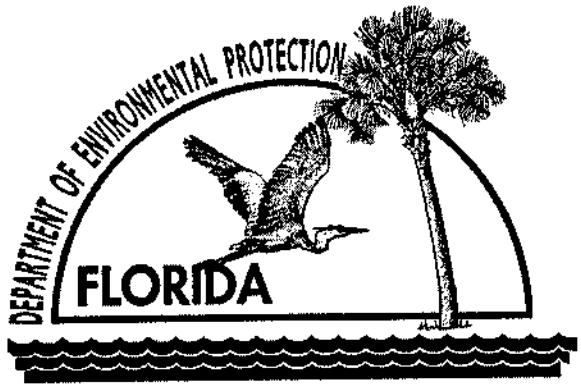


Biological Assessment of

City of Vernon Wastewater Treatment Plant

Washington County

NPDES #FL0028941

Sampled January 1994

August 1994

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: City of Vernon WWTP
County: Washington
NPDES Number: FL0028941
State Permit Expiration Date: 1 May 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 18 January 1994

Results: No organic pollutants were detected in the effluent. None of the metals analyzed for exceeded Class III standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 18 January 1994

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 19 January 1994

Results: The dip net results indicated an extremely poor quality macroinvertebrate community at the test site. Taxa richness, the Florida Index, the EPT Index, and the Stream Invertebrate Index for Florida (SIIF), all decreased dramatically between the reference and test sites, indicating severely degraded conditions there. This is clear evidence that the facility was responsible for violating the standard which prohibits imbalances in aquatic flora or fauna (Rule 17-302.530(48)(b) FAC). Another symptom of perturbation at the test site was the extreme dominance of pollution tolerant dipterans and oligochaetes, particularly *Chironomus* sp., *Dero trifida, Dero digitata,* and *Limnodrilus hoffmeisteri,* which together made up 99.5% of the total population. These results show that the facility was also in violation of the standard prohibiting dominance of nuisance species (Rule 17-302.530(47) FAC). Since the periphyton racks were lost during a flood, it was possible to collect only the phytoplankton, which are not well suited to demonstrate near-field nutrient enrichment effects in flowing waters. No negative effects on the phytoplankton community could be attributed to the facility.

Water Quality Inspection (WQI)

Date Sampled: 18 January 1994

Results: Significant nitrate-nitrite enrichment, attributable to the facility, was found at the test site. Nitrate-nitrite increased from 0.34 mg/L at the reference site to 3.0 mg/L at the test site, where it was approximately three times higher than values found in 95% of other Florida streams. Effluent nitrate-nitrite was 11 mg/L. Ortho-phosphate (0.26 mg/L) and total phosphorus (0.37 mg/L) values at the test site were higher than 80% of other Florida streams, but low or undetected at the reference site. Algal growth potential increased dramatically from the reference site (0.4 mg dry wt/L) to the test site (147.7 mg dry wt/L). The test site AGP significantly exceeded the 5 mg dry wt/L "problem threshold". Effluent AGP was 193.9 mg dry wt/L. Because coliform samples were held beyond normal holding times, the results did not represent violations.

Introduction

The City of Vernon Wastewater Treatment Plant is located in Washington County, Florida (see maps in Appendix). This is an extended aeration sewage treatment plant with a design flow of 0.100 MGD, and a mean flow of 0.060 MGD. Effluent is chlorinated, dechlorinated, and discharged to an unnamed tributary of the Class III Holmes Creek.

Permit limits are as follows: flow (0.100 MGD as a maximum monthly average), BOD (15 mg/L as a maximum annual average), TSS (20 mg/L as a maximum annual average), pH (6.0 to 8.5 SU's), fecal coliform bacteria (200 organisms/ 100 mL), dissolved oxygen (6.0 mg/ L minimum), ammonia (2.0 mg/L as a maximum monthly average), and chlorine residual (minimum of 0.5 mg/L for disinfection, maximum of 0.01 mg/L at discharge) (see Appendix). Additionally, acute toxicity tests are to be performed on the effluent on a bi-monthly basis.

This facility has had a number of problems in the past few years, such as exceeding both the flow permit limit and the maximum chlorine residual permit limit on several occasions, as well as being responsible for numerous spills of untreated wastewater into Holmes Creek. The sewage spills have been of fairly high volume, with approximately half of the aeration tank being discharged in April, 1993. In September, 1993, approximately 42,000 gallons of untreated wastewater was spilled from a lift station. The facility received a warning notice from the Department in September, 1993. In October and December, 1993, compliance inspections revealed that the plant was operating very poorly. A number of deficiencies were uncovered, including: 1) sludge and Sp*haerotilus* (sewage bacteria) present in the receiving waters, 2) excess sand in the grit chamber, 3) excess floating solids and algae being transported over the weir, and 4) fecal coliform violations. Monthly Operating Re-

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	36	7
Florida Index	24	0
SIIF Index	21	8
E-P-T Index	11	0
% Contribution of Dominant Taxon	16.5	77.3
% Oligochaeta	6.4	97.4
% Diptera	45.8	2.4
% Plecoptera	13.8	0
% Ephemeroptera	12.8	0
% Odonata	7.4	0.1
e% Isopoda	4.6	0
% Other	9.3	0.1
% Predators/ Carnivores	22.9	0.04
% Deposit feeders (above surface)/ Collector-Gatherers	45.1	2.3
% Deposit feeders (below surface)	6.4	97.6
% Suspension feeders/ Collector-Filterers	6.4	0
% Scavengers	2.5	0
% Plant piercers	0.5	0.01
% Scrapers	9.5	0
% Shredders	6.7	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	20	59
Florida Index	17	20
Shannon-Weaver Diversity	3.4	3.8
% Oligochaeta	3.6	42.8
% Diptera	57	52.8
% Coleoptera	1.2	1.7
% Trichoptera	16.6	0.1
% Plecoptera	13.1	0.1
% Ephemeroptera	5.6	0.1
% Other	2.9	2.4
% Predator/Carnivores	23	5.3
% Deposit feeders (above surface)/ Collector-Gatherers	22.2	23.2
% Deposit feeders (below surface)	3.5	49.1
% Suspension feeders	36.1	4.3
% Scavengers	0	0.5
% Scrapers	3	0.9
% Shredders	12.2	16.7

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

Phytoplankton Algae		
Number of Taxa	3	11
% Contribution of Dominant Taxon	60	21
Chlorophyll a (µg/L)	0.6 U	4.4 A
% Blue-green	80.0	21.4
% Green	0	28.6
% Diatoms	0	21.4
% Other	20.0	28.6
Algal Growth Potential (mg dry wt/L)	0.4	147.7

port data indicate there has been no improvement in the operation of the facility.

