

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 04-1

BIOLOGICAL CONDITIONS

IN THE WEST BRANCH OF THE DUPAGE RIVER

DURING 1994 AND 1995

January 2004

Metropolitan Water Reclamation District of Greater Chicago

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**BIOLOGICAL CONDITIONS
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DURING 1994 AND 1995**

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DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago (District).

SUMMARY

During the summer and fall of 1994 and 1995, the benthic invertebrate and fish communities were assessed at five stations in the West Branch of the DuPage River, extending from Longmeadow Lane to the Cook/DuPage County line. Benthic invertebrates were collected in the pools with ponar dredges and in the riffles with D-frame nets. They were identified to species when possible. Fish were collected by electrofishing and seining. Fish community characteristics assessed included species composition, relative abundance, weight, and length.

The results of four biological surveys conducted at five stations in the West Branch of the DuPage River during the summer and fall of 1994 and 1995 are as follows:

1. The benthic invertebrate community consisted of 87 taxa, sixteen of these at the species level.
2. The average density for all benthic invertebrates collected from the pools of the West Branch of the DuPage River was $9,157/m^2$ (range $3,405/m^2$ to $11,589/m^2$).
3. The benthic invertebrate community of the pools was composed primarily of aquatic worms, of the taxonomic class Oligochaeta, and midge fly larvae, of the family Chironomidae.

4. The benthic invertebrate community of the riffles was composed primarily of midgefly larvae, caddisfly larvae, and blackfly larvae.
5. Seventeen species of fish were identified.
6. A total of 1,777 fish were collected.
7. The fish community was composed primarily of green sunfish, bluegills, orangespotted sunfish, fathead minnows, and white suckers.
8. The biotic integrity of the West Branch of the DuPage River in Cook County was fair during 1994 and 1995.
9. In general, the West Branch of the Du Page River in the study area met Illinois water quality standards, for those water quality constituents for which such standards existed, during 1994 and 1995.

INTRODUCTION

In 1975, the Research and Development (R&D) Department initiated an annual comprehensive environmental monitoring program to characterize the biological communities in Chicago area shallow water and deep draft waterways. The primary objective of this monitoring program was to assess water quality based on the abundance and distribution of the fish and benthic invertebrate communities. Over the years, the monitoring program has served to define biological trends and, where appropriate, to assess the effects of pollution control activities implemented by the District on instream water quality. This report describes the results of fish and benthic macroinvertebrate surveys conducted during 1994 and 1995 in the West Branch of the DuPage River watershed in Cook County, Illinois.

DESCRIPTION OF STUDY AREA

The headwaters of the DuPage River consist of the West Branch and East Branch. The West Branch begins near Hanover Park in northwestern Cook County while the East Branch begins one and one-half miles southeast of Bloomingdale in DuPage County. Both branches are fed by copious springs. The two branches flow generally north to south and join just south of the Will-DuPage County Line. The river continues southward for an additional 45 kilometers until it discharges into the Des Plaines River near Channahon (1).

The West Branch is a low gradient stream (0.96 m/km). It drains agricultural land, plus extensive urbanized areas, while flowing through an intermorainal valley lying between the Minooka and Valparaiso moraines (2). The West Branch is 57 km long. The 32,375 hectare West Branch watershed is located in Cook, DuPage, and Will Counties. Approximately 8% of the West Branch watershed (2,600 hectares) is in Cook County, 90.5% (29,300 hectares) is in DuPage County, and 1.5% (475 hectares) is in Will County (3,4).

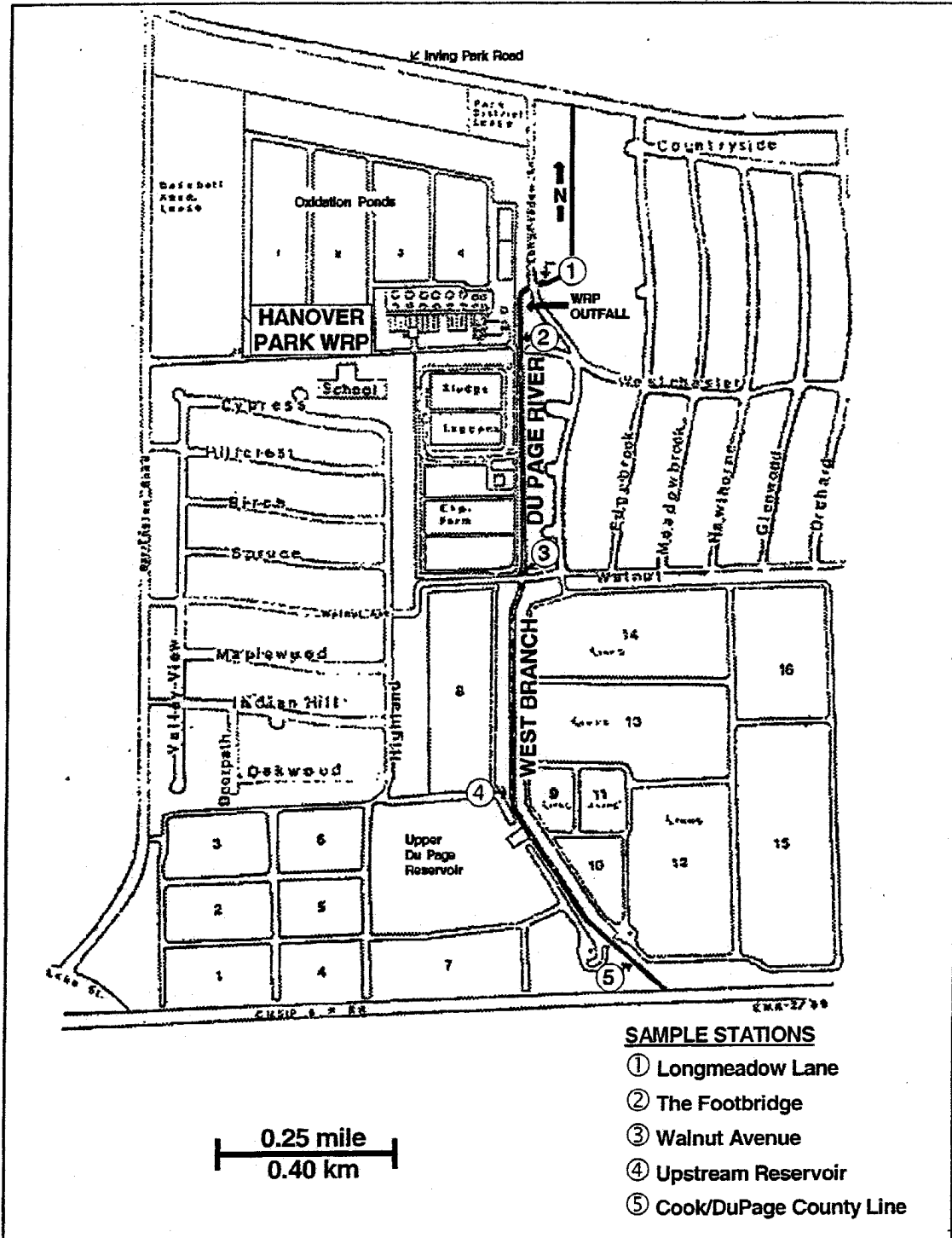
Five monitoring stations were established on the West Branch of the DuPage River in Cook County. One station (Longmeadow Lane) was located upstream of the outfall of the Metropolitan Water Reclamation District of Greater Chicago's (District's) Hanover Park Water Reclamation Plant (WRP), and

four stations (Footbridge, Walnut Avenue, Upstream DuPage Reservoir, and the Cook/DuPage County Line) were located downstream of the outfall of the Hanover Park WRP. The location of the five monitoring stations are shown in Figure 1.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 1

SAMPLE STATIONS ON THE WEST BRANCH OF THE DUPAGE RIVER



MATERIALS AND METHODS

Benthic Invertebrates

Triplicate sediment samples were collected from pools using a Petite Ponar dredge during July 11 and July 18, 1994 and July 17 and July 24, 1995 from five sampling locations along the West Branch of the DuPage River. The bottom samples were processed in the laboratory for benthic invertebrates. Samples were also obtained from riffles using a kicking procedure into a standard D-frame dip-net.

Station 1 was above the Longmeadow Road Bridge, approximately 15 meters upstream from the Hanover Park WRP final effluent outfall.

Station 2 was below the pedestrian foot bridge 160 meters downstream from the Hanover Park WRP outfall. Station 3 was 30 meters downstream of the Walnut Street Bridge, 800 meters downstream from the Hanover Park WRP outfall. Station 4 was 15 meters upstream of the DuPage Reservoir pump station. Station 5 was below an unnamed road and just above the Cook-DuPage County Line, 2.1 kilometers downstream from the Hanover Park WRP outfall.

The sediment samples were sieved in the field using a field sieving bucket with 250 micron openings. The sieved material was placed in plastic containers and returned to the laboratory for further processing.

The sediment samples were washed and screened in the laboratory through a U.S. Standard Number 60 sieve (250 micron openings). The sieved material was examined under a stereo microscope at 7 to 30x magnification. All benthic invertebrates were removed from the finer residual material, sorted into major taxonomic groups, and counted. All organisms were identified to the lowest possible taxonomic group.

Fish

ELECTROFISHING AND SEINING

Fish were collected in the West Branch of the DuPage River during the following periods: August 10 through August 17, 1994, October 24 through November 2, 1994, August 8 through August 21, 1995, and September 27 through October 3, 1995. Fish collection equipment included the following:

1. A direct current (DC) backpack electrofisher was used to collect fish in the West Branch of the DuPage River. The water was electrified with 0.7 to 1.0 amps of current, stunning the fish. In most instances, two 40-meter long backpack electrofisher collections were conducted at each station. A 40-meter reach of the creek was electrified by moving upstream parallel to the bank. Additional personnel followed the electrofisher collecting the stunned fish with dip

nets. Following the first collection, a second 40-meter electrofishing survey was conducted on the opposite bank. If the creek was less than five meters wide, electrofishing occurred only once along a 40-meter reach. The total electrofishing time during each 40-meter collection was noted. The total shocking time for a 40-meter collection in West Branch of the DuPage River ranged from 13 to 36 minutes.

2. A 25-foot bag seine with 0.5-cm mesh was also used to collect fish. Staff pulled the seine for 40 meters traveling upstream parallel to the bank. In most instances, a separate 40-meter seine collection occurred along each bank.

The total area monitored varied with the width of the creek. For example, a location 20-meters wide sampled with two 40-meter electrofisher collections and two 40-meter seine collections would equate to a monitoring area of 800 square meters.

FISH PROCESSING

In the field, large fish (greater than 150 mm) were identified to species, weighed to the nearest gram or nearest 0.1 gram (depending on size), measured for standard and total length to the nearest millimeter, and examined for the

incidence of disease, parasites, or other anomalies. Following processing, the large fish were returned live to the river. Small fish (less than 150 mm in length) were preserved in 10 percent (v/v) formalin and returned to the laboratory for further analysis. Small fish were processed in a similar manner as the large fish, except that they were weighed to the nearest 0.01 gram.

INDEX OF BIOTIC INTEGRITY

Biological integrity of aquatic ecosystems has been defined as the ability to support and maintain a balanced, integrated, and adaptive community having a species composition, diversity, and a functional organization comparable to that of a natural habitat (5,6). The Index of Biotic Integrity (IBI) integrates information from 12 fish community metrics that fall into three major categories: (1) species richness and composition; (2) trophic composition; and (3) fish abundance and condition. Each metric is scored as a 1, 3, or 5 based on whether its evaluation deviates strongly, deviates somewhat, or approximates expectations, respectively, as compared to an undisturbed site located in a similar geographical region and on a stream of comparable size. Individual metrics are added to calculate a total IBI score. A high IBI indicates high biological integrity or health and low disturbance or lack of perturbations. A low IBI indicates low biological integrity

and high disturbance or degradation. Separate IBI metric scores are based on the relative abundance of fish collected with each electrofishing gear (7). IBI categories of good (IBI 41-60), fair (IBI 21-40) and poor (IBI <21) as reported by the Illinois Environmental Protection Agency (IEPA) (8) were used in this report.

RESULTS AND DISCUSSION

Benthic Invertebrates

A total of 91 taxonomic groups of benthic invertebrates were identified from the West Branch of the DuPage River during 1994 and 1995 (Table 1). Fifty taxa were identified at Longmeadow Lane, 48 at the Footbridge, 40 at Walnut Avenue, 45 upstream of the DuPage Reservoir and 30 at the Cook/DuPage County Line.

The average number of benthic invertebrates found in the pool habitats of the West Branch during the 1994-1995 surveys was 9,157 organisms/m² (Table 2). The average numbers ranged from a low of 3,405/m² at the Cook/DuPage County Line to a high of 11,589/m² at the location just upstream of the DuPage Reservoir. Aquatic worms and midgefly larvae made up the majority of benthic invertebrates collected at each location and accounted for 63% and 28%, respectively, of the total benthos collected from the sediment in the pools.

