

# **Appendix A**

**Ohio EPA**

**Biological Community Data**

**Macroinvertebrate Collection**

Collection Date: 08/11/2000 River Code: 19-041 RM: 7.10 Site: Euclid Creek Mayfield Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+			
04964	<i>Mooreobdella microstoma</i>	+			
05800	<i>Caecidotea sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
11120	<i>Baetis flavistriga</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77500	<i>Conchapelopia sp</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
95100	<i>Physella sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 12
No. Qualitative Taxa: 12	ICI:
Number of Organisms: 0	Qual EPT: 3

**Macroinvertebrate Collection**

Collection Date: 08/10/2000 River Code: 19-041 RM: 3.70 Site: Euclid Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
04964	<i>Mooreobdella microstoma</i>	+			
05800	<i>Caecidotea sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11130	<i>Baetis intercalaris</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
78601	<i>Pentaneura Type 1</i>	+			

No. Quantitative Taxa: 0      Total Taxa: 13  
 No. Qualitative Taxa: 13      ICI:  
 Number of Organisms: 0      Qual EPT: 4

**Macroinvertebrate Collection**

Collection Date: 08/24/2000 River Code: 19-041 RM: 1.80 Site: Euclid Creek upst. St. Clair Ave.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	8	85625	<i>Rheotanytarsus sp</i>	10
01801	<i>Turbellaria</i>	40 +	85800	<i>Tanytarsus sp</i>	39
03600	<i>Oligochaeta</i>	178 +	85821	<i>Tanytarsus glabrescens group sp 7</i>	138
04935	<i>Erpobdella punctata punctata</i>	2	87540	<i>Hemerodromia sp</i>	24
04964	<i>Mooreobdella microstoma</i>	+	95100	<i>Physella sp</i>	9
05800	<i>Caecidotea sp</i>	22 +			
06700	<i>Crangonyx sp</i>	1 +	No. Quantitative Taxa: 41		Total Taxa: 49
11120	<i>Baetis flavistriga</i>	527 +	No. Qualitative Taxa: 27		ICI: 40
11130	<i>Baetis intercalaris</i>	7	Number of Organisms: 2371		Qual EPT: 7
13521	<i>Stenonema femoratum</i>	+			
52200	<i>Cheumatopsyche sp</i>	429 +			
52430	<i>Ceratopsyche morosa group</i>	3			
52450	<i>Ceratopsyche sparna</i>	2 +			
52530	<i>Hydropsyche depravata group</i>	77 +			
52540	<i>Hydropsyche dicantha</i>	8 +			
53800	<i>Hydroptila sp</i>	62 +			
62300	<i>Coptotomus sp</i>	1			
68025	<i>Ectopria sp</i>	1			
69400	<i>Stenelmis sp</i>	47 +			
70600	<i>Antocha sp</i>	9 +			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochii</i>	+			
77500	<i>Conchapelopia sp</i>	49 +			
77800	<i>Helopelopia sp</i>	96 +			
78350	<i>Meropelopia sp</i>	15			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
79720	<i>Diamesa sp</i>	10			
80310	<i>Cardiocladius obscurus</i>	+			
80410	<i>Cricotopus (C.) sp</i>	20			
80420	<i>Cricotopus (C.) bicinctus</i>	69 +			
80430	<i>Cricotopus (C.) tremulus group</i>	89 +			
81650	<i>Parametriocnemus sp</i>	20			
82070	<i>Synorthocladius semivirens</i>	10			
82141	<i>Thienemanniella xena</i>	23			
82730	<i>Chironomus (C.) decorus group</i>	+			
83040	<i>Dicrotendipes neomodestus</i>	108 +			
83820	<i>Microtendipes "caelum" (sensu Simpson &amp; Bode, 1980)</i>	10			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	10			
84300	<i>Phaenopsectra obediens group</i>	10 +			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	99			
84470	<i>Polypedilum (P.) illinoense</i>	10 +			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	30			
85500	<i>Paratanytarsus sp</i>	49			

### Macroinvertebrate Collection

Collection Date: 08/24/2000 River Code: 19-041 RM: 0.70 Site: Euclid Creek Lake Shore Blvd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	28 +			
03600	<i>Oligochaeta</i>	477 +			
04964	<i>Mooreobdella microstoma</i>	2			
05800	<i>Caecidotea sp</i>	3 +			
06700	<i>Crangonyx sp</i>	7 +			
11120	<i>Baetis flavistriga</i>	18 +			
11130	<i>Baetis intercalaris</i>	170 +			
13521	<i>Stenonema femoratum</i>	1 +			
52200	<i>Cheumatopsyche sp</i>	82 +			
52450	<i>Ceratopsyche sparna</i>	+			
52530	<i>Hydropsyche depravata group</i>	22 +			
53800	<i>Hydroptila sp</i>	9 +			
68025	<i>Ectopria sp</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
69400	<i>Stenelmis sp</i>	34 +			
72150	<i>Pericoma sp</i>	+			
74100	<i>Simulium sp</i>	1			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	58 +			
77750	<i>Hayesomyia senata or Thienemamiya norena</i>	17			
77800	<i>Helopelopia sp</i>	91 +			
78350	<i>Meropelopia sp</i>	+			
80310	<i>Cardiocladius obscurus</i>	11 +			
80410	<i>Cricotopus (C.) sp</i>	9			
80420	<i>Cricotopus (C.) bicinctus</i>	27 +			
80430	<i>Cricotopus (C.) tremulus group</i>	49			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	4			
81650	<i>Parametriochnemus sp</i>	4			
82141	<i>Thienemanniella xena</i>	4			
82820	<i>Cryptochironomus sp</i>	8			
83040	<i>Dicrotendipes neomodestus</i>	57 +			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	15 +			
84300	<i>Phaenopsectra obediens group</i>	19			
84315	<i>Phaenopsectra flavipes</i>	19			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	4			
84460	<i>Polypedilum (P.) fallax group</i>	4			
84470	<i>Polypedilum (P.) illinoense</i>	4 +			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	15			
85500	<i>Paratanytarsus sp</i>	15 +			
85625	<i>Rheotanytarsus sp</i>	4 +			
85821	<i>Tanytarsus glabrescens group sp 7</i>	11			
87540	<i>Hemerodromia sp</i>	5			

No. Quantitative Taxa: 36      Total Taxa: 42  
 No. Qualitative Taxa: 26      ICI: 32  
 Number of Organisms: 1308      Qual EPT: 7

### Macroinvertebrate Collection

Collection Date: 08/11/2000 River Code: 19-056 RM: 0.10 Site: East Branch Euclid Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
04960	<i>Mooreobdella sp</i>	+			
05800	<i>Caecidotea sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
08250	<i>Orconectes (Procericambarus) rusticus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11130	<i>Baetis intercalaris</i>	+			
13521	<i>Stenonema femoratum</i>	+			
17200	<i>Caenis sp</i>	+			
22001	<i>Coenagrionidae</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
65800	<i>Berosus sp</i>	+			
66200	<i>Cymbiodyta sp</i>	+			
67700	<i>Paracymus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
79720	<i>Diamesa sp</i>	+			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
82820	<i>Cryptochironomus sp</i>	+			
84300	<i>Phaenopsectra obediens group</i>	+			
84315	<i>Phaenopsectra flavipes</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 28
No. Qualitative Taxa: 28	ICI:
Number of Organisms: 0	Qual EPT: 8

### Species List

River Code: <b>19-041</b> River Mile: <b>7.10</b>	Stream: <b>Euclid Creek</b> Basin: Cuyahoga River Time Fished: 1820 sec    Drain Area: 3.0 sq mi Dist Fished: 0.15 km    No of Passes: 1	Sample Date: <b>2000</b> Date Range: 08/28/2000  Sampler Type: E
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Goldfish	G	O	M	T	1	*****	0.09	0.02	0.31	9.00
Blacknose Dace	N	G	S	T	60	*****	5.35	0.20	3.46	1.68
Creek Chub	N	G	N	T	532	*****	47.42	2.15	36.78	2.02
Fathead Minnow	N	O	C	T	4	*****	0.36	0.02	0.27	2.00
Central Stoneroller	N	H	N		521	*****	46.43	3.33	57.15	3.20
Pumpkinseed Sunfish	S	I	C	P	4	*****	0.36	0.12	2.02	14.75
<i>Mile Total</i>					1,122	*****		5.83		
<i>Number of Species</i>					6					
<i>Number of Hybrids</i>					0					

### Species List

River Code: <b>19-041</b> River Mile: <b>3.30</b>	Stream: <b>Euclid Creek</b> Basin: Cuyahoga River Time Fished: 1219 sec      Drain Area: 8.5 sq mi Dist Fished: 0.20 km      No of Passes: 1	Sample Date: <b>2000</b> Date Range: 08/28/2000  Sampler Type: E
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	5	*****	0.75	0.21	2.55	28.40
Blacknose Dace	N	G	S	T	101	*****	15.10	0.59	7.09	3.90
Creek Chub	N	G	N	T	198	*****	29.60	3.39	40.66	11.41
Central Stoneroller	N	H	N		361	*****	53.96	4.05	48.58	7.48
Green Sunfish	S	I	C	T	2	*****	0.30	0.05	0.54	15.00
Green Sf X Pumpkinseed					2	*****	0.30	0.05	0.58	16.00
<i>Mile Total</i>					669	*****		8.34		
<i>Number of Species</i>					5					
<i>Number of Hybrids</i>					1					



### Species List

River Code: <b>19-041</b> River Mile: <b>3.10</b>	Stream: <b>Euclid Creek</b> Basin: <b>Cuyahoga River</b> Time Fished: 1980 sec    Drain Area: 21.0 sq mi Dist Fished: 0.20 km    No of Passes: 1	Sample Date: <b>1989</b> Date Range: 06/29/1989  Sampler Type: E
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S	T	10	*****	2.19	0.32	9.54	21.00
Common Carp	G	O	M	T	15	*****	3.28	0.41	12.26	18.00
Blacknose Dace	N	G	S	T	175	*****	38.29	0.61	18.38	2.31
Creek Chub	N	G	N	T	95	*****	20.79	0.84	25.43	5.89
Fathead Minnow	N	O	C	T	2	*****	0.44	0.01	0.24	2.50
Central Stoneroller	N	H	N		159	*****	34.79	1.10	33.15	4.59
Hybrid X Sunfish					1	*****	0.22	0.03	1.00	22.00
<i>Mile Total</i>					457	*****		3.30		
<i>Number of Species</i>					6					
<i>Number of Hybrids</i>					1					

### Species List

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River Code: <b>19-041</b> River Mile: <b>1.60</b>	Stream: <b>Euclid Creek</b> Basin: Cuyahoga River Time Fished: 4200 sec    Drain Area: 21.8 sq mi Dist Fished: 0.20 km    No of Passes: 1	Sample Date: <b>1999</b> Date Range: 08/19/1999  Sampler Type: D
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S M	1	*****	0.11	0.01	0.06	3.00
White Sucker	W	O	S T	13	*****	1.43	0.38	4.86	19.62
Blacknose Dace	N	G	S T	265	*****	29.25	1.14	14.46	2.87
Creek Chub	N	G	N T	207	*****	22.85	2.46	31.19	7.92
Central Stoneroller	N	H	N	415	*****	45.81	3.86	48.88	6.19
Yellow Bullhead		I	C T	2	*****	0.22	0.01	0.14	3.50
Bluegill Sunfish	S	I	C P	1	*****	0.11	0.01	0.08	4.00
Pumpkinseed Sunfish	S	I	C P	2	*****	0.22	0.03	0.34	9.00
<i>Mile Total</i>				906	*****		7.89		
<i>Number of Species</i>				8					
<i>Number of Hybrids</i>				0					

Species List

River Code: <b>19-041</b>	Stream: <b>Euclid Creek</b>	Sample Date: <b>2000</b>
River Mile: <b>1.60</b>	Basin: <b>Cuyahoga River</b>	Date Range: <b>08/29/2000</b>
	Time Fished: <b>2998 sec</b>	Drain Area: <b>21.8 sq mi</b>
	Dist Fished: <b>0.40 km</b>	No of Passes: <b>2</b>
		Thru: <b>09/28/2000</b>
		Sampler Type: <b>D</b>

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
White Sucker	W	O	S T	14	*****	2.29	0.61	8.21	58.50
Goldfish	G	O	M T	2	*****	0.33	0.20	2.61	130.00
Blacknose Dace	N	G	S T	34	*****	5.56	0.11	1.48	4.35
Creek Chub	N	G	N T	136	*****	22.22	1.43	19.12	14.03
Fathead Minnow	N	O	C T	1	*****	0.16	0.00	0.02	2.00
Bluntnose Minnow	N	O	C T	9	*****	1.47	0.01	0.13	1.44
Central Stoneroller	N	H	N	404	*****	66.01	4.81	64.30	15.88
Yellow Bullhead		I	C T	6	*****	0.98	0.21	2.75	45.67
Pumpkinseed Sunfish	S	I	C P	3	*****	0.49	0.04	0.59	19.67
Green Sf X Pumpkinseed				3	*****	0.49	0.06	0.80	26.67
<i>Mile Total</i>				612	*****		7.48		
<i>Number of Species</i>				9					
<i>Number of Hybrids</i>				1					

### Species List

River Code: <b>19-041</b>	Stream: <b>Euclid Creek</b>	Sample Date: <b>2000</b>
River Mile: <b>0.70</b>	Basin: <b>Cuyahoga River</b>	Date Range: <b>08/29/2000</b>
	Time Fished: <b>2985 sec</b>	Drain Area: <b>23.0 sq mi</b>
	Dist Fished: <b>0.40 km</b>	No of Passes: <b>2</b>
		Thru: <b>09/28/2000</b>
		Sampler Type: <b>D</b>

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Rainbow Trout	E		N	9	*****	0.68	7.02	40.73	1,040.11
Black Redhorse	R	I	S I	1	*****	0.08	0.17	1.01	232.00
White Sucker	W	O	S T	77	*****	5.80	1.15	6.68	19.94
Common Carp	G	O	M T	1	*****	0.08	0.00	0.03	6.00
Goldfish	G	O	M T	1	*****	0.08	0.06	0.33	75.00
Golden Shiner	N	I	M T	6	*****	0.45	0.01	0.04	1.67
Creek Chub	N	G	N T	305	*****	22.98	2.55	14.81	11.16
Sand Shiner	N	I	M M	5	*****	0.38	0.01	0.04	1.80
Fathead Minnow	N	O	C T	11	*****	0.83	0.03	0.16	3.30
Bluntnose Minnow	N	O	C T	374	*****	28.18	1.08	6.28	3.86
Central Stoneroller	N	H	N	249	*****	18.76	2.79	16.17	14.93
Yellow Bullhead		I	C T	11	*****	0.83	0.68	3.96	82.73
White Perch	E		M	1	*****	0.08	0.00	0.01	3.00
Rock Bass	S	C	C	4	*****	0.30	0.05	0.26	15.00
Largemouth Bass	F	C	C	9	*****	0.68	0.04	0.21	5.22
Green Sunfish	S	I	C T	3	*****	0.23	0.03	0.17	13.33
Bluegill Sunfish	S	I	C P	17	*****	1.28	0.19	1.11	15.00
Pumpkinseed Sunfish	S	I	C P	91	*****	6.86	0.87	5.04	12.73
Green Sf X Pumpkinseed				2	*****	0.15	0.04	0.23	26.50
Round Goby				150	*****	11.30	0.47	2.73	4.18
<i>Mile Total</i>				1,327	*****		17.24		
<i>Number of Species</i>				19					
<i>Number of Hybrids</i>				1					

**Species List**

River Code: <b>19-041</b>	Stream: <b>Euclid Creek</b>	Sample Date: <b>1989</b>
River Mile: <b>0.20</b>	Basin: <b>Cuyahoga River</b>	Date Range: <b>06/29/1989</b>
	Time Fished: <b>1981 sec</b>	Drain Area: <b>6400.0 sq mi</b>
	Dist Fished: <b>0.85 km</b>	No of Passes: <b>1</b>
		Sampler Type: <b>A</b>

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Gizzard Shad		O	M	6	*****	1.85	0.26	0.45	36.33
Quillback Carpsucker	C	O	M	10	*****	3.09	11.68	20.33	992.90
White Sucker	W	O	S T	2	*****	0.62	0.06	0.10	24.00
Common Carp	G	O	M T	25	*****	7.72	23.03	40.07	782.88
Goldfish	G	O	M T	7	*****	2.16	0.25	0.43	30.14
Golden Shiner	N	I	M T	4	*****	1.23	0.04	0.07	8.50
Creek Chub	N	G	N T	8	*****	2.47	0.09	0.15	9.38
Emerald Shiner	N	I	S	14	*****	4.32	0.02	0.04	1.29
Striped Shiner	N	I	S	1	*****	0.31	0.01	0.02	8.00
Spottail Shiner	N	I	M P	10	*****	3.09	0.07	0.12	5.80
Bluntnose Minnow	N	O	C T	4	*****	1.23	0.02	0.04	4.75
Brown Bullhead		J	C T	33	*****	10.19	14.17	24.65	364.87
White Bass	F	P	M	1	*****	0.31	0.31	0.54	262.00
White Perch	E		M	183	*****	56.48	2.32	4.04	10.77
Smallmouth Bass	F	C	C M	3	*****	0.93	0.53	0.92	149.33
Largemouth Bass	F	C	C	2	*****	0.62	0.12	0.20	49.00
Bluegill Sunfish	S	I	C P	2	*****	0.62	0.01	0.02	4.50
Pumpkinseed Sunfish	S	I	C P	1	*****	0.31	0.01	0.02	12.00
Hybrid X Sunfish				1	*****	0.31	0.02	0.04	18.00
Freshwater Drum			M P	7	*****	2.16	4.47	7.77	542.29
<i>Mile Total</i>				324	*****		57.46		
<i>Number of Species</i>				19					
<i>Number of Hybrids</i>				1					

Species List

River Code: <b>19-056</b> River Mile: <b>4.50</b>	Stream: <b>East Branch Euclid Creek</b> Basin: Cuyahoga River Time Fished: 3360 sec    Drain Area: 1.7 sq mi Dist Fished: 0.10 km    No of Passes: 1	Sample Date: <b>1989</b> Date Range: 06/06/1989 Sampler Type: E
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	137	*****	82.53			
Fathead Minnow	N	O	C	T	26	*****	15.66			
Yellow Bullhead		I	C	T	3	*****	1.81			
<i>Mile Total</i>					166	*****				
<i>Number of Species</i>					3					
<i>Number of Hybrids</i>					0					

### Species List

River Code: <b>19-056</b> River Mile: <b>0.20</b>	Stream: <b>East Branch Euclid Creek</b> Basin: <b>Cuyahoga River</b> Time Fished: _____ Drain Area: <b>12.5 sq mi</b> Dist Fished: <b>0.20 km</b> No of Passes: <b>1</b>	Sample Date: <b>2000</b> Date Range: <b>08/25/2000</b> Sampler Type: <b>E</b>
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Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Blacknose Dace	N	G	S	T	216	*****	32.58	1.03	36.04	3.17
Creek Chub	N	G	N	T	110	*****	16.59	0.47	16.42	2.84
Bluntnose Minnow	N	O	C	T	4	*****	0.60	0.01	0.49	2.25
Central Stoneroller	N	H	N		325	*****	49.02	1.23	43.26	2.53
Yellow Bullhead		I	C	T	1	*****	0.15	0.02	0.63	12.00
Green Sunfish	S	I	C	T	6	*****	0.90	0.07	2.53	8.00
Green Sf X Pumpkinseed					1	*****	0.15	0.02	0.63	12.00
<i>Mile Total</i>					663	*****		2.85		
<i>Number of Species</i>					6					
<i>Number of Hybrids</i>					1					

# Appendix B

## Modeling Detail

### Waste Load Allocation

During the 2000 Ohio EPA biological and chemical survey of Euclid Creek only one permitted discharging sewage treatment plant remained within the basin. Other publically operated plants have existed and were eliminated in the 1980's and 1990's. The remaining plant operated until June 9, 2004.

The Lake County Pleasant Hills WWTP was discharging during the 2000 survey. The WLA was calculated based on a permitted design flow of 120,000 gallons per day. Effluent data were evaluated for the time period January 1999 thru June 2004. The WLA was calculated using the plant design flow and median phosphorus effluent concentration (Table B1).

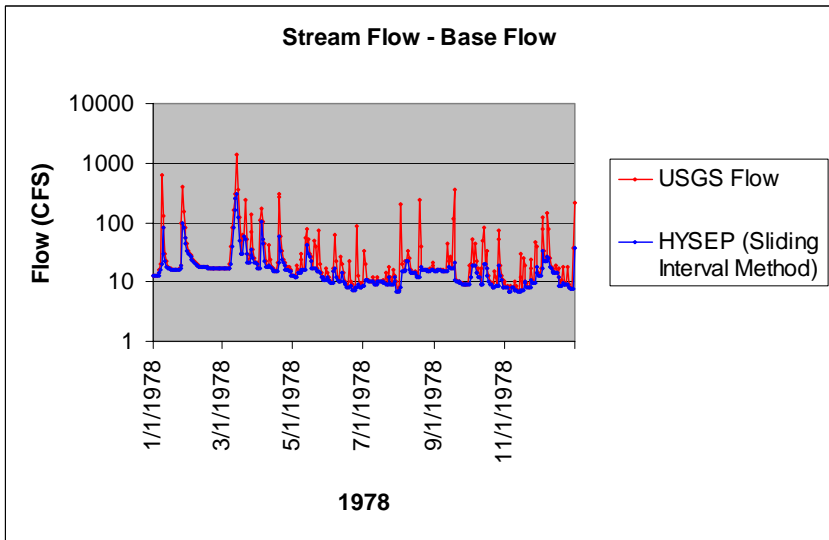
Ohio EPA has recently issued a draft NPDES permit (3PT00117) to the Willoughby Eastlake Schools for a 4,000 gpd package plant. The plant has recently been identified as an unpermitted discharging system. Sanitary sewers will be available within three years at which time the facility will be connected to the sewer. Based on an discharge of 4000 gallons per day and an effluent phosphorus concentration 2 mg/l an estimated waste load allocation can be generated.