Methods

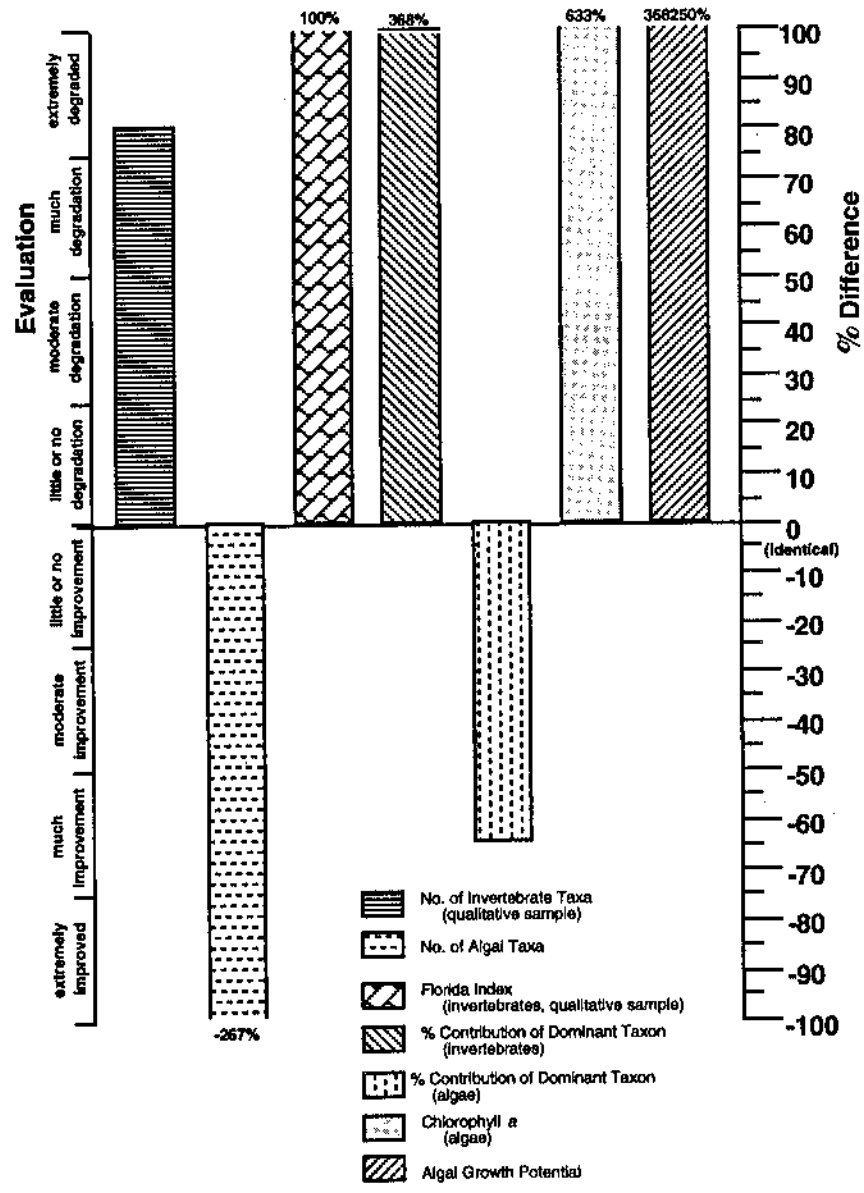
The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in Hard Labor Creek, an adjacent tributary of Holmes Creek, approximately 2.5 miles from the discharge) and a test site (located about 100 m downstream of the discharge in an unnamed tributary of Holmes Creek). Habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1993). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on the effluent, the reference site, and the test site. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at the reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Invertebrates were also collected with Hester-Dendy artificial substrates, but there were problems with the incubation of the Hester-Dendys, including the occurrence of a severe flood (over 8 inches of rain) and a longer than usual incubation period (exceeding the standard period by approximately 1 month). Therefore, results of the dip net samples will be emphasized in this report. Periphyton racks were lost during the flood. Phytoplankton algae for identification and chlorophyll *a* were collected via subsurface grabs (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed in this report. Many of these, such as the number of taxa and Shannon-Weaver Diversity Index 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). The Ephemeroptera/Plecoptera/Trichoptera (EPT) Index is calculated by summing the number of distinct taxa of EPT's represented in a sample. A higher EPT Index is associated with good water quality. Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. 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 selected, and their cumulative total is the QSI. 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). The Stream Invertebrate Index for Florida (SIIF) is a composite metric which is based upon the macroinvertebrate communities found at Florida Eco-regional reference

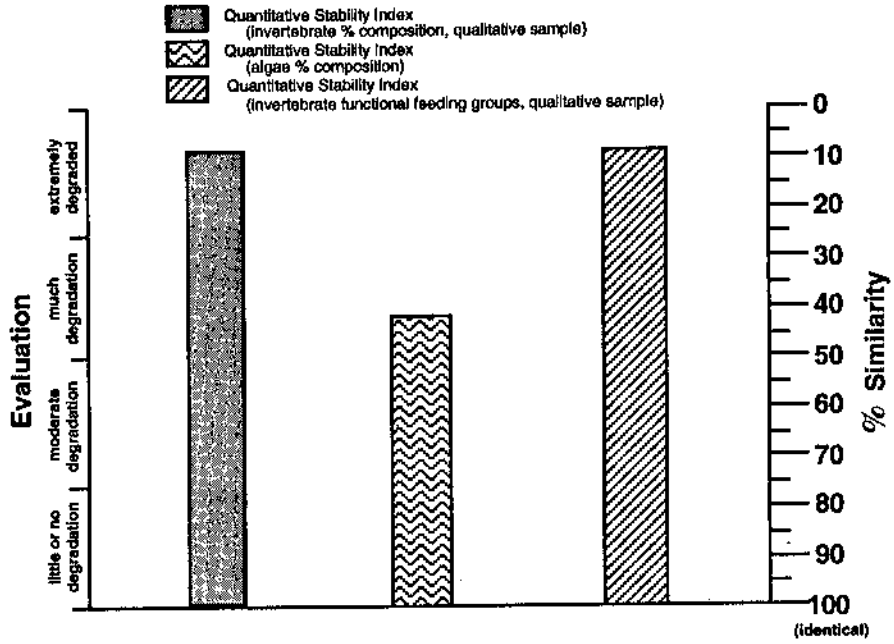
sites sampled with dip net sweeps (EA Engineering 1994). The SIIF assigns 5, 3, or 1 point(s) to a variety of invertebrate parameters, depending on how closely that parameter approaches the expected Eco-regional reference condition. Five points is the best score for metrics which are particularly strong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



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

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the EPT Index, the 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: Glenn Butts and Dawn Gorres (DEP Northwest District), and Chris Barge, Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Elizabeth Miller, Kim Pearce, Urania Quintana, Landon Ross, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Bioassessment Review Committee, consisting of Jan Mandrup-Poulsen, Wayne Magley, and Mike Tanski, as well as District representatives.



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

Results and Discussion

Habitat quality was quite poor at the test site, with 23 points, while the reference site habitat quality was representative of an undisturbed system, with 79 points. While the reference site had ample substrates present for benthic community success (*i.e.*, snags, roots, and leaf packs), the test site was choked with sewage sludge and muck (83% of the benthic area), thereby limiting the types of organisms which could potentially inhabit the system. Surrounding land near the reference site was mostly forested (70%), with the remainder being residential (30%). The land use near the test site consisted of field/pasture (20%), other agricultural uses (10%), residential (5%), and commercial (65%). Water velocity at the reference site (0.5 to 1.5 m/sec) was favorable for benthic macroinvertebrates, but the velocity at the test site (< 0.05 m/sec) was slow enough to limit the probability of encountering rheophilic taxa. The reference and test sites were of similar width (2.5 m to 3 m) but the test site was shallower (0.3 m deep) when compared to the reference site (0.5 m to 2.0 m deep). Potential runoff from non-point sources (agriculture) was noted at both sites.

Surface dissolved oxygen (9.9 mg/L at both the reference and test sites) was adequate to support aquatic life. Specific conductance was lower at the test site (24.5 µmhos/cm) than at the reference site (110 µmhos/cm). The water was acidic (5.2 SU's) at the test site and became only slightly more alkaline (6.2 SU's) at the reference site. Temperature measurements (10 °C to 10.5 °C) were similar at both sites.

