

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO



**DEPARTMENT OF RESEARCH
AND DEVELOPMENT**

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1979 ANNUAL SUMMARY REPORT
WATER QUALITY WITHIN THE WATERWAYS SYSTEM OF
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO
VOLUME 2
BIOLOGICAL**

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1979 ANNUAL REPORT
WATER QUALITY WITHIN THE WATERWAY SYSTEM OF
THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO

VOLUME II

BIOLOGICAL

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SUMMARY AND CONCLUSIONS

The waters of the Des Plaines River were sampled during 1979 and analyzed for bacteria, algae, and fish for the purpose of establishing a data base for comparison with future sampling. Improvement or deterioration of the water quality may then be determined.

Bacteria

None of the water samples collected in the Des Plaines River met the Illinois Pollution Control Board's General Use water quality standard of 200 fecal coliform (FC) per 100 milliliters. The range of the geometric means of the FC counts from three sampling runs was 3.0×10^2 to 7.7×10^3 FC per 100 milliliters.

The numbers of total coliform (TC) and FC increased significantly from Wheeling (9.7×10^3 TC per 100 milliliters and 3.0×10^2 FC per 100 milliliters) to Roosevelt Road (1.1×10^5 TC per 100 milliliters and 7.7×10^3 FC per 100 milliliters) and then decreased at Stephen Street (4.6×10^4 TC per 100 milliliters and 2.9×10^3 FC per 100 milliliters). Fecal streptococci (FS) reached their highest level at Belmont Avenue (1.6×10^4 FS per 100 milliliters).

The standard plate count (SPC), Pseudomonas aeruginosa, (P. aeruginosa), Staphylococcus aureus (S. aureus), and Salmonella spp. levels were relatively constant in the Des Plaines River study area. Geometric means for each ranged

as follows: SPC - 1.4×10^6 to 6.7×10^6 per 100 milliliters;
P. aeruginosa - 3.6×10^2 to 3.3×10^3 per 100 milliliters;
S. aureus - 2.2×10^1 to 6.3×10^1 per 100 milliliters;
Salmonella spp. - 1.5×10^{-1} to 1.7×10^{-1} per 100 milliliters.

The Des Plaines River, based upon the bacterial data collected, can be classified as of poor quality throughout its length in Cook County. Bacterial contamination increased from County-Line Road to Belmont Avenue.

Algae

Des Plaines River plankton densities in all samples collected exceeded the definition for an algal bloom (500 organisms per milliliter). Chlorophyll a concentrations, on the average, exceeded the level of 12 micrograms per milliliter associated with eutrophic conditions. Plankton species defined as pollutant-tolerant were always present as dominants (greater than one percent of the total population). In May, of the 16 dominant species, 18.75 percent were pollutant-tolerant; in August, of the 13 dominant species, 46.15 percent were pollutant-tolerant; in November, of the nine dominant species, 22.22 percent were pollutant-tolerant. Those species dominant in May, August, and November were Cyclotella meneghiniana (a diatom), Planktonema lauterbornii (a green alga), and Oscillatoria tenuis (a blue-green alga). The diatom and blue-green algae are both defined as pollutant-tolerant.

The plankton results lead to the conclusion that the Des

plaines River was of poor quality throughout its length in the study area.

There was a high average periphyton standing crop of 10^7 organisms per square centimeter in the Des Plaines River. The percentage of periphyton pollutant-tolerant species was 25-30 percent. Of the six dominant periphyton species common to the stations sampled and in more than half of the samples collected, the following four species of diatoms were defined as pollutant-tolerant: Cocconeis placentula, Gomphonema parvulum, Hantzschia amphioxys, and Navicula cryptocephala.

The periphyton results also lead to the conclusion that the Des Plaines River study area was of poor quality, confirming the conclusion based upon the plankton data.

Fish

The two upstream stations on the Des Plaines River, Dundee and Golf Roads, were found to have 15 and 16 species of fish, respectively. The two downstream stations, Willow Springs Road and Stephen Street, were found to have 13 and 16 species of fish, respectively. At the intermediate stations the numbers of species ranged from seven to eleven. Goldfish, carp, and carp x goldfish hybrids comprised 69 percent of the total catch and 95 percent of the biomass. These fish are indicative of polluted environments. Based upon the fish collections made, the Des Plaines River can be classified as of poor

quality along the entire length within the study area,
especially in the central portion where species diversity was
the lowest.

I. INTRODUCTION

The Metropolitan Sanitary District of Greater Chicago (District) is responsible for the quality of the water in the streams and canals within its jurisdiction. The District established in 1975 its Ecosystematic Study Program, to monitor these waterways. The biological research activities under this monitoring program are provided by the Research and Development Department's Biology Research Section. The field monitoring studies are handled by the following biology groups within the Section: Analytical Microbiology, Aquatic Ecology, and Fisheries.

From 1975-1977, the deep-draft waterways (Chicago and Calumet River systems) were studied. The monitoring efforts during 1978 and 1979 were concentrated in the portion of the Des Plaines River within Cook County.

According to the 1973 Water Quality Standards adopted by the Illinois Pollution Control Board, the waters of the Des Plaines River were designated for "General Use". By definition, this means that the water is to be protected "...for aquatic life, agricultural use, primary and secondary contact use, and most industrial uses, and ensure the aesthetic quality of the state's aquatic environment."

Contamination of a river system can alter the community structure of aquatic ecosystems. Evaluation of the existing biological community structure in a river system can be useful

in detecting contamination and in quantifying the intensity of its effects. When a waterway is stressed, the more pollutant-tolerant organisms will increase in abundance while the less tolerant ones will decrease. Effects of stress can be detected by examining the population density, species composition, and species diversity of the various aquatic communities. The bacteria, phytoplankton, periphyton, and fish communities of the Des Plaines River were monitored during 1979. Baseline data were gathered to establish the water quality of this river system.

II. WATER QUALITY MONITORING

A. Description of the Des Plaines River System

The Des Plaines River watershed area covers 448,000 acres (700 square miles) in Kenosha and Racine Counties in Wisconsin and in Lake, Cook, Du Page, and Will Counties in Illinois (1). In Cook County much of the river's adjacent flood plain is owned by the Cook County Forest Preserve District. As a recreational area the floodplain attracts large numbers of the county's population.

The upper Des Plaines River is a shallow, sluggish stream with an overall elevation drop of 18 inches per mile. It flows southward through a highly urbanized watershed from the Lake-Cook County Line downstream to Highway 171 (Archer Avenue). From Highway 171 downstream to the Lockport Lock and Dam, the Des Plaines River flows southwestward parallel and adjacent to the Chicago Sanitary and Ship Canal. This lower reach of the Des Plaines River has an even more sluggish flow with an overall drop in elevation of 12 inches per mile.

B. Biological Samples Taken in the Des Plaines River

Three kinds of biological samples were collected from the Des Plaines River during 1979: (1) bacterial, (2) algae, and (3) fish.

1. Bacteria

a. Indicator bacteria. Bacterial analyses, including fecal coliform, total coliform and fecal streptococcus, have

been performed routinely on all District waterways, including the Des Plaines River, for many years, and give an indication of the presence of contamination by domestic wastes.

b. Standard Plate Count. An empirical procedure which gives an estimate of the total bacterial populations.

c. Pseudomonas aeruginosa. This ubiquitous organism is a causative agent of otitis media, otitis externa, chronic ulcerations of the skin, and many wound and burn infections.

d. Staphylococcus aureus. The most common infections caused by this organism include pimples, boils, carbuncles, and it is a causative agent of food poisoning.

e. Salmonella spp. The genus Salmonella contains species which are pathogenic for man or animals and usually for both.

2. Algae

The algae are a group of organisms containing chlorophyll (and their colorless relatives) that are thalloid, having no roots, stems, leaves, or leaf-like organs (3). This group of organisms is composed of nine phyla or divisions based on combinations of the following characteristics: pigments, reserve food products of photosynthesis, flagellation, cell wall, prokaryotic organization, life history, and reproduction. Most algae are aquatic and ubiquitous and categorized in their aquatic habitats as either phytoplankton (free swimming or passive to movements of water by current or wind) or periph-

yton (attached to a substrate).

a. Phytoplankton. Lakes and reservoirs, where the area of the littoral zone is a small portion of the total surface area, are inhabited primarily by phytoplankton. One or a number of phytoplankton may produce nuisance blooms turning the water green. A bloom has been defined as greater than 500 algae per milliliter (4).

Phytoplankton are also present in those rivers and streams where the area of the littoral zone is a small portion of the surface area. The number and variety of phytoplankton are dependent on flow and turbidity. They are usually carried passively by the current and are indicative of the water quality at some location upstream. Phytoplankton will occasionally become entrapped by the periphyton.

b. Periphyton. Rivers and streams, where the area of the littoral zone approximates the surface area, are inhabited primarily by periphyton. These algae will carpet rocks, submerged wood, aquatic plants, and many other substrates present. For the purpose of this study periphyton are defined as those algae growing on submerged microscope slides one centimeter below the water's surface.

Periphyton are also present in those lakes and reservoirs where the area of the littoral zone approximates the surface area. Periphytic organisms may be found among the phytoplankton

where they were swept by wind, waves, or the action of currents.

c. Chlorophyll a. An estimate of algal biomass is given by the chlorophyll a concentration since all aquatic algae, regardless of taxonomic classification, contain chlorophyll a as the primary photosynthetic pigment. The amount of chlorophyll a, however, varies as a function of size, age, and physiological health of the organisms.

d. Organic Matter (Volatile Solids). The measurement of organic matter can be used as an estimate of total biomass present in a sample.

3. Fish

Fish collections and analyses, which give the most meaningful index of water quality to the public, have been performed on the District waterways since 1974. Fish occupy the upper levels of the aquatic food web. Any conditions that significantly affect the other organisms of the aquatic community will also affect the species composition and abundance of the fish population.

Fish diversity measurements are useful for determining water quality. Their use is based on the observed phenomenon that relatively undisturbed environments support fish communities having large numbers of species with no individual species present in overwhelming abundance. If the fish species in such an undisturbed community are ranked on the basis of their numerical abundance, one will not find a few species with large

numbers of individuals, but rather large numbers of species each represented by only a few individuals. Many forms of stress tend to change the species composition and abundance of the fish population by making the environment unsuitable for some species or by giving other species a competitive advantage.

C. Sampling-Locations and Frequency

Seven stations were sampled for bacteria and phytoplankton (Figure 1 and Table 1), including County Line Road (Station 39), Oakton Street (Station 41), Belmont Avenue (Station 42), Roosevelt Road (Station 43), Ogden Avenue (Station 46), Willow Springs Road (Station 47), and Stephen Street (Station 48). Periphyton were collected at Dundee Road (near Station 39) and at Stephen Street (Station 48).

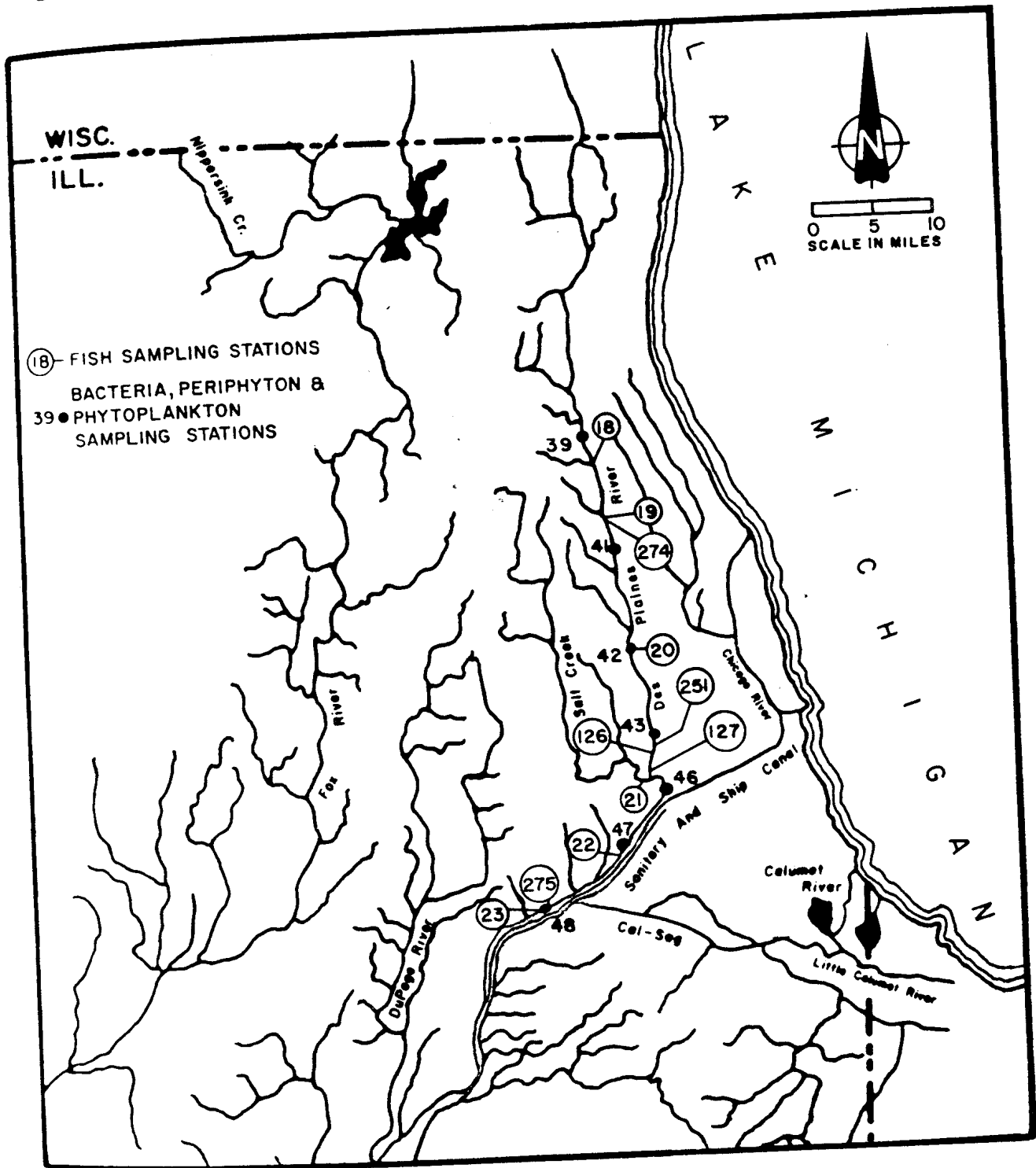
Samples for bacterial and phytoplankton analyses were collected during May, August, and November. Periphyton samples were collected biweekly beginning March 13 and ending December 4.

Nine main channel stations were sampled for fish. These stations are shown in Figure 1 and described in Table 2. These stations were sampled during June and September. Station number 126, Forest Avenue, was also sampled during April and the data are included in this report. Also included are data from two other collections which were made at Big Bend Lake (Station 274) and Goose Lake Drain mouth (Station 275) during September.

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FIGURE I

DES PLAINES RIVER WATERWAY SAMPLING STATIONS



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TABLE 1

LIST OF BACTERIA, PHYTOPLANKTON, AND PERIPHYTON SAMPLING STATIONS ON THE DES PLAINES RIVER

Station	
<u>Number</u>	<u>Location*</u>
39	County Line Road**
41	Oakton Street
42	Belmont Avenue
43	Roosevelt Road
46	Ogden Avenue
47	Willow Springs Road
48	Stephen Street**

* The water samples for analysis are taken from the upstream side of each bridge.

** Phytoplankton and Periphyton sampling stations.

Table 2

FISH SAMPLING STATION LOCATIONS

Number	Station	Location
18		River mile 74.0, T42N/R11E/S12SE, 1500 meters above Dam No. 1, Dundee Road, Wheeling, Illinois
19		River mile 67.0, T41N/R12E/S8SE upstream of Golf Road, Des Plaines, Illinois
274		River mile 66.0, T41N/R12E/S16NE, Big Bend Lake, Des Plaines, Illinois
20		River mile 55.1, T40N/R12E/S27NE, upstream of Grand Avenue, River Grove, Illinois

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Table 2 (Continued)

FISH SAMPLING STATION LOCATIONS

Number	Station	Location
251		River mile 49.1, T39N/R12E/S23NW, downstream of Roosevelt Road, Maywood, Illinois
126		River mile 45.4, T38-39N/R12E/S2NE-35SE, 400 meters above mouth of Salt Creek, Forest Avenue, Lyons, Illinois
127		River mile 45.2, T38N/R12E/S2NW, mouth of Salt Creek with Des Plaines River, First Avenue, Lyons, Illinois
21		River mile 45.1, T38N/R12E/S2NW, 50 meters downstream of mouth of Salt Creek, Ogden Avenue, Lyons, Illinois

Table continued on following page

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Table 2 (Continued)

FISH SAMPLING STATION LOCATIONS

<u>Number</u>	<u>Station</u>	<u>Location</u>
22		River mile 35.2, T37N/R12E/S5NW, 515 meters downstream of Willow Springs Road, Willow Springs, Illinois
23		River mile 26.7 (Sept.) - 28.2 (June), T37N/R11E/S19-20, downstream of Stephen Street, Lemont, Illinois
275		River mile 27.0, T37N/R11E/S19NE, mouth of Goose Lake Drain, Lemont, Illinois

III. METHODS OF BIOLOGICAL ANALYSES OF WATERWAYS SAMPLES

A. Bacteria

Water samples for bacterial analyses were collected in sterile one-gallon containers with enough sodium thiosulfate to neutralize 15 milligrams per liter chlorine. All samples were taken with a bucket at the stream surface in the center of the waterway. The samples were transported, on ice, to the R & D Laboratory in Stickney, Illinois. Analyses were begun approximately six hours after collection. Total coliform (TC) were estimated and verified according to membrane filter (MF) procedures outlined in Standard Methods for the Examination of Water and Wastewater (5). Fecal coliform (FC) determinations and verifications were carried out according to the MF technique described by Geldreich et al. (6). Fecal streptococci (FS) were determined and verified by a technique described by Kenner et al. (7) Standard plate counts (SPC) were performed using the pour plate technique described in Standard Methods (5). Pseudomonas aeruginosa analyses were performed and confirmed according to a most probable number (MPN) procedure described in Standard Methods (5). Staphylococcus aureus was quantified and verified using a MF procedure in Standard Methods (8). Salmonella spp. densities were estimated using a modification of the MPN technique described by Kenner and Clark (9). Presumptive Salmonella spp. were identified biochemically using the API-20[®] system. Confirma-

tion of isolates was performed with polyvalent Salmonella "O" antisera. Verification and further serotyping of the isolates were performed by the Illinois Department of Public Health. Several isolates were submitted in duplicate or triplicate to assess the accuracy of the serotyping.

