

**Cuyahoga River Downstream of Tinkers Creek  
July 18, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 696 miles<sup>2</sup>  
River Mile: 16.20**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	13	0.640	--	0	--
<i>Ictiobus cyprinellus</i> Bigmouth buffalo	1	1.500	--	0	--
<i>Ictiobus bubalus</i> Smallmouth buffalo	1	2.540	--	0	--
<i>Moxostoma erythrurum</i> Golden redbreast	19	4.440	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbreast	3	1.860	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	46	5.722	Moderately Intolerant	1	Deformed body
<i>Catostomus commersonii</i> Common white sucker	13	3.074	Highly Tolerant	2	Fin lesions
<i>Minytrema melanops</i> Spotted Sucker	1	0.320	--	0	--
<i>Cyprinus carpio</i> Common carp	22	38.470	Highly Tolerant	1	Eroded tail
<i>Notropis cornutus</i> Common shiner	15	0.236	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	34	0.170	--	0	--
<i>Pimephales notatus</i> Bluntnose minnow	3	0.006	Highly Tolerant	0	--
<i>Ctenopharyngodon idella</i> Grass carp	1	5.000	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	4	7.450	--	0	--
<i>Ictalurus natalis</i> Yellow bullhead	2	0.420	Highly Tolerant	0	--

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<i>Morone americana</i> White perch	6	0.290	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	10	1.130	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	27	3.192	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	1	0.004	--	0	--
<i>Lepomis cyanellus</i> Green sunfish	1	0.002	Highly Tolerant	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	5	0.248	Moderately Tolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	4	0.036	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	5	5.000	Moderately Tolerant	0	--
Totals	<u>237</u>	<u>81.750</u>		<u>4</u>	

\*DELT anomalies were observed on 1.688 % of the fish collected.

Index of Biotic Integrity (IBI) =	40	(Good)
Modified Index of Well-Being (MIwb)	9.7	(Exceptional)
Shannon Diversity Index, wt.	2.577	
Shannon Diversity Index, no.	1.995	
N	378	
B	68.98	

**Cuyahoga River Downstream of Tinkers Creek  
August 20, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 696 miles<sup>2</sup>  
River Mile: 16.20**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	12	1.700	--	0	--
<i>Ictiobus cyprinellus</i> Bigmouth buffalo	1	1.000	--	0	--
<i>Carpiodes cyprinus</i> Central quillback carpsucker	5	3.520	--	0	--
<i>Moxostoma erythrurum</i> Golden redhorse	22	2.366	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redhorse	8	0.729	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	60	8.262	Moderately Intolerant	1	Lesion
<i>Catostomus commersonii</i> Common white sucker	8	1.384	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	6	13.890	Highly Tolerant	0	--
<i>Notropis cornutus</i> Common shiner	34	0.450	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	75	0.246	--	1	Deformity
<i>Notropis stramineus</i> Sand shiner	20	0.042	Moderately Intolerant	1	Deformity
<i>Ericymba buccata</i> Silverjaw minnow	3	0.010	--	0	--
<i>Pimephales notatus</i> Bluntnose minnow	32	0.042	Highly Tolerant	0	--
<i>Campostoma anomalum</i> Central stoneroller minnow	1	0.048	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	7	3.620	--	0	--