No organic pollutants were detected in the effluent. Of the metals analyzed for, only aluminum (291 µg/L), iron (104 µg/L), and zinc (42 µg/L) were found in the effluent at concentrations above their respective practical quantitation limits, but none exceeded Class III standards.

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

Fecal coliform bacteria at the reference site (1400 organisms/100 mL) were above Class III water quality standards, but test site values (220 organisms/100 mL) were within the legal limit. Total coliform bacteria at the reference and test sites (1 organism/100 mL and 1100 organisms/100 mL, respectively) were both within water quality standards. In the chlorinated effluent, however, fecal coliforms (2,000 organisms/100 mL) and total coliforms (7,000 organisms/100 mL) both exceeded Class III standards. Because the samples were held beyond normal holding times, these values do not represent violations, however, they do suggest that violations are likely to occur if the holding times are satisfied.

Significant nitrate-nitrite enrichment, attributable to the facility, was found at the test site. Nitrate-nitrite increased from 0.34 mg/L at the reference site to 3.0 mg/L at the test site, where it was approximately three times higher than values found in 95% of other Florida streams (see Table of Typical Water Quality Parameters in the Appendix). Effluent nitrate-nitrite was 11 mg/L, appearing directly responsible for the test site enrichment.

Ortho-phosphate (0.26 mg/L) and total phosphorus (0.37 mg/L) values at the test site were higher than 80% of other Florida streams, but low or undetected at the reference site. TKN was typical at all

sites. Ammonia was undetected at the reference site, but slightly elevated at the test site (0.11 mg/L).

Algal growth potential (AGP) increased dramatically from the reference site (0.4 mg dry wt/L) to the test site (147.7 mg dry wt/L). The test site AGP significantly exceeded the 5 mg dry wt/L "problem threshold" (Raschke and Schultz 1987), indicating a high probability that eutrophication effects will occur at some point in the receiving waters. AGP of the effluent was extremely elevated, at 193.9 mg dry wt/L.

The results of the benthic community analyses, based upon the dip net sampling (which occurred during normal flow), indicated that the test site was extremely degraded. The Hester-Dendy sampling results were suspect due to the unusually severe flooding which occurred during the incubation period, which in turn led to an extended incubation time. Therefore, the dip net results are discussed here since they represent a normal situation and are thought to better characterize the effects of the discharge. The figure on p. 3 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference site. The relative abundance of each individual taxon appears in the Appendix. The figure on page 4 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

The dip net results indicated an extremely poor quality macroinvertebrate community at the test site. Taxa richness decreased from 36 taxa at the reference station to 7 taxa at the downstream site. The Florida Index decreased from 24 points at the reference site to 0 points at the test site. Further, the EPT Index decreased from 11 to 0. These extraordinarily low values illustrate the extremely degraded conditions associated with the discharge. While the reference site scored in the upper range of the "moderate impairment" category of the Stream Invertebrate Index for Florida (SIIF), with 21 points, the test site SIIF score (9 points) indicated "severe degradation". This is clear evidence that the facility was responsible for violating the standard which prohibits imbalances in aquatic flora or fauna (Rule 17-302.530(48)(b) FAC).

Another symptom of perturbation at the test site was the extreme dominance of pollution tolerant dipterans and oligochaetes, particularly *Chironomus* sp., *Dero trifida, Dero digitata,* and *Limnodrilus hoffmeisteri*, which together made up 99.5% of the total population. *Chironomus* sp. is listed as a nuisance organism by Beck and Beck (1969) and considered pollution tolerant by Hudson *et al.* 1990. The oligochaetes are known to be tolerant of organic enrichment (*e.g.*, Brinkhurst 1965). These results show that the facility was also in violation of the standard prohibiting dominance of nuisance species (Rule 17-302.530(47) FAC).

Since the periphyton racks were lost during the flood, it was possible to collect only the phytoplankton. Since the phytoplankton community flows with the current, it is not well suited to demonstrate near-field nutrient enrichment effects in flowing waters. Consequently, with the exception of slight increases in chlorophyll *a*, phytoplankton community parameters did not appear to be much affected by the WWTP discharge. Chlorophyll *a* at the test site (4.4 µg/L), was increased compared to the reference site (0.6 µg/L). While 3 taxa were collected at the reference site, 11 were represented in the test site sample. The percent contribution of the dominant taxon was higher at the reference site (60% of the population was *Chroococcus* sp.) compared to the test site (21% of the total was *Dinobryon* sp.). The reference site population was made up of cyanophytes (80%) and cryptophytes (20%). The test site community was more diverse, consisting of diatoms (21.4%), cyanophytes (21.4%), chlorophytes (28.6%), cryptophytes (7.1%), and chrysophytes (21%). Overall, no negative effects on the phytoplankton community could be attributed to the facility.

Conclusions

No organic pollutants were detected in the effluent. Of the metals analyzed for, only aluminum (291 µg/L), iron (104 µg/L), and zinc (42 µg/L) were found in the effluent at concentrations above their respective practical quantitation limits, but none exceeded Class III standards.

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

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Since the periphyton racks were lost during the flood, it was possible to collect only the phytoplankton. Since the phytoplankton community flows with the current, it is not well suited to demonstrate near-field nutrient enrichment effects in flowing waters. Consequently, no negative effects on the phytoplankton community could be attributed to the facility.

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Chemistry summary table for City of Vernon WWTP

	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
None detected			
Metals (ug/L)			
Aluminum	291		
Antimony	15 U		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	10 U		
Chromium	10 U		
Iron	104		
Lead	15 U		
Mercury	0.10 U		
Nickel	5 U		
Selenium	30 U		
Silver	0.05 U		
Zinc	42		
Nutrients (mg/L)			
Ortho-phosphate	0.94	0.010 U	0.26
Total phosphorus	1.2	0.030 I	0.37
Ammonia	0.064	0.020 U	0.11
Nitrate+Nitrite*	11	0.34	3.0
TKN	1.2	0.26	1.0
Other Parameters			
Habitat Assessment		79	23
D.O. (mg/L)	7.6	9.9	9.9
pH (SU's)	6.8	6.2	5.2
Conductivity (µmhos/cm)	325	110	24.5
Temperature (°C)	14.2	10.0	10.5
BOD5 (mg/L)	4.0	3.4	0.9
TSS (mg/L)	5 U	8	5 U
Turbidity (NTU's)	9	16	9
Hardness (mg/L as CaCO3)	103.9		
Color (PCU's)		70	40
Algal Growth Potential (mg dry wt/L)	193.9	0.4	147.7
Bioassay Fish	not toxic		
Bioassay Invertebrate	not toxic		
Fecal coliform (org/100 mL)	2000 Q	1400 Q	220 Q
Total coliform (org/100 mL)	7000 Q	1 KQ	1100 Q