B. Algae

1. Phytoplankton

Surface grab samples were collected from the Des Plaines River from bridges (on the upstream side) by the Industrial Waste Division samplers. A one-half gallon sample (preserved in four percent (v/v) formalin) was collected at each of the seven sites and kept iced in the dark until delivered to the laboratory. This preserved sample was analyzed for phytoplankton after being split into two parts; one 200 milliliter sample for diatom analysis and one 875 milliliter sample for non-diatom analysis. Diatoms were separated from other organisms and organic debris by nitric acid digestion (10). After digestion the acid solution was diluted, cooled, and the organisms concentrated on cellulose acetate membrane filters (0.22 micrometer pore size) by vacuum filtration. After air drying, a portion of the filter was cleared with immersion oil on a slide and examined under the highest possible magnification for identification and enumeration.

The second aliquot of sample, for non-diatom analyses, was processed through three cycles of settling and siphoning.

Each settling period was of five days duration. Settling was accelerated by use of a surfactant (Ivory Liquid[®]) (11). The final concentrated sample volume was 4.4 milliliters. A 0.1 milliliter portion of this concentrated sample was sealed into a small reservoir on a microscope slide and examined at 400X magnification for organism identification and enumeration. Using the appropriate factors the total diatom and non-diatom phytoplankton population per milliliter was calculated.

2. Periphyton

Periphyton samplers consisting of floats and a plastic cage containing eight microscope slides held vertically were placed into the Des Plaines River at Wheeling and Lemont. A lead line of at least five feet anchored each sampler. Periphyton (attached algae) were allowed to develop on these glass slides for two weeks, the cage of slides was then replaced and the developed slides were iced and kept in the dark until delivered to the laboratory. In the laboratory, the organisms were scraped off the slides and analyzed. Diatoms were cleared of organic matter by treatment with 30 percent hydrogen peroxide for 24 hours followed by the addition of dichromate. After digestion the organisms were repeatedly washed with distilled water to remove all traces of dichromate. The cleaned diatoms were concentrated to 50 milliliters by sedimentation and a two milliliter aliquot was dried on a

cover slip by heating on a hot plate. The cover slip was mounted on a microscope slide using Hyrax[®] mounting medium and examined microscopically for diatom identification and enumeration.

The non-diatoms were preserved and fixed with several drops of 50 percent (v/v) glutaraldehyde. The volume was adjusted to 10 milliliters and 0.1 milliliters was placed in a small reservoir, sealed onto a microscope slide, and examined microscopically for non-diatom periphyton. The non-diatoms were identified and enumerated using the high dry objective (total magnification 620X). Total counts and diatom and non-diatom counts were calculated and expressed as organisms per square centimeter of slide area.

3. Chlorophyll a

A one-half gallon sample without preservative was also collected at each of the seven phytoplankton sites for chlorophyll a analysis. A portion, usually 500 milliliters, was filtered through a glass fiber filter, the solids from the filter were ground in a tissue grinder at 500 revolutions per minute for three minutes, and refrigerated in 90 percent acetone in the dark for a maximum of 24 hours.

In order to determine the chlorophyll a content of periphyton the scrapings from one or two slides were placed in a tissue grinder with 90 percent acetone and ground at 500 revolutions per minute for three minutes. The sample

was allowed to steep in acetone in the dark at 4°C for a maximum of 24 hours.

From this point the handling and analysis of chlorophyll a samples from phytoplankton and periphyton were the same. The ground sample was centrifuged at over 500 x g for approximately 20 minutes to remove turbidity and the supernatant was scanned in a Beckman DK-2A[®] Spectrophotometer (bandpass six nanometers at 663 nanometers) from 750 to 600 nanometers. The UNESCO equations (11) for chlorophyll (trichromatic method) were used to determine chlorophyll concentrations in the extract and extrapolated to the original sample. The monochromatic method for chlorophyll a concentration, pheophytin corrected, was also used (11).

4. Organic Matter

Organic matter was determined for periphyton samples by drying one to two slides (105°C) and weighing when at room temperature. These slides were placed in a muffle furnace (550 to 600°C), ashed for one-half hour, and weighed when at room temperature. The difference in weight between the dried and ashed sample yielded the organic matter present in the sample. Knowing the area of the slides the weight of organic matter per square centimeter was calculated.

5. Autotrophic Index (AI)

The AI is the ratio of the organic matter concentration (micrograms per square centimeter) to the chlorophyll a concentration (micrograms per square centimeter). Based on the

observation that in relatively clean water chlorophyll a is one to two percent of the organic matter, Weber (11) states that values greater than 100 indicate organic matter contamination such as sewage. Standard Methods (5) states that normal AI values are in the range of 50 to 200 and that values greater than 200 are indicative of organic matter pollution.

C. Fish

Fish were collected by use of a 230 volt (8-11 amp) alternating current boat-mounted-boom electrofisher. Fish were removed from the water with a net after being stunned. The electrofishing boat was followed by a back-up boat in order to collect those stunned fish which rose to the surface more slowly than others.

Generally, a 400 meter section of stream was marked off by use of an optical range finder and both shorelines were electrofished for a total distance of 800 meters. Exceptions to this occurred at the following locations: Station 274 (Big Bend Lake) and Station 275 (Goose Lake Drain) where the total distance was not measured; Station 251 (Roosevelt Road) during September where the total distance was 900 meters; Station 126 (Forest Avenue) during April where the total distance was 400 meters; and Station 127 (First Avenue) during June and September where the total distance was 160 meters in each month. Electro-fishing time was noted for all collections.

Large fish were identified to species, weighed to the nearest gram or ounce, and measured for total length to the

nearest millimeter, and released into the stream of capture. Smaller fish (less than 80 millimeters total length) were preserved in 10 to 15 percent (v/v) formalin and identified, weighed, and measured in the laboratory at a later date.

IV. RESULTS AND DISCUSSION OF THE DES PLAINES RIVER BIOLOGICAL MONITORING FOR 1979

A. Bacteria

1. Indicator Bacteria

a. Total Coliform. As seen in Table 3, the TC counts increased from 9.7×10^3 per 100 milliliters to 1.1×10^5 per 100 milliliters from County Line Road to Roosevelt Road, respectively. The TC counts decreased significantly from 1.1×10^5 per 100 milliliters to 6.0×10^3 at Willow Springs Road before increasing to 4.6×10^4 per 100 milliliters at Stephen Street.

Sixty-one percent of the 92 typical colonies tested confirmed as TC (Table 4). This is within the normal range of 60 to 70 percent confirmations for TC (5).

b. Fecal Coliform. The data given in Table 3 shows a significant increase of FC from County Line Road (3.0×10^2 FC per 100 milliliters) to Roosevelt Road (7.7×10^3 FC per 100 milliliters). No further significant change in FC ensues downstream of Roosevelt Road to Stephen Street (2.9×10^3 FC per 100 milliliters). Apparently the largest contamination source affecting the Des Plaines River occurred between County Line Road and Roosevelt Road as shown by the TC and FC data. The sources of this contamination are the 197 combined sewer outfalls on the Des Plaines River and the 119 combined sewer outfalls on Salt Creek which combines with the Des Plaines River between Roosevelt Road and Ogden Avenue (District,

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Table 3

BACTERIAL COUNTS IN THE DES PLAINES RIVER, 1979
(GEOMETRIC AVERAGE OF THREE SAMPLING RUNS: MAY 9, AUGUST 5, AND NOVEMBER 27)

STATION*		TC ¹	FC ²	FS ³	SPC ⁴	PA ⁵	SA ⁶	Sal. ⁷
Number	Location	(All units are counts per 100 milliliters)						
39	County Line Road	9.7x10 ³	3.0x10 ²	2.5x10 ²	1.4x10 ⁶	4.8x10 ²	<2.2x10 ¹	<1.5x10 ⁻¹
41	Oakton Street	5.7x10 ⁴	3.6x10 ³	7.9x10 ²	1.9x10 ⁶	6.2x10 ²	<2.2x10 ¹	<1.5x10 ⁻¹
42	Belmont Avenue	8.0x10 ⁴	7.0x10 ³	1.6x10 ⁴	2.6x10 ⁶	3.6x10 ²	<6.3x10 ¹	<1.5x10 ⁻¹
43	Roosevelt Road	1.1x10 ⁵	7.7x10 ³	3.4x10 ³	3.2x10 ⁶	5.2x10 ²	<2.2x10 ¹	<1.5x10 ⁻¹
46	Ogden Avenue	8.1x10 ⁴	6.5x10 ³	1.8x10 ³	1.7x10 ⁶	8.5x10 ²	<2.2x10 ¹	<1.5x10 ⁻¹
47	Willow Springs Road	6.0x10 ³	4.1x10 ³	1.4x10 ⁴	6.7x10 ⁶	3.3x10 ³	<4.2x10 ¹	<1.7x10 ⁻¹
48	Stephen Street	4.6x10 ⁴	2.9x10 ³	2.0x10 ³	2.3x10 ⁶	5.9x10 ²	<2.2x10 ¹	<1.5x10 ⁻¹

* Figure 1

1 = total coliform

2 = fecal coliform

3 = fecal streptococcus

4 = standard plate count

5 = Pseudomonas aeruginosa

6 = Staphylococcus aureus

7 = Salmonella spp.

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Table 4

TOTAL COLIFORM, FECAL COLIFORM AND FECAL STREPTOCOCCUS
COLONY CONFIRMATIONS DURING THE DES PLAINES
RIVER ECOSYSTEMATIC STUDY - 1979.

	Total Coliform	Fecal Coliform	Fecal Streptococcus
Typical colonies picked	92	85	92
Typical colonies confirmed	56	89	89
Percent confirmed	61	94	97

1981). Non-point source runoff from heavily populated areas adds to the bacterial contamination. Ninety-four percent of 85 typical colonies tested were confirmed as FC. This is well within the normal range of 90-95 percent for bacteria classified as FC (Table 4) (5).

The Des Plaines River is subject to an IPCB stream standard of 200 FC per 100 milliliters as a geometric mean of five samples taken over a less than 30-day sampling period. If one considers seven samples collected on one day as meeting the sampling requirements, the Des Plaines River did not meet the IPCB stream standard at any time at any station, indicating water of relatively poor bacterial quality.

c. Fecal Streptococcus. The FS increased from County Line Road (2.5×10^2 FS per 100 milliliters) to Belmont Avenue (1.6×10^4 FS per 100 milliliters), as shown in Table 3. Downstream of Belmont Avenue, the FS remained within the same range with a low of 1.8×10^3 FS per 100 milliliters at Ogden Avenue and a high of 1.4×10^4 FS per 100 milliliters at Willow Springs Road. Significant contamination entered the Des Plaines River between County Line Road and Belmont Avenue. The sources of FS contamination were combined sewer outfalls and non-point source runoff from the populated and industrial areas along the Des Plaines River.

Ninety-seven percent of the 92 typical colonies tested were confirmed as FS. Again, this is well within the normal range of 90-100 percent for bacteria classified as FS (Table 4) (5).

2. Standard Plate Count

The SPC as shown in Table 3 did not vary greatly ranging from 1.4×10^6 SPC per 100 milliliters at County Line Road to 6.7×10^6 SPC per 100 milliliters at Willow Springs Road. This suggested that the total bacterial population was relatively unchanged within the study area.

3. Pseudomonas aeruginosa

The number of Pseudomonas aeruginosa (PA) isolated did not range widely in the study area, varying from a low of 3.6×10^2 PA per 100 milliliters at Belmont Avenue to a high of 3.3×10^3 PA per 100 milliliters at Willow Springs Road (Table 3). This means that a basic PA population inhabited the waters of the Des Plaines River with very little variation and no detectable additions.

4. Staphylococcus aureus

The data given in Table 3 shows little variation between stations for Staphylococcus aureus (SA) densities. The geometric means range from a low of $<2.2 \times 10^1$ SA per 100 milliliters at all stations except Belmont Avenue ($<6.3 \times 10^1$ SA per 100 milliliters) and Willow Springs Road ($<4.2 \times 10^1$ SA per 100 milliliters). Only three out of 156 typical colonies tested were confirmed as SA. This data indicated that a small SA population inhabited the waters of the Des Plaines River throughout the study area. No additions of this organism were detected in the study area.

5. Salmonella spp.

Salmonella spp. levels were low in the Des Plaines River. The highest density of 1.7×10^{-1} Salmonella spp. per 100 milliliters shown in Table 3 occurred at Willow Springs Road. Salmonella spp. were isolated from the November sampling run. Four of the five serotypes isolated were the common S. hartford, S. anatum, S. typhimurim, and S. infantis. Serotyping results are presented in Table 5.

B. Algae

1. Phytoplankton

In a river phytoplankton are transients moving downstream with the current reflecting conditions upstream rather than conditions existing at the point of sampling.

Three sampling runs were conducted on the Des Plaines River during 1979 on May 8, August 14, and November 27. Seven stations were sampled on each run from County Line Road on the north (upstream) to Stephen Street on the south (downstream). Figure 1 shows the locations of the seven stations sampled for phytoplankton.

Results of the phytoplankton analyses and associated chlorophyll a concentrations are presented in Table 6. It can be seen that the phytoplankton densities found at each station for each sampling run constituted algal bloom proportions (500 organisms per milliliter) as defined by Lackey (4). On the basis of chlorophyll a concentrations, oligotrophy has been defined as less than seven micrograms per liter, mesotrophy as 7-12 micrograms per

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Table 5

RESULTS OF SEROTYPING SALMONELLA ISOLATES
FROM THE DES PLAINES RIVER SYSTEM, NOVEMBER 22, 1979

Serotype	Location*	Number Isolated
<u>S. hartford</u>	Oakton Street	1
<u>S. anatum</u>	Roosevelt Road	1
<u>S. 58:6:26 subgenus II</u>	Willow Springs Road	1
<u>S. typhimurium</u>	Willow Springs Road	1
<u>S. infantis</u>	County Line Road	1

* Figure 1 for location.

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TABLE 6

INDIVIDUAL AND AVERAGE RESULTS OF PHYTOPLANKTON AND CHLOROPHYLL A ANALYSES
DES PLAINES RIVER - MAY 8, 1979

Stations*	Total Plankton (counts/ml)	Number of Plankton Species	Chlorophyll a (µg/L)		
			Trichromatic	Monochromatic	
County Line Road	39	2,000	57	16.2	14.4
Oakton Street	41	1,800	62	16.8	8.0
Belmont Avenue	42	2,200	63	23.9	28.3
Roosevelt Road	43	2,600	66	25.5	29.9
Ogden Avenue	46	2,400	65	22.9	21.9
Willow Springs Road	47	2,200	64	25.1	26.7
Stephen Street	48	2,700	70	26.1	26.2
	Average 2,270		63.9	22.36	22.2

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TABLE 6 (CONTINUED)

INDIVIDUAL AND AVERAGE RESULTS OF PHYTOPLANKTON AND CHLOROPHYLL A ANALYSES
DES PLAINES RIVER - AUGUST 14, 1979

Stations*		Total Plankton (counts/ml)	Number of Plankton Species	Chlorophyll a (µg/L)	
				Trichromatic	Monochromatic
County Line Road	39	7,500	68	21.4	13.4
Oakton Street	41	17,000	57	43.1	29.9
Belmont Avenue	42	44,000	48	58.2	43.2
Roosevelt Road	43	16,000	34	20.3	16.6
Ogden Avenue	46	20,000	46	10.1	6.4
Willow Springs Road	47	22,000	46	18.1	11.8
Stephen Street	48	11,000	42	16.8	10.9
	Average	19,600	48.7	26.84	18.89

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TABLE 6 (CONTINUED)

INDIVIDUAL AND AVERAGE RESULTS OF PHYTOPLANKTON AND CHLOROPHYLL A ANALYSES
DES PLAINES RIVER - NOVEMBER 27, 1979

Stations*		Total Plankton (counts/ml)	Number of Plankton Species	Chlorophyll a (µg/L)	
				Trichromatic	Monochromatic
County Line Road	39	6,100	45	8.8	5.3
Oakton Street	41	3,190	48	7.4	4.3
Belmont Avenue	42	7,400	41	9.9	7.5
Roosevelt Road	43	2,900	46	37.4	21.9
Ogden Avenue	46	4,500	46	10.6	9.6
Willow Springs Road	47	4,300	42	9.2	8.0
Stephen Street	48	6,200	48	9.3	8.0
	Average	4,900	45.1	13.23	9.23

*Figure 1 for location.

