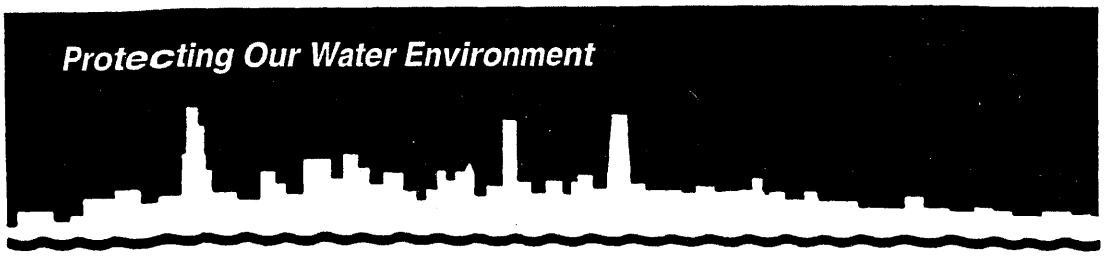

Metropolitan Water Reclamation District of Greater Chicago

RESEARCH AND DEVELOPMENT DEPARTMENT

REPORT NO. 05-8

WATER AND SEDIMENT QUALITY ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING 2004

July 2005

Metropolitan Water Reclamation District of Greater Chicago
100 East Erie Street Chicago, IL 60611-2803 (312) 751-5600

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by

Jennifer L. Wasik
Biologist II

Thomas A. Minarik Jr.
Biologist I

Research and Development Department
Richard Lanyon, Director

July 2005

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DISCLAIMER

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

SUMMARY

During May, August, and October of 2004, the Metropolitan Water Reclamation District of Greater Chicago (District) conducted water quality surveys at 49 monitoring stations along a 133 nautical mile reach of the Illinois Waterway from the Lockport Lock to the Peoria Lock. Sediment quality was assessed at 14 of the monitoring stations in October. Based on results from the 2004 surveys, the following conclusions can be made concerning the water and sediment quality along the study reach:

Water Quality

During 2004, the mean concentration of total suspended solids (TSS) decreased in the downstream direction of the Illinois Waterway from the Lockport Pool (140 mg/L) to the lower Peoria Pool (77 mg/L).

There was a slight increase in the mean concentration of five-day biochemical oxygen demand (BOD_5) from a mean of 2 mg/L in the Lockport Pool to 3 mg/L in the lower Peoria Pool.

In 2004, the mean dissolved oxygen (DO) concentration increased substantially along the waterway from the Lockport Pool (4.4 mg/L) to the upper Peoria Pool (10.2 mg/L). In the lower Peoria Pool, mean DO fell slightly (9.0 mg/L).

There was an increase in pH from the Lockport Pool (7.2) to the lower Peoria Pool (8.5) during 2004.

The mean ammonia nitrogen (NH_4-N), nitrite plus nitrate nitrogen (NO_2+NO_3-N), and total nitrogen (TN) concentrations decreased between the Lockport Pool and the lower Peoria Pool. The mean values decreased from 0.71, 5.48, and 7.15 mg/L, respectively, in the Lockport Pool to 0.16, 2.82, and 4.18 mg/L, respectively, in the lower Peoria Pool.

There was a slight increase in the mean concentration of un-ionized ammonia (NH_3-N) between the Lockport Pool (0.006 mg/L) and the lower Peoria Pool (0.025 mg/L).

The mean total Kjeldahl nitrogen (TKN) concentration decreased from the Lockport Pool (1.67 mg/L) to the Marseilles Pool (0.86 mg/L), and then increased to a mean of 1.36 mg/L in the lower Peoria Pool.

There was a considerable decrease in the mean total phosphorus (TP) concentrations along the Illinois Waterway from the Lockport Pool (1.72 mg/L) to the lower Peoria Pool (0.52 mg/L).

Mean chlorophyll *a* substantially increased in concentration along the Illinois Waterway from the Brandon Road Pool (5.5 µg/L) to the lower Peoria Pool (77.0 µg/L).

The mean concentration of cyanide was between 0.003–0.004 mg/L in the Lockport, Brandon Road, and Dresden Island Pools, while the mean value in the Marseilles, Starved Rock, upper and lower Peoria Pools was 0.002 mg/L during 2004.

There was a slight decrease in mean phenols concentrations along the Illinois Waterway from the Lockport Pool (0.009 mg/L) to the lower Peoria Pool (0.007 mg/L).

There was a dramatic drop in the geometric mean of fecal coliform in the Illinois Waterway throughout the Dresden Island Pool. Fecal coliform then remained fairly uniform from the Marseilles Pool until a spike in the lower Peoria Pool. The overall decrease from Lockport to the lower Peoria Pool was from 176 to 37 cfu/100 mL.

The mean total concentrations of cadmium, chromium, copper, iron, lead, nickel, and zinc analyzed in surface waters were highest in the Lockport Pool (0.0011, 0.014, 0.029, 2.187, 0.027, 0.009, and 0.107 mg/L, respectively), decreased in the Brandon Road Pool, and then remained fairly uniform throughout the Illinois Waterway downstream to the lower Peoria Pool (0.0004, 0.005, 0.015, 1.900, 0.011, 0.005, and 0.032 mg/L, respectively). Mean total arsenic, mercury, and silver concentrations were generally constant from Lockport to the lower Peoria Pool. The mean total manganese concentration was higher in the lower Peoria Pool (0.1156 mg/L) when compared to the rest of the Illinois Waterway during the three sampling periods of 2004. For example, in the Lockport Pool the mean concentration of total manganese was 0.0612 mg/L.

With the exception of iron, manganese, and zinc, the mean concentrations of the other eight dissolved trace metals analyzed in surface waters remained fairly uniform in the Illinois Waterway from the Lockport Pool to the lower Peoria Pool. The mean concentrations of dissolved iron in Lockport and Brandon Road Pools were 0.026 and 0.023 mg/L, compared to a mean concentration of 0.015 mg/L in the lower Peoria Pool. Dissolved manganese concentrations measured in Lockport and Brandon Road Pools were 0.0232 and 0.0204 mg/L, while the concentration in the lower Peoria Pool was 0.0034 mg/L. In both Lockport and Brandon Road Pools the mean dissolved zinc concentration was 0.018 mg/L, which decreased along the Illinois Waterway until the concentration reached 0.004 mg/L in the lower Peoria Pool.

Sediment Quality

The mean total solids (TS) in sediment increased between Lockport (41.9 percent) and the Marseilles Pool (75.1 percent) and then decreased along the Illinois Waterway until the lower Peoria Pool (58.3 percent).

There was generally a decrease in the mean total volatile solids (TVS) from the Lockport Pool (10 percent) to the Starved Rock Pool (1 percent), and then a slight increase until the lower Peoria Pool (5 percent).

Ammonia nitrogen in sediment substantially decreased from 127 mg/kg in the Lockport Pool to a mean of 4 mg/kg in the Starved Rock Pool. Ammonia nitrogen increased again from Starved Rock to the upper Peoria Pool where the mean was 35 mg/kg, and finally fell to 23 mg/kg in the lower Peoria Pool.

The mean concentration of TKN in sediment decreased from the Lockport Pool (3,169 mg/kg) to the Starved Rock Pool (115 mg/kg) and increased downstream to the lower Peoria Pool (1,645 mg/kg).

Total phosphorus in the sediment varied along the Illinois Waterway with an overall decrease in mean concentration from the Lockport Pool (6,315 mg/kg) to the lower Peoria Pool (693 mg/kg).

The mean concentration of total cyanide in the sediment decreased between the Lockport Pool (1.534 mg/kg) and the upper Peoria Pool (0.401 mg/kg). There were no data available for cyanide in the lower Peoria Pool.

There were generally constant concentrations of phenols in the sediment moving downstream from the Lockport Pool (0.119 mg/kg) to the upper Peoria Pool (0.150 mg/kg). There were no data available for phenols in the lower Peoria Pool.