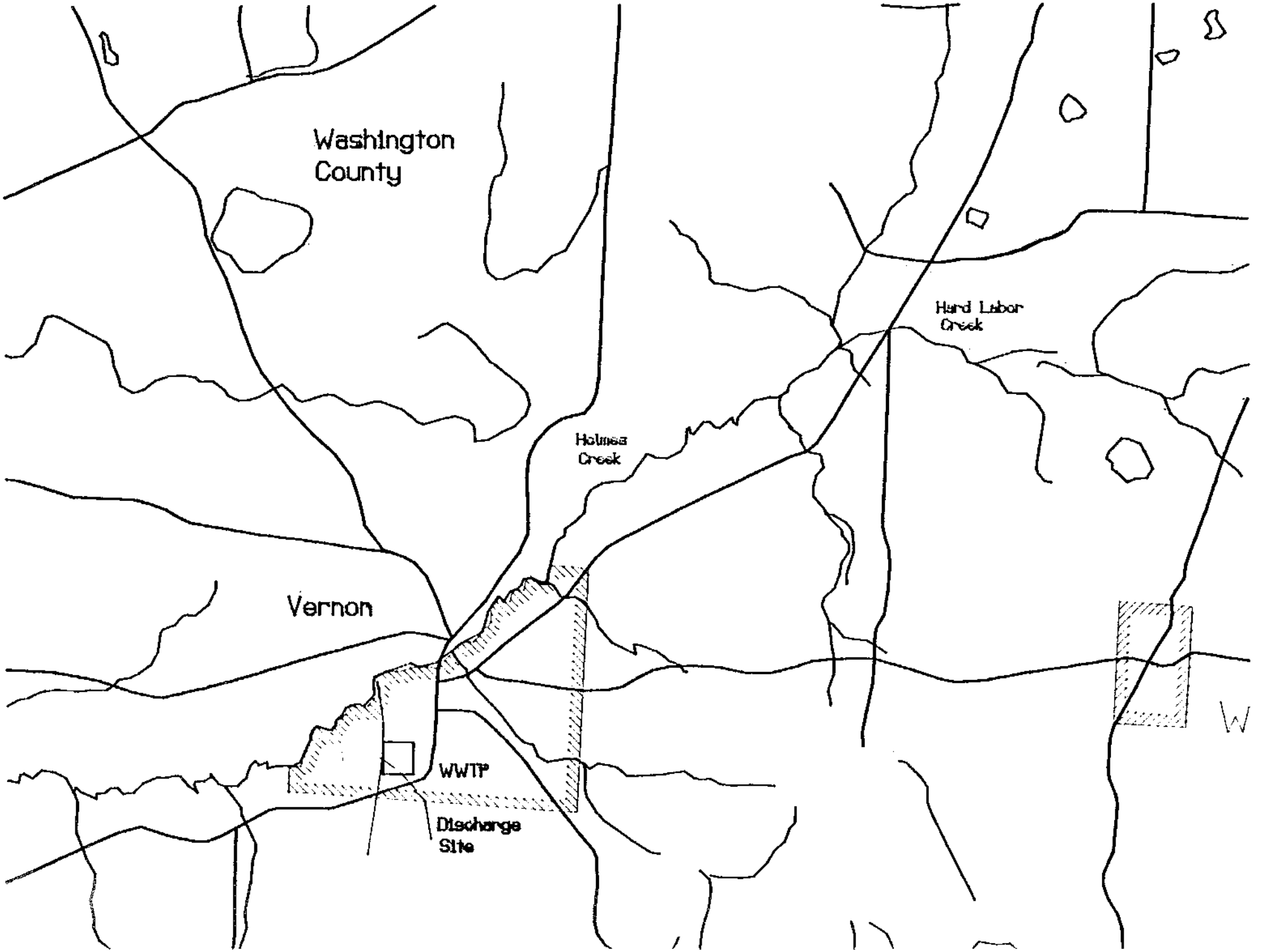
* Blank contaminated with 0.54 µg/L

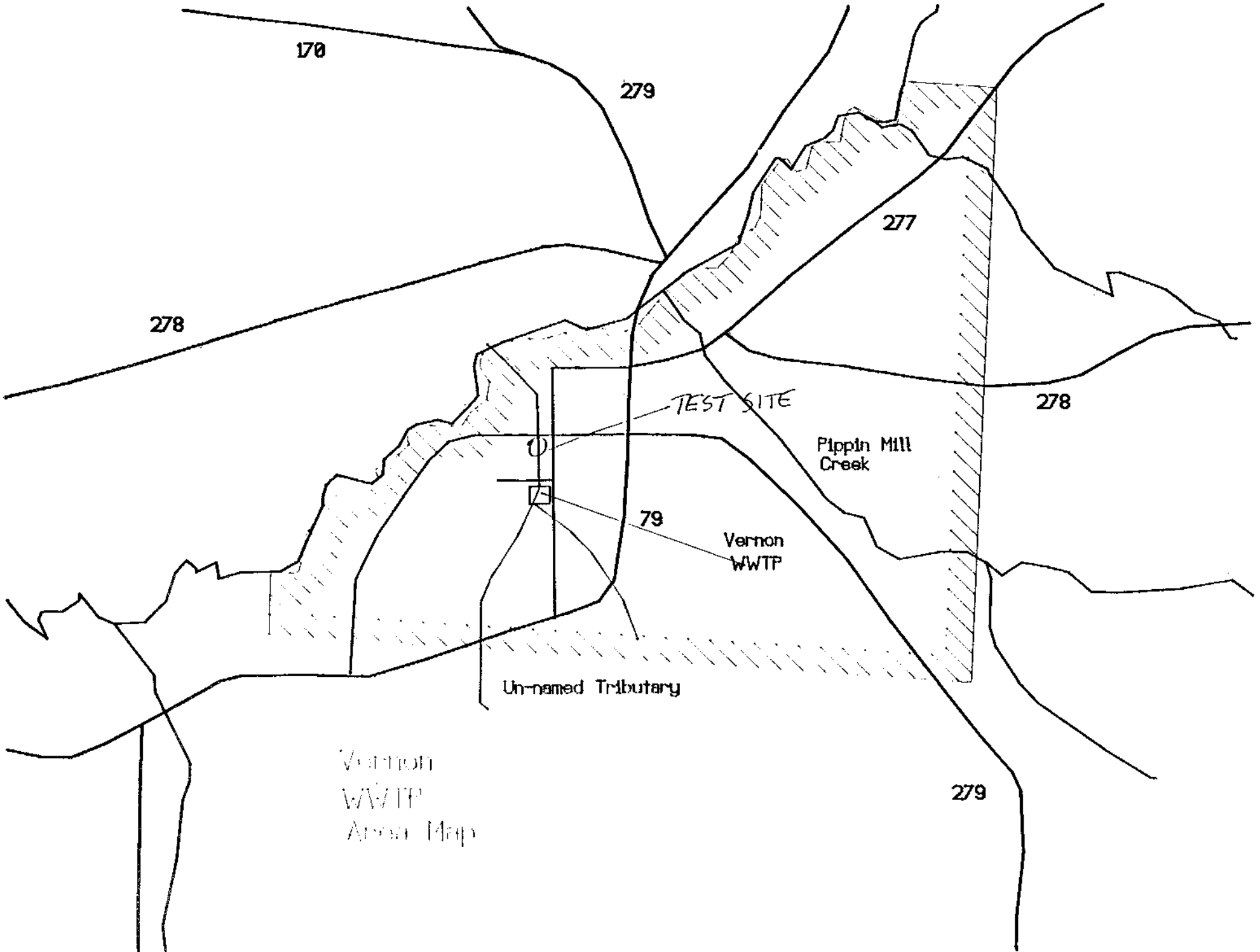
I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

