is strained and disposed of through spray irrigation. The weak waste, consisting of barometric condenser water, non contact cooling water, stormwater, and refrigerant cooling water, receives no treatment prior to discharge. Up to 8.8 MGD of effluent is released into an unnamed Class III drainage which flows through a marsh area for approximately 2.5 miles to Lake Yale.

During the Florida fruit harvesting season (November through June) State permit limits for the effluent are as follows: BOD (average of 473 lbs/day, maximum of 945 lbs/day), TSS (average of 675 lbs/day, maximum of 1350 lbs/day), pH (6 to 8.5), flow (8.8 MGD), and dissolved oxygen (minimum of 5.0 mg/L). During the off-season, the facility continues to process in ported fruit at a lower rate. BOD and TSS limits during this time are set at 9 mg/L as a daily average and 18 mg/L maximum.

There has been a history of problems with this plant. The transmission line which delivers the strong waste to the sprayfield has broken several times in the past. By October, 1990, the facility was to have completed a dye and smoke test to check for cross-contamination between the strong and weak waste lines, but results of this study were not on record. The facility is also supposed to install cooling towers to eliminate the barometric condenser discharge. There are occasional problems with unpleasant odors from this facility. Based upon Monthly Operating Report data, there have been numerous permit violations for the BOD limits, as well as a few exceedences of the flow limit. BOD of the effluent is often extremely high. For example, in the month of December, 1990, it averaged 30.5 mg/L. Because the flow from the facility dominates the stream, BOD's of this magnitude would render the receiving waters anoxic. There have been no previous DEP water quality studies for this facility.

Methods

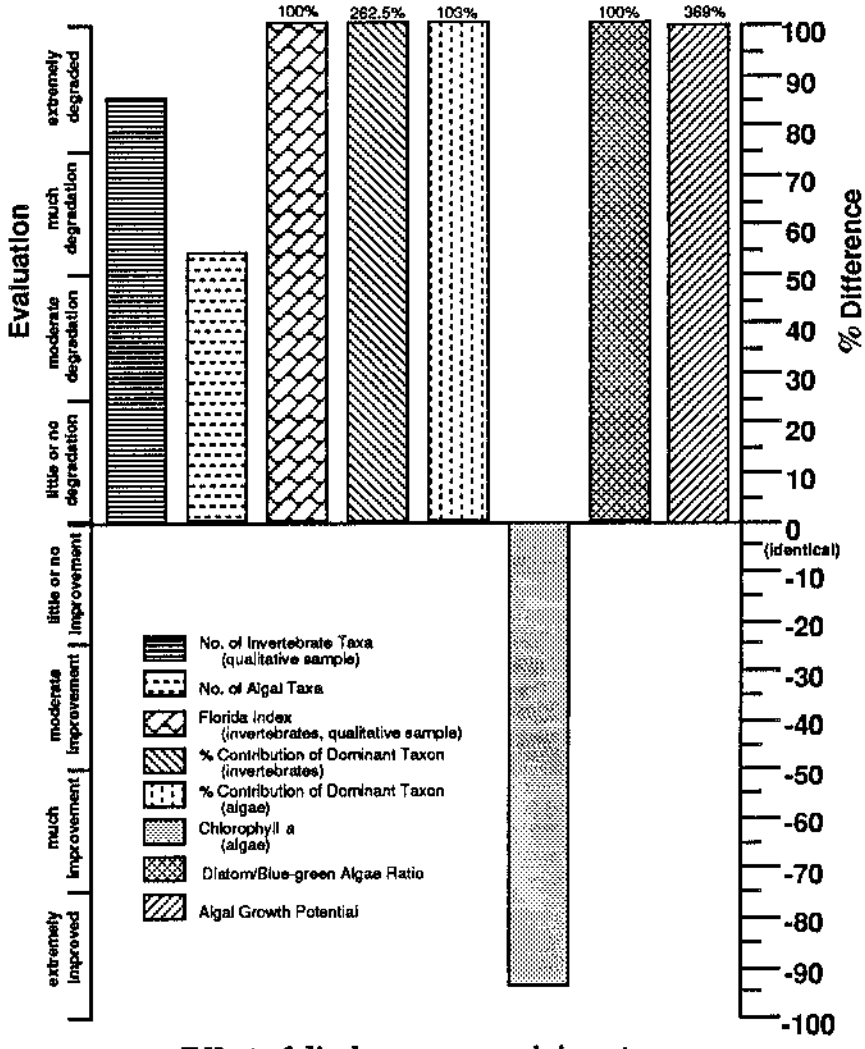
The focus of this investigation was to determine the discharger's

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	29	4
Florida Index	3	0
% Contribution of Dominant Taxon	16	58
% Oligochaeta	0	99
% Diptera	50.9	1
% Ephemeroptera	17.9	0
% Pelecypoda	3.8	0
% Odonata	18.9	0
% Gastropoda	2.8	0
% Other	5.8	0
% Predators/ Carnivores	34.6	0
% Deposit feeders (above surface)/ Collector-Gatherers	33.2	0
% Deposit feeders (below surface)	0	100
% Suspension feeders/ Collector-Filterers	16.9	0
% Scavengers	0.3	0
% Plant piercers	0.5	0
% Scrapers	11.0	0
% Shredders	3.4	0
% Parasites	0.3	0
Phytoplankton Algae		
Number of Taxa	14	5
% Contribution of Dominant Taxon	43.7	88.8
Chlorophyll a (mg/L)	8.1	0.44 U
Diatom/Diatom + B-G Abundance Ratio	0.67	0
% Blue-green	9.4	100
% Green	65.6	0
% Diatoms	18.8	0
% Other	6.3	0
Algal Growth Potential (mg dry wt/L)	0.13	0.61

effects on the receiving waters. A comparison of biological community health was made between a reference site (located in a channelized slough about a mile east of the facility, draining from the Lake Umatilla area to Eustis Meadows) and a test site (the unnamed ditch downstream of the discharge, draining to Lake Yale). 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 *Notropis leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Phytoplankton populations were analyzed from samples taken via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).



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

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed in this report. Many of these, such as the number of taxa and chlorophyll *a* are well known. Others are briefly explained here. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions. The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, Florida Index and the diatom to blue-green algae ratio are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the percent contribution of dominant taxon, 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: Phil Kane and Steve Kent (DEP Central District) and Lyn Burton, Marshall Faircloth, Russel Frydenborg, Kathleen Lurding, Urania Quintana, Landon Ross, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Bioassessment Review Committee, consisting of Jan Mandrup-Poulsen, Wayne Magley, Mike Tanski, and Phil Coram, as well as District representatives.

