

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO



**DEPARTMENT OF RESEARCH
AND DEVELOPMENT**

REPORT NO. 85-14

**ILLINOIS WATERWAY WATER QUALITY SURVEY FROM
THE LOCKPORT LOCK AND DAM TO THE PEORIA LOCK AND DAM
1977 AND 1983**

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LOCKPORT LOCK AND DAM TO THE PEORIA LOCK AND DAM
1977 AND 1983

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SUMMARY AND CONCLUSIONS

In August through October of 1977, the Metropolitan Sanitary District of Greater Chicago (District) conducted an extensive water quality survey at 49 sampling stations along a 133 mile reach of the Illinois Waterway from the Lockport Lock and Dam to the Peoria Lock and Dam. A follow-up study of water and sediments in the same 133 mile reach was made during September and October of 1983. Differences in water quality between 1977 and 1983 were determined using Student's t-test. To simplify the statistical analysis, the Illinois Waterway was divided into six navigational pools (Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria), and all the data collected within each pool was combined. Based on the results from the 1977 and 1983 studies, the following conclusions can be made concerning the water and sediment quality along the Illinois Waterway during the two sampling periods:

1. During 1977 and 1983 the mean dissolved oxygen (DO) concentration increased significantly ($p < 0.01$) down the Illinois Waterway from the Lockport pool (1977 - 1.3 mg/L; 1983 - 3.8 mg/L) to the Peoria pool (1977 - 7.2 mg/L; 1983 - 7.8 mg/L). Significantly higher ($p < 0.01$) mean DO values were found during 1983 compared to 1977 in the Lockport (1977 - 1.3 mg/L; 1983 - 3.8 mg/L), Brandon Road (1977 - 2.7 mg/L;

1983 - 4.1 mg/L), Dresden Island (1977 - 5.3 mg/L; 1983 - 6.5 mg/L) and Peoria pools (1977 - 7.2 mg/L; 1983 - 7.8 mg/L).

2. There was little variation in the mean concentration of the total five-day biochemical oxygen demand (BOD_5) for the six navigational pools during both 1977 and 1983, ranging from 3 mg/L in the Lockport pool to 7 mg/L in the Dresden Island and Marseilles pools. There were no significant differences ($p < 0.05$) in the mean BOD_5 values between 1977 and 1983 among the six navigational pools in the Illinois Waterway.
3. During 1983 there was little variation in the concentration of total organic carbon (TOC) along the Illinois Waterway. The mean concentration of TOC in each of the six navigational pools was 6 mg/L in 1983. TOC was not measured during the 1977 survey.
4. Except for a slight drop in the mean total suspended solids (TSS) concentration in the Dresden Island pool, TSS increased in the waterway from the Lockport pool (20 mg/L) to the Peoria pool (54 mg/L) during 1983. TSS was not measured in 1977.
5. In 1977 and 1983, the mean concentration of ammonium nitrogen (NH_4-N) decreased in the Illinois Waterway from the Lockport pool (1977 - 2.7 mg/L; 1983 - 2.5

- mg/L) to the Peoria pool (1977 - 0.1 mg/L; 1983 - 0.3 mg/L). Significantly higher ($p < 0.01$) mean $\text{NH}_4\text{-N}$ values were found in 1983 than in 1977 in the Dresden Island (1977 - 1.7 mg/L; 1983 - 2.1 mg/L), Marseilles (1977 - 0.9 mg/L; 1983 - 1.3 mg/L), and Peoria pools (1977 - 0.1 mg/L; 1983 - 0.3 mg/L).
6. In 1977, the mean nitrite plus nitrate nitrogen ($\text{NO}_2 + \text{NO}_3\text{-N}$) concentration increased from the Lockport pool (2.49 mg/L) to the Peoria pool (4.70 mg/L). There was, however, little variation in the mean $\text{NO}_2 + \text{NO}_3\text{-N}$ concentration in the waterway during 1983. Significantly lower ($p < 0.01$) mean $\text{NO}_2 + \text{NO}_3\text{-N}$ values were measured during 1983 than in 1977 in the Marseilles (1977 - 4.08 mg/L; 1983 - 3.01 mg/L), Starved Rock (1977 - 4.64 mg/L; 1983 - 3.22 mg/L), and Peoria pools (1977 - 4.70 mg/L; 1983 - 3.13 mg/L).
7. Generally, during both 1977 and 1983, the mean total phosphorus (TP) concentration decreased along the waterway from the Lockport pool (1977 - 0.67 mg/L; 1983 - 0.63 mg/L) to the Peoria pool (1977 - 0.40 mg/L; 1983 - 0.46 mg/L). Mean TP values were significantly higher ($p < 0.01$) during 1983 than in 1977 in the Dresden Island (1977 - 0.60 mg/L; 1983 - 0.69 mg/L), Marseilles (1977 - 0.39 mg/L; 1983 - 0.64 mg/L), Starved Rock (1977 - 0.43 mg/L; 1983 - 0.58

mg/L), and Peoria pools (1977 - 0.40 mg/L; 1983 - 0.46 mg/L).

8. Overall, the pH increased slightly in the Illinois Waterway from the Lockport pool to the Peoria pool during 1977 and showed little variation in 1983. In 1977, the pH values along the waterway ranged from 6.5 to 8.7, while in 1983 they ranged from 6.0 to 7.6.
9. Cyanide values were quite variable during the 1977 survey, ranging from 0.012 mg/L at Station 32 in the Peoria pool to 0.033 mg/L at Stations 12 and 18 in the Marseilles pool. However, in 1983 there was little variation in the concentration (range: 0.002 - 0.011 mg/L) among the 49 sampling stations. Significantly higher ($p < 0.01$) mean cyanide values were found in 1977 compared to 1983 in the Brandon Road (1977 - 0.017 mg/L; 1983 - 0.007 mg/L), Dresden Island (1977 - 0.016 mg/L; 1983 - 0.006 mg/L), Marseilles (1977 - 0.033 mg/L; 1983 - 0.005 mg/L), Starved Rock (1977 - 0.027 mg/L; 1983 - 0.005 mg/L), and Peoria pools (1977 - 0.022 mg/L; 1983 - 0.005 mg/L).
10. Except for an increase in the lower end of the Peoria pool from Station 45 to Station 49, phenol decreased in concentration down the waterway from the Lockport

pool (0.020 mg/L) to the Peoria pool (0.014 mg/L) during the 1983 survey. Phenol was not measured in 1977.

11. In 1983 there was little variation in the mean concentration of fats, oils, and greases (FOG) down the Illinois Waterway. The mean FOG values during 1983 in the Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools were 6, 4, 4, 5, 4, and 5 mg/L, respectively. FOG was not measured in 1977.
12. The concentration of copper, iron, manganese, mercury, and zinc in 1983 were quite variable among sampling stations along the Illinois Waterway ranging from a low of <0.01, 0.2, 0.03, <0.0001, and <0.01 mg/L, respectively, to a high of 0.2, 6.9, 0.21, 0.0018, and 0.4 mg/L, respectively. No obvious trend was evident during 1983 except for an increase in the mean concentration of iron and manganese from the Lockport pool (0.6500 and 0.0425 mg/L, respectively) to the Peoria pool (0.9727 and 0.0900 mg/L, respectively). Trace metals were not measured in 1977.
13. Fecal coliforms (FC) decreased significantly ($p < 0.05$) both in 1977 and 1983 with distance along the Illinois Waterway from the Lockport pool (1977 - 33,574 cfu/100 mL; 1983 - 1,621 cfu/100 mL) to the Peoria pool

(1977 - 314 cfu/100 mL; 1983 - 97 cfu/100 mL). Significantly higher ($p < 0.01$) geometric means of FC were observed in all of the six navigational pools during 1977 (33,574, 8,704, 2,515, 692, 622, and 314 cfu/100 mL, respectively) than in 1983 (1,621, 2,097, 1,091, 225, 205, and 97 cfu/100 mL, respectively).

14. Seven of 22 samples (32 percent) collected in 1983 yielded confirmed viruses along the Illinois Waterway. The virus levels ranged from a low of 0 PFU/L at all 11 sampling stations during one or both of the sampling dates to a high of 0.18 PFU/L at Station 22 in the Starved Rock pool. There was little difference in the concentration of confirmed virus levels among the sampling stations collected in 1983.
15. In 1983 the percent of total and volatile solids in sediments varied considerably from a low of 23.0 and 0.80 percent, respectively, to a high of 81.5 and 9.6 percent, respectively. No clean trends were discernible for total and volatile solids in sediments along the Illinois Waterway. Total and volatile solids were not measured in sediment during 1977.
16. The chemical oxygen demand (COD) in bottom sediments was quite variable in 1983 among the 12 sampling stations ranging from a low of 5,189 mg/kg at Station 23 in the Starved Rock pool to a high of 153,885

mg/kg at Station 1 in the Lockport pool. COD did not show any trend in the sediments along the waterway. COD was not measured in sediment in 1977.

17. In 1983 total organic carbon (TOC) fluctuated widely in sediment samples ranging from 0.10 percent at Station 23 in the Starved Rock pool to 6.53 percent at Station 1 in the Lockport pool. TOC did not show a well defined pattern of concentration in sediments down the Illinois Waterway. TOC was not measured in sediment in 1977.
18. Total kjeldahl nitrogen (TKN) in Illinois Waterway sediments exhibited a high degree of variability during 1983 ranging from a low of 250 mg/kg at Station 32 in the Peoria pool to a high of 27,999 mg/kg at Station 1 in the Lockport pool. No clear trend was discernible for TKN in sediments along the waterway. TKN was not measured in sediment in 1977.
19. All sampling stations in both 1977 and 1983 had sediment cyanide values of less than 1.0 mg/kg, except for Station 1 in the Lockport pool (1977 - 2.20 mg/kg; 1983 - 5.39 mg/kg), Station 8 in the Dresden Island pool (1977 - 4.00 mg/kg), and Station 44 in the Peoria pool (1977 - 1.00 mg/kg). During both 1977 and 1983 cyanide generally decreased in concentration in sediments along the waterway. Fifty per-

cent of the sediment cyanide values were higher during 1977 than in 1983.

20. In 1983 the phenol concentration in the sediments ranged from 0.03 mg/kg at Station 8 in the Dresden Island pool to 5.80 mg/kg at Station 1 in the Lockport pool. Except for the two extreme values at Station 1 (5.80 mg/kg) and Station 44 (1.91 mg/kg), there was little variation in the sediment phenol concentrations along the Illinois Waterway. Phenol was not measured in sediment in 1977.
21. The concentration of fats, oils, and greases (FOG) in sediments was quite variable during 1983 among the sampling stations ranging from a low of 124 mg/kg at Station 41 in the Peoria pool to a high of 17,398 mg/kg at Station 1 in the Lockport pool. Generally, FOG decreased in concentration in the sediments along the waterway. FOG was not measured in sediment in 1977.
22. During 1983 the concentration of cadmium, chromium, copper, lead, mercury, nickel, and zinc in sediments of the Lockport pool (58.18, 389.35, 441.01, 217.27, 4.60, 427.39, and 2,096.67 mg/kg, respectively) were significantly higher ($p < 0.01$) than in the other five navigational pools. However, arsenic, iron, manganese, and silver did not differ significantly

in the sediments of the various pools from Lockport to Peoria. Generally, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc decreased in concentration from the Lockport pool to the upper portion of the Peoria pool, and then increased along the middle and lower portions of the Peoria pool. Trace metals were not measured in sediment in 1977.

DISCLAIMER

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

INTRODUCTION

The waters of the Illinois Waterway have had great demands placed upon them by the people residing within northeastern and central Illinois. The multiple uses of these water resources include agriculture, fishing, industrial water supply, power generation, public water supply, recreation, transportation, and wastewater assimilation.

The District operates three major sewage treatment works in Cook County, Illinois, whose discharges make up 93 percent of all waste flows entering the Illinois Waterway (Butts et al., 1975). These sewage treatment works provide secondary treatment for an average flow of 1,358 million gallons per day. As a result of the promulgation of Public Law 92-500 (Federal Water Pollution Control Act Amendments of 1972), the District has undertaken to reduce combined sewer overflows (CSOs) into area waterways, utilize limited flows of diversion water from Lake Michigan for low flow augmentation, expand and improve the quality of its sewage treatment facility effluents, and install a system of artificial instream aeration to increase directly the DO concentration of the Chicago area deep draft waterways.

In August through October of 1977, the District conducted an extensive water quality study along the Illinois Waterway from the Lockport Lock and Dam to the Peoria Lock and Dam, a distance of 133 miles. The District made a follow-up water

and sediment survey of this same 133 mile reach during September and October of 1983.

The purpose of these two studies was to obtain data to characterize water quality conditions in the Illinois Waterway. Statistical analysis (t-test) was performed to determine whether significant water quality changes had occurred during the five-year period between the 1977 and 1983 surveys.

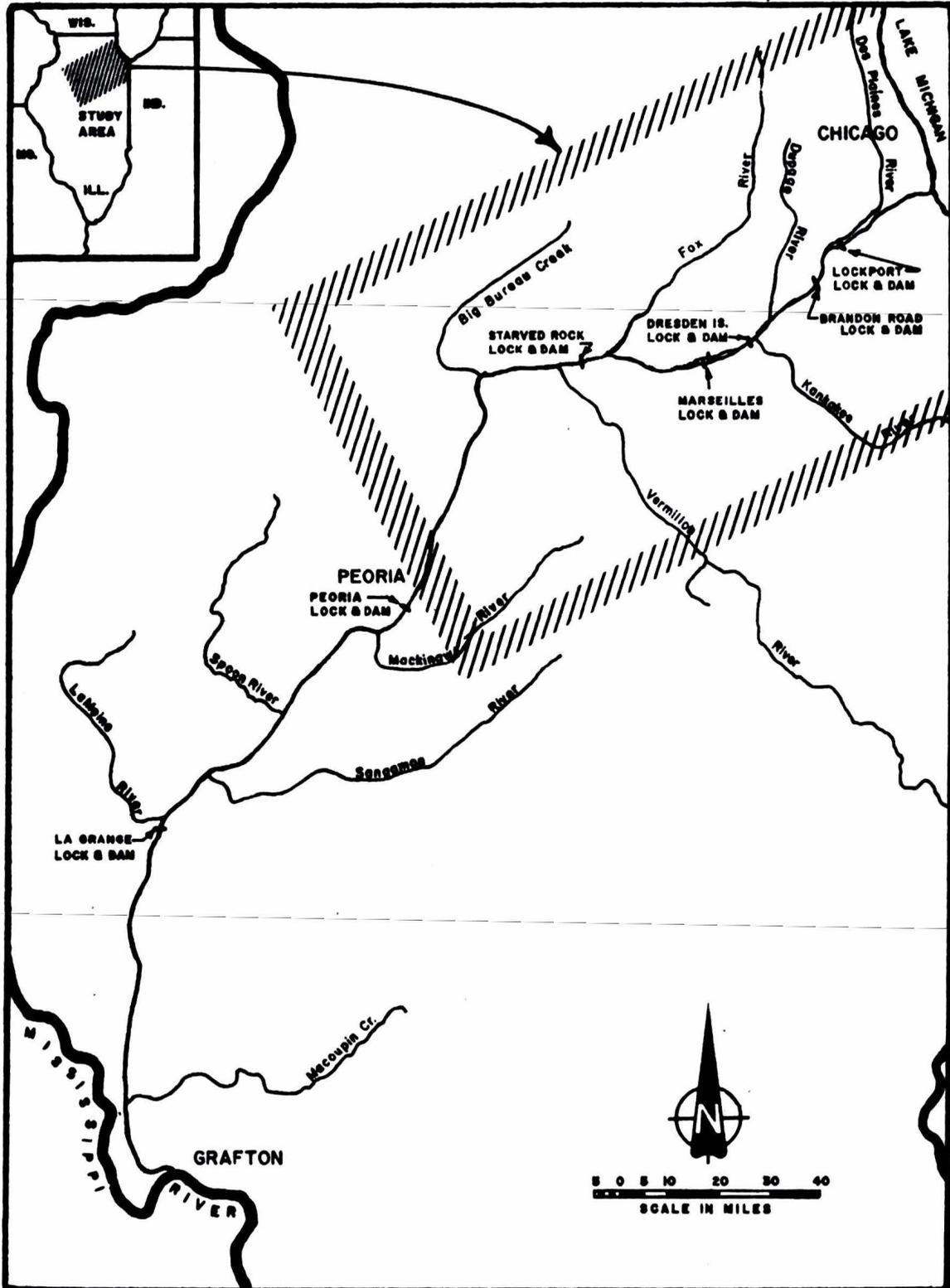
DESCRIPTION OF STUDY AREA

Illinois Waterway

The Illinois Waterway extending from Grafton, Illinois, located on the Mississippi River upstream of St. Louis, Missouri, to Chicago, Illinois (Figure 1), includes the following segments: 1) the Illinois River from its mouth at Grafton, Illinois, to the confluence of the Kankakee and Des Plaines River; 2) the Des Plaines River from the Lockport Lock and Dam to the confluence with the Kankakee River; 3) the Chicago Sanitary and Ship Canal; 4) the South Branch of the Chicago River; and 5) the Chicago River. The 327 mile waterway is composed of a series of eight navigational pools whose lengths and U.S. Army Corps of Engineers waterway mile-point designations are presented in Table 1. The pools were created by locks and dams to maintain the water depths required for commercial barge traffic. The present study area was a 133 mile reach of the Illinois Waterway extending from the Lockport Lock and Dam to the Peoria Lock and Dam.

As reported by Butts et al. (1975), the mean water velocity is 0.39 feet/second. The very low hydraulic gradient, an average of 0.267 feet/mile, partially accounts for the low velocity in the system. The bottom deposits are composed primarily of organic material (sludge) and detritus in the Lockport, Brandon Road, and Dresden Island pools, while varying amounts of sand and gravel are found down the waterway in the Marseilles, Starved Rock, and Peoria pools (Butts et al., 1975).

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 FIGURE 1
 ILLINOIS WATERWAY FROM CHICAGO TO GRAFTON, ILLINOIS



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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 1

ILLINOIS WATERWAY NAVIGATION POOLS

Pool	Inclusive Waterway Mile Points	Length (Miles)
Lockport	327.2 - 291.0	36.2
Brandon Road	291.0 - 286.0	4.7
Dresden Island	286.0 - 271.5	14.5
Marseilles	271.5 - 247.0	24.5
Starved Rock	247.0 - 231.0	15.4
Peoria	231.0 - 157.6	73.4
La Grange	157.6 - 80.2	77.4
Alton	80.2 - 0.0	80.2

Sampling Locations

Forty-nine sampling stations were selected for the study. Two stations were located on the Chicago Sanitary and Ship Canal, eight on the Des Plaines River, and 39 on the Illinois River. Table 2 lists the locations of the 49 sampling stations.

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TABLE 2

SAMPLING LOCATIONS ALONG ILLINOIS WATERWAY FROM THE LOCKPORT
LOCK AND DAM TO THE PEORIA LOCK AND DAM

Station Number	Waterway	Waterway Mile Point Location	Navigation Pool
1	Chicago Sanitary and Ship Canal	291.5	Lockport
2	Chicago Sanitary and Ship Canal	290.5	Brandon Road
3	Des Plaines River	287.3	Brandon Road
4	Des Plaines River	286.5	Brandon Road
5	Des Plaines River	285.0	Dresden Island
6	Des Plaines River	282.8	Dresden Island
7	Des Plaines River	280.5	Dresden Island
8	Des Plaines River	278.0	Dresden Island
9	Des Plaines River	276.1	Dresden Island
10	Des Plaines River	274.0	Dresden Island

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TABLE 2 (continued)

SAMPLING LOCATIONS ALONG ILLINOIS WATERWAY FROM THE LOCKPORT
LOCK AND DAM TO THE PEORIA LOCK AND DAM

Station Number	Waterway	Waterway Mile Point Location	Navigation Pool
11	Illinois River	272.4	Dresden Island
12	Illinois River	270.0	Marseilles
13	Illinois River	268.9	Marseilles
14	Illinois River	265.0	Marseilles
15	Illinois River	263.0	Marseilles
16	Illinois River	261.6	Marseilles
17	Illinois River	256.0	Marseilles
18	Illinois River	253.0	Marseilles
19	Illinois River	250.0	Marseilles
20	Illinois River	247.5	Marseilles

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Table continued on following page

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TABLE 2 (continued)

SAMPLING LOCATIONS ALONG ILLINOIS WATERWAY FROM THE LOCKPORT
LOCK AND DAM TO THE PEORIA LOCK AND DAM

Station Number	Waterway	Waterway Mile Point Location	Navigation Pool
21	Illinois River	246.0	Starved Rock
22	Illinois River	243.7	Starved Rock
23	Illinois River	240.6	Starved Rock
24	Illinois River	238.5	Starved Rock
25	Illinois River	236.8	Starved Rock
26	Illinois River	234.5	Starved Rock
27	Illinois River	231.7	Starved Rock
28	Illinois River	229.6	Peoria
29	Illinois River	226.9	Peoria
30	Illinois River	224.7	Peoria

Table continued on following page.

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TABLE 2 (continued)

SAMPLING LOCATIONS ALONG ILLINOIS WATERWAY FROM THE LOCKPORT
LOCK AND DAM TO THE PEORIA LOCK AND DAM

Station Number	Waterway	Waterway Mile Point Location	Navigation Pool
31	Illinois River	222.6	Peoria
32	Illinois River	219.8	Peoria
33	Illinois River	217.1	Peoria
34	Illinois River	213.4	Peoria
35	Illinois River	209.4	Peoria
36	Illinois River	205.0	Peoria
37	Illinois River	200.4	Peoria
38	Illinois River	196.9	Peoria
39	Illinois River	190.0	Peoria
40	Illinois River	186.4	Peoria

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TABLE 2 (continued)

SAMPLING LOCATIONS ALONG ILLINOIS WATERWAY FROM THE LOCKPORT
LOCK AND DAM TO THE PEORIA LOCK AND DAM

Station Number	Waterway	Waterway Mile Point Location	Navigation Pool
41	Illinois River	183.2	Peoria
42	Illinois River	179.0	Peoria
43 ^v	Illinois River	174.9	Peoria
44	Illinois River	170.9	Peoria
45	Illinois River	165.3	Peoria
46	Illinois River	162.8	Peoria
47	Illinois River	160.6	Peoria
48	Illinois River	159.4	Peoria
49	Illinois River	158.2	Peoria

*Peoria Lock and Dam
Assoc*

MATERIALS AND METHODS

Field Sampling and Laboratory Analysis

WATER

Chemical Constituents. Water samples for chemical analyses were collected from the 49 sampling stations on August 23-25, August 30-September 2, September 12-15, September 19-22, October 3-6, and October 10-14 during 1977, and on September 19-22, September 26-29, October 3-6, and October 10-13 in 1983. Samples were collected at a depth of three feet below the water surface in the center of the waterway with a Kemmerer water sampler. All samples were transported to the laboratory in iced, insulated containers within 24 hours following sample collection.

The constituents analyzed, sample containers, and preservation methods are presented in Table 3. TSS, TOC, phenol, FOG, and trace metals were not measured during the 1977 survey. The DO samples were fixed in the field and returned to the laboratory for titration. Fixation and titration were by the Azide Modification of the Winkler Method, as detailed in Standard Methods, 15th Edition.

Except for BOD₅ which was analyzed according to the 15th Edition of Standard Methods, all other analyses were conducted by procedures set forth in Methods for Chemical Analysis of Water and Wastes, USEPA (1979).

Fecal Coliform. Water samples for FC analyses were also collected from the 49 sampling stations on the same days as

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TABLE 3

CONSTITUENTS ANALYZED, ~~SAMPLE CONTAINERS,~~ AND PRESERVATION METHODS
FOR WATER SAMPLES COLLECTED FROM THE ILLINOIS WATERWAY STUDY AREA

Constituent	Sample Container	Preservative
Dissolved Oxygen	Glass	Determined on Site
Water Temperature	Plastic	Determined on Site
Five-Day Biochemical Oxygen Demand	Plastic	Cool, 4°C
Total Organic Carbon	Plastic	Cool, 4°C
Total Suspended Solids	Plastic	Cool, 4°C
Ammonium Nitrogen	Plastic	Cool, 4°C
Nitrite Plus Nitrate Nitrogen	Plastic	Cool, 4°C
Total Phosphorus	Plastic	Cool, 4°C
pH	Plastic	Cool, 4°C
Total Cyanide	Plastic	NaOH to pH 12
Phenol	Glass	H ₂ SO ₄ to pH <2
Fats, Oils, and Greases	Glass	Cool, 4°C
Trace Metals (Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Manganese, Silver, and Zinc)	Plastic	HNO ₃ to pH <2
Fecal Coliform	Sterile Glass	Cool, 4°C, EDTA and Thiosulfate
Virus	Plastic	Cool, 4°C, and Thiosulfate

the chemical constituents. Fecal coliform samples were collected with a Kemmerer water sampler at a depth of three feet below the water surface in the center of the waterway. The sample was poured into a sterile, 120 mL bottle containing sufficient sodium thiosulfate to neutralize 15 mg/L chlorine. The FC samples were kept cool in iced, insulated containers. The analyses were performed by the membrane filtration technique as described in the 14th Edition of Standard Methods.

Virus. Samples for virus analyses were collected only during 1983 at 11 of the 49 sampling stations (1, 2, 4, 5, 11, 12, 20, 22, 27, 28, and 49) on October 3-6 and October 10-13. Water samples were collected with a plastic, submersible drainage pump from the water surface in the center of the waterway. The virus samples were stored in five-gallon Nalgene® carboys and kept cool on dry ice.

The viruses in the water samples were concentrated, assayed, and confirmed by a modification of the methods described by Bertucci et al. (1983).

SEDIMENT

Chemical Constituents. Sediment samples were collected only during the 1983 survey at 12 of the 49 sampling stations (1, 5, 8, 18, 23, 28, 32, 35, 38, 41, 44, and 48). A sediment sample was taken with a Ponar grab sampler from each of the 12 stations on September 19-22. The sample was transferred into a quart glass jar and analyzed for TS, TVS, COD, TOC, TKN, cya-

nide, phenol, FOG, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. All constituents were analyzed according to Methods for Chemical Analysis of Water and Wastes, USEPA (1979).

Statistical Analysis

Differences in the water quality between 1977 and 1983 in each of the six navigational pools were analyzed statistically using the Student's t-test (Zar, 1974). Fecal coliform values were transformed to the logarithms (base 10) before statistical analysis. Differences were considered significant at the five percent level.

RESULTS AND DISCUSSION

Water Quality

Traditionally, the quality of water in lakes and rivers has been evaluated in relation to biological, chemical, and physical criteria, including bacterial levels, the concentration of various dissolved gasses, dissolved and suspended inorganic and organic compounds, temperature, and the rate of flow. Methods for measuring the biological and chemical constituents, and physical properties of water are well defined, and they have considerable precision. In contrast to the sediment which reflects long-term conditions, water samples are indicative of the quality of the water at the time of sampling only.

To simplify the statistical analysis, the Illinois Waterway was divided into six navigational pools (Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria), and all the data collected within each pool was combined. Comparisons of the mean values and ranges of the chemical water quality constituents measured in each of these six pools during 1977 and 1983 are shown in Tables 4-9. The concentrations of constituents analyzed at each of the 49 sampling stations during 1977 and 1983 are presented in Appendices AI, AII, and AIII.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 4

A COMPARISON OF THE MEAN VALUES OF THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED IN THE LOCKPORT POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983.