<b>Lake County - Pleasant Hills WWTP</b>		<b>NPDES Permit #3PH00055</b>	
Flow		Data from Jan 1999 to June 2004	
	0.163	Average Flow (mgd)	
	0.085	Median Flow (mgd)	
	3.783	Maximum Flow (mgd)	
Phosphorus		Data from Jan 1999 to June 2004	
	2.22	Average Concentration (mg/l)	
	2.00	Median Concentration (mg/l)	
	8.00	Maximum Concentration (mg/l)	
<b>WLA (lb/yr)</b>	<b>730.584</b>	Based on a concentration of 2 mg/l and plant design flow of 0.12 mgd	
<b>Willoughby Eastlake City Schools</b>		<b>NPDES Permit #3PT00117</b>	
Flow	0.004	Design Flow (mgd)	
Phosphorus	2.0	Estimated Concentration (mg/l)	
<b>WLA (lb/yr)</b>	<b>24.35</b>	Based on a concentration of 2 mg/l and plant design flow of 0.004 mgd	
<b>NPDES storm water Allocation (from STEPL)</b>			
<b>WLA (lb/yr)</b>	<b>561.9</b>		

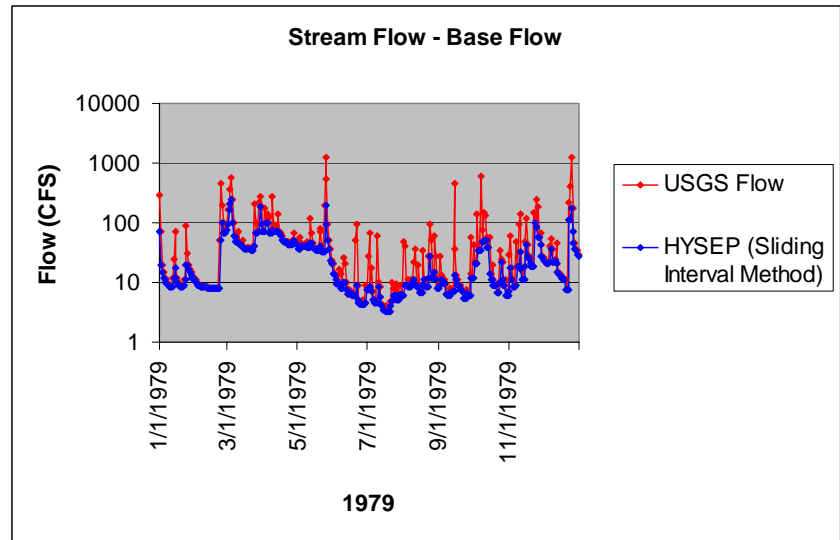


## Load Allocation

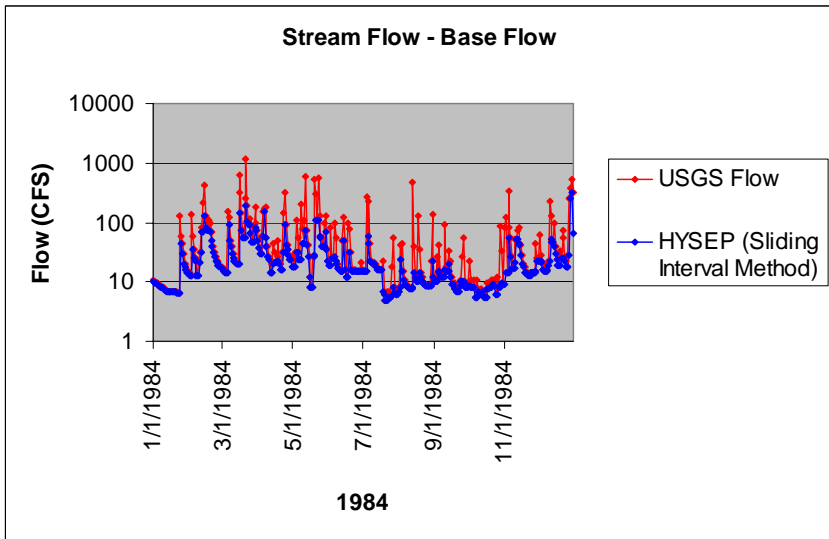
The Load Allocation was prepared utilizing the USGS HYSEP sliding-interval method for groundwater contributions and the U.S. EPA STEPL model as described in Chapter 4.2.3. USGS flow data was available at the St. Clair Gage (# USGS 04208690 Euclid Creek near Euclid OH) for the time periods May 1977-September 1980. September 1983-October 1985, and June 2001-February 2003.



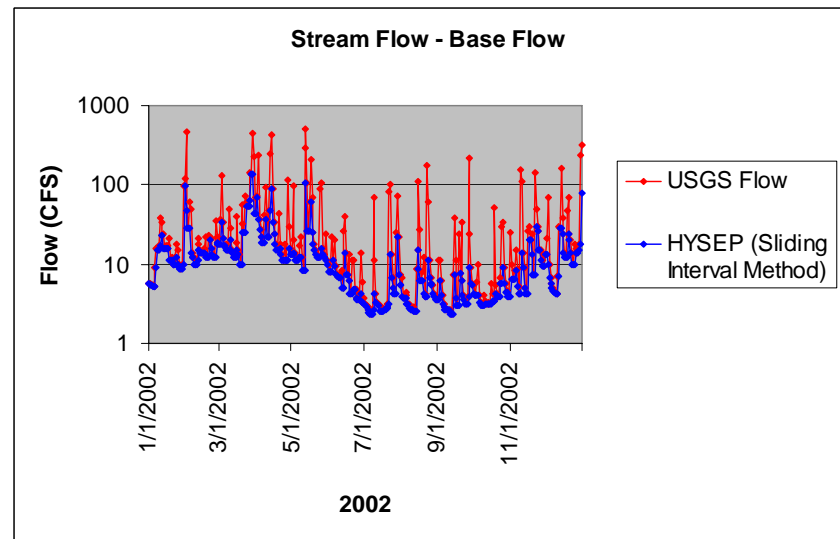
Graph B1



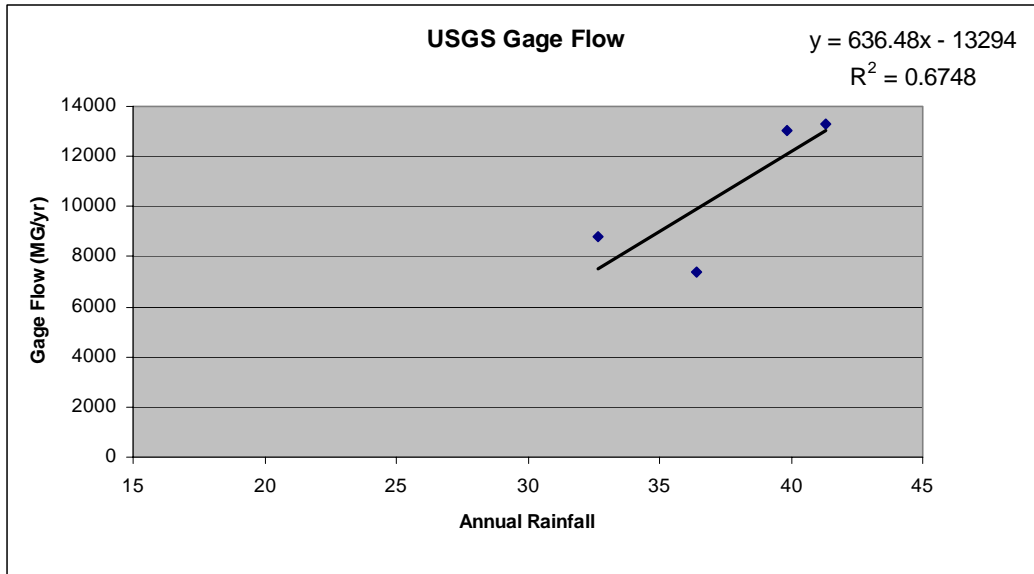
Graph B2



Graph B3



Graph B4



Graph B5

#### Groundwater Load Allocation

Graphs B1 through B4 represent the results of HYSEP flow separation for the years 1978, 1979, 1984, and 2002.

Utilizing the four years for which complete annual flow data was available, a simple linear regression could be generated to estimate groundwater flow during an average rain year.

Initially total flow data were calculated for the USGS gage. Based on data from 1978, 1979, 1984, and 2002 (Table B2), Graph B5 was prepared.

USGS Gage		
	MG/year	Rain (inches/yr)
<b>1978</b>	8766.477	32.690
<b>1979</b>	13010.739	39.840
<b>1984</b>	13289.467	41.330
<b>2002</b>	7389.192	36.390

Table B2

Using the regression equation, an estimate of an annual gage flow during the average annual rainfall year (35.81 in/yr) was generated:

$$\text{Estimated Gage Flow (MG/yr)} = 636.48 * \text{Average Rainfall} - 13294$$

$$\text{Estimated Gage Flow (MG/yr)} = 9498.34$$

A graph depicting the USGS gage flow and HYSEP predicted flow is included as Graph B6. From this graph the regression equation was utilized to estimate baseflow during an

average rainfall year.

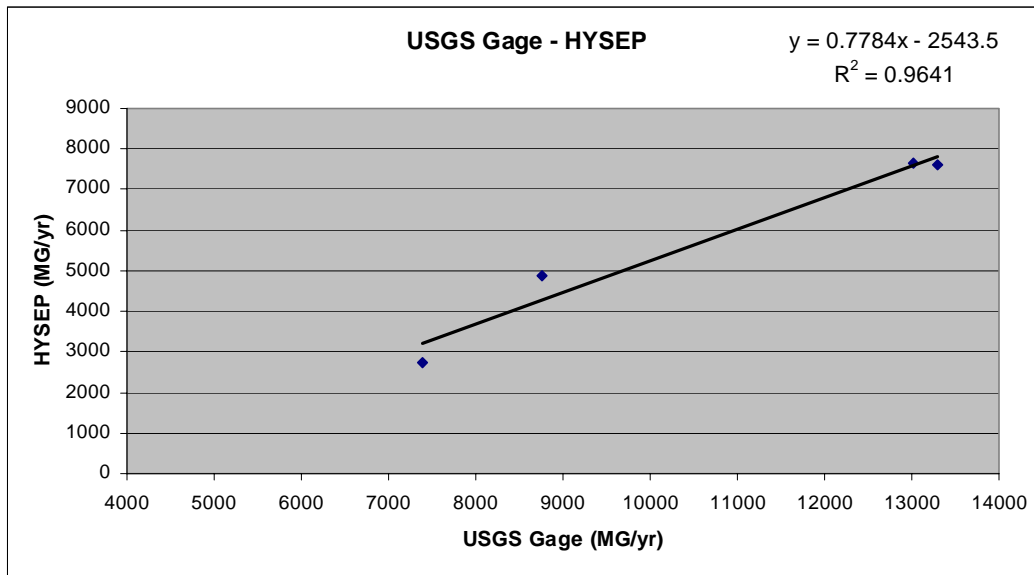
$$\text{Estimated HYSEP Flow (MG/yr)} = 0.7784 * \text{Estimated Gage Flow} - 2543.5$$

$$\text{Estimated HYSEP Flow (MG/yr)} = 4850.0$$

Utilizing an average groundwater phosphorus concentration of 0.01 mg/l, the estimated annual groundwater phosphorus load was calculated as:

$$\text{Estimated Annual Phosphorus Load} = 0.01 \text{ mg/l} * 8.34 \text{ lb/gal} * 4850 \text{ MG/yr}$$

$$\text{Estimated Annual Phosphorus Load} = 404.49 \text{ lb/yr}$$



Graph B6

### *STEPL Load Allocation for Surface Water*

As mentioned in Section 4.2.2 of the report, STEPL was selected as a load allocation technique. Additional details on the model can be found at: <http://it.tetrattech-ffx.com/stepl/>. The model allows for sub-watershed allocation. The model also allows for pollutant reduction estimates utilizing various BMP's.

Table B3 includes land use distribution data utilized in the model. Seven subwatersheds were identified in the Watershed Action Plan and will be maintained here for consistency.

Sub-watershed	Single Family	Multi Family	Commercial	Industrial	Open Space	Institutional	Transportation/Utility	Vacant	Agriculture
A	310.6	190.4	493.6	110.5	263.1	46.7	439.3	46.7	0.3
B	815.4	141.8	341.1	20.8	0.0	141.9	160.0	141.9	0.0
C	1115.9	401.9	204.6	62.9	55.3	287.0	247.1	287.0	0.0
D	1211.9	98.8	279.9	39.3	31.0	231.6	222.4	231.6	0.0
E	1204.1	26.3	231.0	78.5	106.9	446.2	219.5	446.2	53.5
F	1362.2	131.4	60.6	35.1	0.9	26.7	311.6	26.7	0.0
G	1650.1	481.5	555.1	174.5	111.3	140.1	526.6	140.1	0.0
Totals	7670.3	1472.1	2165.9	521.7	568.4	1320.1	2126.6	1320.1	53.8

Table B3

Table B4 includes the septic system input data utilized by the model. Septic system numbers were supplied by the Cuyahoga County Planning Commission and the failure rate was taken from a 2001 NOACA study on home sewage disposal systems.

Subwatershed	Number of Septic Systems
A	0
B	7
C	348
D	20
E	7
F	2
G	110
<b>Total</b>	<b>494</b>
<b>Failure Rate</b>	<b>16.2%</b>

Table B4

The model generates a load for both the watershed and septic systems for nitrogen, phosphorus, biochemical oxygen demand, and sediment (land use only). The Tables B5 and B6 contain the model results.

Total load by subwatershed(s)				
Watershed	N Load (no BMP) lb/year	P Load (no BMP) lb/year	BOD Load (no BMP) lb/year	Sediment Load (no BMP) ton/year
W1	10109.90	<b>981.08</b>	32710.69	162.36
W2	6050.52	<b>662.50</b>	19968.95	97.93
W3	14061.41	<b>1915.79</b>	46692.93	196.76
W4	8864.71	<b>957.63</b>	28760.77	137.89
W5	8429.10	<b>930.28</b>	28516.37	137.01
W6	8476.55	<b>921.69</b>	29778.05	119.30
W7	13928.43	<b>1665.55</b>	51051.00	192.15
Total	69920.63	<b>8034.52</b>	237478.77	1043.40

Table B5

<b>Septic nutrient load in lb/yr</b>			
<b>Watershed</b>	<b>N Load lb/year</b>	<b>P Load lb/year</b>	<b>BOD Load lb/year</b>
W1	0.00	<b>0.00</b>	0.00
W2	35.25	<b>13.81</b>	143.95
W3	1752.63	<b>686.45</b>	7156.57
W4	100.73	<b>39.45</b>	411.30
W5	35.25	<b>13.81</b>	143.95
W6	10.07	<b>3.95</b>	41.13
W7	553.99	<b>216.98</b>	2262.13
<b>Total</b>	<b>2487.93</b>	<b>974.44</b>	<b>10159.04</b>

Table B6

The phosphorus load allocation will be 6498.2 lbs/yr. Based on conversations with US EPA Region 5, a portion of the STEPL model phosphorus allocation (561.9 lbs/yr) will be assigned to the WLA as an NPDES storm water load. The remaining load will be the LA (7472.64 lb/yr, includes septic phosphorus load). The total modeled phosphorus load will remain the same and the percent reductions needed to achieve the TMDL will be evenly distributed.

# **Appendix C**

## **Qualitative Habitat Evaluation Index**

### **Ohio EPA Data**

River: Euclid Creek

Code: 19-041

Rm: 7.10

Year: 2000

Initials: XCEB

<i>Bldr_slab:</i> Gravel: X <i>Boulder:</i> Sand: <i>Cobble:</i> Bedrock: X <i>Hardpan:</i> Detritus: Silt: Artificial: Muck:		Limestone: Tills: Lacustrine: Sandstone: Y Shale: Y Riprap: Hardpan_o: Coal_fines:		Silt_heavy: Silt_mod: Y Silt_norml: Y Silt_free: Embed_xten: Embed_mod: Y Embed_low: Y Embed_none:		Substrate: 10.5
Num_types:						
Undercut: X Overhang: Shallows: X		Deep_pools: X Rootwads: Bould_cov: X		Oxbow: Aq_plants: Logs: X		Cover: 11.0
H_sinuos: M_sinuos: L_sinuos: X N_sinuos:		E_develop: G_develop: F_develop: X P_develop:		Ch_none: Recovered: Y Recovering: Y Recent:		H_stable: X M_stable: L_stable: Channel: 11.5
Rip_wide: Rip_mod: Rip_nar: X Rip_v_nar: Rip_none: X		Forest: Old fld_sh: X Park: Fence_past:		Cons_till: Urban_inds: X Op_past_rw: Mining_con:		Erosion_nl: Y Erosion_m: Erosion_hs: Riparian: 5.0
Cm_100: Cm_70_100: Cm_40_70: X Cm_20_40: Cm_20:		Wider: Y Narrower: Equal: Y		Torrent: Fast: Moderate: X Slow: X		Eddies: Interstit: Intermitt: Pool: 5.5
Rif_z_high: Rif_z_mod: Rif_z_low: X Rif_z_vlow:		Rif_stable: X Rif_mod: Rif_unstbl:		Rifembed_n: Rifembed_l: X Rifembed_m: Rifembed_e:		Riffle: 4.0
Mwh_attrib: 6 Wwh_attrib: 6		Mwh_h_attr: 2		Drain Area: 3.0		Gradient_s: 37.04 Gradient_v: 8



River: Euclid Creek

Code: 19-041

Rm: 3.30

Year: 2000

Initials: XCEB

<i>Bldr_slab:</i>	<i>Gravel:</i>	<i>Limestone:</i>	<i>Silt_heavy:</i>	Substrate: <b>12.5</b>
<i>Boulder:</i>	<i>Sand:</i>	<i>Tills:</i>	<i>Silt_mod:</i>	
<i>Cobble:</i>	<i>Bedrock: Y</i>	<i>Lacustrine:</i>	<i>Silt_norml: Y</i>	
<i>Hardpan:</i>	<i>Detritus:</i>	<i>Sandstone: Y</i>	<i>Silt_free: Y</i>	
<i>Silt:</i>	<i>Artificial:</i>	<i>Shale: Y</i>	<i>Embed_xten:</i>	
<i>Muck:</i>		<i>Riprap:</i>	<i>Embed_mod:</i>	
<i>Num_types: X</i>		<i>Hardpan_o:</i>	<i>Embed_low: Y</i>	
		<i>Coal_fines:</i>	<i>Embed_none: Y</i>	

<i>Undercut:</i>	<i>Deep_pools:</i>	<i>Oxbow:</i>	<i>Ext_cov:</i>	Cover: <b>5.0</b>
<i>Overhang:</i>	<i>Rootwads:</i>	<i>Aq_plants:</i>	<i>Mod_cov:</i>	
<i>Shallows: X</i>	<i>Bould_cov: X</i>	<i>Logs:</i>	<i>Sparse_cov: X</i>	
			<i>No_cov:</i>	

<i>H_sinusos:</i>	<i>E_develop:</i>	<i>Ch_none: X</i>	<i>H_stable: X</i>	Channel: <b>14.0</b>
<i>M_sinusos:</i>	<i>G_develop:</i>	<i>Recovered:</i>	<i>M_stable:</i>	
<i>L_sinusos: X</i>	<i>F_develop: X</i>	<i>Recovering:</i>	<i>L_stable:</i>	
<i>N_sinusos:</i>	<i>P_develop:</i>	<i>Recent:</i>		

<i>Rip_wide: X</i>	<i>Forest: X</i>	<i>Cons_till:</i>	<i>Erosion_nl:</i>	Riparian: <b>6.0</b>
<i>Rip_mod:</i>	<i>Old_fd_sh:</i>	<i>Urban_inds:</i>	<i>Erosion_m: X</i>	
<i>Rip_nar:</i>	<i>Park: X</i>	<i>Op_past_rw:</i>	<i>Erosion_hs: X</i>	
<i>Rip_v_nar: X</i>	<i>Fence_past:</i>	<i>Mining_con:</i>		
<i>Rip_none:</i>				

<i>Cm_100:</i>	<i>Wider: X</i>	<i>Torrent:</i>	<i>Eddies:</i>	Pool: <b>7.0</b>
<i>Cm_70_100:</i>	<i>Narrower:</i>	<i>Fast: X</i>	<i>Interstit:</i>	
<i>Cm_40_70: X</i>	<i>Equal:</i>	<i>Moderate: X</i>	<i>Intermitt:</i>	
<i>Cm_20_40:</i>		<i>Slow: X</i>		
<i>Cm_20:</i>				

<i>Rif_z_high:</i>	<i>Rif_stable: X</i>	<i>Rifembed_n: Y</i>	Riffle: <b>4.5</b>
<i>Rif_z_mod:</i>	<i>Rif_mod:</i>	<i>Rifembed_l: Y</i>	
<i>Rif_z_low: X</i>	<i>Rif_unstbl:</i>	<i>Rifembed_m:</i>	
<i>Rif_z_vlow:</i>		<i>Rifembed_e:</i>	

<i>Mwh_attrib: 3</i>	<i>Mwh_h_attr: 2</i>	<i>Drain Area: 8.5</i>	<i>Gradient_s: 58.82</i>
<i>Wwh_attrib: 6</i>			<i>Gradient_v: 4</i>

