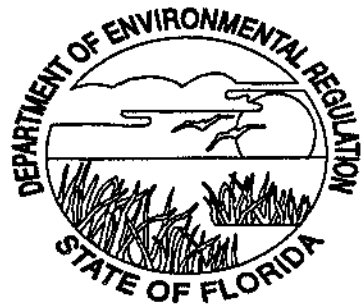


Biological Assessment of

City of Winter Garden WWTP

Orange County, Florida

NPDES #FL0020109

Sampled 27 August 1990

November 1990

Biology Section
Division of Administrative and Technical Services

Introduction

Biological, chemical, and toxicological data concerning the Winter Garden WWTP discharge were collected on 27 August 1990 and analyzed. This information will be used to evaluate the facility's permit criteria.

The wastewater treatment plant is a 2.0 MGD design capacity advanced secondary treatment facility located in Orange County, Florida (see location map in Appendix). Phosphorus reduction, nitrification/denitrification, and tertiary filtration are included in the wastewater treatment process at the treatment facility. The permit limits for the underdrain discharge are:

Parameter	DER Permit*	NPDES Permit**
BOD	20 mg/l	30 mg/l
TSS	20 mg/l	30 mg/l
TN	9.17 mg/l	4.6 mg/l
TP	0.5 mg/l	0.25 mg/l

**monthly averages
*annual averages

From a summary of the last 12 months' operating reports, the annual average daily flow of the underdrain system was calculated to be 0.85 MGD. The treated wastewater is pumped from the plant to a series of ponds. The water then percolates into a system of underdrains and discharges to an unnamed stream. The discharge is the primary source of the stream flow which meanders through a wetland and eventually empties into Lake Apopka in Orange County.

During the past 12 month reporting period, the discharge has exceeded total nitrogen and total phosphorus NPDES permit limits on one occasion. The State of Florida operating permit limits were not exceeded. Other than this deviation, the plant appeared to be operating within all permit parameters.

The following personnel were involved in this investigation: Phillip Kane (DER Central District) and Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandra McClure (Tallahassee Central Biology Laboratory).

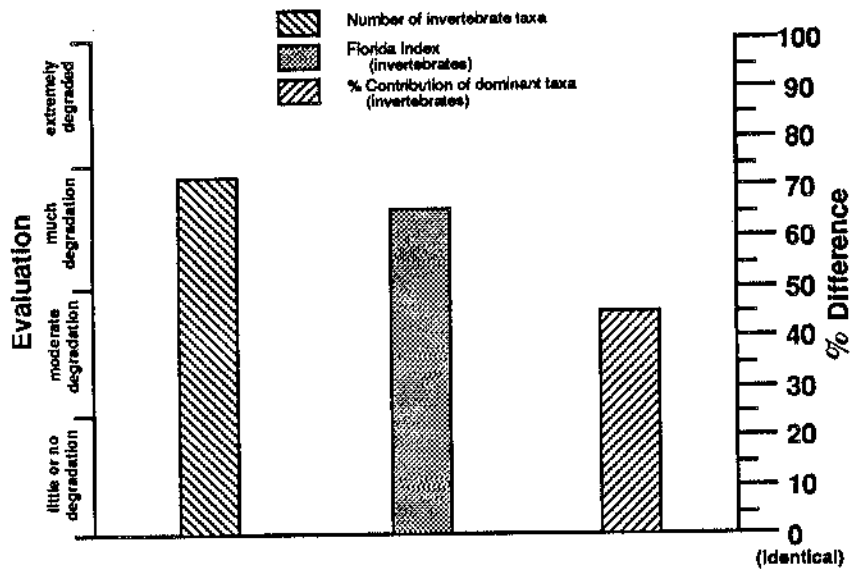
Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located nearby in an unnamed tributary to Lake Apopka) and a test site (the area down gradient of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites (Appendix). Supplemental physical/chemical data were also collected on the effluent and study sites (Appendix). An acute screening toxicity test using *Notropis leedsi* as a test organism was performed on an effluent sample (methods of Peltier and Weber 1985, FDER 1985). The effluent was also analyzed for organic constituents (base neutral, acid and pesticide extractables) and metals. Methods used for all chemical analyses are on file at the Central DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Collection methods consisted of timed sampling (one hour per site) of multiple substrates (e.g, snags, vegetation, sediment) using dip nets and petit ponar grabs (Ross 1990).