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	6	1.3	0.8 -1.7	4	3.8	2.8 -4.2	0.01
Five-Day Biochemical Oxygen Demand	6	5	3.0 -6.0	4	3	1.0 -5.0	No Significant Difference
Ammonium Nitrogen	6	2.7	1.0 -4.3	4	2.5	1.9 -3.2	No Significant Difference
Nitrite Plus Nitrate Nitrogen	6	2.49	1.28-3.54	4	2.36	2.12-2.66	No Significant Difference
Total Phosphorus	6	0.67	0.50-0.79	4	0.63	0.47-0.84	No Significant Difference
pH (units)	6		6.9 -7.3	4		6.8 -7.0	
Cyanide		NO DATA		4	0.006	0.005-0.007	

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

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TABLE 5

A COMPARISON OF THE MEAN VALUES OF THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED
IN THE BRANDON ROAD POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	18	2.7	1.2 -4.6	12	4.1	3.3 -4.6	0.01
Five-Day Biochemical Oxygen Demand	18	4	2 -8	12	4	1 -9	No Significant Difference
Ammonium Nitrogen	18	2.3	1.1 -4.2	12	2.4	1.6 -3.7	No Significant Difference
Nitrite Plus Nitrate Nitrogen	18	2.61	1.36-4.22	12	2.65	2.22-3.48	No Significant Difference
Total Phosphorus	18	0.66	0.50-0.082	12	0.67	0.47-0.94	No Significant Difference
pH (units)	18		6.5 -7.3	12		6.4 -7.1	
Cyanide	1	0.017		12	0.007	0.005-0.010	0.01

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

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TABLE 6

A COMPARISON OF THE MEAN VALUES IN THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED
IN THE DRESDEN ISLAND POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	42	5.3	3.5 - 7.1	28	6.5	5.3 - 8.2	0.01
Five-Day Biochemical Oxygen Demand	42	7	3 -15	28	7	3 -12	No Significant Difference
Ammonium Nitrogen	42	1.7	0.5 - 2.8	28	2.1	0.7 - 4.0	0.05
Nitrite Plus Nitrate Nitrogen	42	3.04	1.50- 4.31	28	2.92	2.04- 3.62	No Significant Difference
Total Phosphorus	42	0.60	0.36- 0.80	28	0.69	0.61- 0.89	0.01
pH (units)	42		6.5 - 7.6	28		6.2 - 7.1	
Cyanide	2	0.016	0.016-0.016	28	0.006	0.004-0.009	0.01

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

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TABLE 7

A COMPARISON OF THE MEAN VALUES IN THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED
IN THE MARSEILLES POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	54	7.3	5.0 - 9.9	36	7.2	5.3 - 8.7	No Significant Difference
Five-Day Biochemical Oxygen Demand	54	7	3 -17	36	7	2 -12	No Significant Difference
Ammonium Nitrogen	54	0.9	0.2 - 2.4	36	1.3	0.4 - 2.8	0.01
Nitrite Plus Nitrate Nitrogen	54	4.08	2.21- 5.11	36	3.01	2.47- 3.57	0.01
Total Phosphorus	54	0.39	0.20- 0.78	36	0.64	0.45- 0.95	0.01
pH (units)	54		7.2 - 8.5	36		6.2 - 7.3	
Cyanide	2	0.033	0.033-0.033	36	0.005	0.003-0.007	0.1

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

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TABLE 8

A COMPARISON OF THE MEAN VALUES OF THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED
IN THE STARVED ROCK POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	42	7.1	4.6 - 9.3	28	7.2	4.7 - 8.9	No Significant Difference
Five-Day Biochemical Oxygen Demand	42	6	3 - 10	28	6	2 - 10	No Significant Difference
Ammonium Nitrogen	42	0.5	0.1 - 1.5	28	0.6	0.1 - 1.2	No Significant Difference
Nitrite Plus Nitrate Nitrogen	42	4.64	3.28- 5.61	28	3.22	2.92- 3.81	0.01
Total Phosphorus	42	0.43	0.22- 0.78	28	0.58	0.42- 0.90	0.01
pH (units)	42		7.2 - 8.7	28		6.2 - 7.3	
Cyanide	1	0.027		28	0.005	0.003-0.007	0.01

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

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TABLE 9

A COMPARISON OF THE MEAN VALUES OF THE CHEMICAL WATER QUALITY CONSTITUENTS MEASURED
IN THE PEORIA POOL OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Constituent*	August to October 1977			September to October 1983			Significance Level***
	Number of Observations**	Mean	Range	Number of Observations**	Mean	Range	
Dissolved Oxygen	132	7.2	4.1 -10.0	88	7.8	4.5 -10.9	0.01
Five-Day Biochemical Oxygen Demand	132	5	2 -10.0	88	4	1 - 7	No Significant Difference
Ammonium Nitrogen	132	0.1	<0.1 - 0.5	88	0.3	0.1 - 1.0	0.01
Nitrite Plus Nitrate Nitrogen	132	4.70	3.06- 6.70	88	3.13	2.20- 3.92	0.01
Total Phosphorus	132	0.40	0.21- 0.61	88	0.46	0.37- 0.82	0.01
pH (units)	132		7.3 - 8.3	88		6.0 - 7.6	
Cyanide	6	0.022	0.012-0.030	88	0.005	0.002-0.011	0.01

*Expressed in mg/L except where noted.

**The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

***The Student's t-test was used to determine whether significant differences existed between mean chemical water quality values determined in 1977 and 1983.

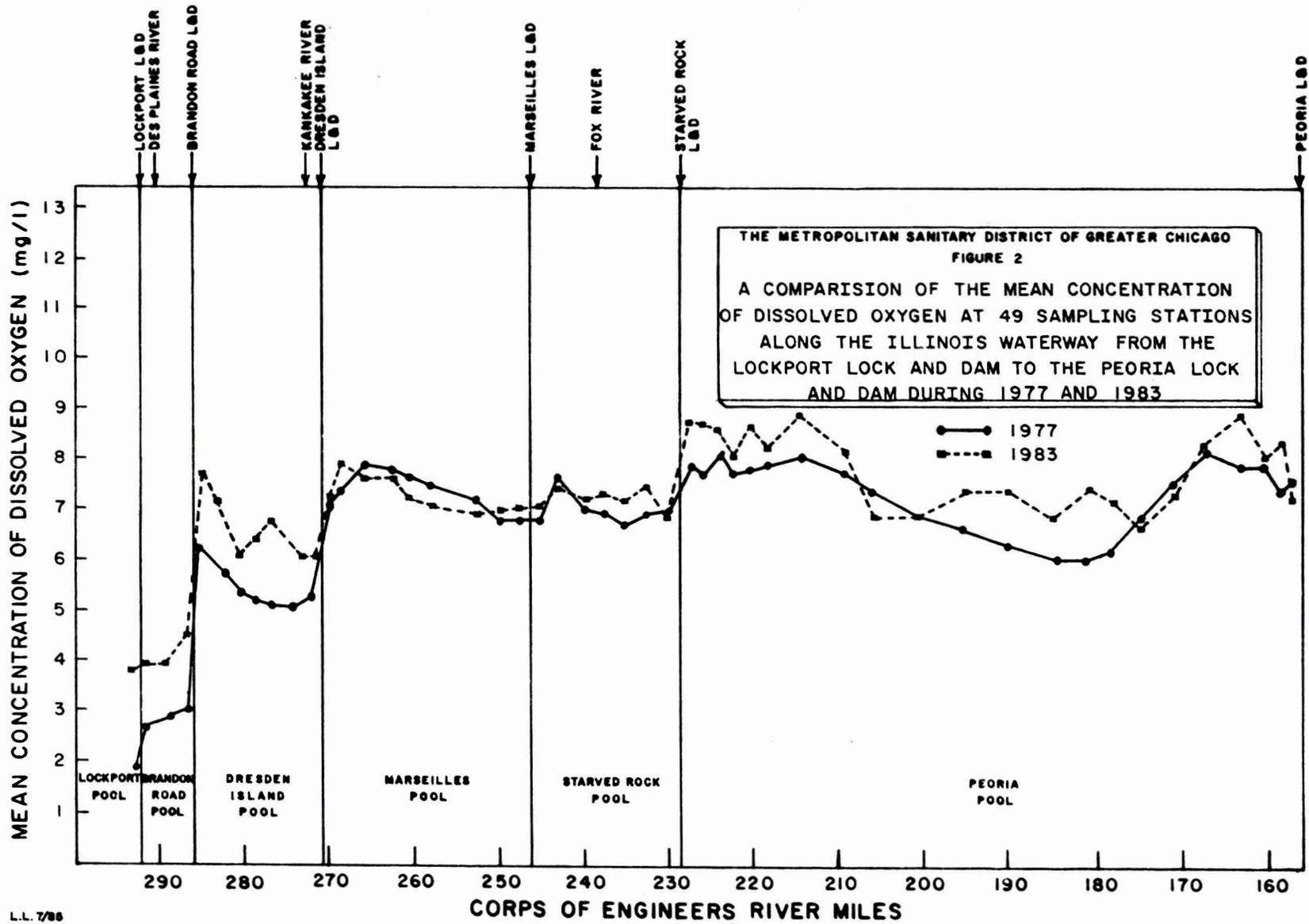
CHEMICAL

Dissolved Oxygen. During 1977 and 1983, the DO concentration ranged from a low of 0.8 mg/L at Station 1 in the Lockport pool to a high of 10.9 mg/L at Station 34 in the Peoria pool. As shown in Figure 2, the mean DO concentration in the study area increased significantly ($p < 0.01$) during both 1977 and 1983 in the Illinois Waterway from the Lockport pool (2.6 mg/L; combined mean value for 1977 and 1983) to the Peoria pool (7.5 mg/L; combined mean value for 1977 and 1983). Butts et al. (1975) also showed an increase in the DO concentration in the waterway during 1971 and 1972.

No significant differences ($p > 0.01$) were found in the mean DO values between 1977 and 1983 in the Marseilles and Starved Rock pools (Tables 7 and 8). However, significantly higher ($p < 0.01$) mean DO values were found during the 1983 survey in the Lockport, Brandon Road, Dresden Island, and Peoria pools of the Illinois Waterway (Tables 4-6 and 9).

A summary of the mean DO concentrations above and below the five dam locations in the present study is shown in Table 10. The data clearly show that the DO concentrations were higher below than above the waterway dams during both 1977 and 1983. Similar results were reported by Butts et al. (1975) in his study of the Illinois Waterway.

Five-Day Biochemical Oxygen Demand. There was little variation in the mean concentration of total BOD₅ along the



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TABLE 10

SUMMARY OF MEAN DISSOLVED OXYGEN VALUES ABOVE AND BELOW DAM LOCATIONS
IN THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK AND DAM TO THE
STARVED ROCK LOCK AND DAM DURING 1977 AND 1983

Dam Location	Number of Observations		Dissolved Oxygen Concentration (mg/L)			
	1977*	1983**	Above Dam		Below Dam	
			1977	1983	1977	1983
Lockport	6	4	3.8	2.5	3.9	3.3
Brandon Road	6	4	4.4	3.8	7.6	6.9
Dresden Island	6	4	6.1	5.7	6.9	7.2
Marseilles	6	4	7.0	7.0	7.5	7.7
Starved Rock	6	4	6.5	6.7	8.8	8.4

*Six observations above and six below the waterway dam in 1977.

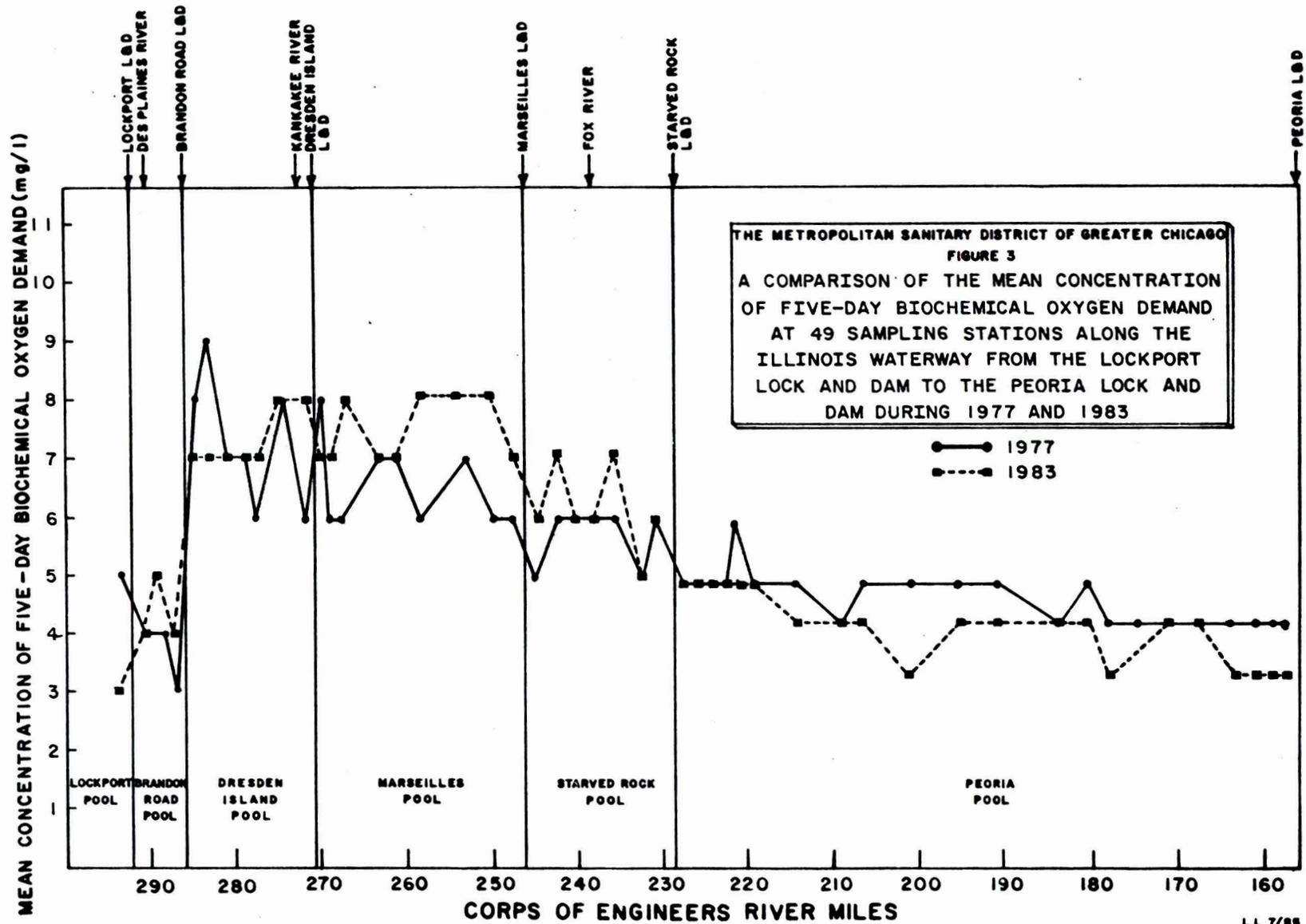
**Four observations above and four below the waterway dam in 1983.

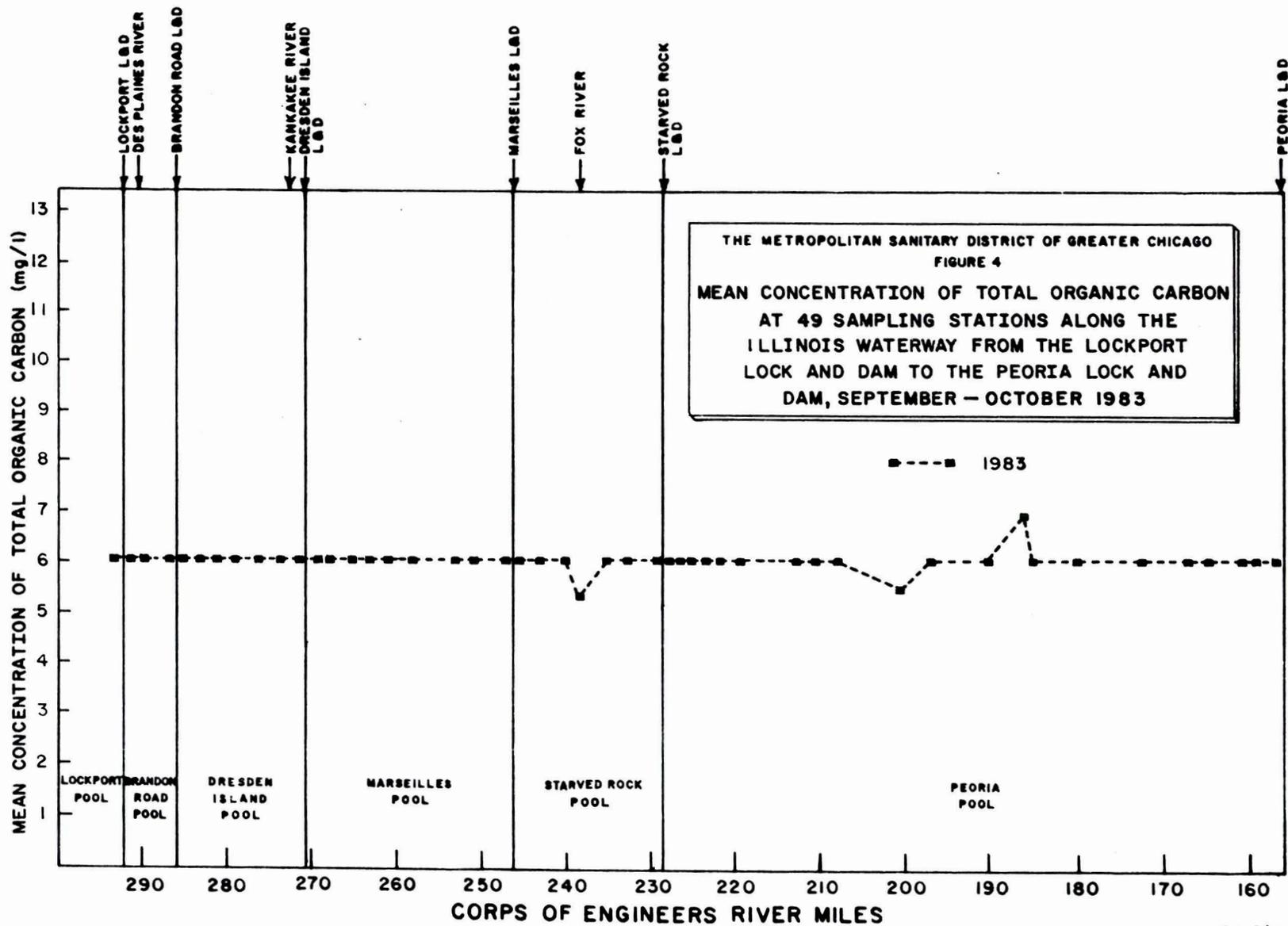
Illinois Waterway during both 1977 and 1983 (Figure 3). The ranges of values of the BOD₅ for all 49 sampling stations in the Illinois Waterway during 1977 and 1983 were from 1 to 17 mg/L (Tables 4-9). The mean BOD₅ values for all six pools ranged from 3 mg/L in the Lockport pool to 7 mg/L in the Dresden Island and Marseilles pools.

There were no significant differences ($p > 0.05$) in the mean BOD₅ values between 1977 and 1983 among the six navigational pools in the Illinois Waterway (Tables 4-9).

Total Organic Carbon. TOC is a measure of the amount of reduced carbon, but does not differentiate between biodegradable and refractory organic compounds. There was little variation in the concentration of TOC along the Illinois Waterway during 1983 (Figure 4). TOC was not measured during the 1977 survey. TOC ranged from 4 mg/L at Station 37 to 12 mg/L at Station 40, both sampling stations in the Peoria pool. There were no significant differences ($p > 0.01$) in the mean value of the TOC between the six navigational pools. The mean concentration of TOC in each of the six pools was 6 mg/L.

Total Suspended Solids. TSS values along the Illinois Waterway were quite variable in 1983, ranging from 7 mg/L at Station 1 in the Lockport pool to 117 mg/L at Station 49 in the Peoria pool. TSS was not measured during 1977. Except for a slight drop in the mean concentration of TSS in the Dresden Island pool, TSS increased down the waterway from the

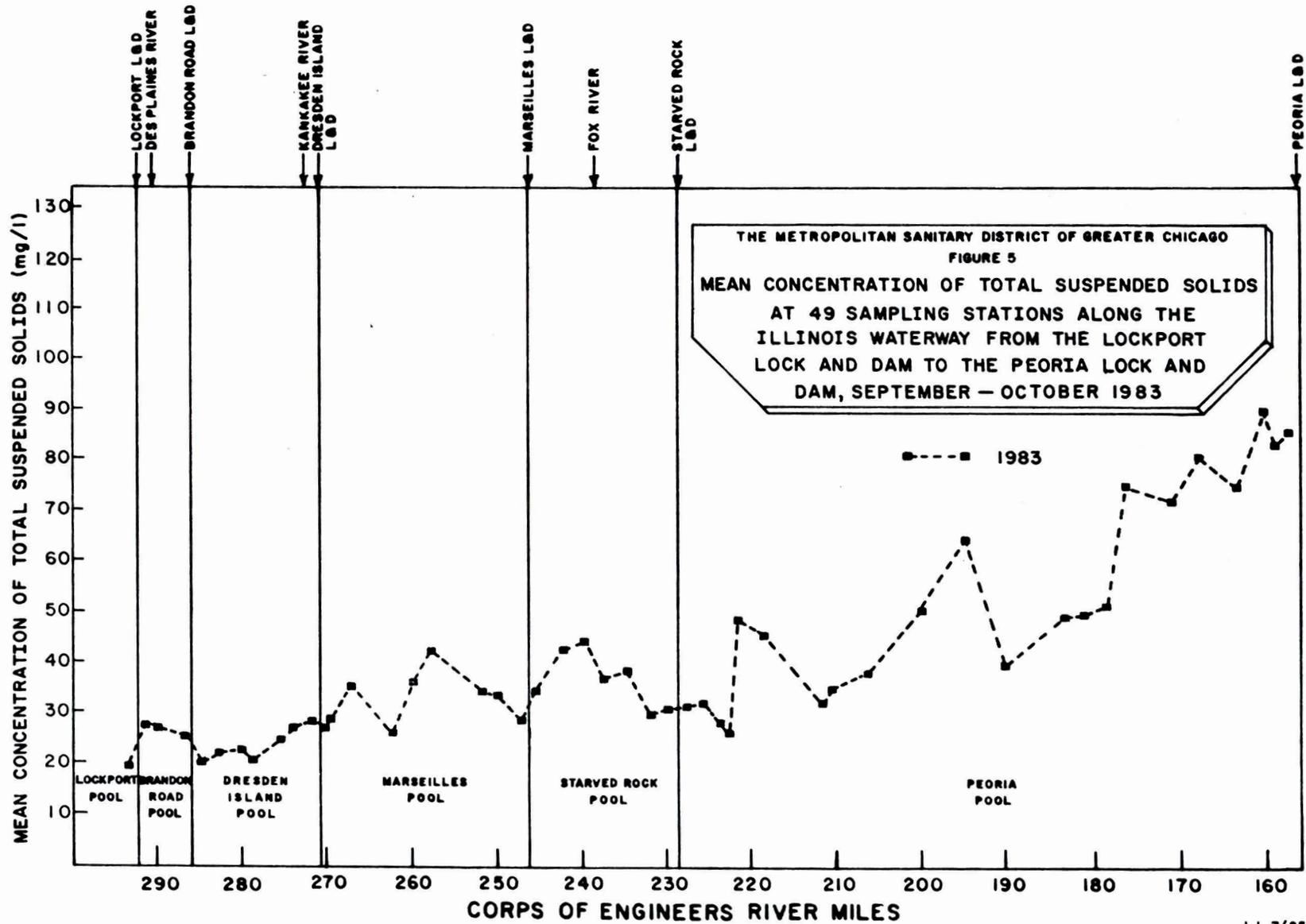


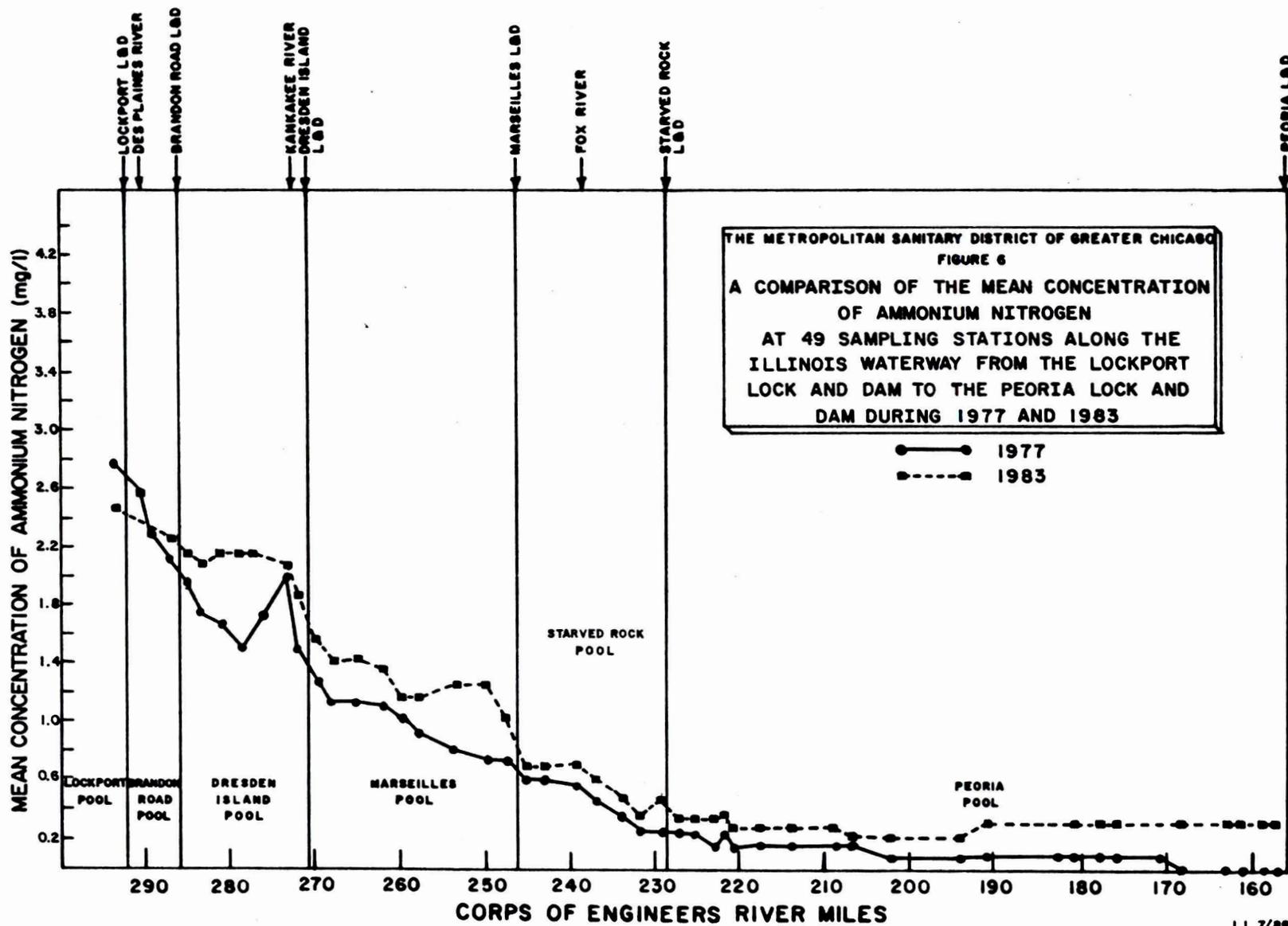


Lockport pool (20 mg/L) to the Peoria pool (54 mg/L) (Figure 5). The mean TSS values in the Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools were 20, 26, 24, 33, 34, and 54 mg/L, respectively. This increase in TSS along the waterway may be due, in part, to nonpoint agricultural runoff and erosion from unstable stream banks and beds. Kothandaraman et al. (1981) also found that TSS increased in concentration down the Illinois Waterway.

Ammonium Nitrogen. Ammonium nitrogen ($\text{NH}_4\text{-N}$) values during 1977 and 1983 for the six navigational pools ranged from <0.1 mg/L in the Peoria pool to 4.3 mg/L in the Lockport pool. Seventy-three percent of the $\text{NH}_4\text{-N}$ observations in 1977 and 1983 were less than 1.0 mg/L, and only one percent of the observations had values greater than 4.0 mg/L. The mean concentration of $\text{NH}_4\text{-N}$ decreased significantly ($p < 0.01$) down the Illinois Waterway from the Lockport pool (2.6 mg/L; combined mean value for 1977 and 1983) to the Peoria pool (0.2 mg/L; combined mean value for 1977 and 1983) (Figure 6). The trend of the curve was quite similar both in 1977 and in 1983. This same decrease in $\text{NH}_4\text{-N}$ in the waterway was also found by Butts et al. (1975) and Kothandaraman et al. (1981).