Midgefly larvae made up the greatest proportion of the benthos in each collection from the riffle habitats (47% overall) as shown in Table 3. Caddisfly larvae and black fly larvae made up 21% and 10% of all the benthic invertebrates collected from the riffles.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

BENTHIC INVERTEBRATE TAXA IN THE WEST BRANCH OF THE DUPAGE RIVER
AT EACH SAMPLE STATION DURING JULY 1994 AND JULY 1995

Taxonomic Group	West Branch DuPage River Sample Station				
	Longmeadow Lane	Foot-bridge	Walnut Avenue	Reser-voir	County Line
	----- Present (+) / Absent (-) -----				
Bryozoa (Freshwater sponge)	+	-	-	-	-
Nematomorpha (Horse hair worms)	-	-	-	-	+
Hydrozoa (Hydra)					
Hydrozoa					
Hydridae	+	-	-	-	-
Hydra americana	+	+	-	-	-
Turbellaria (Flatworms)					
Tricladida	+	-	+	+	+
Dugesiidae					
Dugesia tigrina	-	-	+	+	-
Annelida					
Oligochaeta (Aquatic worms)	+	+	+	+	+
Hirudinea (Leeches)	-	-	-	+	-
Pharyngobdellida					
Erpobdellidae					
Erpobdella punctata	-	-	+	-	-
Mooreobdella fervida	-	-	+	+	-
Mooreobdella microstoma	+	+	+	+	-
Rhynchobdellida					
Glossiphoniidae					
Helobdella fusca	-	-	-	+	-
Helobdella stagnalis	-	+	+	-	-
Crustacea					
Isopoda (Aquatic sow bugs)					
Asellidae					
Caecidotea sp.	+	-	-	-	-
Caecidotea intermedius	+	+	+	+	-

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

BENTHIC INVERTEBRATE TAXA IN THE WEST BRANCH OF THE DUPAGE RIVER
AT EACH SAMPLE STATION DURING JULY 1994 AND JULY 1995

Taxonomic Group	West Branch DuPage River Sample Station				
	Longmeadow Lane	Foot-bridge	Walnut Avenue	Reser-voir	County Line
	----- Present (+)/Absent (-) -----				
Arachnoidea					
Hydracarina (Water mites)					
Lebertiidae					
Lebertia sp.	-	-	+	+	+
Sperchonidae	+	-	-	-	-
Sperchon sp.	+	+	+	+	+
Insecta					
Coleoptera (Beetles)					
Dytiscidae					
Cybister sp.	-	-	-	-	+
Elmidae					
Stenelmis sp.	+	-	-	-	+
Haliplidae					
Haliplus sp.	-	+	-	-	-
Scirtidae	-	-	-	+	-
Ephemeroptera (Mayflies)					
Baetidae					
Baetis sp.	-	-	-	+	+
Caenidae					
Caenis sp.	+	+	-	-	-
Trichoptera (Caddisflies)					
Hydropsychidae					
Ceratopsyche sp.	-	+	-	-	-
Cheumatopsyche sp.	+	+	+	+	+
Hydropsyche sp.	+	+	+	+	+
Hydropsychinae	-	+	+	+	-
Hydroptilidae					
Hydroptila sp.	-	+	+	-	-
Hydroptilinae	-	+	-	-	-
Odonata					
Coenagrionidae (Damselflies)					
Enallagma sp.	+	-	-	+	-
Ishnura sp.	+	-	+	-	-
Ishnura/Anomalagrion spp.	+	-	-	+	+

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

BENTHIC INVERTEBRATE TAXA IN THE WEST BRANCH OF THE DUPAGE RIVER
AT EACH SAMPLE STATION DURING JULY 1994 AND JULY 1995

Taxonomic Group	West Branch DuPage River Sample Station				
	Longmeadow Lane	Foot-bridge	Walnut Avenue	Reser-voir	County Line
	----- Present (+) / Absent (-) -----				
Insecta					
Odonata (Continued)					
Aeshnidae (Dragonflies)					
Anax sp.	-	-	-	+	-
Diptera					
Ceratopogonidae (Biting midges)					
Palpomyia gr.	+	-	-	-	-
Stilobezzia gr.	+	-	-	-	-
Simuliidae (Black flies)					
Simulium vittatum	+	+	+	+	+
Empididae (Dance flies)					
Hemerodromia sp.	-	+	+	+	+
Tabanidae (Deer flies)					
Chrysops sp.	+	-	-	-	-
Chironomidae (Midgeflies)					
Chironominae					
Chironomus sp.	+	+	+	+	+
Chironomus plumosus gr.	-	+	-	-	-
Chironomus semireductus gr.	-	+	-	-	-
Cladotanytarsus sp.	-	+	-	-	-
Cryptochironomus sp.	+	+	+	+	+
Dicrotendipes sp.	+	+	+	+	+
Dicrotendipes neomodestus	-	+	-	+	+
Einfeldia sp.	+	-	+	-	-
Endochironomus sp.	+	-	-	-	-
Parachironomus arcuatus gr.	+	-	-	-	-
Parachironomus sp.	+	-	+	-	-
Paratanytarsus sp.	+	+	+	+	+
Phaenopsectra sp.	-	+	+	+	+
Polypedilum sp.	+	+	+	+	+
Polypedilum convictum	-	-	-	+	-
Polypedilum nr. scalaenum	+	+	+	+	+
Tanytarsus sp.	+	+	-	+	-
Orthocladiinae					
Cricotopus sp.	+	+	+	+	+

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

BENTHIC INVERTEBRATE TAXA IN THE WEST BRANCH OF THE DUPAGE RIVER
AT EACH SAMPLE STATION DURING JULY 1994 AND JULY 1995

Taxonomic Group	West Branch DuPage River Sample Station				
	Longmeadow Lane	Foot-bridge	Walnut Avenue	Reser-voir	County Line
	----- Present (+)/Absent (-) -----				
Insecta (Continued)					
Diptera (Continued)					
Orthocladinae (Continued)					
Cricotopus bicinctus gr.	+	+	+	+	+
Cricotopus fuscus gr.	-	+	-	-	-
Cricotopus sylvestris gr.	-	+	+	+	-
Cricotopus triannulatus	+	-	-	-	-
Eukiefferiella sp.	-	-	-	+	-
Nanocladius sp.	+	+	+	-	+
Orthocladus sp.	-	-	+	+	+
Thienemanniella sp.	-	+	+	+	+
Tanypodinae	+	-	-	-	-
Apsectrotanypus sp.	-	+	-	-	-
Guttipelopia sp.	-	+	-	-	-
Psectrotanypus sp.	+	-	-	-	-
Procladius sp.	+	+	-	-	+
Tanypus sp.	+	-	-	+	-
Thienemannimyia gr.	+	+	+	+	+
Thienemannimyia sp.	-	-	-	+	-
Psychodidae (Moth flies)	-	-	+	-	-
Mollusca					
Gastropoda (Snails)					
Basommatophora					
Ancyliidae					
Ferrissia parallela	+	+	-	+	+
Lymnaeidae					
Stagnicola reflexa	-	-	+	-	-
Physidae					
Physella gyrina	+	+	+	+	+
Physella gyrina sayi	+	+	-	-	-
Physella integra	-	-	+	+	-
Planorbidae					
Gyraulus parvus	+	-	-	-	-

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

BENTHIC INVERTEBRATE TAXA IN THE WEST BRANCH OF THE DUPAGE RIVER
AT EACH SAMPLE STATION DURING JULY 1994 AND JULY 1995

Taxonomic Group	West Branch DuPage River Sample Station				
	Longmeadow Lane	Foot- bridge	Walnut Avenue	Reser- voir	County Line
	----- Present (+)/Absent (-) -----				
Pelecypoda (Clams and Mussels)					
Veneroida					
Sphaeriidae	-	+	-	-	-
Musculium sp.	-	+	-	+	-
Musculium partumeium	-	+	-	-	-
Musculium transversum	+	+	+	-	-
Pisidium sp.	+	-	+	-	-
Pisidium compressum	-	+	-	-	-
Pisidium henslowanum	+	+	-	-	-
Sphaerium sp.	+	-	+	-	-
Total Taxa	50	48	40	45	30

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

AVERAGE NUMBER¹ PER SQUARE METER (N/m²) AND PERCENTAGE COMPOSITION (%)
OF BENTHIC INVERTEBRATES COLLECTED FROM THE POOLS
OF THE WEST BRANCH THE DUPAGE RIVER DURING JULY 1994 AND JULY 1995

General Taxonomic Group	West Branch of the DuPage River Sample Station										Average for All Collections	
	Longmeadow Lane		Footbridge		Walnut Avenue		Upstream Reservoir		Cook/DuPage County Line			
	N/m ²	%	N/m ²	%	N/m ²	%	N/m ²	%	N/m ²	%	N/m ²	%
Hydra	287	2.5	14	0.1	0	0.0	0	0.0	0	0.0	60	0.7
Flatworms	0	0.0	0	0.0	129	1.4	7	0.1	7	0.2	29	0.3
Horse hair worms	0	0.0	0	0.0	0	0.0	0	0.0	65	1.9	13	0.1
Aquatic worms	8,235	71.9	3,978	39.4	7,446	80.5	7,998	69.0	1,297	38.1	5,791	63.2
Leeches	36	0.3	165	1.6	14	0.2	208	1.8	0	0.0	85	0.9
Aquatic sow bugs	115	1.0	36	0.4	7	0.1	22	0.2	0	0.0	36	0.4
Water mite	14	0.1	7	0.1	65	0.7	79	0.7	108	3.2	54	0.6
Beetles	0	0.0	7	0.1	0	0.0	0	0.0	14	0.4	4	0.0
Mayflies	36	0.3	7	0.1	0	0.0	0	0.0	0	0.0	9	0.1
Damselflies	222	1.9	0	0.0	0	0.0	344	3.0	0	0.0	113	1.2
Dragonflies	0	0.0	0	0.0	0	0.0	7	0.1	0	0.0	1	0.0
Caddisflies	0	0.0	129	1.3	50	0.5	14	0.1	215	6.3	82	0.9
Biting midges	416	3.6	14	0.1	0	0.0	22	0.2	0	0.0	90	1.0
Midgieflyies	1,878	16.4	5,361	53.1	1,319	14.3	2,788	24.1	1,663	48.8	2,602	28.4
Black flies	0	0.0	43	0.4	122	1.3	7	0.1	36	1.1	42	0.5
Dance flies	0	0.0	7	0.1	7	0.1	0	0.0	0	0.0	3	0.0
Snails	151	1.3	208	2.1	7	0.1	86	0.7	0	0.0	90	1.0
Clams	65	0.6	115	1.1	79	0.9	7	0.1	0	0.0	53	0.6
Total	11,455	100.0	10,091	100.0	9,245	100.0	11,589	100.0	3,405	100.0	9,157	100.0

¹Average of six quantitative samples per station (three samples per station per year) using a 6-inch X 6-inch ponar dredge.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3

TOTAL NUMBER¹ (N) AND PERCENTAGE COMPOSITION (%)
OF BENTHIC INVERTEBRATES COLLECTED FROM THE RIFFLES
OF THE WEST BRANCH OF THE DUPAGE RIVER DURING JULY 1994 AND JULY 1995

General Taxonomic Group	West Branch of the DuPage River Sample Station										Total for All Collections	
	Longmeadow Lane		Footbridge		Walnut Avenue		Upstream Reservoir		Cook/DuPage County Line		N	%
	N	%	N	%	N	%	N	%	N	%		
Hydra	7	1.9	0	0.0	0	0.0	0	0.0	0	0.0	7	0.4
Freshwater sponge	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
Flatworms	1	0.3	0	0.0	10	3.4	1	0.3	0	0.0	12	0.6
Horse hair worms	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Aquatic worms	23	6.1	59	11.4	31	10.5	13	3.6	21	5.4	147	7.6
Leeches	0	0.0	1	0.2	5	1.7	3	0.8	0	0.0	9	0.5
Aquatic sow bugs	26	6.9	0	0.0	1	0.3	2	0.6	0	0.0	29	1.5
Water mite	17	4.5	30	5.8	6	2.0	37	10.2	32	8.3	122	6.3
Beetles	1	0.3	0	0.0	0	0.0	1	0.3	1	0.3	3	0.2
Mayflies	0	0.0	0	0.0	0	0.0	2	0.6	4	1.0	6	0.3
Damselflies	7	1.9	0	0.0	1	0.3	1	0.3	1	0.3	10	0.5
Dragonflies	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Caddisflies	29	7.7	56	10.8	66	22.3	129	35.7	121	31.3	401	20.7
Biting midges	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Midgeflies	191	50.5	270	52.2	124	41.9	148	41.0	180	46.5	913	47.1
Black flies	53	14.0	85	16.4	25	8.4	10	2.8	14	3.6	187	9.6
Dance flies	0	0.0	0	0.0	0	0.0	1	0.3	3	0.8	4	0.2
Deer flies	4	1.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.2
Snails	5	1.3	13	2.5	25	8.4	13	3.6	10	2.6	66	3.4
Clams	13	3.4	3	0.6	2	0.7	0	0.0	0	0.0	18	0.9
Total	378	100.0	517	100.0	296	100.0	361	100.0	387	100.0	1,939	100.0

¹Total of two qualitative samples (one sample per station per year) disturbing the rocks of the riffle and using a D-frame net to catch the organisms. Sampling effort was not standardized per station.

LONGMEADOW LANE

Aquatic worms (72%) and midgefly larvae (16%) were the dominant benthic invertebrates among the population of 11,455 organisms/m² in the pools (Table 2). Midgeflies (51%) and black flies (14%) were dominant in the riffle habitat (Table 3). The benthic fauna collected during each sample at Longmeadow Lane during 1994-1995 are shown in Appendix Tables AI-1 and AII-1.

THE FOOTBRIDGE

Midgefly larvae (53%) and aquatic worms (39%) were the dominant benthic invertebrates in the population of 10,091 organisms/m² in the pools (Table 2). Midgeflies (52%) and black flies (16%) were dominant in the riffle habitat (Table 3). The benthic fauna collected during each sample at the Footbridge during 1994-1995 are shown in Appendix Tables AI-2 and AII-2.