Although the concentrations of the 11 trace metals measured in the sediment were quite

variable among the 14 monitoring stations, considerably higher levels of cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc were measured in the Lockport and Brandon Road Pools compared to the Dresden Island, Marseilles, and Starved Rock Pools. There were also elevated levels of iron, manganese, mercury, and zinc in some of the sediment from the Peoria pools. Station number 35 in the upper Peoria Pool showed a very high mercury concentration of 1.2743 mg/kg in the sediment.

INTRODUCTION

The Illinois Waterway provides a water resource for agricultural and urban drainage, commercial and recreational navigation, electric power generation, fishing, industrial and public water supply, and other recreational activities. A principal function of this waterway is for stormwater and treated wastewater conveyance. At the upstream end of the Illinois Waterway, the District operates three major water reclamation plants in Cook County, Illinois, whose treated discharges make up approximately 90 percent of all point source treated wastewater flows entering the Illinois Waterway. These three water reclamation plants provided wastewater treatment for an average flow of 1,165 million gallons per day in 2004.

The District first began monitoring the Illinois Waterway in 1977. With the exception of 1998, the District has conducted annual water quality surveys from the Lockport Lock to the Peoria Lock, a distance of 133 river miles, since 1984. Forty-nine monitoring stations in six navigational pools were selected for study. The primary purpose of the monitoring program is to assess water quality changes downstream of the District's major point source wastewater discharges. A secondary objective is to characterize the sediment chemistry at selected monitoring stations.

This report presents the results from the water and sediment quality surveys conducted during 2004. Data from previous years have been compiled in formal annual reports only for 1977, 1983–85, 1989, 1991, 2002, and 2003.

DESCRIPTION OF THE STUDY AREA

Illinois Waterway

The Illinois Waterway extends from Grafton, Illinois, located on the Mississippi River upstream of St. Louis, Missouri, to Lake Michigan in Chicago, Illinois. The 327-mile waterway is composed of a series of eight navigational pools (Lockport, Brandon Road, Dresden Island, Marseilles, Starved Rock, Peoria, La Grange, and Alton), whose lengths and U.S. Army Corps of Engineers waterway mile-point designations are presented in Table 1.

TABLE 1: ILLINOIS WATERWAY NAVIGATIONAL POOLS

Pool	Inclusive Waterway Mile-Points	Length (Miles)
Lockport	327.2 - 291.0	36.2
Brandon Road	291.0 - 286.0	5.0
Dresden Island	286.0 - 271.5	14.5
Marseilles	271.5 - 247.0	24.5
Starved Rock	247.0 - 231.0	16.0
Peoria	231.0 - 157.6	73.4
LaGrange	157.6 - 80.2	77.4
Alton	80.2 - 0.0	80.2

The pools were created in the 1930s by lock and dam structures to maintain the water depths required for commercial navigation. The present study area is a 133-mile reach of the Illinois Waterway extending from the Lockport Lock to the Peoria Lock (Figures 1 and 2).

Monitoring Stations

Forty-nine monitoring stations were selected for the study (Figures 1 and 2). Two stations were located on the Chicago Sanitary and Ship Canal (CSSC), 8 on the Des Plaines River, and 39 stations on the Illinois River. Table 2 lists the locations of the 49 monitoring stations.