There were no significant differences ($p > 0.05$) in the mean concentrations of $\text{NH}_4\text{-N}$ between 1977 and 1983 in the Lockport, Brandon Road, and Starved Rock pools (Tables 4, 5, and 8). Significantly higher ($p < 0.05$) mean $\text{NH}_4\text{-N}$ concentra-

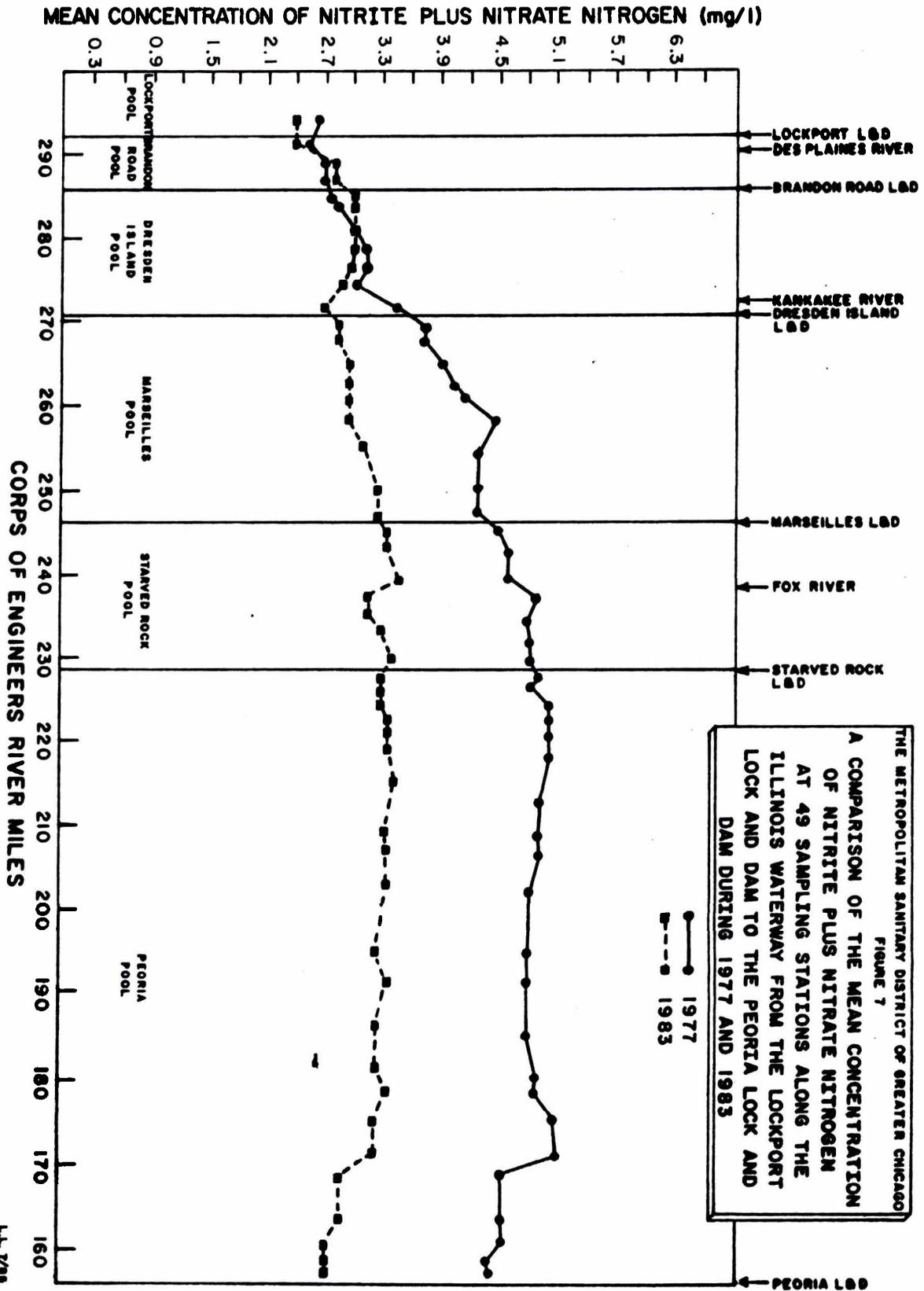




tions were, however, found in 1983 than in 1977 in the Dresden Island, Marseilles, and Peoria pools (Tables 6, 7, and 9). The mean values in 1977 in these three pools were 1.7, 0.9, and 0.1 mg/L, respectively; in 1983 they were 2.1, 1.3, and 0.3 mg/L.

Nitrite Plus Nitrate Nitrogen. In 1977, the $\text{NO}_2+\text{NO}_3\text{-N}$ concentrations ranged from a low of 1.28 mg/L at Station 1 in the Lockport pool to a high of 6.70 mg/L at Station 44 in the Peoria pool, while during the 1983 survey the concentration ranged from 2.04 mg/L at Station 8 in the Dresden Island pool to 3.92 mg/L at Station 33 in the Peoria pool. As shown in Figure 7, the mean $\text{NO}_2+\text{NO}_3\text{-N}$ concentration in 1977 increased in the Illinois Waterway from the Lockport pool (2.49 mg/L) to the Peoria pool (4.70 mg/L). However, during the 1983 study there was little variation in the mean concentration of $\text{NO}_2+\text{NO}_3\text{-N}$ in the waterway from the Lockport pool (2.36 mg/L) to the Peoria pool (3.13 mg/L). An increase in the concentration of $\text{NO}_2+\text{NO}_3\text{-N}$ in the Illinois Waterway has been shown by Butts et al. (1975). In contrast, Kothandaraman et al. (1981) reported that the concentration of $\text{NO}_2+\text{NO}_3\text{-N}$ remained uniform in the waterway.

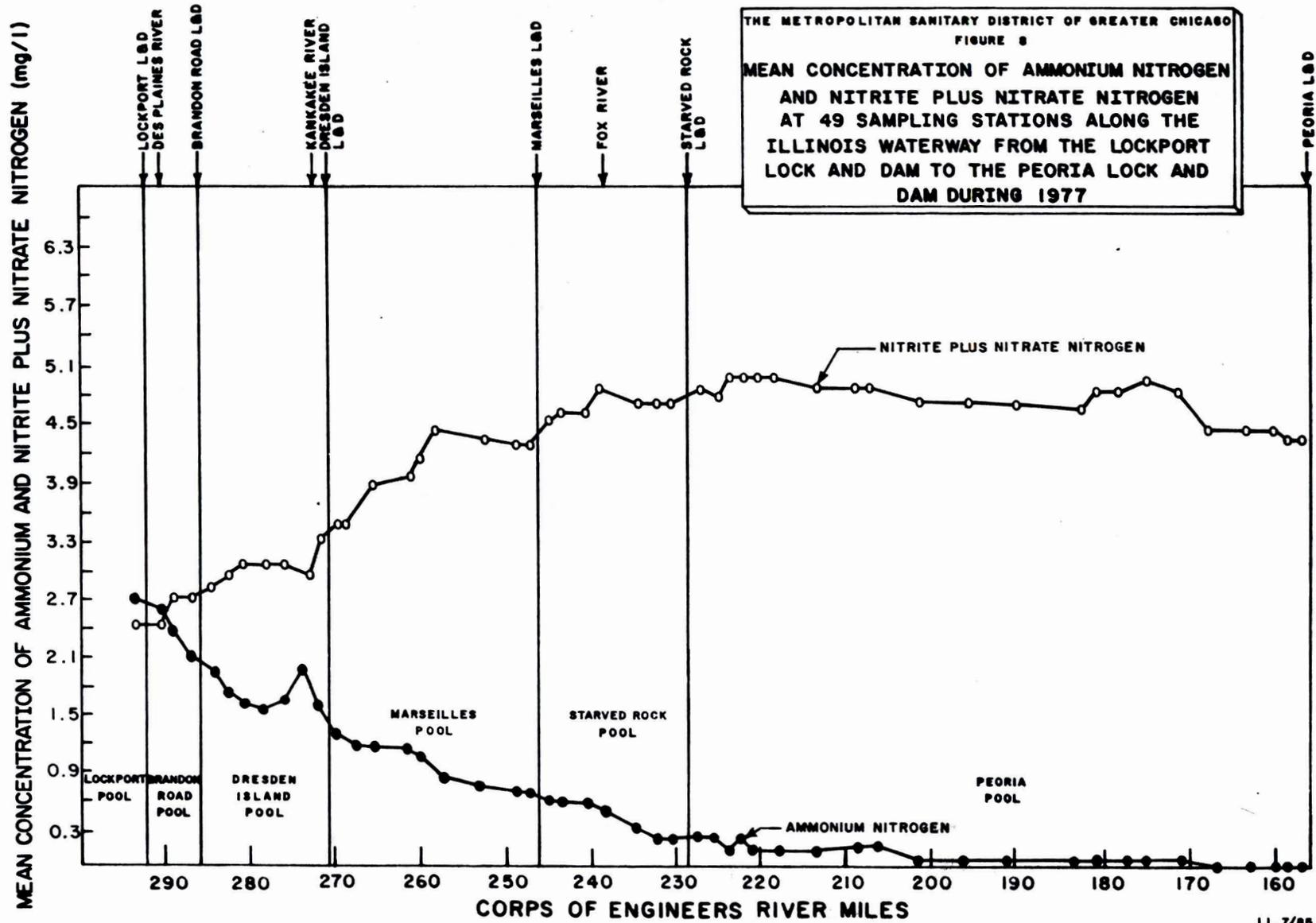
Analysis of the data indicated that there were no significant differences ($p > 0.01$) in the mean concentrations of $\text{NO}_2+\text{NO}_3\text{-N}$ between 1977 and 1983 in the Lockport, Brandon Road, and Dresden Island pools of the Illinois Waterway (Tables 4,

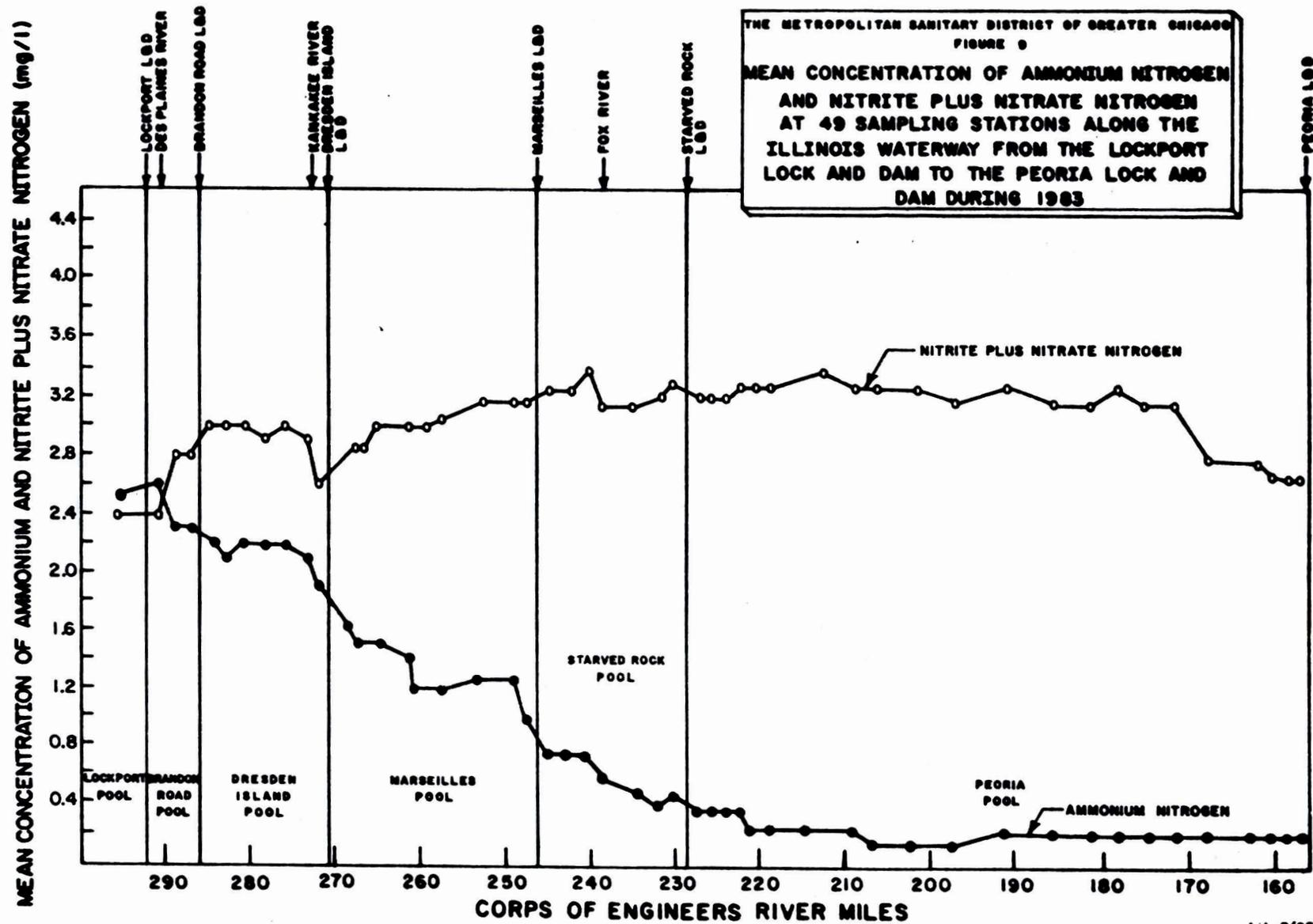


5, and 6). Significantly lower ($p < 0.05$) mean $\text{NO}_2 + \text{NO}_3\text{-N}$ concentrations were found, however, in the Marseilles, Starved Rock, and Peoria pools during 1983 than in 1977 (Tables 7, 8, and 9).

The sequence of the disappearance or reduction of ammonium nitrogen and the corresponding increase in oxidized nitrogen with distance downstream is characteristic of nitrification in flowing streams. In 1977, ammonium nitrogen decreased down the Illinois Waterway, and the $\text{NO}_2 + \text{NO}_3\text{-N}$ concentration increased, indicating that instream nitrification was occurring between the Lockport and the Starved Rock pools (Figure 8). During the 1983 study, $\text{NH}_4\text{-N}$ also decreased in concentration from the Lockport pool to the Starved Rock pool. However, no corresponding increase in $\text{NO}_2 + \text{NO}_3\text{-N}$ occurred with distance downstream (Figure 9). Figures 8 and 9 show that there was little variation in the concentration of $\text{NH}_4\text{-N}$ and $\text{NO}_2 + \text{NO}_3\text{-N}$ below the Starved Rock pool during both 1977 and 1983, suggesting that very little nitrification was occurring in the Peoria pool. Butts et al. (1975) showed that instream nitrification occurred in the Illinois Waterway, while Kothandaraman et al. (1981) found no evidence for nitrification.

Total Phosphorus. During the study, TP varied from 0.20 mg/L at Station 15 in the Marseilles pool to 0.95 mg/L at Station 17 also in the Marseilles pool. Mean phosphorus con-

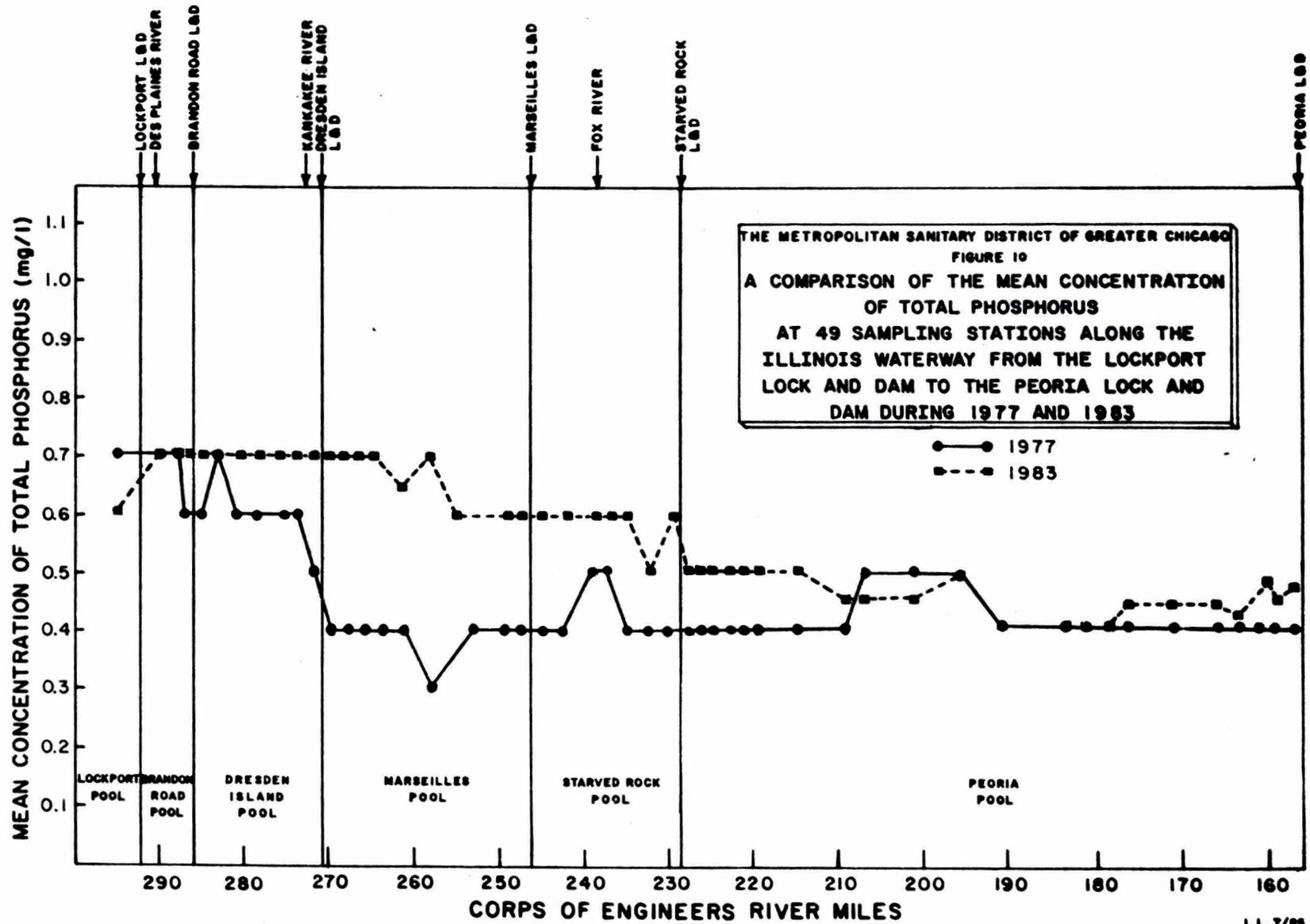




centrations in the Lockport pool (0.65 mg/L; combined mean value for 1977 and 1983) were significantly higher ($p < 0.01$) than the mean value in the Peoria pool (0.43 mg/L; combined mean value for 1977 and 1983) in both 1977 and 1983. The decline in phosphorus along the Illinois Waterway as shown in Figure 10 may be due to the settling and adsorption of phosphorus by bottom sediments, and/or the utilization of this nutrient by aquatic plants.

There were no significant differences ($p > 0.01$) in the total mean phosphorus concentrations in the Lockport and Brandon Road pools between the 1977 and 1983 sampling periods (Tables 4 and 5). Mean TP concentrations were, however, significantly higher ($p < 0.01$) during 1983 than 1977 in the Dresden Island, Marseilles, Starved Rock, and Peoria pools (Tables 6, 7, 8, and 9).

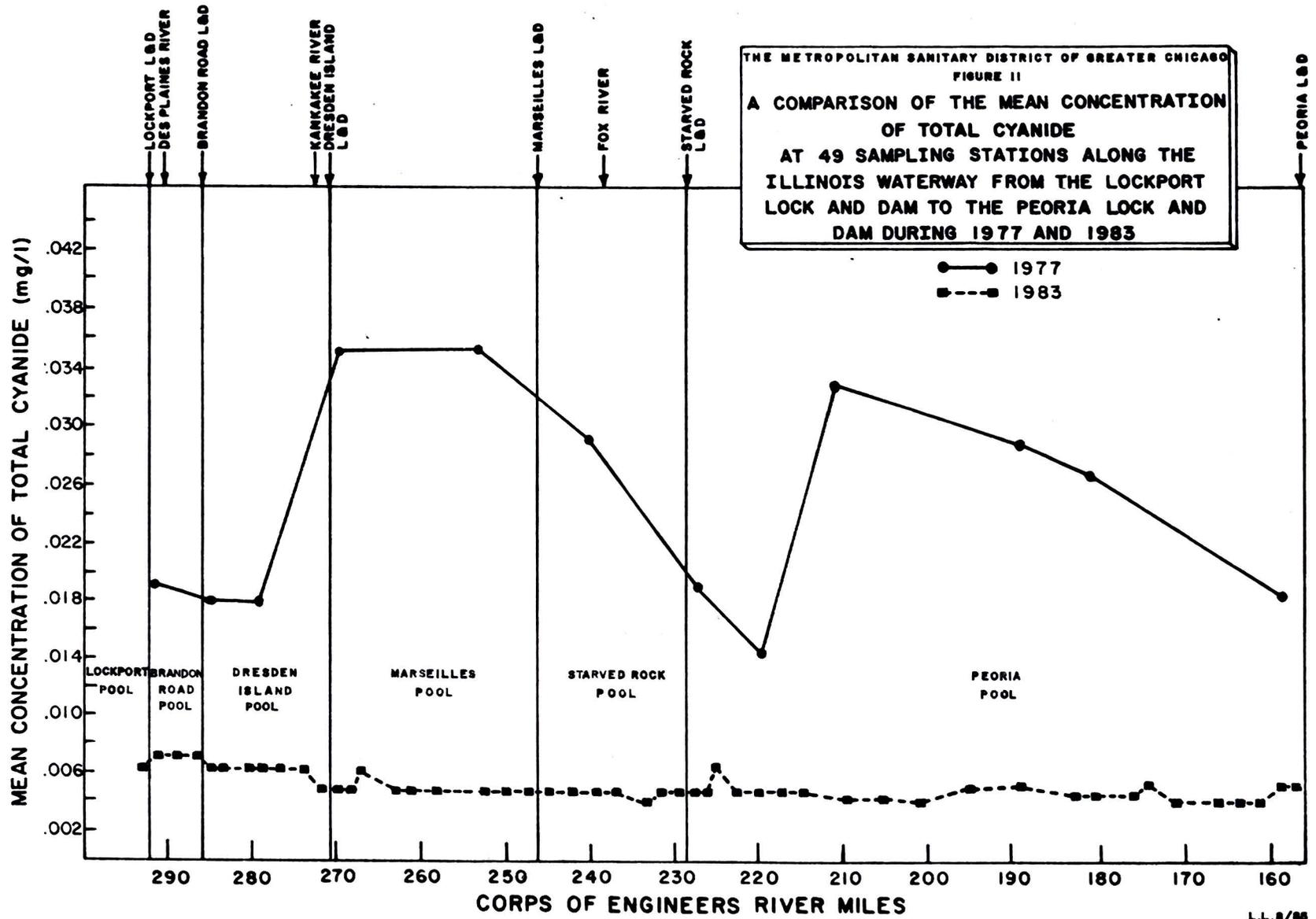
pH. pH values measured in the 133 mile study area during 1977 and 1983 ranged from 6.0 at Station 28 in the Peoria pool to 8.7 at Station 24 in the Starved Rock pool. Overall, the pH increased slightly in the Illinois Waterway from the Lockport pool to the Peoria pool during 1977, and showed little variation in 1983. In 1977, the pH values were slightly alkaline (range: 6.5 - 8.7), while in 1983 they were slightly acid (range: 6.0 - 7.6). Kothandaraman et al. (1981) in their investigation of the Illinois Waterway during 1978 and 1979 found that the pH varied from 7.6 to 8.3.

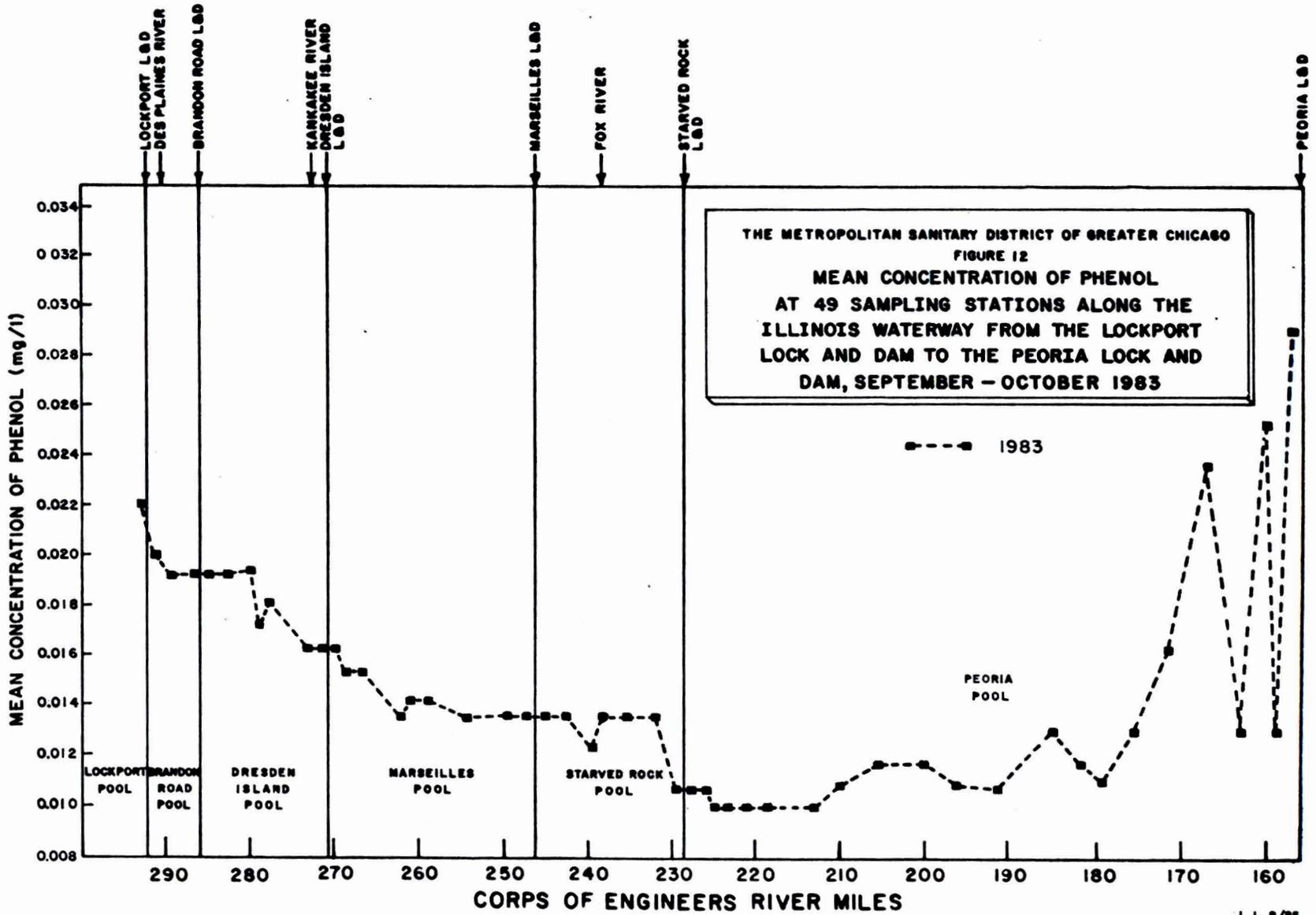


Cyanide. Cyanide values along the Illinois Waterway were quite variable in 1977 ranging from 0.012 mg/L at Station 32 in the Peoria pool to 0.033 mg/L at Stations 12 and 18 in the Marseilles pool. During the 1977 water quality survey, only 12 stations were sampled for cyanide. However, during the 1983 study, there was little variation in the concentration of cyanide among the 49 sampling stations (Figure 11). There were no significant differences ($p > 0.01$) in the mean concentration of cyanide among the six navigational pools in 1983. The mean concentration of cyanide in each of the six pools during 1983 was 0.006, 0.007, 0.006, 0.005, 0.005, and 0.005 mg/L, respectively.