WALNUT AVENUE

Aquatic worms (81%) and midgefly larvae (14%) were the dominant benthic invertebrates in the population of 9,245 organisms/m² in the pools (Table 2). Midgeflies (42%) and caddisflies (22%) were dominant in the riffle habitat (Table 3). The benthic fauna collected during each sample at Walnut Avenue during 1994-1995 are listed in Appendix Tables AI-3 and AII-3.

UPSTREAM DUPAGE RESERVOIR

Aquatic worms (69%) and midgefly larvae (24%) were the dominant benthic invertebrates in the population of 11,589 organisms/m² in the pools (Table 2). Midgeflies (41%) and caddisflies (36%) were dominant in the riffle habitat (Table 3). The benthic fauna collected during each sample upstream of the DuPage Reservoir during 1994-1995 are listed in Appendix Tables AI-4 and AII-4.

COOK/DUPAGE COUNTY LINE

Midgefly larvae (49%) and aquatic worms (38%) were the dominant benthic invertebrates among the pool population of 3,405 organisms/m² in the pools (Table 2). Midgeflies (47%) and caddisflies (31%) were dominant in the riffle habitat (Table 3). The benthic fauna collected during each sample at the Cook/DuPage County Line during 1994-1995 are listed in Appendix Tables AI-5 and AII-5.

Fish

During the 1994 and 1995 surveys, 17 species of fish were collected from the five monitoring stations on the West Branch of the DuPage River (Table 4). A combined total of 1,777 fish were collected from all locations during the two-year study (Table 5). The relative abundance, species composition,

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 4

COMMON AND SCIENTIFIC NAMES OF FISH COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

Common Name ¹	Scientific Name ¹
HERRING FAMILY	CLUPEIDAE
Gizzard shad	<i>Dorosoma cepedianum</i>
MINNOW FAMILY	CYPRINIDAE
Common carp	<i>Cyprinus carpio</i>
Carp x	<i>Cyprinus carpio x</i>
Goldfish hybrid	<i>Carassius auratus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Sand shiner	<i>Notropis stramineus</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Fathead minnow	<i>Pimephales promelas</i>
Creek chub	<i>Semotilus atromaculatus</i>
SUCKER FAMILY	CATOSTOMIDAE
White sucker	<i>Catostomus commersoni</i>
CATFISH FAMILY	ICTALURIDAE
Black bullhead	<i>Ameiurus melas</i>
Yellow bullhead	<i>Ameiurus natalis</i>
LIVEBEARER FAMILY	POECILIIDAE
Western mosquitofish	<i>Gambusia affinis</i>
SUNFISH FAMILY	CENTRARCHIDAE
Green sunfish	<i>Lepomis cyanellus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Orangespotted sunfish	<i>Lepomis humilis</i>
Bluegill	<i>Lepomis macrochirus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Green sunfish x	<i>L. cyanellus x</i>
Orangespotted sunfish hybrid	<i>L. humilis</i>
Green sunfish x	<i>L. cyanellus x</i>
Pumpkinseed hybrid	<i>L. gibbosus</i>
Orangespotted sunfish x Pumpkinseed hybrid	<i>L. humilis x</i> <i>L. gibbosus</i>

¹Common and scientific names from Robins, 1991 (8).

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 5

NUMBER OF FISH COLLECTED (N) AND SPECIES PERCENTAGE COMPOSITION (%) FROM THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

Fish Species or Hybrid	DuPage River Sample Station										All Collections Combined	
	Longmeadow Lane		Footbridge		Walnut Avenue		Upstream Reservoir		Cook/DuPage County Line		N	%
	N	%	N	%	N	%	N	%	N	%		
Gizzard shad	0	0.0	0	0.0	0	0.0	0	0.0	12	5.6	12	0.7
Carp	8	0.9	1	0.4	3	1.1	15	8.1	13	6.0	40	2.3
Carp X goldfish hybrid	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0	1	0.1
Golden shiner	6	0.7	1	0.4	8	3.0	12	6.5	2	0.9	29	1.6
Sand shiner	0	0.0	0	0.0	0	0.0	0	0.0	1	0.5	1	0.1
Bluntnose minnow	1	0.1	0	0.0	0	0.0	0	0.0	10	4.6	11	0.6
Fathead minnow	37	4.3	11	4.3	42	15.7	13	7.0	16	7.4	119	6.7
Creek chub	15	1.8	5	1.9	10	3.7	1	0.5	1	0.5	32	1.8
White sucker	3	0.4	30	11.7	7	2.6	20	10.8	33	15.3	93	5.2
Mosquitofish	2	0.2	0	0.0	0	0.0	0	0.0	3	1.4	5	0.3
Black bullhead ¹	5	0.6	2	0.8	1	0.4	0	0.0	5	2.3	13	0.7
Yellow bullhead ¹	3	0.4	3	1.2	2	0.7	1	0.5	4	1.9	13	0.7
Green sunfish ¹	240	28.2	139	54.1	78	29.1	31	16.8	44	20.4	532	29.9
Pumpkinseed sunfish ¹	6	0.7	0	0.0	0	0.0	4	2.2	2	0.9	12	0.7
Orangespotted sunfish ¹	209	24.6	8	3.1	46	17.2	48	25.9	36	16.7	347	19.5
Bluegill ¹	269	31.6	12	4.7	56	20.9	35	18.9	27	12.5	399	22.5
Hybrid sunfish ¹	22	2.6	45	17.5	7	2.6	2	1.1	4	1.9	80	4.5
Largemouth bass ¹	22	2.6	0	0.0	7	2.6	3	1.6	3	1.4	35	2.0
Black crappie ¹	3	0.4	0	0.0	0	0.0	0	0.0	0	0.0	3	0.2
Total Fish	851	100.0	257	100.0	268	100.0	185	100.0	216	100.0	1,777	100.0
Total Species	15		10		11		11		16		17	

¹Game fish

weight, and length measurements of fish collected at each of the five monitoring stations are presented in Appendix Tables AIII through AVI.

Overall, five species, accounted for 84% of the fish community in the West Branch of the DuPage River during the 1994 and 1995 surveys. The five species included green sunfish (30%), bluegill sunfish (22%), orangespotted sunfish (20%), fathead minnows (7%), and white suckers (5%). Hybrid sunfish also composed 5% of the catch.

Game fish made up 81% of the West Branch of the DuPage River collection during 1994-1995, and included black bullheads, yellow bullheads, green sunfish, pumpkinseed sunfish, orangespotted sunfish, bluegills, largemouth bass, black crappie, and hybrid sunfish.

A discussion of selected characteristics of the fish community assessed at five monitoring stations in the West Branch of the DuPage River during 1994 and 1995 follows.

LONGMEADOW LANE

During 1994-1995, 15 fish species were collected from the West Branch of the DuPage River just upstream from the outfall of the Hanover Park WRP (Table 5). Bluegills (32%), green sunfish (28%), and orangespotted sunfish (25%) were the predominant species, and accounted for 84% of the total catch of 851 fish. Eight game fish species, plus hybrid sunfish, made

up 92% of the catch, including black bullheads, yellow bullheads, green sunfish, pumpkinseed sunfish, orangespotted sunfish, bluegills, largemouth bass, and black crappie. The relative abundance, species composition, weight, and length measurements of fish collected at Longmeadow Lane during 1994 and 1995 are listed in Appendix Tables AIII-1, AIV-1, AV-1, and AVI-1. The biotic integrity at Longmeadow Lane was fair (average IBI was 29, range 24-36).

THE FOOTBRIDGE

During 1994-1995, 10 fish species were collected from the West Branch of the DuPage River at the Footbridge (Table 5). Green sunfish (54%), hybrid sunfish (18%), and white suckers (12%) were the predominant species, and accounted for 83% of the total catch of 257 fish. Five game fish species, plus hybrid sunfish, made up 81% of the catch, including black bullheads, yellow bullheads, green sunfish, orangespotted sunfish, and bluegills. The relative abundance, species composition, weight, and length measurements of fish collected at the Footbridge during 1994 and 1995 are listed in Appendix Tables AIII-2, AIV-2, AV-2, and AVI-2. The biotic integrity at the Footbridge was fair (average IBI was 23, range 20-26).

WALNUT AVENUE

During 1994-1995, 11 fish species were collected from the West Branch of the DuPage River at Walnut Avenue (Table 5). Green sunfish (29%), bluegills (21%), orangespotted sunfish (17%), and fathead minnows (16%) were the predominant species, and accounted for 83% of the total catch of 268 fish. Six game fish species, plus hybrid sunfish, made up 74% of the catch, including black bullheads, yellow bullheads, green sunfish, orangespotted sunfish, bluegills, and largemouth bass. The relative abundance, species composition, weight, and length measurements of fish collected at Walnut Avenue during 1994 and 1995 are listed in Appendix Tables AIII-3, AIV-3, AV-3, and AVI-3. The biotic integrity at Walnut Avenue was fair (average IBI was 27, range 22-32).

UPSTREAM DUPAGE RESERVOIR

During 1994-1995, 11 fish species were collected from the West Branch of the DuPage River upstream of the DuPage Reservoir (Table 5). Orangespotted sunfish (26%), bluegills (19%), green sunfish (17%) and white suckers (11%) were the predominant species, and accounted for 72% of the total catch of 185 fish. Six game fish species, plus hybrid sunfish, made up 67% of the catch, including yellow bullheads, green sunfish, pumpkinseed sunfish, orangespotted sunfish, bluegills, and largemouth bass. The relative abundance, species composition,

weight, and length measurements of fish collected upstream of the DuPage Reservoir during 1994 and 1995 are listed in Appendix Tables AIII-4, AIV-4, AV-4, and AVI-4. The biotic integrity upstream of the DuPage Reservoir was fair (average IBI was 27, range 20-32).

COOK/DUPAGE COUNTY LINE

During 1994-1995, 16 fish species were collected from the West Branch of the DuPage River at the Cook/DuPage County Line (Table 5). Green sunfish (20%), orangespotted sunfish (17%), white suckers (15%), and bluegills (13%) were the predominant species, and accounted for 65% of the total catch of 216 fish. Seven game fish species, plus hybrid sunfish, made up 58% of the catch, including black bullheads, yellow bullheads, green sunfish, pumpkinseed sunfish, orangespotted sunfish, bluegills, and largemouth bass. The relative abundance, species composition, weight, and length measurements of fish collected at the Cook/DuPage County Line during 1994 and 1995 are listed in Appendix Tables AIII-5, AIV-5, AV-5, and AVI-5. The biotic integrity at the Cook/DuPage County Line was fair (average IBI was 28, range 24-32).

Biotic Integrity

The biotic integrity of the West Branch of the DuPage River in Cook County is fair. Average IBIs calculated for

each fish collection are shown in Figure 2 and in Appendix Tables AVII-1 - AVII-5 for each year. Except for the Footbridge (IBI = 23), the average IBIs at each station in the West Branch were not significantly different from each other (average IBI range 27-29).

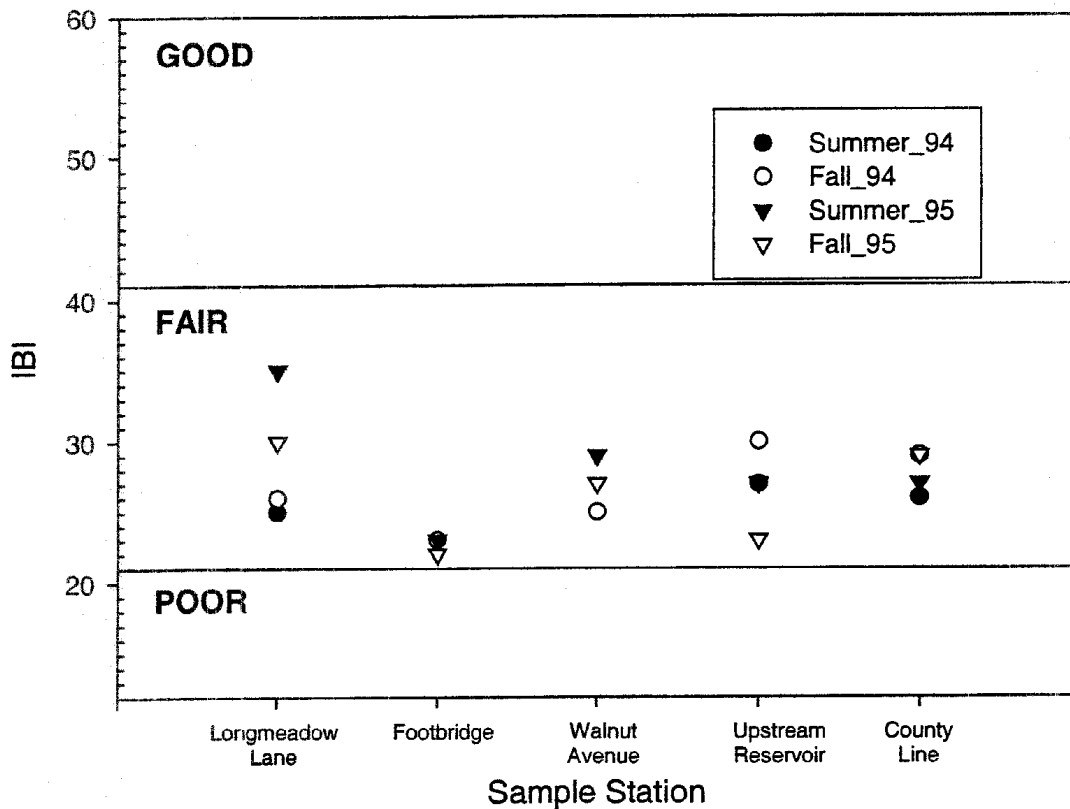
Water Quality

Water quality constituents that could be toxic to fish, as well as those parameters that can affect toxicity such as water temperature, water hardness, pH, and dissolved oxygen concentration, were measured at the time of fish collections and are listed in Appendix Tables AVIII-1 - AVIII-5. Upstream of the Hanover Park WRP at Longmeadow Lane, iron was the only water quality constituent that did not meet Illinois Pollution Control Board (IPCB) water quality standards (25% in compliance). All water quality constituents measured at each of the four stations downstream of the Hanover Park WRP effluent outfall were in 100% compliance with IPCB standards.