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TABLE 7

DOMINANT PLANKTONIC ORGANISMS (>1% OF TOTAL POPULATION) FOUND
IN THE DES PLAINES RIVER - 1979

Stations*	Genus	Species	May 8, 1979 % of total population	Aug. 14, 1979 % of total population	Nov. 27, 1979 % of total population
#39 Lake-Cook Rd.	<u>Cyclotella</u>	<u>glomerata</u>	14.3		19.2
	** <u>C.</u>	<u>meneghiniana</u>	9.0	9.2	9.4
	** <u>Navicula</u>	<u>cryptocephala</u>		5.1	
	<u>Stephanodiscus</u>	<u>astraea</u>	5.4		
	<u>S.</u>	<u>astraea</u>			
		<u>v. minutula</u>	11.7		
	** <u>Chlorella</u>	<u>vulgaris</u>	5.2		
	<u>Crucigenia</u>	<u>quadrata</u>		4.6	
	<u>Gleocystis</u>	<u>vesiculosa</u>		4.9	
	** <u>Micractinium</u>	<u>pusillum</u>		7.7	
	<u>Planktonema</u>	<u>lauterbornii</u>		6.3	
	** <u>Scenedesmus</u>	<u>quadricauda</u>		10.3	
	<u>Anabaena</u>	<u>wisconsinense</u>			13.1
	<u>Chroococcus</u>	<u>dispersus</u>			7.2
		<u>v. minor</u>			
	<u>C.</u>	<u>minutus</u>		8.6	
	<u>Lyngbia</u>	<u>limnetica</u>			20.1
	** <u>Oscillatoria</u>	<u>tenuis</u>		5.8	
#41 Oakton St.	<u>Cyclotella</u>	<u>glomerata</u>	10.3		27.3

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 7 (CONTINUED)

DOMINANT PLANKTONIC ORGANISMS (>1% OF TOTAL POPULATION) FOUND
IN THE DES PLAINES RIVER - 1979

Stations*	Genus	Species	May 8, 1979 % of total population	Aug. 14, 1979 % of total population	Nov. 27, 1979 % of total population
#41 (Cont'd) Oakton St.	<u>C.</u>	<u>meneghiniana</u>	4.9	7.8	16.3
	** <u>Navicula</u>	<u>gregaria</u>			8.2
	** <u>Chlorella</u>	<u>vulgaris</u>	6.6		
	** <u>Eudorina</u>	<u>elegans</u>		5.1	
	** <u>Micractinium</u>	<u>pusillum</u>		6.4	
	<u>Planktonema</u>	<u>kauterbornii</u>		16.1	
	<u>Chroococcus</u>	<u>dispersus</u>		12.1	
	<u>C.</u>	<u>minutus</u>		4.8	
	<u>Lyngbia</u>	<u>limnetica</u>	5.8		
	<u>Oscillatoria</u>	<u>subbrevis</u>		14.0	
	** <u>O.</u>	<u>tenuis</u>	6.6		
	<u>Phormidium</u>	<u>minnesotense</u>			
#42 Belmont Ave.	<u>Cyclotella</u>	<u>glomerata</u>	13.5		9.1
	** <u>C.</u>	<u>meneghiniana</u>	13.8	4.9	7.9
	** <u>Micractinium</u>	<u>pusillum</u>		5.8	
	<u>Planktonema</u>	<u>lauterbornii</u>	6.9		
	<u>Anabaena</u>	<u>wisconsinense</u>			34.4
	<u>Chroococcus</u>	<u>dispersus</u>	8.2		
	<u>Lyngbia</u>	<u>limnetica</u>			21.0
	<u>Oscillatoria</u>	<u>subbrevis</u>		16.4	
	** <u>O.</u>	<u>tenuis</u>		49.7	

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 7 (CONTINUED)

DOMINANT PLANKTONIC ORGANISMS (>1% OF TOTAL POPULATION) FOUND
IN THE DES PLAINES RIVER - 1979

Stations*	Genus	Species	May 8, 1979 % of total population	Aug. 14, 1979 % of total population	Nov. 27, 1979 % of total population
#43 Roosevelt Road	<u>Cyclotella</u>	<u>glomerata</u>	6.0		5.4
	** <u>C.</u>	<u>meneghiniana</u>	5.3	11.8	16.9
	** <u>Stephanodiscus</u>	<u>hantzschii</u>	13.6		
	** <u>Chlorella</u>	<u>vulgaris</u>	5.5		
	<u>Planktonema</u>	<u>lauterbornii</u>		4.8	9.9
	<u>Anabaena</u>	<u>wisconsinense</u>			8.8
	<u>Chroococcus</u>	<u>dispersus</u>	6.6		
	<u>Oscillatoria</u>	<u>subbrevis</u>		31.1	
	** <u>O.</u>	<u>tenuis</u>		44.1	
#46 Ogden Avenue	<u>Cyclotella</u>	<u>glomerata</u>			9.4
	** <u>C.</u>	<u>meneghiniana</u>	5.7		17.6
	<u>Stephanodiscus</u>	<u>astraea</u>			
		<u>v. minutula</u>	5.6		
	** <u>S.</u>	<u>hantzschii</u>	7.6		
	** <u>Chlorella</u>	<u>vulgaris</u>	6.1		
	<u>Planktonema</u>	<u>lauterbornii</u>		5.7	15.4
	<u>Anabaena</u>	<u>oscillarioides</u>		5.9	
	<u>Chroococcus</u>	<u>minutus</u>	5.7		
<u>Lyngbia</u>	<u>limnetica</u>	9.9			

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 7 (CONTINUED)

DOMINANT PLANKTONIC ORGANISMS (>1 % OF TOTAL POPULATION) FOUND
IN THE DES PLAINES RIVER - 1979

Stations*	Genus	Species	May 8, 1979 % of total population	Aug. 14, 1979 % of total population	Nov. 27, 1979 % of total population
#46 (Cont'd) Ogden Avenue	<u>Oscillatoria</u>	<u>subbrevis</u>		44.3	
	** <u>O.</u>	<u>tenuis</u>		31.5	26.8
#47 Willow Springs	<u>Cyclotella</u>	<u>glomerata</u>			8.2
	** <u>C.</u>	<u>meneghiniana</u>			18.3
	<u>Stephanodiscus</u>	<u>astraea</u>			
		<u>v. minutula</u>	6.9		
	** <u>S.</u>	<u>hantzschii</u>	7.1		
	** <u>Ankistrodesmus</u>	<u>falcatus</u>	4.5		
	<u>Planktonema</u>	<u>lauterbornii</u>			30.6
	** <u>Scenedesmus</u>	<u>apoliensis</u>	4.8		
	<u>Dinobryon</u>	<u>cylindricum</u>	4.5		
	<u>Anabaena</u>	<u>oscillarioides</u>		16.3	
	<u>Chroococcus</u>	<u>minutus</u>	12.9		
<u>Lyngbia</u>	<u>limnetica</u>			6.2	
<u>Oscillatoria</u>	<u>subbrevis</u>		25.1		
** <u>O.</u>	<u>tenuis</u>		45.5		

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 7 (CONTINUED)

DOMINANT PLANKTONIC ORGANISMS (>1% OF TOTAL POPULATION) FOUND
IN THE DES PLAINES RIVER - 1979

Stations*	Genus	Species	May 8, 1979 % of total population	Aug 14, 1979 % of total population	Nov. 27, 1979 % of total population
#48 Stephens St.	<u>Cyclotella</u>	<u>glomerata</u>			5.4
	** <u>C.</u>	<u>meneghiniana</u>		6.7	
	<u>Stephanodiscus</u>	<u>astrae</u>			
		<u>v. minutula</u>	9.2		
	** <u>S.</u>	<u>hantzschii</u>	10.1		
	<u>Botryococcus</u>	<u>sudeticus</u>	12.9		
	<u>Anabaena</u>	<u>oscillarioides</u>		29.0	
	<u>Chroococcus</u>	<u>dispersus</u>			
		<u>v. minor</u>	4.6		
	<u>Lyngbia</u>	<u>limnetica</u>	4.9		
	<u>Oscillatoria</u>	<u>subbrevis</u>		25.2	
** <u>O.</u>	<u>tenuis</u>		22.2	55.5	

* Figure 1 for location.

** Polluted Water Algae.

liter, and eutrophy as greater than 12 micrograms per liter (12). The average chlorophyll a concentrations which range between 13.2 to 26.8 micrograms per liter for each sampling run presented in Table 6, therefore, defined an eutrophic situation.

Table 7 lists the phytoplankters present in densities greater than one percent of the total phytoplankton population at each station for each sampling run. These organisms represent the dominants of the total population.

Sixteen species of phytoplankton were dominants in the spring (May 8) samples, however, no single species was present at all stations. Three species (Cyclotella glomerata, C. meneghiniana, and Stephanodiscus hantzschii), all diatoms, were present at more than half the stations. Two of these species (Cyclotella meneghiniana and Stephanodiscus hantzschii) were pollutant-tolerant organisms as shown in Table 7 and defined by Palmer (13 and 14).

Of the 13 dominant phytoplankton species collected during the summer sampling run (August 14), six species were pollutant-tolerant as shown in Table 7 and defined by Palmer (13 and 14). No single species was dominant at all stations but four species (Cyclotella meneghiniana, Planktonema lauterbornii, Oscillatoria subbrevis, and O. tenuis) were present at more than half the stations sampled. Two of these four species (Cyclotella meneghiniana and Oscillatoria tenuis) were pollutant-tolerant as defined by Palmer (13 and 14).

Nine dominant phytoplankters were found in the samples collected November 27 (Table 7). Two of these nine species were tolerant of organic enrichment, a diatom (Cyclotella menaghiniana) and a blue-green alga (Oscillatoria tenuis). Two diatom species, Cyclotella glomerata and C. menaghiniana, were present as dominants at every station. In addition, a blue-green alga (Lynghia limnetica) was present at more than half the stations sampled.

Examination of the phytoplankton results of the three sampling runs showed that the number of dominant species per season declined from 16 in the spring (May 8) to 13 in the summer (August 14) and to nine in the autumn (November 27). Those species present each season sampled as dominants were Cyclotella menaghiniana (a diatom), Planktonema lauterbornii (a green alga), and Oscillatoria tenuis (a blue-green alga). The diatom and blue-green algae are both pollutant-tolerants as defined by Palmer (14).

An assessment of the water quality of the Des Plaines River during 1979 on the basis of the phytoplankton data leads to the conclusion that the entire system within the study area was degraded by organic discharges from a variety of sources which probably include sewage treatment plant effluents, non-point source runoff, and combined sewer overflows.

2. Periphyton

Algae occurring on, but not penetrating, substrates present in the water are defined as periphyton. They may be classified according to the substrate on which they occur, for example:

episammic (occurring on sand), epipellic (occurring on mud), or epidendric (occurring on wood) (15). Periphyton, as used in this report, are defined as those algae growing on microscope slides suspended vertically in water at a depth of one centimeter.

Biweekly sampling of periphyton on the Des Plaines River at Dundee Road in Wheeling, Illinois, and at Stephen Street in Lemont, Illinois, began March 13, 1979 and continued to December 4, 1979. However, only 12 comparative samples were collected. Fluctuations in water levels and vandalism accounted for the loss of many periphyton samplers.

No significant differences were obvious for the two stations in regard to average periphyton densities (Tables 8 and 9). However, a twenty percent decline in average number of species and a reduction in chlorophyll a concentrations (30 percent by the trichromatic method and 40 percent by the monochromatic method) were noted from Wheeling to Lemont. An average increase of 19 percent in organic matter, or ash-free dry weight occurred from the Dundee Road station (Table 8) (0.21 milligrams of organic matter per square centimeter) to the Stephen Street station (0.25 milligrams of organic matter per square centimeter) Table 9.

A shift in species composition occurred with declining numbers of species but the population density remained constant. The organisms at Wheeling contained more chlorophyll a or were in a better physiological state than those collected at Lemont. The increased organic matter content with decreased chlorophyll a

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Table 8

DES PLAINES RIVER PERIPHYTON ANALYSIS
AT WHEELING, ILLINOIS - 1979

Date	Ash Free Dry Weight (mg/cm ²)	Chlorophyll a		Total Periphyton (counts/cm ²)	Numbers of Periphyton Species
		Trichromatic (µg/cm ²)	Monochromatic (µg/cm ²)		
3/13 - 3/27	-*	-	-	6,340	47
4/24 - 5/08	0.34	4.89	4.15	-	-
6/05 - 6/19	0.32	2.19	2.50	380,000	23
7/03 - 7/17	0.45	-	-	1,650,000	40
8/15 - 8/28	0.20	0.98	0.78	60,100,000	25
8/28 - 9/11	0.31	4.95	4.81	47,700,000	36
9/11 - 9/25	0.23	1.88	1.68	15,800,000	28
9/25 -10/09	0.10	1.12	1.11	18,300,000	31
10/09 -10/23	0.05	0.31	0.31	7,490,000	38
10/23 -11/06	0.11	0.23	0.22	6,300,000	39
11/06 -11/20	0.12	0.54	0.48	14,200,000	40
11/20 -12/04	0.04	0.55	0.71	16,100,000	39
Average	0.21	1.76	1.68	17,100,000	35

* Sample lost, no data.

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Table 9

DES PLAINES RIVER PERIPHYTON ANALYSIS
AT LEMONT, ILLINOIS - 1979

Date	Ash Free Dry Weight (mg/cm ²)	Chlorophyll a		Total Periphyton (counts/cm ²)	Numbers of Periphyton Species
		Trichromatic (µg/cm ²)	Monochromatic (µg/cm ²)		
3/13 - 4/10	-*	-	-	39,900	20
4/24 - 5/08	0.51	4.44	3.91	-	-
6/05 - 6/19	0.30	1.92	1.47	75,500	27
7/03 - 7/17	0.19	-	-	20,500,000	24
8/15 - 8/28	0.28	1.06	0.78	1,350,000	24
8/28 - 9/11	0.56	0.42	0.26	622,000	26
9/11 - 9/25	0.10	0.18	0.14	9,600,000	30
9/25 - 10/09	0.27	0.88	0.72	13,800,000	35
10/09 - 10/23	0.10	0.74	0.64	16,400,000	34
10/23 - 11/06	0.24	1.16	1.10	27,000,000	25
11/06 - 11/20	0.11	1.07	1.02	25,600,000	33
11/20 - 12/04	0.08	0.11	0.11	490,000	33
Average	0.25	1.20	1.02	10,500,000	28

*Sample lost, no data.

concentrations indicated dead or dying organisms, increased detritus, or both.

Fifty-six periphyton species were dominants (greater than one percent of the total periphyton population) at Wheeling (Table 10). Forty species were dominants at the Lemont site (Table 11). Of these dominant species, 25 percent (14 species) and 30 percent (12 species) were pollutant-tolerant organisms found at Wheeling and Lemont, respectively. Only nine species at each sampling site were dominants and occurred in more than half of the samples collected; six of these nine species were common to both sites.

The species common to both sites were Cocconeis placentula, Gomphonema parvulum, Hantzschia amphioxys, Melosira varians, Navicula cryptocephala, and Navicula pupula. All these species are diatoms and five of them are pollutant-tolerants as shown in Tables 10 and 11 and defined by Palmer (13 and 14). It can be concluded that the Des Plaines River between Wheeling and Lemont sampling stations has poor water quality based upon the levels of pollutant-tolerant species present.

In assessing the water quality of the Des Plaines River over the entire study area between the Wheeling (Dundee Road) and Lemont (Stevens Street) stations in 1979 on the basis of periphyton analysis, the following was considered:

- (1) The high densities of organisms of approximately 10^7 per square centimeter (Table 8).

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TABLE 10

PERIPHYTON ORGANISMS GREATER THAN 1% OF THE TOTAL POPULATION
AT WHEELING, ILLINOIS IN THE DES PLAINES RIVER, 1979

Genus	Species	Sampling Periods+												
		1	2	3	4	5	6	7	8	9	10	11		
<u>Achnanthes</u>	<u>biasolttiana</u>		1.2											
A.	<u>lanceolata</u>		33.5		19.0	10.2	1.2	6.6	1.5	1.6				
A.	<u>lanceolata</u>													
	<u>v. rostrata</u>	3.5				3.0						3.2	4.2	
<u>Amphora</u>	<u>delicatissima</u>				2.2									
A.	<u>perpusilla</u>		1.6											
<u>Cocconeis</u>	<u>pediculus</u>											1.8		
*C.	<u>placentula</u>		1.0	2.4	41.0	23.9	7.8	14.1	6.7					
<u>Cyclotella</u>	<u>glomerata</u>											2.5		
*C.	<u>meneghiniana</u>						1.0		1.1	1.2				
<u>Gomphonema</u>	<u>heleviticum</u>	5.6												
G.	<u>lanceolatum</u>													
	<u>v. insignis</u>				1.7	5.3	2.0	2.0						
G.	<u>olivaceum</u>	4.9												
*G.	<u>parvulum</u>	7.5	3.7	4.2	11.0	15.6	6.2	5.7	5.2	3.1				2.6
* <u>Hantzschia</u>	<u>amphioxys</u>	3.2				2.5	3.1	1.0	3.6	15.5	19.8	18.6		
H.	<u>elongata</u>								1.1			1.1		
H.	<u>sigma</u>										1.8	3.4	14.0	
H.	<u>#I</u>	48.9			9.1		1.8				6.6	1.1	1.8	
H.	<u>#II</u>		5.6											
H.	<u>#III</u>								1.1					
* <u>Melosira</u>	<u>varians</u>			6.8	2.4	21.4	61.1	56.9	45.0	18.8	3.4	14.8		

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 10 (CONTINUED)

PERIPHYTON ORGANISMS GREATER THAN 1% OF THE TOTAL POPULATION
AT WHEELING, ILLINOIS IN THE DES PLAINES RIVER, 1979

Genus	Species	Sampling Periods+										
		1	2	3	4	5	6	7	8	9	10	11
<u>Meridion</u>	<u>circulare</u>	9.3										
* <u>Navicula</u>	<u>cryptocephala</u>	2.7				1.4	2.7	1.9	7.3	26.2	22.3	12.9
<u>N.</u>	<u>exigua</u>	2.8										
<u>Navicula</u>	<u>gregaria</u>	1.4						1.0		2.7	16.2	7.7
<u>N.</u>	<u>pupula</u>			1.1		1.1	5.9	1.7	1.8	1.6	2.7	
* <u>Nitzschia</u>	<u>palea</u>								1.0	2.3	2.0	
<u>N.</u>	<u>thermalis</u>								1.1	1.9	8.1	5.1
<u>N.</u>	<u>tryblionella</u>			1.5								
<u>Rhoicosphenia</u>	<u>curvata</u>			4.2	3.8	2.8	1.8	2.1	1.5			2.0
* <u>Stephanodiscus</u>	<u>hantzschii</u>									2.3	1.1	2.2
<u>Surirella</u>	<u>ovalis</u>											1.5
* <u>Surirella</u>	<u>ovata</u>	4.7										
* <u>Synedra</u>	<u>acus</u>					1.6						
<u>S.</u>	<u>affinis</u>	1.4						1.0				1.3
<u>S.</u>	<u>gaillonii</u>					1.4						
* <u>S.</u>	<u>ulna</u>					3.6						
<u>Actinastrum</u>	<u>hantzschii</u>			4.4								
* <u>Ankistrodesmus</u>	<u>falcatus</u>			2.2								
<u>Characium</u>	<u>gracilipes</u>			2.2								
<u>Chlamydomonas</u>	<u>mucicola</u>											1.5
* <u>Chlorella</u>	<u>vulgaris</u>	4.9										
<u>Coleochaete</u>	<u>pulvinata</u>			15.3	3.6	2.1						

