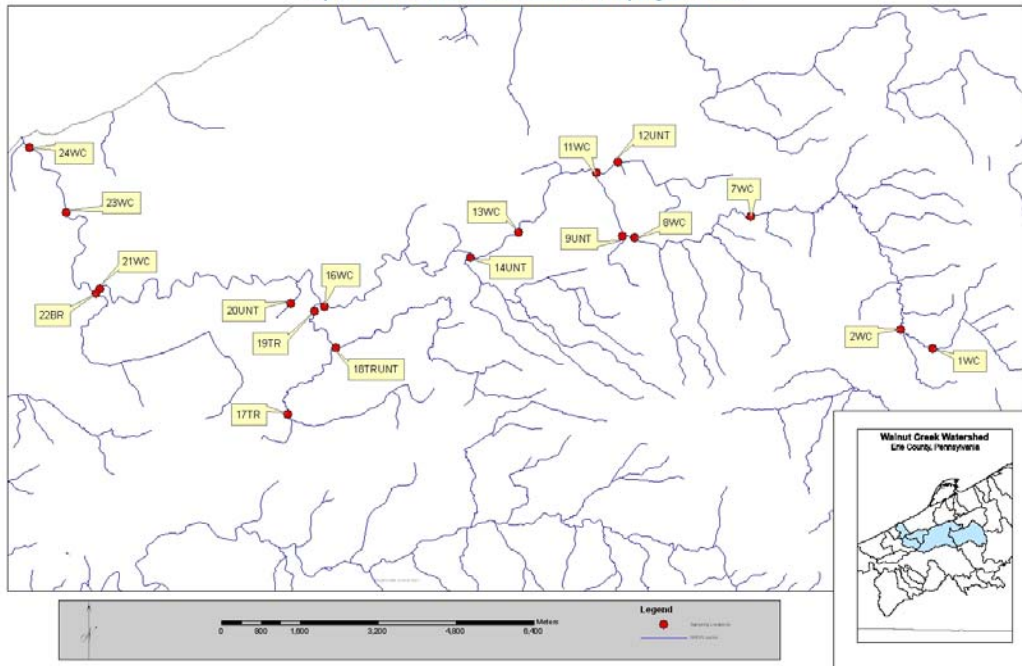


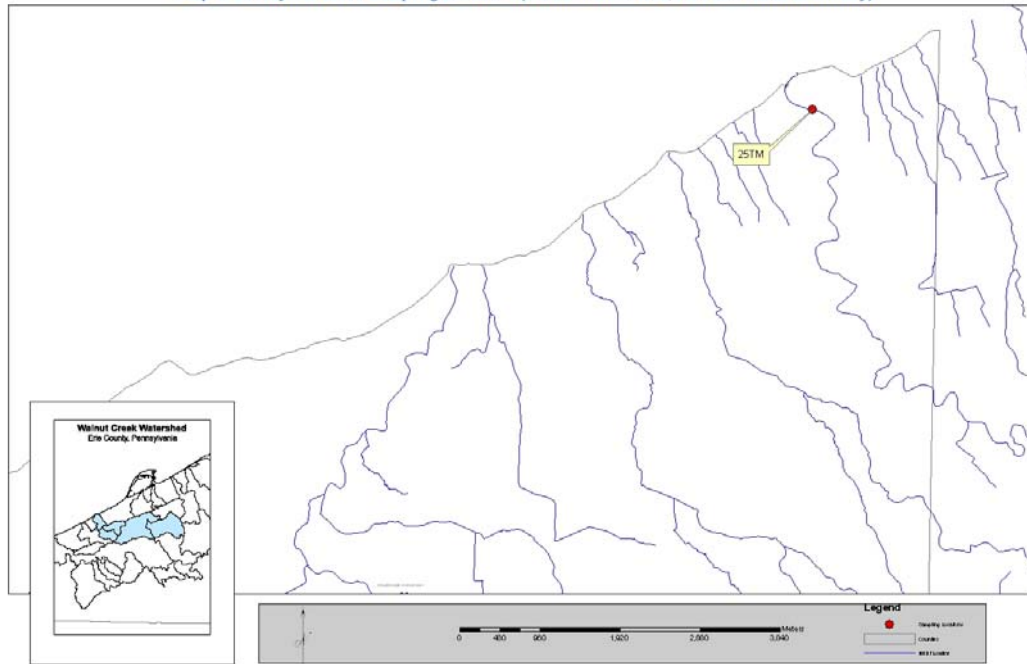
# Walnut Creek Environmental Quality Assessment Report

## Map 1: Walnut Creek Macroinvertebrate Sampling Locations



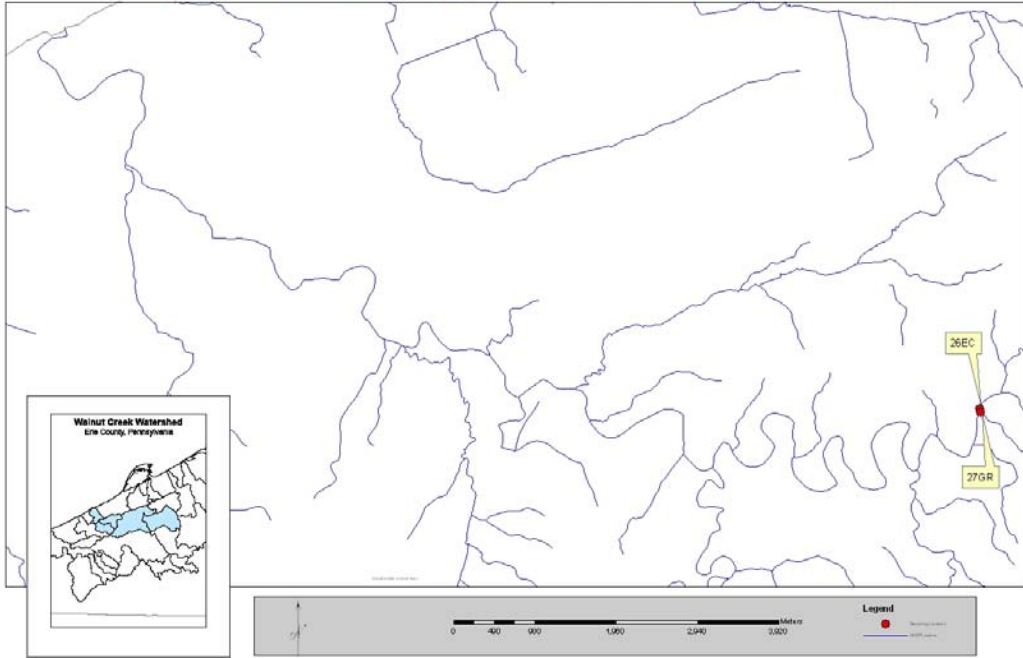
# Walnut Creek Environmental Quality Assessment Report

## Map 2: Twentymile Creek Sampling Locations (Macroinvertebrates, Fish and Water Chemistry)



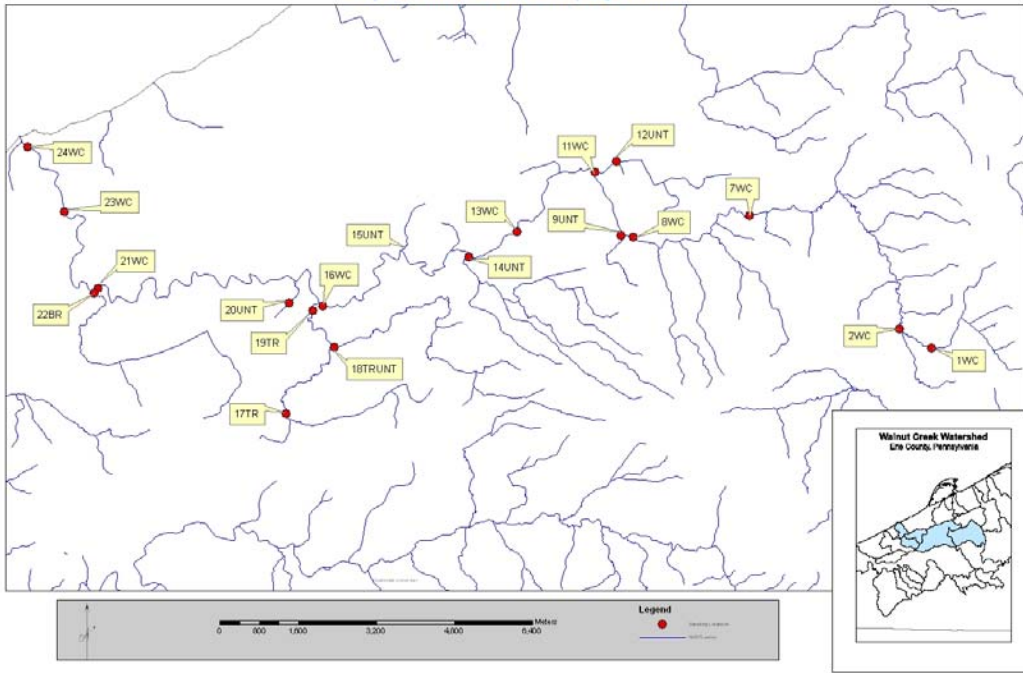
# Walnut Creek Environmental Quality Assessment Report