The District also collected and analyzed monthly samples for water quality constituents both upstream of the Hanover Park WRP at Longmeadow Lane and downstream of the WRP at Walnut Avenue. During 1994, the water quality standard compliance rate both upstream and downstream of the WRP was 100% (10). During 1995, all parameters except total dissolved solids and cyanide were in total compliance at both upstream and

FIGURE 2

INDEX OF BIOTIC INTEGRITY (IBI) FOR THE WEST BRANCH OF THE DUPAGE RIVER IN COOK COUNTY DURING SUMMER AND FALL, 1994 AND 1995



downstream locations. Total dissolved solids was in 67% compliance upstream and 92% compliance downstream. Cyanide was in 92% compliance upstream and 92% compliance downstream (11).

Since concentrations of total dissolved solids and cyanide downstream of the WRP were in compliance at the same or greater frequency than were total dissolved solids and cyanide upstream of the WRP, it can be concluded that the source of these parameters was upstream of the Hanover Park WRP.

The West Branch of the DuPage River met water quality standards for all other measured parameters for which IPCB standards existed during 1994 and 1995.

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APPENDIX AI

BENTHIC INVERTEBRATES COLLECTED FROM THE WEST BRANCH OF THE
DUPAGE RIVER DURING JULY 11 AND 18, 1994

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-1

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT LONGMEADOW LANE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Hydrozoa (Hydra)				
Hydroidea				
Hydridae				
Hydra americana	0	43	1,419	0
unidentified	0	0	258	0
Annelida				
Oligochaeta (Aquatic Worms)	1,892	10,320	7,525	10
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	0	0	43	1
Arachnoidea				
Hydracarina (Water mite)				
Sperchonidae				
Sperchon sp.	0	86	0	0
Insecta				
Ephemeroptera (Mayflies)				
Caenidae				
Caenis sp.	43	43	129	0
Odonata				
Coenagrionidae (Damselflies)				
Enallagma sp.	129	731	344	7
Ishnura sp.	0	0	86	0
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	0	0	0	52
Chironomidae (Midgeflies)				
Chironomus sp.	43	0	0	0
Chironomus sp.	516	2,279	1,548	2
Cricotopus bicinctus gr.	43	0	0	3
Cricotopus sp.	387	645	430	36
Cryptochironomus sp.	0	86	129	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT LONGMEADOW LANE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number Riffle Sample 1
	Pool Sample 1	Pool Sample 2	Pool Sample 3	
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Continued)				
Dicrotendipes sp.	0	387	43	0
Endochironomus sp.	0	43	0	0
Fragmented	0	0	0	1
Nanocladius sp.	0	301	129	5
Parachironomus arcuatus gr.	0	0	0	1
Parachironomus sp.	43	387	215	2
Paratanytarsus sp.	86	0	86	0
Procladius sp.	43	430	172	67
Psectrotanypus sp.	0	43	0	0
pupa	0	0	0	2
Tanypus sp.	0	989	215	0
Tanytarsus sp.	0	43	0	0
Thienemannimyia gr.	0	0	0	2
Ceratopogonidae (Biting midges)	0	86	43	0
Gastropoda (Snails)				
Physidae				
Physella gyrina	0	516	344	3
Planorbidae				
Gyraulus parvus	0	43	0	0
Pelecypoda (Clams and Mussels)				
Sphaeriidae				
Pisidium sp.	43	86	0	1
Sphaerium sp.	0	129	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-2

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE FOOTBRIDGE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Hydrozoa				
Hydroida				
Hydridae (Hydra)				
Hydra americana	86	0	0	0
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	86	0	43	0
Annelida				
Oligochaeta (Aquatic Worms)	2,365	1,892	6,063	55
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella microstoma	172	86	215	1
Insecta				
Trichoptera (Caddisflies)				
Hydropsychidae				
Ceratopsyche sp.	0	0	0	22
Cheumatopsyche sp.	0	0	0	16
Hydropsychinae	0	0	0	5
Hydroptilidae				
Hydroptila sp.	215	0	258	0
Hydroptilinae	172	0	0	0
Diptera				
Coleoptera (Beetles)				
Haliplidae				
Haliphus sp.	43	0	0	0
Simuliidae (Black Flies)				
Simulium vittatum	129	0	129	42
Empididae (Dance Flies)				
Hemerodromia sp.	0	0	43	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE FOOTBRIDGE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Midgeflies)				
Apsectrotanypus sp.	0	0	43	0
Chironomus sp.	4,128	258	860	41
Cladotanytarsus sp.	43	0	0	0
Cricotopus bicinctus gr.	86	0	1,032	52
Cricotopus fuscus gr.	43	0	0	0
Cricotopus sp.	1,505	645	2,408	43
Cricotopus sylvestris gr.	0	0	43	0
Cryptochironomus sp.	215	43	215	0
Dicrotendipes sp.	301	0	387	0
Guttipelopia	43	0	0	0
Paratanytarsus sp.	0	0	43	0
Phaenopsectra sp.	559	0	344	0
Polypedilum nr. scalaenum	0	0	0	1
Polypedilum sp.	430	43	43	0
Procladius sp.	172	0	0	0
Thienemanniella sp.	0	0	0	1
Thienemannimyia gr.	946	258	1,677	48
Ceratopogonidae (Biting Midges)	43	0	0	0
Gastropoda (Snails)				
Physidae				
Physella gyrina	860	0	215	6
Sperchonidae (Water Mite)				
Sperchon sp.	0	0	0	5
Pelecypoda (Clams)				
Sphaeriidae				
Musculium partumeium	0	0	0	3
Musculium sp.	43	0	0	0
Pisidium compressum	86	0	86	0
unidentified	43	0	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-3

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT WALNUT AVENUE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Turbellaria (Flatworms)				
Dugesiiidae				
Tricladida	43	0	0	0
Annelida				
Oligochaeta (Aquatic Worms)	15,394	11,180	13,502	19
Hirudinea (Leeches)				
Erpobdellidae				
Erpobdella punctata	0	0	0	2
Mooreobdella fervida	0	0	0	2
Mooreobdella microstoma	0	86	0	0
Glossiphoniidae				
Helobdella stagnalis	0	0	0	1
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	0	0	0	1
Insecta				
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	172	0	0	30
Hydroptilidae				
Hydroptila sp.	0	0	0	9
Odonata				
Coenagrionidae (Damselflies)				
Ishnura sp.	0	0	0	1
Diptera				
Chironomidae (Midgeflies)				
Chironomus sp.	0	43	258	2
Cricotopus bicinctus gr.	172	0	43	31
Cricotopus sp.	559	0	0	43
Cricotopus sylvestris gr.	0	0	0	2
Cryptochironomus sp.	344	172	301	0
Dicrotendipes sp.	43	0	0	0
Einfeldia sp.	43	0	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-3 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT WALNUT AVENUE
JULY 11, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Continued)				
Nanocladius sp.	43	0	0	0
Orthocladius sp.	172	0	0	1
Parachironomus sp.	43	0	0	0
Paratanytarsus sp.	0	0	0	1
Phaenopsectra sp.	0	0	43	0
Polypedilum	43	0	0	0
Polypedilum sp.	172	0	344	6
Thienemanniella sp.	0	0	0	3
Thienemannimyia gr.	989	301	301	29
Gastropoda (Snails)				
Lymnaeidae				
Stagnicola reflexa	0	0	0	1
Physidae				
Physella gyrina	43	0	0	0
Physella integra	0	0	0	22
Hydracarina (Water Mite)				
Lebertiidae				
Lebertia sp.	43	0	0	0
Sperchonidae				
Sperchon sp.	129	0	0	0
immature	0	0	0	5
Pelecypoda Clams)				
Sphaeriidae				
Musculium transversum	215	0	0	0
Sphaerium sp.	0	0	0	1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-4

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER UPSTREAM OF THE DUPAGE RESERVOIR
JULY 18, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	0	0	0	1
Arachnoidea				
Hydracarina (Water Mite)				
Lebertiidae				
Lebertia sp.	172	258	43	0
Sperchonidae				
Sperchon sp.	0	0	0	16
Annelida				
Turbellaria (Flatworms)				
Tricladida	0	0	0	1
Oligochaeta (Aquatic Worms)	6,235	11,954	3,526	3
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella fervida	0	0	0	2
Mooreobdella microstoma	387	559	129	0
Glossiphoniidae				
Helobdella fusca	0	0	0	1
Insecta				
Odonata				
Coenagrionidae (Damselflies)				
Enallagma sp.	0	0	0	1
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	0	0	0	62
Coleoptera (Beetles)				
Scirtidae	0	0	0	1
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	0	0	0	1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-4 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER UPSTREAM OF THE DUPAGE RESERVOIR
JULY 18, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Empididae (Dance Flies)				
<i>Hemerodromia</i> sp.	0	0	0	1
Chironomidae (Midgeflies)				
<i>Chironomus</i> sp.	172	731	903	0
<i>Cricotopus bicinctus</i> gr.	0	43	0	46
<i>Cricotopus</i> sp.	0	129	0	19
<i>Cricotopus sylvestris</i> gr.	0	0	0	3
<i>Cryptochironomus</i> sp.	215	258	172	0
<i>Dicrotendipes neomodestus</i>	301	1462	1333	0
<i>Dicrotendipes</i> sp.	473	989	1290	0
<i>Polypedilum convictum</i>	0	0	0	1
<i>Polypedilum</i> nr. <i>scalaenum</i>	129	0	0	0
<i>Polypedilum</i> sp.	86	0	0	3
pupa	0	0	0	1
<i>Tanytarsus</i> sp.	0	0	0	3
<i>Thienemannimyia</i> gr.	344	817	688	36
<i>Thienemannimyia</i> sp.	0	0	172	0
Ceratopogonidae (Biting Midges)				
unidentified	0	0	43	0
Mollusca				
Gastropoda (Snails)				
Ancylidae				
<i>Ferrissia</i> sp.	0	0	43	0
Physidae				
<i>Physella integra</i>	0	43	86	13
Pelecypoda (Clams)				
Sphaeriidae				
<i>Musculium</i> sp.	0	43	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-5

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE COOK/DUPAGE COUNTY LINE
JULY 18, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Annelida				
Oligochaeta (Aquatic Worms)	2,107	731	989	6
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella microstoma	0	0	0	0
Arachnoidea				
Hydracarina (Water Mite)				
Sperchonidae				
Sperchon sp.	0	0	0	17
unidentified	0	0	0	2
Insecta				
Coleoptera (Beetle)				
Dytiscidae				
Cybister sp.	0	0	0	1
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	0	0	0	8
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	0	0	43	50
immature	0	0	0	6
Empididae (Dance Flies)				
Hemerodromia sp.	0	0	0	1
Chironomidae (Midgeflies)				
Chironomus sp.	473	129	43	1
Cricotopus bicinctus gr.	0	0	0	12
Cricotopus sp.	86	0	258	29
Cryptochironomus sp.	430	215	215	0
Dicrotendipes neomodestus	129	129	559	0
Dicrotendipes sp.	172	559	516	0
Phaenopsectra sp.	43	0	0	0
Polypedilum nr. scalaenum	473	0	0	0
Polypedilum sp.	215	129	43	14

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-5 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE COOK/DUPAGE COUNTY LINE
JULY 18, 1994

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Continued)				
Procladius sp.	43	43	0	0
pupa	0	0	0	1
Thienemannimyia gr.	258	172	602	23
Gastropoda (Snails)				
Ancylidae				
Ferrissia sp.	0	0	0	1

APPENDIX AII

BENTHIC INVERTEBRATES COLLECTED FROM THE WEST BRANCH OF THE
DUPAGE RIVER DURING JULY 17 AND 24, 1995

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-1

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT LONGMEADOW LANE
JULY 17, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Bryzoa (Freshwater Sponge)	0	0	0	1
Hydrozoa (Hydra)				
Hydrozoa				
Hydridae				
Hydra americana	0	0	0	7
Turbellaria (Flatworms)	0	0	0	1
Annelida				
Oligochaeta (Aquatic Worms)	5,504	20,167	3,999	13
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella microstoma	129	0	86	0
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	0	301	0	14
Caecidotea sp.	0	344	0	11
Arachnoidea				
Hydracarina (Water Mite)				
Sperchonidae				
Sperchon sp.	0	0	0	9
unidentified	0	0	0	8
Insecta				
Coleoptera (Beetles)				
Elmidae				
Stenelmis sp.	0	0	0	1
Odonata				
Coenagrionidae (Damselflies)				
Ishnura/Anomalagrion spp.	43	0	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-1 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT LONGMEADOW LANE
JULY 17, 1995