Results

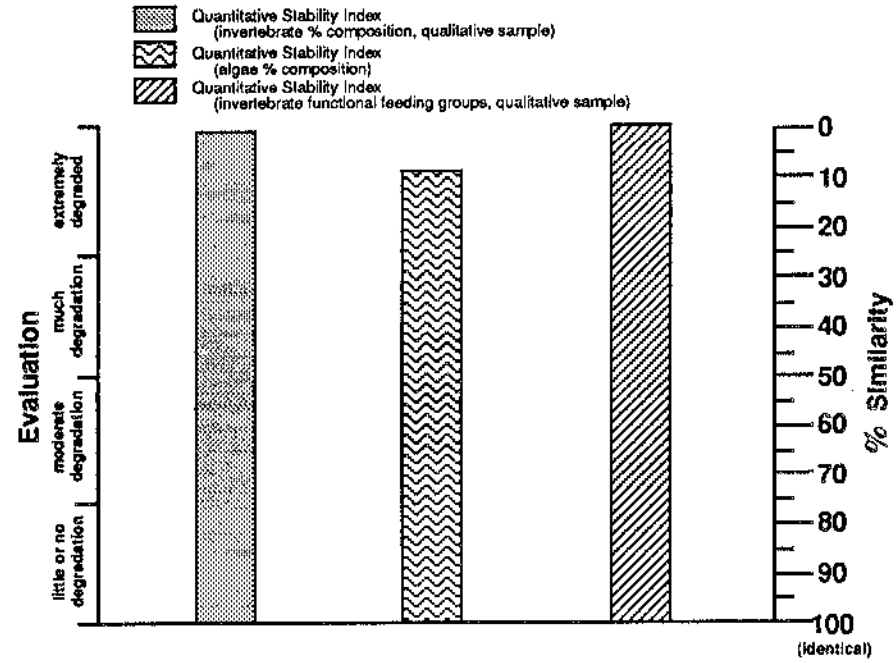
There were some differences in habitat quality between the reference site (with 74 points) and the test site (with 61 points). The reference site was situated in a channelized, marshy slough (velocity = 0.3 m/sec), which drains water from Lake Umatilla to Eustis Meadows. Land uses near the reference site were mostly agricultural (45%), followed by forest (15%), pasture (20%), and residential (20%). The test site was also in a channelized ditch, but had greater (= better) flow (velocity was 0.5 m/sec). Surrounding land uses there were industrial (45%), agricultural (50%), and residential (5%). While dissolved oxygen was somewhat low at the reference site (4.7 mg/L), it was lower (3.8 mg/L) at the test site. Dissolved oxygen at both sites was below Class III water quality standards (Rule 17-302.510(3)(g) FAC). The dissolved oxygen measured at the test site was also in violation of the facility's permit.

Extremely high temperature (37° C or 98.6° F) prevailed at the downstream receiving water station due to the influence of the thermal discharge of the citrus wastewater. This is a violation of Rule 17-302.520(1)(a) FAC, which prohibits raising the temperature of a receiving water to a level that causes substantial harm to aquatic life or vegetation. Disturbances in benthic macroinvertebrate and phytoplankton communities downstream of the discharge will be discussed below.

The presence of a citrus smell was noted in the sediments and water at the test site, but not at the reference site. The pH was 7.2 at both sampling stations. Conductivity was 196 µmhos/cm at the reference site but not measured at the test site. An abundant growth of sulfur reducing bacteria (*e.g.*, *Sphaerotilus* sp.) was observed at the test site, but not at the reference site. Presence of sulfur reducing bacteria is generally associated with inadequately treated organic waste (meaning high BOD and very low dissolved oxygen conditions).

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Notropis leedsi*, exposed to the full strength sample.

Organic pollutants, including valencene (34 µg/L), alkyl sub. benzenes (12 µg/L), total extractable petroleum hydrocarbons (830 µg/L), and other unidentifiable organics (37 µg/L) were detected in the discharge. The level of petroleum hydrocarbons is cause for concern, as short chain aliphatics can be toxic to aquatic organisms at concentrations as low as



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

500 µg/L). No information was available for valencene.

Iron (52 µg/L) and zinc (10 µg/L) were measured in the effluent, but neither metal value was in excess of water quality standards. While the effluent concentration of mercury was elevated, the blank was also contaminated with mercury, indicating a source other than the discharge.

Nutrient enrichment was not a problem with this facility during this particular survey. Nutrient levels at the test site were near the median concentrations for Florida stream systems (see table of typical water quality values in Appendix). Nutrients were very low or undetected at the reference site.

Algal growth potential increased slightly from 0.13 mg algal dry wt/L at the reference site to 0.61 mg algal dry wt/L at the test site. AGP of the effluent was 1.66 mg algal dry wt/L. Note that all the samples were below the 5 mg algal dry wt/L "problem threshold" (Raschke and Schultz 1987). Although the increase in AGP shown on the graph appears to be large, the absolute value at the test site was low.

Measures of macroinvertebrate health indicated that the test site was grossly degraded. 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 site. The relative abundance of each individual taxon appears in the Appendix. The figure on p. 3 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Dip net sampling indicated that taxa richness was good at the reference site (with 29 taxa), dramatically decreasing to 4 taxa at the test site (see species lists in Appendix). Species richness at the test site was substantially less than 95% of all other Florida streams, indicating extremely degraded conditions. The only taxa found at the test site were well known pollution tolerant forms, including the oligochaetes, *Limnodrilus hoffmeisteri*, *Dero lodeni*, and *Tubifex tubifex*. These animals, often referred to as sludge worms, are among the few types capable of surviving in sewage treatment plant trickling filters (Cooke 1959). The dominance of organisms typical of polluted conditions, coupled with the conspicuous absence of other forms, is the classical biological response to organic waste contamination (Mackenthun and Ingram 1967). This is interpreted to be a violation of Rule 17-302.510(q) FAC, which prohibits the discharge of substances which result in the dominance of nuisance species.