River: Euclid Creek

Code: 19-041

Rm: 1.60

Year: 2000

Initials: XCEB

Bldr_slab: Boulder: Cobble: X Hardpan: Silt: Muck: Num_types: X	Gravel: Sand: Bedrock: X Detritus: Artificial: Muck:	Limestone: Tills: Lacustrine: Sandstone: Y Shale: Y Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Silt_norml: Y Silt_free: Y Embed_xten: Embed_mod: Embed_low: Y Embed_none: Y	Substrate: 15.5
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Undercut: X Overhang: Shallows:	Deep_pools: X Rootwads: X Bould_cov: X	Oxbow: Aq_plants: Logs:	Ext_cov: Mod_cov: Y Sparse_cov: Y No_cov:	Cover: 11.0
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H_sinus: Y M_sinus: Y L_sinus: N_sinus:	E_develop: Y G_develop: Y F_develop: P_develop:	Ch_none: Recovered: X Recovering: Recent:	H_stable: X M_stable: L_stable:	Channel: 16.5
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Rip_wide: Rip_mod: Rip_nar: X Rip_v_nar: Rip_none: X	Forest: Old fld_sh: Park: Fence_past:	Cons_till: Urban_inds: Y Op_past_rw: Mining_con:	Erosion_nl: Y Erosion_m: Erosion_hs:	Riparian: 4.0
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Cm_100: X Cm_70_100: Cm_40_70: Cm_20_40: Cm_20:	Wider: X Narrower: Equal:	Torrent: Fast: X Moderate: X Slow: X	Eddies: Interstit: Intermitt:	Pool: 11.0
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Rif_z_high: Rif_z_mod: X Rif_z_low: Rif_z_vlow:	Rif_stable: X Rif_mod: Rif_unstbl:	Rifembed_n: Rifembed_l: X Rifembed_m: Rifembed_e:	Riffle: 6.0
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Mwh_attr: 0 Wwh_attr: 10	Mwh_h_attr: 1	Drain Area: 21.8	Gradient_s: 38.46 Gradient_v: 6
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River: Euclid Creek

Code: 19-041 Rm: 0.70 Year: 2000 Initials: XCEB

<i>Bldr_slab:</i>	<i>Gravel:</i> Y	<i>Limestone:</i>	<i>Silt_heavy:</i>	Substrate: 14.5
<i>Boulder:</i>	<i>Sand:</i>	<i>Tills:</i>	<i>Silt_mod:</i> Y	
<i>Cobble:</i>	<i>Bedrock:</i>	<i>Lacustrine:</i>	<i>Silt_norml:</i> Y	
<i>Hardpan:</i>	<i>Detritus:</i>	<i>Sandstone:</i>	<i>Silt_free:</i>	
<i>Silt:</i>	<i>Artificial:</i>	<i>Shale:</i> Y	<i>Embed_xten:</i>	
<i>Muck:</i>		<i>Riprap:</i> Y	<i>Embed_mod:</i> Y	
<i>Num_types:</i> X		<i>Hardpan_o:</i>	<i>Embed_low:</i> Y	
		<i>Coal_fines:</i>	<i>Embed_none:</i>	

<i>Undercut:</i> X	<i>Deep_pools:</i> X	<i>Oxbow:</i>	<i>Ext_cov:</i>	Cover: 13.0
<i>Overhang:</i> X	<i>Rootwads:</i>	<i>Aq_plants:</i>	<i>Mod_cov:</i> Y	
<i>Shallows:</i> X	<i>Bould_cov:</i> X	<i>Logs:</i> X	<i>Sparse_cov:</i> Y	
			<i>No_cov:</i>	

<i>H_sinuos:</i>	<i>E_develop:</i>	<i>Ch_none:</i>	<i>H_stable:</i>	Channel: 12.0
<i>M_sinuos:</i> X	<i>G_develop:</i> Y	<i>Recovered:</i>	<i>M_stable:</i> X	
<i>L_sinuos:</i>	<i>F_develop:</i> Y	<i>Recovering:</i> X	<i>L_stable:</i>	
<i>N_sinuos:</i>	<i>P_develop:</i>	<i>Recent:</i>		

<i>Rip_wide:</i>	<i>Forest:</i>	<i>Cons_till:</i>	<i>Erosion_nl:</i> Y	Riparian: 6.0
<i>Rip_mod:</i> X	<i>Old_fld_sh:</i>	<i>Urban_inds:</i>	<i>Erosion_m:</i>	
<i>Rip_nar:</i>	<i>Park:</i> Y	<i>Op_past_rw:</i>	<i>Erosion_hs:</i>	
<i>Rip_v_nar:</i> X	<i>Fence_past:</i>	<i>Mining_con:</i>		
<i>Rip_none:</i>				

<i>Cm_100:</i> X	<i>Wider:</i> X	<i>Torrent:</i>	<i>Eddies:</i>	Pool: 10.0
<i>Cm_70_100:</i>	<i>Narrower:</i>	<i>Fast:</i>	<i>Interstit:</i>	
<i>Cm_40_70:</i>	<i>Equal:</i>	<i>Moderate:</i> X	<i>Intermitt:</i>	
<i>Cm_20_40:</i>		<i>Slow:</i> X		
<i>Cm_20:</i>				

<i>Rif_z_high:</i>	<i>Rif_stable:</i>	<i>Rifembed_n:</i>	Riffle: 2.5
<i>Rif_z_mod:</i>	<i>Rif_mod:</i> Y	<i>Rifembed_l:</i> X	
<i>Rif_z_low:</i> X	<i>Rif_unstbl:</i> Y	<i>Rifembed_m:</i>	
<i>Rif_z_vlow:</i>		<i>Rifembed_e:</i>	

<i>Mwh_attrib:</i> 5	<i>Mwh_h_attr:</i> 1	<i>Drain Area:</i> 23.0	<i>Gradient_s:</i> 10.11
<i>Wwh_attrib:</i> 7			<i>Gradient_v:</i> 10

River: Euclid Creek

Code: 19-041 Rm: 1.60 Year: 1999 Initials: XST

Bldr_slab: Boulder: Cobble: Hardpan: Silt: Muck:	Gravel: X Sand: Bedrock: X Detritus: Artificial:	Limestone: Tills: X Lacustrine: Sandstone: Shale: Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Y Silt_norm: Y Silt_free: Embed_xten: Embed_mod: Embed_low: X Embed_none:	Substrate: 14.5
Num_types: X				

Undercut: X Overhang: X Shallows: X	Deep_pools: X Rootwads: Bould_cov: X	Oxbow: Aq_plants: Logs:	Ext_cov: Mod_cov: Y Sparse_cov: Y No_cov:	Cover: 11.0
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H_sinuos: M_sinuos: Y L_sinuos: Y N_sinuos:	E_develop: G_develop: X F_develop: P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: M_stable: Y L_stable: Y	Channel: 15.0
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Rip_wide: Rip_mod: X Rip_nar: Rip_v_nar: X Rip_none:	Forest: Old_fid_sh: Park: X Fence_past:	Cons_till: Urban_inds: X Op_past_rw: Mining_con:	Erosion_nl: Y Erosion_m: Erosion_hs:	Riparian: 5.5
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Cm_100: Cm_70_100: X Cm_40_70: Cm_20_40: Cm_20:	Wider: X Narrower: Equal:	Torrent: Fast: X Moderate: X Slow: X	Eddies: Interstit: Intermitt:	Pool: 9.0
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Rif_z_high: Rif_z_mod: Rif_z_low: X Rif_z_vlow:	Rif_stable: Y Rif_mod: Y Rif_unstbl:	Rifembed_n: Rifembed_l: X Rifembed_m: Rifembed_e:	Riffle: 3.5
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Mwh_attr: 2 Wwh_attr: 9	Mwh_h_attr: 1	Drain Area: 21.8	Gradient_s: 38.46 Gradient_v: 6
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River: Euclid Creek

Code: 19-041

Rm: 6.70

Year: 1997

Initials: XBM

<i>Bldr_slab:</i>	<i>Gravel:</i>	<i>Limestone:</i>	<i>Silt_heavy:</i>	Substrate: <b>9.5</b>
<i>Boulder:</i>	<i>Sand:</i>	<i>Tills:</i>	<i>Silt_mod:</i> X	
<i>Cobble:</i>	<i>Bedrock:</i> Y	<i>Lacustrine:</i>	<i>Silt_norml:</i>	<b>9.0</b>
<i>Hardpan:</i>	<i>Detritus:</i>	<i>Sandstone:</i>	<i>Silt_free:</i>	
<i>Silt:</i>	<i>Artificial:</i>	<i>Shale:</i> X	<i>Embed_xten:</i>	<b>14.0</b>
<i>Muck:</i>		<i>Riprap:</i>	<i>Embed_mod:</i> Y	
<i>Num_types:</i> X		<i>Hardpan_o:</i>	<i>Embed_low:</i> Y	<b>3.5</b>
		<i>Coal_fines:</i>	<i>Embed_none:</i>	

<i>Undercut:</i>	<i>Deep_pools:</i> X	<i>Oxbow:</i>	<i>Ext_cov:</i>	Cover: <b>9.0</b>
<i>Overhang:</i>	<i>Rootwads:</i>	<i>Aq_plants:</i>	<i>Mod_cov:</i> Y	
<i>Shallows:</i> X	<i>Bould_cov:</i> X	<i>Logs:</i>	<i>Sparse_cov:</i> Y	<b>14.0</b>
			<i>No_cov:</i>	

<i>H_sinuos:</i>	<i>E_develop:</i>	<i>Ch_none:</i> X	<i>H_stable:</i>	Channel: <b>14.0</b>
<i>M_sinuos:</i> X	<i>G_develop:</i>	<i>Recovered:</i>	<i>M_stable:</i> X	
<i>L_sinuos:</i>	<i>F_develop:</i> X	<i>Recovering:</i>	<i>L_stable:</i>	<b>3.5</b>
<i>N_sinuos:</i>	<i>P_develop:</i>	<i>Recent:</i>		

<i>Rip_wide:</i>	<i>Forest:</i>	<i>Cons_till:</i>	<i>Erosion_nl:</i>	Riparian: <b>3.5</b>
<i>Rip_mod:</i> X	<i>Old_fd_sh:</i>	<i>Urban_inds:</i>	<i>Erosion_m:</i>	
<i>Rip_nar:</i>	<i>Park:</i> Y	<i>Op_past_rw:</i>	<i>Erosion_hs:</i> Y	<b>8.5</b>
<i>Rip_v_nar:</i>	<i>Fence_past:</i>	<i>Mining_con:</i>		
<i>Rip_none:</i> X				

<i>Cm_100:</i>	<i>Wider:</i>	<i>Torrent:</i>	<i>Eddies:</i> X	Pool: <b>8.5</b>
<i>Cm_70_100:</i> X	<i>Narrower:</i> Y	<i>Fast:</i> X	<i>Interstit:</i>	
<i>Cm_40_70:</i>	<i>Equal:</i> Y	<i>Moderate:</i> X	<i>Intermitt:</i>	<b>2.5</b>
<i>Cm_20_40:</i>		<i>Slow:</i> X		
<i>Cm_20:</i>				

<i>Rif_z_high:</i>	<i>Rif_stable:</i>	<i>Rifembed_n:</i>	Riffle: <b>2.5</b>
<i>Rif_z_mod:</i> X	<i>Rif_mod:</i>	<i>Rifembed_l:</i>	
<i>Rif_z_low:</i>	<i>Rif_unstbl:</i> X	<i>Rifembed_m:</i> Y	<b>3.4</b>
<i>Rif_z_vlow:</i>		<i>Rifembed_e:</i> Y	

<i>Mwh_attrib:</i> 4	<i>Mwh_h_attr:</i> 1	<i>Drain Area:</i> 3.4	<i>Gradient_s:</i> 38.46
<i>Wwh_attrib:</i> 6			<i>Gradient_v:</i> <b>8</b>

River: Euclid Creek

Code: 19-041 Rm: 6.30 Year: 1997 Initials: XBM

Bldr_slab: Boulder: Cobble: Hardpan: Silt: Muck:	Gravel: Sand: Bedrock: Y Detritus: Artificial:	Limestone: Tills: Lacustrine: Sandstone: Shale: X Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: X Silt_norml: Silt_free: Embed_xten: Embed_mod: X Embed_low: Embed_none:	Substrate: 9.0
Num_types: X				

Undercut: Overhang: Shallows: X	Deep_pools: X Rootwads: Bould_cov: X	Oxbow: Aq_plants: Logs:	Ext_cov: Mod_cov: Sparse_cov: X No_cov:	Cover: 7.0
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H_sinuos: M_sinuos: Y L_sinuos: Y N_sinuos:	E_develop: G_develop: F_develop: X P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: M_stable: X L_stable:	Channel: 13.5
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Rip_wide: Rip_mod: X Rip_nar: Rip_v_nar: Rip_none: X	Forest: Old fld_sh: Park: Y Fence_past:	Cons_till: Urban_inds: Op_past_rw: Mining_con:	Erosion_nl: Erosion_m: Erosion_hs: Y	Riparian: 3.5
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Cm_100: Cm_70_100: X Cm_40_70: Cm_20_40: Cm_20:	Wider: Narrower: Equal: X	Torrent: Fast: X Moderate: X Slow: X	Eddies: X Interstit: Intermitt:	Pool: 9.0
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Rif_z_high: Rif_z_mod: X Rif_z_low: Rif_z_vlow:	Rif_stable: Rif_mod: Rif_unstbl: X	Rifembed_n: Rifembed_l: Rifembed_m: X Rifembed_e:	Riffle: 3.0
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Mwh_attr: 5 Wwh_attr: 4	Mwh_h_attr: 2	Drain Area: 3.8	Gradient_s: 16.39 Gradient_v: 10
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River: Euclid Creek

Code: 19-041 Rm: 3.10 Year: 1989 Initials: XRES

<p><i>Bidr_slab:</i></p> <p><i>Boulder:</i> X</p> <p><i>Cobble:</i> X</p> <p><i>Hardpan:</i></p> <p><i>Silt:</i></p> <p><i>Muck:</i></p>	<p><i>Gravel:</i></p> <p><i>Sand:</i></p> <p><i>Bedrock:</i></p> <p><i>Detritus:</i></p> <p><i>Artificial:</i></p>	<p><i>Limestone:</i></p> <p><i>Tills:</i> Y</p> <p><i>Lacustrine:</i></p> <p><i>Sandstone:</i></p> <p><i>Shale:</i> Y</p> <p><i>Riprap:</i></p> <p><i>Hardpan_o:</i></p> <p><i>Coal_fines:</i></p>	<p><i>Silt_heavy:</i></p> <p><i>Silt_mod:</i></p> <p><i>Silt_norml:</i></p> <p><i>Silt_free:</i> X</p> <p><i>Embed_xten:</i></p> <p><i>Embed_mod:</i></p> <p><i>Embed_low:</i></p> <p><i>Embed_none:</i> X</p>	<p>Substrate:</p> <p>21.0</p>	
<p><i>Num_types:</i> X</p>	<p><i>Undercut:</i></p> <p><i>Overhang:</i></p> <p><i>Shallows:</i> X</p>	<p><i>Deep_pools:</i> X</p> <p><i>Rootwads:</i></p> <p><i>Bould_cov:</i> X</p>	<p><i>Oxbow:</i></p> <p><i>Aq_plants:</i></p> <p><i>Logs:</i></p>	<p><i>Ext_cov:</i></p> <p><i>Mod_cov:</i> X</p> <p><i>Sparse_cov:</i></p> <p><i>No_cov:</i></p>	<p>Cover:</p> <p>11.0</p>
<p><i>H_sinuos:</i></p> <p><i>M_sinuos:</i> X</p> <p><i>L_sinuos:</i></p> <p><i>N_sinuos:</i></p>	<p><i>E_develop:</i></p> <p><i>G_develop:</i> X</p> <p><i>F_develop:</i></p> <p><i>P_develop:</i></p>	<p><i>Ch_none:</i> X</p> <p><i>Recovered:</i></p> <p><i>Recovering:</i></p> <p><i>Recent:</i></p>	<p><i>H_stable:</i></p> <p><i>M_stable:</i></p> <p><i>L_stable:</i> X</p>	<p>Channel:</p> <p>15.0</p>	
<p><i>Rip_wide:</i></p> <p><i>Rip_mod:</i> X</p> <p><i>Rip_nar:</i> X</p> <p><i>Rip_v_nar:</i></p> <p><i>Rip_none:</i></p>	<p><i>Forest:</i> X</p> <p><i>Old fld_sh:</i></p> <p><i>Park:</i> X</p> <p><i>Fence_past:</i></p>	<p><i>Cons_till:</i></p> <p><i>Urban_inde:</i></p> <p><i>Op_past_rw:</i></p> <p><i>Mining_con:</i></p>	<p><i>Erosion_ni:</i></p> <p><i>Erosion_m:</i> X</p> <p><i>Erosion_hs:</i> X</p>	<p>Riparian:</p> <p>6.0</p>	
<p><i>Cm_100:</i></p> <p><i>Cm_70_100:</i> X</p> <p><i>Cm_40_70:</i></p> <p><i>Cm_20_40:</i></p> <p><i>Cm_20:</i></p>	<p><i>Wider:</i> X</p> <p><i>Narrower:</i></p> <p><i>Equal:</i></p>	<p><i>Torrent:</i></p> <p><i>Fast:</i> X</p> <p><i>Moderate:</i> X</p> <p><i>Slow:</i> X</p>	<p><i>Eddies:</i> X</p> <p><i>Interstit:</i></p> <p><i>Intermitt:</i></p>	<p>Pool:</p> <p>10.0</p>	
<p><i>Rif_z_high:</i></p> <p><i>Rif_z_mod:</i></p> <p><i>Rif_z_low:</i> X</p> <p><i>Rif_z_vlow:</i></p>	<p><i>Rif_stable:</i> X</p> <p><i>Rif_mod:</i></p> <p><i>Rif_unstbl:</i></p>	<p><i>Rifembed_n:</i> X</p> <p><i>Rifembed_l:</i></p> <p><i>Rifembed_m:</i></p> <p><i>Rifembed_e:</i></p>	<p>Riffle:</p> <p>5.0</p>		
<p><i>Mwh_attrib:</i> 0</p> <p><i>Mwh_h_attr:</i> 0</p> <p><i>Wwh_attrib:</i> 10</p>	<p>Drain Area: 21.0</p>	<p>Gradient_s: 32.50</p> <p>Gradient_v: 6</p>			

River: Euclid Creek

Code: 19-041 Rm: 0.20 Year: 1989 Initials: XRES

Bldr_slab: Boulder: Cobble: Hardpan: Silt: Muck: Y	Gravel: Sand: Bedrock: Detritus: Artificial:	Limestone: Tills: Lacustrine: Sandstone: Shale: Riprap: Hardpan_o: Coal_fines:	Silt_heavy: X Silt_mod: Silt_norml: Silt_free: Embed_xten: Embed_mod: Embed_low: Embed_none: X	Substrate: 3.0
Num_types:				

Undercut: Overhang: X Shallows: X	Deep_pools: X Rootwads: Bould_cov:	Oxbow: Aq_plants: Logs: X	Ext_cov: Mod_cov: X Sparse_cov: No_cov:	Cover: 12.0
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H_sinuos: X M_sinuos: L_sinuos: N_sinuos:	E_develop: G_develop: X F_develop: P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: M_stable: X L_stable:	Channel: 17.0
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Rip_wide: Rip_mod: Rip_nar: Y Rip_v_nar: Rip_none:	Forest: Old fld_sh: X Park: X Fence_past:	Cons_till: Urban_inds: Op_past_rw: Mining_con:	Erosion_nl: X Erosion_m: X Erosion_hs:	Riparian: 6.0
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Cm_100: X Cm_70_100: Cm_40_70: Cm_20_40: Cm_20:	Wider: Narrower: Equal:	Torrent: Fast: Moderate: Slow: X	Eddies: Interstit: Intermitt:	Pool: 7.0
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Rif_z_high: Rif_z_mod: Rif_z_low: Rif_z_vlow:	Rif_stable: Rif_mod: Rif_unstbl:	Rifembed_n: Rifembed_l: Rifembed_m: Rifembed_e:	Riffle: 0.0
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Mwh_attr: 3 Wwh_attr: 6	Mwh_h_attr: 1	Drain Area: 6,400.0	Gradient_s: 0.10 Gradient_v: 6
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River: East Branch Euclid Creek

Code: 19-056 Rm: 0.20 Year: 2000 Initials: XCEB

Bldr_slab: Boulder: Cobble: Hardpan: Silt: Muck:	Gravel: Sand: Bedrock: Y Detritus: Artificial:	Limestone: Tills: Y Lacustrine: Sandstone: Shale: Y Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Silt_norml: Y Silt_free: Y Embed_xten: Embed_mod: Embed_low: Y Embed_none: Y	Substrate: 13.0
Num_types: X				

Undercut: X Overhang: Shallows:	Deep_pools: X Rootwads: Bould_cov: X	Oxbow: Aq_plants: Logs: X	Ext_cov: Mod_cov: Sparse_cov: X No_cov:	Cover: 8.0
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H_sinuos: M_sinuos: Y L_sinuos: Y N_sinuos:	E_develop: G_develop: F_develop: X P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: X M_stable: L_stable:	Channel: 14.5
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Rip_wide: Y Rip_mod: Rip_nar: Rip_v_nar: Rip_none:	Forest: Y Old fld_sh: Park: Fence_past:	Cons_till: Urban_inds: Op_past_rw: Mining_con:	Erosion_nl: Erosion_m: Y Erosion_hs:	Riparian: 9.0
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Cm_100: Cm_70_100: Cm_40_70: X Cm_20_40: Cm_20:	Wider: Y Narrower: Equal: Y	Torrent: Fast: X Moderate: X Slow:	Eddies: Interstit: Intermitt:	Pool: 5.5
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Rif_z_high: Rif_z_mod: Rif_z_low: Y Rif_z_vlow: Y	Rif_stable: X Rif_mod: Rif_unstbl:	Rifembed_n: Y Rifembed_l: Y Rifembed_m: Rifembed_e:	Riffle: 4.0
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Mwh_attrib: 2 Wwh_attrib: 7	Mwh_h_attr: 2	Drain Area: 12.5	Gradient_s: 125.00 Gradient_v: 4
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River: Trib. to Euclid Creek (RM 3.19)