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	36	10
Florida Index	18	6
% Contribution of Dominant Taxon	17.7	25.8
% Gastropoda	15.8	0
% Diptera	34.5	6.5
% Ephemeroptera	3.5	9.7
% Pelycepoda	8.9	6.5
% Odonata	12.8	71.0
% Coleoptera	21.6	0
% Other	3.5	6.5
% Predators	26.9	71.9
% Collector-Gatherers	21.5	9.0
% Collector-Filterers	13.4	6.5
% Scrapers	28.8	4.8
% Shredders	8.8	7.4
% Parasites	.05	0



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

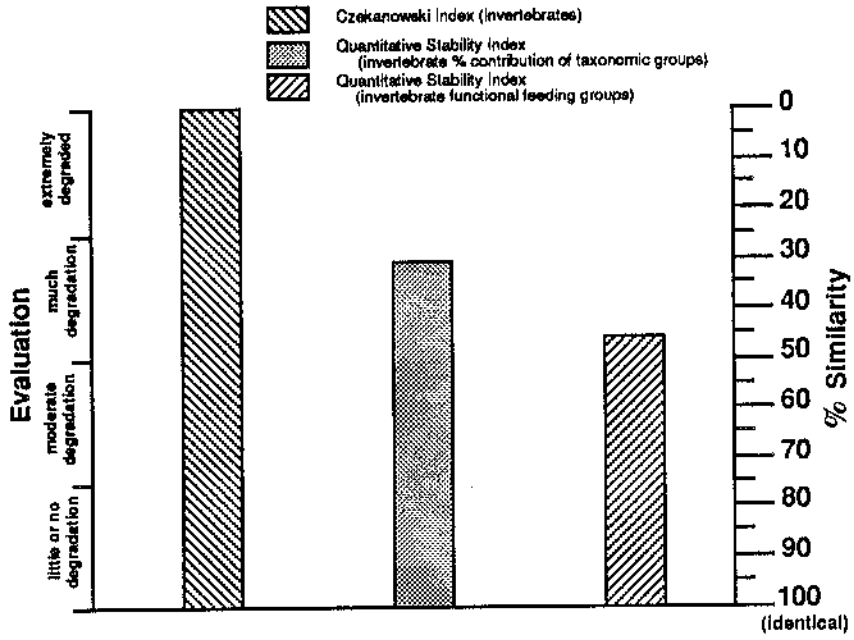
Results and Discussion

Habitat quality at the test site (Habitat Score = 65) was comparable to, but slightly better than the reference site (Habitat Score = 59, Appendix). Both sites were macrophyte dominated, fairly shady, with somewhat acidic water (pH was 6.3 at the study site, and 6.7 at the reference site). Dissolved oxygen was 6.0 mg/l at both sites but conductivity was higher downstream in the effluent dominated stream (420 µmhos/cm at the study site, 270 µmhos/cm at the reference site).

All effluent organic constituents determined from a single grab sample were below detection limits (Appendix). Zinc was the only metal detected in the effluent, at a concentration of 5 µg/l. This is a very low level which should not pose a threat to the biota.

The effluent did not cause mortality to the fish, *Notropis leedsi*, in a 48 hour acute static toxicity test (Appendix). However, virtually all measures of benthic macroinvertebrate community health indicated that the test site was very stressed (see table on previous page and figures on this page). These included substantial decreases in taxa richness and the Florida Index, as well as large differences in overall community structure and the functional feeding groups represented. The upper left figure indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. The lower right figure summarizes similarities between the sites. In this case, smaller similarities (lower percentages) correspond with greater degradation.

Only three taxa were common to both sites (see species lists in Appendix). It should be noted, though, that despite the gross community shifts observed, a few pollution sensitive taxa such as *Polypedilum fallax*, *Gomphus minutus*, and *Neurocordulia alabamensis* were represented at the test site.



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

Conclusions

Water samples collected from the City of Winter Garden WWTP on 27 August 1990 proved non-toxic to fish, and were not found to contain deleterious levels of priority pollutants or metals. However, the benthic macroinvertebrate community downstream of the discharge was very stressed compared to a nearby reference site.