## Map 3: Elk Creek and Goodban Run Sampling Locations (Macroinvertebrates, Fish and Water Chemistry)

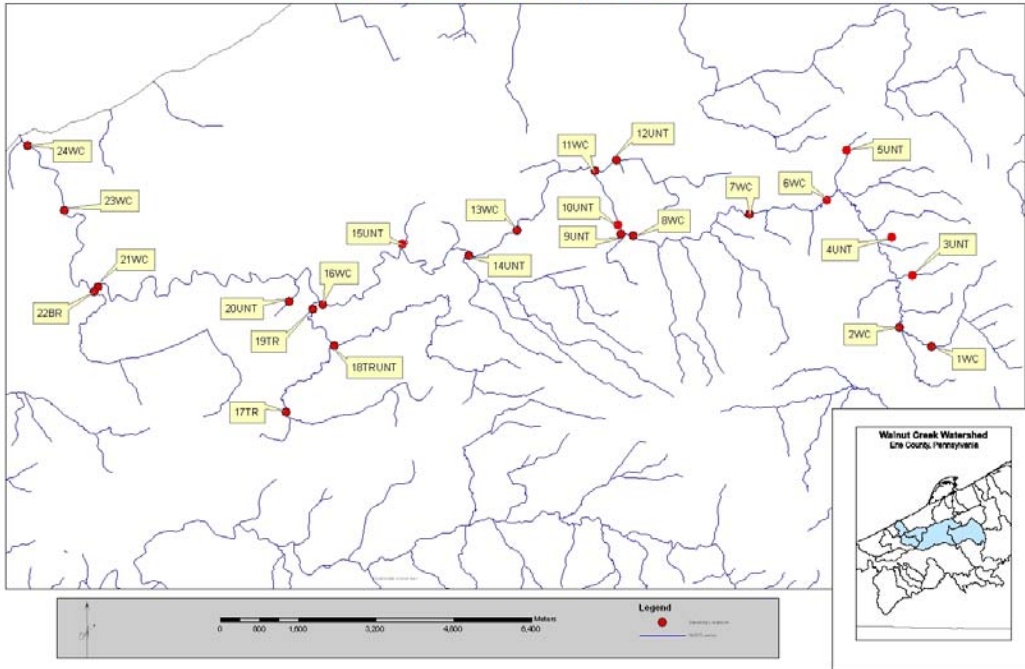


# Walnut Creek Environmental Quality Assessment Report

## Map 4: Walnut Creek Fish Sampling Locations



Walnut Creek Environmental Quality Assessment Report  
Map 5: Walnut Creek Water Sampling Locations



## STREAM ASSESSMENT DATA TABLES

Site #	Site Name	Drainage Area (m <sup>2</sup> )	Latitude	Longitude
1 WC	Walnut Creek downstream of Donation Road bridge		42.0418	-80.0125
2 WC	Walnut Creek upstream of Zwilling Road bridge		42.0451	-80.0206
3 UNT	UNT Walnut Creek @ landfill (site #2)		42.0549	-80.0182
4 UNT	UNT Walnut Creek @ landfill (site #1)		42.0615	-80.0223
5 UNT	UNT Walnut Creek downstream of Footmill Road crossing		42.0775	-80.0341
6 WC	Walnut Creek downstream of Route 97/ Route 19 Interchange		42.0686	-80.0387
7 WC	Walnut Creek upstream of Cherry Street bridge		42.0654	-80.0584
8 WC	Walnut Creek at Glade Drive dead end		42.061	-80.0871
9 UNT	UNT Walnut Creek downstream of Peach Street		42.0612	-80.09
10 UNT	Drainage Pipe from Wegman's / Amish Buggy		42.0627	-80.0907
11 WC	Walnut Creek behind Millcreek Mall Cinemas		42.0728	-80.097
12 UNT	UNT Walnut Creek upstream of Peach Street		42.0749	-80.0917
13 WC	Walnut Creek upstream of Schermer Road bridge		42.0614	-80.1159
14 UNT	UNT Walnut Creek upstream of Garries Road bridge		42.0565	-80.1277
15 UNT	UNT Walnut Creek downstream of Loves Road bridge		42.0581	-80.1434
16 WC	Walnut Creek upstream of Thomas Run confluence		42.0469	-80.1635
17 TR	Thomas Run downstream of California Road bridge		42.0268	-80.172
18 TRUNT	UNT Thomas Run @ mouth		42.0392	-80.1604
19TR	Thomas Run - 1/4 mile upstream of mouth		42.046	-80.166
20 UNT	UNT Walnut Creek downstream of Asbury Park bridge		42.0473	-80.1719
21 WC	Walnut Creek upstream of Bear Run confluence		42.0491	-80.2193
22 BR	Bear Run @ mouth	3.31	42.0482	-80.2203
23 WC	Walnut Creek upstream of Route 5		42.063	-80.2281
24 WC	Walnut Creek @ mouth	38.1	42.0748	-80.2377
25 TM (REF)	Twentymile Creek @ mouth	34.7	42.2606	-79.7802
26 EC (REF)	Elk Creek upstream of Route 98		41.9861	-80.2362
27 GR (REF)	Goodban Run @ mouth	3.85	41.9857	-80.2361

Table 1. Walnut Creek watershed and reference waterway sampling locations.

TAXA	1WC	2WC	7WC	8WC	9UNT	11WC	12UNT	13WC	14UNT	16WC	17TR
<b>Ephemeroptera (mayflies)</b>											
Ameletidae; <i>Ameletus</i>	5			2					3		
Baetidae; <i>Acentrella</i>											
<i>Baetis</i>		64	2	24		6	1		36	5	86
Caenidae; <i>Caenis</i>	43	9	25	1		5		1		1	1
Ephemerellidae; <i>Ephemerella</i>	2										8
<i>Eurylophella</i>	7	15				1		1	4		18
Ephemeridae; <i>Ephemera</i>			2								
Heptageniidae; <i>Cinygmula</i>											
<i>Epeorus</i>	51	6							1		
<i>Leucrocuta</i>											
<i>Stenacron</i>	11			2					1	1	
<i>Stenonema</i>	4	9	7	4		5		2	1	3	
Isonychidae; <i>Isonychia</i>	1					1					
Leptophlebiidae; <i>Paraleptophlebia</i>	141	4	1	7					10	1	38
<b>Plecoptera (stoneflies)</b>											
Chloroperlidae; <i>Haploperla</i>	685	127	11	98		1		7	74	3	276
<i>Sweltsa</i>	14	6		4		7			7		
Leuctridae; <i>Leuctra</i>	23	8	2	2				1	1		1
Nemouridae; <i>Amphinemura</i>	20	11							1		14
<i>Ostrocerca</i>				1							
<i>Prostoia</i>	1	6									
Perlidae; <i>Acroneuria</i>											
<i>Agnatina</i>									1		20
<i>Neoperla</i>											
<i>Paragnetina</i>											
Perlodidae; <i>Diploperla</i>	41	5	4	4					4		1
<i>Isoperla</i>	11	1									29
<b>Trichoptera (caddisflies)</b>											
Hydropsychidae; <i>Cheumatopsyche</i>	5	76	24	6		17		23	5	16	1
<i>Diplectrona</i>	25			3	9						
<i>Hydropsyche</i>	3	29	2	23	2	26		10	12	10	61
Lepidostomatidae; <i>Lepidostoma</i>											
Limnephilidae; <i>Pycnopsyche</i>		2									
Philopotamidae; <i>Chimarra</i>	1	85	6			1		1	4		
<i>Dolophilodes</i>	2									2	
<i>Wormaldia</i>											
Polycentropodidae; <i>Polycentropus</i>	1		2	17	1	2		8	8	2	1
Rhyacophilidae; <i>Rhyacophila</i>	10	4	1						2		
Uenoidae; <i>Neophylax</i>	23	6							1		7
<b>Diptera (true flies)</b>											
Ceratopogonidae; <i>Bezzia</i>			3								19
<i>Ceratopogon</i>	1	1						1			
<i>Probezzia</i>	15	14	7	9	3	10	7	12	6	26	37
<i>Seromyia</i>											
Chironomidae	878	632	493	868	109	539	159	477	353	537	1648
Dolichopodidae									1		

Table 2. Total macroinvertebrate taxa list.

TAXA	1WC	2WC	7WC	8WC	9UNT	11WC	12UNT	13WC	14UNT	16WC	17TR
Empididae; <i>Chelifera</i>	1						1	1		1	1
<i>Clinocera</i>			6	5					1		35
<i>Hemerodromia</i>	4	23				6		2	1		10
Ephydriidae											2
Simuliidae; <i>Prosimulium</i>	16	89									11
<i>Simulium</i>	64							6	2	2	21
Tabanidae									1	1	
Tipulidae; <i>Antocha</i>	1	9	2	1		1	1	4		1	10
<i>Dicranota</i>	3		1						1	1	
<i>Hexatoma</i>	2			1					7		31
<i>Molophilus</i>		1				1					
<i>Pseudolimnophila</i>		2									
<i>Tipula</i>	1	3				2	1				
<b>Coleoptera (aquatic beetles)</b>											
Dytiscidae; <i>Agabus</i>	6										
Elmidae; <i>Dubiraphia</i>	3	1									2
<i>Optioservus</i>	3	145							5		77
<i>Oulimnius</i>											
<i>Stenelmis</i>		70	93	1		83	11	159		13	126
Gyrinidae; <i>Dineutus</i>	2										
Haliplidae; <i>Peltodytes</i>	3										
Hydrophilidae; <i>Helophorus</i>							1				
Psephenidae; <i>Ectopria</i>	1										1
<i>Psephenus</i>	8	36	8	2		16		22	7	3	25
Ptilodactylidae; <i>Anchytarsus</i>				1							
<b>Megaloptera (alderflies, dobsonflies)</b>											
Corydalidae; <i>Nigronia</i>											
Sialidae; <i>Sialis</i>		1									
<b>Odonata (dragonflies, damselflies)</b>											
Macromiidae; <i>Macromia</i>	1										
Calopterygidae; <i>Calopteryx</i>	3										
<b>Non-Insect Taxa</b>											
<b>Oligochaeta (aquatic worms)</b>	4	14	20	5	18	22	41	57		23	2
<b>Hydracarina (aquatic mites)</b>		1				1					
<b>Planariidae (flatworms)</b>	1				3			16		1	7
<b>Cambaridae (crayfish)</b>	1	1									
<b>Nematomorpha (horsehair worms)</b>		1									
<b>Hirundinea (leeches)</b>							2	1			
<b>Amphipoda (freshwater shrimp)</b>											
Crangonyctidae; <i>Crangonyx</i>				1		6		3		1	
Gammaridae; <i>Gammarus</i>								1			
Talitridae; <i>Hyaella</i>	2										
<b>Isopoda (scuds or sowbugs)</b>											
Asellidae; <i>Caecidotea</i>			2	1							
<b>Gastropoda (snails, limpets)</b>											
Ancylidae		2	1								
Physidae							2				
Planorbidae					2		2				

Table 2. Total macroinvertebrate taxa list, continued.