FIGURE 1: MAP OF THE ILLINOIS WATERWAY FROM LOCKPORT TO MARSEILLES SHOWING SAMPLING STATIONS 1 TO 21

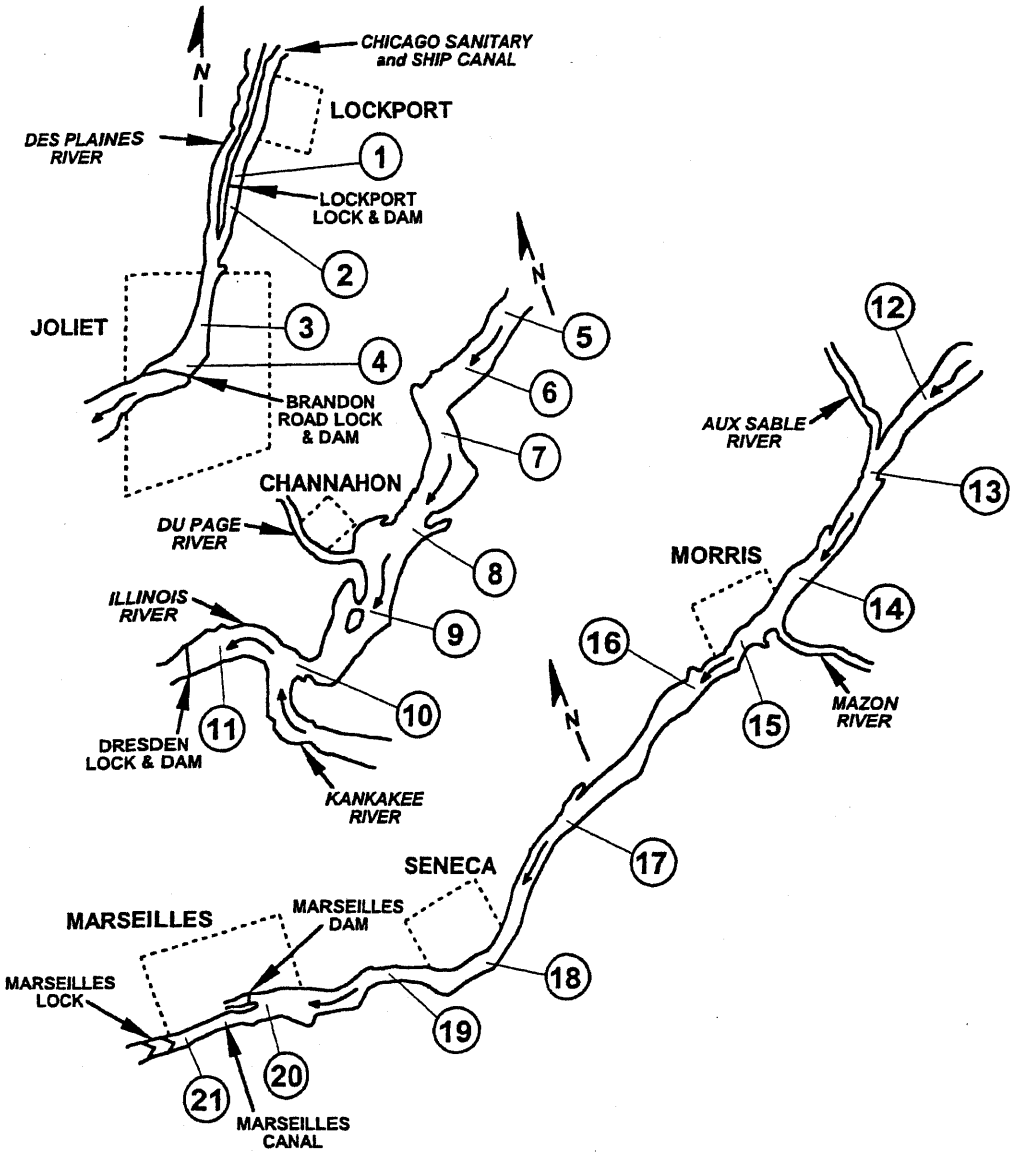

FIGURE 2: MAP OF ILLINOIS WATERWAY FROM OTTAWA TO PEORIA SHOWING SAMPLING STATIONS 22 TO 49

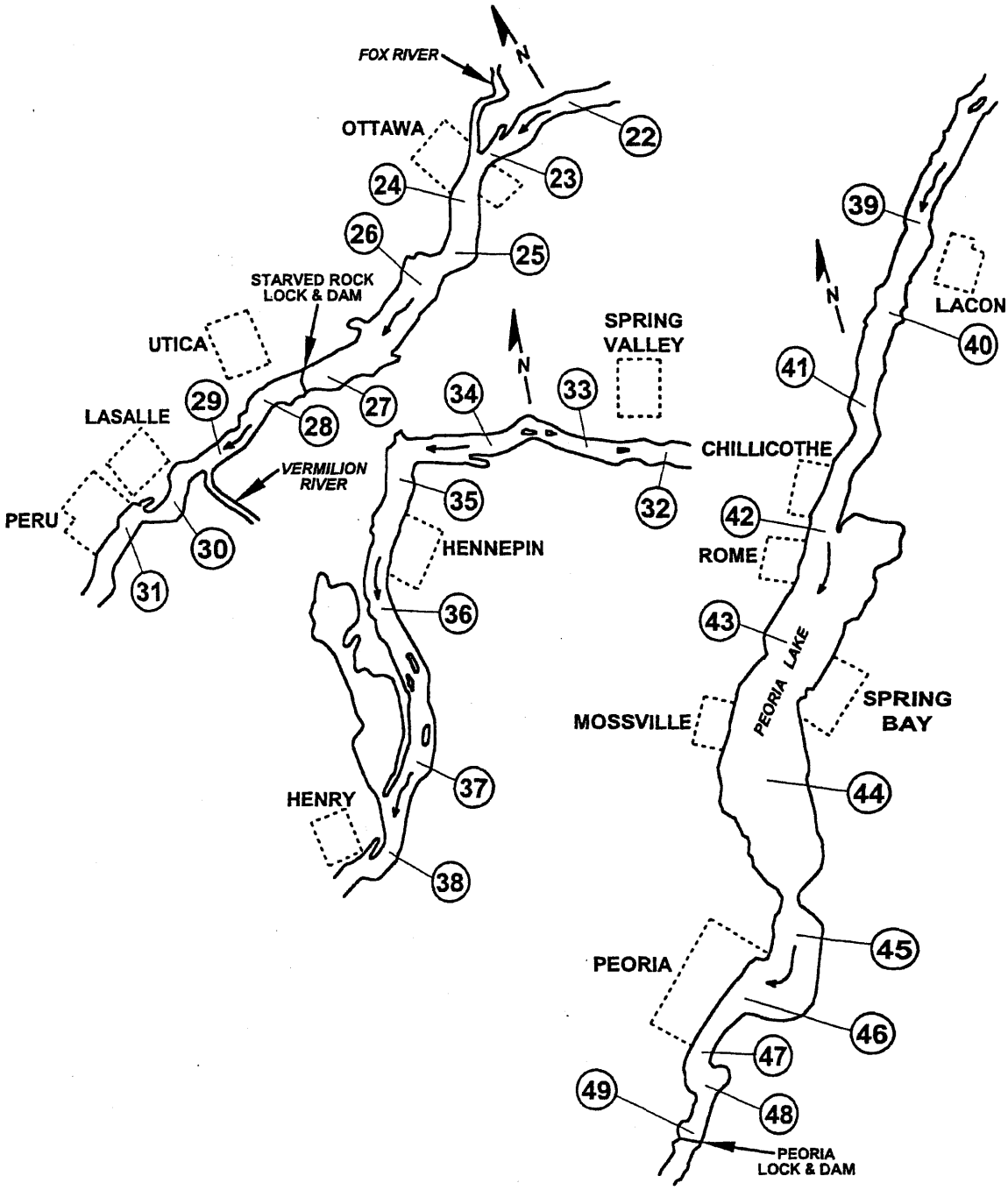

TABLE 2: MONITORING STATIONS ALONG THE ILLINOIS WATERWAY FROM LOCKPORT LOCK TO PEORIA LOCK

Station Number	Waterway	Waterway Mile-Point Location	Navigational 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
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
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

TABLE 2 (Continued): MONITORING STATIONS ALONG THE ILLINOIS WATERWAY FROM LOCKPORT LOCK TO PEORIA LOCK

Station Number	Waterway	Waterway Mile-Point Location	Navigational Pool
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
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
41	Illinois River	183.2	Peoria
42	Illinois River	179.0	Peoria
43	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

MATERIALS AND METHODS

Field Monitoring and Laboratory Analysis

Water. *Chemical Constituents.* Water samples for chemical analyses were collected from the 49 monitoring stations on May 3–7, May 10–14, August 2–6, August 9–13, October 4–8, and October 11–15 in 2004. Samples were collected at a depth of three feet below the water surface in the center of the waterway with a submersible drainage pump. Water samples were collected for dissolved trace metal analysis by the Environmental Monitoring and Research Division (EM&R) personnel with an air-driven Teflon bellows pump. Samples were filtered in the field through a 0.45 µm high capacity in-line groundwater sampling capsule (Gelman Laboratory) attached to the bellows pump. Prior to sample collection, the Teflon bellows pump was flushed with one gallon of de-ionized water followed by river water for two minutes. Except for FC, all water samples were transported to the Cecil Lue-Hing R&D Laboratory in iced, insulated chests within 24 hours of collection. PDC Laboratories in Peoria, Illinois, were contracted to retrieve water samples from EM&R personnel and perform FC analysis.

The constituents analyzed in water, sample containers used, and preservation methods are presented in Table 3. Water temperature, turbidity, conductivity, DO, and pH were measured in the field using a calibrated YSI Incorporated Model 6600 water quality monitor. In the laboratory, all constituents were analyzed using procedures established by the United States Environmental Protection Agency (USEPA) or described in the 19th Edition of Standard Methods for the Examination of Water and Wastewater (Standard Methods) (1995).

The concentration of un-ionized ammonia was calculated according to the following equation:

$$U = \frac{N}{\left[0.94412 \quad \left(1 + 10^{X}\right) + 0.0559\right]}$$

Where:

$$X = 0.09018 + \frac{2729.92}{\left(T + 273.16\right)} - pH$$

U = Concentration of un-ionized ammonia as N in mg/L.

N = Concentration of total ammonia nitrogen as N in mg/L.

T = Water temperature in degrees Celsius.

Fecal Coliform. Water samples for FC analyses were collected from the 49 stations on the same day and at the same time as the chemical constituents. Fecal coliform samples were collected with a submersible drainage pump at a depth of three feet below the water surface in the center of the waterway. The sample was poured into a sterile, 175-mL plastic bottle containing 0.3 mL of a 15 percent solution of sodium thiosulfate and 0.1 mL of a 10 percent solution of EDTA. The FC samples were kept cool in iced, insulated chests. The analyses were performed within 24 hours by membrane filter analysis as described in Standard Methods.

Chlorophyll a. Water samples for chlorophyll analysis were collected at 22 selected monitoring stations (2, 3, 5, 7, 10, 11, 15, 18, 20, 22, 25, 27, 28, 31, 34, 36, 38, 41, 42, 44, 45, and 48) in the same manner as described for chemical constituents. The sample was poured into a 1-liter, wide-mouth, amber plastic bottle containing 1 mg of magnesium carbonate. The water samples were stored in

TABLE 3: CONSTITUENTS ANALYZED, SAMPLE CONTAINERS, AND PRESERVATION METHODS FOR WATER SAMPLES COLLECTED FROM THE ILLINOIS WATERWAY STUDY AREA

Constituent and Abbreviation	Units of Measure	Sample Container	Preservative
Water Temperature	°C	NA	Measured in Field
Total Suspended Solids (TSS)	mg/L	Plastic	Cool, 4°C
Turbidity	NTU	NA	Measured in Field
Conductivity	µS/cm	NA	Measured in Field
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	Plastic	Cool, 4°C
Dissolved Oxygen	mg/L	NA	Measured in Field
pH	units	NA	Measured in Field
Ammonia Nitrogen (NH_4-N)	mg/L	Plastic	Cool, 4°C, H_2SO_4 to pH <2
Un-ionized Ammonia (NH_3-N)*	mg/L	---	---
Total Kjeldahl Nitrogen (TKN)	mg/L	Plastic	Cool, 4°C, H_2SO_4 to pH <2
Nitrite plus Nitrate Nitrogen (NO_2+NO_3-N)	mg/L	Plastic	Cool, 4°C, H_2SO_4 to pH <2
Total Phosphorus (TP)	mg/L	Plastic	Cool, 4°C
Chlorophyll a	µg/L	Plastic, Amber	Cool, 4°C, $MgCO_3$
Total Cyanide (TCN)	mg/L	Plastic	NaOH to pH 12
Phenols	mg/L	Glass	H_2SO_4 to pH <2
Total and Soluble Metals (Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Silver, and Zinc)	mg/L	Plastic	HNO_3 to pH <2
Fecal Coliform (FC)	cfu/100 mL	Sterile Plastic	Cool, 4°C, EDTA, and Thiosulfate

NA = Not Applicable.
*Determined by calculation using water temperature, pH and NH_4-N.

iced, insulated chests. In the laboratory, the water samples were analyzed for chlorophyll *a*, *b*, and *c* using methods described in Standard Methods.