Significantly higher ($p < 0.01$) mean cyanide concentrations were found in 1977 than in 1983 in the Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools (Tables 5 - 9). No samples for cyanide analysis were collected from the Lockport pool during 1977.

Phenol. During 1983, phenol values for the six navigational pools ranged from a low of 0.006 mg/L at Station 42 to a high of 0.083 mg/L at Station 49, both sampling stations in the Peoria pool. Phenol was not measured in 1977. Except for an increase in the lower end of the Peoria pool, phenol decreased in concentration in the Illinois Waterway from the Lockport pool (mean = 0.020 mg/L) to the Peoria pool (mean = 0.014 mg/L) (Figure 12). The mean phenol concentration in the



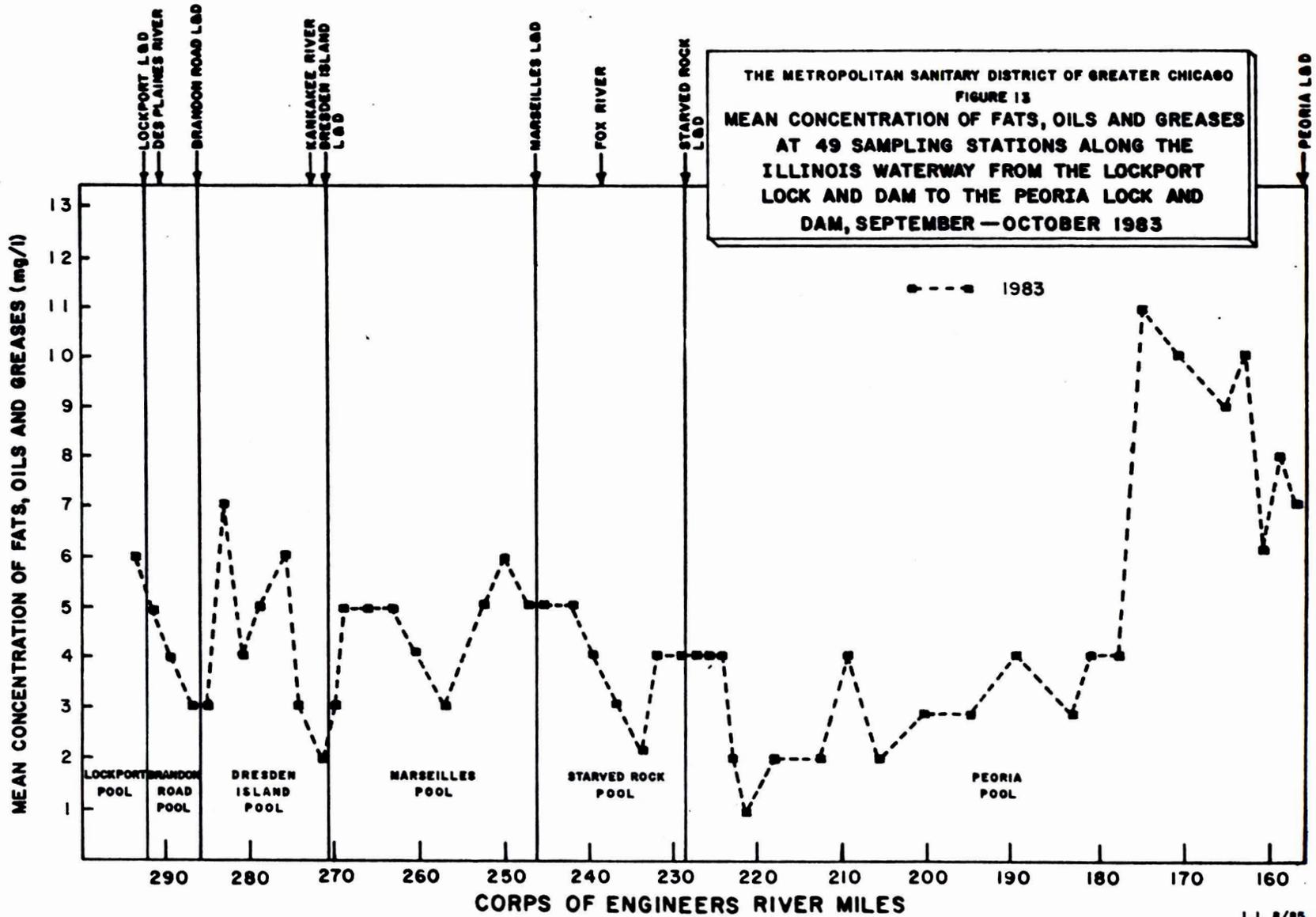


Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools was 0.020, 0.020, 0.018, 0.014, 0.013, and 0.014 mg/L, respectively.

Fats, Oils, and Greases. Oils and greases derived from petroleum compounds as well as fats and greases of animal and vegetable origin were quite variable during the 1983 survey in each of the six navigational pools ranging from 0 - 26 mg/L (Figure 13). The highest values were found in the lower end of the Peoria pool. There were, however, no significant differences ($p > 0.005$) in the mean concentrations of FOG among the six pools. The mean FOG concentrations during 1983 in the Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools of the Illinois Waterway were 6, 4, 4, 5, 4, and 5 mg/L, respectively. FOG was not measured in 1977.

Trace Metals. Most trace metals are normally present in all natural water systems (Durum et al. 1971). A total of 11 trace metals were measured during the 1983 survey, including arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. Trace metals were not measured during the 1977 study. Means and ranges for the metals in each of the six navigational pools are presented in Table 11.

The concentration of copper (Figure 14), iron (Figure 15), manganese (Figure 16), mercury (Figure 17), and zinc (Figure 18) were quite variable among sampling stations along the



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TABLE 11

A COMPARISON OF THE MEAN AND RANGES OF TRACE METALS MEASURED IN THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER TO OCTOBER 1983¹

Metal ²	Navigational Pool					
	Lockport (N=4) ³	Brandon Road (N=12)	Dresden Island (N=28)	Marseilles (N=36)	Starved Rock (N=28)	Peoria (N=88)
Arsenic	0.0000 ^{4,5} (<0.1000) ⁶	0.0000 ⁵ (<0.1000)	0.0000 ⁵ (<0.1000)	0.0111 (<0.1000-0.1000)	0.0074 (<0.1000-0.1000)	0.0000 ⁵ (<0.1000)
Cadmium	0.0025 (<0.0100-0.0100)	0.0017 (<0.0100-0.0100)	0.0021 (<0.0100-0.0100)	0.0011 (<0.0100-0.0100)	0.0019 (<0.0100-0.0100)	0.0010 (<0.0100-0.0100)
Chromium	0.0075 (<0.0100-0.0200)	0.0017 (<0.0100-0.0100)	0.0093 (<0.0100-0.0600)	0.0033 (<0.0100-0.0200)	0.0107 (<0.0100-0.0600)	0.0092 (<0.0100-0.0600)
Copper	0.0350 (0.0100-0.0900)	0.0367 (<0.0100-0.1300)	0.0257 (<0.0100-0.1800)	0.0289 (<0.0100-0.2000)	0.0193 (<0.0100-0.0400)	0.0136 (<0.0100-0.0500)
Iron	0.6500 (0.3000-1.3000)	0.9167 (0.3000-2.5000)	0.8786 (0.3000-2.1000)	0.6583 (0.2000-2.1000)	0.5889 (0.2000-1.4000)	0.9591 (0.3000-6.9000)
Lead	0.0100 (<0.0100-0.0200)	0.0092 (<0.0100-0.0200)	0.0168 (<0.0100-0.0500)	0.0144 (<0.0100-0.0600)	0.0119 (<0.0100-0.0400)	0.0103 (<0.0100-0.0500)
Manganese	0.0425 (0.0400-0.0500)	0.0558 (0.0300-0.1000)	0.0586 (0.0300-0.1000)	0.0778 (0.0500-0.1900)	0.0807 (0.0500-0.2100)	0.0892 (0.0400-0.1500)

Table continued on following page.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 11 (continued)

A COMPARISON OF THE MEAN AND RANGES OF TRACE METALS MEASURED IN THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER TO OCTOBER 1983¹

Metal ²	Navigational Pool					
	Lockport (N=4) ³	Brandon Road (N=12)	Dresden Island (N=28)	Marseilles (N=36)	Starved Rock (N=28)	Peoria (N=88)
Mercury	0.0003 (<0.0001-0.0007)	0.0001 (<0.001-0.0005)	0.0002 (<0.0001-0.0007)	0.0002 (<0.0001-0.0009)	0.0003 (<0.0001-0.0007)	0.0003 (<0.0001-0.0018)
Nickel	0.1250 (<0.1000-0.4000)	0.0750 (<0.1000-0.3000)	0.0821 (<0.1000-0.4000)	0.0389 (<0.1000-0.3000)	0.0333 (<0.1000-0.2000)	0.0409 (<0.1000-0.3000)
Silver	0.0025 (<0.0100-0.0100)	0.0033 (<0.0100-0.0100)	0.0018 (<0.0100-0.0200)	0.0014 (<0.0100-0.0100)	0.0015 (<0.0100-0.0100)	0.0006 (<0.0100-0.0100)
Zinc	0.0250 (<0.0100-0.1000)	0.0200 (<0.0100-0.1000)	0.0125 (<0.0100-0.1000)	0.0472 (<0.0100-0.4000)	0.0296 (<0.0100-0.2000)	0.0659 (<0.0100-0.4000)

¹No comparable analysis for 1977.

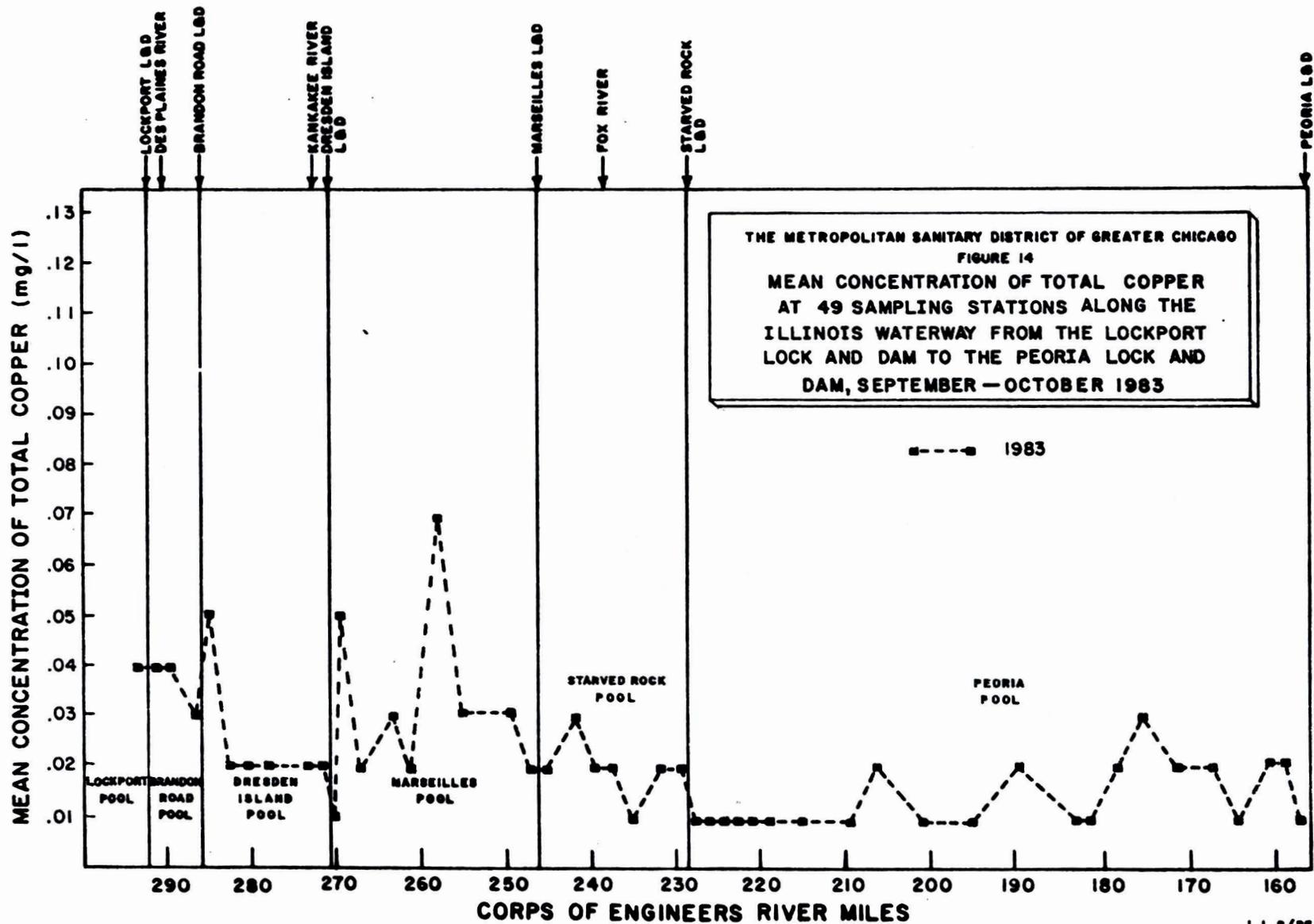
²Expressed as mg/L.

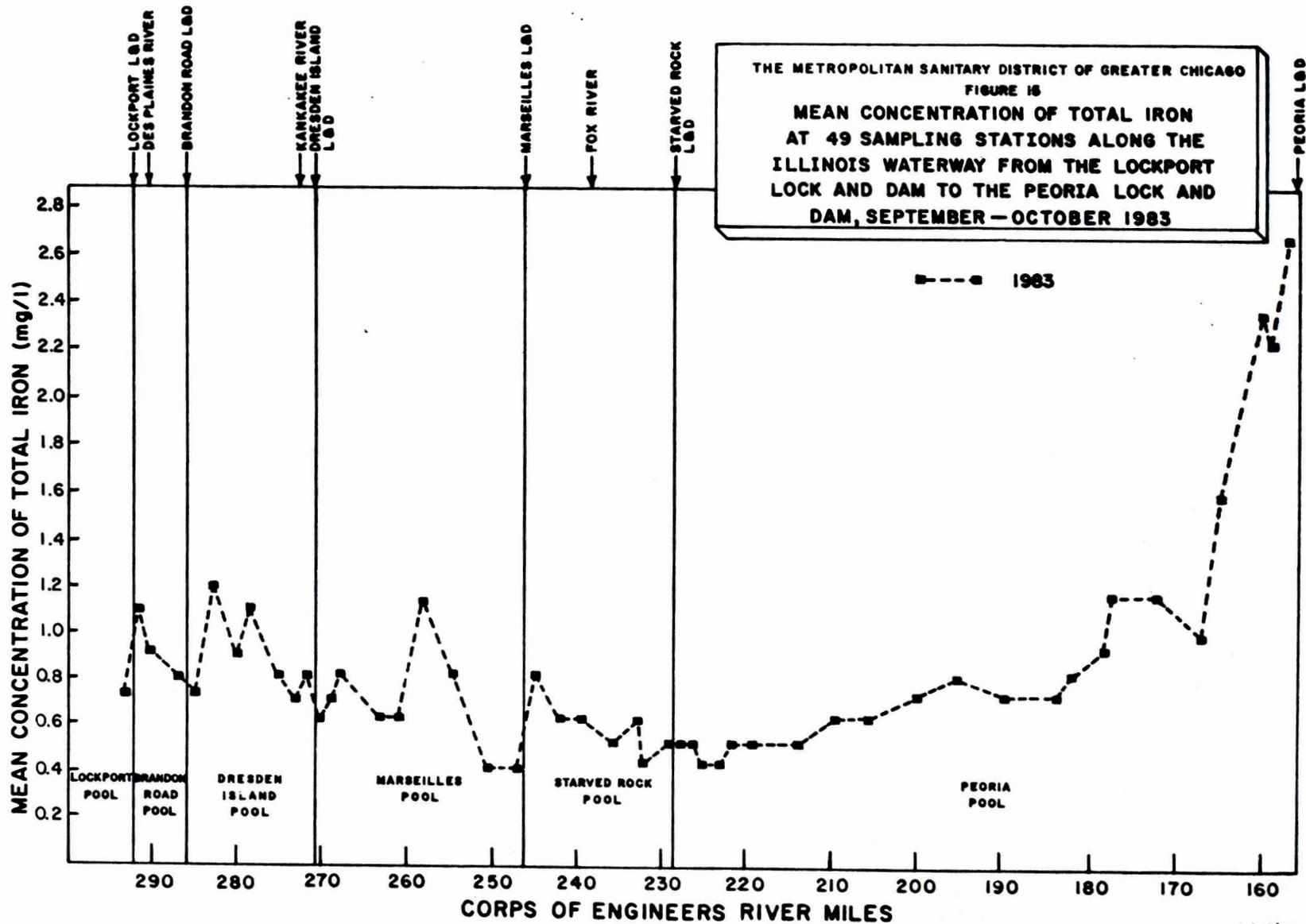
³The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

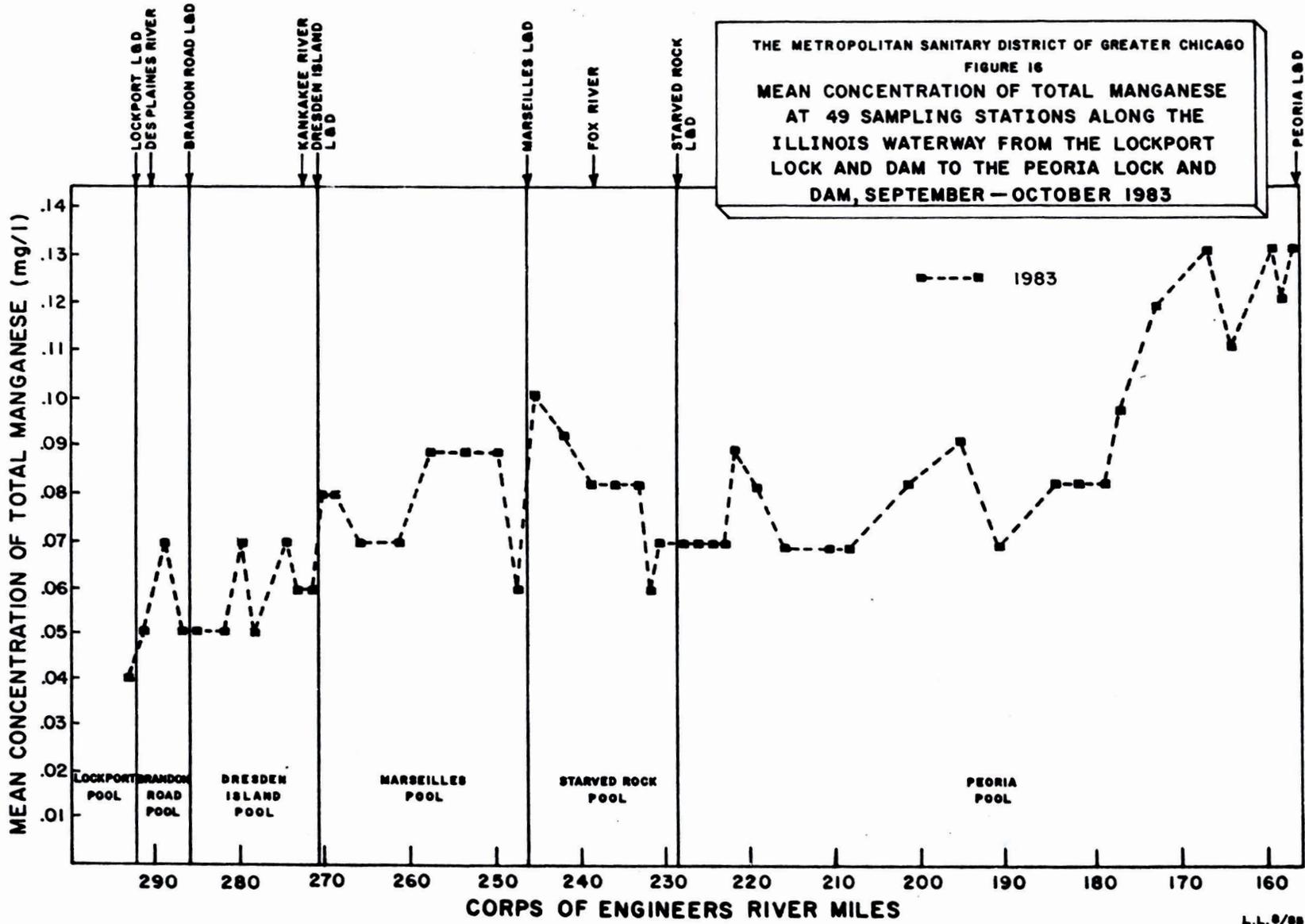
⁴Mean Value. Values less than detection limit were considered to be zero for calculating mean.

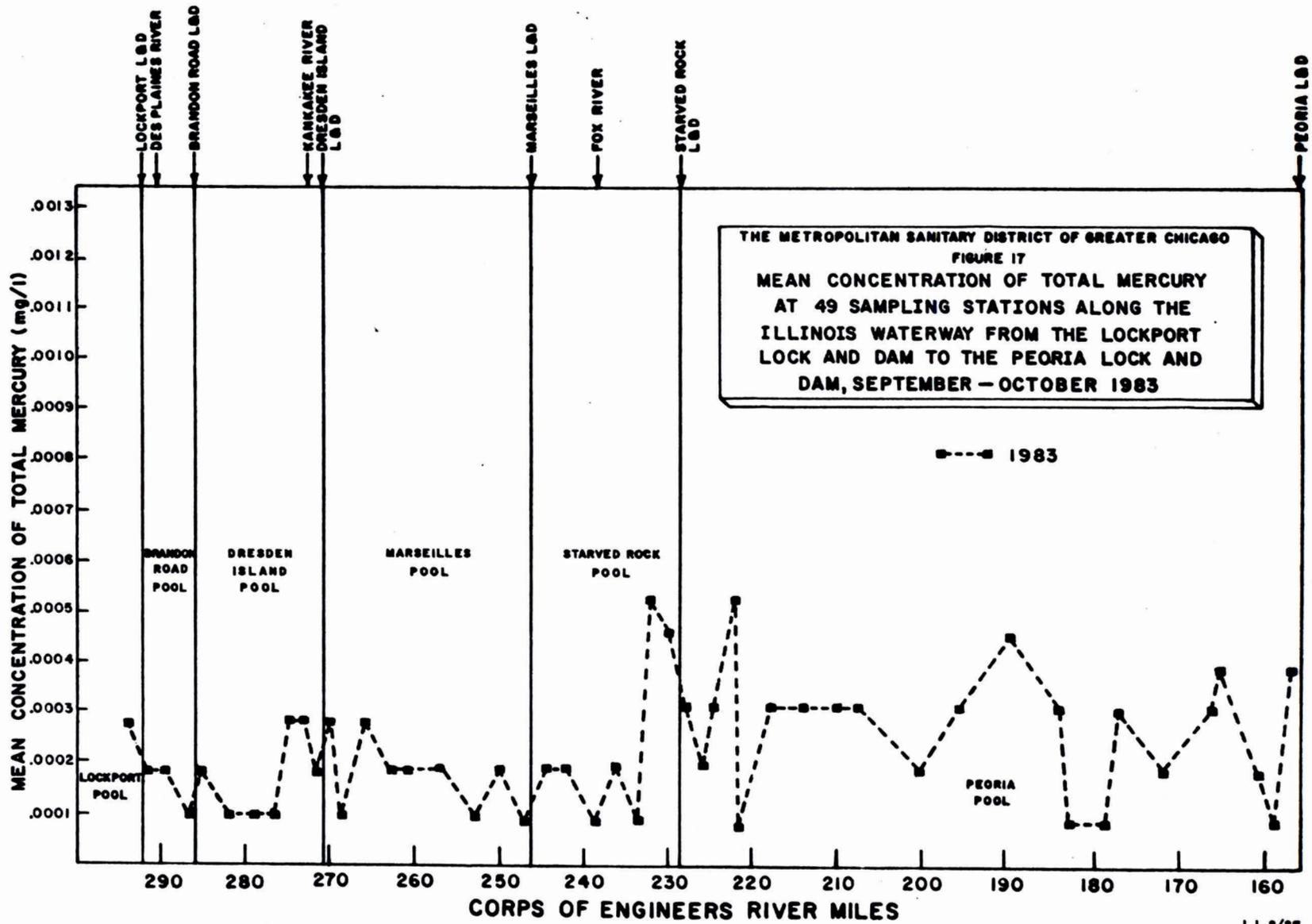
⁵All values less than detection limit.

⁶Range of Values. If only one number is shown, all values less than detection limit.