Taxonomic Group	Number Per Square Meter			Number Riffle Sample 1
	Pool Sample 1	Pool Sample 2	Pool Sample 3	
Insecta (Continued)				
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	0	0	0	19
Hydropsyche sp.	0	0	0	10
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	0	0	0	1
Tabanidae (Deer Flies)				
Chrysops sp.	0	0	0	4
Chironomidae (Midgeflies)				
Chironomus sp.	0	516	0	0
Cricotopus bicinctus gr.	0	0	0	1
Cricotopus sp.	0	0	0	2
Cricotopus triannulatus	0	0	0	1
Dicrotendipes sp.	43	258	86	0
Einfeldia sp.	43	0	0	0
Nanocladius sp.	0	0	0	2
Paratanytarsus sp.	43	0	0	0
Polypedilum nr. scalaenum	0	86	0	1
Polypedilum sp.	0	0	0	2
Procladius sp.	0	43	43	0
Tanypodinae	86	0	0	0
Tanypus sp.	43	43	0	0
Tanytarsus sp.	0	43	86	0
Thienemannimyia gr.	0	0	0	57
unidentified	0	43	0	4
Biting Midges				
Ceratopogonidae				
Palpomyia gr.	301	1419	86	0
Stilobezzia gr.	0	0	215	0
unidentified	0	258	86	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-1 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT LONGMEADOW LANE
JULY 17, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Gastropoda (Snails)				
Ancylidae				
Ferrissia sp.	0	0	0	1
Physidae				
Physella gyrina	0	43	0	0
Physella gyrina sayi	0	0	0	1
Pelecypoda (Clams and Mussels)				
Sphaeriidae				
Musculium transversum	43	0	0	12
Pisidium henslowanum	0	0	43	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-2

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE FOOTBRIDGE
JULY 17, 1995

Taxonomic Group	Number Per Square Meter			Number Riffle Sample 1
	Pool Sample 1	Pool Sample 2	Pool Sample 3	
Annelida				
Oligochaeta (Aquatic Worms)	5,676	5,934	1,935	4
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella microstoma	430	43	0	0
Glossiphoniidae				
Helobdella stagnalis	0	43	0	0
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	43	43	0	0
Arachnoidea				
Hydracarina (Water Mite)				
Sperchonidae				
Sperchon sp.	0	43	0	25
Insecta				
Ephemeroptera (Mayflies)				
Caenidae				
Caenis sp.	43	0	0	0
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	0	0	43	10
Hydropsyche sp.	43	43	0	3
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	0	0	0	43
Chironomidae (Midgeflies)				
Chironomus plumosus gr.	43	43	172	1
Chironomus semireductus gr.	43	0	0	0
Chironomus sp.	2,881	4,730	2,494	9
Cricotopus bicinctus gr.	43	129	0	21

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-2 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE FOOTBRIDGE
JULY 17, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Continued)				
Cricotopus sp.	0	86	0	35
Cryptochironomus sp.	129	258	43	0
Dicrotendipes neomodestus	43	0	0	0
Dicrotendipes sp.	0	43	0	0
Nanocladius sp.	0	86	0	0
Phaenopsectra sp.	86	301	129	0
Polypedilum nr. scalaenum	0	817	172	1
Polypedilum sp.	301	1,290	172	0
Tanytarsus sp.	43	0	0	0
Thienemanniella sp.	0	0	0	4
Thienemannimyia gr.	301	258	0	9
pupa	0	86	0	3
unidentified	43	86	0	1
Ceratopogonidae (Biting Midges)	43	0	0	0
Gastropoda (Snails)				
Ancyliidae				
Ferrissia parallela	0	86	0	0
Physidae				
Physella gyrina	0	43	0	7
Physella gyrina sayi	43	0	0	0
Pelecypoda (Clams)				
Sphaeriidae				
Musculium transversum	258	86	0	0
Pisidium henslowanum	43	0	43	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-3

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT WALNUT AVENUE
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number Riffle Sample 1
	Pool Sample 1	Pool Sample 2	Pool Sample 3	
Turbellaria (Flatworms)				
Dugesiidae				
<i>Dugesia tigrina</i>	0	0	473	1
unidentified	0	43	215	9
Annelida				
Oligochaeta (Aquatic Worms)	3,354	430	817	12
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
<i>Caecidotea intermedius</i>	43	0	0	0
Arachnoidea				
Hydracarina (Water Mite)				
Lebertiidae				
<i>Lebertia</i> sp.	0	0	43	0
Sperchonidae				
<i>Sperchon</i> sp.	0	0	172	0
unidentified	0	0	0	1
Insecta				
Trichoptera (Caddisflies)				
Hydropsychidae				
<i>Cheumatopsyche</i> sp.	0	0	86	17
<i>Hydropsyche</i> sp.	0	0	0	6
Hydropsychinae	0	0	43	4
Diptera				
Simuliidae (Black Flies)				
<i>Simulium vittatum</i>	172	0	0	0
Empididae (Dance Flies)				
<i>Hemerodromia</i> sp.	0	0	43	0
Chironomidae (Midgeflies)				
<i>Chironomus</i> sp.	258	0	43	1
<i>Cricotopus bicinctus</i> gr.	43	0	0	1
<i>Cricotopus</i> sp.	43	0	0	2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-3 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT WALNUT AVENUE
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera (Continued)				
Chironomidae (Continued)				
Cryptochironomus sp.	43	0	0	0
Dicrotendipes sp.	559	43	301	0
Polypedilum nr. scalaenum	172	0	0	0
Polypedilum sp.	516	0	43	1
Thienemannimyia gr.	0	86	1,247	1
unidentified	86	0	0	0
Gastropoda (Snails)				
Lymnaeidae				
Stagnicola reflexa	0	0	0	1
Physidae				
Physella gyrina	0	0	0	1
Pelecypoda (Clams and Mussels))				
Sphaeriidae				
Musculium transversum	86	0	0	0
Pisidium sp.	86	0	0	0
unidentified	86	0	0	1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-4

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER UPSTREAM DUPAGE RESERVOIR
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Turbellaria (Flatworms)				
Dugesiidae				
Dugesia tigrina	0	0	43	0
Annelida				
Oligochaeta (Aquatic Worms)				
unidentified	15,609	5,375	5,289	10
Hirudinea (Leeches)				
Erpobdellidae				
Mooreobdella microstoma	0	43	86	0
unidentified	0	0	43	0
Crustacea				
Isopoda (Aquatic Sow Bugs)				
Asellidae				
Caecidotea intermedius	0	0	129	1
Arachnoidea				
Hydracarina (Water Mite)				
Sperchonidae				
Sperchon sp.	0	0	0	21
Insecta				
Ephemeroptera (Mayflies)				
Baetidae				
Baetis sp.	0	0	0	1
unidentified	0	0	0	1
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	0	0	43	7
Hydropsyche sp.	0	0	0	60
Hydropsychinae	0	0	43	0
Odonata				
Coenagrionidae (Damselflies)				
Ishnura/Anomalagrion sp.	129	0	1,720	0
unidentified	43	0	172	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-4 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER UPSTREAM OF DUPAGE RESERVOIR
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Odonata (Continued)				
Aeshnidae (Dragonflies)				
Anax sp.	0	0	43	0
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	43	0	0	9
Diptera (Continued)				
Chironomidae (Midgeflies)				
Chironomus sp.	473	43	172	0
Cricotopus sp.	430	0	559	13
Cryptochironomus sp.	172	43	43	0
Dicrotendipes sp.	172	172	43	0
Eukiefferiella sp.	0	0	0	1
Orthocladius sp.	0	0	43	8
Paratanytarsus sp.	0	0	43	0
Phaenopsectra sp.	0	0	86	0
Polypedilum nr. scalaenum	1376	43	86	0
Polypedilum sp.	1032	172	129	0
pupa	129	0	0	1
Tanypus sp.	0	0	86	0
Tanytarsus sp.	86	0	43	1
Thienemanniella sp.	86	0	86	2
Thienemannimyia gr.	86	0	0	8
unidentified	43	0	43	2
Ceratopogonidae (Biting midges)				
unidentified	0	0	86	0
Gastropoda (Snails)				
Ancylidae				
Ferrissia parallela	43	0	43	0
Physidae				
Physella gyrina	0	0	258	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-5

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE COOK/DUPAGE COUNTY LINE
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Nematomorpha (Horse Hair Worms)	387	0	0	0
Turbellaria (Flatworms)	43	0	0	0
Annelida				
Oligochaeta (Aquatic Worms)	817	1,376	1,763	15
Arachnoidea				
Hydracarina (Water Mite)				
Lebertiidae				
Lebertia sp.	43	0	86	0
Sperchonidae				
Sperchon sp.	129	43	344	13
Insecta				
Coleoptera (Beetles)				
Elmidae				
Stenelmis sp.	86	0	0	0
Ephemeroptera (Mayflies)				
Baetidae				
Baetis sp.	0	0	0	2
unidentified	0	0	0	2
Trichoptera (Caddisflies)				
Hydropsychidae				
Cheumatopsyche sp.	129	0	129	38
Hydropsyche sp.	516	0	215	27
unidentified	129	0	129	0
Odonata				
Coenagrionidae (Damselflies)				
Ishnura/Anomalagrion spp.	0	0	0	1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AII-5 (Continued)

NUMBER OF BENTHIC INVERTEBRATES COLLECTED FROM THE
WEST BRANCH OF THE DUPAGE RIVER AT THE COOK/DUPAGE COUNTY LINE
JULY 24, 1995

Taxonomic Group	Number Per Square Meter			Number
	Pool Sample 1	Pool Sample 2	Pool Sample 3	Riffle Sample 1
Insecta (Continued)				
Diptera				
Simuliidae (Black Flies)				
Simulium vittatum	86	43	86	6
Empididae (Dance Flies)				
Hemerodromia sp.	0	0	0	2
Chironomidae (Midgeflies)				
Chironomus sp.	0	0	86	0
Cricotopus bicinctus gr.	0	0	0	6
Cricotopus sp.	258	86	0	13
Cryptochironomus sp.	430	0	86	0
Dicrotendipes sp.	430	43	129	6
Nanocladius sp.	0	0	0	4
Orthocladius sp.	215	387	430	43
Paratanytarsus sp.	172	0	0	0
Polypedilum nr. scalaenum	645	172	0	2
Polypedilum sp.	172	0	43	3
pupa	0	0	0	1
Thienemanniella sp.	0	0	0	1
Thienemannimyia gr.	215	0	43	20
unidentified	0	0	0	1
Gastropoda (Snails)				
Ancyliidae				
Ferrissia parallela	0	0	0	1
Physidae				
Physella gyrina	0	0	0	8

APPENDIX AIII

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF
FISH COLLECTED FROM THE WEST BRANCH OF THE DUPAGE RIVER
DURING AUGUST 10-17, 1994

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIII-1

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 10, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	5	5.0	3.4	0.7	0.2	1.2	35	26	44
Fathead minnow	1	1.0	1.4	1.4	1.4	1.4	51	51	51
Green sunfish	26	26.0	214.0	8.2	3.7	20.5	71	57	101
Green sunfish x orangespotted	16	16.0	25.7	1.6	0.3	3.2	44	28	57
Orangespotted sunfish	49	49.0	38.8	0.8	0.2	6.6	36	24	70
Pumpkinseed	2	2.0	1.1	0.5	0.5	0.6	34	31	37
White sucker	1	1.0	5.3	5.3	5.3	5.3	79	79	79
Totals	100	100.0	289.6						

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIII-2

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 12, 1994

AIII-2

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	1	2.5	67.5	67.5	67.5	67.5	168	168	168
Bluegill	1	2.5	15.8	15.8	15.8	15.8	94	94	94
Creek chub	2	5.0	147.9	74.0	50.3	97.6	171	156	186
Fathead minnow	4	10.0	4.9	1.2	0.8	1.8	49	45	54
Green sunfish	23	57.5	229.9	10.0	3.1	36.7	76	57	119
Green sunfish x orangespotted	1	2.5	2.2	2.2	2.2	2.2	50	50	50
Green sunfish x pumpkinseed	2	5.0	6.5	3.2	2.8	3.7	56	54	57
White sucker	6	15.0	629.9	105.0	9.9	258.0	186	95	273
Totals	40	100.0	1,104.5						

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIII-3

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
WALNUT STREET ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 15, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	1	2.2	9.3	9.3	9.3	9.3	79	79	79
Carp	1	2.2	6.4	6.4	6.4	6.4	69	69	69
Carp x goldfish	1	2.2	854.0	854.0	854.0	854.0	393	393	393
Fathead minnow	12	26.7	13.5	1.1	0.3	1.7	47	36	54
Green sunfish	16	35.6	98.8	6.2	0.5	13.8	64	30	89
Orangespotted sunfish	12	26.7	6.9	0.6	0.2	1.3	33	26	43
Orangespotted x pumpkinseed	1	2.2	1.4	1.4	1.4	1.4	43	43	43
Yellow bullhead	1	2.2	2.0	2.0	2.0	2.0	50	50	50
Totals	45	100.0	992.3						

AIII-3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIII-4

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED
UPSTREAM OF THE RESERVOIR ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 16, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	2	6.5	3.0	1.5	1.2	1.8	44	42	46
Carp	2	6.5	1,025.0	512.5	400.0	625.0	320	300	340
Fathead minnow	1	3.2	1.7	1.7	1.7	1.7	54	54	54
Green sunfish	7	22.6	43.9	6.3	1.8	11.7	69	45	86
Orangespotted sunfish	14	45.2	11.7	0.8	0.2	3.5	35	27	57
White sucker	5	16.1	879.3	175.9	85.8	289.0	244	207	292
Totals	31	100.0	1,964.6						

