

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

**RESEARCH AND DEVELOPMENT
DEPARTMENT**

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*A STUDY OF THE FISHERIES RESOURCES AND
WATER QUALITY IN THE CHICAGO WATERWAY SYSTEM*

1974 THROUGH 1996

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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.

SUMMARY AND CONCLUSIONS

The Metropolitan Water Reclamation District of Greater Chicago (District) monitored the fish populations within the 81 mile long Chicago Waterway System from 1974 through 1996. A considerable improvement in the numbers of fish species, in the relative abundance of fish, and in the quality of the water occurred downstream from the District's three major water reclamation plant (WRP) effluent outfalls.

Six months after cessation of effluent chlorination on April 1, 1984, a five-fold increase in fish species and a 10-fold increase in numbers of fish occurred from one to two miles downstream of the North Side WRP effluent outfall.

A 150 percent increase in the abundance of fish and a 50 percent increase in the number of fish species occurred throughout the waterway system after the Tunnel and Reservoir Plan (TARP) went online in 1985.

The five Sidestream Elevated Pool Aeration (SEPA) Stations increased the dissolved oxygen (DO) in the Calumet River System by pumping canal water to elevated pools and allowing it to cascade back into the waterway. This attracted game fish species, such as smallmouth and largemouth bass and channel catfish, to these locations.

Water quality is now generally good downstream of the WRP effluents. Stream quality for fish improved, but is limited

by the practical considerations of providing for navigation and water reclamation in an urban environment.

The improvements in the quality of the fishery and in the water quality and stream quality of the Chicago Waterway System, are due to the effectiveness of the discontinuation of effluent chlorination at the major WRPs, TARP's prevention of waterway pollution, and increased dissolved oxygen provided by the SEPA stations.

Major measures of improvements in the fisheries resources and water quality within the waterways of the Chicago Waterway System that occurred between the 1970s and the 1990s were as follows:

1. North Shore Channel: Water quality improved from poor to good. Stream quality improved from poor to fair. Total fish species increased from 21 to 34. Game fish species increased from 11 to 15. Total weight of fish catch increased from 15 to 22 pounds per 30 minutes. Total number of fish increased from 39 to 246 per 30 minutes.
2. North Branch of the Chicago River: Water quality improved from poor to good. Stream quality improved from poor to fair. Total fish species increased from 10 to 22. Game fish species increased from 3 to 9. Total weight of fish catch increased from less than 1 pound to 36 pounds

per 30 minutes. Total number of fish increased from 1 to 53 per 30 minutes.

3. Chicago River: Water quality remained good. Stream quality remained fair. Total fish species increased from 21 to 32. Game fish species increased from 11 to 15. Total weight of fish catch increased from 16 pounds to 65 pounds per 30 minutes. Total number of fish increased from 23 to 71 per 30 minutes.
4. Chicago Sanitary and Ship Canal: Water quality improved from poor to good. Stream quality improved from poor to fair. Total fish species increased from 5 to 25. Game fish species increased from 2 to 10. Total weight of fish catch increased from 1 to 79 pounds per 30 minutes. Total number of fish increased from 2 to 88 per 30 minutes.
5. Calumet River: Water quality remained good. Stream quality remained fair. Total fish species increased from 15 to 33. Game fish species increased from 7 to 15. Total weight of fish catch increased from 21 pounds to 53 pounds per 30 minutes. Total number of fish increased from 86 to 119 per 30 minutes.
6. Little Calumet River: Water quality improved from poor to fair. Stream quality remained

fair. Total fish species increased from 14 to 20. Game fish species increased from 4 to 9. Total weight of fish catch increased from 14 to 49 pounds per 30 minutes. Total number of fish increased from 33 to 82 per 30 minutes.

7. Cal-Sag Channel: Water quality improved from very poor to fair. Stream quality improved from poor to fair. Total fish species increased from 12 to 24. Game fish species increased from 3 to 9. Total weight of fish catch increased from less than 1 pound to 20 pounds per 30 minutes. Total number of fish increased from 4 to 32 per 30 minutes.

The following conclusions were drawn from this study:

1. The discontinuation of effluent chlorination at the District's major WRPs, TARP's prevention of waterway pollution, and the increased dissolved oxygen provided by the SEPA stations, have directly benefited the fisheries by improving the water and stream quality of the Chicago Waterway System.
2. The abundance and species richness of the fish populations have increased in every one of the seven waterway segments of the Chicago Waterway System from 1974 through 1996.

3. Numbers of game fish species have increased in all waterway segments of the Chicago Waterway System from 1974 through 1996. Harvestable size game fish in the waterways now include northern pike, white bass, white perch, rock bass, green sunfish, pumpkinseed sunfish, bluegill, smallmouth and largemouth bass, white and black crappie, and yellow perch, as well as the rainbow, brook, brown and lake trout and coho and chinook salmon that enter the waterway system from Lake Michigan.
4. The cessation of WRP final effluent chlorination removed toxic chlorine and chloramines from the waterways downstream of the three major WRP outfalls which resulted in considerable improvement in the fish populations because of the absence of these toxicants.
5. TARP similarly removed the mixture of raw sewage and storm water that flowed into the waterways during every storm event (an average of once every four days), thus removing a significant quantity of materials that exert biochemical oxygen demand and toxicity. This also caused a dramatic improvement in conditions for maintaining healthy fish populations.

6. The SEPA stations increased the dissolved oxygen levels in the waterways and attracted desirable species of fish to areas where they were not previously collected.
7. Because of improvements in the collection and treatment of wastewater by the District, the water quality for fish in the Chicago Waterway System is now, theoretically, of a quality good enough to support balanced fish populations. This is of itself a major accomplishment and indicates commendable environmental stewardship by the District. Such water quality improvement helps to protect the fisheries resources downstream, especially those of the Illinois River.
8. Even though the water quality is generally good, the fish populations of the Chicago Waterway System are still dominated by omnivores, tolerant forms, and habitat generalists. This is primarily because water quality alone does not take into concern the condition of habitat, flow, or other outside factors. The waterways of the Chicago Waterway System were not constructed to be fishable streams with diverse habitat types. They were built for navigation and water reclamation. It is unlikely that these waterways can achieve the same stream

quality for fish as a natural habitat-rich waterway unless desirable fish habitat is created, such as the unique habitat that the SEPA waterfall tailraces provide.

INTRODUCTION

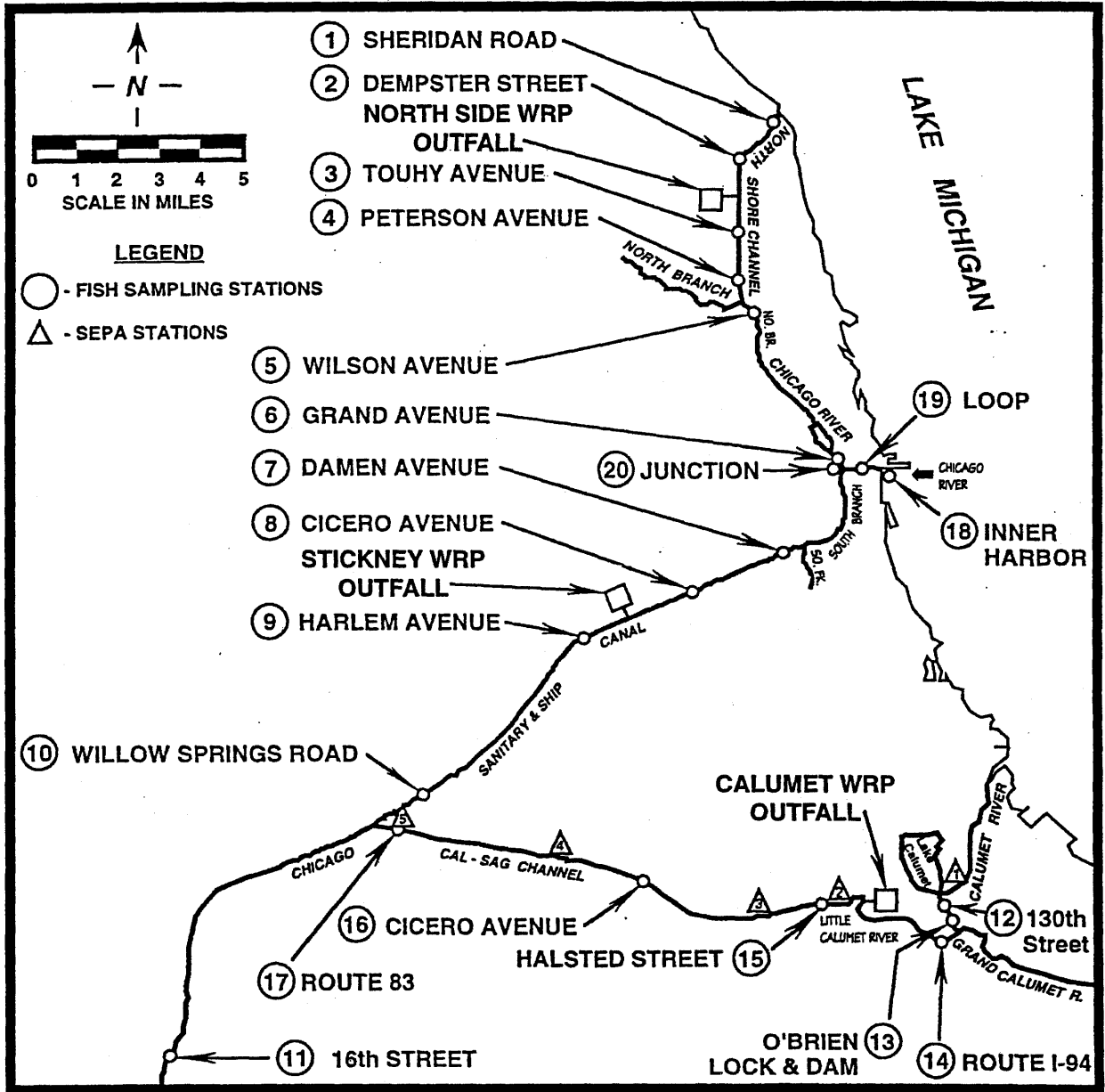
The Metropolitan Water Reclamation District of Greater Chicago (District) serves an area of 872 square miles. The area is highly urbanized and industrialized. The District treats a total domestic and nondomestic wastewater load that is equivalent to a population of 9.5 million people. Approximately 375 square miles of the District's area is served by combined sewers, with the remainder served by storm sewers or is unsewered. The District presently owns and operates seven water reclamation plants (WRPs) which all utilize the biological activated sludge process, and approximately 537 miles of intercepting sewers. The North Side, Stickney, Calumet and Lemont WRPs together have 1889 MGD of secondary capacity. The Hanover, Egan and Kirie WRPs have a combined tertiary capacity of 114 MGD (1).

In order to protect the area's primary water supply, Lake Michigan, the flow of the Chicago River System was reversed in 1900 and the Calumet River System was reversed in 1922. Fifty-four miles of navigable canals were constructed and connected to existing river systems to form the 81 mile long Chicago Waterway System (Figure 1). The District's Research and Development Department has conducted electrofishing surveys to monitor the species composition, distribution and relative abundance of fish populations in the Chicago Waterway System from 1974 through 1996.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 1

LOCATION OF SAMPLING STATIONS FOR FISH IN THE METROPOLITAN CHICAGO WATERWAY SYSTEM



The Chicago Waterway System (Figure 1) includes the Chicago River System with five segments: North Shore Channel, North Branch Chicago River, Chicago River, South Branch Chicago River and Chicago Sanitary and Ship Canal and the Calumet River System with three segments: Calumet River, Little Calumet River, and Cal-Sag Channel.

The North Shore Channel is 7.63 miles long and 5.2 to 7.3 feet deep (1). The Channel was completed in 1907 to divert more lake water to the North Branch of the Chicago River for dilution of sewage, in order to protect Lake Michigan. The lock at Sheridan Road was installed in 1910. The North Shore Channel receives final effluent from the District's North Side WRP (Figure 1) which began operation on October 3, 1928 (2).

The deep draft portion of the North Branch of the Chicago River extends from its junction with the North Shore Channel to its junction with the Chicago River in downtown Chicago. This portion of the river is 7.85 miles long and 6.1 to 18.5 feet deep (1).

The 1.31 mile long Chicago River extends from the locks at Chicago Harbor through downtown Chicago to the river's junction with its North and South Branches.

The South Branch of the Chicago River is 4.83 miles long and 18.5 to 20.2 feet deep (1). It extends from the Chicago River junction to the beginning of the Chicago Sanitary and Ship Canal near Damen Avenue.

The Chicago Sanitary and Ship Canal is 30.06 miles long and 10.7 to 27.1 feet deep (1). This canal was completed in 1900 to divert Lake Michigan water for dilution of sewage. The Stickney WRP began operation on June 2, 1930, (West Side Plant) and on May 23, 1939, (Southwest Plant) (2). The final effluent from the Stickney WRP flows into the Chicago Sanitary and Ship Canal (Figure 1).

The Calumet River is 7.73 miles long and 8.5 to 11.5 feet deep (1). The river flows from Calumet Harbor to the junction with the Grand Calumet River, just downstream of the O'Brien Lock and Dam.

The deep draft portion of the Little Calumet River is 6.55 miles long and 14 feet deep (1). The original Calumet WRP began operation on September 11, 1922. It was replaced by a conventional activated sludge plant in 1935 (2). The final effluent from the Calumet WRP flows into the Little Calumet River (Figure 1).

The Cal-Sag Channel is 15.98 miles long and 8.8 to 11.7 feet deep (1). The Channel extends from its junction with the Little Calumet River to its junction with the Chicago Sanitary and Ship Canal.

The fish monitoring program has served to document the effectiveness of the District's wastewater treatment program, especially as to the effects of the discontinuation of effluent chlorination at the major WRPs, TARP, and the SEPA stations.

Cessation of Effluent Chlorination

In 1983, the Appellate Court of Illinois allowed cessation of chlorination for District WRPs which discharge into secondary contact and indigenous aquatic life waters. Also in 1983, the District filed a petition for variance before the Illinois Pollution Control Board (IPCB) requesting a variance from the water quality effluent standards for the Calumet WRP, which discharges final effluent into the designated secondary contact waters of the Little Calumet River (Figure 1). This variance was granted for the period of August 1, 1983 through March 31, 1984. On March 21, 1984, the IPCB granted a variance beginning April 1, 1984, for the District's major WRPs, including the Calumet, North Side, and Stickney WRPs (3). The North Side WRP discharges final effluent into the designated secondary contact waters of the North Shore Channel (Figure 1). The Stickney WRP discharges final effluent into the designated secondary contact waters of the Chicago Sanitary and Ship Canal (Figure 1).

Tunnel and Reservoir Plan (TARP)

The District's TARP was designed to capture wastewater being washed into streams with runoff from the 375 square miles of combined sewer area within the District. TARP Phase I is for pollution control and consists of 109 miles of tunnels. This phase of TARP prevents backflows into Lake Michigan and intercepts combined sewer overflows (CSOs). TARP

Phase II is for flood control in the combined sewer area and is planned to consist of 21.5 miles of additional conveyance tunnels and three storage reservoirs totaling 125,630 acre-foot. As of December 1996, 75.4 miles of tunnels have been constructed and 18 miles are under construction. The 31-mile long Mainstream TARP became operational in May 1985. The 9.2-mile long Calumet TARP system commenced intercepting CSOs in October 1985, but full utilization was not achieved until July 1988 (1).

Sidestream Elevated Pool Aeration Stations (SEPA)

The SEPA system was designed to provide artificial aeration to the Calumet Waterway System in order to maintain a minimum dissolved oxygen concentration of 3.0 mg/L. With this system of five SEPA stations, low dissolved oxygen water is withdrawn from the waterways by means of screw pumps, passed through a shallow elevated pool, and cascaded over a number of steps back to the waterway. The primary aeration mechanism is the waterfall cascade (1).