TAXA	18TRUNT	19TR	20UNT	21WC	22BR	23WC	24WC	25TM	26EC	27GR
<b>Ephemeroptera (mayflies)</b>										
Ameletidae; <i>Ameletus</i>										27
Baetidae; <i>Acentrella</i>								9	10	65
<i>Baetis</i>	81	61		1	355	7		13	6	480
Caenidae; <i>Caenis</i>						1		2	17	1
Ephemerellidae; <i>Ephemerella</i>					2			13		1
<i>Eurylophella</i>	1				1			1		3
Ephemeridae; <i>Ephemera</i>										
Heptageniidae; <i>Cinygmula</i>								8		
<i>Epeorus</i>								10	13	2447
<i>Leucrocuta</i>								8		
<i>Stenacron</i>				1			1		4	
<i>Stenonema</i>					1	4		8	25	
Isonychidae; <i>Isonychia</i>								2	1	
Leptophlebiidae; <i>Paraleptophlebia</i>	1	4		1	183		1	70		40
<b>Plecoptera (stoneflies)</b>										
Chloroperlidae; <i>Haploperla</i>		137		8	1054	1	4	24	5	101
<i>Sweltsa</i>	20							2		11
Leuctridae; <i>Leuctra</i>	1	1						1		10
Nemouridae; <i>Amphinemura</i>	1	1			38	6		5	12	208
<i>Ostrocerca</i>										
<i>Prostoia</i>										3
Perlidae; <i>Acroneuria</i>										1
<i>Agnatina</i>	3	7			17	2				
<i>Neoperla</i>								11		
<i>Paragnetina</i>								5		
Perlodidae; <i>Diploperla</i>					1				1	6
<i>Isoperla</i>	1	10			68	1			2	33
<b>Trichoptera (caddisflies)</b>										
Hydropsychidae; <i>Cheumatopsyche</i>		3		4	2	14	1	30	46	
<i>Diplectrona</i>					7					6
<i>Hydropsyche</i>	11	10		2	18	9	1	49	14	12
Lepidostomatidae; <i>Lepidostoma</i>										1
Limnephilidae; <i>Pycnopsyche</i>										
Philopotamidae; <i>Chimarra</i>									39	
<i>Dolophilodes</i>					7			4		14
<i>Wormaldia</i>						1			2	5
Polycentropodidae; <i>Polycentropus</i>	1			1				3		1
Rhyacophilidae; <i>Rhyacophila</i>	1				3					1
Uenoidae; <i>Neophylax</i>								2		1
<b>Diptera (true flies)</b>										
Ceratopogonidae; <i>Bezzia</i>									3	
<i>Ceratopogon</i>										
<i>Probezzia</i>	18	19		9	2	9	5	3	22	3
<i>Serromyia</i>										1
Chironomidae	1040	471	1349	179	226	423	67	234	286	334
Dolichopodidae										
Empididae; <i>Chelifera</i>	1	2			1					2

Table 2. Total macroinvertebrate taxa list, continued.

TAXA	18TRUNT	19TR	20UNT	21WC	22BR	23WC	24WC	25TM	26EC	27GR
<i>Clinocera</i>										
<i>Hemerodromia</i>	3	24		1	6			6	1	1
<b>Ephydriidae</b>										
Simuliidae; <i>Prosimulium</i>	12	8						7		172
<i>Simulium</i>	2	18			3	15		12	168	121
<b>Tabanidae</b>	2								1	
Tipulidae; <i>Antocha</i>	2	1			2					
<b>Dicranota</b>		3			2				1	
<i>Hexatoma</i>	7	13			4			2		1
<i>Molophilus</i>		2			3					
<i>Pseudolimnophila</i>										
<i>Tipula</i>	1	4			1		1			
<b>Coleoptera (aquatic beetles)</b>										
Dytiscidae; <i>Agabus</i>										
Elmidae; <i>Dubiraphia</i>	2									
<i>Optioservus</i>	19	17			14	2	1	3	2	
<i>Oulimnius</i>					6					
<i>Stenelmis</i>	32	4		3		10	2		97	
Gyrinidae; <i>Dineutus</i>										
Haliplidae; <i>Peltodytes</i>										
Hydrophilidae; <i>Helophorus</i>										
Psephenidae; <i>Ectopria</i>		1								
<i>Psephenus</i>	3					1		2	24	1
Ptilodactylidae; <i>Anchytarsus</i>										
<b>Megaloptera (alderflies, dobsonflies)</b>										
Corydalidae; <i>Nigronia</i>	1									
Sialidae; <i>Sialis</i>										
<b>Odonata (dragonflies, damselflies)</b>										
Macromiidae; <i>Macromia</i>										
Calopterygidae; <i>Calopteryx</i>										
<b>Non-Insect Taxa</b>										
<b>Oligochaeta (aquatic worms)</b>	6	4	826	3	17					5
<b>Hydracarina (aquatic mites)</b>	3	3			3					
<b>Planariidae (flatworms)</b>			39							
<b>Cambaridae (crayfish)</b>	1				1					
<b>Nematomorpha (horsehair worms)</b>	1	1								
<b>Hirundinea (leeches)</b>										
<b>Amphipoda (freshwater shrimp)</b>										
Crangonyctidae; <i>Crangonyx</i>			37	1						2
Gammaridae; <i>Gammarus</i>										
Talitridae; <i>Hyaella</i>										
<b>Isopoda (scuds or sowbugs)</b>										
Asellidae; <i>Caecidotea</i>					2					
<b>Gastropoda (snails, limpets)</b>										
<b>Ancylidae</b>										1
<b>Physidae</b>										
<b>Planorbidae</b>										

Table 2. Total macroinvertebrate taxa list, continued.



**Table 3.**  
**Rapid Bioassessment Protocol (RBP III) – Benthic Macroinvertebrate  
Metric Analysis**

Metric	Biological 6	Condition 4	Scoring 2	Criteria 0
1. Taxa Richness <sup>(a)</sup>	>80%	60-80%	40-60%	<40%
2. Hilsenhoff Biotic Index (modified) <sup>(b)</sup>	>85%	70-85%	50-70%	<50%
3. Ratio EPT and Chironomid Abundances <sup>(a)</sup>	>75%	50-75%	25-50%	<25%
4. EPT Index <sup>(a)</sup>	>90%	80-90%	70-80%	<70%
5. Community Loss Index <sup>(c)</sup>	<0.5	0.5 – 1.5	1.5 – 4.0	>4.0

(a) Score is a ratio of study site to reference site x 100.

(b) Score is a ratio of reference site to study site x 100.

(c) Range of values obtained. A comparison to the reference station is incorporated in these indices.

#### Criteria for Characterization of Biological Condition for RBP III

% Comparison to Reference Score <sup>(a)</sup>	Biological Condition Category	Attributes
>83%	Non-Impaired	Comparable to the best situation to be expected within an ecoregion. Balanced trophic structure. Optimum community structure (composition and dominance) for stream size and habitat quality.
54-79%	Slightly Impaired	Community structure less than expected. Composition (species richness) lower than expected due to loss of some intolerant forms. Percent contribution of tolerant forms increases.
21-50%	Moderately Impaired	Fewer species due to loss of most intolerant forms. Reduction in EPT index.
<17%	Severely Impaired	Few species present. If high densities of organisms, then dominated by one or two taxa.

a) Percentage values obtained that are intermediate to the above ranges will require subjective judgment as to the correct placement. Use of the habitat assessment and physiochemical data may be necessary to aid in the decision process.

TAXA	7WC	8WC	11WC	13WC	16WC	21WC	23WC	24WC	25TM
<b>Taxa Richness</b>	24	26	22	23	22	13	16	10	30
<b>Total # Individuals (sample size)</b>	732	1093	759	816	654	214	506	84	549
<b>Hilsenhoff Biotic Index (HBI)</b>	5.74	5.32	5.82	5.99	6.02	5.77	5.85	5.55	4.25
<b>Number (#) of EPT</b>	8	10	6	5	5	3	6	3	17
<b>Percent (%) EPT</b>	5.6	11.6	2.1	1.5	1.5	4.7	3	7.1	33.3
<b>% Dominant</b>	67.3	79.4	71	58.5	82.1	83.6	83.6	79.8	42.6
<b>Shannon Diversity</b>	1.37	0.95	1.24	1.47	0.89	0.79	0.83	0.9	2.26
<b># Intolerant Taxa (&lt;6)</b>	13	17	13	11	11	6	10	7	22
<b># Mayflies</b>	3	4	3	2	3	2	1	2	9
<b>% Mayflies</b>	1.4	1.4	0.9	0.4	0.8	0.9	0.8	2.4	23.5
<b># Stoneflies</b>	3	5	2	2	1	1	4	1	6
<b>% Stoneflies</b>	3.3	10	1.1	1	0.5	3.7	2	4.8	8.7
<b>% Shredders</b>	0.3	0.4	0.4	0.1	0	0	1.2	1.2	1.1
<b>% Filterer/Collectors</b>	4.6	4.5	6.1	5.9	4.9	3.3	7.7	2.4	19.1
<b>% Scrapers</b>	14.9	0.8	13.8	22.5	3.1	1.9	3.4	4.8	7.8
<b>% Predators</b>	5.5	11.1	3.3	4.9	4.9	8.4	2.6	10.7	9.7
<b>% Collector/Gatherers</b>	74.7	83.3	76.4	66.5	87	86.4	85.2	81	62.3
<b>Biological Condition Score vs 25TM</b>	8	14	12	12	12	8	10	6	30
<b>% Comparability to Reference vs 25TM</b>	27%	47%	40%	40%	40%	27%	33%	20%	Reference
<b>Biological Condition Category vs 25TM</b>	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Reference

Table 4. Macroinvertebrate community comparisons: Walnut Creek main stem sampling locations vs. Twentymile Creek sampling locations.