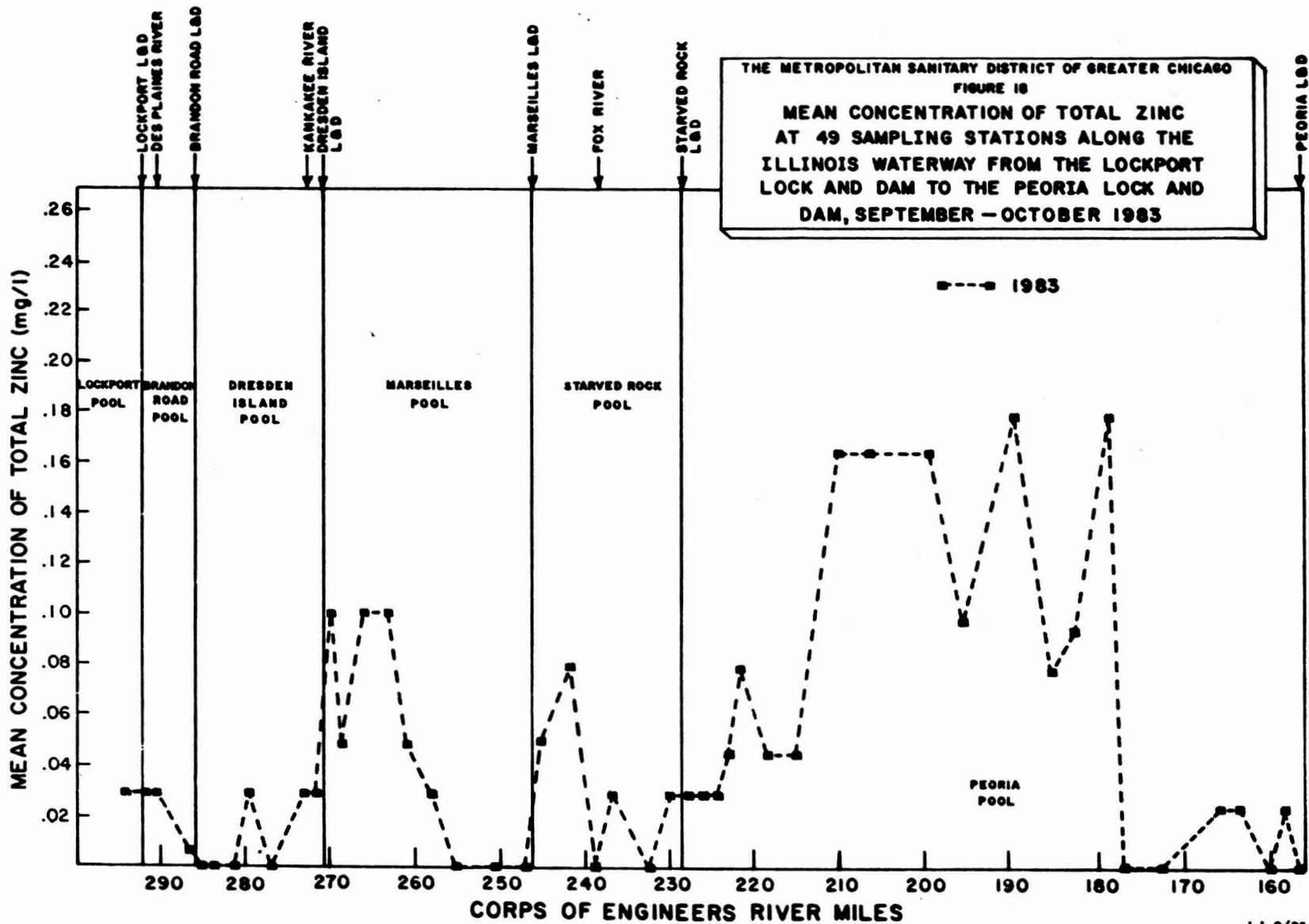








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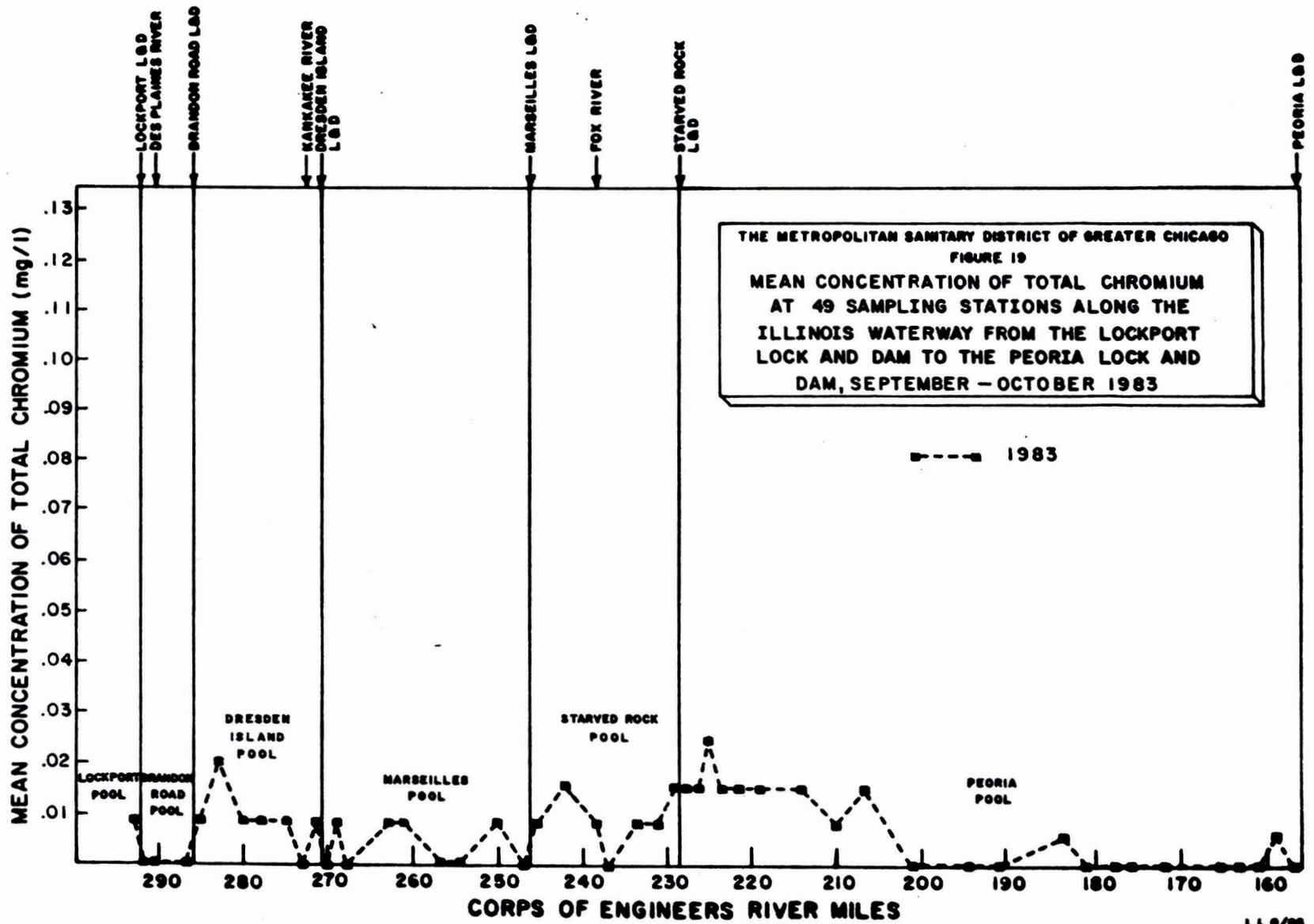
Illinois Waterway ranging from a low of <0.001, 0.2, 0.03, <0.0001, and <0.01 mg/L, respectively, to a high of 0.2, 6.9, 0.21, 0.0018, and 0.4 mg/L, respectively. There was, however, little variation in the concentration of arsenic, cadmium, chromium, (Figure 19), lead (Figure 20), nickel (Figure 21), and silver. Except for an increase in the concentration of iron (Figure 15), and manganese (Figure 16) from the Lockport pool to the Peoria pool, no increasing or decreasing trend down the Illinois Waterway was evident for any of the other nine metals (Figures 14, and 17 through 21).

BIOLOGICAL

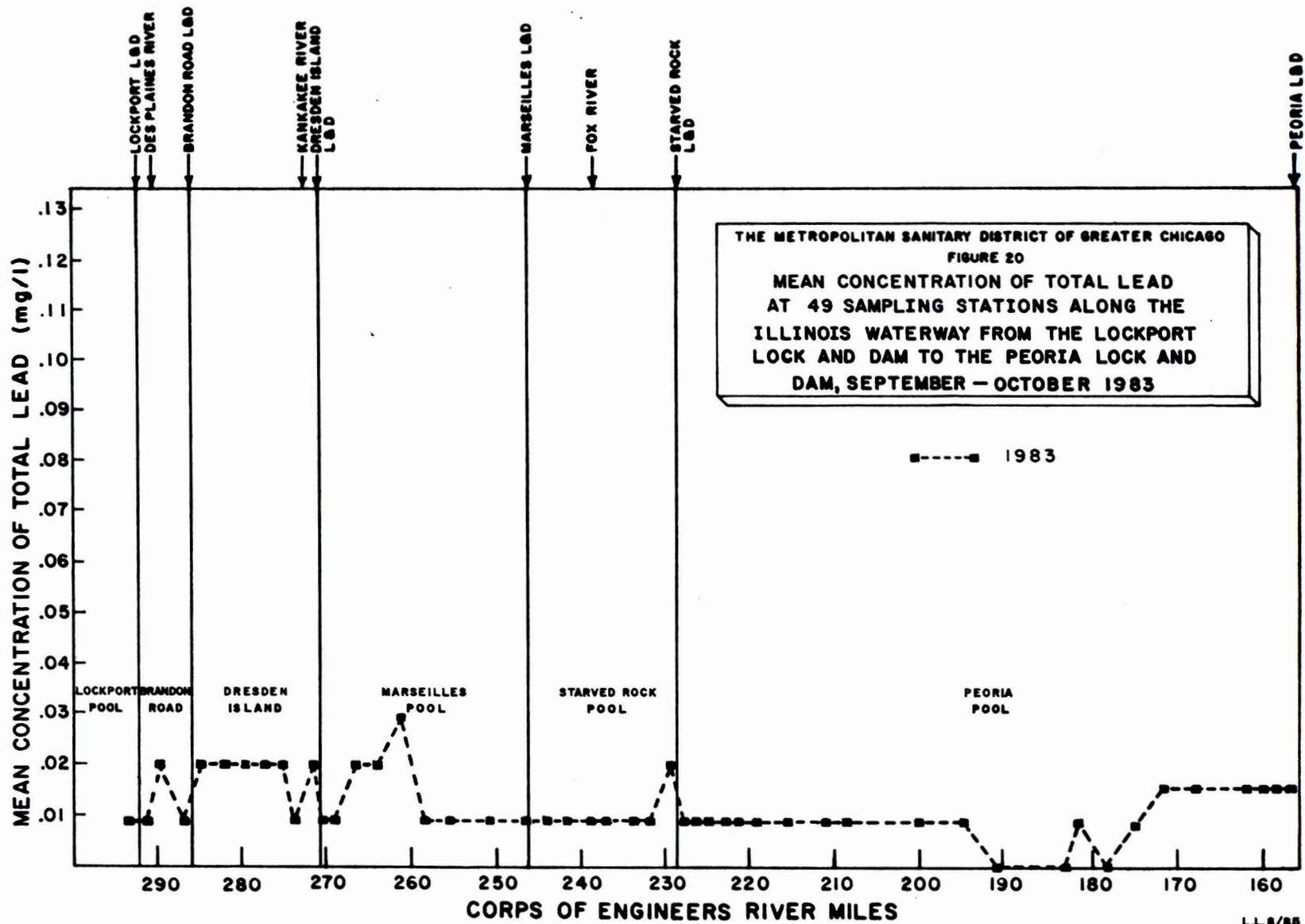
Fecal Coliform. During 1977 and 1983, FC densities varied widely at all stations in the study area ranging from a minimum of ten colony forming units per 100 milliliters (cfu/100 mL) in the Peoria pool to a maximum of 270,000 cfu/100 mL in the Dresden Island pool.

Fecal coliforms decreased significantly ($p < 0.05$) both in 1977 and 1983 with distance down the Illinois Waterway (Figure 22). A similar downstream decrease in FC densities along the waterway was reported by Butts et al. (1975).

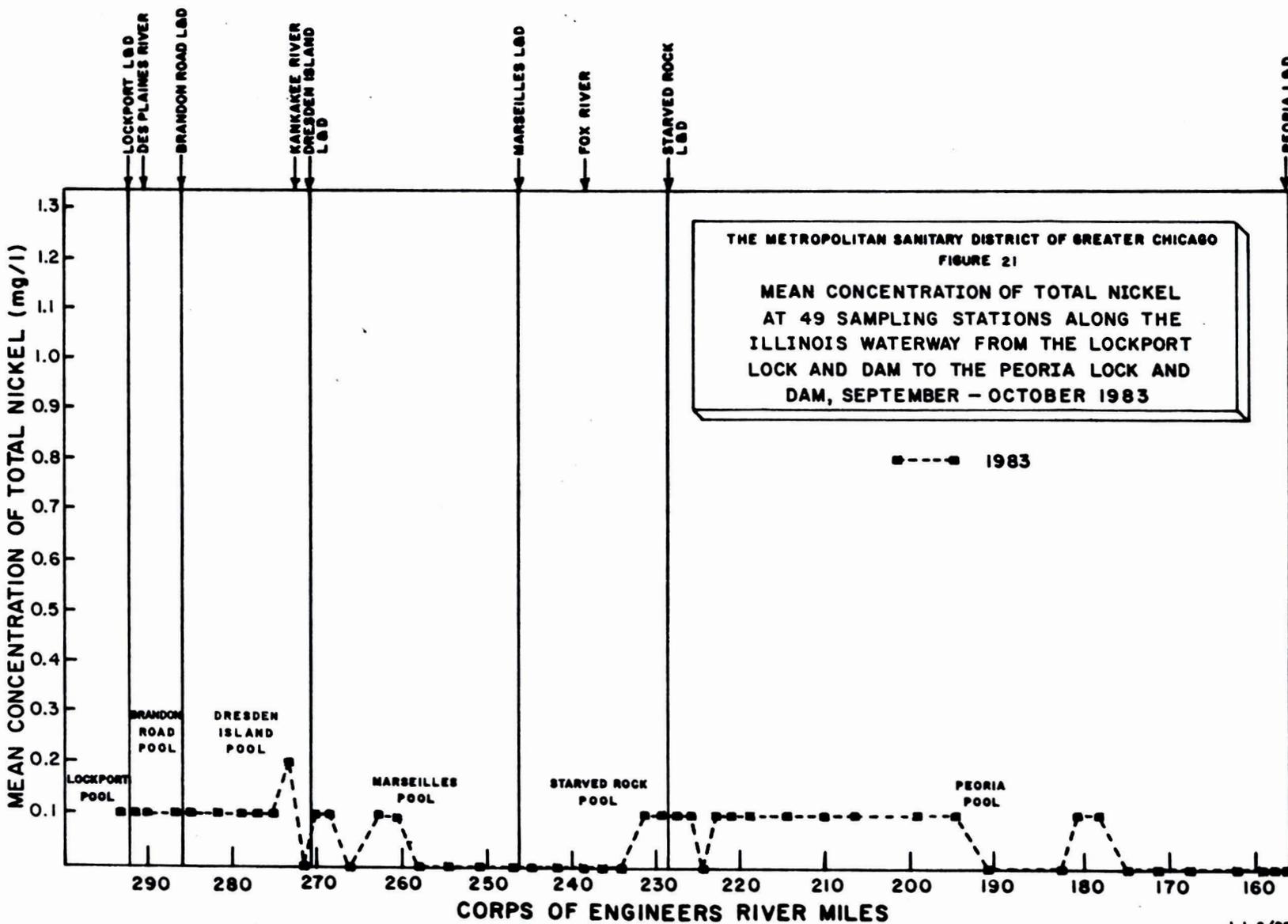
The statistical analysis showed that significantly higher ($p < 0.01$) geometric means of FCs were observed in all of the six navigational pools along the Illinois Waterway during 1977 compared to 1983 (Table 12). The geometric means in the Lockport, Brandon Road, Dresden Island, Marseilles, Starved

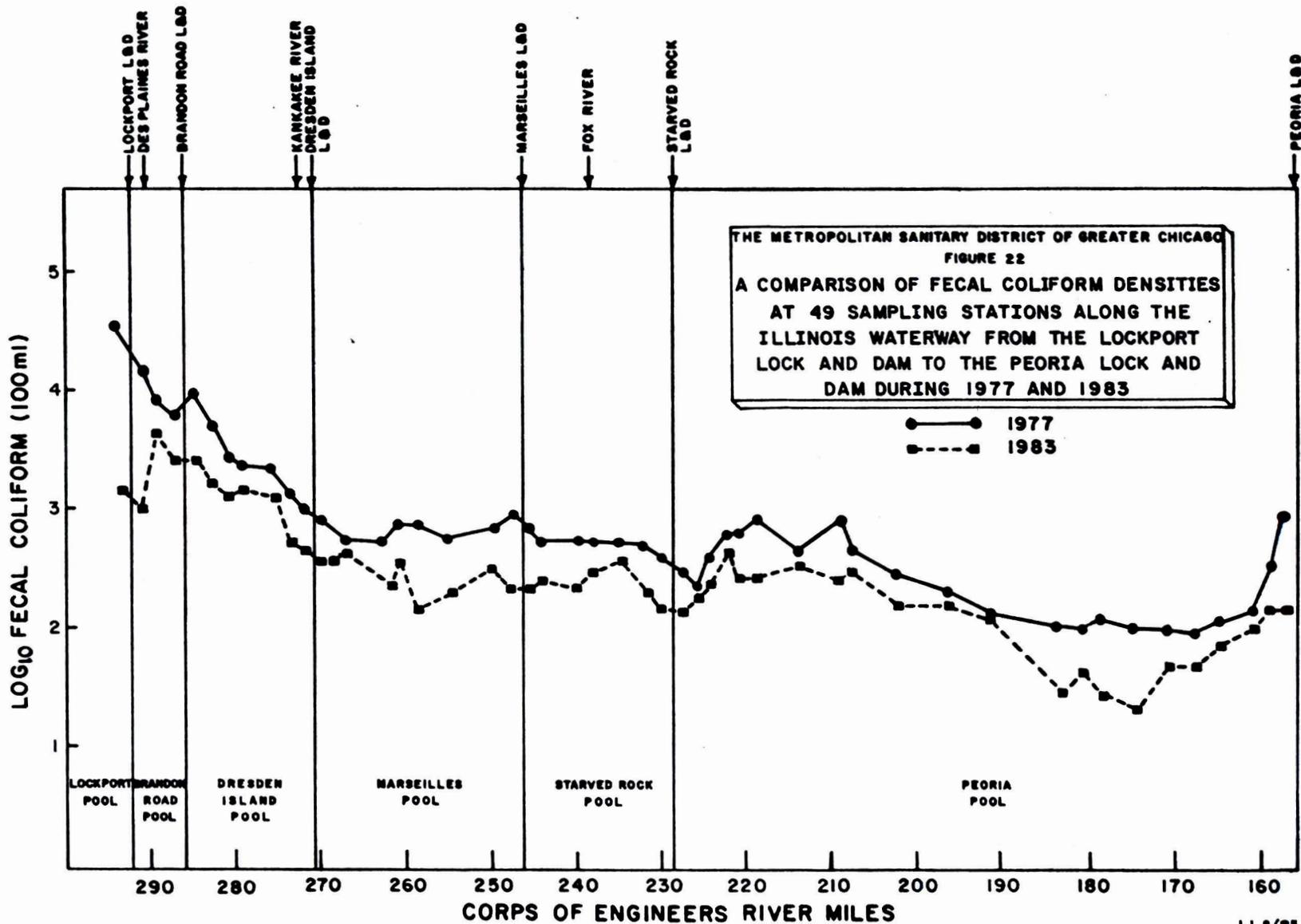


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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 12

A COMPARISON OF THE GEOMETRIC MEAN OF FECAL COLIFORM MEASURED IN THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Year	Navigational Pool					
	Lockport	Brandon Road	Dresden Island	Marseilles	Starved Rock	Peoria
1977	33,574* (6)**	8,704 (18)	2,515 (42)	692 (54)	622 (42)	314 (132)
1983	1,621 (4)	2,097 (9)	1,091 (27)	225 (36)	205 (28)	97 (88)

*Geometric mean as cfu/100 mL.

**Number in parenthesis is number of observations used to calculate geometric mean. The number of observations was determined by multiplying the number of stations sampled in a pool times the frequency of sampling at each station.

Note: All values significant at p < 0.01 level.

Rock, and Peoria pools were 33,574, 8,704, 2,515, 692, 622, and 314 cfu/100 mL, respectively, in 1977, and 1,621, 2,097, 1,091, 225, 205, and 97 cfu/100 mL, respectively, during 1983.

Virus. Viruses may reach natural bodies of water in the effluents from sewage treatment facilities or from nonpoint sources such as agricultural or urban runoff. Except for one sampling station in the lower end of the Lockport pool, samples were collected and analyzed for viruses from two stations (upper and lower ends) in each of the other five navigational pools.

In the Illinois Waterway, only 7 of 22 samples (32 percent) yielded confirmed viruses. There was little difference in the concentration of confirmed virus levels from the 11 different sampling stations along the waterway collected on the different sampling dates during 1983 (Table 13). The virus levels ranged from a low of 0 PFU/L at all 11 sampling stations during one or both of the sampling dates to a high of 0.18 PFU/L at Station 22 in the Starved Rock pool. Viruses were not measured during the 1977 survey. To date, no other studies are known to have been published on the virus levels along the Illinois Waterway.

Sediment Quality

Much of the suspended material that has been discharged from municipal and industrial discharges, and nonpoint sources eventually settles to the bottom of receiving rivers and

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 13

CONFIRMED VIRUS LEVELS AT ELEVEN SAMPLING STATIONS ALONG THE ILLINOIS WATERWAY
FROM THE LOCKPORT LOCK AND DAM TO THE PEORIA LOCK AND DAM, OCTOBER 1983¹

Station Number	Navigational Pool	Sample Collection Date	Sample Volume (L) ²	Total PFU ³	Percent Confirmed	Confirmed PFU/L	Detection Limit ⁴ (PFU/L)
1	Lockport	10/03/83	14.3	2	0	0	0.07
1	Lockport	10/13/83	14.3	56	1.8	0.07	0.07
2	Brandon Road	10/03/83	20.0	1	0	0	0.05
2	Brandon Road	10/13/83	33.3	50	2	0.03	0.03
4	Brandon Road	10/03/83	14.3	2	0	0	0.07
4	Brandon Road	10/13/83	20.0	3	33.3	0.05	0.05
5	Dresden Island	10/03/83	20.0	15	6.7	0.05	0.05
5	Dresden Island	10/13/83	14.3	3	0	0	0.07
11	Dresden Island	10/04/83	25.0	1	0	0	0.04
11	Dresden Island	10/12/83	11.1	5	0	0	0.09

Table continued on following page.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 13 (continued)

CONFIRMED VIRUS LEVELS AT ELEVEN SAMPLING STATIONS ALONG THE ILLINOIS WATERWAY
FROM THE LOCKPORT LOCK AND DAM TO THE PEORIA LOCK AND DAM, OCTOBER 1983¹

Station Number	Navigational Pool	Sample Collection Date	Sample Volume (L) ²	Total PFU ³	Percent Confirmed	Confirmed PFU/L	Detection Limit ⁴ (PFU/L)
12	Marseilles	10/04/83	10.0	1	0	0	0.10
12	Marseilles	10/12/83	1.6	0	0	0	0.61
20	Marseilles	10/04/83	8.3	1	0	0	0.12
20	Marseilles	10/12/83	33.3	48	0	0	0.03
22	Starved Rock	10/04/83	12.5	1	0	0	0.08
22	Starved Rock	10/12/83	20.0	24	16.6	0.18	0.05
27	Starved Rock	10/05/83	12.5	10	0	0	0.08
27	Starved Rock	10/11/83	33.3	43	7.0	0.09	0.03
28	Peoria	10/05/83	12.5	9	0	0	0.08
28	Peoria	10/11/83	33.3	85	4.7	0.14	0.03

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THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 13 (continued)

CONFIRMED VIRUS LEVELS AT ELEVEN SAMPLING STATIONS ALONG THE ILLINOIS WATERWAY
FROM THE LOCKPORT LOCK AND DAM TO THE PEORIA LOCK AND DAM, OCTOBER 1983¹

Station Number	Navigational Pool	Sample Collection Date	Sample Volume (L) ²	Total PFU ³	Percent Confirmed	Confirmed PFU/L	Detection Limit ⁴ (PFU/L)
49	Peoria	10/06/83	14.3	0	0	0	0.07
49	Peoria	10/10/83	11.1	4	0	0	0.09

¹No comparable analyses for 1977.

²Represents unconcentrated sample volume inoculated into BGM cell cultures.

³PFU = Plaque Forming Units.

⁴Detection Limit = $\frac{1}{\text{Sample Volume}}$

lakes. Many of these materials are toxic to aquatic organisms when present in high concentrations. These wastes may include trace metals and man-made organic compounds such as pesticides, polychlorinated biphenyls, and certain industrial organic compounds. Even though such materials are usually discharged to aquatic systems at subtoxic levels, many are capable of being concentrated in successive steps in aquatic food chains through a process called biological magnification (Odum 1971).

The sediment quality of each of the 12 stations sampled in 1983 is summarized in Tables 14 and 15. Table 16 also presents the results from a previous study in 1977, in which cyanide was measured in sediment samples along the Illinois Waterway for comparison with the 1983 data.

CHEMICAL

Total and Volatile Solids. The total solids in the sediments varied from a low of 23.0 percent at Station 44 in the Peoria pool to a high of 81.5 percent at Station 23 in the Starved Rock pool. The volatile solids also varied considerably ranging from 0.80 percent at Station 28 in the Peoria pool to 9.6 percent at Station 1 in the Lockport pool. No clear trends were discernible for total and volatile solids in sediments collected from the 12 sampling stations along the Illinois Waterway (Table 14).

Chemical Oxygen Demand. The concentration of COD in bottom sediments was quite variable among the 12 sampling sta-

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 14

CHEMICAL CHARACTERISTICS OF BOTTOM SEDIMENTS MEASURED IN THE LOCKPORT, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER 1983*

Station Number	Navigational Pool	Constituent**							
		Total Solids (%)	Volatile Solids (%)	Chemical Oxygen Demand	Total Organic Carbon (%)	Total Kjeldahl Nitrogen	Cyanide	Phenol	Fats, Oils, and Greases
1	Lockport	44.69	9.57	153,885	6.53	27,999	5.39	5.80	17,398
5	Dresden Island	71.81	3.96	11,075	0.38	7,540	0.55	0.06	5,860
8	Dresden Island	59.14	4.64	43,945	2.12	3,050	0.84	0.03	1,486
18	Marseilles	58.23	3.95	58,476	2.53	1,561	0.55	0.16	750
23	Starved Rock	81.53	1.42	5,189	0.10	8,695	0.08	0.06	932
28	Peoria	73.40	0.80	7,170	0.16	290	0.21	0.15	828
32	Peoria	77.22	0.81	8,213	0.13	250	0.09	0.10	944
35	Peoria	56.16	3.80	49,848	1.26	1,343	0.25	0.13	785
38	Peoria	64.40	3.16	38,438	0.93	998	0.15	0.22	676
41	Peoria	43.70	9.18	82,308	2.68	2,435	0.50	0.09	124

Table continued on following page.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 14 (continued)

CHEMICAL CHARACTERISTICS OF BOTTOM SEDIMENTS MEASURED IN THE LOCKPORT, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER 1983*

Station Number	Navigational Pool	Constituent**							
		Total Solids (%)	Volatile Solids (%)	Chemical Oxygen Demand	Total Organic Carbon (%)	Total Kjeldahl Nitrogen	Cyanide	Phenol	Fats, Oils, and Greases
44	Peoria	23.01	7.09	83,713	2.77	7,349	0.43	1.91	1,834
48	Peoria	54.77	5.20	76,705	1.91	2,189	0.67	0.20	942

*Only cyanide was measured in sediment samples during the 1977 study.

**Expressed in mg/kg of dry weight, except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 15

TRACE METALS IN BOTTOM SEDIMENTS COLLECTED FROM THE LOCKPORT, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER 1983*

Station Number	Navigational Pool	Metal**										
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
1	Lockport	<1.00	58.18	389.35	441.01	2,544	217.27	270.75	4.60	427.39	<0.05	2,096.67
5	Dresden Island	<1.00	2.79	15.87	25.21	557	49.16	204.71	0.62	47.35	<0.05	162.93
8	Dresden Island	<1.00	5.07	31.79	46.16	916	67.30	219.82	3.40	62.56	<0.05	309.44
18	Marseilles	<1.00	6.87	45.85	50.31	737	69.55	417.31	1.50	39.50	<0.05	257.60
23	Starved Rock	<1.00	0.61	3.92	3.92	319	5.89	127.56	0.24	11.04	<0.05	26.98
28	Peoria	<1.00	0.68	4.36	5.31	463	12.67	170.29	0.18	13.62	<0.05	31.34
32	Peoria	<1.00	0.52	3.76	3.37	527	6.48	130.80	0.08	12.95	<0.05	47.92
35	Peoria	<1.00	1.78	10.86	14.07	760	21.72	229.70	0.50	21.37	<0.05	107.62
38	Peoria	<1.00	1.55	8.23	11.49	1,096	13.70	697.21	0.40	23.29	<0.05	71.43
41	Peoria	<1.00	3.89	16.90	28.60	1,540	40.05	709.38	1.14	43.48	<0.05	215.10

Table continued on following page.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 15 (continued)

TRACE METALS IN BOTTOM SEDIMENTS COLLECTED FROM THE LOCKPORT, DRESDEN ISLAND,
MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, SEPTEMBER 1983*

Station Number	Navigational Pool	Metal**										
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
44	Peoria	<1.00	4.78	26.08	36.07	2,247	43.89	995.22	1.24	56.50	<0.05	225.99
48	Peoria	<1.00	1.64	5.48	16.07	964	25.74	770.49	0.32	25.56	<0.05	76.68

*No comparable analyses for 1977.

**Expressed in mg/kg of dry sediment.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE 16

A COMPARISON OF THE CONCENTRATION OF CYANIDE IN BOTTOM SEDIMENTS COLLECTED FROM THE LOCKPORT, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY DURING 1977 AND 1983

Station Number	Navigational Pool	1977*	1983
		Cyanide (mg/kg of Dry Sediment)	Cyanide (mg/kg of Dry Sediment)
1	Lockport	2.20	5.39
8	Dresden Island	4.00	0.84
18	Marseilles	0.20	0.55
23	Starved Rock	0.10	0.08
32	Peoria	0.10	0.09
35	Peoria	0.10	0.25
38	Peoria	0.90	0.15
41	Peoria	0.20	0.50
44	Peoria	1.00	0.43
48	Peoria	0.20	0.67

*One sediment sample was collected from each station during 1977 and 1983.

tions ranging from a low of 5,189 mg/kg at Station 23 in the Starved Rock pool to a high of 153,885 mg/kg at Station 1 in the Lockport pool (Table 14). As with volatile solids, the highest COD concentration was found in the Lockport pool. COD did not show any discernible trend in the sediment along the 133 mile study area.