AIII-4

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIII-5

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 17, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	3	7.0	147.0	49.0	28.6	71.3	158	136	179
Bluegill	9	20.9	96.4	10.7	4.5	16.1	87	66	105
Carp	1	2.3	727.0	727.0	727.0	727.0	390	390	390
Gizzard shad	2	4.7	26.8	13.4	11.9	14.9	120	115	124
Golden shiner	1	2.3	4.6	4.6	4.6	4.6	81	81	81
Green sunfish	12	27.9	135.0	11.3	5.0	30.3	80	66	115
Orangespotted sunfish	11	25.6	28.8	2.6	0.2	8.7	46	24	76
White sucker	1	2.3	102.0	102.0	102.0	102.0	214	214	214
Yellow bullhead	3	7.0	87.5	29.2	17.8	42.0	131	112	150
Totals	43	100.0	1,355.1						

AIII-5

APPENDIX AIV

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF
FISH COLLECTED FROM THE WEST BRANCH OF THE DUPAGE RIVER
DURING OCTOBER 24-NOVEMBER 2, 1994

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIV-1

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 24, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	5	3.0	3.4	0.7	0.5	1.1	36	33	43
Carp	1	0.6	64.8	64.8	64.8	64.8	163	163	163
Fathead minnow	8	4.8	28.9	3.6	2.5	6.2	66	60	76
Green sunfish	40	23.8	304.8	7.8	1.0	41.2	68	38	130
Green sunfish x orangespotted	8	4.8	19.6	2.5	0.6	5.5	49	33	66
Mosquitofish	2	1.2	0.3	0.2	0.1	0.2	26	22	30
Orangespotted sunfish	102	60.7	104.0	1.0	0.4	2.1	39	30	49
Pumpkinseed	1	0.6	2.0	2.0	2.0	2.0	48	48	48
White sucker	1	0.6	77.7	77.7	77.7	77.7	192	192	192
Totals	168	100.0	605.6						

AIV-1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIV-2

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 26, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Fathead minnow	7	7.8	14.8	2.1	1.4	2.6	56	49	60
Green sunfish	49	54.4	483.7	9.9	1.3	29.7	76	41	115
Green sunfish x orangespotted	14	15.6	75.7	5.4	2.8	6.8	65	54	71
Green sunfish x pumpkinseed	2	2.2	19.7	9.9	9.8	9.9	79	78	79
Orangespotted sunfish	4	4.4	8.8	2.2	1.4	3.1	49	43	55
White sucker	13	14.4	1,346.2	103.6	22.2	235.0	200	130	285
Yellow bullhead	1	1.1	6.7	6.7	6.7	6.7	83	83	83
Totals	90	100.0	1,955.5						

AIV-2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIV-3

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
WALNUT STREET ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 28, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Fathead minnow	8	18.2	19.1	2.4	1.5	3.4	59	53	65
Green sunfish	13	29.5	178.5	13.7	1.1	40.8	85	41	125
Green sunfish x orangespotted	2	4.5	17.1	8.6	6.5	10.6	78	70	86
Green sunfish x pumpkinseed	1	2.3	8.5	8.5	8.5	8.5	75	75	75
Orangespotted sunfish	15	34.1	22.3	1.5	0.7	2.2	44	36	52
White sucker	4	9.1	589.1	147.3	37.9	216.6	230	152	271
Yellow bullhead	1	2.3	7.5	7.5	7.5	7.5	86	86	86
Totals	44	100.0	842.2						

AIV-3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIV-4

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED
UPSTREAM OF THE RESERVOIR ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 28, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Carp	12	10.5	1,130.5	94.2	14.0	750.0	142	87	360
Fathead minnow	7	6.1	19.3	2.8	1.4	4.3	63	51	73
Green sunfish	1	0.9	22.3	22.3	22.3	22.3	105	105	105
Orangespotted sunfish	81	71.1	189.8	2.3	0.6	10.4	50	34	82
White sucker	12	10.5	2,052.9	171.1	19.5	302.0	242	122	278
Yellow bullhead	1	0.9	36.0	36.0	36.0	36.0	146	146	146
Totals	114	100.0	3,450.8						

AIV-4

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AIV-5

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER,
NOVEMBER 2, 1994

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Alewife	1	1.1	0.3	0.3	0.3	0.3	38	38	38
Black bullhead	1	1.1	119.0	119.0	119.0	119.0	196	196	196
Bluntnose minnow	2	2.3	2.3	1.1	0.5	1.8	48	39	57
Carp	7	8.0	2,224.2	317.7	21.1	1,992.0	187	105	535
Fathead minnow	4	4.5	12.4	3.1	1.5	6.0	62	51	77
Green sunfish	24	27.3	164.3	6.9	1.0	22.0	66	38	105
Green sunfish x orangespotted	1	1.1	3.2	3.2	3.2	3.2	58	58	58
Mosquitofish	3	3.4	2.9	1.0	0.6	1.3	43	36	46
Orangespotted sunfish	19	21.6	46.9	2.5	0.8	6.2	50	36	70
White sucker	25	28.4	3,519.4	140.8	17.0	270.0	226	115	291
Yellow bullhead	1	1.1	52.9	52.9	52.9	52.9	160	160	160
Totals	88	100.0	6,147.8						

AIV-5

APPENDIX AV

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF
FISH COLLECTED FROM THE WEST BRANCH OF THE DUPAGE RIVER
DURING AUGUST 8-21, 1995

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AV-1

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 8, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	2	0.7	23.8	11.9	3.2	20.6	124	124	124
Black crappie	3	1.1	3.8	1.3	1.0	1.4	47	44	50
Bluegill	118	43.7	76.3	0.7	0.1	3.1	33	22	61
Carp	1	0.4	9.5	9.5	9.5	9.5	87	87	87
Creek chub	3	1.1	5.3	1.8	1.5	2.1	53	51	56
Fathead minnow	18	6.7	26.4	1.5	0.6	5.4	49	38	76
Golden shiner	6	2.2	12.8	2.1	0.7	7.1	56	44	88
Green sunfish	51	18.9	378.6	7.4	1.1	24.6	72	40	107
Green sunfish x orangespotted	8	3.0	19.9	2.5	0.3	7.3	42	24	71
Largemouth bass	19	7.0	43.8	2.3	0.6	7.2	54	36	85
Orangespotted sunfish	37	13.7	139.2	3.8	1.1	7.4	58	40	78
Pumpkinseed	2	0.7	4.2	2.1	1.1	3.1	48	41	55
White sucker	1	0.4	193.6	193.6	193.6	193.6	257	257	257
Yellow bullhead	1	0.4	23.2	23.2	23.2	23.2	123	123	123
Totals	270	100.0	960.2						

AV-1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AV-2

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 9, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	1	1.9	85.0	85.0	85.0	85.0	185	185	185
Bluegill	9	17.0	18.6	2.1	0.3	15.4	40	31	103
Carp	1	1.9	879.1	879.1	879.1	879.1	402	402	402
Green sunfish	27	50.9	333.1	12.3	0.9	31.3	82	34	120
Green sunfish x orangespotted	7	13.2	127.1	18.2	4.0	30.0	87	59	105
Orangespotted sunfish	2	3.8	12.0	6.0	4.3	7.7	68	65	71
White sucker	6	11.3	673.7	112.3	6.6	206.9	194	80	273
Totals	53	100.0	2,128.5						

AV-2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AV-3

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
WALNUT STREET ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 10, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	1	1.2	2.8	2.8	2.8	2.8	61	61	61
Bluegill	22	27.2	13.1	0.6	0.2	2.7	33	26	60
Carp	2	2.5	2,749.0	1,374.5	696.0	2,053.0	459	379	538
Creek chub	6	7.4	11.7	2.0	1.5	2.3	54	52	56
Fathead minnow	14	17.3	14.5	1.0	0.6	1.7	45	40	54
Golden shiner	4	4.9	5.5	1.4	0.4	2.6	50	39	62
Green sunfish	9	11.1	84.5	9.4	3.3	18.1	79	58	98
Green sunfish x orangespotted	2	2.5	32.1	16.0	6.3	25.8	84	67	100
Largemouth bass	5	6.2	14.9	3.0	1.9	4.3	62	52	73
Orangespotted sunfish	15	18.5	34.2	2.3	0.9	6.7	50	39	78
White sucker	1	1.2	5.5	5.5	5.5	5.5	74	74	74
Totals	81	100.0	2967.78						

AV-3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AV-4

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED
UPSTREAM OF THE RESERVOIR ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 11, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	23	41.1	20.8	0.9	0.3	5.3	39	30	73
Carp	1	1.8	578.0	578.0	578.0	578.0	330	330	330
Fathead minnow	8	14.3	9.8	1.2	0.8	1.7	47	42	52
Golden shiner	3	5.4	11.8	3.9	1.2	8.9	67	50	96
Green sunfish	7	12.5	81.5	11.6	3.7	30.9	83	61	118
Green sunfish x orangespotted	1	1.8	26.3	26.3	26.3	26.3	100	100	100
Largemouth bass	1	1.8	2.5	2.5	2.5	2.5	62	62	62
Orangespotted sunfish	10	17.9	44.2	4.4	1.2	7.0	64	45	75
Pumpkinseed	1	1.8	0.6	0.6	0.6	0.6	33	33	33
White sucker	1	1.8	359.0	359.0	359.0	359.0	322	322	322
Totals	56	100.0	1,134.4						

AV-4

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AV-5

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER,
AUGUST 21, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	1	3.4	2.8	2.8	2.8	2.8	63	63	63
Bluegill	5	17.2	4.5	0.9	0.5	1.2	40	34	44
Carp	2	6.9	1,198.2	599.1	23.2	1,175.0	282	120	444
Fathead minnow	2	6.9	2.4	1.2	0.6	1.8	46	39	53
Gizzard shad	10	34.5	95.9	9.6	6.0	14.2	104	89	118
Green sunfish	4	13.8	38.0	9.5	5.5	14.1	81	69	90
Largemouth bass	1	3.4	2.8	2.8	2.8	2.8	59	59	59
Orangespotted sunfish	2	6.9	4.1	2.1	0.8	3.3	48	36	60
White sucker	2	6.9	392.0	196.0	191.0	201.0	267	264	269
Totals	29	100.0	1,740.6						

AV-5

APPENDIX AVI

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF
FISH COLLECTED FROM THE WEST BRANCH OF THE DUPAGE RIVER
DURING SEPTEMBER 27-OCTOBER 3, 1995

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVI-1

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER,
SEPTEMBER 27, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Black bullhead	3	0.9	16.3	5.4	4.6	5.9	75	72	80
Bluegill	143	44.4	187.3	1.3	0.4	3.2	43	29	60
Bluntnose minnow	1	0.3	6.9	6.9	6.9	6.9	87	87	87
Carp	6	1.9	128.5	21.4	16.2	32.1	112	103	131
Creek chub	10	3.1	92.0	9.2	2.5	55.3	80	60	165
Fathead minnow	12	3.7	29.5	2.5	1.6	4.3	60	54	71
Green sunfish	111	34.5	811.3	7.3	0.5	41.4	69	28	130
Green sunfish x orangespotted	7	2.2	54.3	7.8	2.1	14.0	75	51	91
Green sunfish x pumpkinseed	3	0.9	4.7	1.6	0.7	3.2	46	36	56
Largemouth bass	3	0.9	16.0	5.3	2.8	6.6	75	59	85
Orangespotted sunfish	18	5.6	34.9	1.9	1.3	4.4	48	41	65
Pumpkinseed	3	0.9	8.4	2.8	2.2	3.3	55	51	58
Yellow bullhead	2	0.6	113.6	56.8	23.0	90.6	163	125	200
Totals	322	100.0	1,503.4						

AVI-1

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVI-2

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER,
SEPTEMBER 28, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	2	2.7	7.7	3.9	3.5	4.2	63	62	64
Creek chub	3	4.1	176.5	58.8	7.7	120.5	155	89	212
Golden shiner	1	1.4	12.0	12.0	12.0	12.0	105	105	105
Green sunfish	40	54.1	417.5	10.4	1.2	29.0	82	39	117
Green sunfish x orangespotted	19	25.7	272.8	14.4	6.2	27.5	90	72	115
Orangespotted sunfish	2	2.7	12.6	6.3	3.5	9.1	69	57	80
White sucker	5	6.8	712.6	142.5	28.6	268.0	225	127	290
Yellow bullhead	2	2.7	75.5	37.8	6.5	69.0	129	82	175
Totals	74	100.0	1,687.3						

AVI-2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVI-3

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
WALNUT STREET ON THE WEST BRANCH OF THE DUPAGE RIVER,
SEPTEMBER 29, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	32	32.7	97.5	3.1	0.6	7.7	57	35	76
Creek chub	4	4.1	20.3	5.1	4.6	5.6	76	73	78
Fathead minnow	7	7.1	16.4	2.3	1.5	3.5	58	52	65
Golden shiner	4	4.1	19.4	4.9	2.2	10.3	76	63	100
Green sunfish	40	40.8	361.1	9.0	1.5	23.1	76	43	112
Green sunfish x orangespotted	1	1.0	29.4	29.4	29.4	29.4	107	107	107
Green sunfish x pumpkinseed	1	1.0	3.9	3.9	3.9	3.9	59	59	59
Largemouth bass	3	3.1	36.5	12.2	4.9	22.3	98	78	124
Orangespotted sunfish	4	4.1	15.8	4.0	2.9	5.0	64	60	67
White sucker	2	2.0	576.0	288.0	229.0	347.0	290	275	304
Totals	98	100.0	1,176.4						