**Cuyahoga River Downstream of Tinkers Creek  
August 20, 2008**

<i>Ictalurus natalis</i> Yellow bullhead	1	0.062	Highly Tolerant	0	--
<i>Morone americana</i> White perch	8	0.400	--	0	--
<i>Pomoxis annularis</i> White crappie	1	0.120	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	2	0.280	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	32	2.642	Moderately Intolerant	1	Lesion
<i>Micropterus salmoides</i> Largemouth bass	3	0.061	--	0	--
<i>Lepomis cyanellus</i> Green sunfish	4	0.088	Highly Tolerant	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	4	0.335	Moderately Tolerant	0	--
<i>Lepomis gibbosus</i> Pumpkinseed sunfish	3	0.102	Moderately Tolerant	0	--
<i>HYBRID</i> Green SF X Bluegill SF	1	0.022	--	0	
<i>HYBRID</i> Green SF X Pumpkinseed	1	0.028	--	0	
<i>Percina caprodes</i> Northern logperch darter	4	0.059	Moderately Intolerant	0	--
<i>Etheostoma blenniodes</i> Greenside darter	2	0.020	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	1	1.000	Moderately Tolerant	1	Lesion
Totals	<u>361</u>	<u>42.528</u>		<u>5</u>	

\*DELT anomalies were observed on 1.385 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 48 (Exceptional)  
 Modified Index of Well-Being (MIwb) 10.0 (Exceptional)  
 Shannon Diversity Index, wt. 2.619  
 Shannon Diversity Index, no. 2.22  
 N 600

**Cuyahoga River Downstream of Tinkers Creek  
August 20, 2008**

B

53.22

**Cuyahoga River Upstream of Mill Creek  
July 22, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 710 miles<sup>2</sup>  
River Mile: 11.95**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Moxostoma erythrurum</i> Golden redbhorse	31	0.595	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	5	0.195	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	44	2.675	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	25	1.930	Highly Tolerant	1	Fin lesion
<i>Cyprinus carpio</i> Common carp	16	25.190	Highly Tolerant	0	--
<i>Carassius auratus</i> Goldfish	4	0.850	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	19	0.055	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	85	0.225	--	0	--
<i>Notropis stramineus</i> Sand shiner	3	0.009	Moderately Intolerant	0	--
<i>Ictalurus punctatus</i> Channel catfish	3	3.650	--	2	Eroded barbels
<i>Ictalurus natalis</i> Yellow bullhead	3	0.650	Highly Tolerant	0	--
<i>Morone americana</i> White perch	3	0.098	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	4	0.254	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	9	0.944	Moderately Intolerant	0	--
<i>Lepomis cyanellus</i> Green sunfish	1	0.038	Highly Tolerant	0	--

**Cuyahoga River Upstream of Mill Creek  
July 22, 2008**

<i>Lepomis gibbosus</i> Pumpkinseed sunfish	4	0.158	Moderately Tolerant	0	--
<i>Perca flavescens</i> Yellow perch	3	0.158	--	0	--
<i>Percina caprodes</i> Northern logperch darter	8	0.110	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	1	0.640	Moderately Tolerant	0	--
	<hr/>	<hr/>			
Totals	<u>271</u>	<u>38.424</u>		<u>3</u>	

\*DELT anomalies were observed on 1.107 % of the fish collected.

Index of Biotic Integrity (IBI) = 34 (Fair)

Modified Index of Well-Being (MIwb) 8.2 (Fair)

Shannon Diversity Index, wt. 2.248

Shannon Diversity Index, no. 1.399

N 438

B 19.34

**Cuyahoga River Downstream of Mill Creek  
July 22, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 730 miles<sup>2</sup>  
River Mile: 11.30**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	8	0.950	--	0	--
<i>Carpionodes cyprinus</i> Central quillback carpsucker	1	0.550	--	1	Lesion
<i>Moxostoma anisurum</i> Silver Redhorse	1	0.800	Moderately Intolerant	0	
<i>Moxostoma erythrurum</i> Golden redhorse	5	1.219	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redhorse	8	1.880	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	48	4.950	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	9	2.180	Highly Tolerant	1	Lesion
<i>Cyprinus carpio</i> Common carp	8	16.060	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	4	0.024	--	0	--
<i>Notropis cornutus</i> Common shiner	1	0.025	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	43	0.146	--	1	Deformed nose
<i>Ictalurus punctatus</i> Channel catfish	6	4.770	--	1	Lesion
<i>Ictalurus natalis</i> Yellow bullhead	1	0.331	Highly Tolerant	0	--
<i>Morone chrysops</i> White bass	1	0.052	--	0	--
<i>Morone americana</i> White perch	2	0.150	--	0	--