Code: 19-056 Rm: 4.50 Year: 1989 Initials: X

Bldr_slab: Boulder: Cobble: X Hardpan: Silt: X Muck:	Gravel: Sand: Bedrock: Detritus: Artificial:	Limestone: Tills: Lacustrine: Sandstone: Shale: X Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Silt_norml: Silt_free: Embed_xten: Embed_mod: Embed_low: X Embed_none:	Substrate: 9.0
Num_types:				

Undercut: X Overhang: X Shallows:	Deep_pools: X Rootwads: X Bould_cov:	Oxbow: Aq_plants: Logs: X	Ext_cov: Mod_cov: Sparse_cov: X No_cov:	Cover: 9.0
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H_sinus: M_sinus: X L_sinus: N_sinus:	E_develop: G_develop: F_develop: X P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: X M_stable: L_stable:	Channel: 15.0
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Rip_wide: Rip_mod: X Rip_nar: Rip_v_nar: Rip_none: X	Forest: Old fld_sh: Park: Y Fence_past:	Cons_till: Urban_inds: Op_past_rw: Mining_con:	Erosion_nl: Y Erosion_m: Erosion_hs:	Riparian: 5.5
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Cm_100: Cm_70_100: X Cm_40_70: Cm_20_40: Cm_20:	Wider: X Narrower: Equal:	Torrent: Fast: X Moderate: X Slow: X	Eddies: Interstit: Intermitt:	Pool: 9.0
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Rif_z_high: Rif_z_mod: Rif_z_low: X Rif_z_vlow:	Rif_stable: X Rif_mod: Rif_unstbl:	Rifembed_n: X Rifembed_l: Rifembed_m: Rifembed_e:	Riffle: 5.0
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Mwh_attr: 1 Wwh_attr: 7	Mwh_h_attr: 2	Drain Area: 1.7	Gradient_s: 16.67 Gradient_v: 10
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River: Trib. to Euclid Creek (RM 3.19)

Code: 19-056 Rm: 2.70 Year: 1988 Initials: XMAS

Bldr_slab: X Boulder: Cobble: X Hardpan: Silt: Muck:	Gravel: Sand: Bedrock: Detritus: Artificial:	Limestone: X Tills: Lacustrine: Sandstone: Shale: Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Silt_norml: X Silt_free: Embed_xten: Embed_mod: Embed_low: X Embed_none:	Substrate: 19.0
Num_types:				

Undercut: X Overhang: Shallows: X	Deep_pools: Rootwads: X Bould_cov: X	Oxbow: Aq_plants: Logs: X	Ext_cov: Mod_cov: X Sparse_cov: No_cov:	Cover: 12.0
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H_sinuos: M_sinuos: X L_sinuos: N_sinuos:	E_develop: G_develop: X F_develop: P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: X M_stable: L_stable:	Channel: 17.0
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Rip_wide: Rip_mod: Y Rip_nar: Rip_v_nar: Rip_none:	Forest: Y Old_fid_sh: Park: Fence_past:	Cons_till: Urban_inds: Op_past_rw: Mining_con:	Erosion_nl: Y Erosion_m: Erosion_hs:	Riparian: 9.0
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Cm_100: Cm_70_100: Cm_40_70: X Cm_20_40: Cm_20:	Wider: X Narrower: Equal:	Torrent: Fast: X Moderate: X Slow: X	Eddies: Interstit: Intermitt:	Pool: 7.0
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Rif_z_high: Rif_z_mod: Rif_z_low: X Rif_z_vlow:	Rif_stable: X Rif_mod: Rif_unstbl:	Rifembed_n: X Rifembed_l: Rifembed_m: Rifembed_e:	Riffle: 5.0
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Mwh_attrib: 0 Wwh_attrib: 9	Mwh_h_attr: 0	Drain Area: 2.7	Gradient_s: 142.86	Gradient_v: 4
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River: Trib. to Euclid Creek (RM 3.19)

Code: 19-056 Rm: 1.60 Year: 1988 Initials: XMAS

Bldr_slab: Gravel: X Boulder: Sand: Cobble: Bedrock: X Hardpan: Detritus: Silt: Artificial: Muck:		Limestone: Y Tills: Y Lacustrine: Sandstone: Shale: Riprap: Hardpan_o: Coal_fines:		Silt_heavy: Silt_mod: X Silt_norml: Silt_free: Embed_xten: Embed_mod: X Embed_low: Embed_none:		Substrate: 11.0
Num_types:		Undercut: Deep_pools: X Overhang: Rootwads: Shallows: X Bould_cov: X		Oxbow: Aq_plants: Logs:		Ext_cov: Mod_cov: Sparse_cov: X No_cov: Cover: 7.0
H_sinuos: M_sinuos: X L_sinuos: N_sinuos:		E_develop: G_develop: X F_develop: P_develop:		Ch_none: X Recovered: Recovering: Recent:		H_stable: X M_stable: L_stable: Channel: 17.0
Rip_wide: Y Rip_mod: Rip_nar: Rip_v_nar: Rip_none:		Forest: Y Old fld_sh: Park: Fence_past:		Cons_till: Urban_inds: Op_past_rw: Mining_con:		Erosion_nl: Erosion_m: Y Erosion_hs: Riparian: 9.0
Cm_100: Cm_70_100: X Cm_40_70: Cm_20_40: Cm_20:		Wider: X Narrower: Equal:		Torrent: Fast: X Moderate: X Slow: X		Eddies: Interstit: Intermitt: Pool: 9.0
Rif_z_high: Rif_z_mod: Rif_z_low: X Rif_z_vlow:		Rif_stable: Y Rif_mod: Y Rif_unstbl:		Rifembed_n: Rifembed_l: Rifembed_m: Rifembed_e: X		Riffle: 1.5
Mwh_attrib: 3 Wwh_attrib: 6		Mwh_h_attr: 1		Drain Area: 9.0		Gradient_s: 71.42 Gradient_v: 4

River: Trib. to Euclid Creek (RM 3.19)

Code: 19-056 Rm: 1.50 Year: 1988 Initials: XMAS

<i>Bldr_slab:</i>	<i>Gravel:</i> X	<i>Limestone:</i> Y	<i>Silt_heavy:</i>	Substrate: 13.0
<i>Boulder:</i>	<i>Sand:</i>	<i>Tills:</i> Y	<i>Silt_mod:</i> X	
<i>Cobble:</i>	<i>Bedrock:</i> X	<i>Lacustrine:</i>	<i>Silt_norml:</i>	Embed_xten: Embed_mod: X Embed_low: Embed_none:
<i>Hardpan:</i>	<i>Detritus:</i>	<i>Sandstone:</i>	<i>Silt_free:</i>	
<i>Silt:</i>	<i>Artificial:</i>	<i>Shale:</i>		
<i>Muck:</i>		<i>Riprap:</i>		
<i>Num_types:</i> X		<i>Hardpan_o:</i>		
		<i>Coal_fines:</i>		

<i>Undercut:</i>	<i>Deep_pools:</i> X	<i>Oxbow:</i>	<i>Ext_cov:</i>	Cover: 7.0
<i>Overhang:</i>	<i>Rootwads:</i>	<i>Aq_plants:</i>	<i>Mod_cov:</i>	
<i>Shallows:</i> X	<i>Bould_cov:</i> X	<i>Logs:</i>	<i>Sparse_cov:</i> X	Channel: 17.0
			<i>No_cov:</i>	

<i>H_sinuos:</i>	<i>E_develop:</i>	<i>Ch_none:</i> X	<i>H_stable:</i> X	Channel: 17.0
<i>M_sinuos:</i> X	<i>G_develop:</i> X	<i>Recovered:</i>	<i>M_stable:</i>	
<i>L_sinuos:</i>	<i>F_develop:</i>	<i>Recovering:</i>	<i>L_stable:</i>	Riparian: 9.0
<i>N_sinuos:</i>	<i>P_develop:</i>	<i>Recent:</i>		

<i>Rip_wide:</i> Y	<i>Forest:</i> Y	<i>Cons_till:</i>	<i>Erosion_nl:</i>	Riparian: 9.0
<i>Rip_mod:</i>	<i>Old fld_sh:</i>	<i>Urban_inds:</i>	<i>Erosion_m:</i> Y	
<i>Rip_nar:</i>	<i>Park:</i>	<i>Op_past_rw:</i>	<i>Erosion_hs:</i>	Pool: 9.0
<i>Rip_v_nar:</i>	<i>Fence_past:</i>	<i>Mining_con:</i>		
<i>Rip_none:</i>				

<i>Cm_100:</i>	<i>Wider:</i> X	<i>Torrent:</i>	<i>Eddies:</i>	Pool: 9.0
<i>Cm_70_100:</i> X	<i>Narrower:</i>	<i>Fast:</i> X	<i>Interstit:</i>	
<i>Cm_40_70:</i>	<i>Equal:</i>	<i>Moderate:</i> X	<i>Intermitt:</i>	Riffle: 1.5
<i>Cm_20_40:</i>		<i>Slow:</i> X		
<i>Cm_20:</i>				

<i>Rif_z_high:</i>	<i>Rif_stable:</i> Y	<i>Rifembed_n:</i>	Riffle: 1.5
<i>Rif_z_mod:</i>	<i>Rif_mod:</i> Y	<i>Rifembed_l:</i>	
<i>Rif_z_low:</i> X	<i>Rif_unstbl:</i>	<i>Rifembed_m:</i>	Drain Area: 9.9
<i>Rif_z_vlow:</i>		<i>Rifembed_e:</i> X	

<i>Mwh_attrib:</i> 3	<i>Mwh_h_attr:</i> 1	<i>Gradient_s:</i> 71.42	Gradient_v: 4
<i>Wwh_attrib:</i> 6			

River: Trib. to E. Br. Euclid Creek (RM 1.55)

Code: 19-065 Rm: 0.80 Year: 1988 Initials: XMAS

Bldr_slab: Boulder: X Cobble: Hardpan: Silt: Muck:	Gravel: Sand: Bedrock: X Detritus: Artificial:	Limestone: Y Tills: Y Lacustrine: Sandstone: Shale: Riprap: Hardpan_o: Coal_fines:	Silt_heavy: Silt_mod: Silt_norml: X Silt_free: Embed_xten: Embed_mod: Embed_low: X Embed_none:	Substrate: 17.0
Num_types: X				

Undercut: Overhang: Shallows: X	Deep_pools: Rootwads: Bould_cov: X	Oxbow: Aq_plants: Logs: X	Ext_cov: Mod_cov: Sparse_cov: X No_cov:	Cover: 6.0
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H_sinuos: X M_sinuos: L_sinuos: N_sinuos:	E_develop: G_develop: Y F_develop: Y P_develop:	Ch_none: X Recovered: Recovering: Recent:	H_stable: M_stable: X L_stable:	Channel: 16.0
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Rip_wide: Y Rip_mod: Rip_nar: Rip_v_nar: Rip_none:	Forest: Y Old fld_sh: Park: Fence_past:	Cons_till: Urban_inde: Op_past_rw: Mining_con:	Erosion_nl: Erosion_m: Erosion_hs: Y	Riparian: 8.0
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Cm_100: Cm_70_100: Cm_40_70: Cm_20_40: X Cm_20:	Wider: Narrower: Equal: X	Torrent: Fast: Moderate: Slow: X	Eddies: Interstit: Intermitt:	Pool: 3.0
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Rif_z_high: Rif_z_mod: Rif_z_low: Rif_z_vlow: X	Rif_stable: Rif_mod: X Rif_unstbl:	Rifembed_n: Rifembed_l: X Rifembed_m: Rifembed_e:	Riffle: 2.0
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Mwh_attrib: 2 Wwh_attrib: 6	Mwh_h_attr: 2	Drain Area: 0.7	Gradient_s: 83.33 Gradient_v: 4
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River: Trib. to E. Br. Euclid Creek (RM 1.55)

Code: 19-065 Rm: 0.10 Year: 1988 Initials: XMAS

<i>Bldr_slab:</i>	<i>Gravel:</i>	<i>Limestone:</i> Y	<i>Silt_heavy:</i> X	Substrate: <input type="text" value="1.0"/>
<i>Boulder:</i>	<i>Sand:</i>	<i>Tills:</i> Y	<i>Silt_mod:</i>	
<i>Cobble:</i>	<i>Bedrock:</i>	<i>Lacustrine:</i>	<i>Silt_norml:</i>	
<i>Hardpan:</i>	<i>Detritus:</i>	<i>Sandstone:</i>	<i>Silt_free:</i>	
<i>Silt:</i> Y	<i>Artificial:</i>	<i>Shale:</i>	<i>Embed_xten:</i> X	
<i>Muck:</i>		<i>Riprap:</i>	<i>Embed_mod:</i>	
<i>Num_types:</i>		<i>Hardpan_o:</i>	<i>Embed_low:</i>	
		<i>Coal_fines:</i>	<i>Embed_none:</i>	

<i>Undercut:</i>	<i>Deep_pools:</i>	<i>Oxbow:</i>	<i>Ext_cov:</i>	Cover: <input type="text" value="5.0"/>
<i>Overhang:</i> X	<i>Rootwads:</i>	<i>Aq_plants:</i> X	<i>Mod_cov:</i>	
<i>Shallows:</i> X	<i>Bould_cov:</i>	<i>Logs:</i>	<i>Sparse_cov:</i> Y	
			<i>No_cov:</i> Y	

<i>H_sinuos:</i>	<i>E_develop:</i>	<i>Ch_none:</i>	<i>H_stable:</i>	Channel: <input type="text" value="4.0"/>
<i>M_sinuos:</i>	<i>G_develop:</i>	<i>Recovered:</i>	<i>M_stable:</i>	
<i>L_sinuos:</i>	<i>F_develop:</i>	<i>Recovering:</i>	<i>L_stable:</i> X	
<i>N_sinuos:</i> X	<i>P_develop:</i> X	<i>Recent:</i> X		

<i>Rip_wide:</i> X	<i>Forest:</i> X	<i>Cons_till:</i>	<i>Erosion_nl:</i>	Riparian: <input type="text" value="7.5"/>
<i>Rip_mod:</i> X	<i>Old fld_sh:</i>	<i>Urban_insd:</i>	<i>Erosion_m:</i> Y	
<i>Rip_nar:</i>	<i>Park:</i> X	<i>Op_past_rw:</i>	<i>Erosion_hs:</i>	
<i>Rip_v_nar:</i>	<i>Fence_past:</i>	<i>Mining_con:</i>		
<i>Rip_none:</i>				

<i>Cm_100:</i>	<i>Wider:</i>	<i>Torrent:</i>	<i>Eddies:</i>	Pool: <input type="text" value="3.0"/>
<i>Cm_70_100:</i>	<i>Narrower:</i>	<i>Fast:</i>	<i>Interstit:</i>	
<i>Cm_40_70:</i>	<i>Equal:</i> X	<i>Moderate:</i>	<i>Intermitt:</i>	
<i>Cm_20_40:</i> X		<i>Slow:</i> X		
<i>Cm_20:</i>				

<i>Rif_z_high:</i>	<i>Rif_stable:</i>	<i>Rifembed_n:</i>	Riffle: <input type="text" value="0.0"/>
<i>Rif_z_mod:</i>	<i>Rif_mod:</i>	<i>Rifembed_l:</i>	
<i>Rif_z_low:</i>	<i>Rif_unstbl:</i>	<i>Rifembed_m:</i>	
<i>Rif_z_vlow:</i>		<i>Rifembed_e:</i>	

<i>Mwh_attrib:</i> 6	<i>Mwh_h_attr:</i> 5	<i>Drain Area:</i> 0.9	<i>Gradient_s:</i> 125.00
<i>Wwh_attrib:</i> 0			<i>Gradient_v:</i> <input type="text" value="4"/>

# **Appendix D**

**Ohio EPA**

**Euclid Creek Chemical Analysis Results**



Site	Sample Dates	Field Conductivity	Field DO	Field pH	Field Temp C	As, T	Cd, T	Ca, T	Cr, T	Cu, T	Fe, T	Pb, T
Euclid Creek (Storet 504250)	10/19/1977	420	10.4	7.7	9	<10	<5		<30	<30		10
Euclid Creek (Storet 504250)	11/9/1977	440	9.3	7.6	14.8	<10	<5		<30	<30		20
Euclid Creek (Storet 504250)	12/28/1977	450		7.4	0.1	<10	<5		<30	<30		12
Euclid Creek (Storet 504250)	1/19/1978	850	13.1	6.9	0	<10	<5		<30	30		75
Euclid Creek (Storet 504250)	2/8/1978	150	14.2	7	0	<10	<5		<30	<30		12
Euclid Creek (Storet 504250)	3/8/1978	1070	14.4	7.3	0	<10	<5		<30	<30	1140	5
Euclid Creek (Storet 504250)	4/5/1978	235	11.6	7.3	7.6	<10	<5		<30	<30	3700	5
Euclid Creek (Storet 504250)	5/10/1978	445		7.1	10.5	25	<5		50	50	26000	44
Euclid Creek (Storet 504250)	6/14/1978	530	11	7.4	14	<10	<5			<30	3140	<5
Euclid Creek (Storet 504250)	7/26/1978	600	8.2	7.4	22.5	<10	<5		<30	<30	2490	22
Euclid Creek (Storet 504250)	8/10/1978	490	8.9	8.1	21	<10	<5		<30	<30	1870	6
Euclid Creek (Storet 504250)	8/18/1978											
Euclid Creek (Storet 504250)	9/19/1978	450	8.1	7.3	21.5	<10	5		<30	<30	2130	16
Euclid Creek (Storet 504250)	10/12/1978	410	12		9	<10	<5		<30	<30	4500	6
Euclid Creek (Storet 504250)	11/15/1978	370	10.6	7.5	8.5					<30	4600	10
Euclid Creek (Storet 504250)	12/19/1978	490	12	7.5	10					<30	4300	7
Euclid Creek (Storet 504250)	1/31/1979	1300	12.8	7.5	1		<5		<30	<30	5000	10
Euclid Creek (Storet 504250)	2/22/1979		11.8	7.4	0.5					<30		160
Euclid Creek (Storet 504250)	3/22/1979	550	13.5	7.2	7					<30	4900	44
Euclid Creek (Storet 504250)	4/17/1979	460	13.2	6.7	8		<5		<30	<30	4300	12
Euclid Creek (Storet 504250)	5/24/1979	480	9.8	7.2	12					<30	4500	7
Euclid Creek (Storet 504250)	6/13/1979	600	8.9	7.3	19					<30	3100	
Euclid Creek (Storet 504250)	7/24/1979	600	8.8	7.3	22		<5		<30	<30	2660	96
Euclid Creek (Storet 504250)	8/16/1979	470	8.7	7.5	16					<30	2920	<5
Euclid Creek (Storet 504250)	9/19/1979	430	7.3	7.5	17					180	3300	5
Euclid Creek (Storet 504250)	10/17/1979	480		7.8	12		<5		<30	<30	1140	<5
Euclid Creek (Storet 504250)	11/7/1979	320	9.1	7.6	7					<30	1520	15
Euclid Creek (Storet 504250)	12/10/1979	430	12.1	7.3	3					<30	1760	<5
Euclid Creek (Storet 504250)	1/15/1980	380	17.4	7	1.5		<5		<30	<30	1050	<5
Euclid Creek (Storet 504250)	2/25/1980	780	18.4	7.8	0.5					<30	1320	<5
Euclid Creek (Storet 504250)	3/18/1980	900	11.9	7.6	4		<5		<30	<30	2030	12
Euclid Creek (Storet 504250)	4/21/1980	375	12		9.5					<30	960	5
Euclid Creek (Storet 504250)	5/6/1980	800	9.2		13.5		<5		<30	<30	1260	<5
Euclid Creek (Storet 504250)	6/11/1980	360	10.1	7.4	11.5					<30	790	<5
Euclid Creek (Storet 504250)	7/21/1980	11	8.4	7.8	22		<5		<30	<30	1890	<5
Euclid Creek (Storet 504250)	8/19/1980		8.5		22					<30	1070	<5
Euclid Creek (Storet 504250)	9/11/1980	430	8.5	7.5	20		<5		<30	<30	640	<5
Euclid Creek (Storet 504250)	10/30/1980	557	12.2	7.3	4					<30	810	<5
Euclid Creek (Storet 504250)	11/12/1980	390	13.2	7.3	6		<5		<30	<30	810	<5
Euclid Creek (Storet 504250)	12/23/1980	725	13.8	7.3	0					<30	840	<5
Euclid Creek (Storet 504250)	½6/1981	1339	13	7.8	0.5		<5		40	30	9900	29