AVI-3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVI-4

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED
UPSTREAM OF THE RESERVOIR ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 2, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	12	20.3	60.2	5.0	0.7	26.7	61	38	118
Carp	1	1.7	684.0	684.0	684.0	684.0	369	369	369
Creek chub	1	1.7	67.3	67.3	67.3	67.3	176	176	176
Fathead minnow	4	6.8	9.2	2.3	1.5	3.1	59	53	66
Golden shiner	9	15.3	67.9	7.5	1.1	17.4	85	52	116
Green sunfish	16	27.1	117.6	7.4	2.3	18.8	74	51	100
Green sunfish x orangespotted	1	1.7	7.3	7.3	7.3	7.3	71	71	71
Largemouth bass	2	3.4	13.2	6.6	5.6	7.6	83	77	88
Orangespotted x pumpkinseed	2	3.4	8.4	4.2	3.9	4.5	60	58	62
Orangespotted sunfish	8	13.6	29.4	3.7	2.3	7.0	60	53	74
Pumpkinseed	1	1.7	4.0	4.0	4.0	4.0	64	64	64
White sucker	2	3.4	671.0	335.5	183.0	488.0	305	257	353
Totals	59	100.0	1,739.3						

AVI-4

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVI-5

RELATIVE ABUNDANCE, SPECIES COMPOSITION, WEIGHT, AND LENGTH OF FISH COLLECTED AT
THE COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER,
OCTOBER 3, 1995

Fish Species	Relative Abundance (number)	Species Composition (percent)	Collection Weight (grams)	Body Weight (grams)			Total Length (mm)		
				Mean	Minimum	Maximum	Mean	Minimum	Maximum
Bluegill	10	17.5	26.3	2.6	2.0	3.8	57	51	67
Bluntnose minnow	8	14.0	39.0	4.9	2.0	7.6	75	58	86
Carp	3	5.3	3,521.0	1,173.7	46.0	1,971.0	376	147	495
Creek chub	1	1.8	73.7	73.7	73.7	73.7	179	179	179
Fathead minnow	10	17.5	22.0	2.2	1.2	3.6	57	48	70
Golden shiner	1	1.8	3.5	3.5	3.5	3.5	71	71	71
Green sunfish	7	12.3	46.3	6.6	1.4	15.9	68	44	95
Largemouth bass	2	3.5	7.8	3.9	3.2	4.6	72	67	76
Orangespotted sunfish	9	15.8	48.9	5.4	1.6	8.5	67	46	80
Sand shiner	1	1.8	3.6	3.6	3.6	3.6	70	70	70
White sucker	5	8.8	494.5	98.9	14.5	248.0	187	106	296
Totals	57	100.0	4,286.6						

AVI-5

APPENDIX AVII

INDEX OF BIOTIC INTEGRITY FOR FISH COLLECTIONS FROM THE
DUPAGE RIVER DURING 1994 AND 1995

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVII-1

METRICS USED IN THE CALCULATION OF THE INDEX OF BIOTIC INTEGRITY (IBI) FOR LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

IBI Metric	8/10/94		10/24/94		8/8/95		9/27/95	
	BP	SEINE	BP	SEINE	BP	SEINE	BP	SEINE
----- Actual Data -----								
Species Per Sample	5	5	8	5	11	9	11	6
Sucker Species	1	0	1	0	1	0	0	0
Sunfish Species	4	4	4	3	3	4	4	3
Darter Species	0	0	0	0	0	0	0	0
Intolerant Species	0	0	0	0	0	0	0	0
% Green Sunfish	32	13	29	14	34	4	37	19
% Hybrids	18	13	3	9	0	6	3	7
% Diseased	0	0	1	0	<1	1	<1	0
% Omnivores	0	3	5	5	6	12	6	2
% Insectivorous								
Cyprinids	0	0	0	0	2	1	4	0
% Carnivores	0	0	0	0	10	6	1	0
Total Fish	68	32	110	58	131	139	279	43
Shock time (min)	13	-	18	-	14	-	17	-
----- Corresponding Score ¹ -----								
Species Per Sample	1	1	3	1	5	3	5	3
Sucker Species	1	1	1	1	1	1	1	1
Sunfish Species	5	5	5	5	5	5	5	5
Darter Species	1	1	1	1	1	1	1	1
Intolerant Species	1	1	1	1	1	1	1	1
% Green Sunfish	1	3	1	3	1	5	1	3
% Hybrids	1	1	1	1	5	1	1	1
% Diseased	5	5	3	5	3	3	3	5
% Omnivores	5	5	5	5	5	5	5	5
% Insectivorous								
Cyprinids	1	0	1	1	1	1	1	1
% Carnivores	1	1	1	1	5	5	3	1
Abundance	1	1	3	1	3	3	5	1
IBI	24	26	26	26	36	34	32	28

¹Metric scores based on the West Branch of the DuPage River at Longmeadow Lane, a second order stream in the Northeast Illinois Region.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVII-2

METRICS USED IN THE CALCULATION OF THE INDEX OF BIOTIC INTEGRITY (IBI) FOR THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

IBI Metric	8/12/94		10/26/94		8/9/95		9/28/95	
	BP	SEINE	BP	SEINE	BP	SEINE	BP	SEINE
----- Actual Data -----								
Species Per Sample	6	1	5	3	5	3	7	1
Sucker Species	1	0	1	1	1	0	1	0
Sunfish Species	2	0	2	1	2	3	3	1
Darter Species	0	0	0	0	0	0	0	0
Intolerant Species	0	0	0	0	0	0	0	0
% Green Sunfish	61	0	58	0	62	9	54	50
% Hybrids	8	0	19	0	12	1	25	50
% Diseased	3	0	4	0	7	0	3	0
% Omnivores	5	100	5	60	2	0	1	0
% Insectivorous								
Cyprinids	5	0	0	0	0	0	4	0
% Carnivores	0	0	0	0	0	0	0	0
Total Fish	38	2	85	5	42	11	72	2
Shock time (min)	15	-	21	-	18	-	24	-
----- Corresponding Score ¹ -----								
Species Per Sample	3	1	1	1	1	1	3	1
Sucker Species	1	1	1	1	1	1	1	1
Sunfish Species	5	1	5	3	5	5	5	3
Darter Species	1	1	1	1	1	1	1	1
Intolerant Species	1	1	1	1	1	1	1	1
% Green Sunfish	1	5	1	5	1	3	1	1
% Hybrids	1	5	1	5	1	1	1	1
% Diseased	1	5	1	5	1	5	1	5
% Omnivores	5	1	5	1	5	5	5	5
% Insectivorous								
Cyprinids	1	1	1	1	1	1	1	1
% Carnivores	1	1	1	1	1	1	1	1
Abundance	1	1	1	1	1	1	1	1
IBI	22	24	20	26	20	26	22	22

¹Metric scores based on the West Branch of the DuPage River at the Footbridge, a second order stream in the Northeast Illinois Region.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVII-3

METRICS USED IN THE CALCULATION OF THE INDEX OF BIOTIC INTEGRITY (IBI) FOR WALNUT AVENUE ON THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

IBI Metric	8/15/94		10/28/94		8/10/95		9/29/95	
	BP	SEINE	BP	SEINE	BP	SEINE	BP	SEINE
----- Actual Data -----								
Species Per Sample	5	4	5	2	9	7	6	6
Sucker Species	0	0	1	0	1	0	1	0
Sunfish Species	2	3	2	1	3	3	3	3
Darter Species	0	0	0	0	0	0	0	0
Intolerant Species	0	0	0	0	0	0	0	0
% Green Sunfish	58	5	32	0	12	6	57	6
% Hybrids	8	0	7	0	3	0	3	0
% Diseased	0	0	0	0	2	6	1	6
% Omnivores	8	58	15	67	26	19	10	13
% Insectivorous								
Cyprinids	0	0	0	0	8	6	3	6
% Carnivores	0	0	0	0	6	6	0	10
Total Fish	26	19	41	3	65	16	67	31
Shock time (min)	14	-	16	-	13	-	17	-
Stream Order	2	2	2	2	2	2	2	2
Stream Basin	2	2	2	2	2	2	2	2
----- Corresponding Score ¹ -----								
Species Per Sample	1	1	1	1	3	3	3	3
Sucker Species	1	1	1	1	1	1	1	1
Sunfish Species	5	5	5	3	5	5	5	5
Darter Species	1	1	1	1	1	1	1	1
Intolerant Species	1	1	1	1	1	1	1	1
% Green Sunfish	1	3	1	5	3	3	1	3
% Hybrids	1	5	1	5	1	5	1	5
% Diseased	5	5	5	5	1	1	1	1
% Omnivores	5	1	5	1	3	5	5	5
% Insectivorous								
Cyprinids	1	1	1	1	1	1	1	1
% Carnivores	1	1	1	1	5	5	1	5
Abundance	1	1	1	1	1	1	1	1
IBI	24	26	24	26	26	32	22	32

¹Metric scores based on the West Branch of the DuPage River at Walnut Avenue, a second order stream in the Northeast Illinois Region.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVII-4

METRICS USED IN THE CALCULATION OF THE INDEX OF BIOTIC INTEGRITY
(IBI) UPSTREAM OF THE DUPAGE RESERVOIR ON THE WEST BRANCH OF
THE DUPAGE RIVER DURING 1994 AND 1995

IBI Metric	8/16/94		10/28/94		8/11/95		10/2/95	
	BP	SEINE	BP	SEINE	BP	SEINE	BP	SEINE
----- Actual Data -----								
Species Per Sample	4	4	5	4	8	5	7	8
Sucker Species	1	0	1	1	1	0	1	0
Sunfish Species	2	3	1	2	4	2	3	4
Darter Species	0	0	0	0	0	0	0	0
Intolerant Species	0	0	0	0	0	0	0	0
% Green Sunfish	24	20	0	1	23	0	38	20
% Hybrids	0	0	0	0	0	4	4	6
% Diseased	5	0	0	0	3	0	4	3
% Omnivores	10	10	37	7	10	36	29	20
% Insectivorous								
Cyprinids	0	0	0	0	0	0	0	3
% Carnivores	0	0	0	0	0	4	0	6
Total Fish	21	10	38	76	31	25	24	35
Shock time (min)	24	-	21	-	14	-	20	-
----- Corresponding Score ¹ -----								
Species Per Sample	1	1	1	1	3	1	3	3
Sucker Species	1	1	1	1	1	1	1	1
Sunfish Species	5	5	3	5	5	5	5	5
Darter Species	1	1	1	1	1	1	1	1
Intolerant Species	1	1	1	1	1	1	1	1
% Green Sunfish	1	3	5	5	1	5	1	3
% Hybrids	5	5	5	5	5	1	1	1
% Diseased	1	5	5	5	1	5	1	1
% Omnivores	5	5	3	5	5	3	3	3
% Insectivorous								
Cyprinids	1	1	1	1	1	1	1	1
% Carnivores	1	1	1	1	1	3	1	5
Abundance	1	1	1	1	1	1	1	1
IBI	24	30	28	32	26	28	20	26

¹Metric scores based on the West Branch of the DuPage River upstream of the DuPage Reservoir, a second order stream in the Northeast Illinois Region.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVII-5

METRICS USED IN THE CALCULATION OF THE INDEX OF BIOTIC INTEGRITY (IBI) FOR COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

IBI Metric	8/17/94		11/2/94		8/21/95		10/3/95	
	BP	SEINE	BP	SEINE	BP	SEINE	BP	SEINE
----- Actual Data -----								
Species Per Sample	8	4	7	7	7	4	7	10
Sucker Species	1	0	1	1	1	0	1	1
Sunfish Species	3	2	2	2	3	1	3	3
Darter Species	0	0	0	0	0	0	0	0
Intolerant Species	0	0	0	0	0	0	0	0
% Green Sunfish	36	0	37	4	31	0	35	3
% Hybrids	0	0	2	0	0	0	0	0
% Diseased	12	10	0	0	8	0	0	3
% Omnivores	6	20	13	21	23	69	24	45
% Insectivorous								
Cyprinids	0	0	0	0	0	0	0	5
% Carnivores	0	0	0	0	0	6	0	5
Total Fish	33	10	63	24	13	16	17	40
Shock time (min)	23	-	18	-	17	-	15	-
----- Corresponding Score ¹ -----								
Species Per Sample	3	1	3	3	3	1	3	3
Sucker Species	1	1	1	1	1	1	1	1
Sunfish Species	5	5	5	5	5	3	5	5
Darter Species	1	1	1	1	1	1	1	1
Intolerant Species	1	1	1	1	1	1	1	1
% Green Sunfish	1	5	1	5	1	5	1	5
% Hybrids	5	5	1	5	5	5	5	5
% Diseased	1	1	5	5	1	5	5	1
% Omnivores	5	3	5	3	3	1	3	3
% Insectivorous								
Cyprinids	1	1	1	1	1	1	1	1
% Carnivores	1	1	1	1	1	5	1	3
Abundance	1	1	1	1	1	1	1	1
IBI	26	26	26	32	24	30	28	30

¹Metric scores based on the West Branch of the DuPage River at the Cook/DuPage County Line, a second order stream in the Northeast Illinois Region.