Florida Index was less than expected at the reference site (with 3 points), probably due to the fairly low dissolved oxygen there. Florida Index decreased to 0 points at the test site, where dissolved oxygen was further reduced. This also indicated that polluted conditions prevailed downstream of the Golden Gem discharge. Another indication of problems at the test site was the large increase (by 262%) in the percent contribution of the dominant taxon, compared to the reference. This is analogous to a substantial diversity decrease downstream of the discharge. The Quantitative Stability Indices for % contribution (1%) and functional feeding groups (0%) indicate exorbitantly large differences between the reference and test sites, clearly associated with biological degradation from the discharge. A past history of organic enrichment (extremely high BODs) and continuing thermal pollution were the factors contributing to the exceptionally poor biological health at the test site.

Phytoplankton algae were negatively affected by the addition of effluent as well. Fourteen taxa were collected from the reference site, while only 5 were found at the test site (see taxa list in Appendix). The percent contribution of the dominant taxon more than doubled from the reference (43.7%) to the test site (88.8%), also an indication of disturbance. A normal assemblage of algae was present at the reference site, represented by diatoms, chlorophytes, chrysophytes, cryptophytes, and blue-green algae. Downstream of the Golden Gem discharge, the population consisted exclusively of blue-green algae. These cyanophytes present, including *Lyngbya* sp. and *Oscillatoria* sp., are considered nuisance forms, and are very tolerant of organic enrichment. This is further evidence that the discharge was in violation of Rule 17-302.510(q) FAC, dominance of nuisance species. The unusually low chlorophyll *a* at the test site suggested algal growth inhibition. The QSI for percent composition was extremely reduced, again indicating an abnormal phytoplankton population at the test site. The changes seen in algal populations between the reference site and test site are probably related to the history of elevated BOD and temperature in the discharge.

Conclusions

Dissolved oxygen at both the test and reference sites was below Class III water quality standards, a viola-

tion of Rule 17-302.510(3)(g) FAC. The dissolved oxygen measured at the test site was also in violation of the facility's permit.

Extremely high temperature (37° C or 98.6° F) prevailed at the downstream receiving water station due to the influence of the thermal discharge of the citrus wastewater. This is a violation of Rule 17-302.520(1)(a) FAC, which prohibits raising the temperature of a receiving water to a level that causes substantial harm to aquatic life or vegetation.

The presence of a citrus smell was noted in the sediments and water at the test site, but not at the reference site. An abundant growth of sulfur reducing bacteria (*e.g.*, *Sphaerotilus* sp.) was observed at the test site, but not at the reference site. Presence of sulfur reducing bacteria is generally associated with inadequately treated organic waste (meaning high BOD and low dissolved oxygen conditions).

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Notropis leedsi*, exposed to the full strength sample.

Organic pollutants, including valencene (34 µg/L), alkyl sub. benzenes (12 µg/L), total extractable petroleum hydrocarbons (830 µg/L), and other unidentifiable organics (37 µg/L) were detected in the discharge. The level of petroleum hydrocarbons is cause for concern, as short chain aliphatics can be toxic to aquatic organisms at concentrations as low as 500 µg/L. No information was available for valencene (AQUIRE 1993, USEPA 1990).

Iron (52 µg/L) and zinc (10 µg/L) were measured in the effluent, but neither metal value was in excess of water quality standards.

Nutrient enrichment was not a problem with this facility during this particular survey. Nutrient levels at the test site were near the median concentrations for Florida stream systems (see table of typical water quality values in Appendix). Nutrients were very low or undetected at the reference site.

The algal growth potential of all the samples were below the 5 mg algal dry wt/L "problem threshold".

Measures of macroinvertebrate health indicated that the test site was grossly degraded. Species richness at the test site was substantially less than 95% of all other Florida streams. The Florida Index was zero at the test site. The only taxa found downstream of the discharge were well known pollution tolerant forms, including the sludge worms, *Limnodrilus hoffmeisteri*, *Dero lodeni*, and *Tubifex tubifex*. The dominance of organisms typical of polluted conditions, coupled with the conspicuous absence of other forms, is the classical biological response to organic waste contamination. This is interpreted to be a violation of Rule 17-302.510(q) FAC, which prohibits the discharge of substances which result in the dominance of nuisance species.

Phytoplankton algae also indicated that the test site was very disturbed. The very few taxa found downstream of the Golden Gem discharge, including *Lyngbya* sp. and *Oscillatoria* sp., consisted exclusively of pollution tolerant nuisance blue-green algae. This is further evidence that the discharge was in violation of Rule 17-302.510(q) FAC, dominance of nuisance species. A past history of organic enrichment (extremely high BODs) and continuing thermal pollution were the factors contributing to the exceptionally poor biological health at the test site.

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Chemistry summary table for Golden Gem Growers .

	Effluent	Control Site	Test Site
Organic Constituents (ug/L)			
Valencene	34		
Alkyl sub. benzenes	12		
Total extractable petroleum hydrocarbons	830		
Other unidentifiable compounds	37		
Metals (ug/L)			
Aluminum	100 U		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	5 U		
Chromium	10 U		
Iron	52		
Lead	15 U		
Mercury	0.16 T *	* Blank contaminated	
Nickel	5 U		
Silver	0.05 U		
Zinc	10 T		
Nutrients (mg/L)			
Ortho-phosphate	0.066	0.02 U	0.069
Total phosphorus	0.11	0.022 T	0.11 A
Ammonia	0.11	0.02 T	0.1
Nitrate+Nitrite	0.02 U	0.02 U	0.02 U
TKN	0.3	0.86	0.26 A
Other Parameters			
Habitat Assessment		74	61
D.O. (mg/L)		4.7	3.8
pH (SU's)	7.8	7.2	7.2
Conductivity (µmhos/cm)	410	196	
Temperature (°C)		15.5	37.0
AGP (mg dry wt/L)	1.66	0.13	0.61
Bioassay Fish	Not toxic		
Bioassay Invertebrate	Not toxic		

A - Value reported is the mean of two or more determinations
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Presumptive evidence of presence of material
O- Sampled, but analysis lost or not performed
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the minimum detection limit
T- Value reported is less than the practical quantitation limit