MATERIALS AND METHODS

Fish populations were monitored in the Chicago Waterway System from the three waterway controlling works near Lake Michigan (on the North Shore Channel, the Chicago River and the Calumet River) to Lockport, Illinois. These collections occurred primarily at each of 20 locations which were sampled once or twice per year from 1974 through 1977, three or four times per year from 1985 through 1991, and twice per year from 1992 through 1996. Fishing gear used was primarily a 230-volt alternating current boat-mounted electrofisher. Generally, both sides of a 400-meter section of channel were included in the electrofishing sample at each location.

The parameters used to estimate improvements in the fishery were the number of fish species, the species composition, and the relative abundance of fish, as measured by the catch of fish per 30 minutes electrofishing or catch per unit of effort (CPUE), by both numbers and weight. Indices used to estimate water and stream quality for fish were the Bluegill Toxicity Index (BTI) devised by Lubinski and Sparks (4) and the Index of Biotic Integrity (IBI), devised by Karr et al. (5), respectively. The IBI was modified for use in Illinois by Bertrand et al. (6).

Water quality, as measured by the BTI, is based on the acute toxicity level effects on the bluegill sunfish of up to 20 toxicants. If the mixture of chemicals in the water is

toxic enough to cause death to 50 percent of the bluegills exposed to it for a period of four days (LC₅₀), then the water quality was defined, in this study, as being very poor. If the toxicity of the mixture is less than 20 percent of the LC₅₀, then the water quality was defined as being good.

Stream quality, as measured by the IBI, is based on the estimation of the biotic, or biological, integrity of a stream. Biological integrity is the ability to support a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the region. Stream quality is collectively, the combination of chemical, biological and physical features that characterize stream systems. Chemical attributes include nutrients and toxics in both the water and sediments; biological attributes include the fauna and flora of streams; and physical features include stream hydrology variables (e.g., flow regime, discharge, and velocity), and habitat factors such as substrate type and instream cover (7). Stream quality could range from poor quality, or a restricted aquatic resource, to good quality, or a unique aquatic resource (8).

RESULTS

From 1974 through 1996, 113,376 fish, representing 61 species and 8 hybrids, were collected during 809 quantitative collections from the Metropolitan Chicago Waterway System, as shown in Table 1. The total weight of the catch was 15,079 kg (33,244 pounds). Bluntnose minnows, gizzard shad, goldfish, fathead minnows, and carp were collected in the greatest numbers. Together these five species made up 67 percent of the total catch, by number. Carp alone made up 76 percent of the total catch, by weight. Harvestable size game fish have included northern pike, white bass, white perch, rock bass, green sunfish, pumpkinseed sunfish, bluegill, smallmouth and largemouth bass, white and black crappie, and yellow perch, as well as the rainbow, brook, brown and lake trout and coho and chinook salmon that enter the waterway system from Lake Michigan.

Following the cessation of WRP effluent chlorination on April 1, 1984, both the relative abundance and the number of fish species increased by the end of October of that year, at sample stations located one and two miles downstream of the North Side WRP (Figure 2). One hundred fifteen fish (44 CPUE) composed of nine species were collected one mile downstream and 366 fish (141 CPUE) composed of 11 species were collected two miles downstream. Previously, not more than three species and seven individual fish had been collected from either

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

FISH COLLECTED FROM THE DEEP DRAFT CANALS OF THE CHICAGO WATERWAY SYSTEM 1974 THROUGH 1996

Family and Species	North Shore Channel	North Branch Chicago River	Chicago River	Chicago Sanitary and Ship Canal	Calumet River	Little Calumet River	Cal-Sag Channel	Grand Total
<u>Bowfins</u>								
Bowfin	0	1	0	1	1	0	0	3
<u>Freshwater eels</u>								
American eel	0	0	0	0	1	0	0	1
<u>Herrings</u>								
Alewife	2,661	39	528	98	721	49	8	4,104
Gizzard shad	2,216	735	920	1,422	3,567	3,734	1,047	13,641
<u>Salmon and Trouts</u>								
Rainbow trout	16	4	10	2	3	0	1	36
Brown trout	28	0	33	1	0	0	0	62
Brook trout	2	1	1	0	0	0	0	4
Lake trout	1	0	3	0	0	0	0	4
Coho salmon	5	0	10	0	1	0	0	16
Chinook salmon	6	0	11	1	7	1	0	26
<u>Smelts</u>								
Rainbow smelt	2,024	2	34	71	5	1	0	2,137
<u>Mudminnows</u>								
Central mudminnow	5	1	0	15	0	2	9	32

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

FISH COLLECTED FROM THE DEEP DRAFT CANALS OF THE CHICAGO WATERWAY SYSTEM 1974 THROUGH 1996

Family and Species	North Shore Channel	North Branch Chicago River	Chicago River	Chicago Sanitary and Ship Canal	Calumet River	Little Calumet River	Cal-Sag Channel	Grand Total
<u>Pikes</u>								
Grass pickerel	2	0	0	2	2	2	0	8
Northern pike	1	0	0	0	0	0	0	1
<u>Minnnows and Carps</u>								
Goldfish	3,289	708	402	5,623	99	1,255	290	11,666
Grass carp	0	0	1	0	1	0	0	2
Carp	854	568	1,022	3,675	900	940	667	8,626
Carp x Goldfish hybrid	596	169	116	183	32	118	39	1,253
Brassy minnow	1	0	0	0	0	0	0	1
Hornyhead chub	1	0	0	0	0	0	0	1
Golden shiner	2,494	112	63	163	83	121	9	3,045
Emerald shiner	25	20	116	346	873	1,242	241	2,863
Bigmouth shiner	1	0	0	0	0	0	0	1
Spottail shiner	1,160	34	105	82	54	34	1	1,470
Spotfin shiner	1	0	0	0	0	0	0	1
Sand shiner	3	0	1	0	5	0	0	9
Bluntnose minnow	19,270	376	1,278	2,746	6,934	520	56	31,180
Fathead minnow	9,765	49	12	437	127	47	26	10,463
Longnose dace	16	0	0	0	0	0	0	16
Creek chub	1	0	0	2	0	0	5	8
Central stoneroller	0	0	2	0	1	0	0	3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

FISH COLLECTED FROM THE DEEP DRAFT CANALS OF THE CHICAGO WATERWAY SYSTEM 1974 THROUGH 1996

Family and Species	North Shore Channel	North Branch Chicago River	Chicago River	Chicago Sanitary and Ship Canal	Calumet River	Little Calumet River	Cal-Sag Channel	Grand Total
<u>Suckers</u>								
Quillback	0	0	0	0	4	0	0	4
White sucker	123	13	1	2	53	12	24	228
Black buffalo	0	0	1	0	1	0	0	2
<u>Loaches</u>								
Oriental weatherfish	11	1	0	0	0	0	0	12
<u>Freshwater catfishes</u>								
Black bullhead	380	40	39	248	5	20	34	766
Yellow bullhead	5	1	0	3	0	0	1	10
Channel catfish	0	0	0	0	7	1	15	23
<u>Trout-perches</u>								
Trout-perch	0	0	2	0	0	0	0	2
<u>Livebearers</u>								
Mosquitofish	0	0	0	2	0	4	0	6
<u>Silversides</u>								
Brook silverside	0	0	1	0	0	0	0	1
<u>Sticklebacks</u>								
Brook stickleback	1,252	29	2	2	0	0	0	1,285
Threespine stickleback	25	63	19	9	0	1	2	119
Ninespine stickleback	27	0	2	0	0	0	0	29

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

FISH COLLECTED FROM THE DEEP DRAFT CANALS OF THE CHICAGO WATERWAY SYSTEM 1974 THROUGH 1996

Family and Species	North Shore Channel	North Branch Chicago River	Chicago River	Chicago Sanitary and Ship Canal	Calumet River	Little Calumet River	Cal-Sag Channel	Grand Total
<u>Temperate basses</u>								
White bass	0	0	2	0	2	0	0	4
White perch	0	3	11	1	430	406	1	852
Yellow bass	0	0	0	7	0	11	15	33
White x Striped bass hybrid	0	0	0	0	1	0	0	1
<u>Sunfishes</u>								
Rock bass	70	1	556	1	20	0	0	648
Green sunfish	1,524	243	580	113	744	116	520	3,840
Pumpkinseed	174	15	70	36	455	272	15	1,037
Warmouth	0	0	0	0	1	0	1	2
Orangespotted sunfish	81	9	12	3	142	17	1	265
Bluegill	691	284	663	123	467	105	243	2,576
Smallmouth bass	0	0	61	1	77	0	3	142
Largemouth bass	473	198	454	293	1,108	135	190	2,851
White crappie	1	0	0	0	1	0	1	3
Black crappie	83	12	13	13	29	2	7	159
<u>Hybrid sunfish</u>								
Green x Orangespotted	0	1	0	0	1	0	0	2
Green x Pumpkinseed	14	5	2	1	14	3	3	42
Green x Bluegill	14	6	6	1	13	0	1	41
Pumpkinseed x Orangespotted	0	0	0	0	8	1	0	9
Pumpkinseed x Bluegill	7	2	4	0	5	0	0	18
Bluegill x Orangespotted	0	0	0	0	3	0	0	3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1 (Continued)

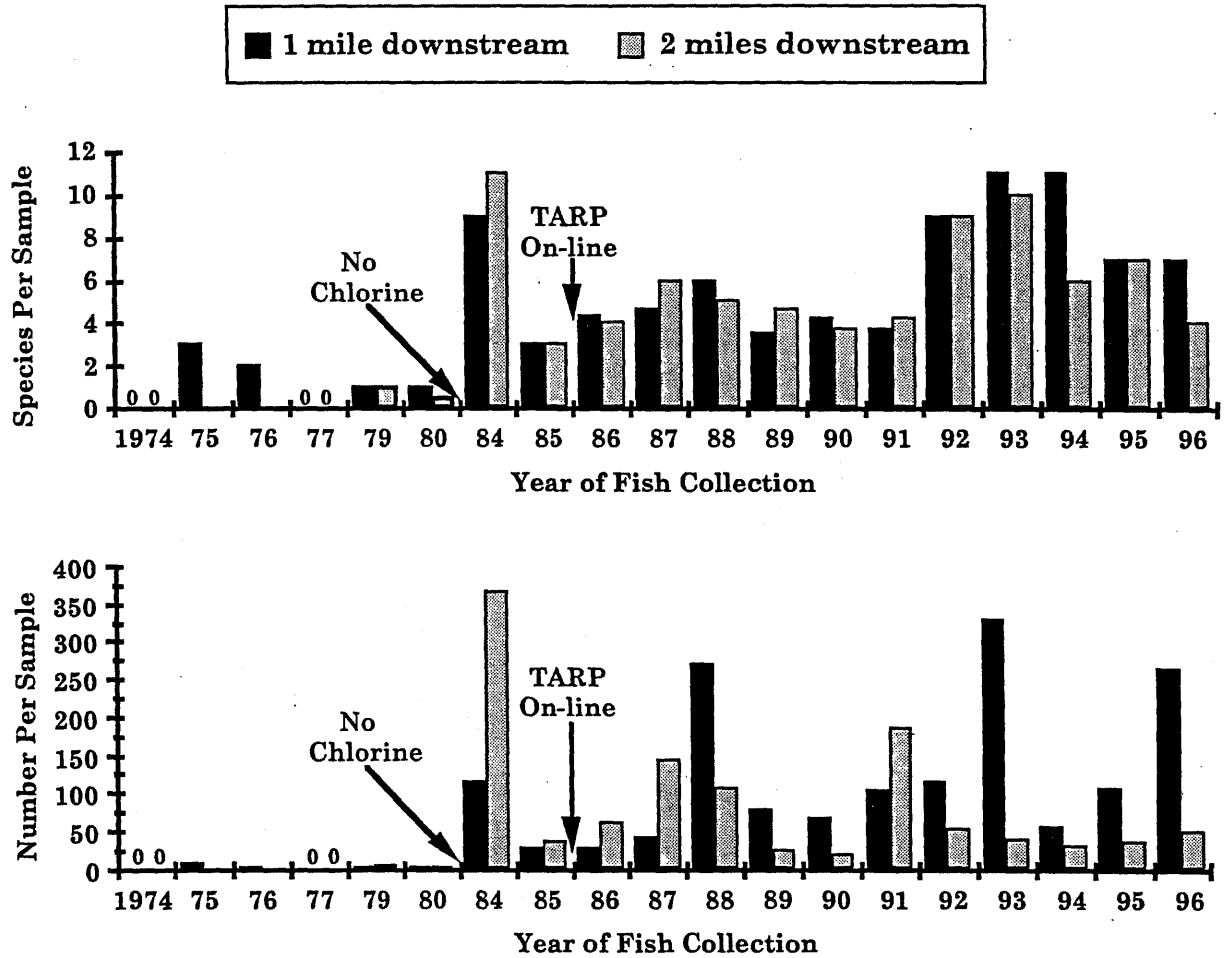
FISH COLLECTED FROM THE DEEP DRAFT CANALS OF THE CHICAGO WATERWAY SYSTEM 1974 THROUGH 1996

Family and Species	North Shore Channel	North Branch Chicago River	Chicago River	Chicago Sanitary and Ship Canal	Calumet River	Little Calumet River	Cal-Sag Channel	Grand Total
<u>Perches</u>								
Johnny darter	1	0	15	0	1	0	0	17
Yellow perch	3,827	300	1,387	909	1,064	118	11	7,616
<u>Drums</u>								
Freshwater drum	0	0	1	0	14	1	1	17
<u>Sculpins</u>								
Mottled sculpin	4	0	2	0	0	0	0	6
<u>Gobies</u>								
Round goby	0	0	0	0	22	0	0	22
Total Fish	53,231	4,045	8,574	16,638	18,109	9,291	3,488	113,376
Number of Species	44	29	41	34	40	28	30	61
Number of Hybrids	4	5	4	3	8	4	3	8

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 2

NUMBER OF FISH SPECIES AND NUMBER OF FISH PER SAMPLE
DOWNSTREAM FROM THE NORTH SIDE WATER RECLAMATION PLANT
EFFLUENT OUTFALL 1974 THROUGH 1996



location during any one sampling event from 1974 through 1980. The discontinuance of chlorination at the North Side WRP also apparently led to a reduction in the nuisance midge population in the North Shore Channel because of predation by these increased fish populations (9).