<b>TAXA</b>	<b>7WC</b>	<b>8WC</b>	<b>11WC</b>	<b>13WC</b>	<b>16WC</b>	<b>21WC</b>	<b>23WC</b>	<b>24WC</b>	<b>26EC</b>
<b>Taxa Richness</b>	24	26	22	23	22	13	16	10	25
<b>Total # Individuals (sample size)</b>	732	1093	759	816	654	214	506	84	802
<b>Hilsenhoff Biotic Index (HBI)</b>	5.74	5.32	5.82	5.99	6.02	5.77	5.85	5.55	5.37
<b>Number (#) of EPT</b>	8	10	6	5	5	3	6	3	11
<b>Percent (%) EPT</b>	5.6	11.6	2.1	1.5	1.5	4.7	3	7.1	14.2
<b>% Dominant</b>	67.3	79.4	71	58.5	82.1	83.6	83.6	79.8	35.7
<b>Shannon Diversity</b>	1.37	0.95	1.24	1.47	0.89	0.79	0.83	0.9	2.11
<b># Intolerant Taxa (&lt;6)</b>	13	17	13	11	11	6	10	7	17
<b># Mayflies</b>	3	4	3	2	3	2	1	2	5
<b>% Mayflies</b>	1.4	1.4	0.9	0.4	0.8	0.9	0.8	2.4	6.6
<b># Stoneflies</b>	3	5	2	2	1	1	4	1	4
<b>% Stoneflies</b>	3.3	10	1.1	1	0.5	3.7	2	4.8	2.5
<b>% Shredders</b>	0.3	0.4	0.4	0.1	0	0	1.2	1.2	1.5
<b>% Filterer/Collectors</b>	4.6	4.5	6.1	5.9	4.9	3.3	7.7	2.4	33.5
<b>% Scrapers</b>	14.9	0.8	13.8	22.5	3.1	1.9	3.4	4.8	21.8
<b>% Predators</b>	5.5	11.1	3.3	4.9	4.9	8.4	2.6	10.7	4.5
<b>% Collector/Gatherers</b>	74.7	83.3	76.4	66.5	87	86.4	85.2	81	38.7
<b>Biological Condition Score vs 26EC</b>	20	24	16	16	16	12	14	10	30
<b>% Comparability to Reference vs 26EC</b>	67%	80%	53%	53%	53%	40%	47%	33%	Reference
<b>Biological Condition Category vs 26EC</b>	Slightly Impaired	Non-Impaired	Slightly Impaired	Slightly Impaired	Slightly Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Reference

Table 5. Macroinvertebrate community comparisons: Walnut Creek main stem sampling locations vs. Elk Creek sampling locations.

TAXA	1WC	2WC	9UNT	12UNT	14UNT	17TR	18TRUNT	19TR	20UNT	22BR	27GR
<b>Taxa Richness</b>	48	38	8	12	30	33	30	26	4	31	36
<b>Total # Individuals (sample size)</b>	2154	1519	147	229	561	2628	1278	829	2251	2050	4122
<b>Hilsenhoff Biotic Index (HBI)</b>	3.19	4.66	6.17	6.68	4.77	4.95	5.76	4.73	7.49	2.18	1.74
<b>Number (#) of EPT</b>	20	15	1	0	15	10	8	6	0	12	20
<b>Percent (%) EPT</b>	50	19.4	6.1	0	20.5	15.7	2.3	19.3	0	67.4	72.4
<b>% Dominant</b>	40.8	41.6	74.1	69.4	62.9	62.7	81.4	56.8	59.9	51.4	59.4
<b>Shannon Diversity</b>	1.88	2.28	0.96	1.06	1.56	1.63	0.93	1.65	0.81	1.63	1.57
<b># Intolerant Taxa (&lt;6)</b>	33	24	2	4	21	18	17	16	1	20	25
<b># Mayflies</b>	8	4	0	0	6	3	2	1	0	4	6
<b>% Mayflies</b>	10.3	2.2	0	0	3.6	2.4	0.2	0.5	0	9.1	62.7
<b># Stoneflies</b>	7	7	0	0	6	6	5	5	0	5	8
<b>% Stoneflies</b>	36.9	10.8	0	0	15.7	13	2	18.8	0	57.5	9
<b>% Shredders</b>	2.2	2	0	0.9	0.4	0.6	0.2	1	0	2	5.4
<b>% Filterer/Collectors</b>	5.4	18.4	8.2	0	5.5	3.6	2	4.7	0	1.8	8
<b>% Scrapers</b>	5.2	19.1	1.4	6.6	3.6	9.8	4.5	2.7	0	1.1	61.1
<b>% Predators</b>	37.1	12.2	4.1	4.4	18.7	17.7	4.5	26.3	1.7	56.6	3.9
<b>% Collector/Gatherers</b>	50	48.3	86.4	88.2	71.7	68.2	88.6	65.4	98.3	38.4	21.6
<b>Biological Condition Score vs 27GR</b>	20	14	2	2	12	12	10	8	0	18	30
<b>% Comparability to Reference vs 27GR</b>	67%	47%	7%	7%	40%	40%	33%	27%	0%	60%	Reference
<b>Biological Condition Category vs 27GR</b>	Slightly Impaired	Moderately Impaired	Severely Impaired	Severely Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Moderately Impaired	Severely Impaired	Slightly Impaired	Reference

Table 6. Macroinvertebrate community comparisons: Walnut Creek tributaries and headwater sampling locations vs. Goodban Run sampling locations.

<b>TAXA</b>	<b>1WC</b>	<b>2WC</b>	<b>7WC</b>	<b>8WC</b>	<b>11WC</b>	<b>13WC</b>	<b>16WC</b>	<b>21WC</b>	<b>23WC</b>	<b>24WC</b>
<b>Taxa Richness</b>	48	38	24	26	22	23	22	13	16	10
<b>Total # Individuals (sample size)</b>	2154	1519	732	1093	759	816	654	214	506	84
<b>Hilsenhoff Biotic Index (HBI)</b>	3.19	4.66	5.74	5.32	5.82	5.99	6.02	5.77	5.85	5.55
<b>Number (#) of EPT</b>	20	15	8	10	6	5	5	3	6	3
<b>Percent (%) EPT</b>	50	19.4	5.6	11.6	2.1	1.5	1.5	4.7	3	7.1
<b>% Dominant</b>	40.8	41.6	67.3	79.4	71	58.5	82.1	83.6	83.6	79.8
<b>Shannon Diversity</b>	1.88	2.28	1.37	0.95	1.24	1.47	0.89	0.79	0.83	0.9
<b># Intolerant Taxa (&lt;6)</b>	33	24	13	17	13	11	11	6	10	7
<b># Mayflies</b>	8	4	3	4	3	2	3	2	1	2
<b>% Mayflies</b>	10.3	2.2	1.4	1.4	0.9	0.4	0.8	0.9	0.8	2.4
<b># Stoneflies</b>	7	7	3	5	2	2	1	1	4	1
<b>% Stoneflies</b>	36.9	10.8	3.3	10	1.1	1	0.5	3.7	2	4.8
<b>% Shredders</b>	2.2	2	0.3	0.4	0.4	0.1	0	0	1.2	1.2
<b>% Filterer/Collectors</b>	5.4	18.4	4.6	4.5	6.1	5.9	4.9	3.3	7.7	2.4
<b>% Scrapers</b>	5.2	19.1	14.9	0.8	13.8	22.5	3.1	1.9	3.4	4.8
<b>% Predators</b>	37.1	12.2	5.5	11.1	3.3	4.9	4.9	8.4	2.6	10.7
<b>% Collector/Gatherers</b>	50	48.3	74.7	83.3	76.4	66.5	87	86.4	85.2	81

Table 7. Macroinvertebrate community comparisons within the Walnut Creek watershed sampling locations.

Fish Species	1 WC	2 WC	7 WC	8 WC	9 UNT	11 WC	12 UNT	13 WC	14 UNT	15 UNT	16 WC	17 TR	18 TR UNT	19 TR	20 UNT	21 WC	22 BR	23 WC	24 WC	25 TM	26 EC	27 GR
Rainbow Trout ( <i>Onchorhynchus mykiss</i> )(stocked smolts)				R+		R+		C	C					P	P		P	P	P	C	R+	P
Rainbow Trout (wild steelhead) (< 100 mm in length)									C	R+				C			A	C	C	A	P	C
Brown Trout ( <i>Salmo trutta</i> ) (Lake Run)																		R	P	R		
Brown Trout ( <i>Salmo trutta</i> ) (Wild-Reproducing)																	P					
Creek Chub ( <i>Semotilus atromaculatus</i> )	VA	C	C	A		C	A	A	P	P	A	C	A	C		A	P	P	C	C	C	C
River Chub ( <i>Nocomis micropogon</i> )							R				P					R		C	P	C	P	
Blacknose Dace ( <i>Rhinichthys atratulus</i> )	VA	C	A	A		VA	A	A	C	C	C	A	C	C		A	C	C	C	P	C	VA
Longnose Dace ( <i>Rhinichthys cataractae</i> )			P	A		C		P	P+				P+	C		C	P+	C	P+	C	C	
Redside Dace ( <i>Clinostomus elongatus</i> )			C	C		C	C															
Central Stoneroller ( <i>Campostoma anomalum</i> )		P	A	VA		VA	P	A	C	C	VA		A	C		VA	P	VA	VA	C	VA	VA
Northern Hog Sucker ( <i>Hypentelium nigricans</i> )		P	P			C		P			P+		P	P+		A		C	P	P	P	R
White Sucker ( <i>Catostomus commersoni</i> )		P+	C	P		C	P	P+	P		P		P	P+		P		P	C	P	P	C
Common Shiner ( <i>Notropis cornutus</i> )		C	P+			A		A	P		C		P	P+		A		C	P	P	C	P
Rainbow Darter ( <i>Etheostoma caeruleum</i> )	R	C	P+			A		C	A	P	VA		P+	C		P+	P	A	A	A	VA	C
Banded Darter ( <i>Etheostoma zonale</i> )																		P				
Fantail Darter ( <i>Etheostoma flabellare</i> )		P	C	P		P+		R	R	R			R	R+		P		P	P	C	P	
Johnny Darter ( <i>Etheostoma nigrum</i> )		P	R																			
Mottled Sculpin ( <i>Cottus bairdi</i> )		P	P			R		C	P	P	P	C	P	R+			C	R	R	R		
Stonecat ( <i>Noturus flavus</i> )											R							C	P	P	P	
Smallmouth Bass (yoy) ( <i>Micropterus dolomieu</i> )																				R	P	C
Largemouth Bass (yoy) ( <i>Micropterus salmoides</i> )												R	P							R		
Yellow Perch ( <i>Perca flavescens</i> )																					R	P
Log Perch ( <i>Percina caprodes</i> )																			P			
Pumpkinseed ( <i>Lepomis gibbosus</i> )									R	R				R					P		P	P
Bluegill ( <i>Lepomis macrochirus</i> )				R			R	R+	P	P	R+							R	P	R+	P	P
Round Goby ( <i>Neogobius melanostomus</i> )																			C	P		
<b>Total Number of Species*</b>	<b>3</b>	<b>11</b>	<b>12</b>	<b>7</b>	<b>0</b>	<b>11</b>	<b>7</b>	<b>11</b>	<b>12</b>	<b>9</b>	<b>11</b>	<b>4</b>	<b>11</b>	<b>12</b>	<b>0</b>	<b>10</b>	<b>8</b>	<b>16</b>	<b>20</b>	<b>17</b>	<b>16</b>	<b>11</b>

\* excludes stocked steelhead smolts

Table 8. General abundance of fish species collected in the Walnut Creek Watershed in 2006. Abundance estimates: Very Abundant (>100 individuals); Abundant (26-99 individuals); Common (10-25 individuals); Present (3-9 individuals); Rare (<3 individuals).