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 10 (CONTINUED)

PERIPHYTON ORGANISMS GREATER THAN 1% OF THE TOTAL POPULATION
AT WHEELING, ILLINOIS IN THE DES PLAINES RIVER, 1979

Genus	Species	Sampling Periods+										
		1	2	3	4	5	6	7	8	9	10	11
<u>Crucigenia</u>	<u>quadrata</u>	2.9										
<u>Oocystis</u>	<u>parva</u>			1.9					1.6			
<u>O.</u>	<u>pyriformis</u>	12.3										
* <u>Pediastrum</u>	<u>boryanum</u>			5.3								
<u>Planktonema</u>	<u>lauterbornii</u>								11.6		5.0	
<u>Protoderma</u>	<u>viride</u>	5.5		10.9	1.0							
<u>Scenedesmus</u>	<u>abundans</u>			3.4								
<u>S.</u>	<u>dimorphus</u>			3.6								
* <u>S.</u>	<u>quadricauda</u>			11.4								
<u>Stigioclonium</u>	<u>nanum</u>	8.2										
<u>Euglena</u>	<u>proxima</u>			7.0								
<u>Chroococcus</u>	<u>dispersus</u>											
	<u>v. minor</u>			4.4								
<u>C.</u>	<u>minutus</u>	8.4										
<u>Lyngbia</u>	<u>limnetica</u>										1.0	

+ Sampling Periods (1979) 1 = March 13-27, 2 = June 5-19, 3 = July 3-17, 4 = August 13-27,
5 = August 28-September 11, 6 = September 11-25, 7 = September 25-October 9, 8 = October 9-23,
9 = October 23-November 6, 10 = November 6-20, 11 = November 26-December 4

* Pollutant-Tolerant Algae (13 and 14)

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 11

PERIPHYTON ORGANISMS GREATER THAN 1% OF THE TOTAL POPULATION
AT LEMONT, ILLINOIS IN THE DES PLAINES RIVER, 1979

Genus	Species	Sampling Periods+										
		1	2	3	4	5	6	7	8	9	10	11
<u>Achnanthes</u>	<u>lanceolata</u>		4.3				1.0					3.4
<u>Amphora</u>	<u>delicatissima</u>		1.2									2.4
* <u>Cocconeis</u>	<u>placentula</u>		32.8	80.0		3.1	17.2	4.2	1.3			
<u>Cyclotella</u>	<u>glomerata</u>						14.2	10.5	10.1	31.2	5.1	1.2
* <u>C.</u>	<u>meneghiniana</u>		4.7			4.4	5.5	9.8	5.1	2.2	9.4	2.8
<u>Gomphonema</u>	<u>lanceolatum</u>											
	<u>v. insignis</u>			1.1								
<u>G.</u>	<u>olivaceum</u>	12.5	1.2									
* <u>G.</u>	<u>parvulum</u>		5.6	8.9		12.6	3.2	1.8	2.5	1.8	1.6	10.0
* <u>Hantzschia</u>	<u>amphioxys</u>	3.6	1.6	2.0		5.3	10.5	27.3	22.0	33.6	28.1	6.8
<u>H.</u>	<u>elongata</u>		1.6			5.3						
<u>H.</u>	<u>sigma</u>						10.1	1.1		5.3	9.7	
<u>H.</u>	<u>#I</u>						7.7		6.4	6.6	2.3	7.5
* <u>Melosira</u>	<u>varians</u>	1.5				6.6		5.5	13.7	2.0	5.3	18.4
<u>Meridion</u>	<u>circulare</u>											
<u>Navicula</u>	<u>cryptocephala</u>	1.1	9.5	1.3		4.7	1.4	2.0	1.3	2.2	1.8	
<u>N.</u>	<u>exigua</u>					1.3						
<u>N.</u>	<u>gregaria</u>								1.0	2.4	1.9	1.6
<u>N.</u>	<u>pupula</u>		17.5	2.0		12.9	21.1	24.2	7.0	2.6		4.4
* <u>Nitzschia</u>	<u>palea</u>						1.8		1.0	1.6	1.6	2.0
<u>N.</u>	<u>thermalis</u>		8.9			7.2		3.5	2.8	3.6	4.6	10.0
<u>N.</u>	<u>tryblionella</u>		3.9			4.1		1.3				

Table continued on following page

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 11 (CONTINUED)

PERIPHYTON ORGANISMS GREATER THAN 1% OF THE TOTAL POPULATION
AT LEMONT, ILLINOIS IN THE DES PLAINES RIVER, 1979

Genus	Species	Sampling Periods+										
		1	2	3	4	5	6	7	8	9	10	11
<u>Pinnularia</u>	<u>viridis</u>											
	<u>v. sudetica</u>					1.3						
	<u>curvata</u>	1.5			3.5	21.4		1.2				1.6
<u>Rhoicosphenia</u>	<u>curvata</u>									1.4		3.6
* <u>Stephanodiscus</u>	<u>hantzschii</u>										4.8	
<u>Surirella</u>	<u>angustata</u>	3.4									1.9	7.6
<u>S.</u>	<u>ovalis</u>	62.2									10.8	4.8
* <u>S.</u>	<u>ovata</u>	2.9	2.3									
* <u>Synedra</u>	<u>acus</u>										1.4	1.6
<u>S.</u>	<u>affinis</u>										1.2	
<u>S.</u>	<u>gaillonii</u>											
* <u>S.</u>	<u>ulna</u>	2.5				2.8						3.1
<u>Chlamydomonas</u>	<u>mucicola</u>											
<u>Coleochaete</u>	<u>pulvinata</u>					6.0						
	<u>pulvinata</u>					9.7						
* <u>Pediastrum</u>	<u>boryanum</u>					4.8		1.8	17.9			
<u>Planktonema</u>	<u>lauterbornii</u>					1.2						
<u>Protoderma</u>	<u>viride</u>	4.2				3.0						
* <u>Scenedesmus</u>	<u>quadricauda</u>					4.8						
<u>Anabaena</u>	<u>wisconsinense</u>					24.1			1.3			
<u>Lynobia</u>	<u>limnetica</u>					36.2						
<u>Oscillatoria</u>	<u>limneticus</u>											

+ Sampling Periods (1979) 1 = March 13-27, 2 = June 5-19, 3 = July 3-17, 4 = August 13-27,
5 = August 28-September 11, 6 = September 11-25, 7 = September 25 - October 9, 8 = October 9-23,
9 = October 23-November 6, 10 = November 6-20, 11 = November 26-December 4

* Pollutant-Tolerant Algae (13 and 14)

- (2) The percentage of pollutant-tolerant species as defined by Palmer (13 and 14); 25 percent of the 56 dominant species at Wheeling and 30 percent of the 40 dominant species at Lemont (Tables 9 and 10).
- (3) The percentage of pollutant-tolerant species of those organisms common to Wheeling and Lemont with a frequency greater than 50 percent of the samples collected at each station (Tables 9 and 10) was greater than eighty percent.
- (4) The AI increased from 119 at Wheeling to 208 at Lemont.

C. Comparison of Bacterial and Plankton Data

At County Line Road, the farthest upstream station in the Des Plaines River study area, the lowest TC, FC, FS and SPC of all the stations sampled were found. The TC, FC, FS and SPC at County Line Road were, respectively, 9.7×10^3 , 3.0×10^2 , 3.5×10^2 and 1.4×10^6 counts per 100 milliliters (Table 3). The plankton counts at County Line Road were the lowest found at any sampling station (5,200 counts per milliliter) while the average number of 54 plankton species was the greatest (Table 6). The bacterial and plankton data indicate that the upstream section of the Des Plaines River, north of County Line Road, had the best water quality of any segment of the Des Plaines River in the study area.

From County Line Road to Oakton Street, the FC counts increased from 3.0×10^2 to 3.6×10^3 per 100 milliliters (Table 3) indicating significant additions of domestic wastes between these

two sampling stations probably from the numerous combined sewer outfalls in the area. The plankton counts between County Line Road (5,200 counts per milliliter) and Oakton Street (7,330 counts per milliliter) (Table 6) were not significantly different nor were the number of plankton species (56.7 average species at County Line Road and 55.7 average species per milliliter at Oakton Street) (Table 6). Therefore, the bacteria data indicated that significant additions of domestic wastes occurred between County Line Road and Oakton Street on the Des Plaines River while the plankton data did not reflect any changes in water quality between these two stations.

From Oakton Street to Belmont Avenue, the FC counts increased from 3.6×10^3 to 7.0×10^3 counts per 100 milliliters (Table 3) indicating some addition of domestic wastes between these two sampling stations probably from the numerous combined sewer outfalls in the area. The plankton counts between Oakton Street (7,330 counts per milliliters) and Belmont Avenue (17,900 counts per milliliter) more than doubled while the average number of plankton species decreased nine percent from 55.7 at Oakton Street to 50.7 at Belmont Avenue (Table 6). The increase in plankton counts coupled with the decrease in average number of plankton species indicates that significant amounts of nutrient addition occurred in this stretch of the Des Plaines River. Therefore, the bacteria and plankton data indicated that additions of domestic wastewater, probably from combined sewer overflows, occurred between Oakton Street and Belmont Avenue on the

Des Plaines River.

From Belmont Avenue to Roosevelt Road, the FC counts were not significantly different (7.0×10^3 FC counts per 100 milliliters at Belmont Avenue to 7.7×10^3 FC counts per 100 milliliters at Roosevelt Road) indicating no significant discharge of domestic wastes between these stations (Table 3). The plankton counts between Belmont Avenue (17,900 counts per milliliter) and Roosevelt Road (7,170 counts per milliliter) decreased (Table 6). The average number of species (50.7 average number of plankton species at Belmont Avenue to 48.7 average number of plankton species at Roosevelt Road) decreased but not significantly (Table 6). The bacteria data reflect no significant change in water quality between Belmont Avenue and Roosevelt Road and the change in the plankton data is probably a delayed effect of the addition of domestic waste upstream of Belmont Avenue.

From Roosevelt Road to Ogden Avenue, the FC counts were not significantly different (7.7×10^3 FC counts per 100 milliliters at Roosevelt Road to 6.5×10^3 FC counts per 100 milliliters at Ogden Avenue) indicating no significant discharge of domestic waste between these stations (Table 3). The plankton counts between Roosevelt Road (7,170 counts per milliliter) and Ogden Avenue (8,970 counts per milliliter) were not significantly different nor were the average number of plankton species (48.7 average number of plankton species at Roosevelt Road and 52.3 average number of plankton species at Ogden Avenue) (Table 6). Therefore, the bacteria and plankton data indicated that no

significant additions of domestic wastes occurred between Roosevelt Road and Ogden Avenue.

From Ogden Avenue to Willow Springs Road, the FC counts decreased (6.5×10^3 FC counts per 100 milliliters at Ogden Avenue and 4.1×10^3 FC counts per 100 milliliters at Willow Springs Road) (Table 3). The FC data indicates little improvement in water quality between these two stations. The plankton densities from Ogden Avenue (8,970 counts per milliliter) and Willow Springs Road (9,500 counts per milliliter) were not significantly different nor were the average number of species (52.3 average number of plankton species at Ogden Avenue to 50.7 average number of plankton species at Willow Springs Road) (Table 6). Therefore, the bacteria and plankton data indicated no significant change in water quality between Ogden Avenue and Willow Springs Road.

From Willow Springs Road to Stephen Street, the FC counts did decrease (4.1×10^3 counts per 100 milliliters at Willow Springs Road to 2.9×10^3 FC counts per 100 milliliters at Stephen Street), but the change is rather small and no significant water quality improvement occurs between these two stations based upon this data (Table 3). The plankton counts between Willow Springs Road (9,500 counts per milliliter) and Stephen Street (6,630 counts per milliliter) decreased about 30 percent and the average number of plankton species increased about five percent (50.7 average number of plankton species at Willow Springs Road to 53.3 average number of plankton species at

Stephen Street) (Table 6). The decreased plankton counts with increased average numbers of plankton species provides an indication of some improvement in water quality between Willow Springs Road and Stephen Street.

Overall, the Des Plaines River from County Line Road to Stephen Street was shown to be of poor water quality. The FC data exceeded the IPCB General Use standard of 200 FC counts per 100 milliliters at all stations within the Des Plaines River study area (Table 3). The plankton counts exceeded the definition of an algal water bloom of 500 counts per milliliter (indication of nutrient enriched waters) at all stations sampled within the Des Plaines River study area (4) (Table 6).

It was possible from the bacteria and plankton data collected from the Des Plaines River study area to detect variations in water quality between reaches. The reach of the Des Plaines River upstream of and at County Line Road was of better water quality than that found in any other portion of the study area. There is an indication that water quality improves at the most downstream station of the study area (Stephen Street) since plankton counts at Stephen Street (6,630 counts per milliliter) were nearly the same as at County Line Road (5,200 counts per milliliter) while number of species was similar (56.7 plankton species at County Line Road and 53.3 species at Stephen Street) (Table 6).

D. Fish

Fish were collected from nine sampling stations located

along the main channel of the Des Plaines River in Cook County, Illinois during June and September, 1979 (Table 2). Additional collections were made from Big Bend Lake (Station 274) and Goose Lake drain (Station 275) during September, and from the Forest Avenue Station (No. 126) during April. Complete results of the 1979 fish collections are included in Appendix Tables AI-1 and AI-2.

The total 1979 Des Plaines River collection included 24 species of fish plus two hybrids, the carp x goldfish hybrid and the green sunfish x bluegill hybrid. Two of the fish species, the bigmouth shiner (Notropis dorsalis) and the mosquito-fish (Gambusia affinis) were collected from the Big Bend Lake and the Goose Lake drain stations, respectively, and did not occur in the main channel collections.

For purposes of comparison among the nine main channel stations, the April collection at the Forest Avenue station (No. 126), as well as the Big Bend Lake and the Goose Lake drain collections, are not included unless specifically noted.

Species composition and average numbers and weights (in grams) of fish taken per 30 minutes electrofishing from all stations on the main channel of the Des Plaines River during 1979 (June and September collections combined) are listed in Table 12.

The goldfish was the most numerous of the species collected. On the average, 62.33 goldfish were collected per 30 minutes of electrofishing. The goldfish also comprised the second greatest

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

Table 12

AVERAGE NUMBER AND WEIGHT (GRAMS) OF FISH TAKEN PER 30 MINUTES ELECTROFISHING
AND PERCENTAGE COMPOSITION OF THE CATCH FROM THE MAIN CHANNEL
OF THE DES PLAINES RIVER DURING 1979

Fish Species	Catch per 30 Minutes Electrofishing		Percentage Composition	
	Number	Weight (grams)	% (By Number)	% (By Weight)
Gizzard shad (<u>Dorosoma cepedianum</u>)	0.18	6.52	0.16	0.07
Central mudminnow (<u>Umbra limi</u>)	0.03	0.29	0.03	0.003
Northern pike (<u>Esox lucius</u>)	0.08	20.50	0.07	0.21
Goldfish (<u>Carassius auratus</u>)	62.33	2,162.11	57.22	22.52
Carp (<u>Cyprinus carpio</u>)	8.92	5,634.24	8.19	58.68
Carp x Goldfish hybrid	2.35	1,239.88	2.16	12.91
Golden shiner (<u>Notemigonus crysoleucas</u>)	0.18	3.10	0.17	0.03
Spotfin shiner (<u>Notropis spilopterus</u>)	0.09	0.06	0.09	0.001
Bluntnose minnow (<u>Pimephales notatus</u>)	14.74	29.67	13.53	0.31
Fathead minnow (<u>Pimephales promelas</u>)	2.80	5.12	2.57	0.05
White sucker (<u>Catostomus commersoni</u>)	0.34	57.18	0.31	0.60
Black bullhead (<u>Ictalurus melas</u>)	2.50	177.77	2.30	1.85
Yellow bullhead (<u>Ictalurus natalis</u>)	0.12	26.12	0.11	0.27
Channel catfish (<u>Ictalurus punctatus</u>)	0.06	18.45	0.05	0.19
Tadpole madtom (<u>Noturus gyrinus</u>)	0.03	0.02	0.03	0.0002
Blackstripe topminnow (<u>Fundulus notatus</u>)	0.03	0.06	0.02	0.001
Yellow bass (<u>Morone mississippiensis</u>)	0.15	8.46	0.14	0.09
Green sunfish (<u>Lepomis cyanellus</u>)	12.01	140.89	11.03	1.47
Pumpkinseed (<u>Lepomis gibbosus</u>)	0.17	1.95	0.16	0.02
Bluegill (<u>Lepomis macrochirus</u>)	1.25	16.31	1.15	0.17
Green x Bluegill hybrid	0.02	0.29	0.02	0.003
Largemouth bass (<u>Micropterus salmoides</u>)	0.32	41.95	0.29	0.44

Table continued on following page

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

Table 12 (Continued)

AVERAGE NUMBER AND WEIGHT (GRAMS) OF FISH TAKEN PER 30 MINUTES ELECTROFISHING
AND PERCENTAGE COMPOSITION OF THE CATCH FROM THE MAIN CHANNEL
OF THE DES PLAINES RIVER DURING 1979

Fish Species	Catch per 30 Minutes Electrofishing		Percentage Composition	
	Number	Weight (grams)	% (By Number)	% (By Weight)
White crappie (<u>Pomoxis annularis</u>)	0.04	1.03	0.04	0.01
Black crappie (<u>Pomoxis nigromaculatus</u>)	0.21	9.66	0.19	0.10
TOTALS	108.93	9,601.63	100	100

portion of the weight of the Des Plaines River collection, with an average of 2,162 grams (4.8 pounds) of goldfish collected per 30 minutes at all stations. The goldfish is known to increase in abundance where other fish have been eliminated (16). Goldfish do not compete well with native species of similar habits in polluted areas, but thrive in polluted environments where there is an absence of competition (17).