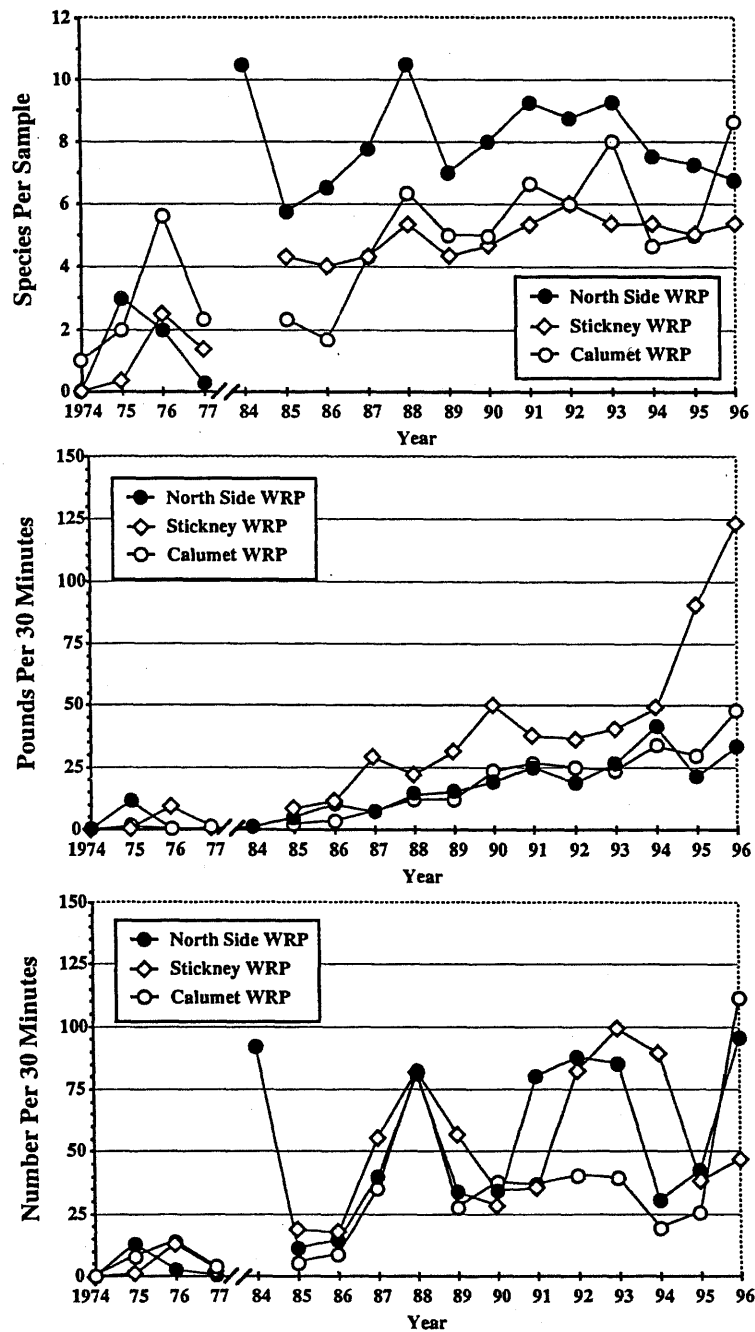
Comparing the years 1974 through 1977 plus 1985 (before TARP) versus 1986 through 1996 (after TARP) for all 20 locations sampled routinely for fish in the Chicago and Calumet River Systems, there has been a 150 percent increase in the abundance of fish, from an average of 43 fish CPUE to an average of 111 fish CPUE and a 50 percent increase in the number of fish species, from 41 species to 61 species. The number of fish species and CPUE, by both number and weight, increased downstream of the three WRPs after TARP went on-line in 1985 (Figure 3).

Thirty-two species of fish were collected from the Chicago and Calumet River Systems both at the start of this study during the period 1974 through 1977 and also in 1995. However, the proportion of game fish in the total collection had increased from 16 percent in the 1970's to 36 percent in 1995, primarily due to the 18 percent increase in the number of largemouth bass and the 4 percent increase in the number of bluegill sunfish. Maximum weight of individual largemouth bass collected from the Chicago and Calumet River Systems had also increased from 0.01 kg (0.02 pounds) in 1974 to 2.2 kg (4.8 pounds) in 1995.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 3

AVERAGE NUMBER OF FISH SPECIES COLLECTED PER SAMPLE AND WEIGHT AND NUMBER OF FISH IN TOTAL CATCH PER 30 MINUTES ELECTROFISHING DOWNSTREAM FROM THE NORTH SIDE, STICKNEY AND CALUMET WRP EFFLUENT OUTFALLS

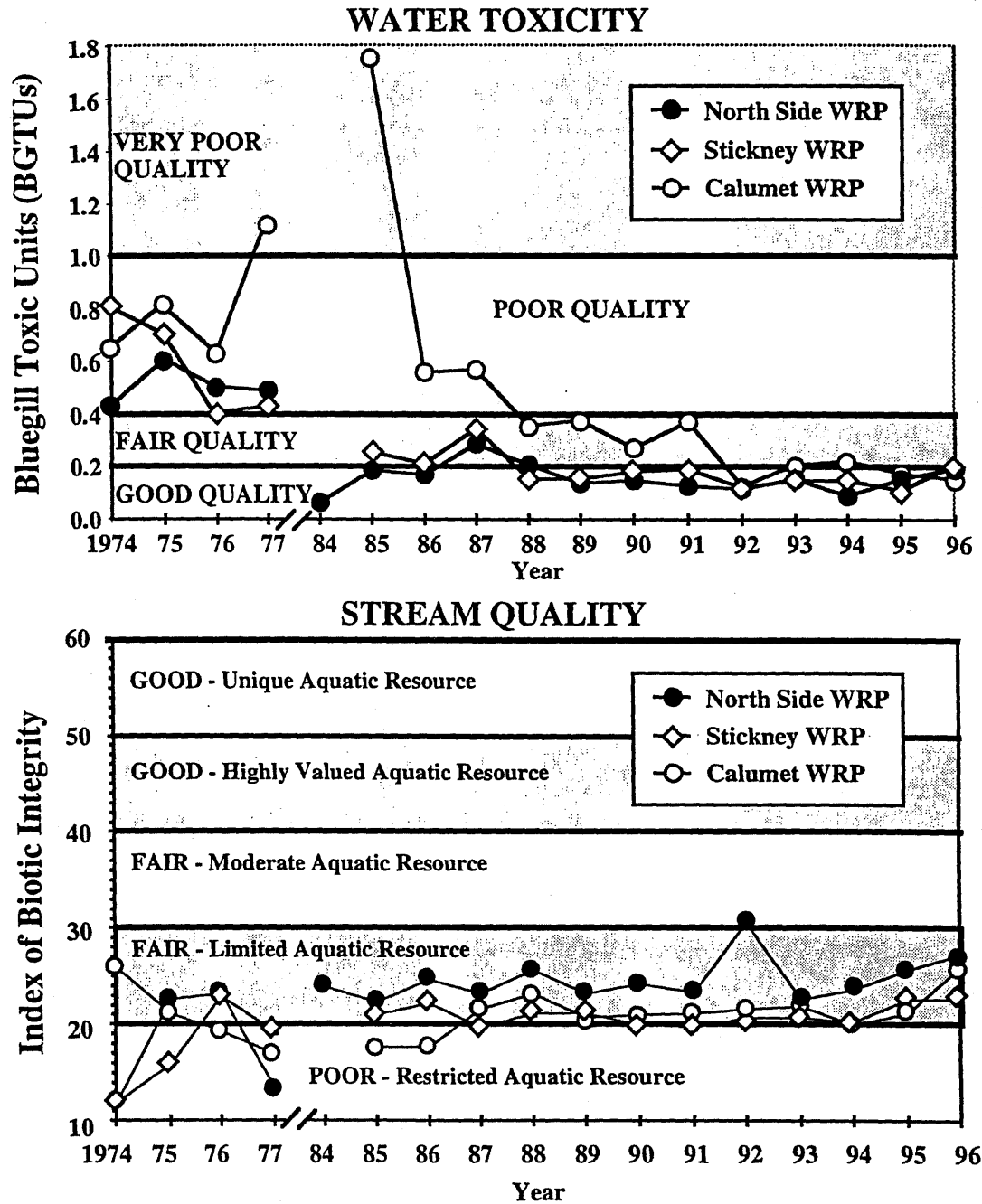


The water quality has improved with the cessation of effluent chlorination and the operation of TARP. Improvements occurred from 1974 to 1996 from poor to good water quality below the North Side and Stickney WRPs and from poor and very poor to fair water quality below the Calumet WRP (Figure 4). Depending on location in the waterway, effluent chlorination would have added a component toxicity of from 3 to 270 percent of the LC₅₀ for bluegills to the existing toxic fraction in the water within five miles of a WRP outfall. Stream quality, as measured by the IBI, has improved from poor to fair from 1974 to 1996 downstream of the North Side, Stickney, and Calumet WRPs.

The SEPA stations have also shown an immediate benefit for the quality of the fish populations in the Calumet River System. Twenty-five fish species have been collected from the waterways at the five SEPA station locations during 1995 and 1996. Smallmouth bass and channel catfish were collected at SEPA stations on the Cal-Sag Channel. This was the first occurrence of these desirable game fish species in the Cal-Sag Channel collections. These game fish were evidently attracted by the elevated dissolved oxygen (DO) concentrations downstream of the waterfalls. At the time of fish collection during 1995, at SEPA Station 3 the DO was 7.8 mg/L, at SEPA Station 4 the DO was 7.6 mg/L, and at SEPA Station 5 the DO was 6.9 mg/L, while the DO in the main channel was 5.5, 4.6, and 4.2 mg/L, respectively.

FIGURE 4

WATER QUALITY AS DETERMINED BY THE BLUEGILL TOXICITY INDEX AND
 STREAM QUALITY AS DETERMINED BY THE INDEX OF BIOTIC INTEGRITY
 DOWNSTREAM FROM THE NORTH SIDE, STICKNEY AND CALUMET
 WRP EFFLUENT OUTFALLS



North Shore Channel

Forty-four fish species were collected from four locations on the North Shore Channel from 1974 through 1996, as shown in Figure 5. Twenty-one species were collected during the 1970s, 36 species during the 1980s and 34 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the North Shore Channel was 39 fish with a total catch weight of 15 pounds during the 1970s, 237 fish weighing 19 pounds during the 1980s, and 246 fish weighing 22 pounds during the 1990s.

Water quality, as measured by the BTI, was poor during the 1970s and good during both the 1980s and 1990s. Stream quality for fish, as measured by the IBI, was poor during the 1970s and fair during the 1980s and 1990s.

North Branch Chicago River

Twenty-nine fish species were collected from two locations on the North Branch of the Chicago River from 1975 through 1996, as shown in Figure 6. Ten species were collected during the 1970s, 21 species during the 1980s and 22 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the North Branch of the Chicago River was 1 fish with a total catch weight of less than one pound during the 1970s, 29 fish weighing 12 pounds during the 1980s, and 53 fish weighing 36 pounds during the 1990s.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 5

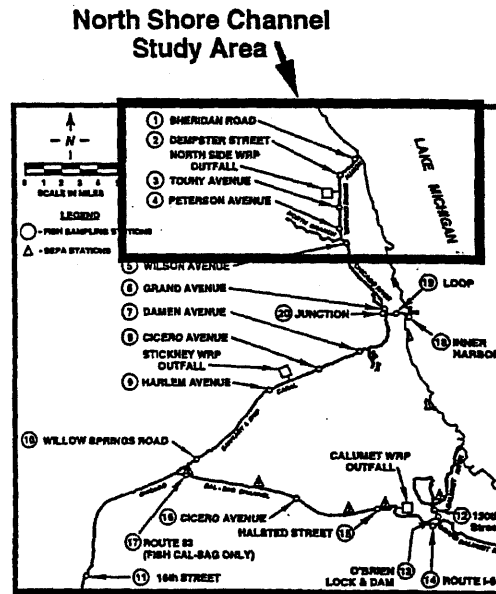
ABUNDANCE AND SPECIES COMPOSITION OF NORTH SHORE CHANNEL FISH WITH CHANGES IN WATER AND STREAM QUALITY 1974 THROUGH 1996

Forty-four fish species have been collected by the Research and Development Department from the North Shore Channel, primarily at four routine sample locations:

- (1) Sheridan Road
- (2) Dempster Street
- (3) Touhy Avenue
- (4) Peterson Avenue

	1970s	1980s	1990s
Water Quality	Poor	Good	Good
Stream Quality	Poor	Fair	Fair
Species	21	36	34
Pounds ¹	15	19	22
Number ¹	39	237	246

¹Per 30 Minutes Electrofishing



Chicago Waterway System

FISH SPECIES COLLECTED 1974 THROUGH 1996*

Herrings	Minnows and Carps	Sticklebacks
Alewife 1,2,3,4	Goldfish 1,2,3,4	Brook stickleback 1,2,3,4
Gizzard shad 1,2,3,4	Carp 1,2,3,4	Threespine stickleback 1,2,3,4
Salmon and Trouts	Carp x Goldfish hybrid 1,2,3,4	Ninespine stickleback 1
Rainbow trout 1,2,3	Brassy minnow 2	Sunfishes
Brown trout 1	Hornyhead chub 1	Rock bass 1,2,3
Brook trout 1	Golden shiner 1,2,3,4	Green sunfish 1,2,3,4
Lake trout 1	Emerald shiner 1,4	Pumpkinseed 1,2,3,4
Coho salmon 1,3	Bigmouth shiner 4	Orangespotted sunfish 1,2,3,4
Chinook salmon 1,2	Spottail shiner 1,2,3,4	Bluegill 1,2,3,4
Smelts	Spotfin shiner 3	Largemouth bass 1,2,3,4
Rainbow smelt 1,2	Sand shiner 1,4	White crappie 1
Mudminnows	Bluntnose minnow 1,2,3,4	Black crappie 1,2,3,4
Central mudminnow 1,3,4	Fathead minnow 1,2,3,4	Hybrid sunfish 1,2,3,4
Pikes	Longnose dace 1,3,4	Perches
Grass pickerel 1	Creek chub 4	Johnny darter 1
Northern pike 1	Suckers	Yellow perch 1,2,3,4
Loaches	White sucker 1,2,3,4	Sculpins
Oriental weatherfish 2,3,4	Freshwater catfishes	Mottled sculpin 1
	Black bullhead 1,2,3,4	
	Yellow bullhead 1,2	

*Numbers indicate North Shore Channel Station where species was collected.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 6

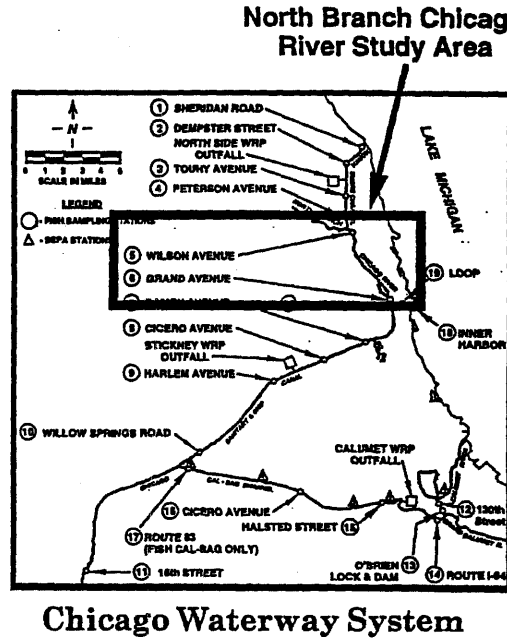
ABUNDANCE AND SPECIES COMPOSITION OF NORTH BRANCH CHICAGO RIVER FISH WITH CHANGES IN WATER AND STREAM QUALITY 1975 THROUGH 1996

Twenty-nine fish species have been collected by the Research and Development Department from the North Branch of the Chicago River, primarily at two routine sample locations:

- (5) Wilson Avenue
- (6) Grand Avenue

	1970s	1980s	1990s
Water Quality	Poor	Fair	Good
Stream Quality	Poor	Fair	Fair
Species	10	21	22
Pounds ¹	0	12	36
Number ¹	1	29	53

¹Per 30 Minutes Electrofishing



FISH SPECIES COLLECTED 1975 THROUGH 1996*

Bowfins

Bowfin 5

Herrings

Alewife 5,6
Gizzard shad 5,6

Salmon and Trout

Rainbow trout 6
Brook trout 6

Smelts

Rainbow smelt 6

Mudminnows

Central mudminnow 5

Minnows and Carps

Goldfish 5,6
Carp 5,6
Carp x Goldfish hybrid 5,6
Golden shiner 5,6
Emerald shiner 5,6
Spottail shiner 5,6
Bluntnose minnow 5,6
Fathead minnow 5,6

Suckers

White sucker 5

Loaches

Oriental weatherfish 5

Freshwater catfishes

Black bullhead 5,6
Yellow bullhead 6

Sticklebacks

Brook stickleback 5
Threespine stickleback 5,6

Temperate basses

White perch 6

Sunfishes

Rock bass 6
Green sunfish 5,6
Pumpkinseed 5,6
Orangespotted sunfish 5,6
Bluegill 5,6
Largemouth bass 5,6
Black crappie 5,6
Hybrid sunfish 5,6

Perches

Yellow perch 5,6

*Numbers indicate North Branch Station where species was collected.