Literature Cited

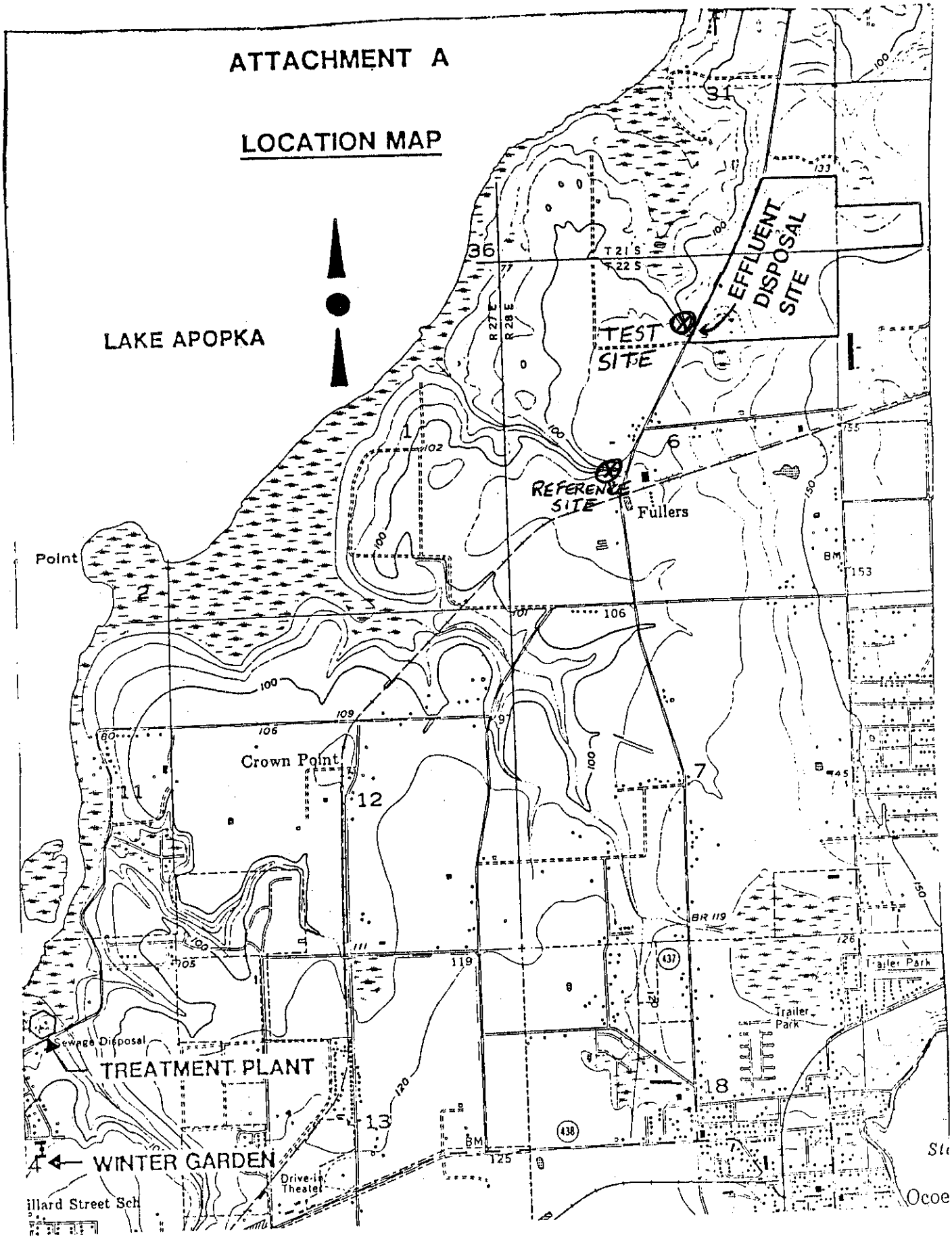
Florida Department of Environmental Regulation. 1985. Quality assurance manual for performing acute toxicity tests. 2nd edition. Fla. Dept. Environmental Regulation, Biology Section, Tallahassee. 53 pp.