**Cuyahoga River Downstream of Mill Creek  
July 22, 2008**

<i>Ambloplites rupestris</i> Northern rockbass	1	0.088	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	28	3.876	Moderately Intolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	8	0.104	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	4	4.315	Moderately Tolerant	0	--
<i>Neogobius melanostomus</i> Round goby	1	0.015	--	0	--
<i>HYBRID</i> WH. Bass X WH. Perch	1	0.050	--	0	
Totals	<u>189</u>	<u>42.535</u>		<u>4</u>	

\*DELT anomalies were observed on 2.116 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 42 (Good)  
 Modified Index of Well-Being (MIwb) 9.2 (Very Good)  
 Shannon Diversity Index, wt. 2.287  
 Shannon Diversity Index, no. 2.054  
 N 334  
 B 47.5

**Cuyahoga River Downstream of Mill Creek  
September 24, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 730 miles<sup>2</sup>  
River Mile: 11.30**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	188	5.470	--	0	--
<i>Moxostoma erythrurum</i> Golden redbhorse	5	0.892	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	7	2.781	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	57	7.920	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	11	3.310	Highly Tolerant	1	Lesion
<i>Cyprinus carpio</i> Common carp	7	19.590	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	1	0.006	--	0	--
<i>Notropis cornutus</i> Common shiner	2	0.082	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	23	0.105	--	0	--
<i>Notropis stramineus</i> Sand shiner	8	0.020	Moderately Intolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	18	0.076	Highly Tolerant	0	--
<i>Ictalurus punctatus</i> Channel catfish	1	0.466	--	0	--
<i>Labidesthes sicculus</i> Brook silverside	1	0.008	Moderately Intolerant	0	--
<i>Morone americana</i> White perch	15	0.153	--	0	--
<i>Pomoxis nigromaculatus</i> Black crappie	1	0.063	--	0	--

**Cuyahoga River Downstream of Mill Creek  
September 24, 2008**

<i>Micropterus dolomieu</i> Smallmouth bass	27	5.970	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	1	0.048	--	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	8	0.250	Moderately Tolerant	0	--
<i>Lepomis gibbosus</i> Pumpkinseed sunfish	1	0.052	Moderately Tolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	3	0.052	Moderately Intolerant	0	--
<b>Totals</b>	<u>385</u>	<u>47.314</u>		<u>1</u>	

\*DELT anomalies were observed on 0.26 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 34 (Fair)  
 Modified Index of Well-Being (MIwb) 8.8 (Good)  
 Shannon Diversity Index, wt. 1.88  
 Shannon Diversity Index, no. 1.766  
 N 668  
 B 48.37

**Cuyahoga River Downstream of Mill Creek  
October 15, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 730 miles<sup>2</sup>  
River Mile: 11.30**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	108	3.950	--	0	--
<i>Oncorhynchus mykiss</i> Rainbow trout	5	16.480	--	0	--
<i>Moxostoma erythrurum</i> Golden redbhorse	3	1.300	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	2	1.250	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	51	7.302	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	17	5.052	Highly Tolerant	1	Lesion
<i>Cyprinus carpio</i> Common carp	8	18.200	Highly Tolerant	1	Deformity
<i>Notropis atherinoides</i> Common Emerald shiner	3	0.030	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	17	0.064	--	0	--
<i>Notropis stramineus</i> Sand shiner	1	0.004	Moderately Intolerant	0	--
<i>Ictalurus punctatus</i> Channel catfish	6	6.990	--	2	Deformity & Erosion
<i>Labidesthes sicculus</i> Brook silverside	17	0.058	Moderately Intolerant	0	--
<i>Morone americana</i> White perch	6	0.182	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	1	0.140	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	28	6.172	Moderately Intolerant	0	--