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

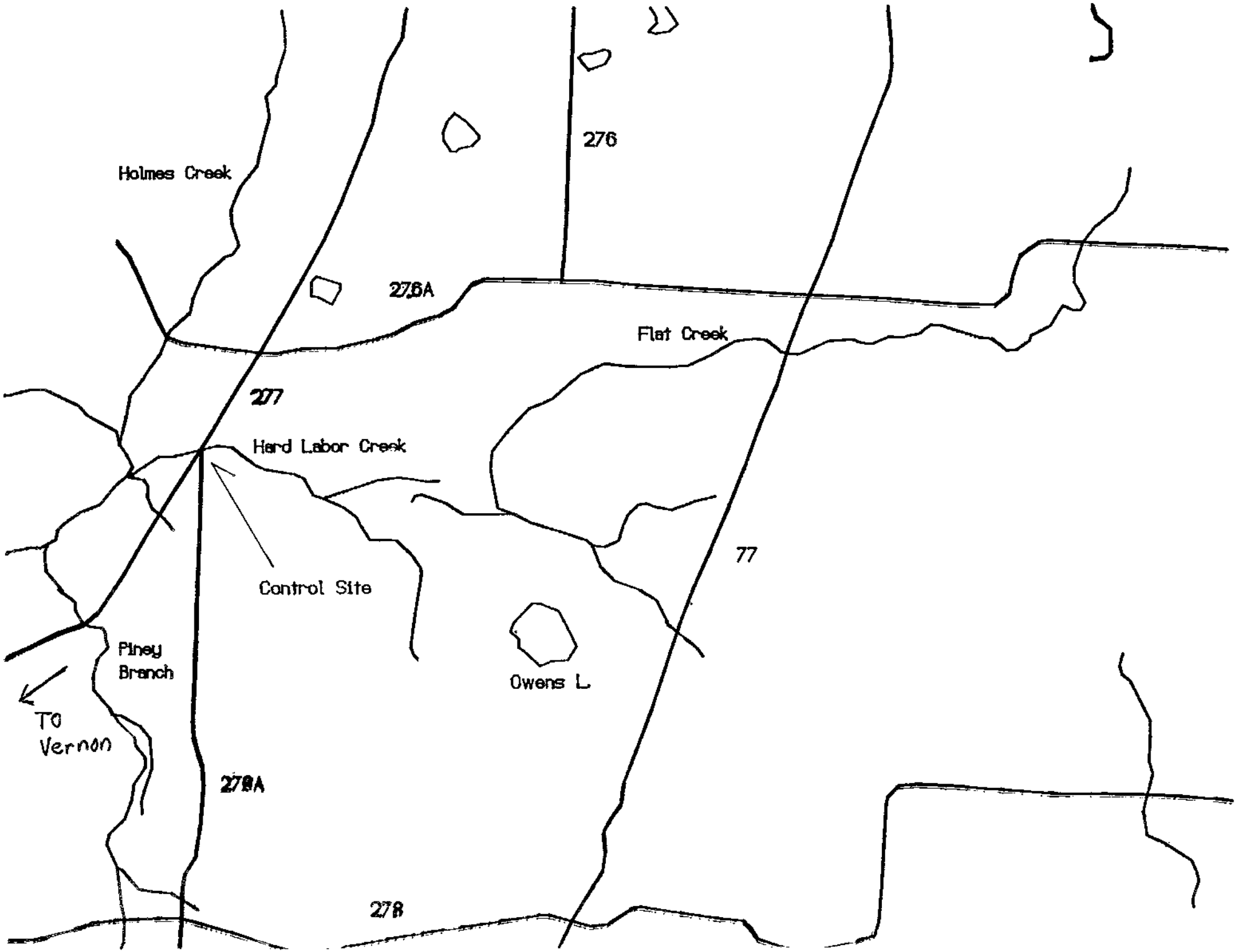
Q - Sample held beyond normal holding time

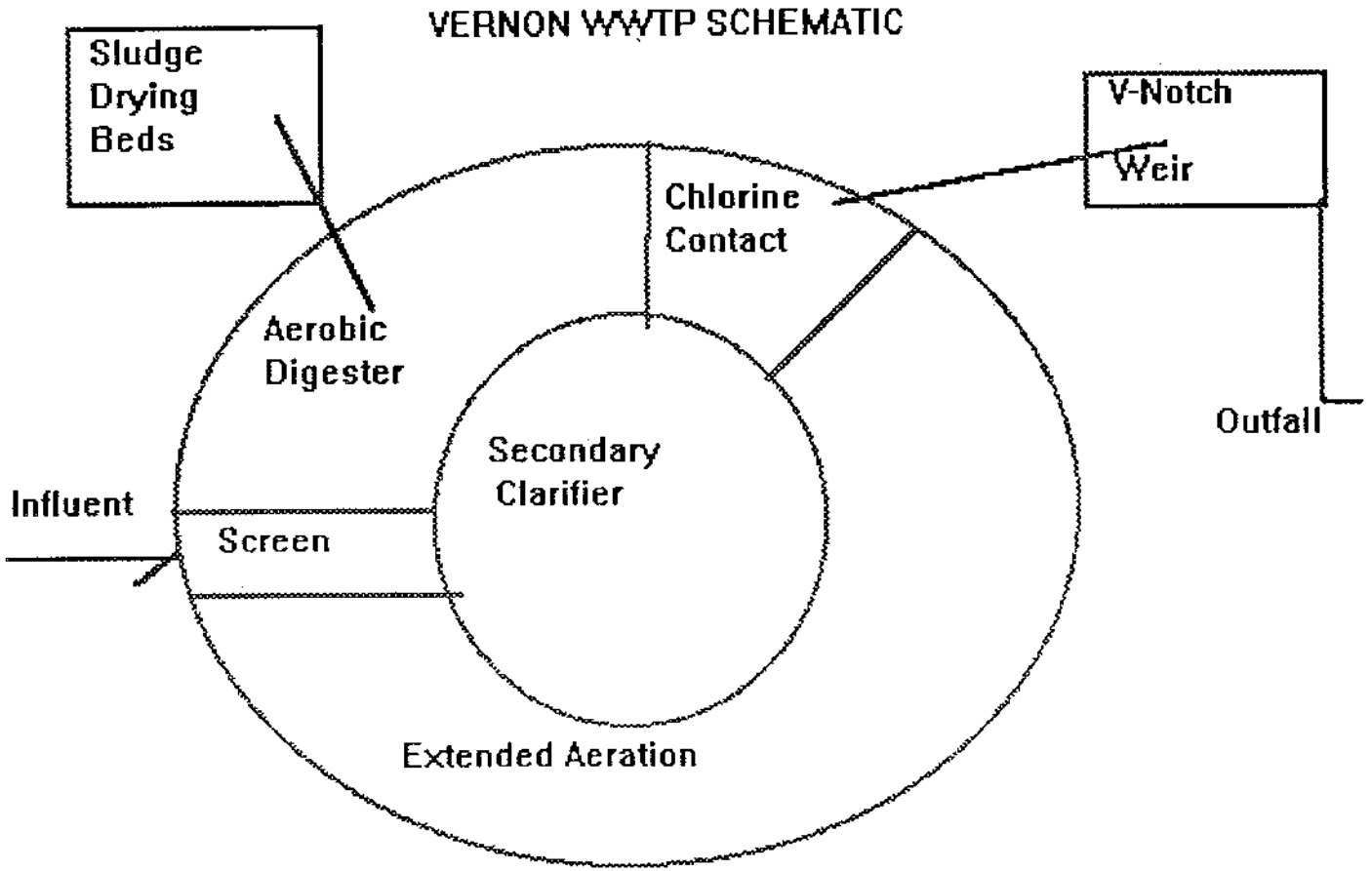
U - Material analyzed for but not detected; value reported is the minimum detection limit


Washington
County
Holmes
Creek
Hard Labor
Creek
Vernon
WWTP
Discharge
Site
W



Vernon
WWTP
Area Map


276
Holmes Creek
276A
Flat Creek
277
Hard Labor Creek
77
Control Site
Owens L.
Piney
Branch
TO
Vernon
278A
278


VERNON WWTP SCHEMATIC
Sludge
Drying
Beds
V-Notch
Weir
Chlorine
Contact
Aerobic
Digester
Outfall
Secondary
Clarifier
Influent
Screen
Extended Aeration

Facility Summary

Facility Name: City of Vernon DWWTF

Date Summary Prepared: January 5, 1994

Location map: South Dawkins St.