Peltier, W. H. and C. I. Weber. 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 3rd edition. EPA/600/4-85/013. U. S. EPA, Cincinnati, Ohio. 216 pp.

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

ATTACHMENT A

LOCATION MAP



GROO & ASSOCIATES
CONSULTING ENGINEERS

COMPARIBLE UPSTREAM SITE SMALL STREAM WITHIN SHORT DRIVE OF DISCHARGE STREAM.

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL REGULATION

Benthic Habitat Assessment Field Data Sheet

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER: 21FLSJ 30480101387	DATE (M/D/Y): 08/27/90	RECEIVING BODY OF WATER: pond ponds - swamp - Lake Apopka
REMARKS: ORANGE COUNTY P # D086-15 FDER P # 111724	LOCATION: 101 EAST CREST AVENUE WINTER GARDEN, FL. ORANGE COUNTY	FIELD ID/NAME: NPDES # FL0020109	

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 15	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. 16-20 points	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. 11-15 points	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. 6-10 points	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. 0-5 points
Flow/ Water Velocity 15	Greater than 0.3 m/sec. 16-20 points	0.1 to 0.3 m/sec 11-15 points	0.05 to 0.1 m/sec 6-10 points	Less than 0.05 m/sec 0-5 points
Channel Alteration & Sediment Effects 12	No channelization, Less than 5% of bottom affected by deposition or scouring. 12-15 points	Some channelization, Evidence of deposition in pools or scouring in 5-20% of bottom. 8-11 points.	Moderate channelization. Sediment deposition or scouring in 30-50% of bottom. 4-7 points.	Extensive channelization. Siltation and sediment deposition or scouring in 50% or more of bottom. 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. 3-5points.	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: A. bottomland hardwoods, B. understory shrubs, or C. 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 sufaces are vegetated. Poor plant community (e.g. grass monoculture) present. 0-2 points.
Total score 59	Comments: CITY OF WINTER GARDEN STP			

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/27/90	Philip N. Kane, Ed.D.	Philip N. Kane, Ed.D.

DOWNSTREAM OF EFFLUENT

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL REGULATION

Benthic Habitat Assessment Field Data Sheet

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER: gms# 3048M01387	DATE (M/D/Y): 08/27/90	RECEIVING BODY OF WATER: perc ponds - swamp - Lake Apopka
REMARKS: ORANGE COUNTY P # D086-15 FDER P # 111729	LOCATION: 101 EAST CREST AVENUE WINTER GARDEN, FL. ORANGE COUNTY		FIELD ID/NAME: NPDES# FL0020109

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. 16-20 points	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. 11-15 points	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. 6-10 points	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. 0-5 points
Flow/ Water Velocity 15	Greater than 0.3 m/sec. 16-20 points	0.1 to 0.3 m/sec 11-15 points	0.05 to 0.1 m/sec 6-10 points	Less than 0.05 m/sec 0-5 points
Channel Alteration & Sediment Effects 12	No channelization, Less than 5% of bottom affected by deposition or scouring. 12-15 points	Some channelization, Evidence of deposition in pools or scouring in 5-20% of bottom. 8-11 points.	Moderate channelization. Sediment deposition or scouring in 30-50% of bottom. 4-7 points.	Extensive channelization. Siltation and sediment deposition or scouring in 50% or more of bottom. 0-3 points.
Bank Stability 9	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. 3-5points.	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: A. bottomland hardwoods, B. understory shrubs, or C. 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 sufaces are vegetated. Poor plant community (e.g. grass monoculture) present. 0-2 points.
Total score 65	Comments: CITY OF WINTER GARDEN STP			

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/27/90	PHILIP N. KANE, Ed.D.	Philip N. Kane, Ed.D.