The carp comprised the greatest weight of the total catch, with an average of 5,634 grams (12.4 pounds) of carp collected per 30 minutes of electrofishing at all main channel stations during June and September. The carp ranked fourth in numerical abundance among the Des Plaines River fishes with an average of 8.92 carp collected per 30 minutes of electrofishing.

Smith (16) notes that the carp hybridizes rather freely with the goldfish in the polluted streams of the Chicago area, and the hybrid seems better adapted for life than the pure carp. Carp x goldfish hybrids, though relatively low in numerical abundance with 2.35 hybrids collected per 30 minutes electrofishing, were third in abundance by weight with 1,240 grams (2.7 pounds) of carp x goldfish hybrids collected per 30 minutes electrofishing.

Goldfish, carp and carp x goldfish hybrids together constituted 68 percent of the total number of fish collected from the Des Plaines River as well as 95 percent of the weight of the total catch.

The bluntnose minnow, though comprising an insignificant portion of the weight of the total Des Plaines River catch, was second in numerical abundance with an average of 14.74 bluntnose minnows per 30 minutes electrofishing. The fathead minnow, which has similar habits as the bluntnose minnow, was fifth in numerical abundance for the entire river with 2.80 fathead minnows collected per 30 minutes electrofishing, on the average. Pflieger (18) noted that the bluntnose minnow was less prolific and less hardy than the fathead minnow, and Smith (16) noted that the fathead minnow was usually abundant where the bluntnose minnow was absent. This suggests that it cannot compete successfully with species of similar habits.

The green sunfish was the third most numerous fish species collected for the entire Cook County Des Plaines River catch. An average of 12 green sunfish per 30 minutes was computed for this hardy sunfish. This species was the most abundant member of the sunfish family. Pflieger (18) mentioned that the green sunfish tolerated extremes of turbidity, dissolved oxygen, temperature and flow, and that it did best where few other sunfishes occurred.

The black bullhead was sixth in numerical abundance with an average of 2.50 black bullheads per 30 minutes electrofishing for the river as a whole. It is a fish with a wide ecological tolerance (16), and was the most numerous member of the catfish family collected.

All the fish species collected from the Des Plaines River in Cook County during 1979 have been recorded as being present in this portion of the river in other recent collections (19, 20, 21, 22). A list of all species reported from the Des Plaines River since 1967 is given in Reference 19.

The distribution and abundance of each species at each sampling station during July and September 1979, is presented in Tables 13 and 14 for average number of fish per 30 minutes electrofishing and in Tables 15 and 16 for average weight (in grams) of fish per 30 minutes electrofishing.

The carp and bluegill were the most widely distributed of the species collected being present at least once during the year at all the main channel locations plus Big Bend Lake and Goose Lake drain. Also very widely distributed were the black bullhead and the green sunfish, each being collected at 10 out of 11 locations.

An estimate of the sections of the Des Plaines River which contained water of poor quality for fish can be made by comparing the percentage of the total catch which was composed of the pollution associated goldfish at each station, as well as the number of species collected at each station, as listed in Table 17. The great abundance of goldfish in the central portion of the Des Plaines River, especially from river mile 55.1 (Grand Avenue) to river mile 45.1 (Ogden Avenue) where the total annual percentage of goldfish ranged from 80.67 percent to 90.50 per-

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 13

AVERAGE NUMBER OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN WHEELING AND MAYWOOD (RIVER MILES
74.0 TO 49.1) DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Stations				
	18 Dundee Road Wheeling	19 Golf Road Des Plaines	274 Big Bend Lake* Des Plaines	20 Grand Avenue River Grove	251 Roosevelt Road Maywood
Northern pike	0.23	0.50			
Goldfish		0.28		70.89	34.66
Carp	34.47	13.62	5.00	5.14	2.93
Carp x Goldfish hybrid		0.17		4.21	2.20
Golden shiner	0.45				
Bigmouth shiner			6.00		
Spotfin shiner	0.68	0.17	8.00		
Bluntnose minnow	0.23	0.28	10.00		
Fathead minnow		0.17		4.52	1.00
White sucker	0.23	0.17	1.00	1.13	
Black bullhead	0.68	0.90		0.19	0.67
Yellow bullhead		0.57			
Channel catfish	0.23	0.28			
Blackstripe topminnow	0.23				
Yellow bass	0.23	0.57	3.00		
Green sunfish	17.23	37.07	68.00	0.60	
Pumpkinseed	0.68		63.00		
Bluegill	0.90	2.01	41.00	0.40	0.34
Green x Bluegill hybrid				0.19	
Largemouth bass	0.23	0.28	17.00	0.20	0.34

Table continued on following page

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 13 (CONTINUED)

AVERAGE NUMBER OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN WHEELING AND MAYWOOD (RIVER MILES
74.0 TO 49.1) DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station				
	18 Dundee Road Wheeling	19 Golf Road Des Plaines	274 Big Bend Lake Des Plaines	20 Grand Avenue River Grove	251 Roosevelt Road Maywood
White crappie	0.23	0.17			
Black crappie			1.00		
Total Number for 30 Minutes	56.93	57.21	223.00	87.44	42.14

* September collection only

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 14

AVERAGE NUMBER OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN LYONS AND LEMONT (RIVER MILES
45.4 TO 26.7) DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station					
	126 Forest Avenue Lyons	127 First Avenue Lyons	21 Ogden Avenue Lyons	22 Willow Springs Rd. Willow Springs	23 Stephen Street Lemont	275 Goose Lake Drain* Lemont
Gizzard shad				1.35	0.25	6.10
Central mudminnow					0.25	
Goldfish	193.68	213.53	39.89	7.86	0.29	2.54
Carp	5.30	2.50	0.49	8.86	13.77	2.03
Carp x Goldfish hybrid	6.93		0.24	2.31	5.10	1.02
Golden shiner	0.27		0.26	0.29	0.39	0.51
Spotfin shiner						0.51
Bluntnose minnow	0.30			1.35	130.47	23.39
Fathead minnow	4.44	13.98	0.24	0.90		1.53
White sucker					1.53	
Black bullhead	0.30	1.82	0.26	6.09	11.63	11.19
Yellow bullhead					0.49	0.51
Tadpole madtom					0.25	0.51
Mosquitofish				0.29		
Yellow bass	0.27			0.29	31.63	96.10
Green sunfish	4.14	5.57	2.52	9.37	0.89	7.12
Pumpkinseed					0.39	3.05
Bluegill	3.00	1.25	0.24	2.73	0.99	
Largemouth bass	0.60			0.23	0.25	2.03
Black crappie		0.91		0.74		
Total Number per 30 min.	219.23	239.56	44.14	42.37	198.32	158.14

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 15

AVERAGE WEIGHT IN GRAMS OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN WHEELING AND MAYWOOD (RIVER MILES 74.0 TO 49.1)
DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station				
	18 Dundee Road Wheeling	19 Golf Road Des Plaines	274 Big Bend Lake* Des Plaines	20 Grand Avenue River Grove	251 Roosevelt Road Maywood
Northern pike	41.67	142.84			
Goldfish		101.32		768.95	529.93
Carp	16,637.75	10,837.02	3,368.15	3,591.28	1,854.19
Carp x Goldfish Hybrid		49.95		2,666.32	1,597.07
Golden Shiner	3.15				
Bigmouth shiner			5.94		
Spotfin shiner	0.39	0.19	11.44		
Bluntnose minnow	0.19	0.43	18.90		
Fathead minnow		0.32		6.57	2.70
White sucker	31.49	34.14	204.00	241.62	
Black bullhead	78.69	70.53		8.05	21.36
Yellow bullhead		95.12			
Channel catfish	66.52	103.57			
Blackstripe topminnow	0.54				
Yellow bass	7.43	44.47	450.00		
Green sunfish	237.89	515.06	336.60	1.50	
Pumpkinseed	7.90		398.16		
Bluegill	7.88	71.10	128.74	3.14	0.32
Green x Bluegill hybrid				2.62	

Table continued on following page

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 15 (CONTINUED)

AVERAGE WEIGHT IN GRAMS OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN WHEELING AND MAYWOOD (RIVER MILES 74.0 TO 49.1)
DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station				
	18 Dundee Road Wheeling	19 Golf Road Des Plaines	274 Big Bend Lake* Des Plaines	20 Grand Avenue River Grove	251 Roosevelt Road Maywood
Largemouth bass	52.85	2.99	5,123.29	0.99	1.95
White crappie	7.62	1.65			
Black crappie			1.06		
TOTAL Weight (grams) per 30 minutes	17,177.96	12,070.70	10,046.28	7,291.04	4,007.52

* September collection only.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 16

AVERAGE WEIGHT IN GRAMS OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN LYONS AND LEMONT (RIVER MILES 45.4 TO 26.7)
DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station					
	126 Forest Avenue Lyons	127 First Avenue Lyons	21 Ogden Avenue Lyons	22 Willow Springs Rd. Willow Springs	23 Stephen Street Lemont	275 Goose Lake Drain* Lemont
Gizzard Shad				41.91	16.78	144.18
Central mudminnow					2.60	
Goldfish	3,994.36	11,778.78	2,042.46	235.61	7.61	112.93
Carp	2,358.93	1,462.53	6.41	4,474.10	9,486.12	374.91
Carp x Goldfish hybrid	3,673.16		146.13	627.79	2,398.56	471.86
Golden shiner	4.00		4.92	6.96	8.90	7.01
Spotfin shiner						0.72
Bluntnose minnow	0.58			1.44	264.40	15.58
Fathead minnow	9.54	25.88	0.10	0.94		1.91
White sucker					207.35	
Black bullhead	13.78	63.13	40.09	458.09	846.28	135.13
Yellow bullhead					139.92	
Tadpole madtom					0.18	7.04
Mosquitofish						0.33
Yellow bass	12.79			11.50		
Green sunfish	6.15	50.58	18.11	120.24	318.50	709.74
Pumpkinseed					9.62	30.59
Bluegill	2.58	1.51	0.11	46.67	13.47	3.39
Largemouth bass	2.17			88.44	228.20	
Black crappie		7.92		27.41	51.64	9.72

Table continued on following page

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 16 (CONTINUED)

AVERAGE WEIGHT IN GRAMS OF FISH TAKEN PER 30 MINUTES ELECTROFISHING FROM
THE DES PLAINES RIVER BETWEEN LYONS AND LEMONT (RIVER MILES 45.4 TO 26.7)
DURING JUNE AND SEPTEMBER, 1979

Fish Species	Sampling Station					
	126 Forest Avenue Lyons	127 First Avenue Lyons	21 Ogden Avenue Lyons	22 Willow Springs Rd. Willow Springs	23 Stephen Street Lemont	275 Goose Lake Drain* Lemont
Total Weight (grams) per 30 minutes	10,078.04	13,390.33	2,258.33	6,141.10	14,000.13	2,025.04

* September collection only.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

Table 17

NUMBER OF FISH SPECIES AND PERCENTAGE COMPOSITION OF
GOLDFISH IN THE CATCH AT EACH MAIN CHANNEL STATION IN
THE DES PLAINES RIVER DURING 1979

Sampling Station	River Mile	Number of Species*			Goldfish Expressed as Percent of Total Fish Collection		
		June	Sept.	Total	June	Sept.	Total
Dundee Road	74.0	8	12	15	0.00	0.00	0.00
Golf Road	67.0	9	10	15	0.00	0.01	<0.01
Grand Avenue	55.1	5	7	8	10.87	88.72	80.67
Roosevelt Road	49.1	2	6	6	62.50	83.33	82.03
Forest Avenue	45.4	6	8	10	68.18	91.47	88.02
First Avenue	45.2	5	5	7	91.40	87.90	89.40
Ogden Avenue	45.1	4	5	7	84.00	93.02	90.50
Willow Springs Road	35.2	8	10	12	11.59	20.69	17.76
Stephen Street	28.2	9	14	15	0.40	0.00	<0.01

* Hybrids not included

cent of the total catch, respectively, suggested that water quality for other fish species was very poor in this area.

The farthest upstream sampling stations in the Des Plaines River at Dundee Road and Golf Road and the farthest downstream station at Stephen Street had the highest number of species of fish (15 species at Dundee Road, 16 species at Golf Road, 16 species at Stephen Street) than any of the other stations in the Des Plaines River (Tables 13 and 14).

The weight of fish gathered at Dundee Road (17 kilograms per 30 minutes electrofishing), Golf Road (12 kilograms per 30 minutes) and Stephen Street (14 kilograms per 30 minutes) were the highest found at any sampling station (except for First Avenue which is at the mouth of Salt Creek with the Des Plaines River) and virtually no goldfish were present at these stations (Table 17).

As compared to the other stations, these fish data indicate that the farthest upstream stations (Dundee Road and Golf Road) were similar in water quality to the farthest downstream station (Stephen Street) and were of better water quality than the stations between them.

As can be seen from Table 13 and Table 14, except for Northern Pike (which is not a pollution tolerant fish) all of the fish found at the Dundee Road, Golf Road and Stephen Street stations were pollutant-tolerant, indicating that although these stations had better water quality than the middle sampling

stations on the Des Plaines River, the water quality was poor,

Karr (23) has found that as a location on a stream declines in water quality, the proportion of fish that are omnivores (an omnivore is a fish which feeds on both animal and vegetable substances) increases. The common omnivores of small midwestern streams are the bluntnose minnow and the fathead minnow, while the carp is found over a wider range of stream sizes. The most degraded streams also commonly support large populations of the omnivorous goldfish. Generally, Karr (23) has found that samples with fewer than 20 percent of individuals as omnivores to be indicative of good water quality, while those with over 45 percent omnivores are indicative of badly degraded water quality.

Obviously, the section of the Des Plaines River with the poorest quality water is the central portion, which, in a downstream direction, have the following annual percent composition of goldfish (Table 17): Grand Avenue (81 percent goldfish), Roosevelt Road (82 percent goldfish), Forest Avenue (88 percent goldfish), First Avenue (89 percent goldfish), and Ogden Avenue (91 percent goldfish).

Willow Springs Road, with 18 percent goldfish, appears to be a station in transition between the poorest water quality middle zone of the Des Plaines River (from Grand Avenue to Ogden Avenue) to somewhat better water quality at Stephen Street, in Lemont.

Overall, the Des Plaines River was of poor water quality in terms of supporting a varied fish population. The data presented does show better water quality upstream of Golf Road and downstream of Willow Springs Road, with the central portion of the Des Plaines River from Golf Road to Willow Springs Road containing the poorest water quality.

E. Comparison Among Bacteria, Plankton and Fish Data

Overall, the bacteria, fish and plankton data, as noted previously, indicate that the farthest upstream station (County Line Road) and the farthest downstream station in the study area (Stephen Street) had similar water quality and was of better water quality than the stations between. Because the FC levels at all stations sampled were above 200 counts per 100 milliliters (IPCB General Use Standard), plankton densities at all stations exceed 500 counts per milliliter (definition of algal bloom) and greater than 98 percent of the fish gathered at all stations on the Des Plaines River were pollutant-tolerant, it can be concluded that the Des Plaines River in the study area (between County Line Road and Stephen Street) is of poor water quality and is receiving significant inputs of pollutants from the numerous combined sewer overflows and non-point source discharges that exist in the area.

Fecal coliform levels are specified by the IPCB as one measure of water quality. Fish and plankton populations are not currently part of either state or federal water quality stand-

ards. However, fish and plankton data support the fecal coliform data and are routinely used throughout the U. S. in water quality assessment. The position of fish at the top of the aquatic food chain in relation to plankton, bacteria and invertebrates also helps to provide an integrated view of the watershed's environment. Plankton are a source of food for fish and invertebrates and are a direct indication of the level of nutrients present in a stream from pollution inputs. Both plankton and fish data compliment FC data and all three are reliable indicators of water quality.