Water quality, as measured by the BTI, was poor during the 1970s, fair during the 1980s, and good during the 1990s. Stream quality for fish, as measured by the IBI, was poor during the 1970s and fair during the 1980s and 1990s.

Chicago River

Forty-one fish species were collected from three locations on the Chicago River from 1975 through 1996, as shown in Figure 7. Twenty-one species were collected during the 1970s, 31 species during the 1980s and 32 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the Chicago River was 23 fish with a total catch weight of 16 pounds during the 1970s, 56 fish weighing 35 pounds during the 1980s, and 71 fish weighing 65 pounds during the 1990s.

Water quality, as measured by the BTI, was good during all three decades. Stream quality for fish, as measured by the IBI, was fair during all three decades.

Chicago Sanitary and Ship Canal

Thirty-four fish species were collected from five locations on the Chicago Sanitary and Ship Canal from 1974 through 1996, as shown in Figure 8. Five species were collected during the 1970s, 29 species during the 1980s and 25 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the Chicago Sanitary and Ship Canal was 2 fish with a total catch weight of one pound during the 1970s,

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

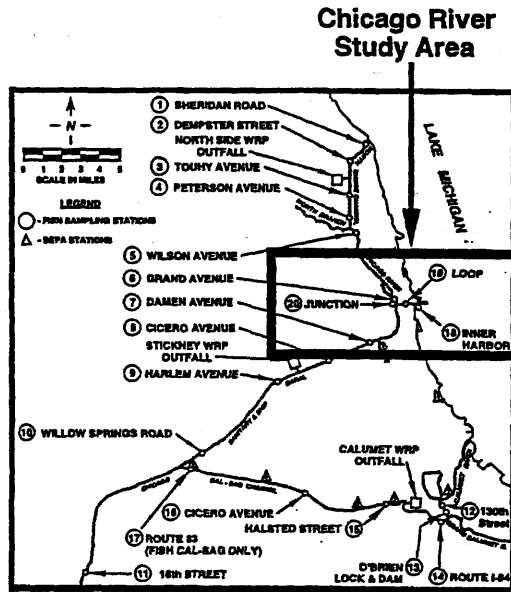
FIGURE 7

ABUNDANCE AND SPECIES COMPOSITION OF CHICAGO RIVER FISH WITH CHANGES IN WATER AND STREAM QUALITY 1975 THROUGH 1996

Forty-one fish species have been collected by the Research and Development Department from the Chicago River at three locations:
 (18) Inner Harbor
 (19) Loop (Franklin Street to Wabash Avenue)
 (20) Junction of the North and South Branches of the Chicago River

	1970s	1980s	1990s
Water Quality	Good	Good	Good
Stream Quality	Fair	Fair	Fair
Species	21	31	32
Pounds ¹	16	35	65
Number ¹	23	56	71

¹Per 30 Minutes Electrofishing



Chicago Waterway System

FISH SPECIES COLLECTED 1975 THROUGH 1996*

Herrings

Alewife 18,19,20
 Gizzard shad 18,19,20

Salmon and Trout

Rainbow trout 18,19
 Brown trout 18,19,20
 Brook trout 18
 Lake trout 18
 Coho salmon 18,19,20
 Chinook salmon 18,19,20

Smelts

Rainbow smelt 18,19,20

Suckers

White sucker 20
 Black buffalo 20

Freshwater catfishes

Black bullhead 18,20

Trout-perches

Trout-perch 18

Minnows and Carps

Goldfish 18,19,20
 Grass carp 18
 Carp 18,19,20
 Carp x Goldfish hybrid 18,19,20
 Golden shiner 18,19,20
 Emerald shiner 18,19,20
 Spottail shiner 18,19,20
 Sand shiner 18
 Bluntnose minnow 18,19,20
 Fathead minnow 18,20
 Central stoneroller 18

Silversides

Brook silversides 19

Sticklebacks

Brook stickleback 19,20
 Threespine stickleback 18,19,20
 Ninespine stickleback 18

Temperate basses

White perch 20
 White bass 18,20

Sunfishes

Rock bass 18,19,20
 Green sunfish 18,19,20
 Pumpkinseed 18,19,20
 Orangespotted sunfish 18,20
 Bluegill 18,19,20
 Smallmouth bass 18,19,20
 Largemouth bass 18,19,20
 Black crappie 18,20
 Hybrid sunfish 18,19,20

Perches

Johnny darter 18
 Yellow perch 18,19,20

Drums

Freshwater drum 20

Sculpins

Mottled sculpin 18

*Numbers indicate Chicago River Station where species was collected.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 8

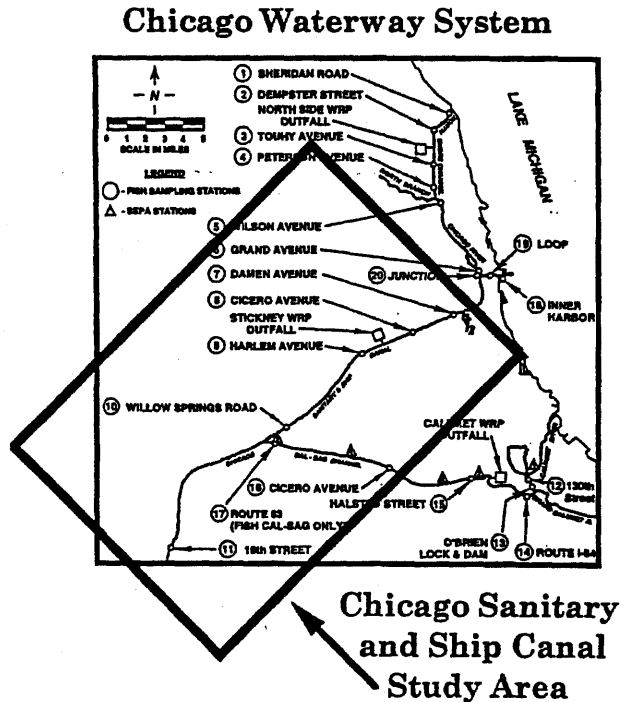
ABUNDANCE AND SPECIES COMPOSITION OF CHICAGO SANITARY AND SHIP CANAL FISH WITH CHANGES IN WATER AND STREAM QUALITY 1974 THROUGH 1996

Thirty-four fish species have been collected by the Research and Development Department from the Chicago Sanitary and Ship Canal, primarily at five routine sample locations:

- (7) Damen Avenue
- (8) Cicero Avenue
- (9) Harlem Avenue
- (10) Willow Springs Road
- (11) 16th Street, Lockport

	1970s	1980s	1990s
Water Quality	Poor	Fair	Good
Stream Quality	Poor	Fair	Fair
Species	5	29	25
Pounds ¹	1	24	79
Number ¹	2	55	88

¹Per 30 Minutes Electrofishing



FISH SPECIES COLLECTED 1974 THROUGH 1996*

<u>Bowfins</u> Bowfin 11	<u>Minnows and Carp</u> Goldfish 7,8,9,10,11 Carp 7,8,9,10,11 Carp x Goldfish hybrid 7,8,9,10,11 Golden shiner 7,8,9,11 Emerald shiner 7,8,9,10,11 Spottail shiner 7,8,9,10,11 Bluntnose minnow 7,8,9,10,11 Fathead minnow 7,8,9,10,11 Creek chub 8,11	<u>Sticklebacks</u> Brook stickleback 8 Threespine stickleback 7,8,9
<u>Herrings</u> Alewife 7,8,9,11 Gizzard shad 7,8,9,10,11	<u>Suckers</u> White sucker 7,11	<u>Temperate basses</u> White perch 7 Yellow bass 11
<u>Salmon and Trouts</u> Rainbow trout 7 Brown trout 9 Chinook salmon 9	<u>Freshwater catfishes</u> Black bullhead 7,8,9,10,11 Yellow bullhead 8,9,10	<u>Sunfishes</u> Rock bass 9 Green sunfish 7,8,9,10,11 Pumpkinseed 7,8,9,10,11 Orangespotted sunfish 7,11 Bluegill 7,8,9,10,11 Smallmouth bass (SEPA) 5 Largemouth bass 7,8,9,10,11 Black crappie 7,8,10,11 Hybrid sunfish 7,10
<u>Smelts</u> Rainbow smelt 7,8,9,10	<u>Livebearers</u> Western mosquitofish 8,10	<u>Perches</u> Yellow perch 7,8,9,10,11
<u>Mudminnows</u> Central mudminnow 7,9,10,11		
<u>Pikes</u> Grass pickerel 9,11		

*Numbers indicate Chicago Sanitary and Ship Canal Station where species was collected.

55 fish weighing 24 pounds during the 1980s, and 88 fish weighing 79 pounds during the 1990s.

Water quality, as measured by the BTI, was poor during the 1970s, fair during the 1980s, and good during the 1990s. Stream quality for fish, as measured by the IBI, was poor during the 1970s and fair during the 1980s and 1990s.

Calumet River

Forty fish species were collected from two locations on the Calumet River from 1974 through 1996, as shown in Figure 9. Fifteen species were collected during the 1970s, 34 species during the 1980s, and 33 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the Calumet River was 86 fish with a total catch weight of 21 pounds during the 1970s, 253 fish weighing 79 pounds during the 1980s, and 119 fish weighing 53 pounds during the 1990s.

Water quality, as measured by the BTI, was good during all three decades. Stream quality for fish, as measured by the IBI, was fair during all three decades.

Little Calumet River

Twenty-eight fish species were collected from two locations on the Little Calumet River from 1974 through 1996, as shown in Figure 10. Fourteen species were collected during the 1970s, 22 species during the 1980s, and 20 species during

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 9

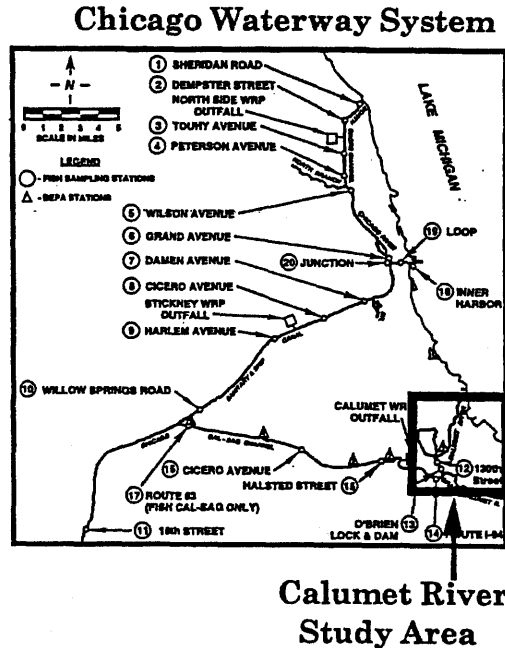
ABUNDANCE AND SPECIES COMPOSITION OF CALUMET RIVER FISH WITH CHANGES IN WATER AND STREAM QUALITY 1974 THROUGH 1996

Forty fish species have been collected by the Research and Development Department from the Calumet River at two locations:

- (12) 130th Street
- (13) O'Brien Lock and Dam

	1970s	1980s	1990s
Water Quality	Good	Good	Good
Stream Quality	Fair	Fair	Fair
Species	15	34	33
Pounds ¹	21	79	53
Number ¹	86	253	119

¹Per 30 Minutes Electrofishing



Calumet River Study Area

FISH SPECIES COLLECTED 1974 THROUGH 1996*

Bowfins

Bowfin 13

Freshwater eels

American eel 13

Herrings

Alewife 12,13
Gizzard shad 12,13

Salmon and Trouts

Rainbow trout 12,13
Coho salmon 13
Chinook salmon 12,13

Smelts

Rainbow smelt 12,13

Pikes

Grass pickerel 12

Suckers

Quillback 12
White sucker 12,13
Black buffalo 12

Minnows and Carps

Goldfish 12,13
Grass carp 12
Carp 12,13
Carp x Goldfish hybrid 12,13
Golden shiner 12,13
Emerald shiner 12,13
Spottail shiner 12,13
Sand shiner 12,13
Bluntnose minnow 12,13
Fathead minnow 12,13
Central stoneroller 13

Freshwater catfishes

Black bullhead 12,13
Channel catfish 12,13

Temperate basses

White perch 12,13
White bass 12
Striped bass x
White bass hybrid (SEPA 1)

Sunfishes

Rock bass 12,13
Green sunfish 12,13
Pumpkinseed 12,13
Warmouth 13
Orangespotted sunfish 12,13
Bluegill 12,13
Smallmouth bass 12,13
Largemouth bass 12,13
White crappie 12,13
Black crappie 12,13
Hybrid sunfish 12,13

Perches

Johnny darter 12
Yellow perch 12,13

Drums

Freshwater drum 12,13

Gobies

Round goby 12,13

*Numbers indicate Calumet River Station where species was collected.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

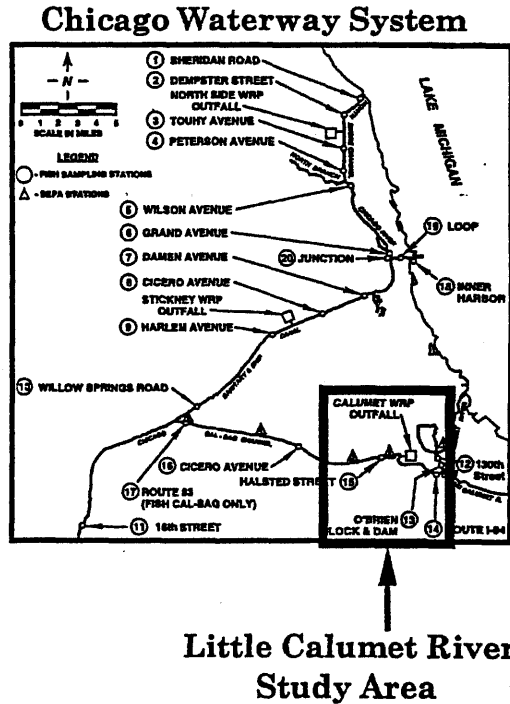
FIGURE 10

ABUNDANCE AND SPECIES COMPOSITION OF LITTLE CALUMET RIVER FISH WITH CHANGES IN WATER AND STREAM QUALITY 1974 THROUGH 1996

Twenty-eight fish species have been collected by the Research and Development Department from the Little Calumet River, primarily at two routine sample locations:
 (14) Route I-94 and
 (15) Halsted Street

	1970s	1980s	1990s
Water Quality	Poor	Poor	Fair
Stream Quality	Fair	Fair	Fair
Species	14	22	20
Pounds ¹	14	19	49
Number ¹	38	78	82

¹Per 30 Minutes Electrofishing



FISH SPECIES COLLECTED 1974 THROUGH 1996*

Herrings

Alewife 14,15
 Gizzard shad 14,15

Salmon and Trouts

Chinook salmon 15

Smelts

Rainbow smelt 14

Mudminnows

Central mudminnow 15

Pikes

Grass pickerel 14,15

Suckers

White sucker 14,15

Minnows and Carps

Goldfish 14,15
 Carp 14,15
 Carp x Goldfish hybrid 14,15
 Golden shiner 14,15
 Emerald shiner 14,15
 Spottail shiner 14,15
 Bluntnose minnow 14,15
 Fathead minnow 14,15

Freshwater catfishes

Black bullhead 14,15
 Channel catfish 14

Sticklebacks

Threespine stickleback (SEPA)

Livebearers

Western mosquitofish 15

Temperate basses

White perch 14,15
 Yellow bass 14,15

Sunfishes

Green sunfish 14,15
 Pumpkinseed 14,15
 Orangespotted sunfish 14,15
 Bluegill 14,15
 Largemouth bass 14,15
 Black crappie 14,15
 Hybrid sunfish 14,15

Perches

Yellow perch 14,15

Drums

Freshwater drum 14

*Numbers indicate Little Calumet River Station where species was collected. The term SEPA means that the species was collected only near a Sidestream Elevated Pool Aeration Station.

the 1990s. The average catch of fish per 30 minutes electrofishing from the Little Calumet River was 33 fish with a total catch weight of 14 pounds during the 1970s, 78 fish weighing 19 pounds during the 1980s, and 82 fish weighing 49 pounds during the 1990s.