UPSTREAM COMPARIBLE SITE SMALL STREAM WITHIN SHORT DRIVE OF DISCHARGE STREAM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
Physical/Chemical Characterization
Field Data Sheet

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER: gms# 3048M01387	DATE (M/D/Y): 08/27/90	RECEIVING BODY OF WATER: perc ponds - swamp - Lake Apopka
REMARKS: ORANGE CTY P# D086-15 FDER P# 111729	LOCATION: 101 EAST CREST AVENUE WINTER GARDEN, FL. ORANGE COUNTY		FIELD ID/NAME: NPDES # FL0020109

Riparian Zone/Instream Features

Predominant Surrounding Land-Use: (specify type and relative percent)

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
70 %		30 %				

Local Watershed Erosion: None (Moderate) Heavy

Local Watershed NPS Pollution : (No evidence) Some potential sources ONLY WIDER ROAD SURFACE Obvious sources

Point-Source Pollution : (No evidence) Present (list location and describe):

Estimated Stream Width (m): 2M Estimated Stream Depth (m): Shallow Areas: 0.1M Pools: 0.2M

High Water Mark (m): 1.0M Impounded? NO Channelized? SLIGHT Velocity: Shallow Areas: 1M/.85 Pools: 1M/.85

Canopy Cover (%): [redacted] Open: 5-10 % Lightly Shaded: 10-15 % Moderately Shaded: Heavily Shaded: 75-80 %

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

Inorganic Substrate Type	Size	Percent Comp	Organic Substrate Type	Characteristic	Percent Comp.
Limerock or Consolidated Pipeclay			Detritus	Woody Debris CPOM	
Gravel	2-64 mm				
Sand	0.06-2 mm		Muck	Black, FPOM	
Silt/Clay	< 0.06 mm		Marl	Gray, Shelly	

Water Quality

Top D.O.: 6.0 Top Temp.: 23.5°C Bottom D.O.: " Bottom Temp.: " Secchi depth (m) TO BOTTOM

Conductivity: 270 pH: 6.7 Other parameters:

Stream Type: Blackwater Deep Aquifer Fed (Surficial Aquifer Fed) Alluvial Other

Water Odors: (Normal) Sewage Petroleum Chemical Other

Water Surface Oils: Slick Sheen Globs (None)

Clarity: (Clear) Slightly turbid Turbid Opaque

Color: Tannic Green (algae) (Clear) Other

Weather conditions (sun? wind?): SUN & NO WIND

Observations: CITY OF WINTER GARDEN STP

Periphyton	Absent	(Rare)	Common	Abundant
Fish	Absent	Rare	(Common)	Abundant
Macrophytes	Absent	Rare	(Common)	Abundant
Iron/sulfur bacteria	(Absent)	Rare	Common	Abundant

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/27/90	Philip N. Kane, Ed.D.	Philip N. Kane, Ed.D.

DOWNSTREAM OF EFFLUENT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
Physical/Chemical Characterization
Field Data Sheet

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL [illegible]	STORET STATION NUMBER: 3049M01387	DATE (M/DY): 08/27/90	RECEIVING BODY OF WATER: peat ponds - swamp - Lake Apopka
REMARKS: ORANGE COUNTY P# 0086-15 / FDER P # [redacted] 111729	LOCATION: 101 EAST CREST AVENUE WINTER GARDEN, FL. ORANGE COUNTY		FIELD ID/NAME: NPDES # FL0020109

Riparian Zone/Instream Features

Predominant Surrounding Land-Use: (specify type and relative percent)

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
30%	70%					

Local Watershed Erosion: (None) Moderate Heavy

Local Watershed NPS Pollution : (No evidence) Some potential sources Obvious sources

Point-Source Pollution : No evidence (Present) (list location and describe): STREAM IS A DIRECT RESULT OF UNDERDRAIN EFFLUENT.

Estimated Stream Width (m): 4 M Estimated Stream Depth (m): Shallow Areas: 0.25M Pools: 0.5M

High Water Mark (m): 0.25M Impounded? NO Channelized? NO Velocity: Shallow Areas: 1M/7S Pools: 1M/7S

Canopy Cover (%): Open: 15% Lightly Shaded: 10% Moderately Shaded: 60% Heavily Shaded: 15%

Sediment/Substrate

Sediment Odors: (Normal) Sewage Petroleum Chemical Anaerobic Other

Sediment Oils: (Absent) Slight Moderate Profuse

Sediment Deposits: Sludge Paper Fiber (Mud) (Sand) Shell Other DETRITUS

Inorganic Substrate Type	Size	Percent Comp	Organic Substrate Type	Characteristic	Percent Comp.
Limerock or Consolidated Pipeclay			Detritus	Woody Debris CPOM	
Gravel	2-64 mm				
Sand	0.06-2 mm		Muck	Black, FPOM	
Silt/Clay	< 0.06 mm		Marl	Gray, Shelly	