APPENDIX AVIII

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE
TIME OF FISH COLLECTIONS FROM THE WEST BRANCH OF THE
DUPAGE RIVER DURING 1994 AND 1995

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVIII-1

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE TIME OF FISH COLLECTIONS AT
LONGMEADOW LANE ON THE WEST BRANCH OF THE DUPAGE RIVER
DURING 1994 AND 1995

Water Quality Constituent	Date of Sample Collection				IPCB Standard ^a	Percent Compliance ^b
	8/10/94	10/24/94	8/8/95	9/27/95		
	----- Analytical Value -----					
Temperature (°C)	18.8	10	24	15	32.2	100
Hardness (mg/L as CaCO ₃)	160	243	222	219	NS	NA
Dissolved Oxygen (mg/L)	8.9	8.45	7.57	7.14	5.0	100
pH (units)	7.27	7.5	7.64	7.91	6.5-9.0	100
Total NH ₄ -N (mg/L)	0.2	0.0	0.1	0.1	1.5	100
Un-ionized NH ₃ -N (mg/L)	0.002	<0.000	0.003	0.003	0.04	100
NO ₂ +NO ₃ -N (mg/L)	0.07	0.08	0.81	0.22	NS	NA
Arsenic (mg/L)	<0.1	<0.1	<0.2	<0.2	1.0	100
Boron (mg/L)	0.07	0.22	0.09	0.10	NS	NA
Cadmium (mg/L)	<0.003	<0.003	<0.003	<0.003	0.05	100
Total Residual Chlorine (mg/L)	<0.01	<0.01	<0.01	<0.01	NS	NA
Chromium (Tri) (mg/L)	<0.006	<0.006	<0.006	<0.006	1.0	100
Chromium (Hex) (mg/L)	<0.002	<0.002	0.0006	<0.0004	1.0	100
Copper (mg/L)	<0.003	<0.003	<0.003	<0.003	0.02	100
Cyanide (mg/L)	0.003	0.001	0.006	0.003	0.025	100
Fluoride (mg/L)	0.95	0.68	0.32	0.62	1.4	100
Iron (mg/L)	0.84	1.76	1.01	1.21	1.0	25
MBAS (mg/L)	0.008	0.005	0.006	0.005	NS	NA
Lead (mg/L)	<0.06	<0.06	<0.05	<0.05	0.1	100
Manganese (mg/L)	0.05	0.09	0.04	0.05	1.0	100
Mercury (µg/L)	<0.2	<0.2	<0.2	0.3	0.5	100
Nickel (mg/L)	<0.03	<0.03	<0.03	<0.03	1.0	100
Phenol (mg/L)	<0.002	<0.002	<0.002	0.002	0.1	100
Silver (mg/L)	<0.003	<0.003	<0.003	<0.003	0.005	100
Zinc (mg/L)	0.026	0.018	<0.006	<0.006	1.0	100

^a1994-1995 Standards, NS = No Standard.

^bNA = Not Applicable.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVIII-2

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE TIME OF FISH COLLECTIONS AT THE FOOTBRIDGE ON THE WEST BRANCH OF THE DUPAGE RIVER DURING 1994 AND 1995

Water Quality Constituent	Date of Sample Collection				IPCB Standard ^a	Percent Compliance ^b
	8/12/94	10/26/94	8/9/95	9/28/95		
	----- Analytical Value -----					
Temperature (°C)	19.6	16	23	21	32.2	100
Hardness (mg/L as CaCO ₃)	247	191	245	199	NS	NA
Dissolved Oxygen (mg/L)	7.5	7.39	7.26	7.65	5.0	100
pH (units)	7.03	7.99	7.68	7.65	6.5-9.0	100
Total NH ₄ -N (mg/L)	0.1	0.0	0.0	0.1	1.5	100
Un-ionized NH ₃ -N (mg/L)	0.001	<0.000	<0.000	0.002	0.4	100
NO ₂ +NO ₃ -N (mg/L)	10.28	17.24	9.32	10.99	NS	NA
Arsenic (mg/L)	<0.1	<0.1	<0.2	<0.2	1.0	100
Boron (mg/L)	0.43	0.75	0.37	0.45	NS	NA
Cadmium (mg/L)	<0.003	<0.005	0.010	<0.003	0.05	100
Total Residual Chlorine	<0.01	<0.01	<0.01	<0.01	NS	NA
Chromium (Tri) (mg/L)	<0.006	<0.006	<0.006	<0.006	1.0	100
Chromium (Hex) (mg/L)	<0.002	<0.002	0.0005	<0.0004	1.0	100
Copper (mg/L)	0.010	0.020	0.010	0.010	0.02	100
Cyanide (mg/L)	0.013	0.019	0.015	0.014	0.025	100
Fluoride (mg/L)	0.96	1.03	0.89	0.98	1.4	100
Iron (mg/L)	0.34	0.12	0.21	0.12	1.0	100
MBAS (mg/L)	0.022	0.073	0.040	0.020	NS	NA
Lead (mg/L)	<0.06	<0.06	<0.05	<0.05	0.1	100
Manganese (mg/L)	0.02	0.01	0.01	0.02	1.0	100
Mercury (µg/L)	0.2	<0.2	<0.2	0.2	0.5	100
Nickel (mg/L)	<0.05	<0.05	<0.05	<0.05	1.0	100
Phenol (mg/L)	<0.002	<0.002	<0.002	0.002	0.1	100
Silver (mg/L)	<0.003	<0.003	<0.003	<0.003	0.005	100
Zinc (mg/L)	0.028	0.017	0.032	0.135	1.0	100

^a1994-1995 Standards, NS = No Standard.

^bNA = Not Applicable.

AVIII-2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVIII-3

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE TIME OF FISH COLLECTIONS AT
WALNUT AVENUE ON THE WEST BRANCH OF THE DUPAGE RIVER
DURING 1994 AND 1995

Water Quality Constituent	Date of Sample Collection				IPCB Standard ^a	Percent Compliance ^b
	8/15/94	10/28/94	8/10/95	9/29/95		
	----- Analytical Value -----					
Temperature (°C)	22.3	16	23	21	32.2	100
Hardness (mg/L as CaCO ₃)	226	186	223	198	NS	NA
Dissolved Oxygen (mg/L)	8.04	9.14	7.14	8.19	5.0	100
pH (units)	7.49	7.49	7.70	7.71	6.5-9.0	100
Total NH ₄ -N (mg/L)	0.4	0.1	0.1	0.1	1.5	100
Un-ionized NH ₃ -N (mg/L)	0.007	0.001	0.003	0.003	0.04	100
NO ₂ +NO ₃ -N (mg/L)	10.23	18.57	4.63	9.64	NS	NA
Arsenic (mg/L)	<0.1	<0.1	0.09	<0.2	1.0	100
Boron (mg/L)	0.36	0.56	0.20	0.40	NS	NA
Cadmium (mg/L)	<0.003	<0.003	<0.003	<0.003	0.05	100
Total Residual Chlorine	<0.01	<0.01	<0.01	<0.01	NS	NA
Chromium (Tri) (mg/L)	<0.006	<0.006	<0.006	<0.006	1.0	100
Chromium (Hex) (mg/L)	<0.002	<0.002	0.0005	<0.0004	1.0	100
Copper (mg/L)	0.010	0.010	<0.003	0.010	0.02	100
Cyanide (mg/L)	0.014	0.013	0.009	0.014	0.025	100
Fluoride (mg/L)	0.79	1.17	0.61	1.00	1.4	100
Iron (mg/L)	0.15	0.29	0.57	0.15	1.0	100
MBAS (mg/L)	0.014	0.024	0.016	0.038	NS	NA
Lead (mg/L)	<0.06	<0.06	<0.05	<0.05	0.1	100
Manganese (mg/L)	0.01	0.01	0.03	0.02	1.0	100
Mercury (µg/L)	<0.2	<0.2	<0.2	0.2	0.5	100
Nickel (mg/L)	<0.05	0.04	<0.05	<0.05	1.0	100
Phenol (mg/L)	<0.002	<0.002	0.002	0.002	0.1	100
Silver (mg/L)	<0.003	<0.003	<0.003	<0.003	0.005	100
Zinc (mg/L)	0.029	0.072	0.022	0.041	1.0	100

^a1994-1995 Standards, NS = No Standard.

^bNA = Not Applicable.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVIII-4

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE TIME OF FISH COLLECTIONS
UPSTREAM OF THE DUPAGE RESERVOIR ON THE WEST BRANCH OF THE DUPAGE RIVER
DURING 1994 AND 1995

Water Quality Constituent	Date of Sample Collection				IPCB Standard	Percent Compliance
	8/16/94	10/28/94	8/11/95	10/2/95		
	----- Analytical Value -----					
Temperature (°C)	21.4	16	24	21	32.2	100
Hardness (mg/L as CaCO ₃)	223	190	254	193	NS	NA
Dissolved Oxygen (mg/L)	8.84	11.00	7.58	8.87	5.0	100
pH (units)	7.57	7.98	7.67	7.65	6.5-9.0	100
Total NH ₄ -N (mg/L)	0.4	0.1	0.1	0.1	1.5	100
Un-ionized NH ₃ -N (mg/L)	0.008	0.003	0.003	0.002	0.04	100
NO ₂ +NO ₃ -N (mg/L)	10.58	18.61	5.17	11.15	NS	NA
Arsenic (mg/L)	<0.1	<0.1	<0.2	<0.2	1.0	100
Boron (mg/L)	0.58	0.56	0.26	0.39	NS	NA
Cadmium (mg/L)	<0.003	<0.003	<0.003	<0.003	0.05	100
Total Residual Chlorine	<0.01	<0.01	<0.01	<0.01	NS	NA
Chromium (Tri) (mg/L)	<0.006	<0.006	<0.006	<0.006	1.0	100
Chromium (Hex) (mg/L)	<0.002	<0.002	0.0005	<0.0004	1.0	100
Copper (mg/L)	0.010	0.010	0.010	<0.003	0.02	100
Cyanide (mg/L)	0.014	0.013	0.008	0.017	0.025	100
Fluoride (mg/L)	1.05	1.17	0.69	0.85	1.4	100
Iron (mg/L)	0.30	0.17	0.33	0.20	1.0	100
MBAS (mg/L)	0.033	0.007	0.016	0.042	NS	NA
Lead (mg/L)	<0.06	<0.06	<0.05	<0.05	0.1	100
Manganese (mg/L)	0.02	0.01	0.02	0.02	1.0	100
Mercury (µg/L)	<0.2	<0.2	<0.2	0.2	0.5	100
Nickel (mg/L)	<0.05	<0.05	<0.05	<0.05	1.0	100
Phenol (mg/L)	<0.002	<0.002	<0.002	<0.002	0.1	100
Silver (mg/L)	<0.003	<0.003	<0.003	<0.003	0.005	100
Zinc (mg/L)	0.052	0.039	0.022	0.039	1.0	100

^a1994-1995 Standards, NS = No Standard.

^bNA = Not Applicable.

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AVIII-5

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT THE TIME OF FISH COLLECTIONS AT THE
COOK/DUPAGE COUNTY LINE ON THE WEST BRANCH OF THE DUPAGE RIVER
DURING 1994 AND 1995

Water Quality Constituent	Date of Sample Collection				IPCB Standard	Percent Compliance
	8/17/94	11/2/94	8/21/95	10/3/95		
	----- Analytical Value -----					
Temperature (°C)	22.2	12	24	20	32.2	100
Hardness (mg/L as CaCO ₃)	217	197	260	207	NS	NA
Dissolved Oxygen (mg/L)	9.33	9.56	7.54	8.21	5.0	100
pH (units)	7.6	7.78	7.79	7.68	6.5-9.0	100
Total NH ₄ -N (mg/L)	0.3	0.2	0.2	0.1	1.5	100
Un-ionized NH ₃ -N (mg/L)	0.007	0.003	0.008	0.002	0.04	100
NO ₂ +NO ₃ -N (mg/L)	11.91	8.61	5.09	11.75	NS	NA
Arsenic (mg/L)	<0.1	<0.1	<0.2	<0.2	1.0	100
Boron (mg/L)	0.66	0.21	0.29	0.43	NS	NA
Cadmium (mg/L)	<0.005	<0.005	<0.005	<0.005	0.05	100
Total Residual Chlorine	<0.01	<0.01	<0.01	<0.01	NS	NA
Chromium (Tri) (mg/L)	<0.006	<0.006	<0.006	<0.006	1.0	100
Chromium (Hex) (mg/L)	<0.002	<0.002	0.0009	<0.0004	1.0	100
Copper (mg/L)	0.010	0.010	0.010	0.010	0.02	100
Cyanide (mg/L)	0.015	0.007	0.007	0.022	0.025	100
Fluoride (mg/L)	1.29	0.78	0.87	0.90	1.4	100
Iron (mg/L)	0.17	0.90	0.40	0.70	1.0	100
MBAS (mg/L)	0.007	0.019	0.036	0.019	NS	NA
Lead (mg/L)	<0.06	<0.06	<0.05	<0.05	0.1	100
Manganese (mg/L)	0.02	0.04	0.03	0.04	1.0	100
Mercury (µg/L)	<0.2	<0.2	<0.2	0.2	0.5	100
Nickel (mg/L)	<0.05	<0.05	<0.05	<0.05	1.0	100
Phenol (mg/L)	<0.002	<0.002	<0.002	<0.002	0.1	100
Silver (mg/L)	<0.003	<0.003	<0.003	<0.003	0.005	100
Zinc (mg/L)	0.037	0.054	0.031	0.050	1.0	100

^a1994-1995 Standards, NS = No Standard.

^bNA = Not Applicable.

AVIII-5