Total Organic Carbon. As shown in Table 14, TOC fluctuated widely in sediment samples from the Illinois Waterway. The total organic carbon content of the sediments ranged from 0.10 percent at Station 23 in the Starved Rock pool to 6.53 percent at Station 1 in the Lockport pool. As was true with volatile solids and COD, the highest TOC concentration was in sediments from the Lockport pool. TOC did not show a well defined pattern of concentration in the sediments in the Illinois Waterway.

Total Kjeldahl Nitrogen. TKN in Illinois Waterway sediments exhibited a relatively high degree of variability in concentration ranging from a low of 250 mg/kg at Station 32 in the Peoria pool to a high of 27,999 mg/kg at Station 1 in the Lockport pool. No clear trend was discernible for TKN in sediments collected from the sampling stations along the Illinois Waterway (Table 14).

Cyanide. As with volatile solids, COD, TOC, and TKN, the highest cyanide concentration was found in sediment from the Lockport pool (5.39 mg/kg). Cyanide generally decreased in

concentration in bottom sediments down the Illinois Waterway from the Lockport pool to the Peoria pool (Table 14). Fifty percent of the sediment cyanide values were higher during the 1977 survey than in the 1983 survey (Table 16).

Phenol. Phenol concentrations in the sediment were highest at Stations 1 (5.80 mg/kg) and 44 (1.91 mg/kg) in the Lockport and Peoria pools, respectively. All other sampling stations had concentrations of phenol less than 0.22 mg/kg (Table 14). Except for the two extreme values, there was little variation in the sediment phenol concentrations along the Illinois Waterway.

Fats, Oils, and Greases. The concentration of FOG in bottom sediments was quite variable among the 12 sampling stations ranging from a low of 124 mg/kg at Station 41 in the Peoria pool to a high of 17,398 mg/kg at Station 1 in the Lockport pool. Generally, FOG decreased in concentration in the sediments along the Illinois Waterway from the Lockport pool to the Peoria pool.

Trace Metals. A total of 11 trace metals were measured in bottom sediments during the 1983 survey, including arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. While the concentration of trace metals in the sediments was quite variable, as with the other constituents measured in sediment samples, a significant enrichment of cadmium, chromium, copper, lead, mercury, nickel,

and zinc is evident in the sediments from the Lockport pool as compared to the sediments from the Brandon Road, Dresden Island, Marseilles, Starved Rock, and Peoria pools (Table 15). With the exception of arsenic, iron, manganese, and silver, metal concentrations from sediments of the Lockport pool were significantly higher ($p < 0.01$) than the other five navigational pools.

The concentration of arsenic and silver measured in the sediments of all 12 sampling stations along the Illinois Waterway were all below the detection limit of 1.0 mg/kg and 0.05 mg/kg, respectively. Generally, the other nine trace metals decreased from the Lockport pool to the upper portion of the Peoria pool, and then increased in concentration along the middle and lower portions of the Peoria pool (Table 15).

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APPENDIX I
WATER QUALITY AT SAMPLING STATIONS (1-49) IN THE
ILLINOIS WATERWAY, AUGUST-OCTOBER 1977

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-1

WATER QUALITY AT STATION 1 IN THE CHICAGO SANITARY AND SHIP CANAL
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
✓ DO	1.7	0.8	1.3	1.0	1.0	1.8
✓ BOD ₅	4	5	4	3	5	6
AI-2 ✓ NH ₄ -N	4.3	1.0	2.4	1.4	3.7	3.1
NO ₂ +NO ₃ -N	2.44	1.28	2.72	3.45	1.50	3.54
TP	0.68	0.50	0.52	0.75	0.79	0.77
pH (units)	6.9	7.3	7.1	7.0	7.1	7.2
FC (cfu/100 mL)	190,000	53,000	9,000	43,000	49,000	7,500

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-2

WATER QUALITY AT STATION 2 IN THE CHICAGO SANITARY AND SHIP CANAL
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	1.8	2.9	3.0	1.3	1.2	3.1
BOD ₅	2	8	3	4	4	3
NH ₄ -N	4.2	1.7	2.4	1.2	3.2	3.0
NO ₂ +NO ₃ -N	2.37	1.36	2.79	2.69	1.81	3.74
TP	0.66	0.60	0.55	0.74	0.71	0.80
pH (units)	7.0	6.7	7.1	7.2	7.2	7.1
FC (cfu/100 mL)	20,000	49,000	4,000	60,000	10,000	3,500

*Expressed in mg/L except where noted.

AI-3

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-3

WATER QUALITY AT STATION 3 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	2.9	4.0	2.1	2.7	2.3	3.6
BOD ₅	5	4	2	4	4	3
NH ₄ -N	3.1	1.6	2.2	1.1	2.8	2.8
NO ₂ +NO ₃ -N	2.57	1.46	2.84	3.12	1.87	4.22
TP	0.62	0.50	0.60	0.73	0.69	0.82
pH (units)	7.2	6.6	7.1	7.3	7.3	7.0
FC (cfu/100 mL)	4,400	47,000	4,000	20,000	4,700	2,400

*Expressed in mg/L except where noted.

AI-4

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-4

WATER QUALITY AT STATION 4 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	4.6	3.8	1.4	3.5	1.9	3.2
BOD ₅	3	4	3	3	3	3
NH ₄ -N	2.9	1.3	2.3	1.1	2.2	2.8
NO ₂ +NO ₃ -N	2.64	1.44	2.89	3.09	1.87	4.22
TP	0.54	0.53	0.61	0.65	0.69	0.77
pH (units)	7.2	6.5	7.0	7.4	7.2	7.2
FC (cfu/100 mL)	1,700	53,000	6,000	5,000	4,500	4,400

*Expressed in mg/L except where noted.

AI-5

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-5

WATER QUALITY AT STATION 5 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent *	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	6.3	6.7	5.5	5.5	7.1	6.0
BOD ₅	6	8	10	5	9	8
NH ₄ -N	2.4	1.4	1.7	0.9	2.2	2.8
NO ₂ +NO ₃ -N	2.93	1.62	3.02	3.01	2.15	4.34
TP	0.56	0.49	0.62	0.64	0.66	0.74
pH (units)	7.3	6.5	7.2	7.4	7.4	7.4
FC (cfu/100 mL)	4,200	270,000	5,000	3,900	6,000	6,300

*Expressed in mg/L except where noted.

AI-6

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-6

WATER QUALITY AT STATION 6 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	5.6	6.5	4.1	5.5	6.5	5.5
BOD ₅	6	5	13	6	10	11
NH ₄ -N	1.6	1.3	1.4	0.9	2.3	2.4
NO ₂ +NO ₃ -N	3.11	1.67	3.57	2.96	2.01	4.24
TP	0.54	0.60	0.62	0.64	0.68	0.80
pH (units)	7.3	6.5	7.1	7.5	7.4	7.5
FC (cfu/100 mL)	4,600	5,400	5,000	4,000	14,000	6,000

*Expressed in mg/L except where noted.

AI-7

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-7

WATER QUALITY AT STATION 7 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	5.1	5.3	4.3	5.4	6.0	5.8
BOD ₅	5	4	9	6	6	9
NH ₄ -N	1.6	1.5	1.0	0.9	2.2	2.4
NO ₂ +NO ₃ -N	3.18	1.76	3.95	2.79	2.06	3.98
TP	0.57	0.66	0.64	0.65	0.67	0.64
pH (units)	7.3	6.6	7.1	7.4	7.6	7.4
FC (cfu/100 mL)	1,900	5,900	2,000	3,500	2,500	2,200

*Expressed in mg/L except where noted.

AI-8

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-8

WATER QUALITY AT STATION 8 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	4.9	5.0	3.8	5.4	6.2	6.0
BOD ₅	6	4	7	5	9	9
NH ₄ -N	1.5	1.6	0.8	0.8	2.2	2.3
NO ₂ +NO ₃ -N	3.59	1.50	4.09	2.98	2.35	3.92
TP	0.52	0.69	0.57	0.61	0.64	0.59
pH (units)	7.3	6.8	7.5	7.4	7.3	7.5
FC (cfu/100 mL)	930	5,700	600	2,400	3,800	1,000

*Expressed in mg/L except where noted.

AI-9

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-9

WATER QUALITY AT STATION 9 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/23	9/02	9/12	9/22	10/03	10/14
DO	4.6	4.8	4.2	4.7	6.0	5.6
BOD ₅	6	3	7	6	6	9
NH ₄ -N	1.8	2.2	0.8	0.8	2.2	2.3
NO ₂ +NO ₃ -N	3.61	1.55	4.26	2.69	2.56	3.79
TP	0.53	0.74	0.63	0.60	0.61	0.58
pH (units)	7.3	6.8	7.2	7.5	7.4	7.4
FC (cfu/100 mL)	590	4,700	1,100	2,100	2,500	2,000

*Expressed in mg/L except where noted.

AI-10

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-10

WATER QUALITY AT STATION 10 IN THE DES PLAINES RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	5.2	4.7	3.5	5.2	6.0	5.2
BOD ₅	5	15	10	6	5	7
NH ₄ -N	2.8	2.3	1.8	1.1	2.1	2.0
NO ₂ +NO ₃ -N	3.64	2.11	3.07	2.74	2.75	3.87
TP	0.62	0.73	0.52	0.58	0.57	0.65
pH (units)	6.9	7.3	7.1	7.6	7.3	6.9
FC (cfu/100 mL)	300	3,000	1,100	2,100	700	2,800

*Expressed in mg/L except where noted.

AI-11

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-11

WATER QUALITY AT STATION 11 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/14	10/13
DO	4.3	4.3	3.8	5.3	6.0	6.9
BOD ₅	4	11	9	4	4	3
NH ₄ -N	2.5	2.4	1.6	0.5	1.2	1.0
NO ₂ +NO ₃ -N	3.52	2.00	3.13	3.88	3.66	4.13
TP	0.54	0.75	0.50	0.38	0.41	0.36
pH (units)	7.2	7.3	7.3	7.7	7.5	7.6
FC (cfu/100 mL)	200	3,200	1,200	1,200	1,800	700

*Expressed in mg/L except where noted.

AI-12

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-12

WATER QUALITY AT STATION 12 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/4	10/13
DO	5.3	6.5	6.6	6.3	9.5	8.4
BOD ₅	4	17	11	4	5	4
NH ₄ -N	2.1	2.4	1.0	0.3	0.7	0.7
NO ₂ +NO ₃ -N	3.54	2.21	3.21	4.61	4.18	4.37
TP	0.47	0.78	0.43	0.30	0.28	0.32
pH (units)	7.3	7.3	7.4	7.9	7.5	7.8
FC (cfu/100 mL)	100	4,300	800	1,200	1,200	630

*Expressed in mg/L except where noted.

AI-13

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-13

WATER QUALITY AT STATION 13 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	7.2	6.3	6.0	7.2	9.5	7.6
BOD ₅	3	16	7	3	4	4
NH ₄ -N	2.0	2.2	0.9	0.4	0.5	0.7
NO ₂ +NO ₃ -N	3.61	2.36	3.28	4.18	4.32	4.40
TP	0.44	0.71	0.48	0.22	0.25	0.29
pH (units)	7.4	7.3	7.6	7.8	7.6	8.0
FC (cfu/100 mL)	100	1,400	400	1,000	100	590

*Expressed in mg/L except where noted.

AI-14

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-14

WATER QUALITY AT STATION 14 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	7.1	6.0	8.2	7.3	9.3	8.3
BOD ₅	4	14	9	4	4	3
NH ₄ -N	2.0	2.0	0.8	0.4	0.4	0.8
NO ₂ +NO ₃ -N	3.61	2.73	3.69	4.35	4.35	4.51
TP	0.43	0.66	0.42	0.22	0.24	0.34
pH (units)	7.2	7.3	7.3	7.0	7.5	8.0
FC (cfu/100 mL)	100	3,000	500	540	1,100	670

*Expressed in mg/L except where noted.

AI-15

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-15

WATER QUALITY AT STATION 15 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.2	6.6	6.2	6.8	9.6	9.7
BOD ₅	5	14	9	5	4	4
NH ₄ -N	2.1	2.1	0.7	0.3	0.4	0.7
NO ₂ +NO ₃ -N	3.61	2.97	3.70	4.52	4.39	4.81
TP	0.44	0.62	0.46	0.20	0.23	0.31
pH (units)	7.4	7.3	7.4	7.4	7.7	8.2
FC (cfu/100 mL)	200	2,000	420	1,000	800	390

*Expressed in mg/L except where noted.

AI-16

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-16

WATER QUALITY AT STATION 16 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.5	5.2	6.6	6.7	9.4	9.9
BOD ₅	5	15	8	5	5	4
NH ₄ -N	1.9	2.0	0.7	0.3	0.4	0.8
NO ₂ +NO ₃ -N	3.60	3.28	3.86	4.58	4.60	5.05
TP	0.41	0.69	0.47	0.20	0.24	0.33
pH (units)	7.4	7.3	7.6	7.5	7.7	8.2
FC (cfu/100 mL)	600	2,100	500	2,000	900	360

*Expressed in mg/L except where noted.

AI-17

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-17

WATER QUALITY AT STATION 17 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.4	6.2	6.7	7.4	9.2	9.4
BOD ₅	6	11	8	4	4	4
NH ₄ -N	2.0	1.4	0.4	0.3	0.4	0.7
NO ₂ +NO ₃ -N	3.61	3.32	3.91	5.03	5.04	5.11
TP	0.48	0.51	0.36	0.21	0.22	0.27
pH (units)	7.3	7.3	7.5	7.7	7.8	8.5
FC (cfu/100 mL)	400	1,900	400	1,500	800	510

*Expressed in mg/L except where noted.

AI-18

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-18

WATER QUALITY AT STATION 18 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.4	5.0	6.0	6.4	9.2	9.8
BOD ₅	5	14	8	5	4	4
NH ₄ -N	1.6	1.3	0.4	0.3	0.4	0.7
NO ₂ +NO ₃ -N	3.70	3.44	3.67	5.04	5.04	4.98
TP	0.49	0.52	0.40	0.23	0.23	0.28
pH (units)	7.2	7.2	7.6	7.7	7.8	8.5
FC (cfu/100 mL)	400	3,800	280	800	600	410

*Expressed in mg/L except where noted.

AI-19

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-19

WATER QUALITY AT STATION 19 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.4	5.0	6.3	6.8	9.0	8.2
BOD ₅	5	13	7	5	4	4
NH ₄ -N	1.4	1.2	0.3	0.4	0.4	0.6
NO ₂ +NO ₃ -N	3.85	3.49	3.66	4.76	5.09	4.87
TP	0.46	0.57	0.40	0.46	0.27	0.26
pH (units)	7.4	7.2	7.6	7.7	7.8	8.5
FC (cfu/100 mL)	300	1,600	200	1,500	700	390

*Expressed in mg/L except where noted.

AI-20

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-20

WATER QUALITY AT STATION 20 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.5	5.0	5.0	7.4	8.7	8.9
BOD ₅	5	10	7	3	4	4
NH ₄ -N	1.4	1.2	0.2	0.4	0.4	0.5
NO ₂ +NO ₃ -N	3.98	3.31	3.68	4.87	5.11	5.07
TP	0.52	0.59	0.38	0.50	0.25	0.26
pH (units)	7.4	7.2	7.7	7.8	7.7	8.2
FC (cfu/100 mL)	900	25,000	330	1,600	700	330

*Expressed in mg/L except where noted.

AI-21

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-21

WATER QUALITY AT STATION 21 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.2	5.6	5.8	6.0	8.4	9.6
BOD ₅	5	5	6	4	3	4
NH ₄ -N	1.5	0.5	0.4	0.2	0.3	0.4
NO ₂ +NO ₃ -N	4.14	3.28	3.57	5.10	5.30	5.52
TP	0.57	0.47	0.36	0.53	0.27	0.22
pH (units)	7.3	7.5	7.7	7.9	7.7	8.2
FC (cfu/100 mL)	200	5,500	440	2,200	500	350

*Expressed in mg/L except where noted.

AI-22

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-22

WATER QUALITY AT STATION 22 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	7.0	6.3	6.3	8.5	9.3	9.3
BOD ₅	5	7	7	5	5	4
NH ₄ -N	1.2	0.9	0.2	0.3	0.4	0.5
NO ₂ +NO ₃ -N	4.28	4.07	3.75	4.93	5.21	5.28
TP	0.58	0.59	0.43	0.54	0.24	0.25
pH (units)	7.3	7.5	7.6	7.9	7.8	8.2
FC (cfu/100 mL)	300	5,100	190	1,100	1,000	310

*Expressed in mg/L except where noted.

AI-23

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-23

WATER QUALITY AT STATION 23 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.0	5.7	7.0	6.7	9.3	8.4
BOD ₅	5	10	7	5	5	4
NH ₄ -N	1.2	1.0	0.2	0.2	0.3	0.4
NO ₂ +NO ₃ -N	4.48	3.51	3.77	5.06	5.16	5.38
TP	0.61	0.78	0.41	0.44	0.25	0.24
pH (units)	7.2	7.5	7.7	7.9	7.7	8.4
FC (cfu/100 mL)	200	5,800	150	1,100	1,200	330

*Expressed in mg/L except where noted.

AI-24

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-24

WATER QUALITY AT STATION 24 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.2	5.6	5.3	7.0	9.0	9.2
BOD ₅	4	9	9	5	4	4
NH ₄ -N	1.2	0.7	0.3	0.2	0.3	0.4
NO ₂ +NO ₃ -N	4.37	4.23	3.83	5.29	5.29	5.56
TP	0.57	0.74	0.51	0.38	0.28	0.27
pH (units)	7.4	7.4	7.8	7.9	7.6	8.7
FC (cfu/100 mL)	200	3,600	210	700	1,500	360

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-25

WATER QUALITY AT STATION 25 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	6.1	4.6	5.6	7.0	9.0	7.8
BOD ₅	5	8	8	7	3	4
NH ₄ -N	1.1	0.5	0.2	0.2	0.2	0.4
NO ₂ +NO ₃ -N	4.30	4.15	3.70	5.12	5.50	5.55
TP	0.56	0.51	0.46	0.38	0.28	0.25
pH (units)	7.3	7.3	7.8	7.9	7.7	8.2
FC (cfu/100 mL)	200	4,700	430	1,500	600	270

*Expressed in mg/L except where noted.

AI-26

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-26

WATER QUALITY AT STATION 26 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/24	9/01	9/13	9/21	10/04	10/13
DO	7.1	5.0	5.5	6.7	8.8	8.1
BOD ₅	6	5	8	5	3	4
NH ₄ -N	0.3	0.5	0.3	0.1	0.3	0.4
NO ₂ +NO ₃ -N	4.36	4.10	3.60	5.11	5.24	5.61
TP	0.58	0.50	0.46	0.28	0.30	0.25
pH (units)	7.3	7.4	7.6	7.8	7.6	8.3
FC (cfu/100 mL)	100	3,300	370	800	1,000	350

*Expressed in mg/L except where noted.

AI-27

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-27

WATER QUALITY AT STATION 27 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.5	6.0	5.4	6.2	9.0	9.1
BOD ₅	6	9	7	4	6	5
NH ₄ -N	0.4	0.8	0.2	0.1	0.3	0.2
NO ₂ +NO ₃ -N	4.41	4.57	3.65	4.45	5.25	5.83
TP	0.48	0.58	0.62	0.28	0.33	0.29
pH (units)	7.4	7.2	7.8	7.6	7.2	7.9
FC (cfu/100 mL)	200	270	420	2,500	480	300

*Expressed in mg/L except where noted.

AI-28

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-28

WATER QUALITY AT STATION 28 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent *	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.9	7.9	6.9	7.0	9.4	8.4
BOD ₅	6	8	6	4	4	4
NH ₄ -N	0.3	0.6	0.2	0.1	0.3	0.2
NO ₂ +NO ₃ -N	4.29	4.74	3.80	4.55	5.29	5.84
TP	0.55	0.49	0.45	0.32	0.32	0.29
pH (units)	7.5	7.4	7.9	7.6	7.3	8.0
FC (cfu/100 mL)	200	190	270	2,100	330	520

*Expressed in mg/L except where noted.

AI-29

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-29

WATER QUALITY AT STATION 29 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.7	8.0	6.0	6.6	9.4	8.2
BOD ₅	5	8	5	4	4	4
NH ₄ ⁻ N	0.3	0.4	0.2	0.1	0.3	0.2
NO ₂ +NO ₃ ⁻ N	4.33	4.48	3.82	4.41	5.29	5.79
TP	0.55	0.48	0.45	0.36	0.31	0.29
pH (units)	7.6	7.6	7.9	7.5	7.4	8.1
FC (cfu/100 mL)	190	180	280	2,300	210	60

*Expressed in mg/L except where noted.

AI-30

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-30

WATER QUALITY AT STATION 30 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.5	7.0	7.5	8.0	9.2	9.0
BOD ₅	5	10	5	4	4	4
NH ₄ -N	0.2	0.4	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.40	4.25	3.72	4.92	5.76	6.20
TP	0.52	0.47	0.47	0.23	0.29	0.28
pH (units)	7.6	7.4	7.9	7.6	7.6	8.1
FC (cfu/100 mL)	210	200	340	2,900	550	540

*Expressed in mg/L except where noted.

AI-31

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-31

WATER QUALITY AT STATION 31 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.7	6.7	6.7	6.5	9.2	8.7
BOD ₅	4	8	7	4	4	4
NH ₄ -N	0.2	0.6	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.43	4.29	3.67	4.99	6.00	6.19
TP	0.50	0.49	0.47	0.50	0.30	0.29
pH (units)	7.6	7.6	7.9	7.6	7.6	8.1
FC (cfu/100 mL)	500	2,900	340	1,400	570	660

*Expressed in mg/L except where noted.

AI-32

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-32

WATER QUALITY AT STATION 32 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.9	7.3	6.0	7.0	9.3	8.8
BOD ₅	4	9	8	5	4	4
NH ₄ ⁻ -N	0.1	0.5	0.2	0.1	0.2	0.2
NO ₂ ⁻ +NO ₃ ⁻ -N	4.29	4.29	3.60	4.88	6.06	6.14
TP	0.52	0.48	0.45	0.44	0.31	0.29
pH (units)	7.8	7.7	7.9	7.5	7.7	8.2
FC (cfu/100 mL)	490	10,000	300	2,500	240	430

*Expressed in mg/L except where noted.

AI-33

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-33

WATER QUALITY AT STATION 33 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.8	8.0	6.0	7.0	8.9	9.2
BOD ₅	3	9	7	4	5	4
NH ₄ -N	0.1	0.5	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.21	4.21	3.52	4.77	6.00	6.51
TP	0.53	0.50	0.40	0.34	0.32	0.30
pH (units)	7.9	7.7	7.9	7.6	7.8	8.2
FC (cfu/100 mL)	400	3,300	230	1,900	1,700	560

*Expressed in mg/L except where noted.

AI-34

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-34

WATER QUALITY AT STATION 34 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	7.1	6.7	5.9	6.3	8.9	9.2
BOD ₅	3	8	6	4	5	4
NH ₄ -N	0.2	0.3	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.18	4.02	3.55	4.70	6.06	6.51
TP	0.55	0.45	0.39	0.42	0.32	0.30
pH (units)	7.7	7.8	7.9	7.6	7.8	8.1
FC (cfu/100 mL)	510	800	340	1,600	510	570

*Expressed in mg/L except where noted.

AI-35

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-35

WATER QUALITY AT STATION 35 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.7	7.2	6.0	5.8	8.8	8.8
BOD ₅	3	6	6	4	4	3
NH ₄ -N	0.2	0.0	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.27	3.77	3.77	4.55	6.04	6.52
TP	0.62	0.42	0.40	0.40	0.37	0.30
pH (units)	7.5	7.8	7.9	7.6	7.7	8.2
FC (cfu/100 mL)	1,200	1,700	1,400	2,700	510	540

*Expressed in mg/L except where noted.

AI-36

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-36

WATER QUALITY AT STATION 36 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.3	7.3	5.8	6.5	8.9	8.1
BOD ₅	3	6	6	4	5	6
NH ₄ -N	0.2	0.0	0.2	0.1	0.2	0.2
NO ₂ +NO ₃ -N	4.26	3.76	3.94	4.38	6.04	6.66
TP	0.58	0.43	0.44	0.33	0.50	0.64
pH (units)	7.6	7.9	7.9	7.6	7.8	8.2
FC (cfu/100 mL)	400	190	240	2,000	700	530

*Expressed in mg/L except where noted.

AI-37

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-37

WATER QUALITY AT STATION 37 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.3	6.5	5.2	6.0	8.3	8.7
BOD ₅	3	6	7	4	4	6
NH ₄ -N	0.3	0.0	0.1	0.1	0.1	0.2
NO ₂ +NO ₃ -N	4.32	3.82	3.80	4.31	6.09	5.96
TP	0.60	0.40	0.42	0.28	0.62	0.60
pH (units)	7.5	7.9	7.9	7.5	7.8	8.2
FC (cfu/100 mL)	100	190	260	1,500	1,200	350

*Expressed in mg/L except where noted.

AI-38

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-38

WATER QUALITY AT STATION 38 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent *	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.8	6.3	4.2	5.8	8.5	7.4
BOD ₅	3	6	7	3	4	5
NH ₄ -N	0.1	0.1	0.0	0.1	0.2	0.1
NO ₂ +NO ₃ -N	4.30	4.11	3.78	4.25	6.02	5.85
TP	0.59	0.43	0.45	0.35	0.58	0.61
pH (units)	7.6	7.7	8.0	7.5	7.8	8.2
FC (cfu/100 mL)	100	120	390	1,100	380	380

*Expressed in mg/L except where noted.

AI-39

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-39

WATER QUALITY AT STATION 39 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.3	5.4	4.8	5.0	8.4	7.6
BOD ₅	3	6	6	4	4	5
NH ₄ ⁻ -N	0.1	0.0	0.0	0.1	0.2	0.1
NO ₂ ⁺ +NO ₃ ⁻ -N	4.26	4.05	3.66	4.11	5.90	6.39
TP	0.53	0.43	0.36	0.36	0.49	0.30
pH (units)	7.6	7.8	8.0	7.5	7.7	8.2
FC (cfu/100 mL)	50	100	540	2,800	360	10

*Expressed in mg/L except where noted.

AI-40

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-40

WATER QUALITY AT STATION 40 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.1	5.5	4.1	6.0	8.1	7.2
BOD ₅	3	6	5	3	3	4
NH ₄ -N	0.0	0.0	0.0	0.1	0.1	0.2
NO ₂ +NO ₃ -N	3.93	4.00	3.61	4.39	5.66	6.47
TP	0.46	0.43	0.38	0.35	0.38	0.29
pH (units)	7.6	7.8	8.0	7.5	7.8	8.3
FC (cfu/100 mL)	50	40	210	1,600	20	220

*Expressed in mg/L except where noted.

AI-41

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-41

WATER QUALITY AT STATION 41 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/20	10/05	10/11
DO	6.2	6.3	4.5	5.0	7.9	7.1
BOD ₅	2	6	5	4	3	8
NH ₄ -N	0.0	0.0	0.0	0.1	0.1	0.1
NO ₂ +NO ₃ -N	4.10	4.10	3.72	4.42	5.71	6.43
TP	0.44	0.46	0.39	0.35	0.33	0.30
pH (units)	7.5	7.8	8.0	7.5	7.7	8.1
FC (cfu/100 mL)	160	10	120	470	240	200

*Expressed in mg/L except where noted.