Typical Values for Selected Parameters in Florida Waters

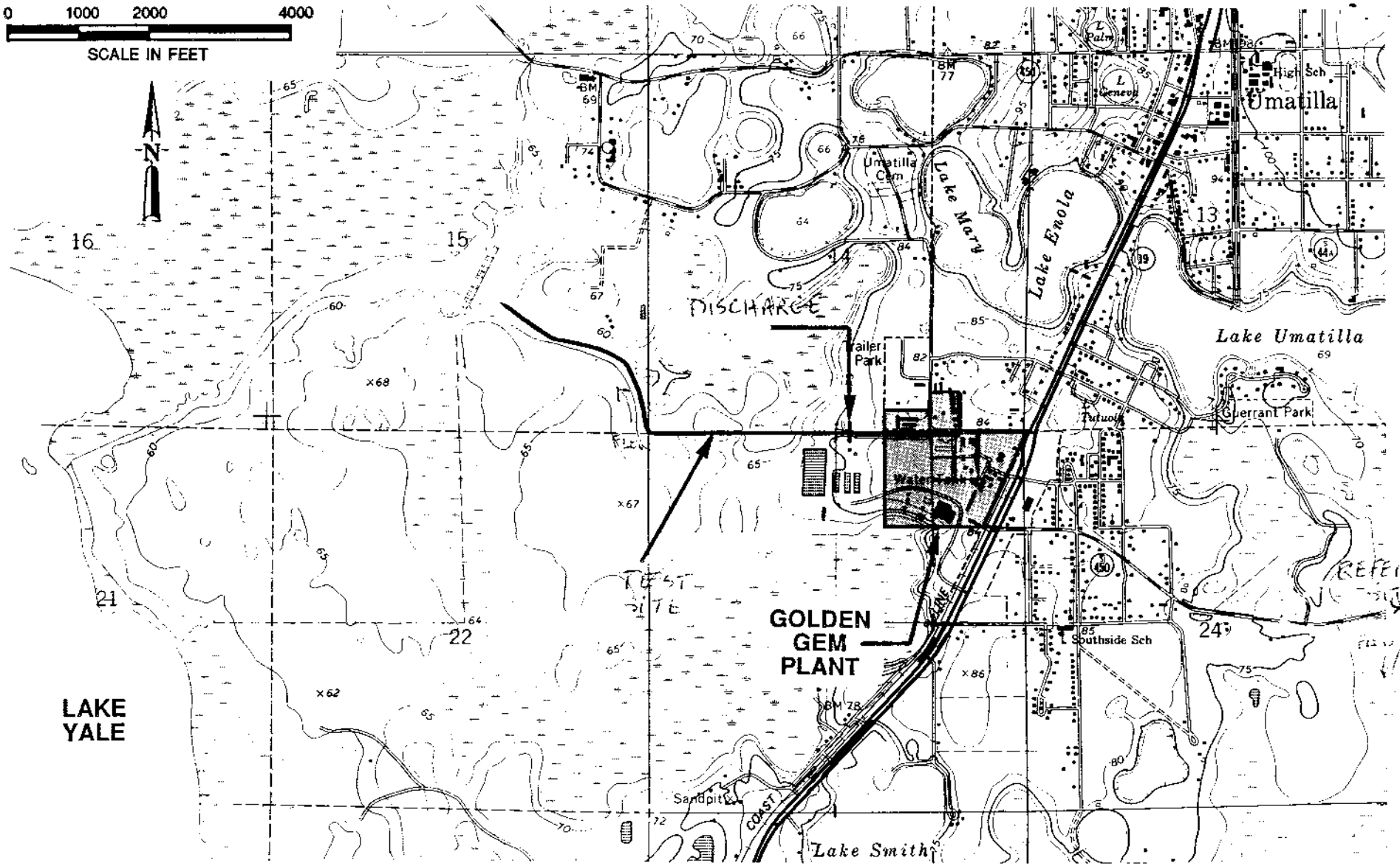
Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

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



ATTACHMENT 1. Site Location Map

SOURCE: USGS Quadrangle Umatilla, Florida 1965.
07700-300-03-01 #189

Jones Edmunds & Associates, Inc. JEA

Facility Name: GOLDEN GEM / COOLING WATER DISCHARGE		Date Summary Prepared :
Location (attach detailed map): STATE ROAD 19 UMATILLA, LAKE COUNTY, FL	County: LAKE	District: CENTRAL
Federal Permit # FL0001066 and expiration date: 11/30/94	State GMS # and 3035 P03089 State expiration date: PERMIT RENEWAL UND. REVIEW 7/15/92	Facility Type: Industrial Municipal Federal Agricultural Other (list):
Function of facility: PROCESSING OF CITRUS FRUIT INTO CONCENTRATE		

Description of treatment process:

STRONG WASTE (PULP, PEEL, ETC) GOES TO SPRAYFIELD.

WEAK WASTE (CONDENSER & COOLING WATER) GETS NO TREATMENT, JUST FLOW MEASUREMENT (V NOTCH WIER) BEFORE DISCHARGE.

Receiving waters: LAKE YALE	Classification: I II III	
Design Flow: 8.828 MGD	Mean Flow:	Flow during survey:

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.):

NO

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

Parameter	Limit (units)
BOD5	473 lbs/day A.D. 945 lbs/day M.D.
TSS	675 lbs/day A.D. 1350 lbs/day M.D.
Flow	8.828 MGD
PH	6.0 - 8.5 S.U.'s
D.O	greater than 5.0 mg/L

Describe special permit conditions and permit modifications:

During OFF-Season BOD5 limit is TSS Limit is 9 mg/L Ave Daily 18 mg/L Ave MAX.

10-4-90

DYE & SMOKE TEST TO CHECK FOR CROSS CONTAMINATION IN STRONG & WEAK WASTE LINES.

Description of permitted outfall(s):

Barometric condenser water and refrigerant cooling H2O disch. to Lake Yale.

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

Transmission line to Sprayfield has Broken several times in the past. Odors at the Sprayfield are intermittant.

BID violators @ Surface H2O disch. BASED ON MOR DATA. NO DER SAMPLING

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

BOD
2-93 AVE 436.3 LB. DAY, MAX 512.6 LB. DAY
AVE 12.9 MG/L, MAX

SEE ATTACHED DATA

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

no Change.