**Cuyahoga River Downstream of Mill Creek  
October 15, 2008**

<i>Micropterus salmoides</i> Largemouth bass	1	0.040	--	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	2	0.070	Moderately Tolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	1	0.030	Moderately Intolerant	0	--
<i>Etheostoma blenniodes</i> Greenside darter	1	0.020	Moderately Intolerant	0	--
<i>Etheostoma nigrum</i> Johnny darter	1	0.010	--	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	1	2.100	Moderately Tolerant	0	--
Totals	<u>280</u>	<u>69.444</u>		<u>4</u>	

\*DELT anomalies were observed on 1.429 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 38 (Marginally Good)  
 Modified Index of Well-Being (MIwb) 9.2 (Very Good)  
 Shannon Diversity Index, wt. 2.065  
 Shannon Diversity Index, no. 2.044  
 N 488  
 B 59.06

**Cuyahoga River Upstream of Southerly WWTC  
July 21, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 743 miles<sup>2</sup>  
River Mile: 10.75**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Ictiobus bubalus</i> Smallmouth buffalo	1	4.030	--	0	--
<i>Moxostoma erythrurum</i> Golden redhorse	25	1.880	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redhorse	3	0.154	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	68	5.456	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	24	1.783	Highly Tolerant	1	Deformed body
<i>Cyprinus carpio</i> Common carp	17	31.470	Highly Tolerant	1	Deformed tail
<i>Carassius auratus</i> Goldfish	2	0.400	Highly Tolerant	0	--
<i>Semotilus atromaculatus</i> Creek chub	2	0.004	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	4	0.014	--	0	--
<i>Notropis cornutus</i> Common shiner	3	0.095	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	34	0.114	--	0	--
<i>Pimephales promelas</i> Northern fathead minnow	2	0.008	Highly Tolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	1	0.002	Highly Tolerant	0	--
<i>Ictalurus punctatus</i> Channel catfish	6	8.625	--	4	Eroded fin & barbels
<i>Ictalurus natalis</i> Yellow bullhead	4	0.900	Highly Tolerant	1	Eroded fin

**Cuyahoga River Upstream of Southerly WWTC  
July 21, 2008**

<i>Morone americana</i> White perch	4	0.880	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	3	0.206	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	10	1.240	Moderately Intolerant	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	1	0.082	Moderately Tolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	7	0.080	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	4	3.060	Moderately Tolerant	0	--
<i>Neogobius melanostomus</i> Round goby	6	0.080	--	0	--
Totals	<u>231</u>	<u>60.563</u>		<u>7</u>	

\*DELT anomalies were observed on 3.03 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 38 (Marginally Good)  
 Modified Index of Well-Being (MIwb) 9.0 (Good)  
 Shannon Diversity Index, wt. 2.386  
 Shannon Diversity Index, no. 1.701  
 N 338  
 B 50.07

**Cuyahoga River Upstream of Southerly WWTC  
September 23, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 743 miles<sup>2</sup>  
River Mile: 10.75**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	55	2.016	--	0	--
<i>Oncorhynchus mykiss</i> Rainbow trout	1	1.500	--	0	--
<i>Moxostoma erythrurum</i> Golden redbhorse	6	1.434	Moderately Intolerant	1	Lesion
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	5	0.295	Moderately Intolerant	2	Lesions
<i>Hypentelium nigricans</i> Northern hog sucker	94	8.846	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	51	4.200	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	1	3.000	Highly Tolerant	0	--
<i>Semotilus atromaculatus</i> Creek chub	5	0.017	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	2	0.008	--	0	--
<i>Notropis cornutus</i> Common shiner	1	0.003	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	9	0.027	--	0	--
<i>Notropis stramineus</i> Sand shiner	55	0.160	Moderately Intolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	20	0.087	Highly Tolerant	0	--
<i>Campostoma anomalum</i> Central stoneroller minnow	85	0.253	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	8	3.530	--	2	Erosion & multiple



**Cuyahoga River Upstream of Southerly WWTC  
September 23, 2008**

<i>Morone americana</i> White perch	20	0.875	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	1	0.140	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	8	1.200	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	1	0.005	--	0	--
	<hr/>	<hr/>			
Totals	<u>428</u>	<u>27.596</u>		<u>5</u>	

\*DELT anomalies were observed on 1.168 % of the fish collected.