Water Quality

Top D.O.: 6.0 Top Temp.: 25°C Bottom D.O.: 6.0 Bottom Temp.: 25°C Secchi depth (m) TO BOTTOM

Conductivity: 420 pH: 6.3 Other parameters:

Stream Type: Blackwater Deep Aquifer Fed Surficial Aquifer Fed Alluvial (Other) EFFLUENT FROM UNDERDRAINS

Water Odors: (Normal) SLIGHTEST HINT OF (Sewage) Petroleum Chemical Other

Water Surface Oils: Slick Sheen Globs (None)

Clarity: (Clear) Slightly turbid Turbid Opaque

Color: Tannic Green (algae) (Clear) Other

Weather conditions (sun? wind?): SUN + NO WIND

Observations: CITY OF WINTER GARDEN STP

Periphyton	Absent	Rare	(Common)	Abundant	
Fish	Absent	Rare	(Common)	Abundant	
Macrophytes	Absent	Rare	(Common)	(Abundant)	
Iron/sulfur bacteria	(Absent)	Rare	Common	Abundant	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/27/90	Philip N. Kane, Ed.D.	Philip N. Kane, Ed.D.

Number: 90-AUG-28-06-01 Sample Status: Authorized by Liang T. Lin
Location: City of Winter Garden WWTP Matrix: Fresh Surf Water
Field ID: Org Sample 1-2 Storet Station Number: 20020354
Date/Time Collected: 27-AUG-1990 11:50:07.56
Comments:

Sample Number: 90-AUG-28-06-01 Test status: Authorized by Laura Harrison
Analysis Id: W-BNA Analysis Description: base-neutral-acid water analysis

Storet Number	Analyte	Result	Units
34205	Acenaphthene	10 U	ug/L
34200	Acenaphthylene	10 U	ug/L
39330	Aldrin	10 U	ug/L
34220	Anthracene	10 U	ug/L
34526	Benzo(a)anthracene	10 U	ug/L
34230	Benzo(b)fluoranthene	10 U	ug/L
34242	Benzo(k)fluoranthene	10 U	ug/L
34247	Benzo(a)pyrene	10 U	ug/L
34521	Benzo(g,h,i)perylene	20 U	ug/L
34292	Benzyl butyl phthalate	10 U	ug/L
	a-BHC	10 U	ug/L
39337	b-BHC	10 U	ug/L
39340	d-BHC	10 U	ug/L
	g-BHC	10 U	ug/L
39120	Benzidine	10 U	ug/L
34273	Bis(2-chloroethyl)ether	10 U	ug/L
34278	Bis(2-chloroethoxy)methane	20 U	ug/L
34283	Bis(2-chloroisopropyl)ether	20 U	ug/L
39100	Bis(2-ethylhexyl)phthalate	10 U	ug/L
34636	4-Bromophenyl phenyl ether	10 U	ug/L
34581	2-Chloronaphthalene	10 U	ug/L
34641	4-Chlorophenyl phenyl ether	10 U	ug/L
34320	Chrysene	10 U	ug/L
39310	4,4'-DDD	10 U	ug/L
39320	4,4'-DDE	10 U	ug/L
39300	4,4'-DDT	10 U	ug/L
34556	Dibenzo(a,h)anthracene	25 U	ug/L
39110	Di-n-butyl phthalate	10 U	ug/L
34536	1,2-Dichlorobenzene	10 U	ug/L
34566	1,3-Dichlorobenzene	10 U	ug/L
34571	1,4-Dichlorobenzene	10 U	ug/L
34631	3,3'-Dichlorobenzidine	10 U	ug/L
39380	Dieldrin	10 U	ug/L
34336	Diethylphthalate	10 U	ug/L
34341	Dimethylphthalate	10 U	ug/L
34611	2,4-Dinitrotoluene	10 U	ug/L
34626	2,6-Dinitrotoluene	10 U	ug/L
34596	Di-n-octyl phthalate	10 U	ug/L
34361	Endosulfan-I	10 U	ug/L