Dissolved Mercury. The Method Detection Limit (MDL) for total and dissolved mercury analysis was lowered from 0.00006 mg/L to 0.00005 mg/L on July 1, 2004. After this date, dissolved mercury analysis was only run if the total mercury value was twice the MDL. Samples collected during May of 2004 were analyzed for dissolved mercury every time a total mercury value was detected in that sample.

Sediment. *Chemical Constituents.* Sediment samples were collected during the 2004 survey at 14 of the 49 monitoring stations (1, 2, 5, 8, 12, 18, 23, 28, 32, 35, 38, 41, 44, and 48). Over the period of October 4–8, 2004, one sediment sample was taken with a 6- x 6-inch Ponar grab sampler from each of the 14 stations. The sediment sample was transferred to a wide-mouth quart glass jar and analyzed for TS, TVS, ammonia, TKN, NO_2+NO_3-N, TP, TCN, phenols, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. The constituents analyzed, sample containers, and preservation methods are summarized in Table 4. All constituents were analyzed according to procedures found in Standard Methods.

TABLE 4: CONSTITUENTS ANALYZED, SAMPLE CONTAINERS, AND PRESERVATION METHODS FOR SEDIMENT SAMPLES COLLECTED FROM THE ILLINOIS WATERWAY STUDY AREA

Constituent and Abbreviation	Units of Measure[1]	Sample Container	Preservative
Total Solids (TS)	percent	Glass	Cool, 4°C
Total Volatile Solids (TVS)	percent	Glass	Cool, 4°C
Ammonia Nitrogen (NH_4-N)	mg/kg	Glass	Cool, 4°C
Total Kjeldahl Nitrogen (TKN)	mg/kg	Glass	Cool, 4°C
Nitrite plus Nitrate Nitrogen (NO_2+NO_3-N)	mg/kg	Glass	Cool, 4°C
Total Phosphorus (TP)	mg/kg	Glass	Cool, 4°C
Total Cyanide (TCN)	mg/kg	Glass	Cool, 4°C
Phenols	mg/kg	Glass	Cool, 4°C
Total and Soluble Metals (Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Silver, and Zinc)	mg/kg	Glass	Cool, 4°C

[1]Expressed on a dry weight basis.

RESULTS AND DISCUSSION

Water Quality

Water quality in lotic ecosystems can be evaluated by assessing a combination of biological, chemical, and physical parameters, including bacterial levels, the concentrations of dissolved gases, dissolved and suspended inorganic and organic compounds, nutrients, water temperature, and rate of flow. Methods for measuring the biological and chemical constituents, and the physical properties of water are well defined, and they have considerable precision. While sediment data can reflect long-term conditions, water samples are indicative of the water quality only at the time of monitoring.

In order to describe water quality in the Illinois Waterway, the 133-mile study area was divided by navigational pool; 1) Lockport (Station 1), 2) Brandon Road (Stations 2–4), 3) Dresden Island (Stations 5–11), 4) Marseilles (Stations 12–20), 5) Starved Rock (Stations 21–27), and 6) Peoria, upper Peoria (Stations 28–41), and lower Peoria (Stations 42–49). The Peoria Pool was subdivided based on geo-morphological differences between the upper and lower reaches.

The concentrations of the 38 constituents measured at each of the 49 monitoring stations, including calculated values for un-ionized ammonia and total nitrogen, are presented in Appendices AI through AVII. The water quality data for selected parameters are summarized by navigational pool in Table 5. When the analytical result was less than the MDL, the MDL value was used to calculate the mean.

Dissolved mercury data are not reported in the appendices because the values were generally less than the MDL. The mean dissolved mercury values were between 0.00008 and 0.00048 mg/L at Stations 2, 5, 6, 7, 8, 10, 40, 41, and 43 during the month of May. Dissolved mercury was not detected during August of 2004. During October, dissolved mercury values measured 0.00010 mg/L at Stations 12 and 23.

Lockport Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 3.0 (May) to 4.8 mg/L (October) in the Lockport Pool. The mean DO concentration during May, August, and October of 2004 was 4.4 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from 0.37 (October) to 1.76 mg/L (May) at Station 1 during 2004. The mean ammonia nitrogen concentration during May, August, and October was 0.71 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.008 mg/L in August, while the minimum calculated un-ionized ammonia concentration was 0.004 mg/L at Station 1 in May. The mean calculated un-ionized ammonia value for the three monitoring periods was 0.006 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.66 (May) to 4.98 mg/L (May) at Station 1 during 2004. The mean TKN concentration during May, August, and October was 1.67 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N concentration recorded during the three sampling periods of 2004 was 6.87 mg/L (October) while the minimum NO_2+NO_3-N value was 3.80 mg/L (August). The mean concentration of NO_2+NO_3-N for the three monitoring periods was 5.48 mg/L.

TABLE 5: SUMMARY OF WATER QUALITY FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Lockport	Water Temperature (°C)[b]	19.2 – 28.0	23.8
	TSS	7 – 760	140
	Turbidity (NTU)[b]	12 – 447	88
	Conductivity (µS/cm)[b]	629 – 1.151	862
	BOD_5	<2 – 5	2
	Dissolved Oxygen (DO)[b]	3.0 – 4.8	4.4
	pH (units)[b]	7.0 – 7.3	7.2
	NH_4-N	0.37 – 1.76	0.71
	NH_3-N	0.004 – 0.008	0.006
	TKN	0.66 – 4.98	1.67
	NO_2+NO_3-N	3.80 – 6.87	5.48
	TN	4.88 – 9.86	7.15
	TP	0.87 – 4.45	1.72
	Chlorophyll *a* (µg/L)	No Data	No Data
	Total Cyanide	0.002 – 0.007	0.003
	Phenols	0.005 – 0.012	0.009
	FC (cfu/100 mL)[c]	30 – 600	176
Brandon Road	Water Temperature (°C)[b]	17.2 – 27.7	23.2
	TSS	13 – 45	23
	Turbidity (NTU)[b]	15 – 54	25
	Conductivity (µS/cm)[b]	633 – 1.213	890
	BOD_5	<2 – 7	3
	Dissolved Oxygen (DO)[b]	4.5 – 8.7	5.7
	pH (units)[b]	7.0 – 7.8	7.3
	NH_4-N	0.24 – 1.15	0.48
	NH_3-N	0.003 – 0.012	0.006
	TKN	0.58 – 2.29	1.15
	NO_2+NO_3-N	3.78 – 7.31	5.86
	TN	4.81 – 8.64	7.01
	TP	0.86 – 1.83	1.28
	Chlorophyll *a* (µg/L)	2.5 – 40.8	5.5
	Total Cyanide	0.002 – 0.008	0.004
	Phenols	0.006 – 0.012	0.009
	FC (cfu/100 mL)[c]	40 – 2.500	196