Water quality, as measured by the BTI, was poor during the 1970s and 1980s, and fair during the 1990s. Stream quality for fish, as measured by the IBI, was fair during all three decades.

Cal-Sag Channel

Thirty fish species were collected from two locations on the Cal-Sag Channel from 1974 through 1996, as shown in Figure 11. Twelve species were collected during the 1970s, 20 species during the 1980s, and 24 species during the 1990s. The average catch of fish per 30 minutes electrofishing from the Cal-Sag Channel was 4 fish with a total catch weight of less than one pound during the 1970s, 19 fish weighing 7 pounds during the 1980s, and 32 fish weighing 20 pounds during the 1990s.

Water quality, as measured by the BTI, was very poor during the 1970s, poor during the 1980s, and fair during the 1990s. Stream quality for fish, as measured by the IBI, was poor during the 1970s and fair during the 1980s and 1990s.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 11

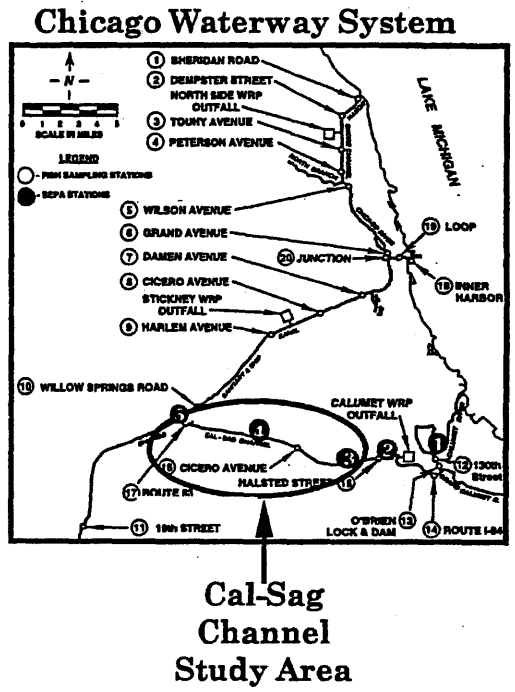
ABUNDANCE AND SPECIES COMPOSITION OF CAL-SAG CHANNEL FISH WITH CHANGES IN WATER AND STREAM QUALITY 1974 THROUGH 1996

Thirty fish species have been collected by the Research and Development Department from the Cal-Sag Channel, primarily at two routine sample locations:

- (16) Cicero Avenue
- (17) Route 83

	1970s	1980s	1990s
Water Quality	Very Poor	Poor	Fair
Stream Quality	Poor	Fair	Fair
Species	12	20	24
Pounds ¹	0	7	20
Number ¹	4	19	32

¹Per 30 Minutes Electrofishing



FISH SPECIES COLLECTED 1974 THROUGH 1996*

Herrings

- Alewife 16,17
- Gizzard shad 16,17

Salmon and Trouts

- Rainbow trout 17

Mudminnows

- Central mudminnow 16,17

Minnows and Carps

- Goldfish 16,17
- Carp 16,17
- Carp x Goldfish hybrid 16,17
- Golden shiner 16,17
- Emerald shiner 16,17
- Spottail shiner 17
- Bluntnose minnow 16,17
- Fathead minnow 16,17
- Creek chub 16,17

Suckers

- White sucker 16

Freshwater catfishes

- Black bullhead 16,17
- Yellow bullhead 17
- Channel catfish (SEPA)

Sticklebacks

- Threespine stickleback (SEPA)

Temperate basses

- White perch 17
- Yellow bass 16,17

Sunfishes

- Green sunfish 16,17
- Pumpkinseed 16,17
- Warmouth (SEPA)
- Orangespotted sunfish 16
- Bluegill 16,17
- Smallmouth bass (SEPA)
- Largemouth bass 16,17
- White crappie 16
- Black crappie 16,17
- Hybrid sunfish 16,17

Perches

- Yellow perch 17

Drums

- Freshwater drum (SEPA)

*Numbers indicate Cal-Sag Channel Station where species was collected. The term SEPA means that the species was collected only near a Sidestream Elevated Pool Aeration Station.

SEPA Stations

Twenty-five fish species were collected at the locations of the five SEPA stations during 1995 and 1996 (Figure 12). Numbers of fish collected from Stations 1 through 20 during each year are listed in Appendix Tables AI-1 through AI-20.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

FIGURE 12

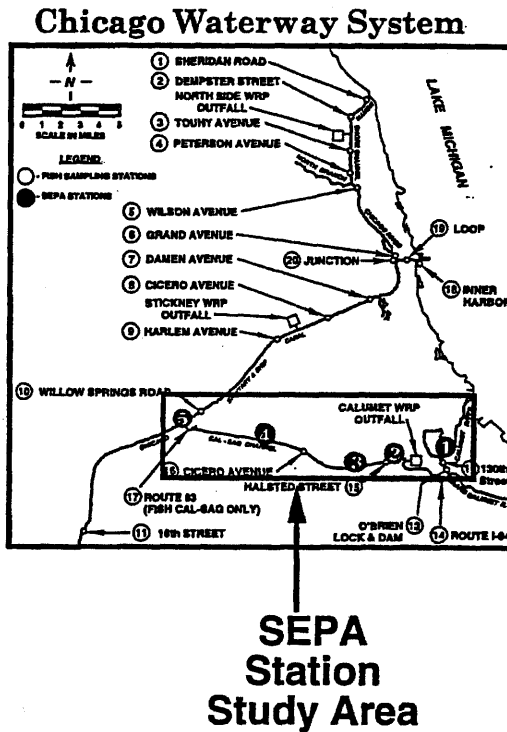
FISH IN THE WATERWAYS AT THE
SIDESTREAM ELEVATED POOL AERATION (SEPA) STATIONS
1995 THROUGH 1996

Twenty-five fish species and three hybrids have been collected by the Research and Development Department from the Calumet River, Little Calumet River and Cal-Sag Channel at the locations of the five Sidestream Elevated Pool Aeration (SEPA) Stations, during 1995 and 1996:

Calumet River
SEPA 1 - Torrence Avenue

Little Calumet River
SEPA 2 - 127th Street

Cal-Sag Channel
SEPA 3 - Western Avenue
SEPA 4 - Harlem Avenue
SEPA 5 - Junction of the Cal-Sag Channel with the Chicago Sanitary and Ship Canal



FISH SPECIES COLLECTED DURING 1995 AND 1996*

Herrings

Gizzard shad 1,2,3,4,5

Pikes

Grass pickerel 1

Minnows and Carps

Goldfish 1,2,3,4,5
Carp 1,2,3,4,5
Carp x goldfish hybrid 2
Golden shiner 2,3
Emerald shiner 1,2,3,4,5
Bluntnose minnow 1,2,3,4
Fathead minnow 1,2,3,4

Suckers

Quillback 1
White sucker 1,2,3,4

Freshwater catfishes

Black bullhead 3,4
Channel catfish 4,5

Sticklebacks

Threespine
stickleback 2,3,4

Temperate basses

White perch 1,2
Yellow bass 3,4,5
Striped bass x
white bass hybrid 1

Sunfishes

Rock bass 1
Green sunfish 1,2,3,4,5
Pumpkinseed 1,2,3,5
Warmouth 3
Bluegill 1,2,3,4,5
Hybrid sunfish 1,4
Smallmouth bass 1,3,4,5
Largemouth bass 1,2,3,4,5
Black crappie 4

Drums

Freshwater drum 1,4

Gobies

Round goby 1

*Numbers indicate the SEPA Station where the species was collected.

DISCUSSION

The increased fish populations below the North Side WRP outfall in the North Shore Channel, and North Branch of the Chicago River, and below the Stickney WRP outfall in the Chicago Sanitary and Ship Canal that occurred after the cessation of effluent chlorination on April 1, 1984, at both the North Side and Stickney WRPs were apparently responses to the absence of toxicity to fish following the removal of chlorine and chloramines from these waterways. Similarly, the improved water quality and fish populations that have occurred with the operation of TARP have resulted from the absence of the mixture of pollutants which had previously entered the Chicago Waterway System via the combined sewer system with every rainfall.

The increased numbers of the piscivorous largemouth bass may be one reason for the 16 percent decrease in the proportion of forage fish in the catch when the period 1974 through 1977 is compared with 1995. Also notable was the 12 percent decrease in the proportion of goldfish in the catch. The goldfish is a pollution tolerant and opportunistic species which does well when other species do not, but is otherwise a poor competitor.

The water quality for fish in the Chicago Waterway System is now, theoretically, of a quality good enough to support balanced fish populations. However, the waterway fish

populations are still dominated by omnivores, tolerant forms and habitat generalists. This is primarily because water quality alone does not take into concern the condition of habitat, flow or other outside factors. The waterways of the Chicago Waterway System were not constructed to be fishable streams with diverse habitat types. They were built for navigation and water reclamation. It is unlikely that these waterways can achieve the same stream quality for fish as a natural habitat-rich waterway. However, these waterways can now be listed as limited aquatic resources and some segments could become moderate aquatic resources within the urban environment. For example, the game fish at the SEPA stations were evidently attracted by the elevated DO concentrations and unique habitat that the waterfall tailraces provide.

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APPENDIX AI

Number of Fish Collected from Each Station
in the Chicago Waterway System
from 1974 through 1996

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-1

NUMBER OF FISH COLLECTED FROM STATION 1 AT SHERIDAN ROAD (RIVER MILE 341.2) ON THE NORTH SHORE CHANNEL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																		Grand Total	
	1974	1975	1976	1977	1977 ¹	1979	1980 ²	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995		1996
Alewife	0	323	90	34	0	34	0	238	1	80	208	466	227	228	239	167	61	19	27	2442
Gizzard shad	0	2	0	0	0	0	0	0	1	6	80	11	15	3	29	1	1	18	4	171
Rainbow trout	0	1	0	0	0	0	0	4	4	1	1	0	0	1	1	0	0	1	0	14
Brown trout	0	0	0	8	0	2	0	0	0	4	2	2	0	5	1	2	1	1	0	28
Brook trout	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Lake trout	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Coho salmon	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	4
Chinook salmon	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	1	5
Rainbow smelt	0	0	1	0	0	47	0	1407	18	493	3	11	16	1	0	0	0	0	0	1997
Central mudminnow	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Northern pike	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Grass pickerel	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
Goldfish	275	180	18	20	40	7	6	62	25	40	115	106	37	95	49	13	22	32	6	1148
Carp	134	50	12	0	5	18	4	55	28	22	9	11	6	5	5	2	8	8	5	387
Carp x Goldfish	1	47	7	2	3	5	0	19	10	7	9	7	2	6	1	2	7	5	7	147
Hornyhead chub	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Golden shiner	0	0	0	2	0	0	0	37	34	49	103	124	216	378	18	3	6	5	1	976
Emerald shiner	0	0	0	0	0	0	0	14	2	0	0	5	0	0	1	0	0	0	0	22
Spottail shiner	0	27	2	1	0	20	0	85	8	40	104	231	62	29	31	29	37	4	0	710
Sand shiner	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Bluntnose minnow	0	321	166	0	0	18	0	1086	679	1443	1998	1296	3726	2379	3515	680	343	32	5	17687
Fathead minnow	0	0	22	0	0	107	0	1420	160	104	460	185	2012	484	124	29	2	0	0	5109
Longnose dace	0	0	0	0	0	0	0	0	0	0	2	0	3	0	1	0	0	0	0	6
White sucker	1	0	0	0	0	1	0	16	1	1	2	3	1	1	0	2	0	1	0	30
Black bullhead	0	0	0	0	0	0	0	61	0	10	16	6	0	2	2	8	11	6	4	126
Yellow bullhead	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	1	4
Brook stickleback	0	0	0	0	0	0	0	512	209	29	11	5	1	0	0	0	0	0	0	767
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	8	0	0	0	18
Ninespine stickleback	0	0	1	0	0	25	0	0	0	0	0	0	0	0	0	0	0	1	0	27
Rock bass	0	1	2	0	0	0	0	1	1	6	20	9	2	9	1	4	4	2	2	64
Green sunfish	5	6	14	1	1	5	3	481	34	27	42	10	65	29	47	26	35	13	10	854
Pumpkinseed	1	0	2	0	0	3	0	38	2	3	5	6	2	6	4	0	14	0	0	86
Orangespotted sunfish	0	0	0	0	2	0	0	18	1	2	4	1	1	1	2	1	2	1	0	36
Bluegill	0	17	24	0	0	3	0	25	8	32	37	19	31	19	7	11	51	30	21	335
Largemouth bass	0	2	0	0	0	0	0	4	12	2	19	6	35	2	1	27	54	52	50	266
White crappie	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Black crappie	0	0	0	0	0	1	0	3	7	0	0	0	1	0	0	0	2	3	0	17
Green x Pumpkinseed	0	0	2	0	0	0	0	1	0	1	0	0	2	0	1	2	0	0	0	9
Green x Bluegill	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	2	1	1	0	7
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	1	0	5
Johnny darter	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Yellow perch	0	117	1	0	0	5	0	919	294	343	205	23	1	2	0	9	0	1	4	1924
Mottled sculpin	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	4
Total Fish	418	1095	364	68	51	303	13	6508	1539	2748	3460	2549	6466	3687	4092	1029	666	238	149	35443
Total Species	6	13	13	6	4	16	2	23	21	24	24	25	22	22	22	19	18	20	15	39
Sample Events Per Year	3	3	1	2	2	2	1	5	3	3	3	3	4	4	2	2	2	2	2	

AI-1

¹Data for collection at Lincoln Street (River Mile 340.2).

²Data for collections from Bridge Street (River Mile 339.5) to Church Street (River Mile 338.7).

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-2

NUMBER OF FISH COLLECTED FROM STATION 2 AT DEMPSTER STREET (RIVER MILE 338.2) ON THE NORTH SHORE CHANNEL FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																	Grand Total
	1975	1976	1977	1979	1980 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	13	0	9	0	1	0	36	17	2	30	2	1	0	4	115
Gizzard shad	0	0	0	0	0	0	0	6	4	7	18	0	116	0	2	11	24	188
Rainbow trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Chinook salmon	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Rainbow smelt	0	0	0	0	0	3	3	19	0	0	2	0	0	0	0	0	0	27
Goldfish	37	6	5	2	0	43	79	320	340	174	353	199	26	16	8	20	6	1634
Carp	4	3	2	17	0	12	3	15	71	7	17	23	3	3	8	10	2	200
Carp x Goldfish	20	7	0	8	0	15	15	18	41	14	59	36	3	9	12	21	4	282
Brassy minnow	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Golden shiner	0	0	0	0	0	4	29	75	117	275	171	166	20	9	8	5	5	884
Spottail shiner	0	0	0	0	0	3	10	12	9	4	29	3	17	8	25	0	3	123
Bluntnose minnow	0	0	0	0	0	4	41	38	9	51	75	404	100	20	3	2	4	751
Fathead minnow	0	1	0	25	0	424	154	194	244	1637	969	233	54	3	2	0	0	3940
White sucker	0	0	0	0	0	3	1	6	6	2	0	0	0	1	0	0	0	19
Oriental weatherfish	0	0	0	0	0	0	0	1	0	0	3	3	0	0	0	1	0	8
Black bullhead	0	0	0	0	0	23	28	43	27	34	6	12	0	2	2	0	9	186
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Brook stickleback	0	0	0	0	0	23	201	7	37	5	1	0	0	0	0	0	0	274
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Rock bass	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	4
Green sunfish	1	0	0	0	1	63	41	40	29	18	55	69	16	10	13	5	6	367
Pumpkinseed	0	0	0	0	0	4	0	15	8	1	2	14	4	10	5	7	3	73
Orangespotted sunfish	0	0	0	0	0	0	0	1	12	2	0	0	1	0	1	2	0	19
Bluegill	0	0	0	0	0	4	3	17	55	35	23	6	3	6	12	6	23	193
Largemouth bass	0	0	0	0	0	0	5	0	2	3	3	2	2	0	9	36	17	79
Black crappie	0	0	0	0	0	4	9	4	3	2	3	2	0	1	0	0	0	28
Green x Pumpkinseed	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
Green x Bluegill	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	4
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2
Yellow perch	0	0	0	0	0	473	482	292	366	10	2	0	0	0	0	0	0	1625
Total Fish	62	17	7	65	1	1115	1105	1126	1381	2318	1808	1177	399	101	111	128	113	11034
Total Species	3	3	2	4	1	16	15	20	18	18	18	15	15	13	14	13	12	26
Sample Events Per Year	1	1	2	4	2	4	3	3	3	3	4	4	2	2	2	2	2	

¹Data for collections from Church Street (River Mile 338.7) to Oakton Street (River Mile 337.2).