Site	Sample Dates	Field Conductivity	Field DO	Field pH	Field Temp C	As, T	Cd, T	Ca, T	Cr, T	Cu, T	Fe, T	Pb, T
Euclid Creek (Storet 504250)	2/23/1981	500	11.2	6.7	6		<5		<30	<30	3400	23
Euclid Creek (Storet 504250)	3/23/1981	900	12.1	7.5	3.5					<30	1460	<5
Euclid Creek (Storet 504250)	4/27/1981	550	11.7	7.6	10		<25		<30	<30	1440	<5
Euclid Creek (Storet 504250)	5/5/1981	600	11.1	7.8	14					<30	1610	<5
Euclid Creek (Storet 504250)	6/16/1981		6.3	7.3	22.5					<30	10600	<10
Euclid Creek (Storet 504250)	7/16/1981	310	9.5	6.8	16.5					<30	890	<5
Euclid Creek (Storet 504250)	8/25/1981	625		7.5	21					<30	1730	<5
Euclid Creek @ Route 283	1/10/1985	800	9.5	7.3	0.5		<.2	89	<30	10	4260	<2
Euclid Creek (Storet 504250)	7/18/1989	430	8.6	7.6	19		<.2	50	<30		2260	<2
Euclid Creek (Storet 504250)	7/18/1989	492	10.2	8.1	17		<.2	49	<30		570	2
Euclid Creek @ Euclid Avenue (dst)	9/20/1989	520	12.2	8.8	18.5		<.2	48	<30		<50	<2
Euclid Creek @ Lakeshore (ust)	9/20/1989	513	12.2	8.7	17.5		<.2	52	<30		400	2
Euclid Creek @ Mouth	9/20/1989	520	9.1	8.3	18.5			0.2	49	<30	710	3
Euclid Creek @ Mozina-Underwood Road	7/18/1989	660	8.5	8.8	19		2.4	94	<30		108000	180
Euclid Creek @ Mozina-Underwood Road	9/20/1989	657	10.4	8.2	17.5		<.2	52	<30		460	2
Euclid Creek @ Nyack Road	9/20/1989	492	10	8.1	17		<.2	50	<30		550	<2
Euclid Creek @ Route 185	7/18/1989	451	8.6	7.6	19		<.2	53	<30		2350	2
Euclid Creek @ Route 283	7/18/1989		10.1	8.2	21		<.2	67	<30		2320	6
Euclid Creek @ Route 283	9/20/1989	636	12.2	8.7	17.5		<.2	52	<30		400	2
Euclid Creek @ Villaview Road (dst)	9/20/1989	505	10.4	8.2	17.5		<.2	52	<30		460	2
Euclid Creek @ Wildwood Park	7/18/1989	770	9.1	8.3	24		0.3	70	<30		510	4
Euclid Creek @ Wildwood Park	9/20/1989	615	9.1	8.3	18.5		0.2	49	<30		710	3
Euclid Creek East Branch @ mouth in park	6/28/1989	465	9.2	7.9	24			49			180	<2
Euclid Creek East Branch @ Rockefeller Road	6/6/1989	653	8.5	7.8	15		0.3	49		<10	850	60
Euclid Creek West Branch @ Highland Park	6/28/1989	420	8	7.92	22.5			43			300	<2
Euclid Creek (Storet 504250)	7/27/2000	581	10.28	8.3	22.68	<2	<.2	48	40	<10	514	3
Euclid Creek (Storet 504250)	8/30/2000	619	8.92	8.17	21.48	<2	<.2	46	<30	<10	218	<2
Euclid Creek (Storet 504250)	9/6/2000	626	10.55	8.03	15.46	<2	<.2	54	<30	<10	170	<2
Euclid Creek @ Euclid Park Blvd	7/27/2000	701	9.79	8.16	22.62	<2	<.2	49	<30	<10	227	<2
Euclid Creek @ Euclid Park Blvd	8/30/2000	810	8.47	8.07	21.35	<2	<.2	53	<30	<10	81	<2
Euclid Creek @ Euclid Park Blvd	9/6/2000	764	10.23	7.99	14.35	<2	<.2	55	<30	<10	111	<2
Euclid Creek @ Lakeshore (ust)	7/27/2000	665	10.86	8.15	23.81	<2	<.2	51	64	<10	659	6
Euclid Creek @ Lakeshore (ust)	8/30/2000	647	10.04	8.12	22.19	<2	<.2	48	<30	<10	229	<2
Euclid Creek @ Lakeshore (ust)	9/6/2000	674	10.64	7.92	15.59	<2	<.2	58	<30	<10	200	<2
Euclid Creek @ SR 322	7/27/2000	872	11.58	8.23	22.48	<2	<.2	57	67	<10	704	<2
Euclid Creek @ SR 322	8/30/2000	1222	9.81	8.19	22.3	<2	<.2	66	<30	<10	256	<2
Euclid Creek @ SR 322	9/6/2000	805	10.86	8.03	16.22	<2	<.2	51	<30	<10	327	<2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	7/27/2000	477	9.78	8.07	21.83	<2	<.2	46	<30	<10	100	<2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	8/30/2000	477	9.78	8.07	21.83	<2	<.2	45	<30	<10	151	<2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	9/6/2000	486	10.44	8.11	16.11	<2	<.2	47	<30	<10	91	<2

Euclid Creek (Storet 504250)	Sample	Mg, T	Ni, T	Zn, T	BOD 5	COD	Lab Conductivity	Hardness	NO2-NO3	NO2-N	NH3-N	TKN
Euclid Creek (Storet 504250)	2/23/1981		<100	80		27.5			1.13	0.05	0.25	0.97
Euclid Creek (Storet 504250)	3/23/1981			<30		25		168	0.86	0.01	0.14	0.7
Euclid Creek (Storet 504250)	4/27/1981		<100	<30		14		188	0.74	0.01	0.23	0.7
Euclid Creek (Storet 504250)	5/5/1981			<30		12		198	0.54	0.01	0.2	0.95
Euclid Creek (Storet 504250)	6/16/1981			40		40		188	0.69	0.05	1.6	3.27
Euclid Creek (Storet 504250)	7/16/1981			<30		14		136	0.39	0.01	<.03	0.53
Euclid Creek (Storet 504250)	8/25/1981			<30		<6		212	0.78	0.02	0.2	0.49
Euclid Creek @ Route 283	1/10/1985	24.4		20	1.8	10	1820	427	1.13	0.02	0.25	0.7
Euclid Creek (Storet 504250)	7/18/1989	12		15		<20		174	0.64	<.02	<.05	<.2
Euclid Creek (Storet 504250)	7/18/1989	12	<40	<10		<20	603	172	1.23	<.02	<.05	0.4
Euclid Creek @ Euclid Avenue (dst)	9/20/1989	11	<40	<10		<20	603	165	1.21	<.02	0.05	0.3
Euclid Creek @ Lakeshore (ust)	9/20/1989	13	<40	<10		<20	636	183	1.02	<.02	<.05	0.3
Euclid Creek @ Mouth	9/20/1989	11	<40	<10		26		168		0.03		0.5
Euclid Creek @ Mozina-Underwood Road	7/18/1989	30		475		124		359	0.8	0.02	0.07	0.2
Euclid Creek @ Mozina-Underwood Road	9/20/1989	13	<40	<10		<20		183	1.15		<.05	0.3
Euclid Creek @ Nyack Road	9/20/1989	12	<40	<10		<20	626	174	1.32	<.02	0.14	0.6
Euclid Creek @ Route 185	7/18/1989	13		15		<20		186	0.69	<.02	<.05	<.2
Euclid Creek @ Route 283	7/18/1989	17		15		<20		237	1.02	0.02	<.05	0.2
Euclid Creek @ Route 283	9/20/1989	13	<40	<10		<20		183	1.02		<.05	0.3
Euclid Creek @ Villaview Road (dst)	9/20/1989	13	<40	<10		<20	657	183	1.15	<.02	<.05	0.3
Euclid Creek @ Wildwood Park	7/18/1989	17		10		<20		245	0.73	0.03	0.08	0.3
Euclid Creek @ Wildwood Park	9/20/1989	11	<40	<10		26		168				0.5
Euclid Creek East Branch @ mouth in park	6/28/1989	12		40				172	1.8		<.05	0.5
Euclid Creek East Branch @ Rockefeller Road	6/6/1989	12	<40	<10		28		172	0.77		0.25	0.8
Euclid Creek West Branch @ Highland Park	6/28/1989	9		45				144	0.76		<.05	0.6
Euclid Creek (Storet 504250)	7/27/2000	13	<40	<10	<2	<10	770	173	0.111	<.02	<.05	0.33
Euclid Creek (Storet 504250)	8/30/2000	12	<40	<10	<2	<10	670	164	0.321	<.02	<.05	0.2
Euclid Creek (Storet 504250)	9/6/2000	14	<40	12	<2	15	779	192	0.553	<.02	<.05	0.22
Euclid Creek @ Euclid Park Blvd	7/27/2000	13	<40	<10	<2	<10	914	176	0.1	<.02	<.05	0.22
Euclid Creek @ Euclid Park Blvd	8/30/2000	12	<40	<10	<2	15	883	182	0.324	<.02	<.05	0.2
Euclid Creek @ Euclid Park Blvd	9/6/2000	14	<40	<10	<2	15	967	195	0.54	<.02	<.05	0.2
Euclid Creek @ Lakeshore (ust)	7/27/2000	14	<40	<10	<2	12	855	185	0.1	<.02	<.05	0.21
Euclid Creek @ Lakeshore (ust)	8/30/2000	12	<40	<10	<2	12	689	169	0.237	<.02	<.05	0.45
Euclid Creek @ Lakeshore (ust)	9/6/2000	15	<40	<10	<2	18	837	206	0.535	<.02	<.05	0.2
Euclid Creek @ SR 322	7/27/2000	14	<40	22	<2	16		200	0.135	0.032	<.05	0.51
Euclid Creek @ SR 322	8/30/2000	14	<40	<10	<2	12		222	0.299	<.02	<.05	0.31
Euclid Creek @ SR 322	9/6/2000	11	<40	<10	<2	24	980	173	0.453	<.02	<.05	0.37
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	7/27/2000	12	<40	<10	<2	<10	638	164	0.226	<.02	<.05	0.27
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	8/30/2000	12	<40	<10	<2	<10	569	162	0.413	<.02	<.05	0.2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	9/6/2000	13	<40	<10	<2	11	589	171	0.471	<.02	<.05	0.3

Site	Sample Dates	Phenolics (ug/l)	P, T	P, Soluble, T	TDS	TSS	Chlorides	Hg, T
Euclid Creek (Storet 504250)	10/19/1977	<2	0.92	0.7	414	10	77	<.5
Euclid Creek (Storet 504250)	11/9/1977	<2	0.31	<.05	320	<10		
Euclid Creek (Storet 504250)	12/28/1977	8	0.27	<.05			157	<.5
Euclid Creek (Storet 504250)	1/19/1978	8	0.39	0.06	840	59	376	<.5
Euclid Creek (Storet 504250)	2/8/1978		<.05	<.05	664	12	261	<.5
Euclid Creek (Storet 504250)	3/8/1978	10	0.67	0.44	702	13	295	<.5
Euclid Creek (Storet 504250)	4/5/1978		3.08	2.02	278	32	70	<.5
Euclid Creek (Storet 504250)	5/10/1978	<2	1.99	0.17	368	763	91	
Euclid Creek (Storet 504250)	6/14/1978	<2	0.38		265	55	57	<.5
Euclid Creek (Storet 504250)	7/26/1978	<2	1.14	0.97	402	14	81	<.5
Euclid Creek (Storet 504250)	8/10/1978		0.31	0.07	345	13	81	<.5
Euclid Creek (Storet 504250)	8/18/1978				472	1672		
Euclid Creek (Storet 504250)	9/19/1978	<2	0.27	0.13			65	<.5
Euclid Creek (Storet 504250)	10/12/1978	<2	0.23	<.05	373	30	91	<.5
Euclid Creek (Storet 504250)	11/15/1978	2				13	68	
Euclid Creek (Storet 504250)	12/19/1978	<2	0.2			13	159	
Euclid Creek (Storet 504250)	1/31/1979	15	0.19		1356	28	655	<.5
Euclid Creek (Storet 504250)	2/22/1979	16	0.52				466	
Euclid Creek (Storet 504250)	3/22/1979	<2			612	12	194	
Euclid Creek (Storet 504250)	4/17/1979	2	0.12		460	14		<.5
Euclid Creek (Storet 504250)	5/24/1979	6	0.12		476	14	35	
Euclid Creek (Storet 504250)	6/13/1979	<2	0.05		472	<10	36	
Euclid Creek (Storet 504250)	7/24/1979	10	0.06		380	<10		<.5
Euclid Creek (Storet 504250)	8/16/1979		0.14		414	<10	96	
Euclid Creek (Storet 504250)	9/19/1979	<2	0.06			16	73	
Euclid Creek (Storet 504250)	10/17/1979	<2			442	<10	93	<0.5
Euclid Creek (Storet 504250)	11/7/1979	18			294	22	63	
Euclid Creek (Storet 504250)	12/10/1979	<2	0.34			11	127	
Euclid Creek (Storet 504250)	1/15/1980	<2	0.21		378	<10	95	<0.5
Euclid Creek (Storet 504250)	2/25/1980	2	0.22		578	10		
Euclid Creek (Storet 504250)	3/18/1980	7	0.18		770	21	334	<0.5
Euclid Creek (Storet 504250)	4/21/1980	2	0.14		428	<10	98	
Euclid Creek (Storet 504250)	5/6/1980	6	0.21		502	<10	117	<0.5
Euclid Creek (Storet 504250)	6/11/1980	4	0.186		340	<10		
Euclid Creek (Storet 504250)	7/21/1980	2	0.38			29	53	<0.5
Euclid Creek (Storet 504250)	8/19/1980	4	0.129			<10	170	
Euclid Creek (Storet 504250)	9/11/1980	5	0.102		259	<10	46	1.7
Euclid Creek (Storet 504250)	10/30/1980	3	0.209		300	20		
Euclid Creek (Storet 504250)	11/12/1980	5	0.231		392	<10		<.5
Euclid Creek (Storet 504250)	12/23/1980	6	0.273		788	<10		
Euclid Creek (Storet 504250)	½6/1981	20	0.792		1138	251		<.5

Site	Sample Dates	Phenolics (ug/l)	P, T	P, Soluble, T	TDS	TSS	Chlorides	Hg, T
Euclid Creek (Storet 504250)	2/23/1981	9	0.199		446	72		<.5
Euclid Creek (Storet 504250)	3/23/1981	5	0.193		822	<10		
Euclid Creek (Storet 504250)	4/27/1981	6	0.187		436	<10		<.5
Euclid Creek (Storet 504250)	5/5/1981	6	0.167		400	20	117	
Euclid Creek (Storet 504250)	6/16/1981	8	0.836		440	89	97	
Euclid Creek (Storet 504250)	7/16/1981	2	0.08		1816	20	35	
Euclid Creek (Storet 504250)	8/25/1981		0.067		428	<10	108	
Euclid Creek @ Route 283	1/10/1985	<10	0.07		1250	27		
Euclid Creek (Storet 504250)	7/18/1989				390	10		
Euclid Creek (Storet 504250)	7/18/1989		0.08		386	<5	85	
Euclid Creek @ Euclid Avenue (dst)	9/20/1989	<20	0.14		380	<5	92	
Euclid Creek @ Lakeshore (ust)	9/20/1989		0.05		406	<5	95	
Euclid Creek @ Mouth	9/20/1989	<20	0.06		382	8	90	
Euclid Creek @ Mozina-Underwood Road	7/18/1989				556	2120		
Euclid Creek @ Mozina-Underwood Road	9/20/1989	<20	0.05		420	<5		
Euclid Creek @ Nyack Road	9/20/1989	<20	0.12		398	<5	92	
Euclid Creek @ Route 185	7/18/1989				448	10		
Euclid Creek @ Route 283	7/18/1989				614	52		
Euclid Creek @ Route 283	9/20/1989		0.05		406	<5	95	
Euclid Creek @ Villaview Road (dst)	9/20/1989	<20	0.05		420	<5	100	
Euclid Creek @ Wildwood Park	7/18/1989	<20			626	8		
Euclid Creek @ Wildwood Park	9/20/1989	<20	0.26		382	8	90	
Euclid Creek East Branch @ mouth in park	6/28/1989		0.14					
Euclid Creek East Branch @ Rockefeller Road	6/6/1989		0.26		476	5		
Euclid Creek West Branch @ Highland Park	6/28/1989		<.05					
Euclid Creek (Storet 504250)	7/27/2000		0.1		434	<5	128	
Euclid Creek (Storet 504250)	8/30/2000		0.1		378	<5	101	<.2
Euclid Creek (Storet 504250)	9/6/2000		0.1		474	<5	132	<.2
Euclid Creek @ Euclid Park Blvd	7/27/2000		0.05		514	<5	167	
Euclid Creek @ Euclid Park Blvd	8/30/2000		0.05		482	<5	161	<.2
Euclid Creek @ Euclid Park Blvd	9/6/2000		0.05		312	<5	184	<.2
Euclid Creek @ Lakeshore (ust)	7/27/2000		0.13		478	<5	146	
Euclid Creek @ Lakeshore (ust)	8/30/2000		0.09		384	<5	100	<.2
Euclid Creek @ Lakeshore (ust)	9/6/2000		0.06		580	<5	143	<.2
Euclid Creek @ SR 322	7/27/2000		0.11		642	<5	247	
Euclid Creek @ SR 322	8/30/2000		0.07		714	<5	278	<.2
Euclid Creek @ SR 322	9/6/2000		0.05		542	<5	195	<.2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	7/27/2000		0.13		364	<5	94	
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	8/30/2000		0.14		322	<5	80	<.2
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	9/6/2000		0.18		442	<5	83	<.2

Site	Sample Dates	SULFATE	AL_TOTAL	BA_TOTAL	MN_TOTAL	K_TOTAL	SE_TOTAL	NA_TOTAL	ALKALINITY
Euclid Creek (Storet 504250)	7/27/2000	67	200	24	19	4	2	81	108
Euclid Creek (Storet 504250)	8/30/2000	61	200	24	14	5	2	87	113
Euclid Creek (Storet 504250)	9/6/2000	66	200	27	17	5	2	94	107
Euclid Creek @ Euclid Park Blvd	7/27/2000	70	200	29	10	4	2	92	115
Euclid Creek @ Euclid Park Blvd	8/30/2000	70	200	30	10	5	2		97
Euclid Creek @ Euclid Park Blvd	9/6/2000	73	200	31	10	4	2	46	109
Euclid Creek @ Lakeshore (ust)	7/27/2000	66	200	25	25	4	2	61	106
Euclid Creek @ Lakeshore (ust)	8/30/2000	64	200	23	25	5	2		113
Euclid Creek @ Lakeshore (ust)	9/6/2000	65	200	29	37	4	2		105
Euclid Creek @ SR 322	7/27/2000	65	200	43	38	4	2	83	108
Euclid Creek @ SR 322	8/30/2000	83	200	43	17	6	2		115
Euclid Creek @ SR 322	9/6/2000	68	200	34	20	4	2	58	113
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	7/27/2000	48	200	23	33	4	2	65	108
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	8/30/2000	52	200	22	25	4	2		110
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	9/6/2000	54	200	23	36	4	2	52	109

# **Appendix E**

**Northeast Ohio Regional Sewer District**

**Euclid Creek Chemical Analysis Results**

Site	Year	Date	Field Temperature	Field D.O.	BOD5	COD	Suspended Solids	Total Solids	Dissolved Solids
Highland Park	1987	Average (4/14,7/13,11/13)	6.5	14.4	2	17	5	602	537
Highland Park (East Branch)	1987	Average (4/14,7/13,11/13)	6.5	11.8	3	13	5	359	328
Mayfield Road	1987	Average (4/14,7/13,11/13)	7.4	11.5	2	19	7	610	573
St. Clair Road	1987	Average (4/14,7/13,11/13)	7.5	11.9	5	60	59	413	389
Highland Park	1989	Average (4/20,7/25,11/13)	12.2	9.9	1	15	4	592	564
Highland Park (East Branch)	1989	Average (4/20,7/25,11/13)	12	10.6	12	12	4	404	236
Mayfield Road	1989	Average (4/20,7/25,11/13)	13.4	10.3	3	15	5	601	574
St. Clair Road	1989	Average (4/20,7/25,11/13)	14	9.6	2	17	7	478	439
Highland Park	1991	5/8/1991	10	10.3	2	<10	1	565	522
Highland Park	1991	6/19/1991	21	7.7	2	15	6	522	516
Highland Park	1991	7/17/1991	21.5	7.5	4	<10	2	610	578
Highland Park (East Branch)	1991	5/8/1991	11.1	11.5	3	13	1	454	389
Highland Park (East Branch)	1991	6/19/1991	22	10.6	2	11	4	365	356
Highland Park (East Branch)	1991	7/17/1991	22.2	9.9	3	<10	1	375	332
Lakeshore Blvd	1991	5/8/1991	11.8	11.2	4	11	7	494	458
Lakeshore Blvd	1991	6/19/1991	22	8.4	3	18	12	478	439
Lakeshore Blvd	1991	7/17/1991	22.8	9.8	4	10	4	426	390
Mayfield Road	1991	5/8/1991	11.9	10.9	3	<10	2	655	596
Mayfield Road	1991	6/19/1991	23	10.4	3	<10	1	524	520
Mayfield Road	1991	7/17/1991	22.1	8.5	20	52	15	570	487
St. Clair Road	1991	5/8/1991	11.4	11.5	2	24	4	500	440
St. Clair Road	1991	6/19/1991			3	14	16	457	435
St. Clair Road	1991	7/17/1991	21.2	8.1	4	11	10	451	412
Highland Park	1996	7/24/1996	21.5	8	6	<10	3	804	711
Highland Park (East Branch)	1996	7/24/1996	22	10.6	7	<10	2	586	519
Lakeshore Blvd	1996	7/24/1996	22	10.2	8	<10	4	633	564
Mayfield Road	1996	7/24/1996	24	11	3	<10	3	948	845
St. Clair Road	1996	7/24/1996	22	9.8	6	<10	2	672	590
Highland Park	1997	5/23/1997	10	11.2	<2	12	1	650	603
Highland Park	1997	7/30/1997	20.5	8.3	<2	14	<1	528	488
Highland Park (East Branch)	1997	5/24/1997	11	11	<2	14	1	490	400
Highland Park (East Branch)	1997	7/30/1997	21	9.4	<2	11	1	480	418
Lakeshore Blvd	1997	5/23/1997	12	11.5	2	10	1	520	483