County: Washington

District: Northwest

NPDES Permit # FL0028941 expiration date 2-28-94

State GMS # 1067M02689 expiration date 5-1-94

Facility Type: Ind. Dom. Fed. Agric.

Function of facility: To treat domestic wastewater from the City of Vernon. Effluent is discharged to an unnamed tributary to Holmes Creek.

Description of treatment process:
Wastewater is treated by extended aeration, chlorination, and dechlorination.

Receiving waters: Unnamed tributary to Holmes Creek

Classification: I II III

Design Flow: 0.100 MGD

Mean Flow: 0.060 MGD

Flow during survey:

Discharge is: Continuous Intermittent Seasonal Rainfall dependent
Other (describe)
best time to sample is:

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

List effluent limits (attach relevant paperwork):

Parameter	Limit (units)
Flow	0.100 MGD (max. mo. avg. daily flow)
pH-effluent	6.0 (min) 8.5 (max)
Chlorine residual	0.01 mg/L (min)
Dissolved oxygen	6.0 mg/L (min)
CBOD5-influent	N/A
CBOD5-effluent	15 mg/L (max. annual avg.)
Suspended solids-influent	N/A
Suspended solids-effluent	20 mg/L (max. annual avg.)
NH3-N	2.0 mg/L (max. mo. avg.)
Fecal coliform	200/100 ml (max)
Acute toxicity test	Bimonthly (see permit for more detail)

List permit violations (from MOR data or other source) and plant upsets within past year:
Exceeded max. mo. avg. daily flow in 9/92, 11/92, 12/92, 2/93, 3/93, & 4/93. Exceeded max. chlorine residual in 10/92, 2/93, 3/93, 4/93, 6/93, 7/93, 8/93, & 9/93. Facility experienced numerous sewage spills during 1993 at lift stations and at the DWWTF. In April 1993, the DWWTF experienced a washout due to rain. Approx. one-half the aeration tank discharged into the creek. In Sept. 1993, approx. 42,000 gallons of sewage was spilled from a lift station into the creek.

Permit violations (continued):
12/93 recon inspection showed that the DWWTF was washed out recently due to heavy rainfall. Sludge, Sphaerotilus, and algae were present in the receiving

tributary.
9/93 inspection revealed excess grit/sand in grit chamber, excess floating solids & algae going over weir, & sludge inventory at full capacity.
10/92 inspection noted excessive fecal coliform (20,000/100 ml).

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

Warning Notice issued on 9-15-93 due to sewage spill into creek.
Final Order issued in March 1986
Notice of Violation issued in February 1986

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

MOR results show that the facility frequently exceeds the permitted daily flow as well as the allowable chlorine residuals. The MOR results are comparable to FDEP results. It does not appear that facility operation is improving.

Additional information:

Staff contributing to this review (signature)

Biologist
Inspector
Engineer
Other
Other

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: NW DISTRICT	STORET STATION NUMBER: 32.02.0034	DATE (M/D/Y): 1/19/94	TIME: 11:30-12:30pm	RECEIVING BODY OF WATER: HARD LABOR CREEK

REMARKS:	LOCATION: AT SR 277, NE OF VERNON	FIELD ID/NAME:
CONTROL SITE		# 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
70			30			

Local Watershed Erosion (check box): None [X] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Some potential sources [ ] Obvious sources [X]

Point-Source Pollution (list location and describe): AGRICULTURE / PASTURE RUNOFF INTO SMALL FEEDER TRIBUTARIES

Estimated System Width (range, m): 3.0	Estimated System Depth (range, m): .5-2.0		yes	
High Water Mark (m above bed): 2.0	Velocity (range, m/s): .5-1.5		Impounded [ ]	
			Channelized [ ]	

Canopy Cover % : Open : [ ] Lightly Shaded (11-45%): [ ] Moderately Shaded (46-80%): [X] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [ ] Sand: [X] Shell: [ ] Other: [ ]

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

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top								> 2.0
Mid-depth								
Bottom								

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

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [X] Slightly turbid: [ ] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [X] Green (algae): [ ] Clear: [ ] Other: [ ]

Weather Conditions:

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[ ]	[ ]	[ ]
Fish	[ ]	[ ]	[ ]	[ ]
Aquatic Macrophytes	[ ]	[ ]	[ ]	[ ]
Iron/sulfur Bacteria	[ ]	[ ]	[ ]	[ ]

SAMPLING TEAM:	SIGNATURE:	DATE:
Glenn Butts / Dawn Gorres	Glenn Butts	

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: NW DISTRICT	STORET STATION NUMBER: 32.02.0039	DATE (M/D/Y): 1/19/94	TIME: 10:30-11:15am	RECEIVING BODY OF WATER: UN-NAMED TRIBUTARY TO HOLMES CR.

REMARKS:	LOCATION: AT VERNON WWTP	FIELD ID/NAME:
TEST SITE	DISCHARGE	# 3

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
	20	10	5	65		

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): HEAVY AGRICULTURE / PASTURE RUNOFF UPSTREAM OF VERNON WWTP

Estimated System Width (range, m): 2.5	Estimated System Depth (range, m): 0.3	yes: Impounded ☐ Channelized ☐
High Water Mark (m above bed): 0.6	Velocity (range, m/s): <0.05	

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	1			Riffles	0		
Leaf Packs	0			Sand	10		
Aquatic Vegetation	5			Mud/Muck/Silt	80		
Rock or Shell Rubble	0			Benthic leaf mats	0		
Undercut Banks/Roots	1			Other: Sewage Sludge	63		

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top		10.5		9.9				
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: ☐ ALGAL MATS AND SURFACE ALGAE SHEEN

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

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

Weather Conditions:

Sphaerotilus abundant

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

SAMPLING TEAM: G. Butts / D. Gorves	SIGNATURE: Glenn Butts	DATE:

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

SUBMITTING AGENCY CODE: 8010 SUBMITTING AGENCY NAME: NW DISTRICT	STORET STATION NUMBER: 32.02.0034	DATE (M/D/Y): 1/19/94	RECEIVING BODY OF WATER: HARD LABOR CREEK

REMARKS:	LOCATION: AT SR 277, NE OF	FIELD ID/NAME:
CONTROL SITE	VERNON	# 2

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 25	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 20	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 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 5	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 79

COMMENTS: MAIN STREAM APPEARS HEALTHY, HOWEVER FEEDER STREAMS SHOW IMPACT FROM AGRICULTURE RUNOFF

ANALYSIS DATE:	ANALYST: G. BUTTS / D. GORRES	SIGNATURE: Glenn Butts

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

SUBMITTING AGENCY CODE: 8010 SUBMITTING AGENCY NAME: NW DISTRICT	STORET STATION NUMBER: 32.02.0039	DATE (M/D/Y): 1/19/94	RECEIVING BODY OF WATER: UN-NAMED TRIB TO HOLMES CREEK

REMARKS:	LOCATION: AT VERNON WWTP	FIELD ID/NAME:
TEST SITE	DISCHARGE	# 3

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 8	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 2	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 3	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 5	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 5	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
0	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	23

COMMENTS: HEAVY AGRICULTURE RUNOFF FRIM FIELDS & COW PASTURES.