TABLE 5 (Continued): SUMMARY OF WATER QUALITY FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Dresden Island	Water Temperature (°C)[b]	16.1 – 32.1	24.0
	TSS	10 – 185	33
	Turbidity (NTU)[b]	15 – 864	67
	Conductivity (µS/cm)[b]	690 – 1.219	901
	BOD_5	<2 – 19	4
	Dissolved Oxygen (DO)[b]	5.9 – 11.5	7.8
	pH (units)[b]	7.2 – 8.1	7.6
	NH_4-N	0.07 – 0.62	0.30
	NH_3-N	0.003 – 0.020	0.008
	TKN	0.45 – 2.85	1.06
	NO_2+NO_3-N	3.30 – 7.51	5.83
	TN	4.07 – 8.93	6.89
	TP	0.58 – 2.05	1.20
	Chlorophyll *a* (µg/L)	2.2 – 43.6	18.0
	Total Cyanide	<0.002 – 0.006	0.003
	Phenols	0.004 – 0.015	0.009
	FC (cfu/100 mL)[c]	<10 – 2.900	73
Marseilles	Water Temperature (°C)[b]	15.4 – 29.9	21.7
	TSS	5 – 62	25
	Turbidity (NTU)[b]	11 – 1.263	71
	Conductivity (µS/cm)[b]	702 – 1.022	819
	BOD_5	<2 – 12	3
	Dissolved Oxygen (DO)[b]	7.1 – 12.1	9.1
	pH (units)[b]	7.7 – 8.5	8.1
	NH_4-N	<0.02 – 0.39	0.11
	NH_3-N	0.001 – 0.032	0.008
	TKN	0.03 – 2.77	0.86
	NO_2+NO_3-N	3.09 – 7.40	4.62
	TN	3.95 – 8.38	5.48
	TP	0.38 – 1.30	0.71
	Chlorophyll *a* (µg/L)	9.8 – 53.4	26.5
	Total Cyanide	<0.002 – 0.004	0.002
	Phenols	<0.003 – 0.009	0.006
	FC (cfu/100 mL)[c]	<10 – 80	18

TABLE 5 (Continued): SUMMARY OF WATER QUALITY FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Starved Rock	Water Temperature (°C)[b]	1.59 – 30.2	21.2
	TSS	10 – 70	27
	Turbidity (NTU)[b]	13 – 66	27
	Conductivity (µS/cm)[b]	714 – 947	821
	BOD_5	<2 – 9	4
	Dissolved Oxygen (DO)[b]	7.4 – 15.3	10.4
	pH (units)[b]	8.0 – 8.9	8.4
	NH_4-N	0.02 – 0.38	0.14
	NH_3-N	0.001 – 0.134	0.020
	TKN	0.24 – 2.62	1.10
	NO_2+NO_3-N	2.24 – 6.23	4.10
	TN	3.34 – 7.34	5.19
	TP	0.33 – 0.93	0.59
	Chlorophyll *a* (µg/L)	20.0 – 124.7	54.2
	Total Cyanide	<0.002 – 0.005	0.002
	Phenols	<0.003 – 0.014	0.006
	FC (cfu/100 mL)[c]	<10 – 180	18
Upper Peoria	Water Temperature (°C)[b]	14.5 – 28.3	20.8
	TSS	19 – 121	44
	Turbidity (NTU)[b]	22 – 84	44
	Conductivity (µS/cm)[b]	719 – 931	821
	BOD_5	<2 – 8	4
	Dissolved Oxygen (DO)[b]	6.4 – 13.5	10.2
	pH (units)[b]	8.0 – 8.8	8.5
	NH_4-N	<0.02 – 0.37	0.12
	NH_3-N	<0.001 – 0.081	0.018
	TKN	0.61 – 2.00	1.25
	NO_2+NO_3-N	1.86 – 6.66	3.82
	TN	2.87 – 7.80	5.07
	TP	0.26 – 1.31	0.56
	Chlorophyll *a* (µg/L)	22.7 – 102.5	59.6
	Total Cyanide	<0.002 – 0.006	0.002
	Phenols	<0.003 – 0.034	0.008
	FC (cfu/100 mL)[c]	<10 – 560	16

TABLE 5 (Continued): SUMMARY OF WATER QUALITY FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Lower Peoria	Water Temperature (°C)[b]	15.0 – 27.9	20.4
	TSS	29 – 546	77
	Turbidity (NTU)[b]	2 – 168	83
	Conductivity (µS/cm)[b]	726 – 900	805
	BOD_5	<2 – 10	3
	Dissolved Oxygen (DO)[b]	5.6 – 13.6	9.0
	pH (units)[b]	8.3 – 8.7	8.5
	NH_4-N	<0.02 – 0.43	0.16
	NH_3-N	<0.001 – 0.076	0.025
	TKN	0.62 – 2.60	1.36
	NO_2+NO_3-N	1.23 – 5.73	2.82
	TN	2.22 – 7.73	4.18
	TP	0.24 – 1.32	0.52
	Chlorophyll *a* (µg/L)	26.5 – 175.3	77.0
	Total Cyanide	<0.002 – 0.005	0.002
	Phenols	<0.003 – 0.046	0.007
	FC (cfu/100 mL)[c]	<10 – 10.000	37

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

Total Nitrogen. Total nitrogen ranged from 4.88 (August) to 9.86 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 7.15 mg/L.

Total Phosphorus. The maximum TP concentration during the three sampling periods of 2004 was 4.45 mg/L in May, while the minimum value was 0.87 mg/L at Station 1 in August. The mean concentration of TP for the three monitoring periods was 1.72 mg/L.

Fecal Coliform. Fecal coliform levels at Station 1 ranged from 30 (May) to 600 cfu/100 mL (May) during 2004. The FC geometric mean during May, August, and October was 176 cfu/100 mL.

Brandon Road Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 4.5 (August) to 8.7 mg/L (May) during 2004. The mean DO concentration during May, August, and October was 5.7 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from 0.24 (October) to 1.15 mg/L (May) during 2004. The mean NH_4-N concentration during May, August, and October was 0.48 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.012 mg/L in October, while the minimum calculated concentration was 0.003 mg/L several times throughout the year. The mean calculated un-ionized ammonia value for the three monitoring periods was 0.006 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.58 (May) to 2.29 mg/L (May) during 2004. The mean TKN concentration during May, August, and October was 1.15 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 7.31 mg/L in October, while the minimum NO_2+NO_3-N value was 3.78 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 5.86 mg/L.

Total Nitrogen. Total nitrogen ranged from 4.81 (August) to 8.64 mg/L (October) during 2004. The mean TN concentration during May, August, and October was 7.01 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 1.83 mg/L in May, while the minimum TP value was 0.86 mg/L in August. The mean TP concentration for the three monitoring periods was 1.28 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 2.5 (August) to 40.8 µg/L (May) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 5.5 µg/L.

Fecal Coliform. Fecal coliform levels ranged from 40 (May) to 2,500 cfu/100 mL (May) during 2004. The FC geometric mean during May, August, and October was 196 cfu/100 mL.

Dresden Island Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 5.9 (October) to 11.5 mg/L (May) during 2004. The mean DO concentration during May, August, and October was 7.8 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from 0.07 (October) to 0.62 mg/L (May) during 2004. The mean NH_4-N concentration during May, August, and October was 0.30 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.020 mg/L in October, while the minimum calculated concentration was 0.003 mg/L in August. The mean calculated un-ionized ammonia value for the three monitoring periods was 0.008 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.45 (October) to 2.85 mg/L (May) during 2004. The mean TKN concentration during May, August, and October was 1.06 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 7.51 mg/L in October, while the minimum NO_2+NO_3-N value was 3.30 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 5.83 mg/L.

Total Nitrogen. Total nitrogen ranged from 4.07 (August) to 8.93 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 6.89 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 2.05 mg/L in October, while the minimum TP value was 0.58 mg/L in August. The mean TP concentration for the three monitoring periods was 1.20 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 2.2 (October) to 43.6 µg/L (October) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 18.0 µg/L.

Fecal Coliform. Fecal coliform levels ranged from <10 (May) to 2,900 cfu/100 mL (May) during 2004. The FC geometric mean during May, August, and October was 73 cfu/100 mL.

Marseilles Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 7.1 (August) to 12.1 mg/L (October) during 2004. The mean DO concentration during May, August, and October was 9.1 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from <0.02 (August) to 0.39 mg/L (August) during 2004. The mean NH_4-N concentration during May, August, and October was 0.11 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.032 mg/L in August, while the minimum calculated concentration was 0.001 mg/L on several dates. The mean calculated un-ionized ammonia for the three monitoring periods was 0.008 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.03 (October) to 2.77 mg/L (October) during 2004. The mean TKN concentration during May, August, and October was 0.86 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 7.40 mg/L in May, while the minimum NO_2+NO_3-N value was 3.09 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 4.62 mg/L.