Index of Biotic Integrity (IBI) =	30	(Fair)
Modified Index of Well-Being (MIwb)	9.3	(Very Good)
Shannon Diversity Index, wt.	2.211	
Shannon Diversity Index, no.	2.087	
N	658	
B	35.82	

**Cuyahoga River Downstream of Southerly WWTC  
July 21, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 744 miles<sup>2</sup>  
River Mile: 10.10**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	1	0.030	--	0	--
<i>Moxostoma erythrurum</i> Golden redhorse	7	2.454	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redhorse	6	2.670	Moderately Intolerant	1	Deformed body
<i>Hypentelium nigricans</i> Northern hog sucker	27	1.638	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	11	2.348	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	8	26.940	Highly Tolerant	0	--
<i>Rhinichthys atratulus</i> Western blacknose dace	1	0.006	Highly Tolerant	0	--
<i>Semotilus atromaculatus</i> Creek chub	5	0.004	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	8	0.034	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	44	0.134	--	0	--
<i>Notropis stramineus</i> Sand shiner	6	0.020	Moderately Intolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	5	0.026	Highly Tolerant	0	--
<i>Campostoma anomalum</i> Central stoneroller minnow	1	0.010	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	3	2.580	--	0	--
<i>Ictalurus natalis</i> Yellow bullhead	9	1.850	Highly Tolerant	0	--

**Cuyahoga River Downstream of Southerly WWTC  
July 21, 2008**

<i>Morone americana</i> White perch	3	0.398	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	2	0.335	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	20	3.515	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	1	0.024	--	0	--
<i>Lepomis cyanellus</i> Green sunfish	1	0.010	Highly Tolerant	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	2	0.034	Moderately Tolerant	0	--
<i>HYBRID</i> Green SF X Pumpkinseed	2	0.054	--	0	--
<i>Percina caprodes</i> Northern logperch darter	10	0.110	Moderately Intolerant	0	--
<i>Etheostoma blenniodes</i> Greenside darter	2	0.020	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	1	0.020	--	0	--
Totals	<u>186</u>	<u>45.264</u>		<u>1</u>	

\*DELT anomalies were observed on 0.538 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 44 (Very Good)  
 Modified Index of Well-Being (MIwb) 8.7 (Marginally Good)  
 Shannon Diversity Index, wt. 2.639  
 Shannon Diversity Index, no. 1.558  
 N 280  
 B 27.22

**Cuyahoga River Downstream of Southerly WWTC  
September 4, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 744 miles<sup>2</sup>  
River Mile: 10.10**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	108	2.150	--	0	--
<i>Carpionodes cyprinus</i> Central quillback carpsucker	1	1.000	--	1	Eroded tail
<i>Moxostoma erythrum</i> Golden redhorse	9	1.525	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redhorse	4	0.704	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	51	5.070	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	11	4.050	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	1	1.400	Highly Tolerant	0	--
<i>Rhinichthys atratulus</i> Western blacknose dace	1	0.004	Highly Tolerant	0	--
<i>Semotilus atromaculatus</i> Creek chub	4	0.024	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	5	0.030	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	50	0.150	--	0	--
<i>Notropis stramineus</i> Sand shiner	55	0.108	Moderately Intolerant	0	--
<i>Notropis volucellus</i> Mimic Shiner	1	0.002	Common Intolerant	0	--
<i>Ericymba buccata</i> Silverjaw minnow	1	0.004	--	0	--
<i>Pimephales notatus</i> Bluntnose minnow	32	0.064	Highly Tolerant	0	--