Continued

A - Value reported is the mean of two or more determinations
E - Scientific notation
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 - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Cont. from previous page for Sample Number: 90-AUG-28-06-01 Analysis_id: W-BNA

34356	Endosulfan-II	10 U	ug/L
34351	Endosulfan-sulfate	10 U	ug/L
39390	Endrin	10 U	ug/L
34366	Endrin-aldehyde	10 U	ug/L
34376	Fluoranthene	10 U	ug/L
34381	Fluorene	10 U	ug/L
39410	Heptachlor	10 U	ug/L
39420	Heptachlor-epoxide	10 U	ug/L
39700	Hexachlorobenzene	20 U	ug/L
34391	Hexachlorobutadiene	10 U	ug/L
34396	Hexachloroethane	60 U	ug/L
34386	Hexachlorocyclypentadiene	10 U	ug/L
34403	Indeno(1,2,3-cd)pyrene	10 U	ug/L
34408	Isophorone	10 U	ug/L
34696	Naphthalene	10 U	ug/L
34447	Nitrobenzene	10 U	ug/L
34438	N-Nitrosodimethylamine	50 U	ug/L
34428	N-Nitrosodi-n-propylamine	10 U	ug/L
34433	N-Nitrosodiphenylamine	1.6E+02 U	ug/L
34671	PCB-1016	10 U	ug/L
39488	PCB-1221	10 U	ug/L
39492	PCB-1232	10 U	ug/L
39496	PCB-1242	10 U	ug/L
39500	PCB-1248	10 U	ug/L
39504	PCB-1254	10 U	ug/L
39508	PCB-1260	10 U	ug/L
	PCB-1262	10 U	ug/L
34461	Phenanthrene	10 U	ug/L
34469	Pyrene	10 U	ug/L
39400	Toxaphene	10 U	ug/L
34551	1,2,4-Trichlorobenzene	10 U	ug/L
34462	4-Chloro-3-methyl phenol	20 U	ug/L
34586	2-Chlorophenol	20 U	ug/L
34601	2,4-Dichlorophenol	20 U	ug/L
34606	2,4-Dimethylphenol	20 U	ug/L
34616	2,4-Dinitrophenol	30 U	ug/L
34657	2-Methyl-4,6-dinitrophenol	30 U	ug/L
34591	2-Nitrophenol	30 U	ug/L
34646	4-Nitrophenol	50 U	ug/L
39032	Pentachlorophenol	30 U	ug/L
34694	Phenol	20 U	ug/L
34621	2,4,6-Trichlorophenol	20 U	ug/L

Comments (1):
(2):
(3):
(4):
(5):
(6):

A - Value reported is the mean of two or more determinations
E - Scientific notation
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 - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-AUG-28-05-01 Sample Status: Authorized by Tim Fitzpatrick
Sample Location: City of Winter Garden WWTP P.O. Box 1005 Matrix: Fresh Surf Water
Field ID: Metal Sample #5 Storet Station Number: 20020354
Date/Time Collected: 27-AUG-1990 11:50:10.71
Comments:

Sample Number: 90-AUG-28-05-01 Test status: Authorized by Tim Fitzpatrick
Analysis Id: W-ICP-23 Analysis Description: ICP multielement analysis for water samples

Storet Number	Analyte	Result	Units
01106	Aluminum	NR	ug/L
01002	Arsenic	NR	ug/L
01097	Antimony	NR	ug/L
01007	Barium	NR	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	3 U	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	NR	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	5 U	ug/L
01045	Iron	NR	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	NR	ug/L
01077	Silver	NR	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	5	ug/L

Sample Number: 90-AUG-28-05-01 Test status: Authorized by Tim Fitzpatrick
Analysis Id: HG-H-W Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.2 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
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 - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

DER Biology Section — A...e Bioa... ...h Sheet

Sample Source: Winter Garden STP
Address/City:
County:
Contact/District: Phil Kane/Central
NPDES Permit #: _____ **Outfall #:** _____

Sample Coll... Date 8/28/90 **Time** 11:50
Test Beg...ng: Date 8/29/90 **Time** 830
Test Ending: Date 8-31-90 **Time** 830
Test Organism: M. leidsi
Life Stage/Age: ≤0 days