AI-42

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-42

WATER QUALITY AT STATION 42 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/31	9/14	9/21	10/05	10/11
DO	6.4	5.5	5.5	5.0	7.7	7.5
BOD ₅	3	5	3	3	4	5
NH ₄ ⁻ -N	0.1	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ ⁻ -N	4.18	4.25	3.78	4.54	5.66	6.65
TP	0.43	0.43	0.40	0.39	0.34	0.35
pH (units)	7.7	7.8	8.0	7.5	7.9	8.2
FC (cfu/100 mL)	130	50	90	800	150	370

*Expressed in mg/L except where noted.

AI-43

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-43

WATER QUALITY AT STATION 43 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.0	7.5	5.2	5.0	7.7	8.3
BOD ₅	3	5	5	3	3	4
NH ₄ -N	0.0	0.1	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	4.06	4.39	3.77	4.67	5.64	6.67
TP	0.42	0.32	0.39	0.46	0.41	0.35
pH (units)	7.6	7.3	8.0	7.6	7.8	8.2
FC (cfu/100 mL)	30	50	80	1,000	180	130

*Expressed in mg/L except where noted.

AI-44

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-44

WATER QUALITY AT STATION 44 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	8.4	9.5	5.4	5.5	8.3	8.4
BOD ₅	3	5	7	3	3	4
NH ₄ -N	0.0	0.0	0.0	0.1	0.1	0.1
NO ₂ +NO ₃ -N	3.97	3.75	3.76	4.72	5.61	6.70
TP	0.43	0.32	0.40	0.39	0.39	0.37
pH (units)	8.0	7.7	8.0	7.6	7.8	8.1
FC (cfu/100 mL)	10	90	60	1,000	100	470

*Expressed in mg/L except where noted.

AI-45

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-45

WATER QUALITY AT STATION 45 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.5	9.8	7.0	6.3	8.3	8.6
BOD ₅	3	5	4	5	3	3
NH ₄ -N	0.0	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	3.82	3.54	3.41	4.48	5.60	5.62
TP	0.42	0.28	0.37	0.44	0.38	0.31
pH (units)	8.0	7.8	8.1	7.6	7.8	7.6
FC (cfu/100 mL)	50	190	190	800	30	230

*Expressed in mg/L except where noted.

AI-46

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-46

WATER QUALITY AT STATION 46 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.4	10.0	7.3	5.4	8.0	8.6
BOD ₅	2	6	4	5	3	3
NH ₄ -N	0.0	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	3.78	3.30	3.39	4.59	5.61	5.62
TP	0.40	0.21	0.37	0.48	0.37	0.31
pH (units)	8.0	8.0	8.1	7.6	7.8	8.1
FC (cfu/100 mL)	10	160	700	450	90	230

*Expressed in mg/L except where noted.

AI-47

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-47

WATER QUALITY AT STATION 47 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.3	9.7	7.7	5.6	8.0	8.2
BOD ₅	2	4	6	4	3	5
NH ₄ -N	0.0	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	3.84	3.43	3.34	4.53	5.62	5.63
TP	0.39	0.35	0.31	0.46	0.39	0.32
pH (units)	7.7	7.8	8.1	7.7	7.7	8.0
FC (cfu/100 mL)	130	190	3,300	460	20	120

*Expressed in mg/L except where noted.

AI-48

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-48

WATER QUALITY AT STATION 48 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent*	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.2	8.8	7.4	4.7	7.3	7.2
BOD ₅	2	5	5	3	3	5
NH ₄ -N	0.0	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	3.62	3.39	3.17	4.45	5.58	5.59
TP	0.45	0.36	0.28	0.42	0.38	0.33
pH (units)	7.9	7.9	8.2	7.8	7.9	8.0
FC (cfu/100 mL)	800	270	400	460	50	450

*Expressed in mg/L except where noted.

AI-49

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AI-49

WATER QUALITY AT STATION 49 IN THE ILLINOIS RIVER
AUGUST TO OCTOBER 1977

Constituent *	Sampling Date					
	8/25	8/30	9/15	9/22	10/06	10/10
DO	7.3	8.0	8.0	4.8	7.7	7.1
BOD ₅	3	5	5	3	3	3
NH ₄ -N	0.0	0.0	0.0	0.0	0.1	0.1
NO ₂ +NO ₃ -N	3.66	3.38	3.06	4.24	5.62	5.61
TP	0.45	0.31	0.27	0.42	0.41	0.34
pH (units)	8.0	7.6	8.2	7.8	7.9	8.1
FC (cfu/100 mL)	2,500	190	16,000	1,000	170	160

*Expressed in mg/L except where noted.

AI-50

APPENDIX II

WATER QUALITY AT SAMPLING STATIONS (1-49) IN THE
ILLINOIS WATERWAY, SEPTEMBER-OCTOBER 1983

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-1

WATER QUALITY AT STATION 1 IN THE CHICAGO SANITARY
AND SHIP CANAL, SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/19	9/29	10/03	10/13
DO	2.8	4.2	4.7	3.5
BOD ₅	3	2	5	1
TOC	6	5	7	6
TSS	49	7	9	16
NH ₄ -N	2.2	2.7	1.9	3.2
NO ₂ +NO ₃ -N	2.24	2.12	2.40	2.66
TP	0.84	0.47	0.55	0.65
pH (units)	6.8	7.0	7.0	6.8
Cyanide	0.007	0.006	0.007	0.005
Phenol	0.026	0.018	0.018	0.018
FOG	0	0	15	10
FC (cfu/100 mL)	11,000	1,600	800	490

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-2

WATER QUALITY AT STATION 2 IN THE CHICAGO SANITARY
AND SHIP CANAL, SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	3.5	4.2	4.2	3.5
BOD ₅	2	1	9	2
TOC	6	6	6	6
TSS	63	12	13	19
NH ₄ -N	2.3	2.6	1.9	3.7
NO ₂ +NO ₃ -N	2.22	2.33	2.44	2.66
TP	0.96	0.47	0.53	0.72
pH (units)	7.0	7.0	7.1	7.0
Cyanide	0.010	0.007	0.007	0.005
Phenol	0.024	0.019	0.019	0.024
FOG	0	0	11	10
FC (cfu/100 mL)	NS	1,700	550	1,100

*Expressed in mg/L except where noted.

NS = No Sample

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-3

WATER QUALITY AT STATION 3 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	4.6	4.6	4.0	4.5
BOD ₅	3	5	8	2
TOC	6	6	6	7
TSS	57	11	14	20
NH ₄ -N	2.3	2.2	1.6	3.1
NO ₂ +NO ₃ -N	2.31	2.88	2.58	3.31
TP	0.81	0.54	0.56	0.78
pH (units)	7.0	6.4	7.1	7.0
Cyanide	0.009	0.006	0.006	0.006
Phenol	0.020	0.017	0.016	0.022
FOG	0	0	7	10
FC (cfu/100 mL)	NS	15,000	2,300	2,100

*Expressed in mg/L except where noted.

NS = No Sample

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-4

WATER QUALITY AT STATION 4 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	4.4	3.3	3.7	4.2
BOD ₅	2	5	6	2
TOC	7	6	6	6
TSS	49	18	12	17
NH ₄ -N	2.4	2.1	1.8	2.9
NO ₂ +NO ₃ -N	2.28	2.91	2.43	3.48
TP	0.76	0.62	0.57	0.73
pH (units)	7.0	6.7	7.1	6.9
Cyanide	0.008	0.007	0.006	0.005
Phenol	0.020	0.016	0.019	0.019
FOG	0	0	3	8
FC (cfu/100 mL)	NS	2,500	4,200	1,000

*Expressed in mg/L except where noted
NS = No Sample

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-5

WATER QUALITY AT STATION 5 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	7.4	8.2	7.1	7.5
BOD ₅	6	6	8	6
TOC	7	6	6	6
TSS	44	10	6	17
NH ₄ -N	2.2	1.9	1.6	2.9
NO ₂ +NO ₃ -N	2.35	3.33	2.84	3.47
TP	0.67	0.66	0.65	0.74
pH (units)	6.2	6.3	7.1	7.0
Cyanide	0.008	0.006	0.006	0.005
Phenol	0.020	0.018	0.017	0.019
FOG	0	0	6	7
FC (cfu/100 mL)	4,900	1,000	1,900	3,400

*Expressed in mg/L except where noted.

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TABLE AII-6

WATER QUALITY AT STATION 6 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	7.1	7.8	6.4	7.2
BOD ₅	6	7	9	6
TOC	7	5	6	6
TSS	45	19	5	13
NH ₄ -N	2.4	1.9	1.5	2.7
NO ₂ +NO ₃ -N	2.30	3.29	2.86	3.60
TP	0.83	0.68	0.69	0.68
pH (units)	6.7	6.5	7.1	7.0
Cyanide	0.008	0.006	0.006	0.005
Phenol	0.020	0.019	0.016	0.020
FOG	0	0	18	8
FC (cfu/100 mL)	NS	1,200	1,800	2,500

*Expressed in mg/L except where noted.
NS = No Sample

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TABLE AII-7

WATER QUALITY AT STATION 7 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	6.6	5.7	5.4	6.5
BOD ₅	5	7	9	7
TOC	6	5	7	6
TSS	41	11	25	15
NH ₄ -N	2.6	1.8	1.5	2.7
NO ₂ +NO ₃ -N	2.09	3.46	2.76	3.61
TP	0.70	0.67	0.69	0.66
pH (units)	6.9	6.7	7.2	7.1
Cyanide	0.009	0.005	0.005	0.006
Phenol	0.021	0.016	0.015	0.025
FOG	0	0	8	8
FC (cfu/100 mL)	2,100	900	1,000	1,600

*Expressed in mg/L except where noted.

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TABLE AII-8

WATER QUALITY AT STATION 8 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	6.4	6.8	6.2	6.1
BOD ₅	3	7	8	8
TOC	6	6	7	6
TSS	27	13	25	20
NH ₄ -N	2.6	1.8	1.3	3.0
NO ₂ +NO ₃ -N	2.04	3.62	2.87	3.15
TP	0.64	0.62	0.71	0.65
pH (units)	6.9	6.8	7.1	6.9
Cyanide	0.008	0.005	0.005	0.005
Phenol	0.019	0.015	0.015	0.020
FOG	0	5	9	5
FC (cfu/100 mL)	1,900	1,400	480	3,100

*Expressed in mg/L except where noted.

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TABLE AII-9

WATER QUALITY AT STATION 9 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
DO	6.5	6.3	7.0	6.4
BOD ₅	4	7	8	8
TOC	7	6	6	6
TSS	17	17	49	16
NH ₄ -N	24	1.9	1.1	3.3
NO ₂ +NO ₃ -N	2.14	3.61	3.14	3.09
TP	0.61	0.62	0.89	0.65
pH (units)	7.0	6.9	7.1	7.0
Cyanide	0.008	0.006	0.005	0.005
Phenol	0.020	0.015	0.013	0.023
FOG	0	0	9	13
FC (cfu/100 mL)	3,300	1,900	430	700

*Expressed in mg/L except where noted.

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TABLE AII-10

WATER QUALITY AT STATION 10 IN THE DES PLAINES RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.0	7.3	5.3	5.8
BOD ₅	7	7	7	11
TOC	6	6	6	6
TSS	31	34	26	19
NH ₄ -N	1.8	1.6	1.1	4.0
NO ₂ +NO ₃ -N	2.68	3.03	2.85	3.17
TP	0.74	0.71	0.68	0.80
pH (units)	7.1	6.8	6.6	6.8
Cyanide	0.007	0.005	0.005	0.006
Phenol	0.019	0.015	0.013	0.018
FOG	0	0	4	8
FC (cfu/100 mL)	1,500	580	110	900

*Expressed in mg/L except where noted.

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TABLE AII-11

WATER QUALITY AT STATION 11 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.8	6.2	5.6	6.5
BOD ₅	6	5	7	12
TOC	6	6	6	5
TSS	26	29	32	29
NH ₄ -N	2.1	1.7	0.7	3.1
NO ₂ +NO ₃ -N	2.51	2.91	2.33	2.75
TP	0.65	0.65	0.62	0.77
pH (units)	7.1	6.1	6.7	6.8
Cyanide	0.006	0.004	0.005	0.005
Phenol	0.018	0.016	0.014	0.016
FOG	0	0	4	5
FC (cfu/100 mL)	800	1,100	90	400

*Expressed in mg/L except where noted.

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TABLE AII-12

WATER QUALITY AT STATION 12 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	7.5	7.4	7.9	7.6
BOD ₅	5	4	7	12
TOC	6	6	7	6
TSS	17	27	27	41
NH ₄ -N	1.8	1.1	0.6	2.8
NO ₂ +NO ₃ -N	2.47	2.82	2.54	3.16
TP	0.63	0.68	0.58	0.85
pH (units)	7.0	6.7	6.8	7.1
Cyanide	0.007	0.004	0.005	0.005
Phenol	0.018	0.016	0.013	0.017
FOG	0	0	6	5
FC (cfu/100 mL)	1,200	380	160	150

*Expressed in mg/L except where noted.

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TABLE AII-13

WATER QUALITY AT STATION 13 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	7.3	7.6	7.6	8.2
BOD ₅	5	3	6	12
TOC	6	6	6	6
TSS	32	27	30	34
NH ₄ -N	1.8	1.0	0.7	2.5
NO ₂ +NO ₃ -N	2.53	2.85	2.58	3.33
TP	0.64	0.54	0.61	0.82
pH (units)	7.0	6.2	6.8	7.1
Cyanide	0.006	0.003	0.005	0.005
Phenol	0.017	0.014	0.013	0.016
FOG	0	0	12	9
FC (cfu/100 mL)	900	390	200	150

*Expressed in mg/L except where noted.

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TABLE AII-14

WATER QUALITY AT STATION 14 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	7.0	7.3	7.9	7.8
BOD ₅	8	4	7	11
TOC	6	6	6	5
TSS	35	29	43	32
NH ₄ -N	1.8	1.0	0.7	2.3
NO ₂ +NO ₃ -N	2.50	2.97	2.79	3.55
TP	0.65	0.54	0.70	0.77
pH (units)	7.1	6.8	6.5	7.1
Cyanide	0.007	0.006	0.005	0.004
Phenol	0.017	0.014	0.012	0.015
FOG	0	0	11	7
FC (cfu/100 mL)	2,500	400	290	120

*Expressed in mg/L except where noted.

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TABLE AII-15

WATER QUALITY AT STATION 15 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.8	7.9	7.3	8.5
BOD ₅	8	3	8	9
TOC	6	6	6	5
TSS	32	28	24	21
NH ₄ -N	1.8	1.0	0.7	2.2
NO ₂ +NO ₃ -N	2.52	2.98	2.86	3.49
TP	0.72	0.54	0.59	0.80
pH (units)	7.1	6.2	6.7	6.5
Cyanide	0.006	0.004	0.005	0.005
Phenol	0.017	0.014	0.009	0.013
FOG	0	0	13	6
FC (cfu/100 mL)	1,100	550	50	40

*Expressed in mg/L except where noted.

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TABLE AII-16

WATER QUALITY AT STATION 16 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.6	7.1	7.2	7.7
BOD ₅	7	3	9	9
TOC	5	6	5	6
TSS	38	35	50	30
NH ₄ -N	1.6	0.9	0.6	1.8
NO ₂ +NO ₃ -N	2.60	3.10	2.93	3.18
TP	0.65	0.55	0.73	0.61
pH (units)	7.2	6.2	6.7	6.6
Cyanide	0.007	0.004	0.005	0.004
Phenol	0.015	0.015	0.012	0.013
FOG	0	0	10	6
FC (cfu/100 mL)	550	580	270	90

*Expressed in mg/L except where noted.

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TABLE AII-17

WATER QUALITY AT STATION 17 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.4	6.8	6.9	7.8
BOD ₅	8	4	8	11
TOC	6	5	5	6
TSS	69	25	29	47
NH ₄ -N	1.4	0.8	0.6	1.9
NO ₂ +NO ₃ -N	2.76	3.03	3.10	3.50
TP	0.95	0.50	0.59	0.71
pH (units)	7.2	7.1	6.8	6.8
Cyanide	0.007	0.004	0.005	0.005
Phenol	0.015	0.016	0.011	0.013
FOG	0	0	7	6
FC (cfu/100 mL)	700	200	70	20

*Expressed in mg/L except where noted.

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TABLE AII-18

WATER QUALITY AT STATION 18 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.6	7.9	6.7	7.1
BOD ₅	10	3	6	11
TOC	6	6	5	5
TSS	69	25	17	26
NH ₄ -N	1.9	0.8	0.7	1.6
NO ₂ +NO ₃ -N	2.85	3.11	3.17	3.55
TP	0.81	0.49	0.54	0.54
pH (units)	7.2	6.2	6.4	6.9
Cyanide	0.006	0.004	0.005	0.004
Phenol	0.015	0.016	0.010	0.012
FOG	0	0	13	8
FC (cfu/100 mL)	460	250	70	60

*Expressed in mg/L except where noted.

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TABLE AII-19

WATER QUALITY AT STATION 19 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.3	6.8	7.6	7.9
BOD ₅	12	2	6	10
TOC	7	6	5	5
TSS	73	13	20	21
NH ₄ -N	2.1	0.8	0.6	0.5
NO ₂ +NO ₃ -N	2.95	3.08	3.28	3.57
TP	0.86	0.45	0.53	0.51
pH (units)	7.2	6.4	6.5	7.0
Cyanide	0.006	0.005	0.005	0.004
Phenol	0.016	0.015	0.009	0.013
FOG	0	0	17	8
FC (cfu/100 mL)	900	380	260	30

*Expressed in mg/L except where noted.

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TABLE AII-20

WATER QUALITY AT STATION 20 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.3	7.0	7.0	8.7
BOD ₅	10	4	5	10
TOC	6	5	6	5
TSS	55	20	23	16
NH ₄ -N	1.6	0.7	0.4	1.3
NO ₂ +NO ₃ -N	3.00	3.07	3.14	3.49
TP	0.76	0.51	0.59	0.47
pH (units)	7.3	7.6	6.6	7.1
Cyanide	0.006	0.005	0.005	0.004
Phenol	0.013	0.015	0.009	0.013
FOG	0	0	13	6
FC (cfu/100 mL)	290	310	80	70

*Expressed in mg/L except where noted.

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TABLE AII-21

WATER QUALITY AT STATION 21 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	4.7	7.6	7.3	8.7
BOD ₅	6	3	6	10
TOC	6	6	5	5
TSS	51	18	50	21
NH ₄ ⁻ -N	1.2	0.5	0.3	0.8
NO ₂ ⁺ NO ₃ ⁻ -N	3.16	3.11	3.20	3.61
TP	0.68	0.42	0.77	0.51
pH (units)	7.3	6.8	6.5	7.1
Cyanide	0.006	0.004	0.004	0.004
Phenol	0.017	0.013	0.008	0.016
FOG	0	0	10	10
FC (cfu/100 mL)	240	280	150	50

*Expressed in mg/L except where noted.

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TABLE AII-22

WATER QUALITY AT STATION 22 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.7	7.3	7.2	8.7
BOD ₅	9	3	7	9
TOC	6	6	5	5
TSS	75	33	33	27
NH ₄ -N	1.1	0.5	0.3	1.0
NO ₂ +NO ₃ -N	3.14	3.05	3.27	3.56
TP	0.78	0.50	0.64	0.49
pH (units)	7.2	7.0	6.7	7.2
Cyanide	0.005	0.006	0.004	0.003
Phenol	0.014	0.015	0.009	0.013
FOG	0	0	12	9
FC (cfu/100 mL)	480	290	120	60

*Expressed in mg/L except where noted.

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TABLE AII-23

WATER QUALITY AT STATION 23 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
DO	6.2	7.2	7.5	8.4
BOD ₅	8	2	6	9
TOC	6	6	5	5
TSS	85	27	34	26
NH ₄ -N	1.1	0.5	0.2	0.9
NO ₂ +NO ₃ -N	3.40	3.02	3.27	3.71
TP	0.90	0.46	0.60	0.49
pH (units)	7.1	6.2	6.8	7.1
Cyanide	0.007	0.005	0.005	0.003
Phenol	0.014	0.015	0.007	0.013
FOG	0	0	8	6
FC (cfu/100 mL)	550	250	100	50

*Expressed in mg/L except where noted.

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TABLE AII-24

WATER QUALITY AT STATION 24 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.8	7.4	7.6	8.7
BOD ₅	7	3	6	9
TOC	6	5	5	5
TSS	63	20	27	19
NH ₄ -N	1.1	0.4	0.1	0.7
NO ₂ +NO ₃ -N	2.92	3.01	3.03	3.57
TP	0.90	0.47	0.58	0.49
pH (units)	7.1	6.7	6.9	7.1
Cyanide	0.006	0.004	0.004	0.004
Phenol	0.012	0.015	0.009	0.017
FOG	0	0	0	12
FC (cfu/100 mL)	1,300	210	130	70

*Expressed in mg/L except where noted.

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TABLE AII-25

WATER QUALITY AT STATION 25 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent ^a	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.7	6.6	7.8	8.9
BOD ₅	8	3	7	9
TOC	7	5	5	5
TSS	54	20	42	17
NH ₄ -N	0.9	0.3	0.2	0.5
NO ₂ +NO ₃ -N	3.03	2.95	3.06	3.41
TP	0.78	0.45	0.64	0.46
pH (units)	7.0	6.7	6.9	7.1
Cyanide	0.006	0.004	0.004	0.003
Phenol	0.012	0.017	0.009	0.013
FOG	0	0	4	3
FC (cfu/100 mL)	1,300	270	240	330

^aExpressed in mg/L except where noted.

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TABLE AII-26

WATER QUALITY AT STATION 26 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent *	Sampling Date			
	9/20	9/28	10/04	10/12
DO	5.7	6.7	8.9	9.0
BOD ₅	7	2	7	5
TOC	5	5	6	6
TSS	29	23	27	18
NH ₄ -N	1.0	0.2	0.1	0.4
NO ₂ +NO ₃ -N	3.25	2.95	3.14	3.38
TP	0.68	0.46	0.54	0.44
pH (units)	7.0	7.1	7.0	6.9
Cyanide	0.007	0.004	0.004	0.004
Phenol	0.011	0.016	0.011	0.012
FOG	4	0	3	7
FC (cfu/100 mL)	480	350	130	120

*Expressed in mg/L except where noted.

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TABLE AII-27

WATER QUALITY AT STATION 27 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	5.6	8.1	6.0	6.0
BOD ₅	7	5	5	5
TOC	6	6	5	6
TSS	33	39	28	21
NH ₄ -N	1.1	0.3	0.1	0.3
NO ₂ +NO ₃ -N	3.14	2.63	3.81	3.45
TP	0.64	0.55	0.52	0.50
pH (units)	6.8	6.6	7.0	7.0
Cyanide	0.005	0.005	0.004	0.004
Phenol	0.013	0.007	0.010	0.012
FOG	0	6	4	5
FC (cfu/100 mL)	600	300	50	100

*Expressed in mg/L except where noted.

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TABLE AII-28

WATER QUALITY AT STATION 28 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	8.0	9.9	8.6	8.8
BOD ₅	6	3	5	6
TOC	6	6	6	5
TSS	34	29	25	38
NH ₄ -N	1.0	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.12	2.64	3.77	3.15
TP	0.63	0.49	0.48	0.46
pH (units)	6.5	6.0	7.0	7.1
Cyanide	0.005	0.005	0.005	0.004
Phenol	0.011	0.008	0.010	0.013
FOG	0	8	3	5
FC (cfu/100 mL)	600	280	20	30

*Expressed in mg/L except where noted.

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TABLE AII-29

WATER QUALITY AT STATION 29 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	7.8	9.8	7.9	9.5
BOD ₅	7	4	5	5
TOC	6	6	5	5
TSS	37	32	44	19
NH ₄ -N	1.0	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.13	2.66	3.80	3.08
TP	0.64	0.49	0.51	0.43
pH (units)	6.7	6.6	7.0	7.2
Cyanide	0.005	0.006	0.004	0.004
Phenol	0.013	0.007	0.011	0.012
FOG	0	8	4	4
FC (cfu/100 mL)	700	240	70	40

*Expressed in mg/L except where noted.