Total Nitrogen. Total nitrogen ranged from 3.95 (August) to 8.38 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 5.48 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 1.30 mg/L in October, while the minimum TP value was 0.38 mg/L (May). The mean TP concentration for the three monitoring periods was 0.71 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 9.8 (October) to 53.4 µg/L (October) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 26.5 µg/L.

Fecal Coliform. Fecal coliform levels ranged from <10 (several dates) to 80 cfu/100 mL (October) during 2004. The FC geometric mean during May, August, and October was 18 cfu/100 mL.

Starved Rock Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 7.4 (August) to 15.3 mg/L (August) during 2004. The mean DO concentration during May, August, and October was 10.4 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from 0.02 (May) to 0.38 mg/L (May) during 2004. The mean NH_4-N concentration during May, August, and October was 0.14 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.134 mg/L in August, while the minimum calculated concentration was 0.001 mg/L in May. The mean calculated un-ionized ammonia value for the three monitoring periods was 0.020 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.24 (May) to 2.62 mg/L (October) during 2004. The mean TKN concentration during May, August, and October was 1.10 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 6.23 mg/L in May, while the minimum NO_2+NO_3-N value was 2.24 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 4.10 mg/L.

Total Nitrogen. Total nitrogen ranged from 3.34 (August) to 7.34 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 5.19 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 0.93 mg/L in October, while the minimum TP value was 0.33 mg/L during May. The mean TP concentration for the three monitoring periods was 0.59 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 20.0 (August) to 124.7 µg/L (October) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 54.2 µg/L.

Fecal Coliform. Fecal coliform levels ranged from <10 (several dates) to 180 cfu/100 mL (May) during 2004. The FC geometric mean during May, August, and October was 18 cfu/100 mL.

Upper Peoria Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 6.4 (August) to 13.5 mg/L (May) during 2004. The mean DO concentration during May, August, and October was 10.2 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from <0.02 (August) to 0.37 mg/L (August) during 2004. The mean NH_4-N concentration during May, August, and October was 0.12 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.081 mg/L in August, while the minimum calculated concentration was <0.001 mg/L (August). The mean calculated un-ionized ammonia value for the three monitoring periods was 0.018 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.61 (May) to 2.00 mg/L (May) during 2004. The mean TKN concentration during May, August, and October was 1.25 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 6.66 mg/L in May, while the minimum NO_2+NO_3-N value was 1.86 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 3.82 mg/L.

Total Nitrogen. Total nitrogen ranged from 2.87 (October) to 7.80 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 5.07 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 1.31 mg/L in October, while the minimum TP value was 0.26 mg/L in May. The mean TP concentration for the three monitoring periods was 0.56 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 22.7 (August) to 102.5 µg/L (May) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 59.6 µg/L.

Fecal Coliform. Fecal coliform levels ranged from <10 (several dates) to 560 cfu/100 mL (August) during 2004. The FC geometric mean during May, August, and October was 16 cfu/100 mL.

Lower Peoria Pool. *Dissolved Oxygen.* Dissolved oxygen ranged from 5.6 (August) to 13.6 mg/L (May) during 2004. The mean DO concentration during May, August, and October was 9.0 mg/L.

Ammonia Nitrogen. Ammonia nitrogen ranged from <0.02 (October) to 0.43 mg/L (August) during 2004. The mean NH_4-N concentration during May, August, and October was 0.16 mg/L.

Un-ionized Ammonia. The maximum calculated un-ionized ammonia value during the three sampling periods of 2004 was 0.076 mg/L in August, while the minimum calculated concentration was <0.001 mg/L in October. The mean calculated un-ionized ammonia value for the three monitoring periods was 0.025 mg/L.

Total Kjeldahl Nitrogen. Total Kjeldahl nitrogen ranged from 0.62 (May) to 2.60 mg/L (May) during 2004. The mean TKN concentration during May, August, and October was 1.36 mg/L.

Nitrite plus Nitrate Nitrogen. The maximum NO_2+NO_3-N recorded during the three sampling periods of 2004 was 5.73 mg/L in May, while the minimum NO_2+NO_3-N value was 1.23 mg/L in August. The mean concentration of NO_2+NO_3-N for the three monitoring periods was 2.82 mg/L.

Total Nitrogen. Total nitrogen ranged from 2.22 (October) to 7.73 mg/L (May) during 2004. The mean TN concentration during May, August, and October was 4.18 mg/L.

Total Phosphorus. The maximum TP concentration recorded during the three sampling periods of 2004 was 1.32 mg/L in October, while the minimum TP value was 0.24 mg/L in May. The mean TP concentration for the three monitoring periods was 0.52 mg/L.

Chlorophyll a. Chlorophyll *a* ranged from 26.5 (August) to 175.3 µg/L (May) during 2004. The mean chlorophyll *a* concentration during May, August, and October was 77.0 µg/L.

Fecal Coliform. Fecal coliform levels ranged from <10 (several dates) to 10,000

cfu/100 mL (October) during 2004. The FC geometric mean during May, August, and October was 37 cfu/100 mL.

Spatial Variability Along The Illinois Waterway. *Total Suspended Solids.* As shown in Figure 3, TSS generally increased in concentration from Brandon Road to the Peoria Pool. The increase in TSS along the Illinois Waterway may be related to an increase in agricultural runoff. There was a sharp increase in TSS near Station 44 downstream of the upper Peoria Pool in 2004. A peak of similar magnitude was also present in 2003 near the same station. The elevated mean in the Lockport Pool was due to a high TSS concentration of 760 mg/L on May 14, which may be explained by rain events on May 13 and 14.

Dissolved Oxygen. Dissolved oxygen concentration trends along the Illinois Waterway are shown in Figure 4. The dramatic increase in DO between Stations 4 and 5 is directly attributable to the natural re-aeration resulting from water passing over the Brandon Road Dam. The mean DO concentration along the Illinois Waterway was above 8.0 mg/L below the Dresden Island Lock and Dam.

Ammonia Nitrogen. Ammonia nitrogen rapidly decreased in the Brandon Road and Dresden Island Pools (Figure 5). Mean NH_4-N remained relatively uniform from Marseilles to the lower Peoria Pool.

Total Nitrogen. As shown in Figure 6, there was a general decrease in TN concentration from the Lockport Pool to the lower Peoria Pool. The sharp decrease in TN between Stations 10 and 12 may be attributable to the confluence of the Kankakee River with the Des Plaines River.

Total Phosphorus. Mean concentrations of TP show a general decrease along the Illinois Waterway from the Lockport Pool to the lower Peoria Pool as shown in Figure 7. The sharp decrease in TP between Stations 10 and 12 may be attributable to the confluence of the Kankakee River with the Des Plaines River.

Fecal Coliform. Geometric mean FC peaked in the Brandon Road Pool, decreased drastically along the Dresden Island Pool, and then remained fairly uniform along the Illinois Waterway into the Peoria Pool (Figure 8). FC sharply increased in the lower Peoria Pool after Station 46.

Trace Metals. Mean total concentrations of cadmium, chromium, copper, iron, lead, nickel, and zinc were highest in the Lockport Pool then decreased in the Brandon Road Pool and remained fairly uniform the rest of the way downstream to the lower Peoria Pool (Table 6). Mean total arsenic, mercury, and silver values were relatively constant from Lockport to the lower Peoria Pool. The mean total manganese concentration in the lower Peoria Pool was more than twice the mean total manganese in the upstream pools.

The mean dissolved concentrations of arsenic, cadmium, chromium, copper, lead, mercury, nickel, and silver remained fairly uniform from the Lockport Pool down to the lower Peoria Pool (Table 6). Mean values of dissolved iron and manganese were highest in the Lockport and Brandon Road Pools and then were relatively uniform downstream to the lower Peoria Pool. Mean values of dissolved zinc were equal in the Lockport and Brandon Road Pools and displayed a general decrease to the lower Peoria Pool.