AI-2

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-3

NUMBER OF FISH COLLECTED FROM STATION 3 AT TOUHY AVENUE (RIVER MILE 336.1) ON THE NORTH SHORE CHANNEL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																			Grand Total
	1974	1975	1976	1977	1979	1980	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	0	0	12	0	0	0	0	8	2	7	58	0	0	0	87
Gizzard shad	0	0	0	0	0	0	0	0	2	21	84	23	36	83	135	524	1	130	477	1516
Rainbow trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Coho salmon	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Central mudminnow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Goldfish	0	1	0	0	0	0	1	21	10	41	82	26	51	44	4	3	10	15	22	331
Carp	0	0	2	0	3	0	2	22	8	8	36	17	35	8	3	9	9	2	4	168
Carp x Goldfish	0	1	0	0	0	0	0	6	4	7	23	11	25	11	4	9	8	7	2	118
Golden shiner	0	0	0	0	0	0	0	0	3	9	191	158	60	54	30	11	40	5	1	562
Spottail shiner	0	0	1	0	0	0	0	0	2	8	43	6	2	39	27	10	6	0	0	144
Spotfin shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Bluntnose minnow	0	0	0	0	0	0	12	0	0	7	20	2	0	106	7	10	1	0	0	165
Fathead minnow	0	0	0	0	0	1	71	13	0	2	177	39	3	14	2	0	0	0	0	322
Longnose dace	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	3
White sucker	0	0	0	0	0	0	0	4	3	1	18	1	3	2	0	7	3	3	3	48
Oriental weatherfish	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Black bullhead	0	0	0	0	0	0	1	17	5	6	1	2	4	8	0	1	1	1	0	47
Brook stickleback	0	0	0	0	0	0	18	10	8	3	11	9	1	0	0	0	0	0	0	60
Rock bass	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Green sunfish	0	4	0	0	2	4	7	3	2	8	2	0	23	31	6	7	3	0	0	102
Pumpkinseed	0	0	0	0	0	0	0	1	0	0	4	0	1	0	0	1	5	0	0	12
Orangespotted sunfish	0	0	0	0	0	0	0	0	0	0	15	1	0	0	0	0	0	0	0	16
Bluegill	0	1	0	0	0	0	0	1	1	1	8	9	6	7	0	8	9	15	2	68
Largemouth bass	0	0	0	0	0	0	0	1	2	0	1	1	3	2	1	0	11	30	16	68
Black crappie	0	0	0	0	0	0	0	0	2	1	1	5	7	5	0	2	1	2	0	26
Green x Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Green x Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Yellow perch	0	0	0	0	0	0	2	1	26	3	91	0	0	0	0	0	0	0	0	123
Total Fish	0	7	3	0	5	5	116	112	78	126	809	310	270	419	227	660	111	213	529	4000
Total Species	0	3	2	0	2	2	9	12	13	14	18	14	17	15	11	13	15	11	8	25
Sample Events Per Year	1	1	1	2	2	2	1	4	3	3	3	4	4	4	2	2	2	2	2	2

AI-3

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-4

NUMBER OF FISH COLLECTED FROM STATION 4 AT PETERSON AVENUE (RIVER MILE 334.6) ON THE NORTH SHORE CHANNEL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																	Grand Total
	1974	1977	1979	1980 ¹	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	5	0	1	0	1	3	2	3	1	0	1	0	17
Gizzard shad	0	0	0	0	0	0	0	2	3	9	28	158	49	4	0	13	75	341
Central mudminnow	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Goldfish	0	0	0	0	7	13	10	3	64	32	8	19	3	10	8	4	1	182
Carp	0	0	2	2	6	27	22	1	18	3	2	5	0	2	3	4	0	97
Carp x Goldfish	0	0	1	1	2	7	4	0	8	4	4	6	0	3	4	1	0	45
Golden shiner	0	0	0	1	0	1	0	1	23	12	2	3	8	3	7	11	0	72
Emerald shiner	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	3
Bigmouth shiner	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Spottail shiner	0	0	0	0	1	0	3	4	31	1	1	124	14	4	0	0	0	183
Sand shiner	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Bluntnose minnow	0	0	0	0	100	1	8	155	49	1	0	313	17	17	6	0	0	667
Fathead minnow	0	0	0	0	171	32	1	115	34	0	1	35	4	1	0	0	0	394
Longnose dace	0	0	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	7
Creek chub	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
White sucker	0	0	0	0	0	1	0	0	7	4	1	9	0	0	1	3	0	26
Oriental weatherfish	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Black bullhead	0	0	0	0	0	2	9	4	0	0	2	4	0	0	0	0	0	21
Brook stickleback	0	0	0	0	68	3	2	53	13	11	1	0	0	0	0	0	0	151
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
Green sunfish	0	0	4	0	0	46	10	35	25	4	7	38	6	12	5	8	0	200
Pumpkinseed	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	3
Orangespotted sunfish	0	0	0	0	0	0	0	0	6	0	0	2	0	0	1	1	0	10
Bluegill	0	0	0	0	2	2	2	20	7	2	3	15	2	12	15	6	7	95
Largemouth bass	0	0	0	0	0	1	0	1	0	1	4	0	3	2	3	30	15	60
Black crappie	0	0	0	0	0	0	3	1	0	0	2	1	2	3	0	0	0	12
Green x Pumpkinseed	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Green x Bluegill	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Yellow perch	0	0	0	0	2	1	106	2	43	1	0	0	0	0	0	0	0	155
Total Fish	0	0	7	3	367	141	182	426	322	77	71	744	107	78	57	71	100	2753
Total Species	0	0	2	1	11	12	12	18	15	14	15	17	12	12	9	9	6	26
Sample Events Per Year	1	2	2	1	2	4	3	3	3	3	4	4	2	2	2	2	2	2

¹Data for collections from Peterson Avenue to Foster Avenue (River Mile 333.6).

AI-4

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-5

NUMBER OF FISH COLLECTED FROM STATION 5 AT WILSON AVENUE (RIVER MILE 332.7) NORTH BRANCH CHICAGO RIVER FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1975 ¹	1976	1977	1979 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Bowfin	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Alewife	0	0	0	0	4	1	0	2	1	1	1	1	0	0	0	0	11
Gizzard shad	1	0	0	0	0	0	5	94	5	8	62	20	5	0	42	18	260
Central mudminnow	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Goldfish	21	1	1	0	22	12	29	113	82	26	88	8	26	17	13	16	475
Carp	12	0	3	4	22	11	18	39	14	23	35	9	27	12	18	12	259
Carp x Goldfish	1	0	0	0	5	0	1	23	4	8	24	5	10	1	1	0	83
Golden shiner	0	0	0	0	0	0	1	9	6	8	51	2	11	1	6	8	103
Emerald shiner	0	0	0	0	0	0	0	1	0	1	2	0	1	0	0	0	5
Spottail shiner	0	0	0	0	1	0	2	5	1	0	4	3	0	0	1	0	17
Bluntnose minnow	0	0	0	0	0	0	16	2	6	1	44	185	15	1	0	0	270
Fathead minnow	0	0	0	0	18	0	1	17	4	0	4	1	0	0	0	0	45
White sucker	0	0	0	0	0	0	0	0	0	0	2	1	3	3	4	0	13
Oriental weatherfish	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Black bullhead	0	1	0	0	3	3	8	3	0	5	3	0	0	0	0	1	27
Brook stickleback	0	0	0	0	6	3	14	6	0	0	0	0	0	0	0	0	29
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Green sunfish	6	0	0	0	25	4	28	16	5	12	56	8	28	4	9	5	206
Pumpkinseed	0	0	0	0	0	0	0	0	2	0	8	0	1	0	0	1	12
Orangespotted sunfish	0	0	0	0	2	0	0	3	1	1	0	0	0	0	1	0	8
Bluegill	0	1	0	0	1	1	45	40	13	9	22	3	11	9	26	41	222
Largemouth bass	1	0	0	0	0	0	1	0	2	3	3	1	6	8	43	45	113
Black crappie	0	1	0	0	0	0	0	1	0	3	2	0	0	2	1	0	10
Green x Orangespotted	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Green x Pumpkinseed	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	5
Green x Bluegill	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	5
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Yellow perch	0	0	0	0	2	1	0	97	0	0	0	0	0	0	0	0	100
Total Fish	42	4	4	4	111	36	174	473	146	111	415	248	144	59	165	148	2283
Total Species	5	4	2	1	11	8	13	16	13	13	16	13	11	10	11	10	22
Sample Events Per Year	1	1	2	1	4	3	3	3	3	4	4	2	2	2	2	2	

¹Data from fish collection at the junction of the North Shore Channel with the North Branch Chicago River (River Mile 333.5).

AI-5

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-6

NUMBER OF FISH COLLECTED FROM STATION 6 AT GRAND AVENUE (RIVER MILE 326.0) NORTH BRANCH CHICAGO RIVER FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																	Grand Total	
	1975 ¹	1976	1977 ¹	1977	1980 ²	1980 ³	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995		1996
Alewife	0	0	0	0	1	0	0	1	0	1	2	3	4	1	7	8	0	13	41
Gizzard shad	0	0	0	0	0	0	5	12	16	114	12	15	15	202	25	3	43	0	462
Rainbow trout	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	4
Brook trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Rainbow smelt	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Goldfish	6	0	1	0	0	0	5	0	2	28	34	57	18	25	7	22	15	14	234
Carp	0	0	0	0	0	0	15	24	4	22	20	35	50	24	21	51	20	23	309
Carp x Goldfish	0	0	0	0	0	0	1	0	2	12	7	15	20	7	6	8	7	1	86
Golden shiner	0	0	0	0	0	0	1	0	0	2	1	1	4	0	0	0	0	0	9
Emerald shiner	0	0	0	0	0	0	0	0	0	3	2	5	0	1	1	0	0	3	15
Spottail shiner	2	0	0	0	0	0	0	1	3	1	6	3	0	1	0	0	0	0	17
Bluntnose minnow	0	0	0	0	0	0	0	6	14	9	11	26	15	25	0	0	0	0	106
Fathead minnow	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	4
Black bullhead	0	0	0	0	0	0	7	1	1	1	0	1	1	0	1	0	0	0	13
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	62
White perch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3
Rock bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Green sunfish	2	0	0	0	0	1	2	4	4	1	0	5	11	1	2	1	1	2	37
Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3
Orangespotted sunfish	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Bluegill	0	0	0	0	0	0	2	3	4	6	5	9	12	3	3	1	5	9	62
Largemouth bass	0	0	0	0	0	0	1	1	1	1	2	6	1	3	4	4	37	24	85
Black crappie	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Green x Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Yellow perch	1	0	0	0	2	0	47	9	15	125	1	0	0	0	0	0	0	0	200
Total Fish	11	0	1	0	3	1	89	67	69	327	103	185	153	294	79	100	128	152	1762
Total Species	4	0	1	0	2	1	11	14	12	14	11	15	11	11	10	8	6	10	24
Sample Events Per Year	1	1	2	2	1	1	4	4	3	4	4	4	4	2	2	2	2	2	2

¹Data from fish collection at Diversey Avenue (River Mile 330).

²Data from fish collection at North Avenue (River Mile 327.8).

³Data from fish collection at Chicago Avenue (River Mile 326.5).

AI-6

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-7

NUMBER OF FISH COLLECTED FROM STATION 7 AT DAMEN AVENUE (RIVER MILE 321.1) ON THE CHICAGO SANITARY AND SHIP CANAL FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year														Grand Total
	1975	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	5	1	46	2	4	0	0	7	0	0	0	0	65
Gizzard shad	0	0	1	2	6	13	7	5	16	71	19	2	20	38	200
Rainbow trout	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
Rainbow smelt	0	0	23	2	20	0	0	0	1	0	0	0	0	0	46
Central mudminnow	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Goldfish	0	0	58	28	39	123	81	107	203	204	44	12	20	5	924
Carp	0	0	41	49	53	57	113	166	151	84	31	86	69	41	941
Carp x Goldfish	0	0	5	2	6	5	4	3	3	1	4	2	2	0	37
Golden shiner	0	0	1	1	4	13	11	12	31	18	13	3	3	0	110
Emerald shiner	0	0	0	0	5	47	4	0	1	2	0	0	0	0	59
Spottail shiner	0	0	1	0	2	5	3	0	0	4	0	0	0	0	15
Bluntnose minnow	0	0	5	0	2	29	7	24	71	354	12	6	1	0	511
Fathead minnow	0	0	7	0	1	4	1	0	2	6	0	0	3	0	24
White sucker	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Black bullhead	0	0	24	43	46	33	27	11	0	0	2	1	1	0	188
Threespine stickleback	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2
White perch	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Green sunfish	0	0	6	3	1	0	1	3	3	2	2	1	0	1	23
Pumpkinseed	0	0	0	0	0	0	0	1	5	6	0	2	1	1	16
Orangespotted sunfish	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Bluegill	0	0	5	2	38	8	5	8	10	5	1	0	0	4	86
Largemouth bass	0	0	0	0	5	7	10	16	37	5	9	8	36	10	143
Black crappie	0	0	0	1	2	0	0	0	0	1	0	1	0	1	6
Green x Bluegill	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Yellow perch	0	0	22	12	17	175	82	0	0	0	0	0	0	0	308
Total Fish	0	0	205	147	297	523	361	356	535	770	137	124	156	102	3713
Total Species	0	0	14	11	19	14	15	10	12	14	9	10	9	9	23
Sample Events Per Year	1	2	4	4	4	4	4	4	4	2	2	2	2	2	