Additional information:

Staff contributing to this review (signature):

(Biologist)

Dwayne L Smith (Inspector)

(Engineer)

( )

( )

( )

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form # 17-660.900(1)
Form Title: Application to Operate/Construct Industrial Wastewater Treatment & Disposal Systems
Effective Date: November 30, 1982
DER Application No. _____ (Filled in by DER)

Received
MAY 19 1992
Central Florida District

Application to Operate/Construct Industrial Wastewater Treatment and Disposal Systems

Type application: [X] Operation [ ] Temporary Operation [ ] Construction

Source Status: [ ] New [X] Existing [ ] Modification

Source Name: Golden Gem Growers, Inc. County: Lake

Source Location: State Highway 195 City: Umatilla

Latitude 28 ° 55 · 0 " Longitude 81 ° 40 · 48 " W

Applicant Name and Title: Mr. John F. Nelson, Jr., President and General Manager

Applicant Address: Golden Gem Growers, Inc., P.O. Drawer 9, Umatilla, Florida 32784

Directions

1. All applicable items must be completed in full in order to avoid delay in processing this application. Where attached sheets or other technical documentations are utilized in lieu of the space provided, indicate appropriate cross references.
2. Please type or print in ink.
3. Four (4) copies of this application and any supplemental information, and a check for the application fee in accordance with Florida Administrative Code Rule 17-4.05, made payable to the State of Florida Department of Environmental Regulation, must be submitted to the appropriate District office or approved local program.
4. Projects involving construction shall be accompanied by two (2) sets of engineering drawings, specifications and design data as prepared by a Professional Engineer registered in the State of Florida, where required by Chapter 471, Florida Statutes.
5. A map showing site location, property boundaries, layout of installation and other buildings, discharge point(s), etc., shall accompany the application. It shall also include any surface water bodies or potable water supply wells beyond the property boundaries that may be affected by a discharge plume, if any effluent is to be discharged to groundwater.
6. If effluent or sludges generated as wastes in the treatment process qualify as hazardous wastes as defined by Florida Administrative Code Rule 17-30, additional hazardous waste permits may be required.

Northwest District
160 Governmental Center
Pensacola, Florida 32501-5794
904/436-8300

Northeast District
3426 Bills Rd
Jacksonville, Florida 32207
904/798-4200

Central District
3319 Maguire Blvd. Suite 232
Orlando, Florida 32803-3767
407/894-7555

Southwest District
4520 Oak Fair Blvd
Tampa, Florida 33610-7347
813/623-5561

South District
2269 Bay St
Fort Myers, Florida 33901-2696
813/332-2627

Southeast District
1900 S. Congress Ave., Suite A
West Palm Beach, Florida 33406
407/964-9655

DER Form # 17-660.900(1)
Form Title Application to Operate/Construct Industrial Wastewater Treatment and Disposal Systems
Effective Date November 30, 1982
DER Application No. _____ (Filled in by DER)

Part II - Detailed Description of Source

A. Describe the nature and extent of the project. Refer to existing pollution control facilities, expected improvements in performance of the facilities and state whether the project will result in full compliance. Attach additional sheet if necessary.

Weak waste processing water effluent from barometric condenser, non-contact cooling water, refrigerant cooling water, and stormwater is discharged to a ditch which flows to a swamp/marsh wetlands area adjacent and contiguous to Lake Yale, a Class III water body. Golden Gem is currently installing cooling towers which will eliminate the barometric condenser discharge. Following completion of the cooling tower installation, the discharge will consist of non-contact cooling water, refrigerant cooling water, and stormwater.

B. Construction schedule, if applicable.

Start of Construction (Date): May 1992

Completion of Construction (Date): August 1992

C. Cost of Construction (Show a breakdown of costs for individual components/units of the project serving pollution control purposes only). Information on actual costs shall be furnished with the application for operation permit.

Cooling Towers $600,000 (approximately)

D. For this source indicate previous DER permits; issuance dates, and expiration dates; and orders and notices.

Temporary Operating Permit #IT35-139936

- Issued: August 8, 1988
- Expiration: July 15, 1992

E. Indicate the relationship between this project and area regional planning for wastewater treatment. List steps to be taken for this industrial waste facility to become part of an area wide wastewater treatment system.

N/A

Indicate EPA-NPDES permit, effective date and expiration date.

Permit No. FL: 0001066 Issue Date November 15, 1989 Expiration Date November 30, 1994

DER Form # 17-660.900(1)
Form Title Application to Operate/Construct Industrial Wastewater Treatment and Disposal Systems
Effective Date November 30, 1982
DER Application No. _____ (Filled in by DER)

Part IV - Industrial Wastewater Characteristics

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

2.803	10.557	8.828 ADF
Average	Maximum	Design

B. Water Quality Characteristics of Effluent

Parameter	Concentration (note units)		
	Minimum	Maximum	30-day Average
Organic:			
volatile or purgeable			
base/neutral extractable			
acid extractables			
total organic carbon (TOC)			
biological oxygen demand (BOD) *		3,140 lbs./day	337 lbs./day
Inorganic			
heavy metals			
major ions			
Physical			
pH *	6.6	7.9	7.3
specific conductivity			
temperature *	66°F	91°F	72°F
suspended solids *		1,242 lbs./day	109 lbs./day
Dissolved Oxygen*	5.0 mg/l	9.3 mg/l	7.2 mg/l

* Based on June 1990 through March 1992 data (See Attachment 2)

4. Describe the hydrology and geologic structures of the affected area, using site specific information, including the general vertical and lateral limits of each classification of ground water. (Maps and cross sections are suggested.)

5. What is the direction of ground water flow? _____

6. Water table levels generally range from a high of _____ feet to a low of _____ feet below average land surface elevation.

7. Surface or sub-surface irrigation:

   a. Description of disposal structure(s).

   b. Area under irrigation: total _____ per rotation.

      Latitude _____° _____' _____" N Longitude _____° _____ _____" W

   c. Irrigation rate: _____

   d. Percolation rate: _____

   e. Ultimate disposal of surface/sub-surface runoff: _____

   f. Type of cover crop and general routine operation of the system:

8. Surface Impoundments:

   a. Number of cells and latitude and longitude of each. _____

      _____

   b. Bottom area of cells: _____ ft² _____ acres

   c. Design depth of water in cells: _____ ft

   d. Cell configuration (if rectangular): Length _____ ft; Width _____ ft

   e. Average hydraulic loading rate: _____ inches/day _____ GPD/ft²

   f. Hydraulic loading period: _____ days; resting period _____ days

   g. Percolation rate: _____ gpd/ft²

9. Number and location of monitoring wells: _____

   _____

Additional Data for Temporary Operation Permit
(For Existing Sources Not Meeting Department Standards)