Waterway Use Designations

The Illinois Pollution Control Board (IPCB) has designated water uses for particular waters within the State of Illinois. All waters

FIGURE 3: MEAN TOTAL SUSPENDED SOLIDS CONCENTRATION AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

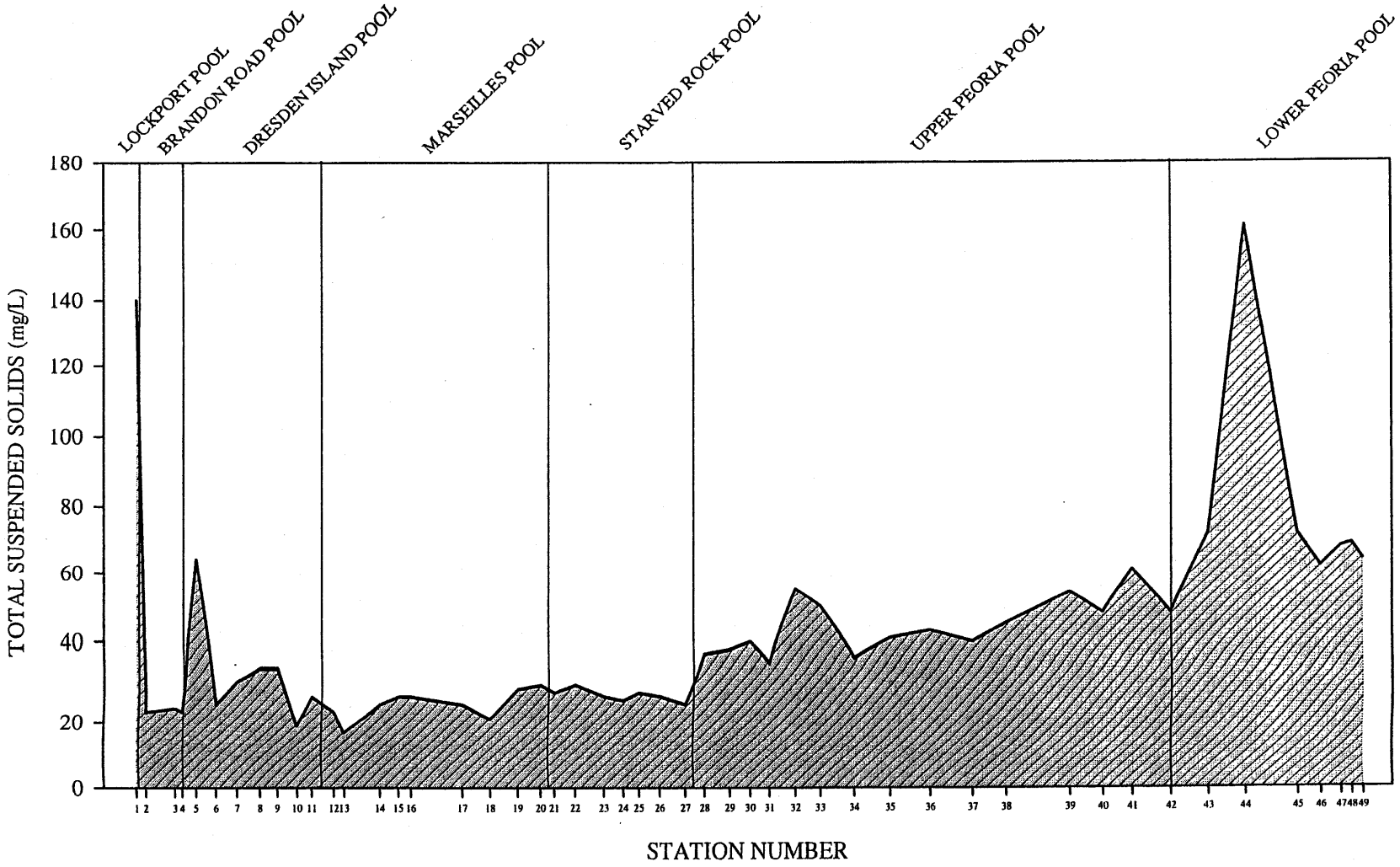

FIGURE 4: MEAN DISSOLVED OXYGEN CONCENTRATION AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