<b>Habitat Parameter</b>	<b>27GR</b>	<b>1WC</b>	<b>2WC</b>	<b>7WC</b>	<b>9UNT</b>	<b>12UNT</b>	<b>14UNT</b>	<b>17TR</b>	<b>18 TRUNT</b>	<b>19TR</b>	<b>20UNT</b>	<b>22BR</b>
Instream Cover (fish)	15	15	16	<b>10</b>	<b>9</b>	<b>6</b>	14	12	14	12	14	14
Epifaunal Substrate	16	15	15	<b>8</b>	<b>9</b>	<b>7</b>	16	12	13	<b>9</b>	12	13
Embeddedness	15	12	15	<b>10</b>	11	<b>4</b>	16	12	12	11	<b>10</b>	12
Velocity/Depth Regimes	16	14	14	11	13	11	16	15	15	15	15	18
Channel Alteration	15	15	16	15	<b>7</b>	<b>7</b>	20	15	20	20	11	19
Sediment Deposition	13	12	13	9	11	<b>5</b>	14	<b>10</b>	13	11	11	12
Frequency of Riffles	16	16	13	9	12	<b>6</b>	16	15	16	12	15	15
Channel Flow Status	<b>10</b>	12	16	15	11	13	11	16	16	11	15	14
Condition of Banks	11	<b>10</b>	11	13	<b>6</b>	<b>2</b>	13	11	11	<b>6</b>	12	<b>8</b>
Bank Vegetative Protection	18	13	16	14	11	<b>2</b>	19	<b>10</b>	16	18	15	16
Grazing or Other Disruptive Pressures	18	13	16	17	12	<b>2</b>	19	<b>9</b>	16	18	13	16
Riparian Vegetative Zone Width	12	12	12	14	<b>6</b>	<b>1</b>	19	<b>10</b>	16	15	<b>10</b>	16
<b>Total Score (possible of 240)</b>	175	159	173	145	118	66	193	147	176	158	153	178
<b>Overall Habitat Rating</b>	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Marginal	Poor	Optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal
<b>Percent Comparability to Reference Station</b>	Reference	90.9%	98.9%	82.9%	67.4%	37.7%	>100%	84%	>100%	90.3%	87.4%	>100%

Table 9. Habitat assessment summary scores for tributary streams in the Walnut Creek Watershed. Station 27GR was used as the comparative reference station. Individual scores in the “marginal” and “poor” categories are listed in bold.

Habitat Parameter	25TM	26EC	8WC	11WC	13WC	16WC	21WC	23WC	24WC
Instream Cover (fish)	13	12	15	15	13	13	13	13	12
Epifaunal Substrate	13	<b>9</b>	15	15	12	12	<b>9</b>	11	<b>10</b>
Embeddedness	13	12	13	13	11	12	11	11	<b>10</b>
Velocity/Depth Regimes	15	15	14	17	15	13	18	15	14
Channel Alteration	14	17	16	13	15	16	19	16	<b>7</b>
Sediment Deposition	16	12	12	11	12	13	11	12	12
Frequency of Riffles	16	16	15	16	15	16	15	12	15
Channel Flow Status	14	12	14	12	13	12	18	11	15
Condition of Banks	<b>10</b>	15	<b>8</b>	<b>8</b>	<b>7</b>	11	<b>5</b>	<b>8</b>	<b>6</b>
Bank Vegetative Protection	12	<b>8</b>	12	<b>8</b>	14	17	12	13	<b>7</b>
Grazing or Other Disruptive Pressures	15	12	12	11	15	18	15	13	14
Riparian Vegetative Zone Width	12	12	11	<b>7</b>	12	16	15	12	<b>3</b>
<b>Total Score (possible of 240)</b>	162	164	157	146	154	169	161	147	125
<b>Overall Habitat Rating</b>	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Sub-optimal	Marginal
<b>Percent Comparability to Reference Station</b>	Reference	Reference	96.3%	89.5%	94.5%	>100%	98.8%	90.2%	76.7%

Table 10. Habitat assessment summary scores for the main stem of Walnut Creek. Stations 25TM and 26EC were used as comparative reference stations. Individual scores in the “marginal” and “poor” categories are listed in bold.



<b>Station</b>	<b>Bedrock</b>	<b>Boulder</b> (>256mm/10in)	<b>Cobble</b> (64-256mm/2.5-10in)	<b>Gravel</b> (2-64mm/0.1-2.5in)	<b>Sand</b> (0.06-2mm/gritty)	<b>Silt</b> (0.004-0.06mm)
27GR (reference)	0	15	42	26	10	7
1WC	0	5	40	25	22	8
2WC	0	2	40	25	25	8
7WC	0	15	25	20	25	15
9UNT	45	5	20	10	15	5
12UNT	0	0	10	25	35	30
14UNT	10	5	35	25	15	10
17TR	0	0	35	30	10	25
18TRUNT	35	0	25	10	10	20
19TR	55	1	10	9	10	15
20UNT	0	0	35	35	15	15
22BR	30	25	5	17	18	5
25TM (reference)	25	5	30	15	10	15
26EC (reference)	35	2	26	12	17	8
8WC	25	10	30	11	10	14
11WC	5	1	40	19	10	25
13WC	25	8	30	10	12	15
16WC	50	2	17	10	5	15
21WC	45	5	14	14	16	6
23WC	45	1	20	14	10	10
24WC	30	7	27	10	11	15

Table 11. Percentage of substrate types for each benthic macroinvertebrate station assessed in the Walnut Creek Watershed. Diameter of each specific particle size is listed in parenthesis (%).

Water Quality Parameters	1WC		2WC		3UNT		4UNT		5UNT		6WC		7WC		8WC		9UNT		10UNT	
	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold
<b>Field Parameters</b>																				
pH	7.08	-	7.93	-	8.38	-	7.24	-	7.3	-	7.45	-	7.47	-	7.82	-	7.93	-	7.64	-
Temperature (degrees C)	7.62	-	11.5	-	17.1	-	14.1	-	14.4	-	12	-	8.79	-	11	-	10.6	-	10.1	-
Alkalinity (mg/l)	40	-	68	-	150	-	140	-	75	-	130	-	100	-	120	-	125	-	80	-
Conductivity (umhos/cm)	82	-	162	-	303	-	741	-	321	-	326	-	275	-	322	-	1264	-	2709	-
Dissolved Oxygen (mg/l)	12.6	-	13.8	-	9.18	-	9.18	-	11.9	-	10.1	-	11.4	-	11.1	-	11.1	-	10.7	-
Dissolved Oxygen (%)	106	-	127	-	89.3	-	89.3	-	117	-	94	-	97.9	-	100	-	100	-	95.6	-
<b>Laboratory Parameters</b>																				
Fecal Coliforms (colonies/100 ml)	<20	1700	20	13000	20	3200	20	43000	140	12000	20	10000	100	2100	20	580	10	3100	20	360
pH	8	7.4	8.1	7.9	8.4	7.9	7.9	7.9	7.6	7.5	7.9	8	8	7.9	8.4	7.6	8.3	7.5	8	7.1
Alkalinity (mg/l)	45	64	92	97	100	124	118	119	63	59	107	98	106	125	92	51	189	35	271	10
Sulfate (mg/l)	13	15	12	12	102	90	69	73	17	15	21	34	22	22	23	15	90	13	23	6
Residue, Total (mg/l)	98	446	178	254	334	564	660	1404	262	344	310	1612	300	456	290	314	176	552	2544	136
Settleable Solids (ml/l)	<0.2	0.4	<0.2	0.4	<0.2	<0.2	<0.2	1.2	<0.2	1.2	<0.2	<0.80	<0.2	1.2	<0.2	0.8	<0.2	0.8	<0.2	0.4
Suspended Solids T (mg/l)	<2	254	<2	28	2	236	28	360	4	124	58	1236	12	118	<2	128	10	264	8	68
Nitrite-N (mg/l)	0.01	0.03	0.01	<0.01	<0.01	0.03	<0.01	0.03	<0.01	0.03	<0.01	0.03	<0.01	<0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01
Nitrate-N (mg/l)	0.19	0.78	0.12	0.36	<0.04	0.58	0.11	0.26	0.06	0.3	0.07	0.42	0.06	0.1	<0.04	0.45	0.5	0.44	0.87	0.24
Nitrogen T (mg/l)	0.43	2.34	0.31	0.81	0.31	1.34	0.71	1.59	0.33	1.6	0.35	1.68	0.24	0.72	0.14	1.32	0.64	2.1	1.03	0.85
Total Organic Carbon TOC (mg/l)	2.9	6.87	3.1	15.7	4.39	15	7.25	7.25	5.19	16.6	3.5	16	3.42	6.88	3.03	9.57	2.35	11.6	1.54	5.07
Ammonia-N (mg/l)	<0.02	0.12	<0.02	0.1	<0.02	0.05	0.06	0.06	0.05	0.17	0.05	0.28	0.03	0.05	<0.02	0.24	<0.02	0.37	0.03	0.35
SPC @ 25 C (umhos/cm)	147	211	302	355	456	487	1052	1167	408	351	431	475	453	518	478	413	2370	328	3630	79
TDS @ 105 C (mg/l)	98	192	178	226	332	328	632	1044	258	220	252	376	288	338	290	230	1746	288	2536	68
Hardness T (mg/l)	58	82	112	126	203	218	254	320	95	96	142	226	143	168	129	95	535	93	528	23
Phosphorus T (mg/l)	0.05	0.53	0.02	0.075	0.02	0.116	0.04	0.308	0.03	0.185	0.03	0.504	0.02	0.11	0.01	0.132	<0.01	0.325	<0.01	0.076
Chloride (mg/l)	8	13.6	32.6	45.5	21.2	25.4	234	286.3	79.6	63.2	58.9	75.5	68	78.4	82.6	84.9	656	71.8	978	11.5
COD (mg/l)	23.8	37.1	24.1	33.4	25.9	67.5	25.4	56.9	20.2	55.6	19.1	54.9	28.4	24.6	16.6	41.9	32.9	38.1	37	22.1
BOD5 Inhib (mg/l)	0.66	10.9	0.69	3.3	1.4	10.4	0.82	10.3	0.68	13.8	0.84	6.8	0.7	3.9	0.45	10.6	0.46	11.3	<0.20	5.5
Turbidity (NTU)	3.43	119	1.62	34.45	2.72	65.7	9.44	494.5	2.23	76.6	16.7	1062	9.19	59.9	1.28	106.8	2.03	123.2	6.52	47.6
Iron T (ug/l)	172	5029	378	1797	172	3660	791	18600	376	4330	874	43000	907	6315	116	4642	180	11200	1413	2444
Aluminum T (ug/l)	<200	3544	<200	746	<200	1590	358	7890	<200	2430	278	21200	203	3788	<200	2614	<200	5215	380	1735
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium T (mg/l)	17	24	33.4	37.7	58.1	63	64.4	76.1	28.7	27.8	42.9	60.3	42.9	48.9	39.1	28.2	156	27.4	156	6.9
Copper T (ug/l)	<10	<10	<10	<10	<10	<10	<10	33	<10	<10	<10	37	<10	<10	<10	15	<10	21	<10	<10
Chromium T (ug/l)	<4	<4	<4	<4	<4	<4	<4	12	<4	<4	<4	18.3	<4	<4	<4	6.5	<4	18.4	<4	5.9
Manganese T (ug/l)	12	255	77	176	73	498	145	667	131	896	180	956	146	752	<10	168	174	976	273	142
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	4.4	<1.0	2	<1.0	2.6	1.1	23.5	<1.0	3.8	<1.0	27.7	<1.0	3.2	<1.0	5.8	<1.0	14.7	2.5	10.4
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	31	<10	12	<10	33	<10	113	<10	32	<10	129	<10	15	<10	58	<10	178	29	101
Magnesium T (mg/l)	3.75	5.33	6.9	7.63	13.9	14.8	21.7	31.5	5.74	6.32	8.33	18.3	8.59	11.2	7.47	6.03	35.1	6.04	33.6	1.51
Oil and Grease	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<5.0	n/a	n/a	n/a	<5.0	<5.0	7.2	<5.0	<5.0	<5.0