Justification for Temporary Operation Permit Request

A. Attach additional sheets responding to the following items:

1. The facts and reasons which support that:

   a. the applicant has a waste for which no feasible and acceptable method of treatment or disposal is known and the applicant is making a bona fide effort through research and other means to discover and implement such a method;

   b. the applicant needs permission to pollute the waters within the state for a period of time necessary to complete research, planning, construction, installation or operation of an approved abatement facility or alternate waste disposal system;

ATTACHMENT 2
GOLDEN GEM GROWERS, INC.
DISCHARGE MONITORING REPORT SUMMARY

	TEMPERATURE (DEG. F)			DO (MG/L)			BOD (LBS/DAY)		pH (SU)			TSS (LBS/DAY)		FLOW (MGD)	
MONTH/YR	MINIUMUM	AVERAGE	MAXIMUM	MINIUMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	MINIUMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
JUN 90		73	80	7.9	8.8	9.3	225.0	985.0	7.1	7.4	7.9	66.0	176.0	2.944	6.046
JUL 90		73	79	5.9	8.3	9.3	481.0	2073.0	6.7	7.2	7.4	99.0	345.0	6.198	10.557
AUG 90		74.5	78.8	5.0	6.1	7.7	168.0	662.0	6.6	7.2	7.4	59.0	123.0	3.164	5.799
SEP 90		70	73	6.7	7.7	8.6	108.0	256.0	6.9	7.5	7.9	99.0	322.0	3.460	7.670
OCT 90		68	70	5.8	7.6	8.3	63.0	360.0	6.8	7.3	7.6	33.0	147.0	1.541	3.831
NOV 90		65	73	5.8	7.4	8.5	665.0	2965.0	7.1	7.4	7.7	286.0	1130.0	3.397	8.884
DEC 90		76	91	5.0	6.4	8.9	1631.0	3140.0	6.9	7.2	7.6	425.0	1145.0	6.388	9.654
JAN 91		72	88	5.3	6.4	8.4	884.0	2605.0	6.6	7.1	7.4	514.0	1242.0	3.902	6.950
FEB 91		68	84	5.1			921.0	2795.0				116.0	269.0	4.193	7.406
MAR 91		75	91	5.1			131.1	212.6				56.2	141.6	2.735	5.424
APR 91		65	68	6.4			448.0	824.0				94.0	206.0	3.773	7.492
MAY 91		70	77	5.4			121.0	266.0				35.0	74.0	1.700	2.933
JUN 91		62	71	5.5			232.1	533.4				69.1	171.4	0.845	2.432
JUL 91		65	67	6.1	6.6	7.0	2.2	2.2	7.3	7.4	7.4	9.0	9.0	0.124	0.364
AUG 91		69	72	7.3	7.6	8.0	4.1	4.8	7.0	7.2	7.5	4.6	8.7	0.113	0.322
SEP 91	68	72	75	7.4	7.9	8.3	1.6	2.0	7.0	7.4	7.6	3.3	6.1	0.142	0.534
OCT 91	70	72	74	7.6	7.9	8.3	10.4	18.0	7.0	7.3	7.9	26.0	51.5	0.554	1.545
NOV 91	66	71	75	5.2	6.1	7.0	218.0	218.0	7.0	7.0	7.0	15.8	15.8	3.161	6.523
DEC 91		78	82	6.9	7.1	7.3	36.9	36.9	7.0	7.3	7.6	13.2	13.2	4.575	8.681
JAN 92		86	88	6.7	7.0	7.3	656.0	810.0	7.0	7.5	7.7	272.0	465.0	3.868	7.745
FEB 92		76	81	6.8	7.2	7.6	335.0	335.0	7.0	7.1	7.1	80.0	80.0	2.719	5.213
MAR 92	80	82	85	5.7	6.6	7.9	71.9	96.1	6.9	7.2	7.3	19.8	26.7	2.160	4.452
AVERAGES	71	72	78	6.1	7.2	8.1	337.0	872.7	6.9	7.3	7.5	108.9	280.4	2.803	5.475
CURRENT PERMIT LIMITS		108	110	5.0			2025	4050	6.0		8.5	675	1350		

JHH:DSCHGE.WQ1
DATE: 5/8/92

ATTACHMENT 3
GOLDEN GEM GROWERS, INC.
PRODUCTION REPORT SUMMARY

MONTH/YR	# OF PRODUCTION DAYS	TOTAL PRODUCTION (BOXES/MONTH)	AVERAGE PRODUCTION (BOXES/DAY)	BOD (LBS/DAY)		TSS (LBS/DAY)		FLOW (MGD)	
				AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
JUN 90	2	8,516	4,258	225	985	66	176	2.944	6.046
JUL 90	2	5,565	2,783	481	2,073	99	345	6.198	10.557
AUG 90	6	2,239	373	168	662	59	123	3.164	5.799
SEP 90	5	6,626	1,325	108	256	99	322	3.460	7.670
OCT 90	15	80,648	5,377	63	360	33	147	1.541	3.831
NOV 90	19	464,769	24,462	665	2,965	286	1,130	3.397	8.884
DEC 90	25	1,184,032	47,361	1,631	3,140	425	1,145	6.388	9.654
JAN 91	26	1,089,061	41,887	884	2,605	514	1,242	3.902	6.950
FEB 91	23	542,357	23,581	921	2,795	116	269	4.193	7.406
MAR 91	23	695,177	30,225	131	213	56	142	2.735	5.424
APR 91	21	717,270	34,156	448	824	94	206	3.773	7.492
MAY 91	21	318,966	15,189	121	266	35	74	1.700	2.933
90-91 PROCESSING SEASON AVG.*		715,947	30,980	686	1,830	218	601	3.727	6.963
JUN 91	4	45,076	11,269	232	533	69	171	0.845	2.432
JUL 91	0	0	0	2	2	9	9	0.124	0.364
AUG 91	0	0	0	4	5	5	9	0.113	0.322
SEP 91	0	0	0	2	2	3	6	0.142	0.534
OCT 91	5	37,690	7,538	10	18	26	52	0.554	1.545
NOV 91	15	338,050	22,537	218	218	16	16	3.161	6.523
DEC 91	26	1,437,986	55,307	37	37	13	13	4.575	8.681
JAN 92	28	1,599,478	57,124	656	810	272	465	3.868	7.745
FEB 92	16	277,262	17,329	335	335	80	80	2.719	5.213
MAR 92	17	327,842	19,285	72	96	20	27	2.160	4.452
91-92 PROCESSING SEASON AVG.**		796,124	34,316	264	299	80	120	3.297	6.523
BAT LIMITS				473	945	675	1,350	8.828	

JHH:PROD.WQ1
DATE: 5/8/92

* Based on NOV 90 through MAY 91 data.
** Based on NOV 91 through MAR 92 data.