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APPENDIX I

FISH DATA COLLECTED FROM THE DES PLAINES RIVER
DURING 1979

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE A I-1

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
		04/25/79	GOLDFISH	83	71.14	87.37	13257.60	11363.70	89.03
126	FOREST AVE	04/25/79	CARP	2	1.71	2.11	288.84	247.58	1.94
126	FOREST AVE	04/25/79	CARP X GOLDFISH	6	5.14	6.32	1279.98	1097.13	8.60
126	FOREST AVE	04/25/79	FATHEAD MINNOW	2	1.71	2.11	5.40	4.63	0.04
126	FOREST AVE	04/25/79	GREEN SUNFISH	1	0.86	1.05	40.00	34.29	0.27
126	FOREST AVE	04/25/79	BLACK CRAPPIE	1	0.86	1.05	20.00	17.14	0.13
126	FOREST AVE	06/20/79	NORTHERN PIKE	1	0.45	0.54	183.33	83.33	0.32
18	DUNDEE RD	06/20/79	CARP	119	54.09	64.68	56740.50	25791.10	97.65
18	DUNDEE RD	06/20/79	GOLDEN SHINER	1	0.45	0.54	6.39	2.90	0.01
18	DUNDEE RD	06/20/79	BLACK BULLHEAD	2	0.91	1.09	255.00	115.91	0.44
18	DUNDEE RD	06/20/79	YELLOW BASS	1	0.45	0.54	32.70	14.86	0.06
18	DUNDEE RD	06/20/79	GREEN SUNFISH	56	25.45	30.43	848.40	385.64	1.46
18	DUNDEE RD	06/20/79	PUMPKINSEED	3	1.36	1.63	34.77	15.80	0.06
18	DUNDEE RD	06/20/79	BLUEGILL	1	0.45	0.54	4.99	2.27	0.01
18	DUNDEE RD	06/20/79	NORTHERN PIKE	3	1.00	3.95	858.00	285.68	1.82
19	GOLF RD	06/13/79	CARP	24	7.99	31.58	44683.40	14878.00	95.03
19	GOLF RD	06/13/79	CARP X GOLDFISH	1	0.33	1.32	300.00	99.89	0.64
19	GOLF RD	06/13/79	SPOTFIN SHINER	1	0.33	1.32	1.13	0.38	0.00
19	GOLF RD	06/13/79	FATHEAD MINNOW	1	0.33	1.32	1.90	0.63	0.00
19	GOLF RD	06/13/79	WHITE SUCKER	1	0.33	1.32	205.07	68.28	0.44
19	GOLF RD	06/13/79	BLACK BULLHEAD	2	0.67	2.63	105.00	34.96	0.22
19	GOLF RD	06/13/79	GREEN SUNFISH	35	11.65	46.05	628.25	209.18	1.34

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO.PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
19	GOLF RD	06/13/79	BLUEGILL	7	2.33	9.21	226.94	75.56	0.48
19	GOLF RD	06/13/79	WHITE CRAPPIE	1	0.33	1.32	9.88	3.29	0.02
20	GRAND AVE	06/21/79	GOLDFISH	5	1.86	10.87	1663.00	620.01	6.22
20	GRAND AVE	06/21/79	CARP	18	6.71	39.13	15424.80	5750.77	57.66
20	GRAND AVE	06/21/79	CARP X GOLDFISH	13	4.85	28.26	9326.68	3477.22	34.86
20	GRAND AVE	06/21/79	FATHEAD MINNOW	3	1.12	6.52	6.17	2.30	0.02
20	GRAND AVE	06/21/79	WHITE SUCKER	5	1.86	10.87	274.27	102.25	1.03
20	GRAND AVE	06/21/79	BLACK BULLHEAD	1	0.37	2.17	43.16	16.09	0.16
20	GRAND AVE	06/21/79	GREEN X BLUEGILL	1	0.37	2.17	14.06	5.24	0.05
251	ROOSEVELT RD	06/14/79	GOLDFISH	5	2.65	62.50	512.00	271.86	23.38
251	ROOSEVELT RD	06/14/79	CARP	1	0.53	12.50	630.00	334.51	28.77
251	ROOSEVELT RD	06/14/79	CARP X GOLDFISH	2	1.06	25.00	1048.00	556.46	47.85
126	FOREST AVE	06/14/79	GOLDFISH	75	39.96	68.18	10845.70	5779.26	37.20
126	FOREST AVE	06/14/79	CARP	12	6.39	10.91	7145.88	3807.75	24.51
126	FOREST AVE	06/14/79	CARP X GOLDFISH	17	9.06	15.45	11084.00	5906.22	38.02
126	FOREST AVE	06/14/79	GOLDEN SHINER	1	0.53	0.91	15.00	7.99	0.05
126	FOREST AVE	06/14/79	FATHEAD MINNOW	2	1.07	1.82	4.04	2.15	0.01
126	FOREST AVE	06/14/79	YELLOW BASS	1	0.53	0.91	48.00	25.58	0.16
126	FOREST AVE	06/14/79	GREEN SUNFISH	2	1.07	1.82	11.03	5.88	0.04
127	FIRST AVE	06/15/79	GOLDFISH	85	154.55	91.40	12318.20	22396.70	99.01
127	FIRST AVE	06/15/79	FATHEAD MINNOW	3	5.45	3.23	7.05	12.82	0.06
127	FIRST AVE	06/15/79	BLACK BULLHEAD	2	3.64	2.15	69.44	126.25	0.56
127	FIRST AVE	06/15/79	GREEN SUNFISH	2	3.64	2.15	38.06	69.20	0.31

AI-3

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
				1	1.82	1.08	8.71	15.84	0.07
127	FIRST AVE	06/15/79	BLACK CRAPPIE	42	21.72	84.00	6559.98	3393.09	96.61
21	OGDEN AVE	06/14/79	GOLDFISH	1	0.52	2.00	19.00	9.83	0.28
21	OGDEN AVE	06/14/79	GOLDEN SHINER	1	0.52	2.00	155.00	80.17	2.28
21	OGDEN AVE	06/14/79	BLACK BULLHEAD	6	3.10	12.00	55.98	28.96	0.82
21	OGDEN AVE	06/14/79	GREEN SUNFISH	8	2.28	11.59	959.04	273.49	10.42
22	WILLOW SPRINGS RD	06/22/79	GOLDFISH	4	1.14	5.80	2617.00	746.29	28.44
22	WILLOW SPRINGS RD	06/22/79	CARP	13	3.71	18.84	3650.79	1041.10	39.68
22	WILLOW SPRINGS RD	06/22/79	CARP X GOLDFISH	2	0.57	2.90	48.80	13.92	0.53
22	WILLOW SPRINGS RD	06/22/79	GOLDEN SHINER	16	4.56	23.19	1360.00	387.83	14.78
22	WILLOW SPRINGS RD	06/22/79	BLACK BULLHEAD	2	0.57	2.90	80.62	22.99	0.88
22	WILLOW SPRINGS RD	06/22/79	YELLOW BASS	17	4.85	24.64	257.21	73.35	2.80
22	WILLOW SPRINGS RD	06/22/79	GREEN SUNFISH	5	1.43	7.25	171.15	48.81	1.86
22	WILLOW SPRINGS RD	06/22/79	BLUEGILL	2	0.57	2.90	56.00	15.97	0.61
22	WILLOW SPRINGS RD	06/22/79	BLACK CRAPPIE	1	0.29	0.40	52.00	15.22	0.12
23	STEPHEN ST	06/25/79	GOLDFISH	42	12.29	16.80	31925.40	9344.01	71.52
23	STEPHEN ST	06/25/79	CARP	18	5.27	7.20	9484.01	2775.81	21.25
23	STEPHEN ST	06/25/79	CARP X GOLDFISH	1	0.29	0.40	20.52	6.01	0.05
23	STEPHEN ST	06/25/79	GOLDEN SHINER	90	26.34	36.00	372.01	108.88	0.83
23	STEPHEN ST	06/25/79	BLUNTNOSSE MINNOW	2	0.59	0.80	725.44	212.32	1.63
23	STEPHEN ST	06/25/79	WHITE SUCKER	19	5.56	7.60	1310.12	383.45	2.93
23	STEPHEN ST	06/25/79	BLACK BULLHEAD	75	21.95	30.00	731.05	213.97	1.64
23	STEPHEN ST	06/25/79	GREEN SUNFISH	1	0.29	0.40	12.38	3.62	0.03
23	STEPHEN ST	06/25/79	PUMPKINSEED						

AI-4

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
23	STEPHEN ST	06/25/79	BLUEGILL	1	0.29	0.40	8.04	2.35	0.02
18	DUNDEE RD	09/05/79	CARP	33	14.84	49.25	17360.30	7484.40	94.44
18	DUNDEE RD	09/05/79	GOLDEN SHINER	1	0.45	1.49	7.57	3.40	0.04
18	DUNDEE RD	09/05/79	SPOTFIN SHINER	3	1.35	4.48	1.71	0.77	0.01
18	DUNDEE RD	09/05/79	BLUNTNOSE MINNOW	1	0.45	1.49	0.84	0.38	0.00
18	DUNDEE RD	09/05/79	WHITE SUCKER	1	0.45	1.49	140.00	62.97	0.76
18	DUNDEE RD	09/05/79	BLACK BULLHEAD	1	0.45	1.49	92.18	41.46	0.50
18	DUNDEE RD	09/05/79	CHANNEL CATFISH	1	0.45	1.49	278.00	125.04	1.51
18	DUNDEE RD	09/05/79	BLACKSTRIPE TOPMINNOW	1	0.45	1.49	2.40	1.08	0.01
18	DUNDEE RD	09/05/79	GREEN SUNFISH	20	9.00	29.85	200.40	90.13	1.09
18	DUNDEE RD	09/05/79	BLUEGILL	3	1.35	4.48	29.97	13.48	0.16
18	DUNDEE RD	09/05/79	LARGEMOUTH BASS	1	0.45	1.49	235.00	105.70	1.28
18	DUNDEE RD	09/05/79	WHITE CRAPPIE	1	0.45	1.49	33.86	15.23	0.18
18	DUNDEE RD	09/05/79	GOLDFISH	1	0.56	0.75	360.00	202.63	2.39
19	GOLF RD	09/07/79	CARP	10	5.63	7.46	12074.30	6796.04	80.09
19	GOLF RD	09/07/79	BLUNTNOSE MINNOW	1	0.56	0.75	1.53	0.86	0.01
19	GOLF RD	09/07/79	BLACK BULLHEAD	2	1.13	1.49	188.50	106.10	1.25
19	GOLF RD	09/07/79	YELLOW BULLHEAD	2	1.13	1.49	338.00	190.24	2.24
19	GOLF RD	09/07/79	CHANNEL CATFISH	1	0.56	0.75	368.00	207.13	2.44
19	GOLF RD	09/07/79	YELLOW BASS	2	1.13	1.49	158.00	88.93	1.05
19	GOLF RD	09/07/79	GREEN SUNFISH	111	62.48	82.84	1458.54	820.94	9.67
19	GOLF RD	09/07/79	BLUEGILL	3	1.69	2.24	118.38	66.63	0.79
19	GOLF RD	09/07/79	LARGEMOUTH BASS	1	0.56	0.75	10.62	5.98	0.07

AI-5

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gms)	WT. (gms) PER 30 MIN.	%TOT. WEIGHT
274	BIG BEND LAKE	09/07/79	CARP	5	5.00	2.24	3368.15	3368.15	33.17
274	BIG BEND LAKE	09/07/79	BIGMOUTH SHINER	6	6.00	2.69	5.94	5.94	0.06
274	BIG BEND LAKE	09/07/79	SPOTFIN SHINER	8	8.00	3.59	11.44	11.44	0.11
274	BIG BEND LAKE	09/07/79	BLUNTNNOSE MINNOW	10	10.00	4.48	18.90	18.90	0.19
274	BIG BEND LAKE	09/07/79	WHITE SUCKER	1	1.00	0.45	204.00	204.00	2.01
274	BIG BEND LAKE	09/07/79	YELLOW BASS	3	3.00	1.35	450.00	450.00	4.43
274	BIG BEND LAKE	09/07/79	GREEN SUNFISH	68	68.00	30.49	336.60	336.60	3.32
274	BIG BEND LAKE	09/07/79	PUMPKINSEED	63	63.00	28.25	398.16	398.16	3.92
274	BIG BEND LAKE	09/07/79	BLUEGILL	41	41.00	18.39	128.74	128.74	1.27
274	BIG BEND LAKE	09/07/79	LARGEMOUTH BASS	17	17.00	7.62	5123.29	5123.29	50.46
274	BIG BEND LAKE	09/07/79	BLACK CRAPPIE	1	1.00	0.45	108.00	108.00	1.06
274	BIG BEND LAKE	09/07/79	GOLDFISH	354	139.92	88.72	2322.24	917.88	19.92
20	GRAND AVE	09/06/79	CARP	9	3.56	2.26	3622.41	1431.78	31.07
20	GRAND AVE	09/06/79	CARP X GOLDFISH	9	3.56	2.26	4694.22	1855.42	40.26
20	GRAND AVE	09/06/79	FATHEAD MINNOW	20	7.91	5.01	27.40	10.83	0.24
20	GRAND AVE	09/06/79	WHITE SUCKER	1	0.40	0.25	963.88	380.98	8.27
20	GRAND AVE	09/06/79	GREEN SUNFISH	3	1.19	0.75	7.59	3.00	0.07
20	GRAND AVE	09/06/79	BLUEGILL	2	0.79	0.50	15.90	6.28	0.14
20	GRAND AVE	09/06/79	LARGEMOUTH BASS	1	0.40	0.25	4.99	1.97	0.04
20	GRAND AVE	09/06/79	GOLDFISH	100	66.67	83.33	1182.00	788.00	11.50
251	ROOSEVELT RD	09/17/79	CARP	8	5.33	6.67	5060.80	3373.87	49.24
251	ROOSEVELT RD	09/17/79	CARP X GOLDFISH	5	3.33	4.17	3956.50	2637.67	38.49
251	ROOSEVELT RD	09/17/79	FATHEAD MINNOW	3	2.00	2.50	8.10	5.40	0.08

AI-6

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
251	ROOSEVELT RD	09/17/79	BLACK BULLHEAD	2	1.33	1.67	64.08	42.72	0.62
251	ROOSEVELT RD	09/17/79	BLUEGILL	1	0.67	0.83	0.94	0.63	0.01
251	ROOSEVELT RD	09/17/79	LARGEMOUTH BASS	1	0.67	0.83	5.83	3.89	0.06
126	FOREST AVE	09/17/79	GOLDFISH	579	347.40	91.47	3682.44	2209.46	47.81
126	FOREST AVE	09/17/79	CARP	7	4.20	1.11	1516.83	910.10	19.69
126	FOREST AVE	09/17/79	CARP X GOLDFISH	8	4.80	1.26	2400.16	1440.10	31.16
126	FOREST AVE	09/17/79	BLUNTNOSE MINNOW	1	0.60	0.16	1.93	1.16	0.03
126	FOREST AVE	09/17/79	FATHEAD MINNOW	13	7.80	2.05	28.21	16.93	0.37
126	FOREST AVE	09/17/79	BLACK BULLHEAD	1	0.60	0.16	45.94	27.56	0.60
126	FOREST AVE	09/17/79	GREEN SUNFISH	12	7.20	1.90	10.68	6.41	0.14
126	FOREST AVE	09/17/79	BLUEGILL	10	6.00	1.58	8.60	5.16	0.11
126	FOREST AVE	09/17/79	LARGEMOUTH BASS	2	1.20	0.32	7.24	4.34	0.09
127	FIRST AVE	09/10/79	GOLDFISH	109	272.50	87.90	464.34	1160.85	27.91
127	FIRST AVE	09/10/79	CARP	2	5.00	1.61	1170.02	2925.05	70.32
127	FIRST AVE	09/10/79	FATHEAD MINNOW	9	22.50	7.26	15.57	38.93	0.94
127	FIRST AVE	09/10/79	GREEN SUNFISH	3	7.50	2.42	12.78	31.95	0.77
127	FIRST AVE	09/10/79	BLUEGILL	1	2.50	0.81	1.21	3.02	0.07
21	OGDEN AVE	09/10/79	GOLDFISH	120	58.06	93.02	1429.78	691.83	68.87
21	OGDEN AVE	09/10/79	CARP	2	0.97	1.55	26.47	12.81	1.27
21	OGDEN AVE	09/10/79	CARP X GOLDFISH	1	0.48	0.78	604.00	292.26	29.09
21	OGDEN AVE	09/10/79	FATHEAD MINNOW	1	0.48	0.78	0.42	0.20	0.02
21	OGDEN AVE	09/10/79	GREEN SUNFISH	4	1.94	3.10	15.00	7.26	0.72
21	OGDEN AVE	09/10/79	BLUEGILL	1	0.48	0.78	0.43	0.21	0.02

AI-7

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO. PER 30 MIN.	ΣTOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	ΣTOT. WEIGHT
22	WILLOW SPRINGS RD	09/10/79	GIZZARD SHAD	6	2.69	4.14	187.20	83.82	0.87
22	WILLOW SPRINGS RD	09/10/79	GOLDFISH	30	13.43	20.69	441.60	197.73	2.05
22	WILLOW SPRINGS RD	09/10/79	CARP	37	16.57	25.52	18317.60	8201.91	84.92
22	WILLOW SPRINGS RD	09/10/79	CARP X GOLDFISH	2	0.90	1.38	479.00	214.48	2.22
22	WILLOW SPRINGS RD	09/10/79	BLUNTNOSSE MINNOW	6	2.69	4.14	6.42	2.87	0.03
22	WILLOW SPRINGS RD	09/10/79	FATHEAD MINNOW	4	1.79	2.76	4.20	1.88	0.02
22	WILLOW SPRINGS RD	09/10/79	BLACK BULLHEAD	17	7.61	11.72	1179.97	528.34	5.47
22	WILLOW SPRINGS RD	09/10/79	GREEN SUNFISH	31	13.88	21.38	373.24	167.12	1.73
22	WILLOW SPRINGS RD	09/10/79	BLUEGILL	9	4.03	6.21	99.45	44.53	0.46
22	WILLOW SPRINGS RD	09/10/79	LARGEMOUTH BASS	1	0.45	0.69	395.00	176.87	1.83
22	WILLOW SPRINGS RD	09/10/79	BLACK CRAFFIE	2	0.90	1.38	86.74	38.84	0.40
23	STEPHEN ST	09/14/79	GIZZARD SHAD	1	0.49	0.15	68.21	33.55	0.22
23	STEPHEN ST	09/14/79	CENTRAL MUDMINNOW	1	0.49	0.15	10.85	5.20	0.04
23	STEPHEN ST	09/14/79	CARP	31	15.24	4.71	19577.40	9628.23	64.47
23	STEPHEN ST	09/14/79	CARP X GOLDFISH	10	4.92	1.52	4110.00	2021.31	13.53
23	STEPHEN ST	09/14/79	GOLDEN SHINER	1	0.49	0.15	23.98	11.79	0.08
23	STEPHEN ST	09/14/79	BLUNTNOSSE MINNOW	477	234.59	72.49	853.83	419.92	2.81
23	STEPHEN ST	09/14/79	WHITE SUCKER	5	2.46	0.76	411.50	202.38	1.36
23	STEPHEN ST	09/14/79	BLACK BULLHEAD	36	17.70	5.47	2661.84	1309.10	8.77
23	STEPHEN ST	09/14/79	YELLOW BULLHEAD	2	0.98	0.30	569.00	279.84	1.87
23	STEPHEN ST	09/14/79	TADPOLE MADTOM	1	0.49	0.15	0.73	0.36	0.00
23	STEPHEN ST	09/14/79	GREEN SUNFISH	84	41.31	12.77	860.16	423.03	2.83
23	STEPHEN ST	09/14/79	PUMPKINSEED	3	1.48	0.46	31.77	15.62	0.10