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

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7at7;9at9	8.7@23°	1380@24°	
24 hr	7at7;9at9	8.7@23°		
48 hr	7at7,9at9	8.7@23°	1316@23°	23°C

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	39	5	5	5	7.9	7.7	7.3	7.9	8.1	8.4	22.1	24.5	23.9			
Control	16	5	5	5	8.0	7.7	7.3	7.9	8.2	8.4				238		254
100%	198	5	5	5	7.1	7.7	7.3	6.7	7.7	8.2	23.0	24.2	23.8			
100%	413	5	5	5	7.2	7.7	7.4	6.7	7.7	8.2				429		469
Measured/Loaded by:		EBF	KML	KML	LB	KML	LB	LB	KML	LB	LB	KML		LB		LB
Recorded by:			KML	KML	KML	LB	KML	KML	LB	KML	KML	LB		KML		KML

Investigators' Signatures

Kathleen M. Lurding
Russell Frydenborg
Lyn Burton

_____
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					EBF
Lab Tot. Resid. Cl2:			0	Hach	LB
Alkalinity:	115	—	83	Hach	KML
Hardness:	122	—	106	Hach	KML
Total Ammonia:			0		EBF

Ammonia meter slope: _____

Benthic macroinvertebrate taxa list for Winter Garden WWTP, Orange County, Florida, collected from a nearby reference stream and downstream of the discharge, on 27 August 1990.

	Reference Site	Test Site
Coleoptera		
Dineutes serrulatus serrulatus	+	–
Dineutus sp.	+	–
Dubiraphia bivittata	+	–
Dubiraphia sp.	+	–
Stenelmis sp.	+	–
Diptera		
Ablabesmyia mallochi	+	–
Chironomus decorus grp.	+	–
Cryptochironomus fulvus grp.	+	–
Labrundinia pilosella	+	–
Palpomyia grp. sp.	+	–
Paracladopelma prob. *undine*	+	–
Pentaneura inconspicua	+	–
Polypedilum fallax grp.	–	+
Polypedilum illinoense	+	–
Polypedilum scalaenum	+	–
Undetermined dipteran pupae	+	–
Rheotanytarsus distictissimus grp. sp.	+	–
Rheotanytarsus exiguus grp. sp.	+	–
Stenochironomus hilaris	+	–
Tanytarsus sp.	+	–
Tribelos fuscicorne	+	+
Ephemeroptera		
Baetis frondalis	+	–
Caenis diminuta	–	+
Centroptilum viridocularis	+	–
Gastropoda		
Ferrissia sp.	+	–
Physella heterostropha pomila	+	–
Planorbella trivolvis intertexta	+	–
Hirudinea		
Helobdella fusca	+	–
Placobdella parasitica	+	–
Lepidoptera		
Neargyractis slossonalis	+	–
Parapoynx sp.	+	–
Undetermined lepidopteran	–	+
Odonata		
Argia fumipennis	–	+
Boyeria vinosa	+	–
Calopteryx maculata	+	–
Gomphus minutus	+	+
Ischnura sp.	–	+

Undetermined libellulid sp.	+	–
Macromia taeniolata	+	–
Nehalennia integricallis	+	–
Neurocordulia alabamensis	–	+
Telebasis byersi	–	+
Oligochaeta		
Lumbriculus variegatus	+	–
Undetermined tubificid w/o capilliform setae	+	–
Pelecypoda		
Musculium partumeium	+	+
Trichoptera		
Hydropsyche decalda	+	–
Total	**36**	**10**

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger:	**City of Winter Garden WWTP**
County:	**Orange**
NPDES Number:	**FL0020109**
State Permit Expiration Date:	**28 February 1991**

Toxics Sampling Inspection (XSI)	
Date Sampled:	27 August 1990
Results:	not found to contain deleterious levels of priority pollutants

Compliance Biomonitoring Inspection (CBI)	
Date Sampled:	27 August 1990
Results:	not toxic

Impact Bioassessment Inspection (IBI)	
Date Sampled:	27 August 1990
Results:	community downstream of the discharge very stressed compared to a nearby reference site

Water Quality Inspection (WQI)	
Date Sampled:	
Results:	

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide specific condition recommendations for renewal to resolve any concerns.