ANALYSIS DATE:	ANALYST: G. BUTTS / D. GORRES	SIGNATURE: Glenn Butts

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: CITY OF VERNON WWTP
Location:
County: WASHINGTON
Contact/District: GLENN BUTTS / NW
NPDES Permit #: FL00 28941 Outfall #:

Sample Collection: Date 1/18/94 Time 10:50 AM
Test Beginning: Date 1/19/94 Time 14:45
Test Ending: Date 1/21/94 Time 14:40
Organism Batch #: #2 Diluent Batch #: ~~WELL~~ #24
Organism Age: 24 HRS
Test Organism: CERIODAPHNIA DUBIA

94-JAN-19-24 68645

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

Test Number: 1 of 2

Remarks:
RESULTS FOR INFORMATION ONLY. THERMOMETER WHICH CONTAINED MERCURY WAS ACCIDENTLY BROKEN INSIDE THE SAMPLE JUG UPON ARRIVAL IN BIOASSAY LAB. KP 1/19/94

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	17.9 @ 17.5	9.2 @ 19.1 C	920 @ 1,000 94 @ ~~10,000~~ @ 21.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	18.8 @ 19.0	9.3 @ 18.6	920 @ 1,000 94 @ ~~10,000~~ @ 19.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	20.3 @ 20.8	9.0 @ 20.3	883 @ 1,000 93 @ ~~10,000~~ @ 20.8 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	7.6		8.0	18.8		22.8	9.3		8.2	~~155~~	KP	190
Control	B	5	5	5			8.0			22.8			8.3	155		185
Control	C	5	5	5			8.0			23.3			8.3			190
Control	D	5	5	5			8.0			23.3			8.3			205
100%	A	5	5	5	6.6		8.0	21.0		23.1	8.5		8.0	320		385
100%	B	5	5	5			8.0			23.7			7.9			~~385~~ 385 OK
100%	C	5	5	5			8.0			23.7			7.8			400
100%	D	5	5	5			8.0			23.7			7.8			395
Measured/Loaded by:		CCK	KP	JM	CZH		TM	CZH		JM	CZH		TM	CZH		TM
Recorded by:		CCK	KP	OW	CCK		OW	CCK		OW	CCK		OW	CCK		OW

Investigators' Signatures
Marshall Faircloth
Carl C. Kircher
Kim Pearce
Charles Henderson
D. [illegible]
Tina Mikulsky
Reviewer
form updated 7/8/93

	Salt Water/ Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			<0.01	—	GB
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	KWP
Alkalinity:	125	70	70	Hach	CK/CH
Hardness:	125	85	100	Hach	CK/CH
Total Ammonia:	<0.017	<0.017	<0.017	amm	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.1 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: CITY OF VERNON WWTP
Location:
County: WASHINGTON
Contact/District: GLENN BUTTS / NW
NPDES Permit #: FL0028941 Outfall #:

Sample Collection: Date 1/18/94 Time 10:50 AM
Test Beginning: Date 1/19/94 Time 1445
Test Ending: Date 1/21/94 Time 1440
Organism Batch #: 1 Diluent Batch #: WELL
Organism Age: 12 DAYS
Test Organism: CYPRINELLA LEEDSI

94-JAN-19-24 68645

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

Test Number: 2 of 2

Remarks:
RESULTS FOR INFORMATION ONLY. THERMOMETER WHICH CONTAINED MERCURY WAS ACCIDENTLY BROKEN INSIDE THE SAMPLE JUG UPON ARRIVAL IN BIOASSAY LAB.
KP 1/19/94

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	17.9 @ 17.5	9.2 @ 19.1°C	920 @ 1,000 94 @ ~~10,000~~ @ 21.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	18.8 @ 19.0	9.3 @ 18.6	920 @ 1,000 94 @ ~~10,000~~ @ 19.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	20.3 @ 20.8	8.0 @ 20.3	883 @ 1,000 93 @ ~~10,000~~ @ 20.8 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	87	5	5	5	7.6	8.0	8.1	18.8	19.1	19.5	9.3	8.7	8.3	~~155~~ KP	235	240
Control	70	5	5	5	7.5	8.1	8.1	18.7	19.1	19.4	~~8.9~~ KP	8.7	8.4	220	235	235
100%	57	5	5	5	6.6	7.3	7.7	21.8	19.0	19.4	8.5	8.3	8.4	~~320~~ KP	335	340
100%	1	5	5	5	6.5	7.4	7.7	21.8	19.0	19.4	8.5	8.2	8.3	350	335	340
									JAR had 0.0 ppt - re read @ 1/19/94 KP	70 3ppt	9.3			re read 0 hr cond in A jars since they warmed up before B jars were read 1/19/94 KP		
Measured/Loaded by:		CZH	CZH	TM	CZH	CZH	TM	CZH	CZH	TM	CZH	CZH	TA	CZH	CZH	TM
Recorded by:		CZH	KP	DW	CCK	KP	DW	CCK	KP	DW	CCK	KP	DW	CCK	KP	DW

220 KF
350 KP

Investigators' Signatures
Carl C. Kircher
Kim Pearce
Charles Henderson
Marshall Faircloth
Reviewer
Form Updated 7/8/93

	Salt Water/ Well Water	Water Quality Parameters 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			<0.01	—	GB
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	KWP
Alkalinity:	125	70	70	Hach	CK/CH
Hardness:	125	85	100	Hach	CK/CH
Total Ammonia:	<0.017	<0.017 KP	~~0.312~~ <0.017	ORION	MF

Ammonia Meter #98136 Meter Slope: ~~-58.1~~ KP ~~-58.7~~ Ammonia Blank: <0.017 Control <0.017 Salinity: 0 ppt Sample Salinity: 0 ppt

Typical Values for Selected Parameters in Florida Waters

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

Parameter	Percentile Distribution 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 Phosphate	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-Phosphate	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-Phosphate	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

VERNON REFERENCE SITE

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft Version 1994)								
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**				**Peninsula (75b, c, d)**			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31 34	16–30	0–15	5	≥ 27	14–26	0–13	
EPT Index	≥ 7 "	4–6	0–3	5		≥ 4	0–3	
% Contribution of Dominant Taxon		≤ 20	> 20	3		≤ 37	> 37	
Florida Index	≥ 18	9–17	0–8	5	≥ 7	4–6	0–3	
% Diptera		≤ 38	> 38	1		≤ 32	> 32	
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6	1	≥ 8	4–7	0–3	
% Shredders		≥ 10	0–9	1		≥ 13	0–12	
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	
Total Score	**Panhandle**			21	**Peninsula**			
Interpretation of Score	**No Impairment**			**29-23**	**No Impairment**			**33-27**
	Moderate Impairment			**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation			**14-7**	**Severe Degradation**			**16-9**