Site	Year	Date	Field Temperature	Field D.O.	BOD5	COD	Suspended Solids	Total Solids	Dissolved Solids
Mayfield Road	1997	5/23/1997	11.5	12	<2	<10	2	884	762
Mayfield Road	1997	7/30/1997	22	12	<2	16	<1	652	604
St. Clair Road	1997	5/23/1997	11	11.8	<2	<10	2	493	465
St. Clair Road	1997	7/30/1997	21	8.8	<2	12	<1	516	453
Highland Park	1998	7/30/1998	22	9.6	<2	<10	3	490	480
Highland Park (East Branch)	1998	7/30/1998	23	9.8	<2	<10	4	340	340
Lakeshore Blvd	1998	7/30/1998	24	8.8	<2	<10	2	470	460
Mayfield Road	1998	7/30/1998	22	11	<2	<10	5	640	620
St. Clair Road	1998	7/30/1998	24	9.3	<2	<10	2	450	450
Highland Park	1999	5/13/1999	14	10	<2	<10	1.6	590	600
Highland Park	1999	8/30/1999	18	8.6	9.9	<10	1.2	500	490
Highland Park (East Branch)	1999	5/13/1999	14	10	<2	15	1.2	520	480
Highland Park (East Branch)	1999	8/30/1999	18	9.4	<2	<10	4.8	430	400
Lakeshore Blvd	1999	5/13/1999	16	9.5	<2	19	1.2	590	560
Lakeshore Blvd	1999	8/30/1999	20	11	<2	<10	2.6	470	450
Mayfield Road	1999	5/13/1999	15	12	<2	15	2	630	630
Mayfield Road	1999	8/30/1999	18	8.4	<2	<10	2.4	590	580
St. Clair Road	1999	5/13/1999	14	11	<2	23	1.2	580	540
St. Clair Road	1999	8/30/1999	18	8.6	<2	<10	2.4	450	440
Highland Park	2000	6/5/2000	14	9.6					
Highland Park (East Branch)	2000	6/5/2000	14	11					
Lakeshore Blvd	2000	6/5/2000	16	10					
Mayfield Road	2000	6/5/2000	15	9.6					
St. Clair Road	2000	6/5/2000	15	9.7					
Highland Park	2002	5/23/2002	12	13	<2.0	<10.0	1	808	702
Highland Park (East Branch)	2002	5/23/2002	14	15	<2.0	10	3	549	471
Lakeshore Blvd	2002	5/23/2002	15	16	2.2	18	6.4	648	578
Mayfield Road	2002	5/23/2002	14	12	<2.0	13	2.7	1010	899
St. Clair Road	2002	5/23/2002	13	14	<2.0	12	1.6	651	577
Highland Park	2003		21.4	9.8	<2	1	2	476	486
Highland Park (East Branch)	2003		22	12	<2	8	2	769	736
Lakeshore Blvd	2003		24	12.2	2	8	3	-	608
Mayfield Road	2003		20.8	10.5	<2	14	3	895	896
St. Clair Road	2003		22.4	10.4	<2	16	1	603	577

Site	Year	Date	Conductance (mS/cm)	Turbidity	Ammonia-N	Total Phosphorus	Soluble Phosphorus	Nitrate
Highland Park	1987	Average (4/14,7/13,11/13)	712	3	0.23	0.11	0.04	0.26
Highland Park (East Branch)	1987	Average (4/14,7/13,11/13)	518	4	0.08	0.24	0.28	1.11
Mayfield Road	1987	Average (4/14,7/13,11/13)	1062	3	0.06	0.04	0.02	0.20
St. Clair Road	1987	Average (4/14,7/13,11/13)	717	6	0.13	0.34	0.06	0.68
Highland Park	1989	Average (4/20,7/25,11/13)	1185	1.5	0.1	0.04	0.01	0.62
Highland Park (East Branch)	1989	Average (4/20,7/25,11/13)	639	1.6	0.05	0.17	0.16	1.04
Mayfield Road	1989	Average (4/20,7/25,11/13)	1028	3	0.07	0.02	0.02	0.45
St. Clair Road	1989	Average (4/20,7/25,11/13)	747		0.08	0.08	0.05	0.84
Highland Park	1991	5/8/1991	650	5	<.01	0.25	0.01	0.36
Highland Park	1991	6/19/1991	880	1	0.11	0.03	0.03	0.33
Highland Park	1991	7/17/1991	910	1	0.06	0.01	0.01	
Highland Park (East Branch)	1991	5/8/1991	500	1	0.06	0.08	0.08	1.17
Highland Park (East Branch)	1991	6/19/1991	620	2	0.09	0.19	0.19	1.00
Highland Park (East Branch)	1991	7/17/1991	568	2	0.12	0.14	0.13	
Lakeshore Blvd	1991	5/8/1991	600	3.5	0.01	0.05	0.02	0.58
Lakeshore Blvd	1991	6/19/1991	765	4	0.14	0.03	0.02	0.27
Lakeshore Blvd	1991	7/17/1991	650	3.2	0.04	0.02	0.01	0.56
Mayfield Road	1991	5/8/1991	770	2	0.11	0.02	0.01	0.47
Mayfield Road	1991	6/19/1991	900	5	0.1	0.05	0.04	0.38
Mayfield Road	1991	7/17/1991	829	4	0.13	0.03	0.02	
St. Clair Road	1991	5/8/1991	560	4	0.04	0.02	0.01	0.63
St. Clair Road	1991	6/19/1991	720	7	0.11	0.03	0.01	0.55
St. Clair Road	1991	7/17/1991	650	4	0.09	0.02	<.01	
Highland Park	1996	7/24/1996	1500	0.7	0.1	0.04	0.05	0.30
Highland Park (East Branch)	1996	7/24/1996	1100		0.1			1.30
Lakeshore Blvd	1996	7/24/1996	1300	2.5	0.3	0.06	0.05	0.30
Mayfield Road	1996	7/24/1996	1700	1.1	0.2	0.04	0.04	0.10
St. Clair Road	1996	7/24/1996	1300	1.5	0.02	0.05	0.04	0.50
Highland Park	1997	5/23/1997	1400	0.56	0.1	0.01	<.01	0.40
Highland Park	1997	7/30/1997	1200	0.59	0.01	0.08	0.07	0.10
Highland Park (East Branch)	1997	5/24/1997	1000	0.92	0.03	0.04	0.04	0.80
Highland Park (East Branch)	1997	7/30/1997	1000	1.3	<.01	0.13	0.12	0.90
Lakeshore Blvd	1997	5/23/1997	1100	1.2	0.01	0.04	0.02	0.40
Lakeshore Blvd	1997	7/30/1997	1100	3.9	0.1	0.12	0.11	0.02

Site	Year	Date	Conductance (mS/cm)	Turbidity	Ammonia-N	Total Phosphorus	Soluble Phosphorus	Nitrate
Mayfield Road	1997	5/23/1997	1800	1.8	0.1	0.02	0.01	0.30
Mayfield Road	1997	7/30/1997	1400	1.7	0.01	0.09	0.08	0.10
St. Clair Road	1997	5/23/1997	1200	1.1	0.02	0.02	0.01	<.01
St. Clair Road	1997	7/30/1997	1100	1.4	0.01	0.11	0.10	0.30
Highland Park	1998	7/30/1998	1490	1	<.01	0.22	0.22	0.04
Highland Park (East Branch)	1998	7/30/1998	600	1.7	0.02	0.31	0.29	0.20
Lakeshore Blvd	1998	7/30/1998	800	1.4	<.01	0.21	0.20	0.03
Mayfield Road	1998	7/30/1998	1100	2.5	0.03	0.24	0.23	0.10
St. Clair Road	1998	7/30/1998	800	1.5	0.01	0.23	0.22	0.10
Highland Park	1999	5/13/1999	0.9	0.35	0.01	<.01	<.01	0.07
Highland Park	1999	8/30/1999		0.8	0.08	0.05	0.053	0.58
Highland Park (East Branch)	1999	5/13/1999	0.8	0.7	0.02	0.092	0.086	0.48
Highland Park (East Branch)	1999	8/30/1999		2	0.08	0.12	0.11	0.58
Lakeshore Blvd	1999	5/13/1999	0.9	1.5	0.07	0.033	0.023	0.1
Lakeshore Blvd	1999	8/30/1999		2	0.12	0.058	0.055	0.4
Mayfield Road	1999	5/13/1999	1	2.5	0.05	0.13	0.11	0.47
Mayfield Road	1999	8/30/1999		2	0.09	0.057	0.05	0.55
St. Clair Road	1999	5/13/1999	0.9	0.8	0.03	0.018	0.015	0.06
St. Clair Road	1999	8/30/1999		2	0.11	0.071	0.061	0.53
Highland Park	2000	6/5/2000						
Highland Park (East Branch)	2000	6/5/2000						
Lakeshore Blvd	2000	6/5/2000						
Mayfield Road	2000	6/5/2000						
St. Clair Road	2000	6/5/2000						
Highland Park	2002	5/23/2002	1.1	0.71	0.03	0.0342	0.02	0.33
Highland Park (East Branch)	2002	5/23/2002	0.6	1.1	0.05	0.0872	0.073	0.69
Lakeshore Blvd	2002	5/23/2002	0.8	2.6	0.02	0.084	0.037	0.29
Mayfield Road	2002	5/23/2002	1.3	2.5	0.06	0.0599	0.05	0.59
St. Clair Road	2002	5/23/2002	0.8	1.2	0.03	0.0422	0.031	0.4
Highland Park	2003		1285	0.92	0.05	0.09	0.09	0.51
Highland Park (East Branch)	2003		809	0.56	0.08	<0.05	<0.05	0.39
Lakeshore Blvd	2003		1042	1.3	0.04	<0.05	0.04	0.23
Mayfield Road	2003		1516	1.72	0.21	0.06	0.06	0.6
St. Clair Road	2003		1045	2.54	0.11	<0.05	<0.05	-

Site	Year	Date	NO3-NO2	TKN	Chloride	Sulfates	Alkalinity	Hardness	ICP Nickel	ICP Copper	ICP Chromium	Hexavalent Chromium
Highland Park	1987	Average (4/14,7/13,11/13)		1.77	171.00	85.00	113.00	189.00	<10	<10	<10	
Highland Park (East Branch)	1987	Average (4/14,7/13,11/13)		1.49	96.00	57.00	100.00	217.00	<10	<10	<20	
Mayfield Road	1987	Average (4/14,7/13,11/13)		1.87	204.00	72.00	122.00	195.00	<10	<10	<10	
St. Clair Road	1987	Average (4/14,7/13,11/13)		1.87	91.00	74.00	96.00	158.00	<10	<20	<20	
Highland Park	1989	Average (4/20,7/25,11/13)		0.93	205.00	94.00	116.00	186.00	20.00	<10	<10	
Highland Park (East Branch)	1989	Average (4/20,7/25,11/13)		1.12	358.00	75.00	104.00	151.00	20.00	<10	<10	
Mayfield Road	1989	Average (4/20,7/25,11/13)		0.84	192.00	92.00	111.00	191.00	10.00	<10	<10	
St. Clair Road	1989	Average (4/20,7/25,11/13)		3.69	142.00	90.00	105.00	223.00	30.00	10.00	10.00	
Highland Park	1991	5/8/1991	0.36	0.48	162.00	85.00	119.00	214.00	20.00	10.00	20.00	<10
Highland Park	1991	6/19/1991	0.33	0.56	180.00	42.00	109.00	214.00	10.00	10.00	20.00	<10
Highland Park	1991	7/17/1991		0.43				228.00	10.00	10.00	20.00	<10
Highland Park (East Branch)	1991	5/8/1991	1.17	0.64	114.00	61.00	117.00	184.00	20.00	10.00	20.00	<10
Highland Park (East Branch)	1991	6/19/1991	1.00	0.50	140.00	57.00	116.00	210.00	10.00	10.00	20.00	<10
Highland Park (East Branch)	1991	7/17/1991		0.47				182.00	10.00	10.00	20.00	<10
Lakeshore Blvd	1991	5/8/1991	0.58	0.68	129.00	85.00	113.00	202.00	20.00	10.00	20.00	<10
Lakeshore Blvd	1991	6/19/1991	0.27	0.48	154.00	62.00	105.00	200.00	10.00	10.00	20.00	<10
Lakeshore Blvd	1991	7/17/1991		0.56				188.00	10.00	10.00	10.00	<10
Mayfield Road	1991	5/8/1991	0.47	0.79	194.00	82.00	128.00	168.00	20.00	10.00	20.00	<10
Mayfield Road	1991	6/19/1991	0.38	0.72	64.00	72.00	112.00	210.00	10.00	10.00	20.00	<10
Mayfield Road	1991	7/17/1991		1.07				196.00	10.00	10.00	20.00	<10
St. Clair Road	1991	5/8/1991	0.63	0.62	125.00	81.00	110.00	197.00	20.00	10.00	20.00	<10
St. Clair Road	1991	6/19/1991	0.55	0.58	144.00	74.00	99.00	214.00	20.00	10.00	20.00	<10
St. Clair Road	1991	7/17/1991		0.31				187.00	20.00	10.00	20.00	<10
Highland Park	1996	7/24/1996		0.70	260.00	117.00	120.00	255.00	16.00	22.00	9.00	<10
Highland Park (East Branch)	1996	7/24/1996			170.00	81.00	133.00	238.00	10.00	11.00	9.00	<10
Lakeshore Blvd	1996	7/24/1996		1.10	196.00	104.00	130.00	239.00	8.00	12.00	3.00	<10
Mayfield Road	1996	7/24/1996		0.60	326.00	104.00	123.00	259.00	4.00	6.00	3.00	<10
St. Clair Road	1996	7/24/1996		1.40	202.00	103.00	124.00	202.00	9.00	11.00	11.00	<10
Highland Park	1997	5/23/1997		0.40	248.00	93.00	128.00	228.00	8.00	16.00	4.00	<10
Highland Park	1997	7/30/1997		0.60	188.00	89.00	115.00	184.00	4.00	7.00	2.00	<10
Highland Park (East Branch)	1997	5/24/1997		0.50	126.00	66.00	114.00	189.00	7.00	17.00	3.00	<10
Highland Park (East Branch)	1997	7/30/1997		0.70	146.00	68.00	134.00	190.00	5.00	7.00	2.00	<10
Lakeshore Blvd	1997	5/23/1997		0.60	160.00	82.00	134.00	206.00	7.00	10.00	4.00	<10
Lakeshore Blvd	1997	7/30/1997		0.90	170.00	90.00	140.00	199.00	5.00	8.00	2.00	<10

Site	Year	Date	NO3-NO2	TKN	Chloride	Sulfates	Alkalinity	Hardness	ICP Nickel	ICP Copper	ICP Chromium	Hexavalent Chromium
Mayfield Road	1997	5/23/1997		0.60	266.00	93.00	123.00	260.00	10.00	20.00	4.00	<10
Mayfield Road	1997	7/30/1997		8.00	264.00	84.00	125.00	210.00	<3	6.00	1.00	<10
St. Clair Road	1997	5/23/1997		0.60	56.00	84.00	128.00	202.00	0.70	13.00	2.00	<10
St. Clair Road	1997	7/30/1997		0.60	152.00	93.00	138.00	205.00	4.00	6.00	2.00	<10
Highland Park	1998	7/30/1998		0.50	160.00	69.00	112.00	183.00	3.20	2.00	1.00	<10
Highland Park (East Branch)	1998	7/30/1998		0.40	84.00	51.00	109.00	159.00	4.90	3.10	1.60	<10
Lakeshore Blvd	1998	7/30/1998		0.60	120.00	80.00	109.00	196.00	3.50	2.00	1.00	<10
Mayfield Road	1998	7/30/1998		0.60	220.00	69.00	109.00	190.00	3.40	4.50	2.20	<10
St. Clair Road	1998	7/30/1998		0.50	130.00	75.00	116.00	186.00	4.20	3.10	1.60	<10
Highland Park	1999	5/13/1999		0.48	220	94	113	186	2.7	8.8	3.2*	<10
Highland Park	1999	8/30/1999		0.39	160	74	105	178	2.6	4.6	3.9*	<10
Highland Park (East Branch)	1999	5/13/1999		0.53	160	110	123	200	5	12	4.3*	<10
Highland Park (East Branch)	1999	8/30/1999		0.49	110	70	117	188	2.5	2.8	2.7*	<10
Lakeshore Blvd	1999	5/13/1999		0.61	200	81	117	205	4.3	11	4.6*	<10
Lakeshore Blvd	1999	8/30/1999		0.56	140	82	113	188	2.9*	4.7	2.9*	<10
Mayfield Road	1999	5/13/1999		0.7	240	96	103	174	4.3*	8.7	3.7*	<10
Mayfield Road	1999	8/30/1999		0.51	200	76	97	198	2.1*	5.2	3.7*	<10
St. Clair Road	1999	5/13/1999		0.48	190	75	114	196	6.6*	10	2.1*	<10
St. Clair Road	1999	8/30/1999		0.5	130	82	110	182	2.4*	3.4	3.1*	<10
Highland Park	2000	6/5/2000										
Highland Park (East Branch)	2000	6/5/2000										
Lakeshore Blvd	2000	6/5/2000										
Mayfield Road	2000	6/5/2000										
St. Clair Road	2000	6/5/2000										
Highland Park	2002	5/23/2002				94	136	266	5	4	<1.0	<10.0
Highland Park (East Branch)	2002	5/23/2002				67	118	218	4	3	<1.0	<10.0
Lakeshore Blvd	2002	5/23/2002				91	122	248	4	6	1	<10.0
Mayfield Road	2002	5/23/2002				91	137	281	3	5	<1.0	<10.0
St. Clair Road	2002	5/23/2002				97	125	249	6	4.5	2	<10.0
Highland Park	2003		0.53				114	196	2	3	1	<10
Highland Park (East Branch)	2003		0.4				121	248	2	4	1	<10
Lakeshore Blvd	2003		0.25				130	220	2	5	2	<10
Mayfield Road	2003		0.62				128	248	2	4	<1	<10
St. Clair Road	2003		0.01				124	230	2	4	1	<10

Site	Year	Date	ICP Chromium	Hexavalent Chromium	ICP Zinc	ICP Iron	ICP Cadmium	ICP Lead	Mercury	Fecal Coliform	pH
Highland Park	1987	Average (4/14,7/13,11/13)	<10		20.00	100.00	<10	<130	0.08		
Highland Park (East Branch)	1987	Average (4/14,7/13,11/13)	<20		10.00	170.00	<10	<10	<.1		
Mayfield Road	1987	Average (4/14,7/13,11/13)	<10		10.00	250.00	<10	10.00	0.12		
St. Clair Road	1987	Average (4/14,7/13,11/13)	<20		40.00	3400.00	<10	<20	<.1		
Highland Park	1989	Average (4/20,7/25,11/13)	<10		30.00	200.00	<10	20.00	0.20	150.00	
Highland Park (East Branch)	1989	Average (4/20,7/25,11/13)	<10		270.00	200.00	<10	30.00	<.2	39.00	
Mayfield Road	1989	Average (4/20,7/25,11/13)	<10		70.00	400.00	<10	20.00	0.20	89.00	
St. Clair Road	1989	Average (4/20,7/25,11/13)	10.00		180.00	1400.00	<10	<10	0.20	460.00	
Highland Park	1991	5/8/1991	20.00	<10	60.00	60.00	10.00	30.00	<.2	140.00	8.00
Highland Park	1991	6/19/1991	20.00	<10	80.00	70.00	<10	20.00	<.2	200.00	7.70
Highland Park	1991	7/17/1991	20.00	<10	20.00	100.00	10.00	10.00	<.2	90.00	7.70
Highland Park (East Branch)	1991	5/8/1991	20.00	<10	130.00	100.00	10.00	30.00	<.2	40.00	7.90
Highland Park (East Branch)	1991	6/19/1991	20.00	<10	80.00	130.00	<10	10.00	<.2	180.00	8.30
Highland Park (East Branch)	1991	7/17/1991	20.00	<10	20.00	80.00	10.00	20.00	0.50	30.00	8.20
Lakeshore Blvd	1991	5/8/1991	20.00	<10	100.00	1000.00	10.00	40.00	<.2	600.00	8.10
Lakeshore Blvd	1991	6/19/1991	20.00	<10	100.00	500.00	10.00	<10	<.2	1900.00	8.00
Lakeshore Blvd	1991	7/17/1991	10.00	<10	10.00	290.00	<10	<10	<.2	300.00	7.80
Mayfield Road	1991	5/8/1991	20.00	<10	40.00	370.00	10.00	20.00	<.2	140.00	8.10
Mayfield Road	1991	6/19/1991	20.00	<10	60.00	400.00	<10	10.00	<.2	600.00	8.10
Mayfield Road	1991	7/17/1991	20.00	<10	30.00	570.00	10.00	20.00	<.2		8.00
St. Clair Road	1991	5/8/1991	20.00	<10	120.00	1100.00	10.00	40.00	<.2	230.00	8.10
St. Clair Road	1991	6/19/1991	20.00	<10	60.00	980.00	<10	10.00	<.2	340.00	7.60
St. Clair Road	1991	7/17/1991	20.00	<10	20.00	710.00	<10	<10	<.2	80.00	7.50
Highland Park	1996	7/24/1996	9.00	<10	100.00	140.00	<1	5.00	<.2	120.00	7.50
Highland Park (East Branch)	1996	7/24/1996	9.00	<10	30.00	140.00	<1	<3	<.2	160.00	7.90
Lakeshore Blvd	1996	7/24/1996	3.00	<10	700.00	210.00	<1	<3	<.2	320.00	7.50
Mayfield Road	1996	7/24/1996	3.00	<10	40.00	130.00	<1	<1	<.2	7400.00	8.00
St. Clair Road	1996	7/24/1996	11.00	<10	170.00	180.00	<1	<3	<.2	1500.00	7.80
Highland Park	1997	5/23/1997	4.00	<10	20.00	70.00	<1	<3	<.2	84.00	7.20
Highland Park	1997	7/30/1997	2.00	<10	20.00	40.00	<1	<3	<.2	52.00	7.40
Highland Park (East Branch)	1997	5/24/1997	3.00	<10	30.00	120.00	<1	4.00	<.2	100.00	7.30
Highland Park (East Branch)	1997	7/30/1997	2.00	<10	10.00	250.00	<1	<3	<.2	110.00	7.50
Lakeshore Blvd	1997	5/23/1997	4.00	<10	40.00	210.00	1.00	3.00	<.2	2200.00	7.50
Lakeshore Blvd	1997	7/30/1997	2.00	<10	20.00	350.00	<1	<3	<.2	270.00	7.10