**Cuyahoga River Downstream of Southerly WWTC  
September 4, 2008**

<i>Campostoma anomalum</i> Central stoneroller minnow	6	0.038	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	6	9.760	--	5	Erosions & lesion
<i>Ictalurus natalis</i> Yellow bullhead	2	0.446	Highly Tolerant	0	--
<i>Morone americana</i> White perch	9	0.438	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	1	0.158	--	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	20	4.230	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	1	0.004	--	0	--
<i>Lepomis cyanellus</i> Green sunfish	1	0.074	Highly Tolerant	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	3	0.093	Moderately Tolerant	0	--
<i>HYBRID</i> Green SF X Pumpkinseed	1	0.035	--	0	--
<i>Percina caprodes</i> Northern logperch darter	6	0.080	Moderately Intolerant	0	--
<i>Etheostoma blenniodes</i> Greenside darter	3	0.012	Moderately Intolerant	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	2	1.418	Moderately Tolerant	0	--
<i>Neogobius melanostomus</i> Round goby	11	0.079	--	0	--
Totals	<u>406</u>	<u>33.150</u>		<u>6</u>	

\*DELTA anomalies were observed on 1.478 % of the fish collected.  
 Index of Biotic Integrity (IBI) = 34 (Fair)  
 Modified Index of Well-Being (MIwb) 9.9 (Exceptional)  
 Shannon Diversity Index, wt. 2.445  
 Shannon Diversity Index, no. 2.23  
 N 666

**Cuyahoga River Downstream of Southerly WWTC  
September 4, 2008**

B

53.07

**Cuyahoga River Downstream of Southerly WWTC  
October 7, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 744 miles<sup>2</sup>  
River Mile: 10.10**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	23	2.090	--	2	Eroded mouth
<i>Moxostoma erythrurum</i> Golden redbhorse	13	1.840	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	39	4.542	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	18	3.060	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	2	4.330	Highly Tolerant	1	Deformed body
<i>Semotilus atromaculatus</i> Creek chub	2	0.010	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	8	0.039	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	78	0.210	--	0	--
<i>Notropis stramineus</i> Sand shiner	57	0.136	Moderately Intolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	32	0.082	Highly Tolerant	0	--
<i>Campostoma anomalum</i> Central stoneroller minnow	16	0.062	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	6	10.680	--	1	Eroded barbel
<i>Labidesthes sicculus</i> Brook silverside	2	0.008	Moderately Intolerant	0	--
<i>Morone americana</i> White perch	4	0.172	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	1	0.190	--	0	--

**Cuyahoga River Downstream of Southerly WWTC  
October 7, 2008**

<i>Micropterus dolomieu</i> Smallmouth bass	12	3.410	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	2	0.042	--	0	--
<i>Aplodinotus grunniens</i> Freshwater drum	3	2.160	Moderately Tolerant	0	--
<i>Neogobius melanostomus</i> Round goby	2	0.020	--	0	--
<i>Notropis dorsalis</i> Bigmouth Shiner	1	0.003	--	0	
	<hr/>	<hr/>			
Totals	<u>321</u>	<u>33.086</u>		<u>4</u>	

\*DELT anomalies were observed on 1.246 % of the fish collected.