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

SUBMITTING AGENCY CODE: 30 SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/DY): 03/08/93	RECEIVING BODY OF WATER: LAKE YALE

REMARKS:	LOCATION: GOLDEN GEM STATE ROAD 19 UMATILLA, FL	FIELD ID/NAME:
DOWNSTREAM		GOLDEN GEM

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 10	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 30	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 2	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 9	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 0	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	TOTAL SCORE 61

COMMENTS:

ANALYSIS DATE: 03/08/93	ANALYST: DR. PHIL KANE	SIGNATURE: Philip N. Kane

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 36 / SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 03/08/93	TIME 1140	RECEIVING BODY OF WATER: LAKE YALE

REMARKS:	LOCATION: GOLDEN GEM, STATE ROAD 19, UMATILLA, FL.	FIELD ID/NAME:
DOWNSTREAM		GOLDEN GEM

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
		50%	5%		45%	

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

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

Point-Source Pollution (list location and describe): STP LOCATED NEARBY. DISCHARGE IS ALL FROM GOLDEN GEM

Estimated System Width (range, m): 1.5m	Estimated System Depth (range, m): 0.25m	yes
High Water Mark (m above bed): 0.3m	Velocity (range, m/s): 0.5m/s	Impounded ☐ Channelized ☑

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

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☑ IRON SULFUR BACT. DETRITUS

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10%	5	sweep	Riffles			
Leaf Packs	5%	5	sweep	Sand	20%	" 2	
Aquatic Vegetation				Mud/Muck/Silt		*	
Rock or Shell Rubble				Benthic leaf mats	10%	" 2	
Undercut Banks/Roots	5%	5	sweep	Other: IRON SULFUR BACTERIA	50%	1	

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top	0.4	37	7.23	3.75	—			TO BOTTOM
Mid-depth								
Bottom								

System Type : Stream: ☑ EFFLUENT (Sand Bottomed, Sand Bot w/ Spring, Swamp & Bog, Calcareous, Alluvial, Misc.) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐ _____

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

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: SUN / LIGHT CLOUD

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

SAMPLING TEAM: KANE, KENT	SIGNATURE: Dr. Philip N. Kane	DATE: 03/08/93

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 03/08/93	TIME: 1230	RECEIVING BODY OF WATER: LAKE YALE

REMARKS:	LOCATION:	FIELD ID/NAME:
UPSTREAM	GOLDEN GEM STATE ROAD 19 UMATILLA, FL.	GOLDEN GEM

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
15	20	45	20			

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

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

Point-Source Pollution (list location and describe):

MARSH NARROWED TO CULVERT/

Estimated System Width (range, m): 3 m'	Estimated System Depth (range, m): 0.2m		yes
High Water Mark (m above bed): —	Velocity (range, m/s): .25 - .3	Impounded ☐	
		Channelized ☐	

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	10	2		Riffles			
Leaf Packs				Sand	5	1	
Aquatic Vegetation	70	IN 14		Mud/Muck/Silt			
Rock or Shell Rubble				Benthic leaf mats	10	2	
Undercut Banks/Roots	5	1		Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top	0.1	15.5	7.2	4.7	196			BOT.
Mid-depth								
Bottom								

System Type : Stream: ☒ (Sand Bottomed, Swamp & Bog, Alluvial, Sand Bot w/ Spring, Calcareous, Misc.) Lake: ☐ Wetland: ☒ Estuary: ☐ Other: ☐

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

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

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

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

Weather Conditions: 10% cloud WARM

Recent Brush Clearing

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

SAMPLING TEAM:	SIGNATURE:	DATE:
KANE, KENT	Dr. Philip N. Kane	03/08/93

CATTAILS, NUPHAR, DOLLARWORT, SAGITTA, LILYS & BULRUSH ELODEA
LOTS OF FERN FARMS IN AREA MAY

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

SUBMITTING AGENCY CODE: 30 SUBMITTING AGENCY NAME: CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 03/08/93	RECEIVING BODY OF WATER: LAKE YALE

REMARKS: UPSTREAM	LOCATION: GOLDEN GEM STATE ROAD 19 UMATILLA, FL.	FIELD ID/NAME: GOLDEN GEM

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 28	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 18	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 12	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 8	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 8	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 0	Add 5 **points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	TOTAL SCORE 74

COMMENTS:

ANALYSIS DATE: 03/08/93	ANALYST: DR. PHIL KANE	SIGNATURE: Philip N. Kane

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Golden Gem
Location:
County:
Contact/District: Phillip Kane / Central
NPDES Permit #: FL0010606 Outfall #:
Lims 93MM09 33 5/241

Sample Collection: Date 3/8/93 Time 10:15
Test Beginning: Date 3/9/93 Time 12:30
Test Ending: Date 3/11/93 Time 12:25
Organism Batch #: 10 Diluent Batch #: well
Organism Age: 10 days
Test Organism: Notropis 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
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.4 @ 22.4	8.4 @ 23.9	973 @ 1,000 9710 @ 10,000 24.1
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 23.0	8.5 @ 23.6	980 @ 1,000 24.5 9800 @ 10,000
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.5 @ 23.4	970 @ 1,000 24.3 9730 @ 10,000

Conc.	Chamber #	Number Live 0	Number Live 24	Number Live 48	pH 0	pH 24	pH 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	D.O. (mg/L) 0	D.O. (mg/L) 24	D.O. (mg/L) 48	Cond. (mmhos/cm) Cond. (µmhos/cm) 0	24	48
Control	29	5	5	5	7.8	8.3	8.4	23.5	23.2	23.2	8.7	8.4	7.8	245	240	245
Control	163	5	5	5	7.9	8.3	8.4				8.8	8.4	7.8	245	245	245
100.%	630	5	5	5	7.8	8.3	8.4	23.8	23.2	23.1	4.9	7.7	7.4	405	395	395
100.%	85	5	5	4	7.8	8.3	8.4				4.9	7.7	7.4	410	395	395
Measured/Loaded by:		TR	TM	TR	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM
Recorded by:		TR	TR	TR	TR	TM	TR	TR	TM	TR	TR	TM	TR	TR	TM	TR