AI-8

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1 (Continued)

ELECTROFISHING RESULTS (TOTAL NUMBERS AND WEIGHTS, PERCENTAGES AND CATCH PER 30 MINUTES) FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	NO.PER 30 MIN.	%TOT. NUMBER	TOTAL WT. (gm)	WT. (gm) PER 30 MIN.	%TOT. WEIGHT
23	STEPHEN ST.	09/14/79	BLUEGILL	1	0.49	0.15	50.00	24.59	0.16
23	STEPHEN ST	09/14/79	LARGEMOUTH BASS	4	1.97	0.61	928.00	456.39	3.06
23	STEPHEN ST	09/14/79	BLACK CRAPPIE	1	0.49	0.15	210.00	103.28	0.69
275	GOOSE LK DRAIN	09/14/79	GIZZARD SHAD	12	6.10	3.86	283.56	144.18	7.12
275	GOOSE LK DRAIN	09/14/79	GOLDFISH	5	2.54	1.61	222.10	112.93	5.58
275	GOOSE LK DRAIN	09/14/79	CARP	4	2.03	1.29	737.32	374.91	18.51
275	GOOSE LK DRAIN	09/14/79	CARP X GOLDFISH	2	1.02	0.64	928.00	471.86	23.30
275	GOOSE LK DRAIN	09/14/79	GOLDEN SHINER	1	0.51	0.32	13.79	7.01	0.35
275	GOOSE LK DRAIN	09/14/79	SPOTFIN SHINER	1	0.51	0.32	1.41	0.72	0.04
275	GOOSE LK DRAIN	09/14/79	BLUNTNOSE MINNOW	46	23.39	14.79	30.64	15.58	0.77
275	GOOSE LK DRAIN	09/14/79	FATHEAD MINNOW	3	1.53	0.96	3.75	1.91	0.09
275	GOOSE LK DRAIN	09/14/79	BLACK BULLHEAD	22	11.19	7.07	265.75	135.13	6.67
275	GOOSE LK DRAIN	09/14/79	TADPOLE MADTOM	1	0.51	0.32	13.85	7.04	0.35
275	GOOSE LK DRAIN	09/14/79	MOSQUITOFISH	1	0.51	0.32	0.65	0.33	0.02
275	GOOSE LK DRAIN	09/14/79	GREEN SUNFISH	189	96.10	60.77	1395.82	709.74	35.05
275	GOOSE LK DRAIN	09/14/79	PUMPKINSEED	14	7.12	4.50	60.17	30.59	1.51
275	GOOSE LK DRAIN	09/14/79	BLUEGILL	6	3.05	1.93	6.66	3.39	0.17
275	GOOSE LK DRAIN	09/14/79	BLACK CRAPPIE	4	2.03	1.29	19.11	9.72	0.48

AI-9

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
				83	181.65	89	320	159.73	8.00	698.00
126	FOREST AVE	04/25/79	GOLDFISH	2	197.50	130	265	144.42	35.64	253.20
126	FOREST AVE	04/25/79	CARP	6	200.67	110	342	213.33	20.00	700.00
126	FOREST AVE	04/25/79	CARP X GOLDFISH	2	61.00	60	62	2.70	2.46	2.93
126	FOREST AVE	04/25/79	FATHEAD MINNOW	1	118.00	118	118	40.00	40.00	40.00
126	FOREST AVE	04/25/79	GREEN SUNFISH	1	117.00	117	117	20.00	20.00	20.00
126	FOREST AVE	04/25/79	BLACK CRAPPIE	1	317.00	317	317	183.33	183.33	183.33
18	DUNDEE RD	06/20/79	NORTHERN PIKE	119	305.14	187	502	476.81	65.00	2579.81
18	DUNDEE RD	06/20/79	CARP	1	89.00	89	89	6.39	6.39	6.39
18	DUNDEE RD	06/20/79	GOLDEN SHINER	2	205.00	200	210	127.50	110.00	145.00
18	DUNDEE RD	06/20/79	BLACK BULLHEAD	1	144.00	144	144	32.70	32.70	32.70
18	DUNDEE RD	06/20/79	YELLOW BASS	56	77.80	42	135	15.15	1.56	78.57
18	DUNDEE RD	06/20/79	GREEN SUNFISH	3	81.67	64	102	11.59	4.57	21.73
18	DUNDEE RD	06/20/79	PUMPKINSEED	1	67.00	67	67	4.99	4.99	4.99
18	DUNDEE RD	06/20/79	BLUEGILL	3	362.00	315	411	286.00	210.00	378.00
19	GOLF RD	06/13/79	NORTHERN PIKE	24	442.46	215	694	1861.81	135.00	4706.02
19	GOLF RD	06/13/79	CARP	1	279.00	279	279	300.00	300.00	300.00
19	GOLF RD	06/13/79	CARP X GOLDFISH	1	51.00	51	51	1.13	1.13	1.13
19	GOLF RD	06/13/79	SPOTFIN SHINER	1	55.00	55	55	1.90	1.90	1.90
19	GOLF RD	06/13/79	FATHEAD MINNOW	1	252.00	252	252	205.07	205.07	205.07
19	GOLF RD	06/13/79	WHITE SUCKER	2	147.50	140	155	52.50	48.00	57.00
19	GOLF RD	06/13/79	BLACK BULLHEAD	35	82.31	50	153	17.95	2.05	95.00
19	GOLF RD	06/13/79	GREEN SUNFISH							

AI-10

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
19	GOLF RD	06/13/79	BLUEGILL	7	113.14	74	145	32.42	6.00	58.00
19	GOLF RD	06/13/79	WHITE CRAPPIE	1	95.00	95	95	9.88	9.88	9.88
20	GRAND AVE	06/21/79	GOLDFISH	5	257.00	237	290	332.60	258.00	580.00
20	GRAND AVE	06/21/79	CARP	18	354.06	134	529	856.94	38.63	2667.30
20	GRAND AVE	06/21/79	CARP X GOLDFISH	13	325.38	178	446	717.44	105.00	1589.00
20	GRAND AVE	06/21/79	FATHEAD MINNOW	3	53.33	49	59	2.06	1.60	2.82
20	GRAND AVE	06/21/79	WHITE SUCKER	5	87.80	37	290	54.85	0.50	272.00
20	GRAND AVE	06/21/79	BLACK BULLHEAD	1	136.00	136	136	43.16	43.16	43.16
20	GRAND AVE	06/21/79	GREEN X BLUEGILL	1	89.00	89	89	14.06	14.06	14.06
251	ROOSEVELT RD	06/14/79	GOLDFISH	5	163.80	112	247	102.40	22.00	254.00
251	ROOSEVELT RD	06/14/79	CARP	1	330.00	330	330	630.00	630.00	630.00
251	ROOSEVELT RD	06/14/79	CARP X GOLDFISH	2	302.50	285	320	524.00	438.00	610.00
126	FOREST AVE	06/14/79	GOLDFISH	75	184.84	96	284	144.61	20.00	400.00
126	FOREST AVE	06/14/79	CARP	12	329.25	189	462	595.49	110.00	1503.88
126	FOREST AVE	06/14/79	CARP X GOLDFISH	17	329.24	157	396	652.00	61.56	1362.00
126	FOREST AVE	06/14/79	GOLDEN SHINER	1	110.00	110	110	15.00	15.00	15.00
126	FOREST AVE	06/14/79	FATHEAD MINNOW	2	54.50	53	56	2.02	1.99	2.05
126	FOREST AVE	06/14/79	YELLOW BASS	1	159.00	159	159	48.00	48.00	48.00
126	FOREST AVE	06/14/79	GREEN SUNFISH	2	61.00	50	72	5.52	2.79	8.24
127	FIRST AVE	06/15/79	GOLDFISH	85	184.20	92	300	144.92	8.00	440.00
127	FIRST AVE	06/15/79	FATHEAD MINNOW	3	56.33	49	60	2.35	1.38	2.87
127	FIRST AVE	06/15/79	BLACK BULLHEAD	2	123.50	89	158	34.72	11.44	58.00
127	FIRST AVE	06/15/79	GREEN SUNFISH	2	90.00	60	120	19.03	4.05	34.00

AI-11

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
127	FIRST AVE	06/15/79	BLACK CRAPPIE	1	84.00	84	84	8.71	8.71	8.71
21	OGDEN AVE	06/14/79	GOLDFISH	42	182.51	105	280	156.19	16.00	523.00
21	OGDEN AVE	06/14/79	GOLDEN SHINER	1	111.00	111	111	19.00	19.00	19.00
21	OGDEN AVE	06/14/79	BLACK BULLHEAD	1	214.00	214	214	155.00	155.00	155.00
21	OGDEN AVE	06/14/79	GREEN SUNFISH	6	70.50	57	73	9.33	5.00	12.00
22	WILLOW SPRINGS RD	06/22/79	GOLDFISH	8	173.88	145	228	119.88	62.00	250.00
22	WILLOW SPRINGS RD	06/22/79	CARP	4	356.00	310	375	654.25	435.00	772.00
22	WILLOW SPRINGS RD	06/22/79	CARP X GOLDFISH	13	238.38	204	360	280.83	70.00	840.00
22	WILLOW SPRINGS RD	06/22/79	GOLDEN SHINER	2	134.00	132	136	24.40	23.79	25.00
22	WILLOW SPRINGS RD	06/22/79	BLACK BULLHEAD	16	168.56	137	225	85.00	40.00	180.00
22	WILLOW SPRINGS RD	06/22/79	YELLOW BASS	2	149.50	149	150	40.31	40.00	40.62
22	WILLOW SPRINGS RD	06/22/79	GREEN SUNFISH	17	78.00	49	112	15.13	2.35	41.80
22	WILLOW SPRINGS RD	06/22/79	BLUEGILL	5	113.20	62	158	34.23	4.70	54.00
22	WILLOW SPRINGS RD	06/22/79	BLACK CRAPPIE	2	117.50	93	142	28.00	18.00	38.00
23	STEPHEN ST	06/25/79	GOLDFISH	1	129.00	129	129	52.00	52.00	52.00
23	STEPHEN ST	06/25/79	CARP	42	354.86	220	630	760.13	165.00	4139.03
23	STEPHEN ST	06/25/79	CARP X GOLDFISH	18	313.33	187	388	526.89	110.00	1275.73
23	STEPHEN ST	06/25/79	GOLDEN SHINER	1	122.00	122	122	20.52	20.52	20.52
23	STEPHEN ST	06/25/79	BLUNTNONE MINNOW	90	68.94	40	82	4.13	0.44	8.14
23	STEPHEN ST	06/25/79	WHITE SUCKER	2	311.00	305	317	362.72	346.00	379.44
23	STEPHEN ST	06/25/79	BLACK BULLHEAD	19	164.28	142	184	68.95	11.12	132.00
23	STEPHEN ST	06/25/79	GREEN SUNFISH	75	72.99	45	134	9.75	1.88	38.00
23	STEPHEN ST	06/25/79	PUMPKINSEED	1	79.00	79	79	12.38	12.38	12.38

AI-12

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
23	STEPHEN ST	06/25/79	BLUEGILL	1	79.00	79	79	8.04	8.04	8.04
18	DUNDEE RD	09/05/79	CARP	33	312.40	194	585	526.07	98.00	3515.34
18	DUNDEE RD	09/05/79	GOLDEN SHINER	1	82.00	82	82	7.57	7.57	7.57
18	DUNDEE RD	09/05/79	SPOTFIN SHINER	3	36.00	33	38	0.57	0.47	0.65
18	DUNDEE RD	09/05/79	BLUNTNOSE MINNOW	1	43.00	43	43	0.84	0.84	0.84
18	DUNDEE RD	09/05/79	WHITE SUCKER	1	240.00	240	240	140.00	140.00	140.00
18	DUNDEE RD	09/05/79	BLACK BULLHEAD	1	180.00	180	180	92.18	92.18	92.18
18	DUNDEE RD	09/05/79	CHANNEL CATFISH	1	378.00	378	378	278.00	278.00	278.00
18	DUNDEE RD	09/05/79	BLACKSTRIPE TOPMINNOW	1	60.00	60	60	2.40	2.40	2.40
18	DUNDEE RD	09/05/79	GREEN SUNFISH	20	73.50	38	102	10.02	1.24	25.99
18	DUNDEE RD	09/05/79	BLUEGILL	3	84.67	75	98	9.99	7.06	15.32
18	DUNDEE RD	09/05/79	LARGEMOUTH BASS	1	250.00	250	250	235.00	235.00	235.00
18	DUNDEE RD	09/05/79	WHITE CRAPPIE	1	146.00	146	146	33.86	33.86	33.86
19	GOLF RD	09/07/79	GOLDFISH	1	247.00	247	247	360.00	360.00	360.00
19	GOLF RD	09/07/79	CARP	10	397.00	30	587	1207.43	0.48	2778.25
19	GOLF RD	09/07/79	BLUNTNOSE MINNOW	1	50.00	50	50	1.53	1.53	1.53
19	GOLF RD	09/07/79	BLACK BULLHEAD	2	178.00	175	181	94.25	84.00	104.50
19	GOLF RD	09/07/79	YELLOW BULLHEAD	2	221.00	187	225	169.00	98.00	240.00
19	GOLF RD	09/07/79	CHANNEL CATFISH	1	344.00	344	344	368.00	368.00	368.00
19	GOLF RD	09/07/79	YELLOW BASS	2	168.00	162	174	79.00	60.00	98.00
19	GOLF RD	09/07/79	GREEN SUNFISH	111	76.75	23	134	13.14	0.35	65.00
19	GOLF RD	09/07/79	BLUEGILL	3	79.00	34	168	39.46	0.67	117.00
19	GOLF RD	09/07/79	LARGEMOUTH BASS	1	87.00	87	87	10.62	10.62	10.62

AI-13

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
274	BIG BEND LAKE	09/07/79	CARP	5	365.60	280	507	673.63	193.00	1360.78
274	BIG BEND LAKE	09/07/79	BIGMOUTH SHINER	6	45.50	41	50	0.99	0.74	1.23
274	BIG BEND LAKE	09/07/79	SPOTFIN SHINER	8	49.75	42	60	1.43	0.70	2.49
274	BIG BEND LAKE	09/07/79	BLUNTNOSE MINNOW	10	55.40	45	66	1.89	0.83	3.31
274	BIG BEND LAKE	09/07/79	WHITE SUCKER	1	286.00	286	286	204.00	204.00	204.00
274	BIG BEND LAKE	09/07/79	YELLOW BASS	3	240.00	144	382	150.00	40.00	320.00
274	BIG BEND LAKE	09/07/79	GREEN SUNFISH	68	53.66	32	116	4.95	0.65	36.94
274	BIG BEND LAKE	09/07/79	PUMPKINSEED	63	55.40	36	110	6.32	0.94	29.91
274	BIG BEND LAKE	09/07/79	BLUEGILL	41	46.27	30	138	3.14	0.55	58.59
274	BIG BEND LAKE	09/07/79	LARGEMOUTH BASS	17	169.35	68	440	301.37	4.63	1615.92
274	BIG BEND LAKE	09/07/79	BLACK CRAPPIE	1	205.00	205	205	108.00	108.00	108.00
20	GRAND AVE	09/06/79	GOLDFISH	354	63.65	37	190	6.56	0.89	178.48
20	GRAND AVE	09/06/79	CARP	9	205.89	48	395	402.49	2.66	1077.28
20	GRAND AVE	09/06/79	CARP X GOLDFISH	9	250.22	55	370	521.58	3.93	1048.93
20	GRAND AVE	09/06/79	FATHEAD MINNOW	20	45.15	40	56	1.37	0.82	2.41
20	GRAND AVE	09/06/79	WHITE SUCKER	1	412.00	412	412	963.88	963.88	963.88
20	GRAND AVE	09/06/79	GREEN SUNFISH	3	43.67	38	64	2.53	0.63	5.70
20	GRAND AVE	09/06/79	BLUEGILL	2	67.50	40	95	7.95	1.37	14.53
20	GRAND AVE	09/06/79	LARGEMOUTH BASS	1	71.00	71	71	4.99	4.99	4.99
251	ROOSEVELT RD	09/17/79	GOLDFISH	100	74.50	49	198	11.82	2.17	192.24
251	ROOSEVELT RD	09/17/79	CARP	8	306.63	81	468	632.60	11.64	1674.12
251	ROOSEVELT RD	09/17/79	CARP X GOLDFISH	5	345.20	316	374	791.30	520.00	990.00
251	ROOSEVELT RD	09/17/79	FATHEAD MINNOW	3	56.33	53	61	2.70	2.08	3.29

AI-14

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
251	ROOSEVELT RD	09/17/79	BLACK BULLHEAD	2	125.00	114	136	32.04	24.14	39.94
251	ROOSEVELT RD	09/17/79	BLUEGILL	1	37.00	37	37	0.94	0.94	0.94
251	ROOSEVELT RD	09/17/79	LARGEMOUTH BASS	1	74.00	74	74	5.83	5.83	5.83
126	FOREST AVE	09/17/79	GOLDFISH	579	61.04	37	174	6.36	0.75	209.00
126	FOREST AVE	09/17/79	CARP	7	167.29	77	403	216.69	8.54	1135.00
126	FOREST AVE	09/17/79	CARP X GOLDFISH	8	186.50	59	388	300.02	4.00	1021.00
126	FOREST AVE	09/17/79	BLUNTNOSE MINNOW	1	52.00	52	52	1.93	1.93	1.93
126	FOREST AVE	09/17/79	FATHEAD MINNOW	13	53.54	40	62	2.17	0.86	3.57
126	FOREST AVE	09/17/79	BLACK BULLHEAD	1	142.00	142	142	45.94	45.94	45.94
126	FOREST AVE	09/17/79	GREEN SUNFISH	12	32.58	26	43	0.89	0.52	1.75
126	FOREST AVE	09/17/79	BLUEGILL	10	62.50	55	70	0.86	0.59	1.34
126	FOREST AVE	09/17/79	LARGEMOUTH BASS	2	34.10	30	40	3.62	2.67	4.56
127	FIRST AVE	09/10/79	GOLDFISH	109	55.31	35	101	4.26	0.65	21.80
127	FIRST AVE	09/10/79	CARP	2	260.50	121	400	585.01	35.01	1135.00
127	FIRST AVE	09/10/79	FATHEAD MINNOW	9	50.56	44	67	1.73	1.12	3.04
127	FIRST AVE	09/10/79	GREEN SUNFISH	3	51.67	32	81	4.26	0.73	10.27
127	FIRST AVE	09/10/79	BLUEGILL	1	40.00	40	40	1.21	1.21	1.21
21	OGDEN AVE	09/10/79	GOLDFISH	120	72.97	35	196	11.91	0.79	175.00
21	OGDEN AVE	09/10/79	CARP	2	69.00	32	106	13.24	0.70	25.77
21	OGDEN AVE	09/10/79	CARP X GOLDFISH	1	335.00	335	335	604.00	604.00	604.00
21	OGDEN AVE	09/10/79	FATHEAD MINNOW	1	34.00	34	34	0.42	0.42	0.42
21	OGDEN AVE	09/10/79	GREEN SUNFISH	4	44.25	32	78	3.75	0.84	11.93
21	OGDEN AVE	09/10/79	BLUEGILL	1	27.00	27	27	0.43	0.43	0.43