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TABLE AII-30

WATER QUALITY AT STATION 30 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	7.6	9.4	7.8	10.0
BOD ₅	6	3	5	5
TOC	6	6	5	5
TSS	34	26	32	18
NH ₄ -N	1.0	0.2	0.1	0.1
NO ₂ +NO ₃ -N	3.10	2.65	3.81	3.04
TP	0.66	0.44	0.47	0.41
pH (units)	6.5	6.4	7.0	7.3
Cyanide	0.006	0.005	0.011	0.004
Phenol	0.010	0.008	0.009	0.012
FOG	0	9	1	4
FC (cfu/100 mL)	1,300	100	150	50

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-31

WATER QUALITY AT STATION 31 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	7.4	9.1	7.3	7.6
BOD ₅	6	3	5	5
TOC	6	6	6	5
TSS	31	25	31	19
NH ₄ -N	1.0	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.49	2.73	3.87	3.09
TP	0.65	0.43	0.43	0.43
pH (units)	7.1	6.4	7.1	7.2
Cyanide	0.005	0.006	0.006	0.004
Phenol	0.010	0.008	0.009	0.010
FOG	0	0	4	4
FC (cfu/100 mL)	700	700	230	190

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-32

WATER QUALITY AT STATION 32 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	7.0	9.6	8.4	9.9
BOD ₅	7	4	5	5
TOC	6	6	6	5
TSS	110	24	36	27
NH ₄ -N	0.8	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.30	2.71	3.91	3.08
TP	0.82	0.43	0.46	0.45
pH (units)	6.8	6.9	7.1	7.2
Cyanide	0.006	0.004	0.005	0.004
Phenol	0.011	0.008	0.008	0.013
FOG	0	0	1	4
FC (cfu/100 mL)	500	350	140	210

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-33

WATER QUALITY AT STATION 33 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	7.3	9.1	8.0	7.7
BOD ₅	6	4	5	6
TOC	7	5	6	6
TSS	106	20	37	20
NH ₄ -N	0.7	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.31	2.78	3.92	3.11
TP	0.59	0.42	0.47	0.45
pH (units)	6.7	7.0	7.0	7.3
Cyanide	0.005	0.006	0.006	0.004
Phenol	0.011	0.006	0.009	0.012
FOG	0	0	5	4
FC (cfu/100 mL)	1,200	170	120	110

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-34

WATER QUALITY AT STATION 34 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.7	10.4	7.7	10.9
BOD ₅	6	3	4	1
TOC	6	6	5	5
TSS	62	16	24	22
NH ₄ -N	0.7	0.3	0.1	0.2
NO ₂ +NO ₃ -N	3.63	2.82	3.88	3.12
TP	0.62	0.40	0.42	0.42
pH (units)	6.8	6.9	7.0	7.3
Cyanide	0.005	0.004	0.007	0.004
Phenol	0.009	0.007	0.014	0.011
FOG	0	0	3	4
FC (cfu/100 mL)	1,100	400	170	140

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-35

WATER QUALITY AT STATION 35 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.4	9.0	9.4	8.3
BOD ₅	6	1	5	2
TOC	6	6	5	5
TSS	56	24	37	21
NH ₄ -N	0.5	0.3	0.1	0.2
NO ₂ +NO ₃ -N	3.59	2.77	3.81	3.07
TP	0.59	0.39	0.42	0.43
pH (units)	7.0	6.3	7.1	7.3
Cyanide	0.005	0.003	0.005	0.004
Phenol	0.009	0.015	0.013	0.012
FOG	0	0	4	10
FC (cfu/100 mL)	1,200	310	140	30

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-36

WATER QUALITY AT STATION 36 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	5.5	8.7	5.0	8.4
BOD ₅	6	3	5	2
TOC	6	6	5	5
TSS	58	28	40	27
NH ₄ -N	0.4	0.2	0.1	0.2
NO ₂ +NO ₃ -N	3.66	2.68	3.77	3.21
TP	0.57	0.41	0.43	0.44
pH (units)	6.7	6.6	7.1	7.3
Cyanide	0.005	0.003	0.004	0.004
Phenol	0.008	0.016	0.015	0.012
FOG	0	0	0	9
FC (cfu/100 mL)	1,500	210	120	130

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-37

WATER QUALITY AT STATION 37 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	5.8	8.6	6.0	7.3
BOD ₅	5	2	5	1
TOC	6	6	5	4
TSS	74	50	39	40
NH ₄ -N	0.3	0.3	0.1	0.2
NO ₂ +NO ₃ -N	3.66	2.64	3.54	3.17
TP	0.52	0.46	0.40	0.47
pH (units)	7.0	6.1	7.1	7.3
Cyanide	0.005	0.003	0.005	0.004
Phenol	0.011	0.013	0.014	0.012
FOG	0	0	0	11
FC (cfu/100 mL)	700	210	90	20

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-38

WATER QUALITY AT STATION 38 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.4	8.4	7.1	7.3
BOD ₅	5	3	5	2
TOC	6	6	5	5
TSS	60	68	62	73
NH ₄ -N	0.2	0.3	0.1	0.3
NO ₂ +NO ₃ -N	3.59	2.62	3.30	3.33
TP	0.42	0.51	0.42	0.69
pH (units)	6.7	6.6	7.1	7.3
Cyanide	0.006	0.003	0.005	0.004
Phenol	0.012	0.012	0.013	0.009
FOG	0	0	5	7
FC (cfu/100 mL)	400	230	200	20

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-39

WATER QUALITY AT STATION 39 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	5.2	8.6	8.7	6.6
BOD ₅	5	3	5	1
TOC	6	6	7	5
TSS	46	36	39	37
NH ₄ -N	0.3	0.3	0.1	0.4
NO ₂ +NO ₃ -N	3.60	2.74	3.51	3.29
TP	0.38	0.41	0.37	0.45
pH (units)	6.6	6.3	7.1	6.5
Cyanide	0.005	0.004	0.005	0.005
Phenol	0.010	0.012	0.013	0.011
FOG	0	0	0	15
FC (cfu/100 mL)	200	20	30	20

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-40

WATER QUALITY AT STATION 40 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.8	8.1	6.7	6.2
BOD ₅	5	2	6	3
TOC	12	6	6	5
TSS	57	42	50	50
NH ₄ -N	0.4	0.3	0.1	0.3
NO ₂ +NO ₃ -N	3.64	2.78	3.17	3.30
TP	0.38	0.43	0.42	0.45
pH (units)	6.5	6.7	7.1	6.7
Cyanide	0.005	0.002	0.005	0.003
Phenol	0.009	0.013	0.013	0.020
FOG	0	0	0	10
FC (cfu/100 mL)	90	30	10	10

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-41

WATER QUALITY AT STATION 41 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.4	7.9	8.9	6.9
BOD ₅	5	4	6	1
TOC	9	5	6	5
TSS	77	43	46	32
NH ₄ -N	0.4	0.3	0.1	0.4
NO ₂ +NO ₃ -N	3.57	2.98	2.87	3.24
TP	0.44	0.42	0.37	0.43
pH (units)	7.1	6.5	7.1	7.1
Cyanide	0.005	0.003	0.004	0.003
Phenol	0.010	0.012	0.010	0.017
FOG	0	0	0	14
FC (cfu/100 mL)	100	30	20	50

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-42

WATER QUALITY AT STATION 42 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
DO	6.8	8.3	6.8	6.4
BOD ₅	5	2	4	1
TOC	8	5	6	5
TSS	59	44	61	42
NH ₄ -N	0.4	0.4	0.1	0.3
NO ₂ +NO ₃ -N	3.52	3.02	3.43	3.23
TP	0.39	0.44	0.40	0.47
pH (units)	6.7	6.7	7.0	7.2
Cyanide	0.005	0.003	0.006	0.003
Phenol	0.006	0.014	0.010	0.012
FOG	0	0	4	13
FC (cfu/100 mL)	80	20	20	10

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-43

WATER QUALITY AT STATION 43 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	6.7	7.6	5.8	7.2
BOD ₅	5	3	7	4
TOC	7	6	5	5
TSS	77	44	107	75
NH ₄ -N	0.2	0.3	0.7	0.1
NO ₂ +NO ₃ -N	3.43	3.32	2.62	3.28
TP	0.38	0.44	0.50	0.51
pH (units)	7.0	6.9	7.4	7.3
Cyanide	0.004	0.006	0.005	0.004
Phenol	0.009	0.010	0.027	0.010
FOG	0	11	7	26
FC (cfu/100 mL)	10	50	10	20

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-44

WATER QUALITY AT STATION 44 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	7.0	7.8	6.8	7.5
BOD ₅	4	4	5	4
TOC	7	6	6	5
TSS	83	50	94	65
NH ₄ -N	0.3	0.3	0.6	0.1
NO ₂ +NO ₃ -N	3.34	3.27	2.76	3.24
TP	0.42	0.47	0.47	0.45
pH (units)	7.1	6.9	7.4	7.3
Cyanide	0.004	0.005	0.004	0.004
Phenol	0.008	0.008	0.043	0.010
FOG	2	12	5	22
FC (cfu/100 mL)	140	80	20	10

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-45

WATER QUALITY AT STATION 45 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	7.4	8.2	7.7	9.0
BOD ₅	4	3	5	3
TOC	7	6	5	6
TSS	106	67	100	49
NH ₄ ⁻ -N	0.2	0.3	0.5	0.1
NO ₂ ⁻ +NO ₃ ⁻ -N	3.05	3.25	2.29	2.73
TP	0.44	0.46	0.46	0.42
pH (units)	7.3	6.9	7.4	7.4
Cyanide	0.004	0.005	0.004	0.004
Phenol	0.011	0.009	0.065	0.010
FOG	4	13	6	11
FC (cfu/100 mL)	220	90	10	10

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-46

WATER QUALITY AT STATION 46 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	7.8	9.1	7.7	10.4
BOD ₅	4	2	4	3
TOC	6	6	5	6
TSS	96	75	74	49
NH ₄ -N	0.2	0.2	0.5	0.1
NO ₂ +NO ₃ -N	2.93	3.19	2.20	2.70
TP	0.40	0.45	0.42	0.40
pH (units)	7.2	7.2	7.3	7.6
Cyanide	0.005	0.005	0.003	0.004
Phenol	0.010	0.008	0.023	0.012
FOG	2	13	5	20
FC (cfu/100 mL)	210	160	10	50

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-47

WATER QUALITY AT STATION 47 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	7.3	8.6	6.9	8.6
BOD ₅	3	2	6	2
TOC	7	6	6	5
TSS	110	76	95	80
NH ₄ -N	0.2	0.2	0.5	0.1
NO ₂ +NO ₃ -N	2.84	3.21	2.20	2.71
TP	0.45	0.46	0.44	0.56
pH (units)	6.5	7.1	7.2	7.5
Cyanide	0.005	0.005	0.003	0.004
Phenol	0.013	0.007	0.070	0.008
FOG	0	13	6	4
FC (cfu/100 mL)	270	130	60	60

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-48

WATER QUALITY AT STATION 48 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	7.8	9.0	6.9	8.7
BOD ₅	3	2	4	2
TOC	7	6	6	6
TSS	114	74	87	62
NH ₄ -N	0.2	0.2	0.5	0.1
NO ₂ +NO ₃ -N	2.75	3.19	2.21	2.66
TP	0.43	0.48	0.45	0.41
pH (units)	7.0	7.1	7.2	7.6
Cyanide	0.005	0.006	0.004	0.004
Phenol	0.013	0.008	0.014	0.017
FOG	0	15	6	9
FC (cfu/100 mL)	220	220	130	30

*Expressed in mg/L except where noted.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AII-49

WATER QUALITY AT STATION 49 IN THE ILLINOIS RIVER,
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
DO	4.5	9.0	6.4	8.5
BOD ₅	3	3	4	2
TOC	7	6	6	5
TSS	117	80	76	76
NH ₄ -N	0.2	0.2	0.5	0.1
NO ₂ +NO ₃ -N	2.73	3.24	2.25	2.70
TP	0.48	0.51	0.44	0.45
pH (units)	7.3	7.0	7.2	7.6
Cyanide	0.005	0.006	0.004	0.004
Phenol	0.012	0.009	0.083	0.010
FOG	3	13	8	2
FC (cfu/100 mL)	150	460	180	40

*Expressed in mg/L except where noted.

APPENDIX III

TRACE METALS IN WATER AT SAMPLING STATIONS (1-49)
IN THE ILLINOIS WATERWAY, SEPTEMBER-OCTOBER 1983

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-1

TRACE METALS AT STATION 1 IN THE CHICAGO SANITARY
AND SHIP CANAL, SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.00	0.02	0.01	0.00
Copper	0.09	0.02	0.02	0.01
Iron	1.30	0.50	0.30	0.50
Lead	0.02	0.00	0.01	0.01
Manganese	0.05	0.04	0.04	0.04
Mercury	0.0007	0.0001	0.0004	0.0000
Nickel	0.40	0.00	0.01	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.00	0.10	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-2

TRACE METALS AT STATION 2 IN THE CHICAGO SANITARY
AND SHIP CANAL, SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.11	0.01	0.01	0.01
Iron	2.50	0.70	0.40	0.60
Lead	0.01	0.00	0.01	0.00
Manganese	0.07	0.06	0.04	0.04
Mercury	0.0000	0.0001	0.0005	0.0000
Nickel	0.20	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.01
Zinc	0.00	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-3

TRACE METALS AT STATION 3 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.13	0.01	0.02	0.01
Iron	2.00	0.50	0.40	0.80
Lead	0.02	0.00	0.02	0.02
Manganese	0.09	0.08	0.04	0.05
Mercury	0.0001	0.0001	0.0004	0.0000
Nickel	0.10	0.00	0.10	0.00
Silver	0.01	0.00	0.00	0.00
Zinc	0.10	0.02	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-4

TRACE METALS AT STATION 4 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00
Copper	0.11	0.00	0.02	0.00
Iron	1.70	0.60	0.30	0.50
Lead	0.01	0.00	0.02	0.00
Manganese	0.07	0.05	0.04	0.04
Mercury	0.0000	0.0000	0.0004	0.0000
Nickel	0.30	0.00	0.10	0.00
Silver	0.00	0.01	0.00	0.01
Zinc	0.00	0.02	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-5

TRACE METALS AT STATION 5 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.04	0.01	0.00	0.00
Copper	0.18	0.01	0.01	0.00
Iron	1.00	0.50	0.50	0.70
Lead	0.02	0.01	0.03	0.02
Manganese	0.06	0.05	0.05	0.04
Mercury	0.0001	0.0001	0.0000	0.0007
Nickel	0.20	0.10	0.10	0.00
Silver	0.00	0.00	0.00	0.01
Zinc	0.00	0.01	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-6

TRACE METALS AT STATION 6 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.06	0.00	0.00	0.00
Copper	0.05	0.00	0.02	0.00
Iron	1.80	2.10	0.40	0.40
Lead	0.01	0.02	0.03	0.01
Manganese	0.09	0.04	0.05	0.03
Mercury	0.0000	0.0000	0.0000	0.0002
Nickel	0.10	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.01	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-7

TRACE METALS AT STATION 7 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.01	0.00
Chromium	0.02	0.01	0.00	0.00
Copper	0.04	0.01	0.02	0.00
Iron	2.00	0.60	0.40	0.60
Lead	0.00	0.02	0.04	0.01
Manganese	0.10	0.08	0.04	0.05
Mercury	0.0002	0.0001	0.0002	0.0000
Nickel	0.40	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.01	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-8

TRACE METALS AT STATION 8 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.04	0.01	0.00	0.00
Copper	0.04	0.01	0.01	0.1
Iron	1.80	1.20	0.30	1.10
Lead	0.01	0.02	0.02	0.02
Manganese	0.06	0.05	0.05	0.05
Mercury	0.0002	0.0002	0.0001	0.0000
Nickel	0.10	0.10	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.10	0.02	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-9

TRACE METALS AT STATION 9 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/19	9/29	10/03	10/13
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.01	0.01	0.02	0.00
Copper	0.04	0.01	0.10	0.00
Iron	1.10	0.50	1.10	0.50
Lead	0.00	0.03	0.05	0.01
Manganese	0.09	0.05	0.07	0.05
Mercury	0.0003	0.0002	0.0005	0.0000
Nickel	0.10	0.00	0.10	0.00
Silver	0.00	0.00	0.02	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-10

TRACE METALS AT STATION 10 IN THE DES PLAINES RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00
Copper	0.02	0.03	0.02	0.01
Iron	0.90	0.60	0.40	0.90
Lead	0.00	0.00	0.01	0.02
Manganese	0.08	0.05	0.05	0.05
Mercury	0.0000	0.0006	0.0002	0.0004
Nickel	0.20	0.00	0.10	0.30
Silver	0.00	0.00	0.00	0.01
Zinc	0.00	0.00	0.00	0.1

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-11

TRACE METALS AT STATION 11 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.01	0.01	0.01	0.00
Copper	0.03	0.02	0.02	0.01
Iron	1.00	0.40	0.50	1.30
Lead	0.01	0.00	0.01	0.04
Manganese	0.09	0.05	0.06	0.05
Mercury	0.0000	0.0001	0.0006	0.0000
Nickel	0.10	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.01
Zinc	0.10	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-12

TRACE METALS AT STATION 12 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.01	0.01	0.02	0.01
Iron	0.80	0.50	0.40	0.60
Lead	0.00	0.00	0.02	0.03
Manganese	0.13	0.17	0.06	0.05
Mercury	0.0002	0.0006	0.0001	0.0001
Nickel	0.30	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.40	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-13

TRACE METALS AT STATION 13 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.00	0.00	0.01	0.01
Copper	0.15	0.02	0.01	0.00
Iron	0.80	0.50	0.40	0.90
Lead	0.00	0.00	0.01	0.03
Manganese	0.14	0.06	0.06	0.06
Mercury	0.0001	0.0000	0.0000	0.0001
Nickel	0.20	0.00	0.00	0.10
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.10	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-14

TRACE METALS AT STATION 14 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00
Copper	0.02	0.02	0.02	0.02
Iron	1.00	0.50	0.70	0.80
Lead	0.00	0.00	0.02	0.05
Manganese	0.08	0.07	0.08	0.06
Mercury	0.0000	0.0007	0.0006	0.0000
Nickel	0.10	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.01
Zinc	0.20	0.10	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-15

TRACE METALS AT STATION 15 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.02
Copper	0.04	0.02	0.02	0.02
Iron	0.70	0.50	0.30	0.80
Lead	0.00	0.00	0.03	0.05
Manganese	0.07	0.07	0.06	0.05
Mercury	0.0000	0.0002	0.0005	0.0000
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.30	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-16

TRACE METALS AT STATION 16 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.01
Copper	0.02	0.02	0.02	0.02
Iron	0.60	0.50	0.70	0.70
Lead	0.00	0.00	0.05	0.06
Manganese	0.07	0.07	0.08	0.06
Mercury	0.0000	0.0009	0.0000	0.0000
Nickel	0.20	0.00	0.00	0.10
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.20

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-17

TRACE METALS AT STATION 17 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.01
Copper	0.20	0.02	0.02	0.02
Iron	1.90	0.50	0.40	1.60
Lead	0.01	0.00	0.02	0.01
Manganese	0.18	0.07	0.05	0.07
Mercury	0.0001	0.0006	0.0000	0.0000
Nickel	0.00	0.00	0.00	0.10
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-18

TRACE METALS AT STATION 18 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.01	0.00	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.05	0.03	0.02	0.02
Iron	2.10	0.60	0.20	0.40
Lead	0.04	0.01	0.00	0.00
Manganese	0.19	0.07	0.05	0.06
Mercury	0.0000	0.0004	0.0001	0.0000
Nickel	0.00	0.00	0.00	0.10
Silver	0.00	0.00	0.01	0.01
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-19

TRACE METALS AT STATION 19 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.00	0.02	0.00	0.00
Copper	0.05	0.02	0.02	0.01
Iron	0.70	0.30	0.30	0.40
Lead	0.03	0.01	0.00	0.00
Manganese	0.17	0.06	0.07	0.06
Mercury	0.0000	0.0001	0.0004	0.0001
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.01	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-20

TRACE METALS AT STATION 20 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.02	0.02	0.02	0.01
Iron	0.70	0.40	0.30	0.20
Lead	0.01	0.00	0.01	0.02
Manganese	0.09	0.06	0.05	0.05
Mercury	0.0003	0.0000	0.0002	0.0000
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-21

TRACE METALS AT STATION 21 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.01	0.02	0.00	0.00
Copper	0.03	0.01	0.03	0.02
Iron	1.40	0.20	1.00	0.50
Lead	0.02	0.00	0.01	0.00
Manganese	0.21	0.05	0.11	0.04
Mercury	0.0001	0.0000	0.0004	0.0001
Nickel	0.00	0.00	0.00	0.10
Silver	0.00	0.00	0.00	0.00
Zinc	0.10	0.00	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-22

TRACE METALS AT STATION 22 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.10	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.01	0.02	0.00	0.03
Copper	0.04	0.02	0.02	0.02
Iron	1.20	0.50	0.50	0.30
Lead	0.02	0.00	0.01	0.00
Manganese	0.15	0.07	0.07	0.07
Mercury	0.0000	0.0004	0.0002	0.0000
Nickel	0.00	0.00	0.00	0.10
Silver	0.00	0.00	0.00	0.00
Zinc	0.10	0.00	0.00	0.20

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-23

TRACE METALS AT STATION 23 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.01	0.01	0.00	0.02
Copper	0.03	0.02	0.02	0.02
Iron	1.10	0.60	0.40	0.40
Lead	0.03	0.00	0.02	0.00
Manganese	0.11	0.07	0.07	0.05
Mercury	0.0000	0.0002	0.0002	0.0000
Nickel	0.00	0.10	0.00	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-24

TRACE METALS AT STATION 24 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.01	0.00
Chromium	0.00	0.01	0.00	0.00
Copper	0.02	0.02	0.02	0.00
Iron	1.00	0.40	0.30	0.30
Lead	0.02	0.00	0.01	0.00
Manganese	0.11	0.07	0.06	0.06
Mercury	0.0000	0.0000	0.0004	0.0003
Nickel	0.00	0.10	0.00	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.00	0.00	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-25

TRACE METALS AT STATION 25 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.01	0.00
Chromium	0.01	0.01	0.01	0.01
Copper	0.02	0.02	0.01	0.00
Iron	0.80	0.40	0.30	0.90
Lead	0.03	0.00	0.02	0.00
Manganese	0.12	0.06	0.07	0.06
Mercury	0.0001	0.0000	0.0000	0.0002
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.01
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-26

TRACE METALS AT STATION 26 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/20	9/28	10/04	10/12
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.00	0.01	0.00	0.02
Copper	0.02	0.02	0.01	0.02
Iron	0.40	0.40	0.40	0.30
Lead	0.01	0.00	0.02	0.00
Manganese	0.08	0.07	0.06	0.04
Mercury	0.0007	0.0006	0.0006	0.0004
Nickel	0.00	0.10	0.00	0.10
Silver	0.00	0.01	0.00	0.00
Zinc	0.00	0.10	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-27

TRACE METALS AT STATION 27 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.06	0.00	0.02	0.00
Copper	0.01	0.01	0.02	0.02
Iron	0.60	0.60	0.40	0.30
Lead	0.04	0.02	0.03	0.00
Manganese	0.06	0.07	0.06	0.07
Mercury	0.0006	0.0003	0.0005	0.0002
Nickel	0.20	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-28

TRACE METALS AT STATION 28 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.01	0.00	0.00
Chromium	0.06	0.00	0.02	0.00
Copper	0.01	0.01	0.01	0.01
Iron	0.60	0.40	0.30	0.60
Lead	0.01	0.01	0.02	0.01
Manganese	0.07	0.06	0.06	0.07
Mercury	0.0000	0.0000	0.0009	0.0001
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-29

TRACE METALS AT STATION 29 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.06	0.00	0.02	0.00
Copper	0.01	0.01	0.01	0.01
Iron	0.50	0.50	0.60	0.30
Lead	0.01	0.01	0.02	0.00
Manganese	0.07	0.06	0.07	0.06
Mercury	0.0001	0.0006	0.0000	0.0001
Nickel	0.30	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-30

TRACE METALS AT STATION 30 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.06	0.01	0.03	0.00
Copper	0.01	0.01	0.01	0.01
Iron	0.60	0.30	0.40	0.30
Lead	0.01	0.01	0.01	0.00
Manganese	0.07	0.06	0.07	0.06
Mercury	0.0009	0.0001	0.0001	0.0001
Nickel	0.00	0.00	0.10	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.10	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-31

TRACE METALS AT STATION 31 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.05	0.00	0.01	0.01
Copper	0.01	0.01	0.01	0.02
Iron	0.60	0.40	0.30	0.30
Lead	0.00	0.00	0.02	0.02
Manganese	0.07	0.06	0.07	0.06
Mercury	0.0003	0.0002	0.0016	0.0003
Nickel	0.20	0.00	0.10	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.10	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-32

TRACE METALS AT STATION 32 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.05	0.00	0.01	0.00
Copper	0.01	0.01	0.01	0.00
Iron	1.00	0.40	0.30	0.40
Lead	0.00	0.01	0.03	0.01
Manganese	0.12	0.07	0.06	0.07
Mercury	0.0004	0.0000	0.0000	0.0000
Nickel	0.00	0.00	0.10	0.10
Silver	0.00	0.01	0.00	0.00
Zinc	0.20	0.00	0.10	0.0

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-33

TRACE METALS AT STATION 33 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.05	0.02	0.02	0.00
Copper	0.01	0.01	0.01	0.01
Iron	0.90	0.40	0.40	0.30
Lead	0.00	0.00	0.02	0.00
Manganese	0.13	0.06	0.06	0.06
Mercury	0.0006	0.0003	0.0000	0.0001
Nickel	0.20	0.00	0.10	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.10	0.10	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-34

TRACE METALS AT STATION 34 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.04	0.01	0.03	0.00
Copper	0.01	0.01	0.01	0.01
Iron	1.10	0.40	0.30	0.30
Lead	0.01	0.01	0.02	0.01
Manganese	0.08	0.06	0.05	0.09
Mercury	0.0003	0.0003	0.0007	0.0000
Nickel	0.10	0.00	0.10	0.00
Silver	0.00	0.01	0.00	0.00
Zinc	0.10	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-35

TRACE METALS AT STATION 35 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.00	0.04	0.00	0.01
Copper	0.02	0.01	0.01	0.01
Iron	0.80	0.50	0.60	0.40
Lead	0.00	0.00	0.00	0.02
Manganese	0.08	0.08	0.08	0.04
Mercury	0.0005	0.0003	0.0000	0.0003
Nickel	0.30	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.40	0.10	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-36

TRACE METALS AT STATION 36 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.04	0.00	0.02
Copper	0.03	0.01	0.01	0.02
Iron	0.80	0.50	0.60	0.50
Lead	0.01	0.00	0.00	0.02
Manganese	0.09	0.07	0.08	0.05
Mercury	0.0000	0.0000	0.0007	0.0005
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.30	0.10	0.00	0.20

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-37

TRACE METALS AT STATION 37 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.00	0.01	0.00	0.00
Copper	0.01	0.01	0.01	0.02
Iron	1.00	0.50	0.60	0.60
Lead	0.01	0.00	0.00	0.01
Manganese	0.10	0.08	0.08	0.07
Mercury	0.0000	0.0001	0.0000	0.0005
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.20	0.20	0.10	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-38

TRACE METALS AT STATION 38 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.01	0.00
Copper	0.01	0.01	0.01	0.01
Iron	0.60	0.60	0.90	1.00
Lead	0.01	0.00	0.00	0.01
Manganese	0.07	0.08	0.10	0.09
Mercury	0.0001	0.0001	0.0000	0.0008
Nickel	0.30	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.20	0.10	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-39

TRACE METALS AT STATION 39 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.00	0.00	0.00	0.01
Copper	0.01	0.03	0.01	0.02
Iron	0.60	0.60	0.70	0.80
Lead	0.00	0.00	0.00	0.00
Manganese	0.06	0.07	0.09	0.07
Mercury	0.0000	0.0003	0.0018	0.0000
Nickel	0.10	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.40	0.20	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-40

TRACE METALS AT STATION 40 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.01	0.00	0.00	0.00
Chromium	0.00	0.01	0.00	0.02
Copper	0.01	0.01	0.01	0.01
Iron	0.60	0.60	0.80	0.90
Lead	0.00	0.00	0.00	0.00
Manganese	0.06	0.07	0.10	0.08
Mercury	0.0004	0.0004	0.0000	0.0005
Nickel	0.10	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.20	0.00	0.10	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-41

TRACE METALS AT STATION 41 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.01
Copper	0.01	0.01	0.01	0.01
Iron	0.80	0.70	0.80	0.80
Lead	0.01	0.00	0.00	0.01
Manganese	0.07	0.06	0.12	0.07
Mercury	0.0000	0.0000	0.0000	0.0005
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.20	0.10	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-42

TRACE METALS AT STATION 42 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/21	9/27	10/05	10/11
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.01	0.00
Copper	0.03	0.01	0.01	0.01
Iron	0.60	0.60	1.60	0.80
Lead	0.00	0.00	0.01	0.00
Manganese	0.06	0.06	0.11	0.08
Mercury	0.0000	0.0000	0.0002	0.0002
Nickel	0.20	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.30	0.00	0.10	0.30

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-43

TRACE METALS AT STATION 43 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.01
Chromium	0.00	0.00	0.00	0.00
Copper	0.05	0.02	0.01	0.03
Iron	1.20	1.10	1.40	0.90
Lead	0.00	0.00	0.02	0.03
Manganese	0.08	0.08	0.14	0.11
Mercury	0.0001	0.0005	0.0006	0.0000
Nickel	0.00	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-44

TRACE METALS AT STATION 44 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.01
Copper	0.03	0.02	0.00	0.03
Iron	1.00	1.10	1.50	1.00
Lead	0.00	0.00	0.02	0.04
Manganese	0.10	0.10	0.15	0.12
Mercury	0.0001	0.0000	0.0000	0.0005
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-45

TRACE METALS AT STATION 45 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00
Copper	0.01	0.03	0.00	0.02
Iron	0.50	1.20	1.50	0.90
Lead	0.00	0.01	0.03	0.05
Manganese	0.08	0.15	0.15	0.13
Mercury	0.0003	0.0001	0.0003	0.0003
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-46

TRACE METALS AT STATION 46 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.00	0.00
Copper	0.01	0.01	0.01	0.02
Iron	1.20	2.80	1.40	1.00
Lead	0.00	0.02	0.02	0.05
Manganese	0.10	0.08	0.14	0.12
Mercury	0.0002	0.0009	0.0000	0.0003
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.10

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-47

TRACE METALS AT STATION 47 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.01	0.00
Copper	0.01	0.03	0.01	0.02
Iron	1.90	5.00	1.40	1.10
Lead	0.00	0.02	0.01	0.04
Manganese	0.12	0.12	0.14	0.15
Mercury	0.0002	0.0001	0.0000	0.0004
Nickel	0.00	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-48

TRACE METALS AT STATION 48 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.01	0.02
Copper	0.01	0.04	0.01	0.02
Iron	2.10	4.10	1.40	1.00
Lead	0.00	0.00	0.02	0.05
Manganese	0.10	0.11	0.15	0.13
Mercury	0.0000	0.0002	0.0002	0.0000
Nickel	0.00	0.00	0.00	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.10	0.00	0.00

*Expressed in mg/L.

THE METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

TABLE AIII-49

TRACE METALS AT STATION 49 IN THE ILLINOIS RIVER
SEPTEMBER-OCTOBER 1983

Constituent*	Sampling Date			
	9/22	9/26	10/06	10/10
Arsenic	0.00	0.00	0.00	0.00
Cadmium	0.00	0.00	0.00	0.00
Chromium	0.00	0.00	0.01	0.00
Copper	0.01	0.00	0.01	0.03
Iron	1.60	6.90	1.20	1.00
Lead	0.00	0.00	0.04	0.05
Manganese	0.10	0.12	0.13	0.15
Mercury	0.0011	0.0006	0.0000	0.0000
Nickel	0.00	0.00	0.10	0.00
Silver	0.00	0.00	0.00	0.00
Zinc	0.00	0.00	0.00	0.00

*Expressed in mg/L.