Index of Biotic Integrity (IBI) =	30	(Fair)
Modified Index of Well-Being (MIwb)	9.5	(Very Good)
Shannon Diversity Index, wt.	2.348	
Shannon Diversity Index, no.	2.036	
N	522	
B	50.82	



**Cuyahoga River Upstream of Big Creek  
July 21, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 743 miles<sup>2</sup>  
River Mile: 8.20**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	1	0.090	--	0	--
<i>Carpionodes cyprinus</i> Central quillback carpsucker	1	1.080	--	1	Eroded fin
<i>Moxostoma erythrum</i> Golden redbreast	1	0.010	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbreast	1	0.980	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	15	1.242	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	9	2.345	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	12	33.330	Highly Tolerant	2	Eroded dorsals
<i>Notropis atherinoides</i> Common Emerald shiner	32	0.080	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	26	0.072	--	0	--
<i>Notropis stramineus</i> Sand shiner	3	0.008	Moderately Intolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	6	0.020	Highly Tolerant	0	--
<i>Ictalurus punctatus</i> Channel catfish	1	1.180	--	0	--
<i>Ictalurus natalis</i> Yellow bullhead	4	0.750	Highly Tolerant	0	--
<i>Morone americana</i> White perch	1	0.030	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	1	0.018	--	0	--

**Cuyahoga River Upstream of Big Creek  
July 21, 2008**

<i>Micropterus dolomieu</i> Smallmouth bass	17	3.390	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	1	0.100	--	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	1	0.012	Moderately Tolerant	0	--
<i>Percina caprodes</i> Northern logperch darter	3	0.031	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	2	0.018	--	0	--
<b>Totals</b>	<u>138</u>	<u>44.786</u>		<u>3</u>	

\*DELT anomalies were observed on 2.174 % of the fish collected.

Index of Biotic Integrity (IBI) = 34 (Fair)

Modified Index of Well-Being (MIwb) 7.5 (Fair)

Shannon Diversity Index, wt. 2.331

Shannon Diversity Index, no. 1.08

N 208

B 16.59

**Cuyahoga River Upstream of Big Creek  
September 23, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 743 miles<sup>2</sup>  
River Mile: 8.20**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	88	1.300	--	0	--
<i>Moxostoma erythrurum</i> Golden redbhorse	1	0.385	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	10	0.476	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	35	3.035	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	11	2.970	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	1	3.000	Highly Tolerant	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	45	0.085	--	0	--
<i>Notropis stramineus</i> Sand shiner	37	0.073	Moderately Intolerant	0	--
<i>Notropis volucellus</i> Mimic Shiner	1	0.002	Common Intolerant	0	--
<i>Pimephales promelas</i> Northern fathead minnow	1	0.004	Highly Tolerant	0	--
<i>Pimephales notatus</i> Bluntnose minnow	9	0.027	Highly Tolerant	0	--
<i>Campostoma anomalum</i> Central stoneroller minnow	5	0.014	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	3	2.670	--	1	Deformity
<i>Morone americana</i> White perch	3	0.205	--	0	--
<i>Ambloplites rupestris</i> Northern rockbass	5	0.780	--	0	--

**Cuyahoga River Upstream of Big Creek  
September 23, 2008**

<i>Micropterus dolomieu</i> Smallmouth bass	18	5.880	Moderately Intolerant	2	Lesions
<i>Micropterus salmoides</i> Largemouth bass	2	0.025	--	0	--
<i>HYBRID</i> Green SF X Pumpkinseed	1	0.035	--	0	
<i>Etheostoma caeruleum</i> Rainbow darter	1	0.002	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	2	0.004	--	0	--
Totals	<u>279</u>	<u>20.972</u>		<u>3</u>	

\*DELT anomalies were observed on 1.075 % of the fish collected.

Index of Biotic Integrity (IBI) =	30	(Fair)
Modified Index of Well-Being (MIwb)	9.0	(Good)
Shannon Diversity Index, wt.	2.154	
Shannon Diversity Index, no.	2.032	
N	502	
B	29.45	