AI-15

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
22	WILLOW SPRINGS RD	09/10/79	GIZZARD SHAD	6	134.67	90	183	31.20	8.29	67.18
22	WILLOW SPRINGS RD	09/10/79	GOLDFISH	30	65.97	32	250	14.72	0.60	260.00
22	WILLOW SPRINGS RD	09/10/79	CARP	37	235.35	44	530	495.07	1.65	2041.17
22	WILLOW SPRINGS RD	09/10/79	CARP X GOLDFISH	2	222.50	180	265	239.50	154.00	325.00
22	WILLOW SPRINGS RD	09/10/79	BLUNTNOSE MINNOW	6	45.50	35	51	1.07	0.47	1.48
22	WILLOW SPRINGS RD	09/10/79	FATHEAD MINNOW	4	43.00	41	50	1.05	0.84	1.64
22	WILLOW SPRINGS RD	09/10/79	BLACK BULLHEAD	17	154.76	38	200	69.41	1.06	135.00
22	WILLOW SPRINGS RD	09/10/79	GREEN SUNFISH	31	64.74	21	135	12.04	0.26	67.57
22	WILLOW SPRINGS RD	09/10/79	BLUEGILL	9	69.67	29	105	11.05	0.47	25.16
22	WILLOW SPRINGS RD	09/10/79	LARGEMOUTH BASS	1	300.00	300	300	395.00	395.00	395.00
22	WILLOW SPRINGS RD	09/10/79	BLACK CRAPPIE	2	144.50	124	165	43.37	36.73	50.00
23	STEPHEN ST	09/14/79	GIZZARD SHAD	1	177.00	177	177	68.21	68.21	68.21
23	STEPHEN ST	09/14/79	CENTRAL MUDMINNOW	1	92.00	92	92	10.85	10.85	10.85
23	STEPHEN ST	09/14/79	CARP	31	354.09	236	485	631.53	192.00	1475.50
23	STEPHEN ST	09/14/79	CARP X GOLDFISH	10	291.70	186	345	411.00	90.00	630.00
23	STEPHEN ST	09/14/79	GOLDEN SHINER	1	123.00	123	123	23.98	23.98	23.98
23	STEPHEN ST	09/14/79	BLUNTNOSE MINNOW	477	52.54	32	82	1.79	0.23	6.95
23	STEPHEN ST	09/14/79	WHITE SUCKER	5	182.20	110	247	82.30	14.94	162.00
23	STEPHEN ST	09/14/79	BLACK BULLHEAD	36	167.89	117	230	73.94	23.81	180.00
23	STEPHEN ST	09/14/79	YELLOW BULLHEAD	2	266.00	257	275	284.50	240.00	329.00
23	STEPHEN ST	09/14/79	TADPOLE MADTOM	1	36.00	36	36	0.73	0.73	0.73
23	STEPHEN ST	09/14/79	GREEN SUNFISH	84	73.58	34	117	10.24	0.89	38.85
23	STEPHEN ST	09/14/79	PUMPKINSEED	3	72.00	50	107	10.59	2.60	24.97

AI-16

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2 (Continued)

MEAN, MINIMUM AND MAXIMUM TOTAL LENGTH (TL) AND WEIGHT (WT)
FOR FISH COLLECTED FROM THE DES PLAINES RIVER DURING 1979

ST. NO.	STATION NAME	DATE	SPECIES NAME	NO. FISH	MEAN TL(mm)	MIN TL(mm)	MAX TL(mm)	MEAN WT(gm)	MIN WT(gm)	MAX WT(gm)
23	STEPHEN ST.	09/14/79	BLUEGILL	1	145.00	145	145	50.00	50.00	50.00
23	STEPHEN ST	09/14/79	LARGEMOUTH BASS	4	249.00	238	257	232.00	200.00	250.00
23	STEPHEN ST	09/14/79	BLACK CRAPPIE	1	240.00	240	240	210.00	210.00	210.00
275	GOOSE LK DRAIN	09/14/79	GIZZARD SHAD	12	117.08	73	187	23.63	4.78	73.62
275	GOOSE LK DRAIN	09/14/79	GOLDFISH	5	98.60	27	179	44.42	0.35	114.14
275	GOOSE LK DRAIN	09/14/79	CARP	4	171.25	37	318	184.33	0.90	450.12
275	GOOSE LK DRAIN	09/14/79	CARP X GOLDFISH	2	300.00	250	350	464.00	250.00	658.00
275	GOOSE LK DRAIN	09/14/79	GOLDEN SHINER	1	116.00	116	116	13.79	13.79	13.79
275	GOOSE LK DRAIN	09/14/79	SPOTFIN SHINER	1	49.00	49	49	1.41	1.41	1.41
275	GOOSE LK DRAIN	09/14/79	BLUNTNOSE MINNOW	46	38.45	26	56	0.67	0.18	1.95
275	GOOSE LK DRAIN	09/14/79	FATHEAD MINNOW	3	44.00	29	56	1.25	0.33	2.05
275	GOOSE LK DRAIN	09/14/79	BLACK BULLHEAD	22	79.64	54	175	12.08	0.65	81.65
275	GOOSE LK DRAIN	09/14/79	TADPOLE MADTOM	1	100.00	100	100	13.85	13.85	13.85
275	GOOSE LK DRAIN	09/14/79	MOSQUITOFISH	1	34.00	34	34	0.65	0.65	0.65
275	GOOSE LK DRAIN	09/14/79	GREEN SUNFISH	189	59.88	25	131	7.39	0.46	56.45
275	GOOSE LK DRAIN	09/14/79	PUMPKINSEED	14	54.64	42	97	4.30	1.28	21.72
275	GOOSE LK DRAIN	09/14/79	BLUEGILL	6	38.33	28	50	1.11	0.42	2.43
275	GOOSE LK DRAIN	09/14/79	BLACK CRAPPIE	4	71.00	60	79	4.78	2.82	6.00

AI-17

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-3

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT DUNDEE RD., GOLF RD., AND GRAND AVE.

PARAMETER	STATION AND DATE					
	DUNDEE RD. 06/20/79	DUNDEE RD. 09/05/79	GOLF RD. 06/13/79	GOLF RD. 09/07/79	GRAND AVE. 06/21/79	GRAND AVE. 09/06/79
FLOURIDE	0.460	NA	0.320	0.370	0.450	0.320
PHENOL (MG/L)	1.000	2.000	12.000	< 1	< 1	2.000
CHLORIDE	100.000	112.000	70.000	84.000	115.000	78.000
SOL. P	0.600	0.600	1.500	1.000	0.500	0.600
SULFATE	180.000	154.000	115.000	139.000	156.000	144.000
CYANIDE	0.015	0.013	0.017	0.015	0.013	0.012
FOG	< 1	1.000	2.000	4.000	< 1	< 1
TOC	18.000	22.000	20.000	24.000	17.000	12.000
TURBIDITY (NTU)	20.000	NA	45.000	48.000	11.000	48.000
ALKALINITY	234.000	330.000	187.000	248.000	231.000	350.000
MBAS	0.008	NA	< 0.001	0.064	0.052	0.030
FIELD TEMP. (DEG. C)	22.500	18.000	20.000	18.000	21.500	19.000
FIELD DO	4.100	6.300	5.500	7.000	3.900	5.100
ZINC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CADMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
COPPER	< 0.02	< 0.02	< 0.02	0.020	0.020	0.030
CHROMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
IRON	0.900	0.600	1.000	1.000	0.400	1.400
NICKEL	0.100	< 0.01	< 0.01	< 0.01	0.100	0.100
LEAD	0.020	< 0.01	0.020	< 0.01	0.030	< 0.01
MANGANESE	0.220	0.110	0.200	0.150	0.070	0.140

Table continued on the following page.

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

AI-18

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-3 (Continued)

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT DUNDEE RD., GOLF RD., AND GRAND AVE.

PARAMETER	STATION AND DATE					
	DUNDEE RD. 06/20/79	DUNDEE RD. 09/05/79	GOLF RD. 06/13/79	GOLF RD. 09/07/79	GRAND AVE. 06/21/79	GRAND AVE. 09/06/79
MAGNESIUM	40.000	27.000	34.000	39.000	40.000	35.000
CALCIUM	75.000	79.000	56.000	85.000	74.000	81.000
SELENIUM	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ARSENIC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SILVER	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
BARIUM	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
MERCURY (µG/L)	< 0.05	< 0.05	0.300	< 0.05	< 0.05	< 0.05
TOTAL SOLIDS	820.000	692.000	752.000	823.000	820.000	711.000
T.VOL.SOLIDS	191.000	220.000	258.000	323.000	302.000	211.000
T.SUS.SOLIDS	57.000	67.000	100.000	83.000	42.000	111.000
T.VOL.SUS.SOLIDS	7.000	9.000	12.000	13.000	11.000	16.000
KJELDAHL N	2.600	0.900	2.100	1.300	1.700	1.100
AMMONIA-N	0.700	0.200	0.400	0.200	0.300	0.200
ORGANIC N	1.900	0.700	1.700	1.100	1.400	0.900
NITRATE	0.100	< 0.1	0.100	< 0.1	0.100	< 0.1
NITRITE	5.500	2.600	5.100	2.600	3.600	2.400
COD	33.000	32.000	39.000	32.000	43.000	34.000
BOD	5.000	3.000	3.000	NA	4.000	3.000
PH (UNITS)	7.800	8.200	8.000	8.000	7.700	8.400
COND. (µ-MHOS)	1100.000	900.000	800.000	1075.000	1100.000	1000.000

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-4

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT ROOSEVELT RD., FOREST AVE., AND FIRST AVE.

PARAMETER	STATION AND DATE					
	ROOSEVELT RD. 06/14/79	ROOSEVELT RD. 09/17/79	FOREST AVE. 06/14/79	FOREST AVE. 09/17/79	FIRST AVE. 06/14/79	FIRST AVE. 09/10/79
FLOURIDE	0.410	0.590	0.410	0.550	0.500	0.600
PHENOL (µG/L)	4.000	< 1	14.000	< 1	18.000	2.000
CHLORIDE	78.000	118.000	84.000	118.000	154.000	204.000
SOL. P	1.500	0.900	1.500	0.900	1.700	1.800
SULFATE	105.000	162.000	108.000	168.000	140.000	176.000
CYANIDE	0.015	0.015	0.016	0.016	0.016	0.021
FOG	< 1	< 1	2.000	4.000	2.000	1.000
TOC	17.000	17.000	26.000	31.000	22.000	7.000
TURBIDITY (NTU)	14.000	15.000	12.000	12.000	11.000	15.000
ALKALINITY	191.000	244.000	197.000	248.000	232.000	264.000
MBAS	0.058	0.046	0.046	0.046	0.112	0.208
FIELD TEMP. (DEG. C)	20.500	16.000	21.500	17.000	21.500	18.000
FIELD DO	2.600	NA	2.200	NA	3.500	4.400
ZINC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CADMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
COPPER	0.030	< 0.02	0.020	< 0.02	0.020	0.020
CHROMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
IRON	0.600	0.500	0.500	1.500	0.700	0.400
NICKEL	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
LEAD	0.050	< 0.01	0.040	< 0.01	0.020	< 0.01
MANGANESE	0.160	0.090	0.170	0.100	0.100	0.050

Table continued on the following page.

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-4 (Continued)

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT ROOSEVELT RD., FOREST AVE., AND FIRST AVE.

PARAMETER	STATION AND DATE					
	ROOSEVELT RD. 06/14/79	ROOSEVELT RD. 09/17/79	FOREST AVE. 06/14/79	FOREST AVE. 09/17/79	FIRST AVE. 06/14/79	FIRST AVE. 09/10/79
MAGNESIUM	33.000	36.000	32.000	36.000	37.000	41.000
CALCIUM	59.000	79.000	58.000	82.000	69.000	97.000
SELENIUM	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ARSENIC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SILVER	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
BARIUM	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
MERCURY (µG/L)	0.200	0.100	0.200	0.100	< 0.05	0.300
TOTAL SOLIDS	673.000	763.000	612.000	759.000	876.000	1178.000
T.VOL.SOLIDS	258.000	229.000	141.000	230.000	215.000	302.000
T.SUS.SOLIDS	32.000	21.000	28.000	14.000	31.000	27.000
T.VOL.SUS.SOLIDS	9.000	1.000	11.000	2.000	11.000	7.000
KJELDAHL N	2.300	2.000	2.300	2.300	2.700	1.900
AMMONIA-N	0.600	0.400	0.700	0.500	0.900	0.800
ORGANIC N	1.700	1.600	1.600	1.800	1.800	1.100
NITRATE	0.100	< 0.1	0.100	0.100	0.300	0.300
NITRITE	4.800	4.400	8.600	4.300	4.000	7.000
COD	32.000	30.000	32.000	29.000	32.000	37.000
BOD	2.000	2.000	2.000	2.000	6.000	10.000
PH (UNITS)	7.600	8.100	7.800	8.000	7.800	7.800
COND. (µ-MHOS)	900.000	1200.000	900.000	1200.000	1200.000	1500.000

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-5

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT OGDEN AVE., WILLOW SPRINGS RD., AND STEPHEN ST.

PARAMETER	STATION AND DATE					
	OGDEN AVE. 06/14/79	OGDEN AVE. 09/10/79	WILLOW SP. RD. 06/22/79	WILLOW SP. RD. 09/10/79	STEPHEN ST. 06/25/79	STEPHEN ST. 09/14/79
FLOURIDE	0.400	0.440	0.400	0.400	0.600	0.520
PHENOL (µG/L)	< 1	1.000	< 1	< 1	12.000	4.000
CHLORIDE	94.000	96.000	108.000	108.000	163.000	150.000
SOL. P	1.500	0.900	1.000	1.000	0.600	1.000
SULFATE	125.000	150.000	141.000	141.000	189.000	180.000
CYANIDE	0.016	0.019	0.014	0.014	0.013	0.015
FOG	2.000	1.000	1.000	1.000	< 1	< 1
TOC	26.000	11.000	16.000	16.000	28.000	36.000
TURBIDITY (NTU)	11.000	18.000	38.000	38.000	38.000	38.000
ALKALINITY	203.000	250.000	258.000	258.000	243.000	258.000
MBAS	0.052	0.100	0.020	0.020	0.046	0.008
FIELD TEMP. (DEG. C)	21.500	17.000	16.000	16.000	18.000	17.000
FIELD DO	2.200	3.700	5.200	5.200	9.800	6.900
ZINC	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CADMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
COPPER	0.020	0.020	0.030	0.030	< 0.02	0.020
CHROMIUM	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
IRON	0.400	0.400	0.800	0.800	1.200	1.100
NICKEL	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
LEAD	0.010	0.030	0.050	0.050	0.060	0.030
MANGANESE	0.160	0.100	0.100	0.100	0.150	0.110

Table continued on the following page.

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-5 (Continued)

1979 DES PLAINES RIVER CHEMICAL DATA
COLLECTED AT OGDEN AVE., WILLOW SPRINGS RD., AND STEPHEN ST.

PARAMETER	STATION AND DATE					
	OGDEN AVE. 06/14/79	OGDEN AVE. 09/10/79	WILLOW SP. RD. 06/22/79	WILLOW SP. RD. 09/10/79	STEPHEN ST. 06/25/79	STEPHEN ST. 09/14/79
MAGNESIUM	33.000	40.000	41.000	40.000	44.000	41.000
CALCIUM	60.000	88.000	83.000	90.000	93.000	91.000
SELENIUM	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ARSENIC	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SILVER	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
BARIUM	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
MERCURY (µG/L)	0.200	0.100	< 0.05	0.200	0.200	0.100
TOTAL SOLIDS	587.000	1152.000	724.000	932.000	906.000	895.000
T.VOL.SOLIDS	134.000	328.000	194.000	277.000	199.000	228.000
T.SUS.SOLIDS	22.000	29.000	53.000	74.000	108.000	75.000
T.VOL.SUS.SOLIDS	8.000	4.000	15.000	12.000	8.000	7.000
KJELDAHL N	2.300	2.000	2.500	1.700	3.200	1.700
AMMONIA-N	0.700	0.500	0.400	0.300	0.100	0.100
ORGANIC N	1.600	1.500	2.100	1.400	3.100	1.600
NITRATE	0.100	< 0.1	0.200	0.100	0.100	< 0.1
NITRITE	3.900	2.900	2.200	3.200	2.900	4.700
COD	30.000	31.000	34.000	35.000	52.000	39.000
BOD	3.000	< 2	4.000	3.000	9.000	5.000
PH (UNITS)	7.800	7.800	7.400	7.900	8.400	8.100
COND. (µ-MHOS)	925.000	1200.000	1200.000	1200.000	1250.000	1300.000

NOTE: ALL PARAMETERS IN MG/L UNLESS OTHERWISE NOTED; NA = NO ANALYSIS PERFORMED; < = BELOW DETECTION LIMIT

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