Table 12. Cold-water chemistry sampling data.

Water Quality Parameter	11WC		12UNT		13WC		14UNT		15UNT		16WC		17TR		18TRUNT		19TR		20UNT	
	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold
<b>Field Parameters</b>																				
pH	8.78	-	7.52	-	7.81	-	8.09	-	8.07	-	8.37	-	7.9	-	8	-	8.12	-	7.77	-
Temperature (degrees C)	13.9	-	11.4	-	9.24	-	11.8	-	14.8	-	10.5	-	9.04	-	10.3	-	7.98	-	11.2	-
Alkalinity (mg/l)	82	-	114	-	120	-	92	-	156	-	106	-	98	-	96	-	112	-	222	-
Conductivity (umhos/cm)	532	-	633	-	411	-	646	-	615	-	602	-	578	-	687	-	557	-	896	-
Dissolved Oxygen (mg/l)	12.6	-	10.8	-	11.6	-	12.2	-	11.3	-	13.7	-	13.7	-	12.2	-	13.3	-	11.6	-
Dissolved Oxygen (%)	122	-	97.3	-	101	-	113	-	112	-	123	-	119	-	109	-	113	-	106	-
<b>Laboratory Parameters</b>																				
Fecal Coliforms (colonies/100 ml)	20	2600	60	8000	140	4600	610	3500	40	11000	80	5600	230	7000	40	4400	80	2800	<20	3600
pH	8.3	7.8	8.2	7.6	8	7.4	8.3	7.6	8.3	7.5	8.5	7.9	8.5	7.7	8.5	7.6	8.5	8	8.1	7.7
Alkalinity	103	39	196	44	120	54	106	45	187	72	117	109	109	83	121	83	126	108	222	87
Sulfate (mg/l)	29	14	46	12	33	18	26	11	52	16	33	31	24	19	25	20	28	24	49	28
Residue, Total (mg/l)	390	516	574	370	480	702	428	248	530	380	402	1084	338	364	416	1096	320	490	652	1556
Settleable Solids (ml/l)	<0.2	1.2	<0.2	0.8	<0.2	1.6	<0.2	0.8	<0.2	1.6	<0.2	8	<0.2	0.8	<0.2	1.2	<0.2	1.6	<0.2	0.4
Suspended Solids T (mg/l)	6	290	<2	264	2	138	18	72	2	158	4	632	<2	62	4	602	<2	206	<2	974
Nitrite-N (mg/l)	<0.01	0.01	<0.01	0.03	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	0.01	<0.01	0.02	<0.01	0.01	<0.01	0.04
Nitrate-N (mg/l)	0.08	0.37	0.22	0.61	0.16	0.49	0.19	0.21	0.28	0.49	0.17	0.46	0.23	0.45	0.12	0.68	0.14	0.42	2.32	0.97
Nitrogen T (mg/l)	0.3	1.73	0.37	2.98	0.32	2.03	0.35	0.94	0.42	1.91	0.28	2.41	0.36	1.36	0.26	2.67	0.42	1.15	2.37	2.11
Total Organic Carbon TOC (mg/l)	3.05	11.2	3.64	20.6	3.06	16.5	2.59	10.8	3.38	17.4	2.87	15.3	3.12	14.5	3.46	23.5	2.79	9.73	1.26	9.72
Ammonia-N (mg/l)	<0.02	0.32	<0.02	0.61	<0.02	0.39	<0.02	0.05	<0.02	0.14	<0.02	0.09	<0.02	0.1	<0.02	0.26	<0.02	0.07	<0.02	0.09
SPC @ 25 C (umhos/cm)	614	306	902	211	745	387	644	299	787	306	675	635	541	516	613	402	543	406	906	400
TDS @ 105 C (mg/l)	384	226	574	106	478	564	410	176	528	222	398	452	338	302	412	494	320	284	652	582
Hardness T (mg/l)	158	89	289	78	191	120	153	59	271	100	182	213	142	113	178	153	162	152	329	180
Phosphorus T (mg/l)	0.01	0.27	0.01	0.583	0.02	0.391	0.01	0.122	0.02	0.236	0.01	0.386	0.01	0.13	0.02	0.557	<0.01	0.152	<0.01	0.528
Chloride (mg/l)	124	60	156	27	156	74	135	58.1	123	39.8	136	127.6	89.8	99	119	64	83.2	48.4	140	54.6
COD (mg/l)	26.5	51.3	21.9	91.6	32.9	48.1	21.9	27.2	23	60.7	22.4	36.7	18.8	49.6	24.2	58.2	15.4	38.4	16.8	16.4
BOD5 Inhib (mg/l)	0.33	11.4	0.72	21.6	0.71	17.1	0.65	2	0.59	11.3	0.66	12	0.96	7.5	0.92	9.5	0.65	6.1	<0.20	5.8
Turbidity (NTU)	<1.0	111	3.2	100.9	1.27	345.8	2.49	80.45	<1	62.45	<1	193.5	<1	50.1	1.01	887.5	<1	168.2	1.25	230.6
Iron T (ug/l)	72	7120	910	7270	231	20100	223	4289	97	6648	50	18200	173	2408	146	43700	83	6144	109	58600
Aluminum T (ug/l)	<200	3760	<200	2790	<200	8791	<200	3508	<200	3486	<200	8480	<200	1619	<200	26400	<200	3600	<200	25900
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	51
Calcium T (mg/l)	47.2	26.6	86.2	23.3	57.2	33.9	46.5	17.6	81.6	29.7	54.5	62.1	42.5	33.6	52.2	39.6	47.5	44.4	98.5	46.3
Copper T (ug/l)	<10	15	<10	23	<10	30	<10	<10	<10	14	<10	22	<10	<10	<10	45	<10	12	<10	66
Chromium T (ug/l)	<4	14	<4	16.4	<4	20.2	<4	<4	<4	<4	<4	15.4	<4	<4	<4	14.9	<4	5.2	<4	16
Manganese T (ug/l)	<10	615	140	383	45	685	12	220	27	814	10	833	15	502	31	1059	15	387	71	671
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	11	<1.0	8.8	<1.0	16.6	<1.0	3.5	<1.0	4.7	<1.0	20	<1.0	2.3	<1.0	38.1	<1.0	93.2	<1.0	18.1
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	124	<10	160	<10	160	<10	31	<10	39	<10	94	<10	15	<10	142	<10	42	<10	186
Magnesium T (mg/l)	9.79	5.43	17.9	4.79	11.7	8.67	8.81	3.55	16.3	6.3	11.1	14.1	8.7	7.1	11.6	13.1	10.6	9.9	20	15.5
Oil and Grease	5.1	<5.0	<5.0	<5.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 12. Cold-water chemistry sampling data, continued