Site	Year	Date	ICP Chromium	Hexavalent Chromium	ICP Zinc	ICP Iron	ICP Cadmium	ICP Lead	Mercury	Fecal Coliform	pH
Mayfield Road	1997	5/23/1997	4.00	<10	40.00	300.00	<1	<3	<.2	90.00	7.30
Mayfield Road	1997	7/30/1997	1.00	<10	30.00	260.00	<1	<3	<.2	160.00	7.80
St. Clair Road	1997	5/23/1997	2.00	<10	40.00	220.00	<1	3.00	<.2	6400.00	7.30
St. Clair Road	1997	7/30/1997	2.00	<10	10.00	190.00	<1	<3	<.2	2000.00	7.50
Highland Park	1998	7/30/1998	1.00	<10	23.00	55.00	<1	<3	<.2	72.00	8.00
Highland Park (East Branch)	1998	7/30/1998	1.60	<10	19.00	103.00	<1	3.30	<.2	110.00	8.20
Lakeshore Blvd	1998	7/30/1998	1.00	<10	27.00	205.00	<1	6.10	<.2	490.00	7.90
Mayfield Road	1998	7/30/1998	2.20	<10	25.00	293.00	<1	<3	<.2	290.00	7.80
St. Clair Road	1998	7/30/1998	1.60	<10	70.00	181.00	1.00	10.00	<.2	700.00	8.20
Highland Park	1999	5/13/1999	3.2*	<10	12	44	<1*	<3*	<.2	88	
Highland Park	1999	8/30/1999	3.9*	<10	37	36	<1*	<3*	<.2	100	8.1
Highland Park (East Branch)	1999	5/13/1999	4.3*	<10	9	90	<1*	<3*	<.2	~28	
Highland Park (East Branch)	1999	8/30/1999	2.7*	<10	44	139	<1*	<3*	<.2	200	8.1
Lakeshore Blvd	1999	5/13/1999	4.6*	<10	44	234	<1*	<3*	<.2	590	
Lakeshore Blvd	1999	8/30/1999	2.9*	<10	90	167	<1*	<3*	<.2	1000	7.6
Mayfield Road	1999	5/13/1999	3.7*	<10	18	239	<1*	<3*	<.2	840	
Mayfield Road	1999	8/30/1999	3.7*	<10	54	268	<1*	<3*	<.2	260	8.1
St. Clair Road	1999	5/13/1999	2.1*	<10	11	190	<1*	<3*	<.2	610	
St. Clair Road	1999	8/30/1999	3.1*	<10	15	214	<1*	<3*	<.2	780	7.9
Highland Park	2000	6/5/2000									8
Highland Park (East Branch)	2000	6/5/2000									8.2
Lakeshore Blvd	2000	6/5/2000									7.5
Mayfield Road	2000	6/5/2000									8
St. Clair Road	2000	6/5/2000									7.7
Highland Park	2002	5/23/2002	<1.0	<10.0	12	78	<1.0	3	<0.05	210	8.3
Highland Park (East Branch)	2002	5/23/2002	<1.0	<10.0	10	148	<1.0	<3.0	<0.05	90	8.5
Lakeshore Blvd	2002	5/23/2002	1	<10.0	15	269	<1.0	<3.0	<0.05	140	8.2
Mayfield Road	2002	5/23/2002	<1.0	<10.0	11	398	<1.0	<3.0	<0.05	260	8.2
St. Clair Road	2002	5/23/2002	2	<10.0	12	193	<1.0	5	<0.05	110	8.1
Highland Park	2003		1	<10	6	147	<1	<1	<0.05 (ng/l)		8.04
Highland Park (East Branch)	2003		1	<10	5	51	<1	<1	<0.05 (ng/l)		8.43
Lakeshore Blvd	2003		2	<10	4	204	<1	<3	<0.05 (ng/l)		8.32
Mayfield Road	2003		<1	<10	5	222	<1	<1	<0.05 (ng/l)		7.85
St. Clair Road	2003		1	<10	4	206	<1	<3	<0.05 (ng/l)		8.14

Site	Year	Date	E. coli	Phenolics	Nitrite	GFAA Antimony	ICP Arsenic	ICP Selenium	GFAA Thallium	ICP Silver	ICP Beryllium	Potassium (mg/l)
Highland Park	1987	Average (4/14,7/13,11/13)			0.02							
Highland Park (East Branch)	1987	Average (4/14,7/13,11/13)			0.04							
Mayfield Road	1987	Average (4/14,7/13,11/13)			0.03							
St. Clair Road	1987	Average (4/14,7/13,11/13)			0.02							
Highland Park	1989	Average (4/20,7/25,11/13)			0.01							
Highland Park (East Branch)	1989	Average (4/20,7/25,11/13)			0.23							
Mayfield Road	1989	Average (4/20,7/25,11/13)			0.17							
St. Clair Road	1989	Average (4/20,7/25,11/13)			0.02							
Highland Park	1991	5/8/1991		<.05	<.01							
Highland Park	1991	6/19/1991		<.05	<.01							
Highland Park	1991	7/17/1991										
Highland Park (East Branch)	1991	5/8/1991		<.05	<.01							
Highland Park (East Branch)	1991	6/19/1991		<.05	<.01							
Highland Park (East Branch)	1991	7/17/1991										
Lakeshore Blvd	1991	5/8/1991		<.05	<.01							
Lakeshore Blvd	1991	6/19/1991		<.05	<.01							
Lakeshore Blvd	1991	7/17/1991										
Mayfield Road	1991	5/8/1991		<.05	<.01							
Mayfield Road	1991	6/19/1991		<.05	<.01							
Mayfield Road	1991	7/17/1991										
St. Clair Road	1991	5/8/1991		<.05	<.01							
St. Clair Road	1991	6/19/1991		<.05	<.01							
St. Clair Road	1991	7/17/1991										
Highland Park	1996	7/24/1996	76.00				<5		<7	2.00	<1	5.00
Highland Park (East Branch)	1996	7/24/1996	100.00				<5		<7	<1	<1	4.40
Lakeshore Blvd	1996	7/24/1996	120.00				<5		<7	1.00	<1	4.60
Mayfield Road	1996	7/24/1996	300.00				<5		<7	<.2	<1	6.00
St. Clair Road	1996	7/24/1996	220.00			<7	<5		<7	3.00	<1	4.80
Highland Park	1997	5/23/1997	72.00			<7	<5	<5	<7	<1	<1	3.80
Highland Park	1997	7/30/1997	52.00			<7	<5	<5	<7	<1	<1	3.60
Highland Park (East Branch)	1997	5/24/1997	64.00			<7	<5	<5	<7	<1	<1	2.70
Highland Park (East Branch)	1997	7/30/1997	68.00				<5	<5	<7	<1	<1	4.00
Lakeshore Blvd	1997	5/23/1997	1900.00			<7	<5	<5	<7	<1	<1	3.80
Lakeshore Blvd	1997	7/30/1997	95.00			<7	<5	<5		<1	<1	4.10



Site	Year	Date	E. coli	Phenolics	Nitrite	GFAA Antimony	ICP Arsenic	ICP Selenium	GFAA Thallium	ICP Silver	ICP Beryllium	Potassium (mg/l)
Mayfield Road	1997	5/23/1997	85.00			<7	<5	<5	<7	<1	<1	4.00
Mayfield Road	1997	7/30/1997	80.00			<7	<5	<5	<7	<1	<1	4.60
St. Clair Road	1997	5/23/1997	2100.00			<7	<5	<5	<7	<1	<1	
St. Clair Road	1997	7/30/1997	2000.00			<7	<5	<5	<7	<1	<1	3.80
Highland Park	1998	7/30/1998	72.00			<7	<5	<5	<7	<1	<1	
Highland Park (East Branch)	1998	7/30/1998	100.00			<7	<5	<5	<7	<1	<1	
Lakeshore Blvd	1998	7/30/1998	360.00			<7	<5	<5	<7	<1	<1	
Mayfield Road	1998	7/30/1998	250.00			<7	<5	<5	<7	<1	<1	
St. Clair Road	1998	7/30/1998	290.00			<7	<5	<5	<7	<1	<1	
Highland Park	1999	5/13/1999	54		<.01	<7	<5*	<5*	<7		<1*	
Highland Park	1999	8/30/1999	88		<.01	<7	<5*	<5*	<7		<1*	
Highland Park (East Branch)	1999	5/13/1999	~16		0.01	<7	<5*	<5*	<7		<1*	
Highland Park (East Branch)	1999	8/30/1999	90		<.01	<7	<5*	<5*	<7		<1*	
Lakeshore Blvd	1999	5/13/1999	430		0.01	<7	<5*	<5*	<7		<1*	
Lakeshore Blvd	1999	8/30/1999	430		0.01	<7	<5*	<5*	<7		<1*	
Mayfield Road	1999	5/13/1999	730		0.02	<7	<5*	<5*	<7		<1*	
Mayfield Road	1999	8/30/1999	200		0.01	<7	<5*	<5*	<7		<1*	
St. Clair Road	1999	5/13/1999	470		0.05	<7	<5*	<5*	<7		<1*	
St. Clair Road	1999	8/30/1999	400		<.01	<7	<5*	<5*	<7		<1*	
Highland Park	2000	6/5/2000	160									
Highland Park (East Branch)	2000	6/5/2000	110									
Lakeshore Blvd	2000	6/5/2000	860									
Mayfield Road	2000	6/5/2000	260									
St. Clair Road	2000	6/5/2000	920									
Highland Park	2002	5/23/2002	90		<0.01		<2.0	<10.0		<2.0	<0.5	
Highland Park (East Branch)	2002	5/23/2002	~22		<0.01		<2.0	<10.0		<2.0	<0.5	
Lakeshore Blvd	2002	5/23/2002	42 EC		<0.01		<2.0	<10.0		<2.0	<0.5	
Mayfield Road	2002	5/23/2002	140		<0.01		2	<10.0		<2.0	<0.5	
St. Clair Road	2002	5/23/2002	100		<0.01		4.5	<10.0		<2.0	<0.5	
Highland Park	2003		3460		0.02		2	4		<1	<0.5	
Highland Park (East Branch)	2003		1340		0.02		<2	4		<1	<0.5	
Lakeshore Blvd	2003		5740		0.02		<2	<5		<1	<0.5	
Mayfield Road	2003		2420		0.02		<2	3		<1	<0.5	
St. Clair Road	2003		4800		0.02		<2	<5		<1	<0.5	

# **Appendix F**

**Ohio EPA and NEORS**

**Euclid Creek Bacteria Analysis Results**

Sample Site	Collected By:	Date	Fecal Coliform	Fecal Streptococcus	E. coli
Euclid Creek @ Euclid Park Blvd	Ohio EPA	7/27/2000	140		100
Euclid Creek @ Euclid Park Blvd	Ohio EPA	8/30/2000	96		48
Euclid Creek @ Euclid Park Blvd	Ohio EPA	9/6/2000	240		120
Euclid Creek @ SR 322	Ohio EPA	7/27/2000	1200		520
Euclid Creek @ SR 322	Ohio EPA	8/30/2000	220		160
Euclid Creek @ SR 322	Ohio EPA	9/6/2000	770		550
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	Ohio EPA	7/27/2000	110		95
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	Ohio EPA	8/30/2000	220		46
Euclid Creek Unnamed Trib @ RM 3.19 @ Mouth	Ohio EPA	9/6/2000	180		220
Highland Park	NEORS	5/8/1991	140		
Highland Park	NEORS	5/29/91	240		
Highland Park	NEORS	6/19/1991	200		
Highland Park	NEORS	7/8/91	160		
Highland Park	NEORS	7/17/1991	90		
Highland Park	NEORS	8/8/91	240		
Highland Park	NEORS	9/12/91	320		
Highland Park	NEORS	10/16/91	140		
Highland Park	NEORS	11/14/91	450		
Highland Park	NEORS	12/12/91	120		
Highland Park	NEORS	2/4/92	950		
Highland Park	NEORS	3/4/92	380		
Highland Park	NEORS	4/14/92	75		
Highland Park	NEORS	5/27/92	70		
Highland Park	NEORS	6/16/92	70		
Highland Park	NEORS	7/7/92	80		
Highland Park	NEORS	8/20/92	130		
Highland Park	NEORS	9/2/92	20		
Highland Park	NEORS	10/8/92	200		
Highland Park	NEORS	12/8/92	110		
Highland Park	NEORS	7/24/1996	120		76
Highland Park	NEORS	5/23/1997	84		72
Highland Park	NEORS	7/30/1997	52		52
Highland Park	NEORS	7/30/1998	72		72
Highland Park (East Branch)	NEORS	5/8/1991	40		
Highland Park (East Branch)	NEORS	5/29/91	70		
Highland Park (East Branch)	NEORS	6/19/1991	180		
Highland Park (East Branch)	NEORS	7/8/91	120		
Highland Park (East Branch)	NEORS	7/17/1991	30		
Highland Park (East Branch)	NEORS	8/8/91	70		
Highland Park (East Branch)	NEORS	9/12/91	180		
Highland Park (East Branch)	NEORS	10/16/91	520		
Highland Park (East Branch)	NEORS	11/14/91	220		
Highland Park (East Branch)	NEORS	12/12/91	180		
Highland Park (East Branch)	NEORS	2/4/92	4400		
Highland Park (East Branch)	NEORS	3/4/92	500		
Highland Park (East Branch)	NEORS	4/14/92	60		
Highland Park (East Branch)	NEORS	5/27/92	50		
Highland Park (East Branch)	NEORS	6/16/92	30		
Highland Park (East Branch)	NEORS	7/7/92	150		
Highland Park (East Branch)	NEORS	8/20/92	170		
Highland Park (East Branch)	NEORS	9/2/92	30		
Highland Park (East Branch)	NEORS	10/8/92	120		

Sample Site	Collected By:	Date	Fecal Coliform	Fecal Streptococcus	E. coli
Highland Park (East Branch)	NEORS	12/8/92	150		
Highland Park (East Branch)	NEORS	7/24/1996	160		100
Highland Park (East Branch)	NEORS	5/24/1997	100		64
Highland Park (East Branch)	NEORS	7/30/1997	110		68
Highland Park (East Branch)	NEORS	7/30/1998	110		100
Lakeshore Blvd	Ohio EPA	2/14/72	14000	1800	
Lakeshore Blvd	Ohio EPA	4/18/72	16000	1800	
Lakeshore Blvd	Ohio EPA	4/25/72	16000	920	
Lakeshore Blvd	Ohio EPA	5/2/72	3400	2600	
Lakeshore Blvd	Ohio EPA	5/9/72	12000	21000	
Lakeshore Blvd	Ohio EPA	5/16/72	1600	320	
Lakeshore Blvd	Ohio EPA	5/23/72	120	250	
Lakeshore Blvd	Ohio EPA	5/30/72	92000	32000	
Lakeshore Blvd	Ohio EPA	6/6/72	9500	5700	
Lakeshore Blvd	Ohio EPA	6/13/72	11000	13000	
Lakeshore Blvd	Ohio EPA	6/20/72	8800	4000	
Lakeshore Blvd	Ohio EPA	6/27/72	500	380	
Lakeshore Blvd	Ohio EPA	7/5/72	100000	64000	
Lakeshore Blvd	Ohio EPA	7/11/72	340	940	
Lakeshore Blvd	Ohio EPA	7/18/72	140	160	
Lakeshore Blvd	Ohio EPA	7/25/72	120	1100	
Lakeshore Blvd	Ohio EPA	8/1/72	30	600	
Lakeshore Blvd	Ohio EPA	8/8/72	64000	36000	
Lakeshore Blvd	Ohio EPA	8/15/72	20000	8400	
Lakeshore Blvd	Ohio EPA	8/22/72	340	2800	
Lakeshore Blvd	Ohio EPA	8/29/72	10	10	
Lakeshore Blvd	Ohio EPA	9/5/72	150	220	
Lakeshore Blvd	Ohio EPA	9/12/72	260	360	
Lakeshore Blvd	Ohio EPA	9/19/72	20	20	
Lakeshore Blvd	Ohio EPA	10/3/72	<5	<5	
Lakeshore Blvd	Ohio EPA	10/10/72	73	120	
Lakeshore Blvd	Ohio EPA	10/17/72	550	460	
Lakeshore Blvd	Ohio EPA	10/24/72	760	600	
Lakeshore Blvd	Ohio EPA	10/31/72	900	230	
Lakeshore Blvd	Ohio EPA	11/14/72	6500	11000	
Lakeshore Blvd	Ohio EPA	11/21/72	2000	700	
Lakeshore Blvd	Ohio EPA	11/28/72	610	480	
Lakeshore Blvd	Ohio EPA	12/5/72	20000	11000	
Lakeshore Blvd	Ohio EPA	12/12/72	13000	18000	
Lakeshore Blvd	Ohio EPA	12/19/72	180	750	
Lakeshore Blvd	NEORS	5/8/1991	600		
Lakeshore Blvd	NEORS	6/19/1991	1900		
Lakeshore Blvd	NEORS	7/17/1991	300		
Lakeshore Blvd	NEORS	7/24/1996	320		120
Lakeshore Blvd	NEORS	5/23/1997	2200		1900
Lakeshore Blvd	NEORS	7/30/1997	270		95
Lakeshore Blvd	NEORS	7/30/1998	490		360
Lakeshore Blvd	Ohio EPA	7/27/2000	1600		730
Lakeshore Blvd	Ohio EPA	8/30/2000	870		650
Lakeshore Blvd	Ohio EPA	9/6/2000	1700		1000
Mayfield Road	NEORS	5/8/1991	140		
Mayfield Road	NEORS	6/19/1991	600		

Sample Site	Collected By:	Date	Fecal Coliform	Fecal Streptococcus	E. coli
Mayfield Road	NEORS	7/24/1996	7400		300
Mayfield Road	NEORS	5/23/1997	90		85
Mayfield Road	NEORS	7/30/1997	160		80
Mayfield Road	NEORS	7/30/1998	290		250
St. Clair Road	Ohio EPA	10/19/77	330	210	
St. Clair Road	Ohio EPA	11/9/77	3400	870	
St. Clair Road	Ohio EPA	12/28/77	170	520	
St. Clair Road	Ohio EPA	1/19/78	5200	4100	
St. Clair Road	Ohio EPA	2/8/78	110	470	
St. Clair Road	Ohio EPA	3/8/78	281	3500	
St. Clair Road	Ohio EPA	4/5/78	10000	5600	
St. Clair Road	Ohio EPA	5/10/78	470	310	
St. Clair Road	Ohio EPA	6/14/78	75	200	
St. Clair Road	Ohio EPA	7/26/78	2100	300	
St. Clair Road	Ohio EPA	8/10/78	3000	2200	
St. Clair Road	Ohio EPA	9/18/78	11000	4400	
St. Clair Road	Ohio EPA	10/12/1978	4400	15000	
St. Clair Road	Ohio EPA	11/15/1978	2900	8100	
St. Clair Road	Ohio EPA	12/19/1978	8000	2200	
St. Clair Road	Ohio EPA	1/31/1979	5200	3300	
St. Clair Road	Ohio EPA	2/22/1979			
St. Clair Road	Ohio EPA	3/22/1979	550	300	
St. Clair Road	Ohio EPA	4/17/1979	3700	1500	
St. Clair Road	Ohio EPA	5/24/1979	26000	6800	
St. Clair Road	Ohio EPA	6/13/1979	2000	730	
St. Clair Road	Ohio EPA	7/24/1979	7600	1700	
St. Clair Road	Ohio EPA	8/16/1979	21000	1200	
St. Clair Road	Ohio EPA	9/19/1979	230	130	
St. Clair Road	Ohio EPA	10/17/1979	13000	2000	
St. Clair Road	Ohio EPA	11/7/1979	19000	22000	
St. Clair Road	Ohio EPA	12/10/1979	35000	38000	
St. Clair Road	Ohio EPA	1/15/1980	24000	6000	
St. Clair Road	Ohio EPA	2/25/1980	18000	19000	
St. Clair Road	Ohio EPA	3/18/1980			
St. Clair Road	Ohio EPA	4/21/1980	14000	2200	
St. Clair Road	Ohio EPA	5/6/1980	7500	5700	
St. Clair Road	Ohio EPA	6/11/1980	15000	3600	
St. Clair Road	Ohio EPA	7/21/1980	130	250	
St. Clair Road	Ohio EPA	8/19/1980	3400	1800	
St. Clair Road	Ohio EPA	9/11/1980	33	67	
St. Clair Road	Ohio EPA	10/30/1980	2800	1700	
St. Clair Road	Ohio EPA	11/12/1980	2400	2100	
St. Clair Road	Ohio EPA	12/23/1980	8000		
St. Clair Road	Ohio EPA	1/6/1981	50000	25000	
St. Clair Road	Ohio EPA	2/23/1981		9300	
St. Clair Road	Ohio EPA	3/23/1981	14000	10000	
St. Clair Road	Ohio EPA	4/27/1981	29000	9500	
St. Clair Road	Ohio EPA	5/5/1981	4500	2700	
St. Clair Road	Ohio EPA	6/16/1981	26000	29000	
St. Clair Road	Ohio EPA	7/16/1981	55	40	
St. Clair Road	Ohio EPA	8/25/1981	120	160	
St. Clair Road	NEORS	7/24/1996	1500		220

Sample Site	Collected By:	Date	Fecal Coliform	Fecal Streptococcus	E. coli
St. Clair Road	NEORS	5/23/1997	6400		2100
St. Clair Road	NEORS	7/30/1997	2000		2000
St. Clair Road	NEORS	7/30/1998	700		290
St. Clair Road	Ohio EPA	7/27/2000	1800		280
St. Clair Road	Ohio EPA	8/30/2000	570		550
St. Clair Road	Ohio EPA	9/6/2000	900		610

# **Appendix G**

**Ohio Water Quality Standards**

**Euclid Creek Use Designation**

Use designations for water bodies in the Cuyahoga river drainage basin.