**Cuyahoga River Downstream of Big Creek  
July 21, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 786 miles<sup>2</sup>  
River Mile: 7.00**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	12	4.548	--	0	--
<i>Moxostoma erythrum</i> Golden redbhorse	11	1.091	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbhorse	9	0.966	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	30	3.970	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	4	2.160	Highly Tolerant	0	--
<i>Cyprinus carpio</i> Common carp	2	6.100	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	8	0.030	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	3	0.028	--	0	--
<i>Ctenopharyngodon idella</i> Grass carp	1	12.870	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	2	3.200	--	1	Eroded barbel
<i>Ictalurus natalis</i> Yellow bullhead	1	0.070	Highly Tolerant	0	--
<i>Micropterus dolomieu</i> Smallmouth bass	11	2.894	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	2	0.054	--	0	--
<i>Percina caprodes</i> Northern logperch darter	6	0.062	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	3	0.020	--	0	--

**Cuyahoga River Downstream of Big Creek  
July 21, 2008**

	<u>          </u>	<u>          </u>	
Totals	<u>105</u>	<u>38.063</u>	<u>1</u>

\*DELT anomalies were observed on 0.952 % of the fish collected.

Index of Biotic Integrity (IBI) =	42		(Good)
Modified Index of Well-Being (MIwb)	8.6		(Marginally Good)
Shannon Diversity Index, wt.	2.291		
Shannon Diversity Index, no.	1.958		
N	188		
B	33.69		

**Cuyahoga River Downstream of Big Creek  
September 23, 2008**

**Collection Distance: 0.5 km  
Collection Method: Boat Electroshocking  
Drainage Area: 786 miles<sup>2</sup>  
River Mile: 7.00**

<u>Species</u>	<u>Number</u>	<u>Weight (kg)</u>	<u>Pollution Tolerance</u>	<u>#</u>	<u>DELT Anomalies Description</u>
<i>Dorosoma cepedianum</i> Eastern gizzard shad	273	9.125	--	0	--
<i>Oncorhynchus mykiss</i> Rainbow trout	1	3.550	--	0	--
<i>Moxostoma erythrum</i> Golden redbreast	1	0.442	Moderately Intolerant	0	--
<i>Moxostoma macrolepidotum</i> Shorthead redbreast	2	0.225	Moderately Intolerant	0	--
<i>Hypentelium nigricans</i> Northern hog sucker	14	1.410	Moderately Intolerant	0	--
<i>Catostomus commersonii</i> Common white sucker	6	3.280	Highly Tolerant	0	--
<i>Semotilus atromaculatus</i> Creek chub	1	0.005	Highly Tolerant	0	--
<i>Notropis atherinoides</i> Common Emerald shiner	4	0.018	--	0	--
<i>Cyprinella spiloptera</i> Spotfin shiner	11	0.034	--	0	--
<i>Pimephales notatus</i> Bluntnose minnow	2	0.006	Highly Tolerant	0	--
<i>Ctenopharyngodon idella</i> Grass carp	2	19.780	--	0	--
<i>Ictalurus punctatus</i> Channel catfish	3	2.800	--	1	Lesion
<i>Micropterus dolomieu</i> Smallmouth bass	11	5.122	Moderately Intolerant	0	--
<i>Micropterus salmoides</i> Largemouth bass	2	0.030	--	0	--
<i>Lepomis macrochirus</i> Northern bluegill sunfish	2	0.155	Moderately Tolerant	0	--

**Cuyahoga River Downstream of Big Creek  
September 23, 2008**

<i>Percina caprodes</i> Northern logperch darter	3	0.031	Moderately Intolerant	0	--
<i>Neogobius melanostomus</i> Round goby	8	0.021	--	0	--
<i>Petromyzon marinus</i> Sea Lamprey	1	0.125	--	0	
	<hr/>	<hr/>			
Totals	<u>347</u>	<u>46.159</u>		<u>1</u>	

\*DELT anomalies were observed on 0.288 % of the fish collected.

Index of Biotic Integrity (IBI) = 28 (Fair)

Modified Index of Well-Being (MIwb) 7.8 (Fair)

Shannon Diversity Index, wt. 1.044

Shannon Diversity Index, no. 1.719

N 652

B 38.78