Investigators' Signatures

Marshall Faulkner
Tina Mikulsky
Tobin Rader

Reviewer

form updated 10/20/92

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	0.02	0.02	0.006	DR-100	TM
Alkalinity:	115	105	190	Hach	TM
Hardness:	120	70	165	Hach	TM
Total Ammonia:	<0.017	<0.017	<0.017	Orion	MF

Cl_2 Blank: ____ Ammonia Meter Slope: -54.4 Ammonia Blank: <0.017 Sample Salinity: ____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Golden Gem
Location:
County:
Contact/District: Phillip Kane / Central
NPDES Permit #: FL0001060 **Outfall #:**
Lims 93MAR0933 51241

Sample Collection: Date 3/8/93 Time 10:15
Test Beginning: Date 3/9/93 Time 12:30
Test Ending: Date 3/11/93 Time 12:35
Organism Batch #: 11 **Diluent Batch #:** 4
Organism Age: < 24 hours
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
0 hr	7.0 @ 7.0	22.4 @ 22.4	8.4 @ 23.9	973 @ 1,000
	9.0 @ 9.0			9710 @ 10,000 24.1
24 hr	7.0 @ 7.0	22.9 @ 23.0	8.5 @ 23.6	980 @ 1,000 @ 24.5
	9.0 @ 9.0			9800 @ 10,000
48 hr	7.0 @ 7.0	22.6 @ 22.7	8.5 @ 23.4	970 @ 1,000 @ 24.3
	9.0 @ 9.0			9720 @ 10,000

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temperature (°C) 0	24	48	D.O. (mg/L) 0	24	48	Cond. (mmhos/cm) Cond. (µmhos/cm) 0	24	48
Control	A	5	5	5	8.4		8.3	23.0		23.5	8.6		7.9	155		150
Control	B	5	5	5			8.3						8.0			160
Control	C	5	5	5			8.3						8.0			160
Control	D	5	5	5			8.3						8.0			160
100%	A	5	5	5	8.0		8.7	23.2		23.6	7.1		7.9	365		360
100%	B	5	5	5			8.7						7.9			375
100%	C	5	5	5			8.7						8.0			370
100%	D	5	5	5			8.7						8.0			380
Measured/Loaded by:		TM/TK	TR	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TR	TR	TM	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Marshall Faircloth
Tina Mikulski
John Rachels

Reviewer

form updated 10/20/92

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			Not measured		
Lab Total Residual Cl2:	0.02	0.02	0.060	DR-100	TM
Alkalinity:	115	105	190	Hach	TM
Hardness:	120	70	165	Hach	TM
Total Ammonia:	<0.017	<0.017	<0.017	Orion	MF

Cl_2 Blank: _____ Ammonia Meter Slope: -54.4 Ammonia Blank: <0.017 Sample Salinity: _____ ppt

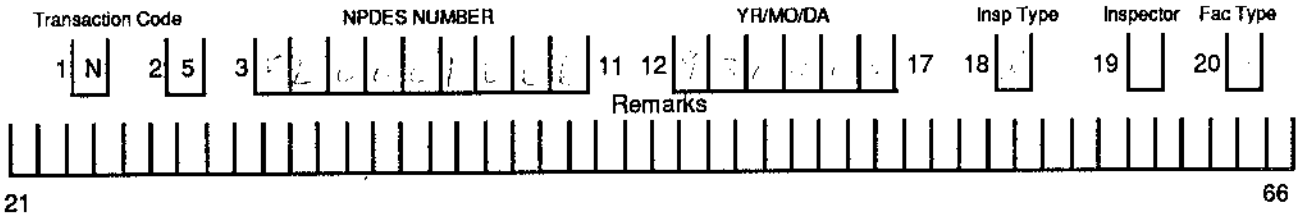
Taxa list for Golden Gem Growers, Inc., collected via 20 dip net sweeps at a nearby reference site and at a test site downstream of the discharge, on 8 March 1993.

	Reference Site	Test Site
Coleoptera		
Haliplus sp.	1	–
Laccophilus sp.	1	–
Tropisternus sp.	1	–
Diptera		
Ablabesmyia sp. B Epler	2	–
Goeldichironomus amazonicus	1	–
Goeldichironomus fluctuans	5	–
Palpomyia grp. sp.	5	–
Parachironomus monochromus	1	–
Polypedilum illinoense	1	–
Polypedilum laetum	1	–
Polypedilum trigonus	6	–
Polypedilum tritum	3	–
Paramerina sp.	2	–
Undetermined dipteran pupae	1	1
Tanytarsus sp. B Epler	1	–
Tanytarsus sp. F Epler	7	–
Tanytarsus sp. G Epler	17	–
Tanytarsus sp. K Epler	1	–
Ephemeroptera		
Caenis sp.	15	–
Callibaetis pretiosus	4	–
Gastropoda		
Micromenetus dilatus	1	–
Physella sp.	3	–
Malacostraca		
Palaemonetes paludosus	1	–
Odonata		
Erythemis simplicicollis	1	–
Ischnura hastata	1	–
Ischnura sp.	1	–
Pachydiplax longipennis	17	–
Oligochaeta		
Dero lodeni	–	31
Limnodrilus hoffmeisteri	–	58
Tubifex tubifex	–	10
Pelecypoda		
Sphaerium or *Musculium* sp.	4	–
Trichoptera		
Oecetis sp.	1	–

Phytoplankton taxa list and densities (#/mL) for Golden Gem, collected via subsurface grabs in Lake Yale, on 8 March, 1993.

	Reference Site	Test Site
Diatoms		
Eunotia sp.	51	–
Nitzschia sp.	51	–
Synedra sp.	51	–
Chlorophyta		
Closterium sp.	26	–
Cosmarium sp.	26	–
Dictyosphaerium sp.	26	–
Mougeotia sp.	26	–
Scenedesmus sp.	51	–
Tetraedron sp.	26	–
Unknown chlorophyte flagellate	359	–
Chrysophyta		
Synura sp.	26	–
Cryptophyta		
Cryptomonas sp.	26	–
Cyanophyta		
Aphanothece sp.	–	104
Chroococcus sp.	51	182
Lyngbya sp.	–	4765
Oscillatoria sp.	–	78
Rhabdoderma sp.	26	234
Total density	822	5363

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



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