VERNON TEST SITE

Calculation and Interpretation of the Stream Invertebrate Index for Florida (SIIF) (Draft Version 1994)								
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	**Panhandle (65, 75a)**				**Peninsula (75b, c, d)**			
	5	3	1	Score	5	3	1	Score
Number of Taxa	≥ 31	16–30	0–15	1	≥ 27	14–26	0–13	
EPT Index	≥ 7	4–6	0–3	1		≥ 4	0–3	
% Contribution of Dominant Taxon		≤ 20	> 20	1		≤ 37	> 37	
Florida Index	≥ 18	9–17	0–8	1	≥ 7	4–6	0–3	
% Diptera		≤ 38	> 38	3		≤ 32	> 32	
% Suspension feeders/ Collector-Filterers	≥ 12	7–11	0–6	1	≥ 8	4–7	0–3	
% Shredders		≥ 10	0–9	1		≥ 13	0–12	
% Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 16	0–15	
# Crustacean/Mollusks (Peninsula only)	–	–	–			≥ 4	0–3	
Total Score	**Panhandle**			9	**Peninsula**			
Interpretation of Score	**No Impairment**			**29-23**	**No Impairment**			**33-27**
	Moderate Impairment			**22-15**	**Moderate Impairment**			**26-17**
	Severe Degradation			**14-7**	**Severe Degradation**			**16-9**

Macroinvertebrate taxa list for the City of Vernon WWTP collected via 20 Dip net sweeps. The test site was sampled in an unnamed tributary to Holmes Creek and the reference site was located in Hard Labor Creek, Washington County, 19 January, 1994.

	Reference Site	Test Site
Coleoptera		
Dubiraphia sp.	1	–
Stenelmis sp.	2	–
Tropisternus striolatus	–	24
Decapoda		
Procambarus sp.	2	–
Diptera		
Ablabesmyia mallochi	1	–
Chironomus sp.	–	1,560
Corynoneura sp.	1	–
Helopelopia sp.	10	–
Microtendipes pedellus	4	–
Polypedilum scalaenum grp.	1	–
Parametriocnemus sp.	2	–
Psychoda sp.	–	192
Rheocricotopus tuberculata	1	–
Simulium sp.	2	–
Smittia sp.	1	–
Stempellinella sp.	2	–
Tanytarsus sp. A Epler	1	–
Tanytarsus sp. L Epler	5	–
Tribelos jucundum	1	–
Unniella sp.	18	–
Undetermined dipteran pupa	–	144
Ephemeroptera		
Acerpenna pygmaeus	1	–
Baetis intercalaris	1	–
Leptophlebia intermedia	8	–
Stenonema floridense	1	–
Stenonema smithae	3	–
Gastropoda		
Hebetancylus excentricus	1	–
Isopoda		
Asellus sp.	5	–
Odonata		
Argia moesta	5	–
Calopteryx dimidiata	1	–
Ischnura posita	1	–
Libellula incesta	–	24
Neurocordulia virginiensis	1	–

Oligochaeta		
Dero digitata	–	59,136
Dero trifida	–	13,440
Eclipidrilus palustris	6	–
Limnodrilus hoffmeisteri	1	2,016
Plecoptera		
Perlesta sp.	5	–
Taeniopteryx burski	1	–
Taeniopteryx lita	9	–
Trichoptera		
Chimarra sp.	2	–
Hydropsyche sp.	1	–
Molanna sp.	1	–
Total	109	76,536

Macroinvertebrate taxa list for the City of Vernon WWTP collected via Hester-Dendy artificial substrates. The test site was sampled in an unnamed tributary to Holmes Creek and the reference site was sampled above the discharge in Hard Labor Creek, Washington County, on 19 January, 1994.

	Reference Site	Test Site
Acarina		
Hygrobates sp.	1	–
Amphipoda		
Crangonyx sp.	–	2
Gammarus sp.	–	3
Hyalella azteca	–	2
Coleoptera		
Hydroporus sp.	–	14
Undetermined Chrysomelidae	1	–
Decapoda		
Procambarus sp.	–	1
Diptera		
Chironomus sp.	–	76
Conchapelopia sp.	2	2
Corynoneura sp.	1	5
Cricotopus bicinctus	–	121
Cricotopus/Orthocladius grp. sp.	–	5
Dicrotendipes modestus	–	2
Dicrotendipes simpsoni	–	1
Helopelopia sp.	–	1
Meropelopia sp.	–	4
Microtendipes pedellus grp.	–	3
Nanocladius rectinervis	–	1
Nanocladius sp.	–	2
Natarsia sp.	–	1
Orthocladius annectens	–	2
Polypedilum convictum grp.	22	–
Polypedilum halterale grp.	–	1
Polypedilum illinoense	–	5
Polypedilum scalaenum grp.	3	2
Polypedilum tritum	–	11
Potthastia longimana	–	6
Parametriocnemus sp.	–	1
Psychoda alternata	–	1
Paratanytarsus sp. A Epler	–	12
Rheocricotopus sp.	–	1
Rheocricotopus tuberculata	–	21
Rheotanytarsus exiguus grp.	–	1
Simulium sp.	16	2
Stictochironomus sp.	–	1
Tanytarsus sp.	–	2

Tanytarsus sp. E Epler	–	3
Tanytarsus sp. C Epler	–	1
Tanytarsus sp. J Epler	1	1
Tanytarsus sp. L Epler	–	1
Tanytarsus sp. U Epler	–	1
Thienemanniella sp.	1	5
Unniella multiverga	1	7
Undetermined Orthocladinae	–	1
Undetermined Chironomidae	–	2
Undetermined Tipulidae	1	–
Undetermined dipteran pupa	–	109
Ephemeroptera		
Caenis sp.	–	1
Stenonema mexicanum integrum	1	–
Stenonema smithae	4	–
Gastropoda		
Planorbella duryi	–	2
Isopoda		
Asellus sp.	–	3
Lirceus sp.	–	4
Oligochaeta		
Allonais inaequalis	–	3
Dero digitata	–	124
Dero pectinata	–	3
Dero trifida	1	163
Limnodrilus hoffmeisteri	–	3
Nais communis	–	9
Nais elinguis	–	27
Nais pardalis	–	2
Nais simplex	2	–
Pristinella jenkinae	–	12
Plecoptera		
Acroneuria sp.	3	–
Perlesta placida	7	1
Taeniopteryx lita	1	–
Trichoptera		
Ceraclea sp.	–	1
Chimarra sp.	5	–
Hydropsyche sp.	9	–
Total	83	804

Phytoplankton taxa list and densities (#/mL) for The City of Vernon WWTP, collected via subsurface grabs. The test site was sampled in an unnamed tributary to Holmes Creek and the reference site was located in Hard Labor Creek on 19 January, 1994.

	Reference Site	Test Site
Bacillariophyta		
Achnanthes sp.	–	56
Coscinodiscus sp.	–	56
Melosira sp.	–	28
Navicula sp.	–	28
Chlorophyta		
Gloeocystis sp.	–	113
Oocystis sp.	–	113
Chrysophyta		
Dinobryon sp.	–	169
Cryptophyta		
Cryptomonas sp.	27	56
Cyanophyta		
Aphanothece sp.	27	28
Chroococcus sp.	82	56
Oscillatoria sp.	–	85
Total	136	788

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0028991		940113		K	3	1

Remarks

21 66

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

1	2	3	11	12	17	18	19	20
Transaction Code		NPDES NUMBER		YR/MO/DA		Insp Type	Inspector	Fac Type
N	5	FL0028991		940113		[illegible]	[illegible]	1

Remarks

21 66