Water Body Segment	Use Designations											Comments	
	Aquatic Life Habitat						Water Supply			Recreation			
	S R W	W W H	E W H	M W H	S S H	C W H	L R W	P W S	A W S	I W S	B W R		P C R
Sawyer brook		*						*	*		*		
Bridge creek		+						-	+		-		
West branch								-	+		-		
Butternut creek		+						-	+		+		
Unnamed tributary (Cuyahoga river RM 88.0)		+						-	+		+		
Johnson Rubber tributary (unnamed tributary RM 2.3)							+	-	+			+	Small drainageway maintenance
Tare creek		*						*	*		*		
Doan brook		*						*	*		*		
Shaker Lakes national environmental education landmark		*	*					*	*		*		
Ninemile creek		*						*	*		*		
Euclid creek - Anderson road (RM 5.6) to U.S. rte. 20 (RM 2.4)		*	*					-	*		*		
- all other segments		*	*					-	*		*		
East branch (Euclid creek RM 3.2)		+						-	+		-		
Unnamed tributary (East branch RM 1.55)							-	-	-			-	Channel modification

SRW = state resource water; WWH = warmwater habitat; EWH = exceptional warmwater habitat; MWH = modified warmwater habitat; SSH = seasonal salmonid habitat; CWH = coldwater habitat; LRW = limited resource water; PWS = public water supply; AWS = agricultural water supply; IWS = industrial water supply; BW = bathing water; PCR = primary contact recreation; SCR = secondary contact recreation.



# **Appendix H**

## **NPDES Permits in the Euclid Creek Watershed**

<b>General Permits in the Basin</b>							
INDSW/INDSW3 - Industrial Storm Water				MS4 - Municipal Storm Sewer System			
COOL2 - Noncontact Cooling Water				INDAPP - Individual Application			
UST/UST2 - Underground Storage Tank							
CO_NAME	FACIL_NAME	FAC_Street	FAC_CITY	COUNTY	GENERAL	FAC_RENEW	ACTIVITY
AIR LIQUIDE AMERICA CORPORATION	EUCLID FILL PLANT	1151 EAST 222ND STREET	EUCLID	CUYAHOGA	OHR000002	3GR00387*AG	INDSW
AIRBORNE EXPRESS INC	AIRBORNE EXPRESS - BDC	23355 MERCHANTILE RD STE C	BEACHWOOD	CUYAHOGA	OHR000003	3GR00908*AG	INDSW3
ARGO-TECH CORPORATION	ARGO-TECH CORPORATION	23555 EUCLID AVENUE	EUCLID	CUYAHOGA	OHN000002	3GN00029*AG	COOL2
BESCAST INC	BESCAST INC	4600 E 355TH ST	WILLOUGHBY	LAKE	OHR000003	3GR00353*BG	INDSW3
BP EXPLORATION & OIL INC	BP SITE #04951	13991 CEDAR ROAD	SOUTH EUCLID	CUYAHOGA	OHU000001	3GU00076*AG	UST
BP EXPLORATION & OIL INC	BP SITE #04744	6267 WILSON MILLS	HIGHLAND HEIGHTS	CUYAHOGA	OHU000001	3GU00128*AG	UST
BP OF LYNDHURST	BP OF LYNDHURST	5615 MAYFIELD ROAD	LYNDHURST	CUYAHOGA	OHU000001	3GU00139*AG	UST
BP PROD NORTH AMERICA INC	BP SITE #04959	4282 MONTICELLO BLVD	SOUTH EUCLID	CUYAHOGA	OHU000002	3GU00104*BG	UST2
BP PROD NORTH AMERICA INC	BP SITE #04806	6680 MAYFIELD RD	MAYFIELD HTS	CUYAHOGA	OHU000002	3GU00198*BG	UST2
BREWER COMPANY	BREWER COMPANY	30060 LAKELAND BOULEVARD	WICKLIFFE	LAKE	OHG000001	3GG00121*AG	GROUP
BUD INDUSTRIES INCORPORATED	BUD INDUSTRIES INCORPORATED	4605 EAST 355TH STREET	WILLOUGHBY	LAKE	OHR000002	3GR00619*AG	INDAPP
CAST NYLONS LIMITED	CAST NYLONS LTD	4300 HAMANN PKWY	WILLOUGHBY	LAKE	OHR000003	3GR00019*BG	INDSW3
CITY OF CLEVELAND	CITY OF CLEVELAND			CUYAHOGA	OHQ000001	3GQ00012*AG	MS4
CITY OF EUCLID	CITY OF EUCLID	585 EAST 222ND STREET	EUCLID	CUYAHOGA	OHQ000001	3GQ00018*AG	MS4
CITY OF LYNDHURST	CITY OF	5301 MAYFIELD	LYNDHURST	CUYAHOGA	OHQ000001	3GQ00102*AG	MS4

General Permits in the Basin							
INDSW/INDSW3 - Industrial Storm Water				MS4 - Municipal Storm Sewer System			
COOL2 - Noncontact Cooling Water				INDAPP - Individual Application			
UST/UST2 - Underground Storage Tank							
CO_NAME	FACIL_NAME	FAC_Street	FAC_CITY	COUNTY	GENERAL	FAC_RENEW	ACTIVITY

	LYNDHURST	RD					
CITY OF MAYFIELD HEIGHTS	CITY OF MAYFIELD HEIGHTS	6154 MAYFIELD ROAD	MAYFIELD HEIGHTS	CUYAHOGA	OHQ000001	3GQ00029*AG	MS4
CITY OF SOUTH EUCLID	CITY OF SOUTH EUCLID	1349 S GREEN RD	SOUTH EUCLID	CUYAHOGA	OHQ000001	3GQ00103*AG	MS4
CITY OF WILLOUGHBY	CITY OF WILLOUGHBY	ONE PUBLIC SQUARE	WILLOUGHBY	LAKE	OHQ000001	3GQ00003*AG	MS4
CSM INDUSTRIES	CSM INDUSTRIES	21801 TUNGSTEN ROAD	EUCLID	CUYAHOGA	OHR000002	3GR00609*AG	INDAPP
CUMBERLAND FARMS INC	CFI 181632	6665 MAYFIELD RD	MAYFIELD HEIGHTS	CUYAHOGA	OHU000002	3GU00284*AG	UST2
CUYAHOGA COUNTY AIRPORT	CUYAHOGA COUNTY AIRPORT	26300 CURTISS WRIGHT PKWY	RICHMOND HTS	CUYAHOGA	OHR000003	3GR00834*AG	INDSW3
DANIELS BROS FUEL CO	DANIELS BROS FUEL CO	38700 PELTON RD	WILLOUGHBY	LAKE	OHR000003	3GG00441*BG	INDSW3
DANIELS BROS FUEL COMPANY	DANIELS BROS FUEL COMPANY	38700 PELTON ROAD	WILLOUGHBY	LAKE	OHG000001	3GG00441*AG	GROUP
DEMILIA IRON AND METAL	OHIO RESOURCE INDUSTRY	3911 BEN HUR AVENUE	WILLOUGHBY	LAKE	OHR000002	3GR00487*AG	INDSW
DEMILTA IRON & METAL	DEMILTA IRON & METAL	3911 BEN HUR AVE	WILLOUGHBY	LAKE	OHR000003	3GR00487*BG	INDSW3
DETREX CORP	DETREX CORP	1410 CHARDON AVE (REAR)	EUCLID	CUYAHOGA	OHR000003	3GR00426*BG	INDSW3
EUCLID DISPOSAL INCORPORATED	EUCLID DISPOSAL INCORPORATED	38303 AIRPORT PARKWAY	WILLOUGHBY	LAKE	OHR000002	3GR00179*AG	INDSW
GE QUARTZ INC	WILLOUGHBY PLANT	4901 CAMPBELL RD	WILLOUGHBY	LAKE	OHR000003	3GR00590*BG	INDSW3
GEARTEC	GEARTEC	4245 HAMANN PKWY	WILLOUGHBY	LAKE	OHR000003	3GR00494*BG	INDSW3

<b>General Permits in the Basin</b>							
INDSW/INDSW3 - Industrial Storm Water			MS4 - Municipal Storm Sewer System				
COOL2 - Noncontact Cooling Water			INDAPP - Individual Application				
UST/UST2 - Underground Storage Tank							
CO_NAME	FACIL_NAME	FAC_Street	FAC_CITY	COUNTY	GENERAL	FAC_RENEW	ACTIVITY
GENERAL ELECTRIC QUARTZ INC	WILLOUGHBY QUARTZ*	4901 CAMPBELL ROAD	WILLOUGHBY	LAKE	OHR000002	3GR00590*AG	INDAPP
H C STARCK INC	H C STARCK INC	21801 TUNGSTEN RD	EUCLID	CUYAHOGA	OHR000003	3GR00609*BG	INDSW3
HIGHLAND HEIGHTS	HIGHLAND HEIGHTS	5827 HIGHLAND RD	HIGHLAND HEIGHTS	CUYAHOGA	OHQ000001	3GQ00113*AG	MS4
KALCOR COATINGS COMPANY	KALCOR COATINGS COMPANY	37721 STEVENS BOULEVARD	WILLOUGHBY	LAKE	OHR000002	3GR00289*AG	INDSW
OHIO BROACH AND MACHINE COMPANY	OHIO BROACH AND MACHINE COMPANY	35264 TOPPS INDUSTRIAL PARKWAY	WILLOUGHBY	CUYAHOGA	OHR000002	3GR00152*AG	INDSW
PAULO PRODUCTS CO	AMERICAN BRAZING CORP	4428 HAMANN PKWY	WILLOUGHBY	LAKE	OHR000003	3GR00536*BG	INDSW3
POWDERMET INC	POWDERMET INC	24112 ROCKWELL DR	EUCLID	CUYAHOGA	OHR000003	3GR00934*AG	INDSW3
PPG INDUSTRIES OHIO INC	PPG PRETREATMENT & SPECIALTY PROD	23000 ST CLAIR AVE	EUCLID	CUYAHOGA	OHR000003	3GR00354*BG	INDSW3
RADIX WIRE CO	RADIX WIRE CO	26260 LAKELAND BLVD	EUCLID	CUYAHOGA	OHR000003	3GR00196*BG	INDSW3
RELIANCE ELECTRIC COMPANY	RELIANCE ELECTRIC COMPANY	24703 EUCLID AVENUE	EUCLID	CUYAHOGA	OHR000002	3GR00408*AG	INDSW
ROADWAY EXPRESS INC	ROADWAY EXPRESS INC (T224)	4375 GLENBROOK ROAD	WILLOUGHBY	LAKE	OHG000001	3GG00471*AG	GROUP
SHELL OIL PRODUCTS CO / EQUILON ENTERPRISES	SHELL WIC #234-3591-0106	5591 WILSON MILLS & BISHOP	HIGHLAND HEIGHTS	CUYAHOGA	OHU000001	3GU00157*AG	UST
SHELL OIL PRODUCTS CO / EQUILON ENTERPRISES	SHELL WIC #234-7758-0304	14473 CEDAR AND GREEN	SOUTH EUCLID	CUYAHOGA	OHU000001	3GU00165*AG	UST
SHELL OIL PRODUCTS CO /	SHELL WIC #234-	4254 MAYFIELD	SOUTH EUCLID	CUYAHOGA	OHU000001	3GU00170*AG	UST

General Permits in the Basin							
INDSW/INDSW3 - Industrial Storm Water			MS4 - Municipal Storm Sewer System				
COOL2 - Noncontact Cooling Water			INDAPP - Individual Application				
UST/UST2 - Underground Storage Tank							
CO_NAME	FACIL_NAME	FAC_Street	FAC_CITY	COUNTY	GENERAL	FAC_RENEW	ACTIVITY

EQUILON ENTERPRISES	7758-0106	ROAD & BELVOIR					
SHERMAN INDUSTRIES INC	SHERMAN INDUSTRIES INC	37701 STEVENS BLVD	WILLOUGHBY	LAKE	OHR000003	3GG00185*BG	INDSW3
TYLOK INTERNATIONAL INC	TYLOK INTERNATIONAL INC	1061 E 260 ST	EUCLID	CUYAHOGA	OHR000003	3GR00234*BG	INDSW3
VILLAGE OF MAYFIELD	VILLAGE OF MAYFIELD	6621 WILSON MILLS RD	MAYFIELD	CUYAHOGA	OHQ000001	3GQ00114*AG	MS4
WILLOUGHBY IRON & WASTE MATERIALS LLC	WILLOUGHBY IRON & WASTE MATERIALS LLC	3884 CHURCH ST	WILLOUGHBY	LAKE	OHR000003	3GG00379*BG	INDSW3
WILLOW HILL INDUSTRIES LLC	WILLOW HILL INDUSTRIES LLC	37611 EUCLID AVE	WILLOUGHBY	LAKE	OHR000003	3GR00535*BG	INDSW3

Individual Permits in the Basin					
Name	Location	City	County	Ohio EPA #	US EPA #
East 185 Marathon	1201 East 185th Street	Cleveland	Cuyahoga	3IG00061	OH0101419
BERGER IND/MIDWEST DIVISI		Cleveland	Cuyahoga	3II00035	OH0103233
GEN. ELECT. TUNGSTEN PROD		Euclid	Cuyahoga	3IN00197	OH0051641
Glastic Corp.	4321 Glenridge Road	South Euclid	Cuyahoga	3IN00204	OH0111848
LYDEN CO (FORMER UNOCAL)		Richmond Heights	Cuyahoga	3IN00206	OH0111961
Shell Retail	795 Richmond Road	Richmond Heights	Cuyahoga	3IN00215	OH0112062
GENERAL MOTOR- CORP-EUCLID	20001 Euclid Avenue	Euclid	Cuyahoga	3IS00072	OH0083992
Cleveland Nottingham WTP	1300 Chardon Road	Cleveland	Cuyahoga	3IV00080	OH0000647
Willoughby Eastlake City Schools	37047 Ridge Rd	Willoughby	Lake	3PT00117	OH0134511
Northeast Ohio Regional Sewer District	CSO Permit			3PA00002	OH0043991

# Appendix I

## Public Comment Responsiveness Summary

This document provides a summary of the comments received on the May 5, 2005 draft Euclid Creek TMDL report. Copies of the original comments are available from the Ohio EPA contact listed. Comments were reviewed by the Ohio Environmental Protection Agency (Ohio EPA) and addressed in the following manner.

Several comments identified editing-related issues, including identification of spelling and grammar errors, reference errors, and citation errors. These errors were addressed as appropriate. In addition, some comments requested additional text clarifying a subject or item, word crafting, or other related issues. These edits did not result in changing the overall content or intent of the report. Ohio EPA thanks the comment authors for contributing to the overall clarity and accuracy of the report.

Comments posing a question are specifically responded to below. Similar comments were grouped.

### **For additional information**

If you would like more information or have questions please contact:

Bill Zawiski, Northeast District Office (330) 963-1134

[bill.zawiski@epa.state.oh.us](mailto:bill.zawiski@epa.state.oh.us)

List of parties who submitted comments on the Euclid Creek draft TMDL:

1. Northeast Ohio Regional Sewer District - Comments Received June 9, 2005

- 1. Comment:**  
A comment was made concerning combined sewer overflows and their impacts on Euclid Creek. It was mentioned that the CSOs could not be the cause of non-attainment.

**Response:**

Ohio EPA has found that CSOs do cause impairment within the streams receiving their discharges. The CSOs impact only the lower 1.6 miles of stream (downstream of St. Clair Avenue). Additional clarification was added to the report indicating that CSOs influence only the lower sections of Euclid Creek.

- 2. Comment:**  
It was pointed out that a discrepancy existed between the Fact Sheet and report text in relation to % of phosphorus sample results exceeding the target concentration.

**Response:**

The Fact Sheet was changed to the correct value of 60%.

- 3. Comment:**  
Several comments were presented concerning phosphorus and its relation to biological impairment observed in Euclid Creek.

**Response:**

Ohio EPA has utilized a 1999 report (contained in the references) which demonstrates a relationship between phosphorus and biological attainment. The agency feels that application of these nutrient targets is appropriate to the Euclid Creek TMDL. The 1999 report also emphasizes the importance of habitat to a stream's ability to assimilate nutrients. The combination of nutrient reduction and habitat improvements will allow the stream to achieve numeric biocriteria.

- 4. Comment:**  
NEORSD felt that storm water runoff was possibly a more significant source of impairment in the Euclid Creek watershed.

**Response:**

Where appropriate additional language has been added to the report emphasizing the importance of storm water runoff as an impairment. Ohio EPA agrees that the issue of land use is very important to Euclid Creek.

- 5. Comment:**  
It was pointed out that the report text made no mention of Figure 1.

**Response:**

Text has been added to the Introduction and Section 2.2 which identifies Figure 1.

- 6. Comment:**



A comment was presented concerning bacteria and discrepancies between the report and Fact Sheet in relation to violations.

**Response:**

The fact sheet language was modified to state that fecal coliform violations have decreased. In the report, additional language has been added to clarify that current data does not allow for an adequate determination of recreational use attainment and that the TMDL will not address bacteria. The monitoring plan recommends that testing be conducted to determine if a bacteria TMDL is needed for Euclid Creek. Additional testing may be conducted by Ohio EPA as resources are available.

**7. Comment:**

A comment was presented requesting some additional watershed information on percent urbanization, riparian zone condition, residential impacts, and percent of the stream channelized.

**Response:**

A statement concerning the percent urbanization was added to Section 2.1. The TMDL has recommended QHEI assessments as part of the monitoring plan. This will enable a more complete picture of specific riparian condition to be developed. It is currently felt that the entire watershed experiences impacts from residential areas. The watershed action plan contains more specific detail on identified problem areas targeted for restoration opportunities.

**8. Comment:**

It was mentioned that the mouth of Euclid Creek may be attributes of an estuary and the applicability of riverine criteria was questioned.

**Response:**

Ohio EPA has been working to develop lacustrary criteria. Current Ohio water quality standards do not include lacustrary biocriteria. Euclid Creek was evaluated for attainment utilizing appropriate current standards. Should standards change in the future those sections of the stream impacted by changes will be reevaluated.

**9. Comment:**

A comment mentions Table 4 and the inclusion of "Clouds (unknown)" as a land use category.

**Response:**

The satellite images often contain areas obscured by cloud cover and are listed as such. To avoid confusion the word "clouds" was removed and will remain as "unknown".

**10. Comment:**

A comment was presented concerning the relationship between nonattainment of biocriteria and its relationship to organic enrichment, flow alteration, and habitat

degradation.

**Response:**

Ohio EPA has determined that this relationship exists statewide and has presented this information in numerous publications.

**11. Comment:**

A question concerning determination of attainment status when a qualitative macroinvertebrate sample was collected in lieu of a quantitative sample.

**Response:**

Attainment status can be determined if qualitative macroinvertebrate data is use in conjunction with fish IBI/MIwb data. If only qualitative macroinvertebrate data is available an attainment status determination will not be made.

**12. Comment:**

Questions were raised concerning the recreational use attainment for bacteria.

**Response:**

Additional information was presented in Section 3.2 to help clarify violation determination. It was also stated that a TMDL for bacteria was not being completed at this time. The information presented is relevant in that it currently appears that the watershed is in nonattainment of its recreational use criteria. It is also pointed out in the report that additional data is needed for a final determination.

**13. Comment:**

It was requested that QHEI target values be included in Figure 5.

**Response:**

Figure 5 was modified to include QHEI target values.

**14. Comment:**

A comment was presented concerning TMDL development for siltation.

**Response:**

Siltation has not been evaluated in great detail in past assessments. Recent field work in preparation of this TMDL has indicated that siltation and sedimentation are a growing concern in the upper part of the watershed. Ongoing development, since the 2000 survey, has resulted in increased impervious surface area and stream channel disturbance. The preparation of a TMDL for siltation was appropriate for this TMDL and will coincide with comprehensive QHEI surveys.

**15. Comment:**

A comment was made concerning the use of Figure 6 representing CSO outfalls in the NEORS service area. NEORS provided a more detailed CSO location map for the Euclid Creek watershed.

**Response:**

The map provided by NEORSD was included as Figure 6.

**16. Comment:**

A comment was made concerning the development of a load duration curve for flows greater than 200 cfs when actual monitoring data was not available.

**Response:**

The loads were developed utilizing a regression based on existing data. Additional text was added to the report indicating that loads above a flow of 200 cfs were computer generated.

**17. Comment:**

A comment was presented concerning the availability of data and their sources.

**Response:**

In the early stages of preparing this report, several additional sources of data were anticipated. Some of this information has not been made available as of the close of public comments. John Carroll University and the Cleveland Metroparks have been removed as data sources.

The most current data from the NEORSD as provided at the beginning of the TMDL process was incorporated into this report.

The Ohio EPA data sheets provided in the appendix detail fish and macroinvertebrate data collected during our surveys and are adequate for inclusion in this report.

Historic QHEI data was included as well as our most recent survey data. Both sets of information will be utilized for comparison to more detailed QHEI surveys to be conducted as part of the monitoring plan implementation.

**18. Comment:**

A comment was presented concerning the presentation of monitoring data as Appendix D.

**Response:**

The appendices have been modified as follows:

Appendix D - Ohio EPA Chemical Analysis Data

Appendix E - NEORSD Chemical Analysis Data

Appendix F - Ohio EPA and NEORSD Bacteria Analysis Data