Water Quality Parameter	21WC		22BR		23WC		24WC		25TM		26EC		27GR	
	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold	Low-Cold	High-Cold
<b>Field Parameters</b>														
pH	7.6	-	8.15	-	8.12	-	8.97	-	7.68	-	8.26	-	7.28	-
Temperature (degrees C)	9.65	-	9.77	-	9.41	-	13.4	-	9.9	-	9.01	-	7	-
Alkalinity (mg/l)	90	-	130	-	120	-	110	-	60	-	90	-	35	-
Conductivity (umhos/cm)	344	-	259	-	620	-	420	-	237	-	194	-	123	-
Dissolved Oxygen (mg/l)	11.9	-	12	-	13	-	11.1	-	12	-	13.7	-	12.3	-
Dissolved Oxygen (%)	105	-	106	-	114	-	106	-	106	-	114	-	101	-
<b>Laboratory Parameters</b>														
Fecal Coliforms (colonies/100 ml)	60	2600	40	1800	20	1000	60	1300	<20	180	20	2100	<20	2900
pH	8.4	8.1	8.4	8.2	8.4	8.1	8.4	8.2	8.3	8.2	8.2	8	7.5	7.5
Alkalinity	125	121	177	147	135	124	132	126	77	82	88	90	34	41
Sulfate (mg/l)	37	40	45	41	41	43	42	42	25	21	21	31	21	26
Residue, Total (mg/l)	420	658	312	360	402	418	392	450	186	156	188	282	126	202
Settleable Solids (ml/l)	<0.2	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Suspended Solids T (mg/l)	<2	240	<2	8	<2	30	<2	12	<2	<2	2	24	2	4
Nitrite-N (mg/l)	<0.01	0.02	<0.01	0.01	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.01	<0.01	0.01
Nitrate-N (mg/l)	0.22	0.42	0.38	0.58	0.27	0.38	0.31	0.5	0.2	0.21	0.31	0.55	0.38	1.02
Nitrogen T (mg/l)	0.34	1.17	0.41	0.81	0.35	0.93	0.44	0.81	0.28	0.28	0.46	0.97	0.45	1.48
Total Organic Carbon TOC (mg/l)	2.74	9.97	2.04	6.78	2.69	6.36	2.7	5.7	2.06	2.74	3.09	6.09	2.95	7.41
Ammonia-N (mg/l)	<0.02	0.04	<0.02	0.05	<0.02	0.04	0.02	0.05	<0.02	0.03	<0.02	0.06	<0.02	0.05
SPC @ 25 C (umhos/cm)	631	601	509	445	616	558	619	561	267	266	300	330	201	250
TDS @ 105 C (mg/l)	420	418	312	352	402	388	392	438	186	156	186	258	124	198
Hardness T (mg/l)	193	209	242	203	200	189	200	191	105	110	116	126	55	71
Phosphorus T (mg/l)	<0.01	0.13	<0.01	0.023	<0.01	0.044	<0.01	0.029	<0.01	<0.01	0.02	0.049	0.01	0.05
Chloride (mg/l)	112	92.4	33.6	28.5	94.8	76.8	94.4	78.5	20.1	19	27.7	27.8	26.1	31.5
COD (mg/l)	19.7	28.8	23.9	41.2	40	35	20.9	34.7	20.3	10.6	19.8	43.1	22.7	47.9
BOD5 Inhib (mg/l)	<0.20	7.5	<0.20	5	<0.20	4.2	0.57	3.5	<0.20	2.1	0.93	3.5	<0.20	3.3
Turbidity (NTU)	<1	40.6	<1	9.59	<1	20.26	<1	18.96	<1	1.26	<1	39.95	<1	23.1
Iron T (ug/l)	42	4760	89	435	42	1801	56	942	22	48	40	2002	<20	906
Aluminum T (ug/l)	<200	2210	<200	<200	<200	958	<200	440	<200	<200	<200	1476	<200	878
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium T (mg/l)	57	62.2	70.9	59.7	58.9	55.8	58.6	56.3	32.1	34.3	35.3	37.2	16.3	20.1
Copper T (ug/l)	<10	<10	<10	<10	<10	13	<10	<10	<10	<10	<10	<10	<10	<10
Chromium T (ug/l)	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Manganese T (ug/l)	<10	246	<10	39	<10	91	<10	46	<10	<10	<10	78	<10	26
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	3.5	<1.0	<1.0	<1.0	3.4	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	29	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Magnesium T (mg/l)	12.3	13.1	15.8	39	12.7	12.1	13	12.1	5.9	5.91	6.72	7.94	4.92	4.92
Oil and Grease	n/a	n/a	n/a	n/a	n/a	n/a	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	n/a	n/a

Table 12. Cold-water chemistry sampling data, continued

Water Quality Parameters	1WC		2WC		3UNT		4UNT		5UNT		6WC		7WC		8WC		9UNT		10UNT	
	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm
<b>Field Parameters</b>																				
pH	6.51	-	6.8	-	7.02	-	6.86	-	6.82	-	7.23	-	7.65	-	8.58	-	8.16	-	7.78	-
Temperature (degrees C)	14.28	-	14.3	-	15.77	-	14.54	-	16.02	-	16.12	-	16.61	-	17.12	-	14.98	-	15.47	-
Alkalinity (mg/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (umhos/cm)	205	-	359	-	419	-	616	-	571	-	503	-	522	-	523	-	1725	-	1457	-
Dissolved Oxygen (mg/l)	9.89	-	8.3	-	9.45	-	8.26	-	3.59	-	7.13	-	10.11	-	13.21	-	10.06	-	9.05	-
Dissolved Oxygen (%)	96.6	-	81.2	-	95.8	-	81.3	-	66.7	-	72.7	-	103.9	-	137.6	-	100.4	-	91.2	-
<b>Laboratory Parameters</b>																				
Fecal Coliforms (colonies/100 ml)	500	45000	160	18000	320	15000	500	30000	360	9900	1000	37000	160	45000	260	30000	480	5200	120	500
pH	7.8	7.7	7.8	7.6	7.9	7.8	7.9	7.9	7.4	7.7	7.8	7.9	8	8	8.7	7.9	8.3	8.1	8	8.1
Alkalinity (mg/l)	79	47	141	38	115	51	116	77	102	71	152	78	147	81	121	77	222	91	233	191
Sulfate (mg/l)	18	15	14	18	105	108	54	37	29	24	33	46	34	43	36	36	83	31	155	131
Residue, Total (mg/l)	176	210	266	144	370	448	580	556	420	276	394	410	404	592	396	420	1604	360	1098	1732
Settlable Solids (ml/l)	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Suspended Solids T (mg/l)	<2	<2	<2	16	2	284	6	52	<2	24	2	170	<2	350	<2	216	2	<2	4	2
Nitrite-N (mg/l)	<0.1	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.03	0.01	0.01	<0.1	0.02	<0.1	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate-N (mg/l)	0.62	0.61	0.12	0.12	0.24	0.38	0.32	0.28	0.27	0.38	0.08	0.43	0.13	0.48	0.05	0.44	0.82	0.44	0.33	0.6
Nitrogen T (mg/l)	0.86	1.51	0.29	2.2	0.46	0.86	0.73	0.76	0.69	1.35	0.32	1.14	0.48	1.4	0.29	1.23	1.05	0.76	0.55	0.93
Total Organic Carbon TOC (mg/l)	3.94	10.6	3.44	19.4	3.83	4.13	5.68	5.15	4.93	12.3	4.26	11.9	4.65	13.8	4.13	10.2	4	5.9	5.25	7.63
Ammonia-N (mg/l)	<0.2	0.03	0.03	0.04	0.03	<0.02	0.04	<0.02	0.06	0.03	0.07	0.03	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
SPC @ 25 C (umhos/cm)	246	219	425	196	480	366	726	344	671	482	565	367	582	372	577	361	1986	631	1667	1443
TDS @ 105 C (mg/l)	176	210	266	128	368	246	574	504	420	252	392	240	404	242	396	204	1602	360	1094	1730
Hardness T (mg/l)	101	76	163	60	225	176	225	141	162	78	208	140	190	137	172	122	527	122	364	283
Phosphorus T (mg/l)	0.169	0.222	0.024	0.14	0.024	0.128	0.051	0.176	0.041	0.153	0.037	0.176	0.023	0.226	0.013	0.164	0.018	0.045	0.015	0.023
Chloride (mg/l)	15.7	27.3	44	24.8	21.3	10.5	140.5	38	139.6	91.2	72.4	36.5	79.9	39	92.2	43	492.7	126.8	334.9	276.6
COD (mg/l)	27.2	119.1	20.6	102.9	32.7	55.2	36.5	58.4	36.9	77.6	23.6	68	22.9	76.1	27.9	109.8	48.1	40.5	54.7	80.4
BOD5 Inhib (mg/l)	1.6	1.7	1.9	17.25	<0.2	3.9	2.3	3.9	2.4	17.6	2.1	19.65	1.8	4.9	1.7	10.8	1.8	6.4	1.9	3.4
Turbidity (NTU)	1.73	38.1	3.39	4.19	5.9	162.5	10.36	310	6.85	27.8	11.23	145.8	5.91	233	<1	185.3	<1	5.37	1.84	1.15
Iron T (ug/l)	140	2850	684	230	568	10800	2680	12700	1110	1827	1350	7614	681	13400	51	11500	28	419	230	272
Aluminum T (ug/l)	<200	1560	<200	<200	225	4570	1320	6900	<200	1218	376	4165	<200	6660	<200	5807	<200	<200	<200	<200
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium T (mg/l)	30.4	22.5	48.8	17.7	67.2	51.9	58.7	41.7	48.7	23.6	61.6	41.6	56.2	39	51.3	35.8	157	38.8	109	87.8
Copper T (ug/l)	12	<10	<10	<10	<10	13	<10	17	<10	<10	<10	10	<10	15	<10	11	<10	<10	<10	<10
Chromium T (ug/l)	<4	<4	<4	<4	<4	5.2		8.1	<4	<4	<4	<4	<4	4.9	<4	4.4	<4	<4	<4	<4
Manganese T (ug/l)	27	100	207	50	358	162	291	168	505	153	221	259	91	361	<10	287	<10	33	147	70
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	2.4	<1.0	<1.0	<1.0	4.6	3	8.9	<1.0	2.1	1.2	3.7	<1.0	5.9	<1.0	4.9	<1.0	<1.0	<1.0	1.7
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	19	<10	29	<10	65	16	45	15	17	21	25	<10	51	<10	36	11	12	23	73
Magnesium T (mg/l)	6	4.85	10	3.86	13.8	11.3	18.9	8.86	9.7	4.526	13.1	8.652	12	9.55	10.7	7.976	32.7	6.087	22.1	15.5
Oil and Grease	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	<5.0	<5.0	n/a	n/a	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Table 13. Warm-water chemistry sampling data.