AI-7

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-8

NUMBER OF FISH COLLECTED FROM STATION 8 AT CICERO AVENUE (RIVER MILE 317.3) ON THE CHICAGO SANITARY AND SHIP CANAL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1974	1975	1976	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	2	0	0	0	0	2	2	1	1	3	0	1	0	0	12
Gizzard shad	0	0	0	0	0	0	9	24	1	4	32	12	153	6	9	41	291
Rainbow smelt	0	0	0	0	5	1	1	2	10	1	0	0	0	0	0	0	20
Goldfish	0	0	7	0	84	81	47	704	330	382	337	41	41	36	38	19	2147
Carp	0	0	3	0	36	32	113	126	110	183	197	37	93	106	134	107	1277
Carp x Goldfish	0	0	4	0	2	8	3	16	9	5	13	3	2	6	6	6	83
Golden shiner	0	0	0	0	0	0	2	6	1	6	2	4	2	3	2	0	28
Emerald shiner	0	0	0	0	0	1	2	31	5	2	0	8	0	0	0	0	49
Spottail shiner	0	0	0	0	0	0	0	12	1	1	18	0	1	0	0	0	33
Bluntnose minnow	0	0	0	0	0	0	1	39	10	152	435	111	11	123	19	0	901
Fathead minnow	0	0	0	0	3	3	0	9	3	10	10	5	1	16	2	0	62
Creek chub	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Black bullhead	0	0	0	0	5	15	4	1	5	4	2	0	0	1	0	0	37
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Mosquitofish	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Brook stickleback	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Threespine stickleback	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
Green sunfish	0	0	0	0	2	0	2	0	0	1	3	5	0	1	2	0	16
Pumpkinseed	0	0	0	0	0	0	0	0	0	1	3	2	0	0	1	0	7
Bluegill	0	0	0	0	0	0	2	1	1	0	2	0	0	0	2	0	8
Largemouth bass	0	0	0	0	0	0	0	0	0	1	9	7	0	13	33	16	79
Black crappie	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	3
Yellow perch	0	0	0	0	0	21	15	205	82	0	0	0	0	0	0	0	323
Total Fish	0	0	17	0	137	162	202	1180	571	754	1065	238	305	312	249	191	5383
Total Species	0	0	4	0	6	7	12	15	14	14	14	11	8	10	11	6	22
Sample Events Per Year	1	1	1	2	3	4	4	4	4	4	4	2	2	2	2	2	

AI-8

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-9

NUMBER OF FISH COLLECTED FROM STATION 9 AT HARLEM AVENUE (RIVER MILE 314.0) ON THE CHICAGO SANITARY AND SHIP CANAL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1974	1975	1977	1977 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	0	11	0	0	0	0	2	0	0	0	0	13
Gizzard shad	0	0	0	0	1	0	2	62	11	1	6	30	3	0	15	41	172
Brown trout	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Chinook salmon	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Rainbow smelt	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	4
Central mudminnow	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Grass pickerel	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Goldfish	0	0	0	0	238	45	166	219	169	133	62	83	1	8	19	4	1147
Carp	0	2	1	5	103	34	63	101	76	79	70	31	14	27	67	55	728
Carp x Goldfish	0	0	0	0	12	0	5	6	0	2	1	1	0	1	2	0	30
Golden shiner	0	0	0	0	0	0	1	1	0	1	14	2	0	0	0	0	19
Emerald shiner	0	0	0	0	0	0	0	6	7	0	15	1	0	1	0	0	30
Spottail shiner	0	0	0	0	3	3	0	1	2	0	0	16	2	0	0	0	27
Bluntnose minnow	0	0	0	0	1	1	12	27	68	33	122	263	264	99	0	1	891
Fathead minnow	0	0	0	0	2	0	0	3	0	0	12	9	33	14	1	0	74
Black bullhead	0	0	0	0	2	1	0	2	0	0	0	0	0	0	0	0	5
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Rock bass	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Green sunfish	0	0	0	0	3	0	3	0	0	0	1	0	0	0	0	0	7
Pumpkinseed	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Bluegill	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	4	7
Largemouth bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	16
Yellow perch	0	0	0	0	41	2	132	3	54	0	0	0	0	0	0	0	232
Total Fish	0	2	1	5	412	86	396	433	388	249	308	439	318	150	107	124	3418
Total Species	0	1	1	1	12	6	9	12	8	5	10	10	7	5	5	8	23
Sample Events Per Year	1	1	2	2	4	4	4	4	4	4	4	2	2	2	2	2	

¹Data for collections at the C & IW Railroad Bridge (River Mile 314.8).

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-10

NUMBER OF FISH COLLECTED FROM STATION 10 AT WILLOW SPRINGS ROAD (RIVER MILE 307.9) ON THE CHICAGO SANITARY AND SHIP CANAL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1974	1975	1976	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Gizzard shad	0	0	0	0	0	1	0	92	1	0	1	6	0	0	0	2	103
Rainbow smelt	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Central mudminnow	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	3
Goldfish	0	0	1	1	52	178	285	395	200	34	29	8	17	35	4	0	1239
Carp	0	0	1	2	5	16	16	24	22	65	23	15	5	29	25	40	288
Carp x Goldfish	0	0	0	0	0	0	1	0	1	0	3	1	0	0	0	0	6
Emerald shiner	0	0	0	0	0	0	0	1	0	8	0	0	0	0	1	0	10
Spottail shiner	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	0	5
Bluntnose minnow	0	0	0	0	0	0	1	13	2	28	29	76	119	132	33	2	435
Fathead minnow	0	0	0	0	0	0	0	2	0	1	0	2	4	262	4	0	275
Black bullhead	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	4
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Mosquitofish	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Green sunfish	0	0	0	0	0	0	3	0	0	2	8	0	0	2	4	0	19
Pumpkinseed	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	3	6
Bluegill	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	6
Largemouth bass	0	0	0	0	0	0	0	0	1	1	2	1	1	3	5	9	23
Black crappie	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Green x Pumpkinseed	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Yellow perch	0	0	0	0	1	2	5	3	10	0	0	0	0	0	0	0	21
Total Fish	0	0	2	3	60	201	312	531	240	142	100	110	146	466	78	57	2448
Total Species	0	0	2	2	5	8	6	8	8	10	9	7	5	9	9	6	18
Sample Events Per Year	1	1	1	2	3	4	3	4	4	4	4	2	2	2	2	2	

AI-10

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-11

NUMBER OF FISH COLLECTED FROM STATION 11 AT 16TH STREET IN LOCKPORT (RIVER MILE 292.1) ON THE CHICAGO SANITARY AND SHIP CANAL FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year															Grand Total
	1975	1976	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Bowfin	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Alewife	0	0	0	0	0	6	0	0	0	0	1	0	1	0	0	8
Gizzard shad	0	0	0	0	0	0	290	41	10	11	23	143	34	37	67	656
Central mudminnow	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	8
Grass pickerel	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Goldfish	0	38	1	11	14	29	9	8	8	17	2	3	23	2	1	166
Carp	0	15	20	24	30	41	19	32	41	55	14	36	19	37	60	443
Carp x Goldfish	0	6	0	4	1	2	2	5	0	2	0	2	1	0	2	27
Golden shiner	0	0	0	0	0	0	1	0	2	2	0	1	0	0	0	6
Emerald shiner	0	0	0	0	1	0	98	83	4	3	0	1	0	0	0	190
Spottail shiner	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
Bluntnose minnow	0	0	0	2	0	1	3	0	0	0	0	1	0	1	0	8
Fathead minnow	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2
Creek chub	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
White sucker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Black bullhead	0	4	0	5	2	1	0	0	2	0	0	0	0	0	0	14
Yellow bass	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6
Green sunfish	0	0	0	1	1	2	2	1	32	3	0	0	0	4	1	47
Pumpkinseed	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Orangespotted sunfish	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Bluegill	0	0	0	2	5	0	1	1	0	1	0	1	1	0	2	14
Largemouth bass	0	0	0	0	0	0	0	0	1	6	0	0	5	2	11	25
Black crappie	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	3
Yellow perch	0	0	0	2	5	6	1	11	0	0	0	0	0	0	0	25
Total Fish	0	64	21	53	67	89	430	183	101	103	41	194	84	84	144	1658
Total Species	0	4	2	9	8	8	13	8	9	9	5	8	6	7	6	23
Sample Events Per Year	1	1	2	3	4	3	4	4	4	4	2	2	2	2	2	

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-12

NUMBER OF FISH COLLECTED FROM STATION 12 AT 130TH STREET (RIVER MILE 327.0) ON THE CALUMET RIVER FROM 1976 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1976	1977	1980	1983 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	4	0	2	0	0	0	0	0	20	28	1	0	2	0	0	0	57
Gizzard shad	16	5	19	82	47	3	26	506	156	333	117	78	60	32	47	102	1629
Rainbow trout	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Chinook salmon	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
Rainbow smelt	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
Grass pickerel	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Goldfish	6	7	1	8	1	0	1	4	3	6	1	3	0	1	1	1	44
Grass carp	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Carp	22	15	2	18	14	32	16	45	45	37	19	9	10	5	4	20	313
Carp x Goldfish	0	1	0	0	0	0	0	0	1	3	0	1	0	0	0	0	6
Golden shiner	0	2	1	8	12	0	4	0	2	1	1	0	0	0	0	3	34
Emerald shiner	51	7	2	0	0	0	6	18	17	223	4	0	8	0	1	57	394
Spottail shiner	0	3	2	0	9	0	2	0	0	1	1	0	0	0	0	0	18
Sand shiner	0	0	2	0	3	0	0	0	0	1	0	0	0	0	0	0	6
Bluntnose minnow	784	60	452	165	1521	333	568	555	76	85	67	1	2	10	28	37	4744
Fathead minnow	0	0	8	1	15	2	1	1	1	23	2	0	0	0	0	0	54
Quillback	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
White sucker	0	0	0	0	1	2	0	2	1	5	1	2	0	1	0	6	21
Black buffalo	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Black bullhead	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	5
Channel catfish	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	3
White bass	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
White perch	0	0	0	0	1	0	24	20	69	114	36	18	5	4	0	7	298
Rock bass	0	0	0	0	0	0	0	0	0	0	0	0	2	4	6	6	14
Green sunfish	14	2	14	61	29	17	52	36	14	12	20	9	7	5	1	2	295
Pumpkinseed	4	0	5	70	23	17	11	27	31	4	20	24	12	4	4	3	259
Orangespotted sunfish	0	1	5	164	23	22	10	18	1	0	0	0	0	0	0	0	244
Bluegill	0	0	1	10	1	2	8	30	35	15	25	5	1	1	8	2	144
Smallmouth bass	0	0	0	0	0	0	0	0	0	0	1	0	1	3	4	18	27
Largemouth bass	41	2	5	34	20	19	34	85	42	26	45	23	13	63	16	29	497
White crappie	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
Black crappie	1	0	2	7	1	1	0	0	0	0	0	0	0	0	0	0	12
Green x Pumpkinseed	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0	0	4
Green x Bluegill	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Pumpkinseed x Orangespot.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Johnny darter	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Yellow perch	12	4	68	5	153	323	13	62	16	0	0	0	0	0	0	0	656
Freshwater drum	0	0	0	0	0	0	0	0	2	0	1	0	2	0	2	0	7
Round goby	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4
Total Fish	955	109	591	642	1878	774	779	1412	535	924	369	173	125	134	121	293	9814
Total Species	11	11	17	15	20	13	17	15	19	18	22	10	13	13	13	14	35
Sample Events Per Year	1	2	1	1	3	3	3	4	4	4	4	2	2	2	2	2	

¹Data from a collection in Lake Calumet.

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-13

NUMBER OF FISH COLLECTED FROM STATION 13 AT O'BRIEN LOCK AND DAM (RIVER MILE 326.2) ON THE CALUMET RIVER FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year															Grand Total
	1974	1975	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Bowfin	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
American eel	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Alewife	0	0	0	6	2	0	7	638	13	0	0	0	0	0	0	666
Gizzard shad	32	177	12	25	8	113	798	136	154	101	118	153	13	4	69	1913
Rainbow trout	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
Coho salmon	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Chinook salmon	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	3
Rainbow smelt	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Goldfish	2	9	0	2	1	2	4	18	3	6	2	3	7	4	0	63
Carp	28	42	12	92	51	30	83	61	32	38	29	3	6	14	52	573
Carp x Goldfish	1	3	5	6	0	0	0	5	1	1	2	1	1	0	0	26
Golden shiner	0	5	0	0	0	1	4	16	1	6	7	13	5	0	0	58
Emerald shiner	0	130	1	20	29	0	88	4	12	87	2	0	1	6	36	416
Spottail shiner	0	0	0	1	0	3	2	31	0	1	0	0	0	0	0	38
Sand shiner	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Bluntnose minnow	0	167	35	882	200	563	191	47	29	137	49	82	155	157	103	2797
Fathead minnow	0	0	0	13	49	9	2	0	1	6	0	1	0	0	0	81
Central stoneroller	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
White sucker	0	0	0	0	0	0	0	2	0	1	3	7	12	4	0	30
Black bullhead	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	3
Channel catfish	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	4
White perch	0	0	0	0	0	2	26	64	11	17	2	1	0	0	0	123
Rock bass	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	5
Green sunfish	0	3	29	23	39	66	44	39	103	123	7	22	9	5	6	518
Pumpkinseed	0	1	7	7	10	13	55	37	7	49	34	14	12	12	8	266
Warmouth	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Orangespotted sunfish	0	0	1	12	3	13	27	8	0	0	2	0	0	1	0	67
Bluegill	0	2	2	1	10	9	31	45	12	110	28	22	6	28	20	326
Smallmouth bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Largemouth bass	1	17	7	11	15	30	23	27	14	84	35	90	87	63	66	570
White crappie	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Black crappie	0	0	0	5	7	2	1	0	2	2	2	0	1	1	3	26
Green x Orangespotted	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Green x Pumpkinseed	0	0	0	0	1	2	0	1	1	4	0	1	0	0	0	10
Green x Bluegill	0	0	0	0	0	2	0	0	2	4	1	0	0	0	1	10
Pumpkinseed x Orangespotted	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	8
Pumpkinseed x Bluegill	0	0	0	0	0	0	2	1	0	0	1	0	0	0	0	4
Bluegill x Orangespotted	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Yellow perch	18	37	0	104	100	169	32	13	4	1	1	2	0	0	0	481
Freshwater drum	0	0	0	2	0	0	1	0	0	0	0	3	0	0	0	6
Round goby	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
Total Fish	82	593	111	1213	529	1036	1428	1201	404	781	323	415	311	313	375	9115
Total Species	5	11	9	17	16	18	22	19	16	19	15	15	13	15	12	34
Sample Events Per Year	1	3	2	3	3	3	4	4	4	4	2	2	2	2	2	

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-14

NUMBER OF FISH COLLECTED FROM STATION 14 AT ROUTE I-94 (RIVER MILE 324.7) ON THE LITTLE CALUMET RIVER FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																Grand Total
	1975	1976	1977	1977 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	0	0	7	3	0	0	0	7	0	2	0	19
Gizzard shad	32	47	31	61	159	45	207	370	132	154	511	100	290	53	68	166	2426
Rainbow smelt	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Grass pickerel	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Goldfish	60	19	6	20	27	8	27	202	70	31	34	11	24	14	0	1	554
Carp	19	24	31	67	45	22	17	52	60	58	66	38	12	17	28	18	574
Carp x Goldfish	2	7	9	3	1	0	3	6	13	6	11	1	0	3	4	0	69
Golden shiner	1	0	0	0	0	0	5	2	9	13	6	2	4	2	0	1	45
Emerald shiner	30	10	32	3	0	0	3	167	20	255	22	75	6	27	7	21	678
Spottail shiner	0	0	0	0	0	0	0	8	2	7	15	1	0	0	0	0	33
Bluntnose minnow	16	5	14	4	298	14	33	8	0	1	10	57	3	15	1	29	508
Fathead minnow	1	0	0	1	9	1	1	3	0	1	0	0	0	0	0	0	17
White sucker	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Black bullhead	0	0	0	1	1	0	2	1	1	4	2	0	1	0	0	0	13
Channel catfish	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
White perch	0	0	0	0	0	0	6	71	46	92	43	50	12	29	21	10	380
Yellow bass	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	8
Green sunfish	0	1	0	11	0	0	1	0	1	0	2	0	0	0	0	1	17
Pumpkinseed	0	1	0	0	7	0	19	19	14	18	10	64	7	27	20	51	257
Orangespotted sunfish	0	0	0	0	1	0	1	12	2	0	0	0	0	0	0	0	16
Bluegill	3	0	0	0	1	0	5	18	7	2	3	8	2	3	0	4	56
Largemouth bass	11	0	4	2	3	7	6	7	2	1	12	5	12	15	9	12	108
Black crappie	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Green x Pumpkinseed	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Yellow perch	0	0	0	0	92	6	6	10	1	0	0	0	0	0	0	0	115
Freshwater drum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total Fish	175	114	127	173	644	105	342	964	383	643	748	415	380	207	160	321	5901
Total Species	9	7	6	10	11	9	15	17	15	13	13	13	12	12	8	12	24
Sample Events Per Year	1	1	2	2	3	3	3	4	4	4	4	2	2	2	2	2	

¹Data for collections at Indiana Avenue (River Mile 322.4).

AI-14

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-15

NUMBER OF FISH COLLECTED FROM STATION 15 AT HALSTED STREET (RIVER MILE 320.1) ON THE LITTLE CALUMET RIVER FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year																	Grand Total
	1974	1975	1976	1977	1983	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	0	0	0	3	27	0	0	0	0	0	0	0	30
Gizzard shad	0	26	0	0	4	23	22	367	240	120	40	34	32	85	14	29	247	1283
Chinook salmon	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Central mudminnow	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Grass pickerel	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Goldfish	0	0	1	3	0	6	0	1	327	93	122	74	13	13	46	4	13	716
Carp	0	2	2	1	6	11	3	15	134	36	49	46	20	22	20	18	36	421
Carp x Goldfish	0	2	1	0	1	6	2	2	9	3	5	7	1	1	5	2	3	50
Golden shiner	0	0	0	0	0	0	0	0	31	5	4	3	1	12	1	6	5	68
Emerald shiner	0	0	0	0	0	0	0	0	440	3	1	6	1	0	0	5	23	479
Spottail shiner	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Bluntnose minnow	0	0	0	0	0	0	0	0	4	0	0	2	1	1	0	1	2	11
Fathead minnow	0	0	0	0	0	8	1	0	19	0	0	0	0	1	0	0	1	30
White sucker	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	1	1	7
Black bullhead	0	0	1	1	0	1	0	0	0	3	2	0	0	0	0	0	0	8
Mosquitofish	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
White perch	0	0	0	0	0	0	0	0	9	0	0	3	4	1	3	0	5	25
Yellow bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Green sunfish	0	0	55	7	0	0	0	2	10	0	4	19	0	1	1	3	2	104
Pumpkinseed	0	0	0	0	0	0	0	0	2	0	0	4	0	0	1	2	3	12
Orangespotted sunfish	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Bluegill	1	0	2	4	0	0	0	10	12	3	0	7	0	0	0	0	1	40
Largemouth bass	0	0	0	0	0	0	0	0	1	1	0	6	1	1	3	3	7	23
Black crappie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Green x Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Pumpkinseed x Orangespotted	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Yellow perch	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
Total Fish	1	30	67	16	11	56	29	397	1245	295	227	215	74	142	94	74	353	3326
Total Species	1	2	7	5	2	5	4	5	16	10	7	14	8	10	8	10	15	24
Sample Events Per Year	1	1	1	2	1	3	3	3	4	4	4	4	2	2	2	2	2	2

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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-16

NUMBER OF FISH COLLECTED FROM STATION 16 AT CICERO AVENUE (RIVER MILE 314.9) ON THE CAL-SAG CHANNEL FROM 1974 THROUGH 1996

Fish Species or Hybrid Cross	Year																	Grand Total
	1974 ¹	1975 ¹	1976	1977	1977 ¹	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Gizzard shad	0	31	0	1	0	0	1	1	107	19	45	39	53	3	13	2	47	362
Central mudminnow	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
Goldfish	1	0	12	2	0	0	0	22	18	51	64	5	5	0	3	3	186	
Carp	0	0	10	1	0	0	2	4	59	41	19	49	28	22	18	35	40	328
Carp x Goldfish	0	0	0	0	0	0	0	0	3	6	5	3	1	4	0	1	0	23
Golden shiner	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Emerald shiner	0	0	1	0	0	0	1	0	12	1	1	3	18	1	0	48	6	92
Bluntnose minnow	0	0	0	0	0	0	0	0	3	0	0	0	7	3	1	0	5	19
Fathead minnow	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	3
Creek chub	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	4
White sucker	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	3
Black bullhead	0	0	3	0	0	0	1	3	3	0	0	0	0	0	0	0	0	10
Yellow bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Green sunfish	0	0	25	0	0	0	0	8	4	0	6	8	0	6	1	0	3	61
Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	3
Orangespotted sunfish	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Bluegill	0	0	5	0	1	0	2	10	1	2	5	12	0	6	0	1	1	46
Largemouth bass	0	0	0	0	0	0	0	0	0	2	2	1	0	3	0	6	3	17
White crappie	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Black crappie	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Green x Pumpkinseed	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Total Fish	1	31	60	5	1	0	7	27	218	92	135	184	113	54	33	98	111	1170
Total Species	1	1	8	4	1	0	5	6	11	9	8	10	6	9	4	7	11	20
Sample Events Per Year	1	1	1	2	2	3	3	3	4	4	4	4	2	2	2	2	2	

¹Data for fish collection at Ashland Avenue (River Mile 319.0).

AI-16

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-17

NUMBER OF FISH COLLECTED FROM STATION 17 AT ROUTE 83 (RIVER MILE 304.2) ON THE CAL-SAG CHANNEL FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year															Grand Total
	1975 ¹	1976	1977	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	0	0	0	4	0	0	0	3	0	0	0	0	0	0	7
Gizzard shad	0	0	0	1	55	7	100	9	4	66	67	31	0	4	291	635
Rainbow trout	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Central mudminnow	0	1	0	1	0	3	0	0	1	0	0	0	0	0	0	6
Goldfish	16	1	2	3	1	6	18	14	12	16	0	1	2	0	92	
Carp	1	0	0	11	8	16	76	20	23	30	5	15	13	17	26	261
Carp x Goldfish	0	0	0	2	1	1	7	2	1	0	0	1	0	1	0	16
Golden shiner	0	0	0	0	1	0	4	0	0	0	0	1	0	0	0	6
Emerald shiner	0	0	0	0	0	1	3	1	1	2	3	0	0	1	2	14
Spottail shiner	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Bluntnose minnow	0	0	0	0	0	0	1	0	1	2	1	4	1	0	3	13
Fathead minnow	0	0	0	12	0	0	3	0	3	0	0	2	1	0	0	21
Creek chub	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Black bullhead	0	0	0	10	3	7	0	0	1	1	0	0	0	0	0	22
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
White perch	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Yellow bass	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
Green sunfish	0	0	1	35	5	118	19	6	153	23	5	35	6	22	22	450
Pumpkinseed	0	0	0	0	1	0	1	1	0	6	1	0	0	0	0	10
Bluegill	0	0	1	3	2	28	4	2	46	10	7	39	7	13	8	170
Largemouth bass	0	0	0	3	1	5	5	12	10	5	4	8	2	13	9	77
Black crappie	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	4
Green x Pumpkinseed	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Yellow perch	0	0	0	1	2	6	2	0	0	0	0	0	0	0	0	11
Total Fish	18	2	4	83	84	201	244	67	260	163	93	138	33	71	363	1824
Total Species	3	2	3	11	11	12	13	8	13	11	8	10	8	6	8	22
Sample Events Per Year	1	1	2	4	4	3	4	4	4	4	2	2	2	2	2	

¹Data for fish collection at 86th Avenue (River Mile 309.7).

AI-17

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-18

NUMBER OF FISH COLLECTED FROM STATION 18 AT THE INNER HARBOR (RIVER MILE 327.0) ON THE CHICAGO RIVER FROM 1975 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year														Grand Total
	1975	1976	1977	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	2	36	0	12	20	109	4	35	1	70	0	0	1	0	290
Gizzard shad	15	0	0	1	0	2	85	1	0	1	371	0	3	0	479
Rainbow trout	0	0	1	0	1	0	2	0	1	1	0	0	0	2	8
Brown trout	0	0	0	0	2	8	6	7	3	0	0	1	0	0	27
Brook trout	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Lake trout	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Coho salmon	0	0	0	0	3	0	1	4	0	0	0	0	0	0	8
Chinook salmon	0	0	1	0	1	0	0	6	0	1	0	0	0	0	9
Rainbow smelt	0	0	0	0	8	1	9	1	0	1	0	0	0	0	20
Goldfish	1	18	0	0	4	7	6	9	6	10	2	2	3	0	68
Grass carp	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Carp	3	9	8	1	6	11	20	10	21	13	21	9	6	17	155
Carp x Goldfish	0	1	0	0	1	0	4	2	7	4	0	1	1	0	21
Golden shiner	0	2	0	1	0	20	3	7	1	3	0	1	0	0	38
Emerald shiner	0	0	0	1	13	5	2	17	0	24	0	0	0	0	62
Spottail shiner	0	0	0	0	4	0	1	1	50	2	0	0	0	1	59
Sand shiner	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Bluntnose minnow	7	222	6	8	48	7	9	28	503	69	0	7	0	1	915
Fathead minnow	0	0	0	1	7	0	0	0	2	0	0	0	0	0	10
Central stoneroller	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Black bullhead	0	1	4	3	6	1	7	4	4	0	1	7	2	0	40
Trout-perch	0	0	0	1	0	0	0	0	2	0	0	0	0	0	3
Threespine stickleback	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3
Ninespine stickleback	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
White bass	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rock bass	0	63	19	1	12	20	47	88	130	41	27	44	18	25	535
Green sunfish	0	3	0	3	41	23	38	196	117	22	6	7	2	0	458
Pumpkinseed	0	4	0	2	0	1	2	1	23	8	0	5	0	1	47
Orangespotted sunfish	0	0	3	0	1	0	2	4	0	0	0	0	0	0	10
Bluegill	3	3	0	0	303	29	24	35	68	11	16	46	9	6	553
Smallmouth bass	0	0	0	0	0	3	3	2	22	12	5	6	4	1	58
Largemouth bass	6	4	0	0	18	6	18	39	41	9	6	97	61	13	318
Black crappie	0	1	1	0	0	1	1	5	1	0	0	0	0	0	10
Green x Pumpkinseed	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Green x Bluegill	0	0	0	0	0	0	0	1	0	0	2	0	1	0	4
Pumpkinseed x Bluegill	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Johnny darter	0	0	0	1	10	0	1	0	3	1	0	0	0	0	16
Yellow perch	0	0	0	17	327	335	208	3	3	1	0	1	0	1	896
Mottled sculpin	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Fish	39	371	43	53	839	592	503	507	1011	307	457	235	111	68	5136
Total Species	9	15	8	14	21	20	23	23	21	20	9	13	10	10	35
Sample Events Per Year	1	1	2	1	3	3	3	4	4	2	2	2	2	2	

AI-18

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-19

NUMBER OF FISH COLLECTED FROM STATION 19 AT THE LOOP (RIVER MILE 326.0) ON THE CHICAGO RIVER FROM 1980 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year											Grand Total
	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	0	1	82	0	52	3	0	0	0	0	1	139
Gizzard shad	0	0	18	3	0	47	0	0	0	0	1	69
Rainbow trout	0	0	1	1	0	0	0	0	0	0	0	2
Brown trout	0	0	2	1	2	0	0	0	0	0	0	5
Coho salmon	0	0	0	0	1	0	0	0	0	0	0	1
Chinook salmon	0	0	0	0	0	1	0	0	0	0	0	1
Rainbow smelt	0	12	0	0	0	0	0	0	0	0	0	12
Goldfish	0	0	2	15	25	9	5	2	4	1	1	64
Carp	2	27	44	57	82	78	22	15	6	27	19	379
Carp x Goldfish	0	0	0	3	1	0	1	0	0	1	1	7
Golden shiner	0	0	0	0	1	0	0	0	0	0	0	1
Emerald shiner	0	0	19	0	0	0	0	0	0	0	0	19
Spottail shiner	0	0	2	0	0	0	1	0	0	0	2	5
Bluntnose minnow	0	10	3	0	3	10	5	0	0	0	0	31
Brook silverside	0	0	0	0	0	0	0	0	0	0	1	1
Brook stickleback	0	1	0	0	0	0	0	0	0	0	0	1
Threespine stickleback	0	0	0	0	0	0	0	1	0	0	1	2
Rock bass	0	0	0	0	0	2	3	2	2	0	2	11
Green sunfish	0	10	10	2	6	9	8	1	2	0	1	49
Pumpkinseed	0	3	0	0	1	1	0	0	1	0	1	7
Bluegill	0	7	0	1	2	9	0	0	0	0	3	22
Smallmouth bass	0	0	0	0	1	1	0	0	0	0	0	2
Largemouth bass	0	0	0	0	2	7	2	0	3	26	4	44
Green sunfish x Bluegill	0	0	0	0	0	0	0	0	0	0	1	1
Yellow perch	0	196	188	75	9	8	3	0	0	0	0	479
Total Fish	2	267	371	158	188	185	50	21	18	55	39	1354
Total Species	1	9	11	9	14	13	9	5	6	4	12	24
Sample Events Per Year	1	3	3	3	4	4	2	2	2	2	2	

AI-19

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE AI-20

NUMBER OF FISH COLLECTED FROM STATION 20 AT THE NBCR/SBCR¹ JUNCTION (RIVER MILE 325.5) ON THE CHICAGO RIVER FROM 1976 THROUGH 1996

Fish Species or Hybrid Cross (x)	Year													Grand Total
	1976	1977	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Alewife	11	0	0	18	4	27	10	26	4	8	0	3	0	111
Gizzard shad	0	0	0	22	13	74	20	210	6	0	0	1	27	373
Brown trout	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Coho salmon	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Chinook salmon	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Rainbow smelt	0	0	0	1	0	0	0	0	1	0	0	0	0	2
Goldfish	12	2	0	0	29	21	47	40	21	44	21	15	18	270
Carp	10	2	1	32	24	68	85	65	25	53	42	38	46	491
Carp x Goldfish	3	0	0	1	3	48	11	8	1	7	1	3	2	88
Golden shiner	6	0	3	0	0	2	11	1	2	0	0	0	0	25
Emerald shiner	0	0	0	12	1	2	0	2	1	0	0	0	18	36
Spottail shiner	0	0	0	0	0	24	6	11	0	0	0	0	0	41
Bluntnose minnow	0	0	0	15	17	50	84	133	22	13	6	0	0	340
Fathead minnow	1	0	1	0	0	1	0	0	0	0	0	0	0	3
White sucker	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Black buffalo	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Black bullhead	0	0	0	1	0	1	0	0	0	0	0	0	0	2
Brook stickleback	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Threespine stickleback	0	0	0	0	0	0	0	0	0	0	0	0	14	14
White bass	0	0	0	0	0	1	0	0	0	0	0	0	0	1
White perch	0	0	0	0	1	3	0	3	1	2	1	0	0	11
Rock bass	0	0	0	0	0	1	2	4	1	1	1	1	0	11
Green sunfish	0	0	2	10	12	3	17	12	7	7	5	0	1	76
Pumpkinseed	0	0	0	0	1	5	6	4	0	1	0	0	1	18
Orangespotted sunfish	0	0	0	0	0	0	0	1	0	1	0	0	0	2
Bluegill	0	0	0	5	27	9	17	19	3	4	1	1	2	88
Smallmouth bass	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Largemouth bass	0	0	0	3	3	10	9	7	1	3	6	18	32	92
Black crappie	0	0	0	0	1	0	1	1	0	0	0	0	0	3
Green x Bluegill	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Pumpkinseed x Bluegill	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Yellow perch	0	0	0	14	2	9	3	1	0	0	0	0	0	29
Freshwater drum	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Total Fish	43	4	7	134	143	359	332	548	97	146	85	80	161	2139
Total Species	5	2	4	11	15	17	17	17	14	13	8	7	9	30
Sample Events Per Year	1	2	1	3	3	3	4	4	2	2	2	2	2	

¹NBCR/SBCR denotes North Branch of the Chicago River and South Branch of the Chicago River.

AI-20