Water Quality Parameter	11WC		12UNT		13WC		14UNT		15UNT		16WC		17TR		18TRUNT		19TR		20UNT	
	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm
<b>Field Parameters</b>																				
PH	8.56	-	7.92	-	8.09	-	7.54	-	8.03	-	8.5	-	8.1	-	8.04	-	8.25	-	7.75	-
Temperature (degrees C)	18.16	-	16.92	-	18.36	-	16.11	-	16.41	-	17.69	-	17.5	-	16.38	-	15.36	-	15.77	-
Alkalinity (mg/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (umhos/cm)	711	-	1049	-	715	-	692	-	766	-	658	-	505	-	629	-	515	-	815	-
Dissolved Oxygen (mg/l)	12.72	-	9.93	-	12.95	-	8.23	-	10.41	-	12.74	-	12.13	-	10.12	-	10.95	-	10.11	-
Dissolved Oxygen (%)	135.1	-	103	-	138.1	-	84	-	106.7	-	134	-	127	-	103.5	-	109.6	-	102.3	-
<b>Laboratory Parameters</b>																				
Fecal Coliforms (colonies/100 ml)	370	37000	220	11000	240	18000	80	8100	500	5600	140	14000	160	30000	180	19000	280	14000	600	26000
PH	8.6	7.9	8.1	8	8.3	8	7.8	7.8	8.3	7.9	8.6	7.8	8.3	7.8	8.3	8.1	8.5	8.1	8.2	7.8
Alkalinity	126	72	238	98	140	72	162	63	251	70	127	65	150	67	157	85	158	81	240	54
Sulfate (mg/l)	43	32	55	19	41	27	21	16	56	17	40	21	29	23	31	25	32	25	52	14
Residue, Total (mg/l)	524	472	782	250	504	334	526	226	616	166	476	364	322	290	466	440	412	428	624	420
Settleable Solids (ml/l)	<0.2	0.4	<0.2	<0.2	<0.2	2.4	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	0.4	<0.2	0.4	<0.2	0.4
Suspended Solids T (mg/l)	2	246	<2	22	4	132	6	22	<2	2	<2	124	<2	48	2	114	<2	118	2	328
Nitrite-N (mg/l)	<0.01	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.03
Nitrate-N (mg/l)	<0.04	0.45	0.13	0.85	0.13	0.42	0.16	0.25	0.12	0.37	0.04	0.41	0.18	0.26	0.09	0.59	0.14	0.51	1.48	0.42
Nitrogen T (mg/l)	0.22	1.17	0.26	1.63	0.28	1.03	0.31	0.71	0.23	0.85	0.15	1.07	0.31	1.1	0.22	1.46	0.24	1.33	1.63	1.02
Total Organic Carbon TOC (mg/l)	4.02	9.66	3.04	8.95	3.21	7.98	3.57	6.57	3.43	7.24	3.22	5.4	2.33	13.5	3.54	11.8	2.77	12.2	1.29	8.18
Ammonia-N (mg/l)	<0.02	0.03	0.02	0.04	<0.02	0.03	<0.02	<0.02	<0.02	0.02	<0.02	0.03	<0.02	0.03	<0.02	0.06	<0.02	0.03	<0.02	0.06
SPC @ 25 C (umhos/cm)	764	351	1155	351	854	349	773	352	848	251	713	315	549	432	701	579	590	510	918	200
TDS @ 105 C (mg/l)	522	226	782	228	500	202	520	204	616	164	476	240	320	242	464	326	412	310	622	92
Hardness T (mg/l)	211	113	359	106	226	99	220	83	338	82	202	87	187	73	220	103	207	99	344	79
Phosphorus T (mg/l)	<0.01	0.204	0.016	0.13	0.011	0.132	0.019	0.076	0.02	0.06	<0.01	0.123	0.015	0.16	0.017	0.179	0.011	0.159	0.012	0.258
Chloride (mg/l)	151.4	44.5	213.1	36.9	172.5	46.6	147.3	59.5	109.7	25.5	140.7	47.3	72.1	79.2	120.7	119.1	79.9	92.9	135.4	19.5
COD (mg/l)	21.1	47.5	22.7	67.3	24.3	81.8	23	103.4	28.9	75.5	35.1	17.3	25	143.1	15.9	38.7	34.9	87.9	24.8	56.3
BOD5 Inhib (mg/l)	1.9	9.65	1.9	3.3	1.8	4.6	1.6	18.8	1.5	1.2	2.3	1.8	2.1	11.1	1.8	12.45	1.5	27.3	2.1	17.1
Turbidity (NTU)	<1	234.5	3.83	17.94	<1	96.8	1.34	11.18	<1	5.24	<1	91.6	<1	29.35	1.26	62.7	<1	50.15	1.08	321.5
Iron T (ug/l)	<20	11900	636	706	55	3981	315	1280	193	402	31	1758	40	2190	163	4520	76	3024	78	11500
Aluminum T (ug/l)	<200	6150	<200	331	<200	2188	<200	548	<200	203	<200	1342	<200	1480	<200	2382	<200	1578	<200	5385
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium T (mg/l)	62.7	33.1	109	33.2	67.8	30.3	66.8	25.2	102	25.5	60.1	27	55.7	22.3	64.6	31	60.8	30	104	23.3
Copper T (ug/l)	<10	11	<10	<10	<10	<10	<10	<10	<10	<10	<10	13	<10	<10	<10	<10	<10	<10	<10	15
Chromium T (ug/l)	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Manganese T (ug/l)	<10	364	120	47	22	205	168	93	38	32	<10	244	24	232	46	298	13	272	56	151
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	6.1	<1.0	<1.0	<1.0	3.6	<1.0	<1.0	<1.0	<1.0	<1.0	6	<1.0	1.9	<1.0	4.8	<1.0	4.9	<1.0	3.1
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	46	<10	13	<10	28	<10	11	<10	<10	<10	27	25	11	<10	19	<10	20	<10	47
Magnesium T (mg/l)	13.2	7.369	21.1	5.658	13.8	5.601	12.9	4.84	20.2	4.4	12.5	4.7	11.7	4.2	14.1	6.2	13.3	5.8	20.4	5
Oil and Grease	<5.0	<5.0	<5.0	<5.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 13. Warm-water chemistry sampling data, continued.

Water Quality Parameter	21WC		22BR		23WC		24WC		25TM		26EC		27GR	
	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm	Low-Warm	High-Warm
<b>Field Parameters</b>														
pH	8.62	-	8.25	-	8.28	-	7.98	-	8.32	-	8.1	-	7.68	-
Temperature (degrees C)	19.35	-	15.24	-	16.2	-	16.42	-	22.33	-	19.36	-	16.82	-
Alkalinity (mg/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity (umhos/cm)	621	-	456	-	551	-	558	-	347	-	330	-	298	-
Dissolved Oxygen (mg/l)	11.18	-	10.46	-	12.24	-	11.53	-	10.26	-	9.96	-	8.84	-
Dissolved Oxygen (%)	121.6	-	104.4	-	124.8	-	118.2	-	118.2	-	108.4	-	90.6	-
<b>Laboratory Parameters</b>														
Fecal Coliforms (colonies/100 ml)	80	18000	100	11000	140	24000	80	16000	<20	14000	280	54000	260	51000
pH	8.6	8	8.4	8.1	8.4	8	8.3	7.9	8.2	7.9	8.3	8	8.1	7.8
Alkalinity	125	62	193	83	132	66	131	65	104	55	91	94	57	39
Sulfate (mg/l)	44	24	52	24	49	24	48	23	35	25	27	30	38	28
Residue, Total (mg/l)	446	406	378	206	402	496	434	612	202	288	212	466	214	148
Settleable Solids (ml/l)	<0.2	0.4	<0.2	0.4	<0.2	0.8	<0.2	3.2	<0.2	0.8	<0.2	1	<0.2	<0.2
Suspended Solids T (mg/l)	<2	204	<2	30	<2	310	<2	418	6	224	8	208	22	4
Nitrite-N (mg/l)	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate-N (mg/l)	<0.04	0.47	0.32	0.64	<0.04	0.52	0.05	0.5	0.11	0.5	0.48	0.67	0.85	1.23
Nitrogen T (mg/l)	0.15	1.21	0.38	1.39	0.15	1.42	0.19	1.64	0.22	1.39	0.75	1.68	1.17	1.67
Total Organic Carbon TOC (mg/l)	3.13	5.52	1.66	10.3	2.66	8.88	2.72	11.3	1.98	9.52	3.06	7.77	3.36	7.03
Ammonia-N (mg/l)	<0.02	0.03	<0.02	0.02	<0.02	0.04	<0.02	0.04	0.02	<0.02	0.02	<0.02	0.03	<0.02
SPC @ 25 C (umhos/cm)	649	317	536	274	616	321	622	294	358	215	368	391	350	242
TDS @ 105 C (mg/l)	446	202	378	176	402	186	434	194	196	64	204	258	192	144
Hardness T (mg/l)	194	95	253	116	212	109	205	108	148	87	122	167	96	67
Phosphorus T (mg/l)	<0.01	0.17	<0.01	0.121	0.01	0.217	0.01	0.283	<0.01	0.143	0.011	0.148	0.023	0.058
Chloride (mg/l)	115	45.8	33.3	18.7	93	42.9	92.6	38.8	29.3	15	41.7	47.1	48.5	28
COD (mg/l)	21.2	72.4	10.1	151.5	20.8	55.9	23.2	156.6	23.6	58.2	16.9	71	34.1	46.2
BOD5 Inhib (mg/l)	2	8.3	1.9	11.35	1.7	23.4	1.5	2.2	2.2	18.1	2.3	22.2	1.9	14.8
Turbidity (NTU)	<1	119.7	<1	23.55	<1	188.8	<1	199.5	<1	96.8	<1	47.85	1.34	10.37
Iron T (ug/l)	37	8650	46	2180	33	14100	36	9702	<20	4108	30	3604	270	479
Aluminum T (ug/l)	<200	4390	<200	919	<200	6700	<200	6912	<200	2512	<200	1900	<200	323
Nickle T (ug/l)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Calcium T (mg/l)	55.9	27.8	73.9	34.6	61.2	32	59.6	32.1	46	26	35.4	52.9	29	19.8
Copper T (ug/l)	<10	11	<10	<10	23	15	<10	<10	<10	<10	<10	<10	<10	<10
Chromium T (ug/l)	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Manganese T (ug/l)	<10	314	<10	154	<10	494	<10	501	<10	186	<10	222	<10	13
Cadmium T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead T (ug/l)	<1.0	7.1	<1.0	1.3	<1.0	9.5	<1.0	12.8	<1.0	2.9	<1.0	3.3	<1.0	<1.0
Mercury T (ug/l)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Zinc T (ug/l)	<10	50	<10	15	15	69	<10	50	<10	21	<10	17	<10	<10
Magnesium T (mg/l)	13.1	6.26	16.5	7.1	14.2	7.1	13.6	6.7	8.1	5.3	8.2	8.5	5.8	4.3
Oil and Grease	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Table 13. Warm-water chemistry sampling data, continue