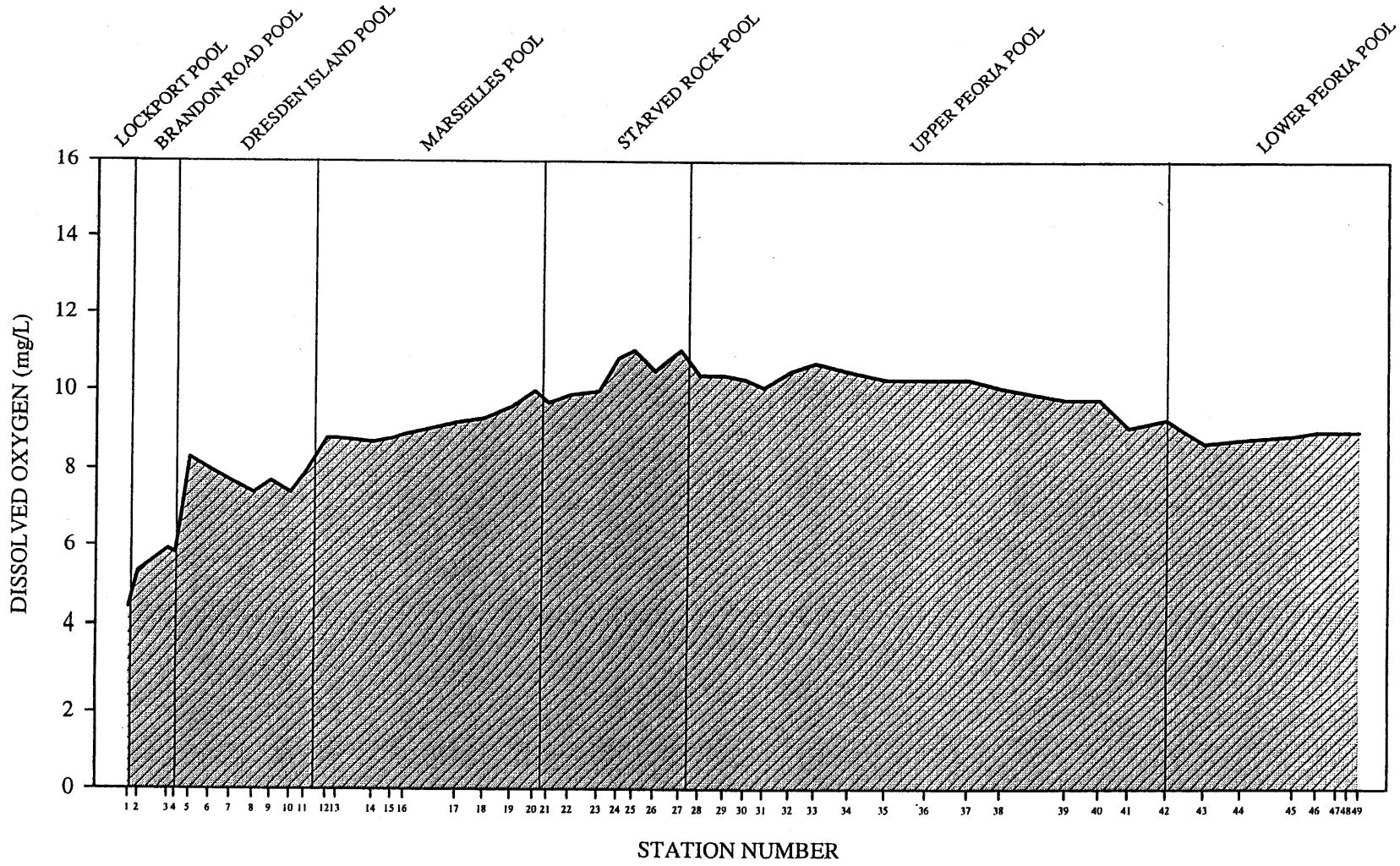

FIGURE 5: MEAN AMMONIA NITROGEN CONCENTRATION AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

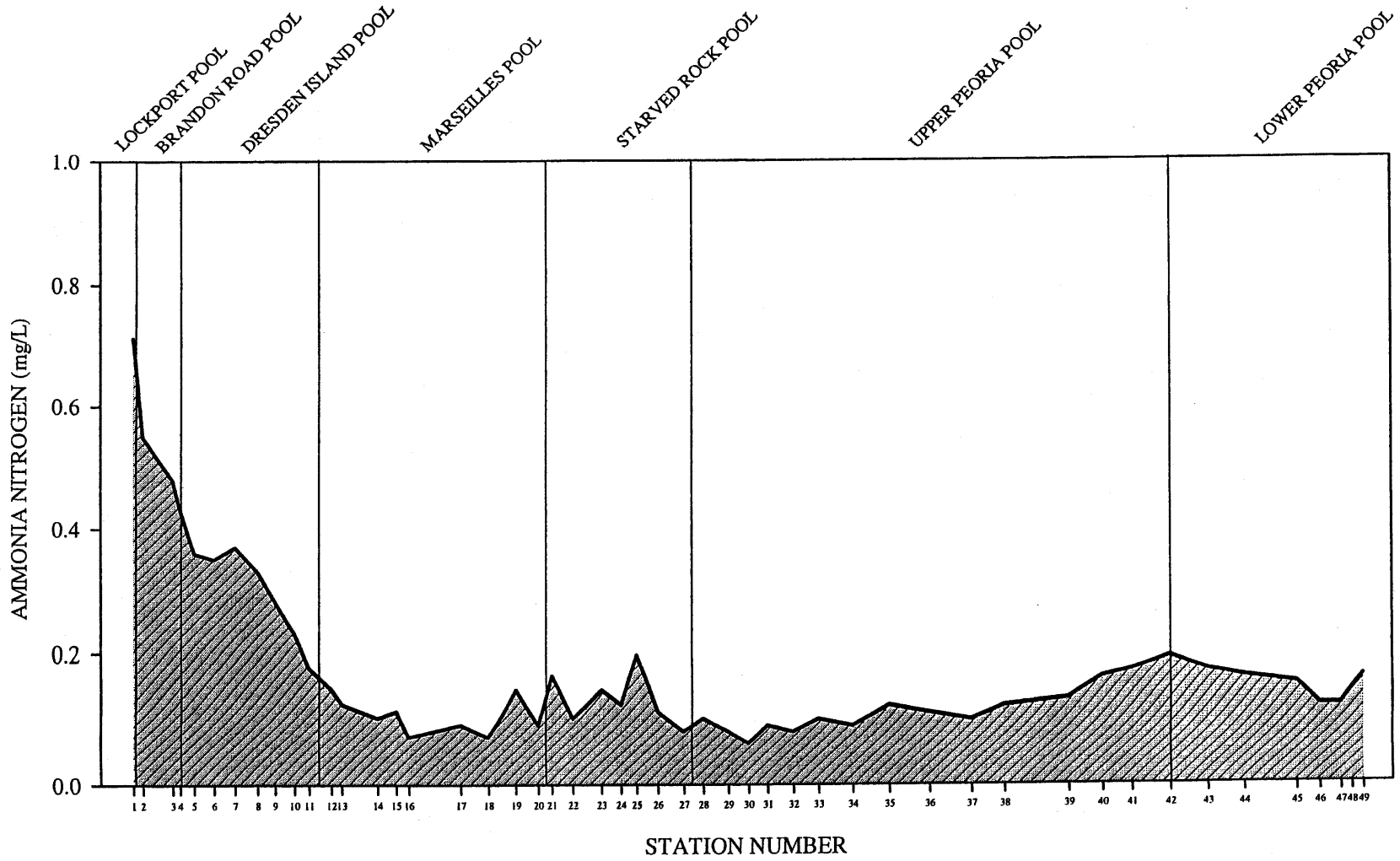

FIGURE 6: MEAN TOTAL NITROGEN CONCENTRATION AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

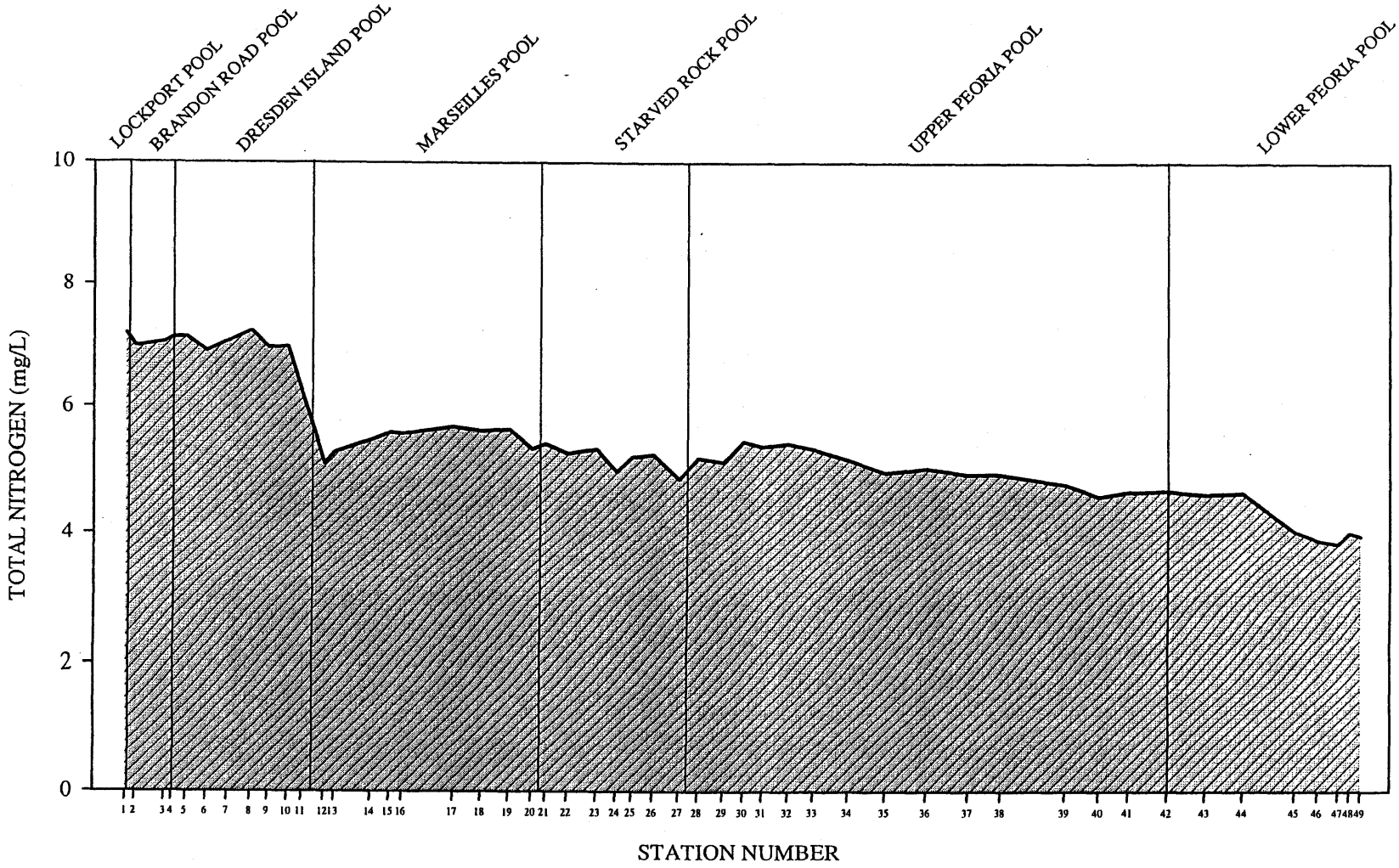

FIGURE 7: MEAN TOTAL PHOSPHORUS CONCENTRATION AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

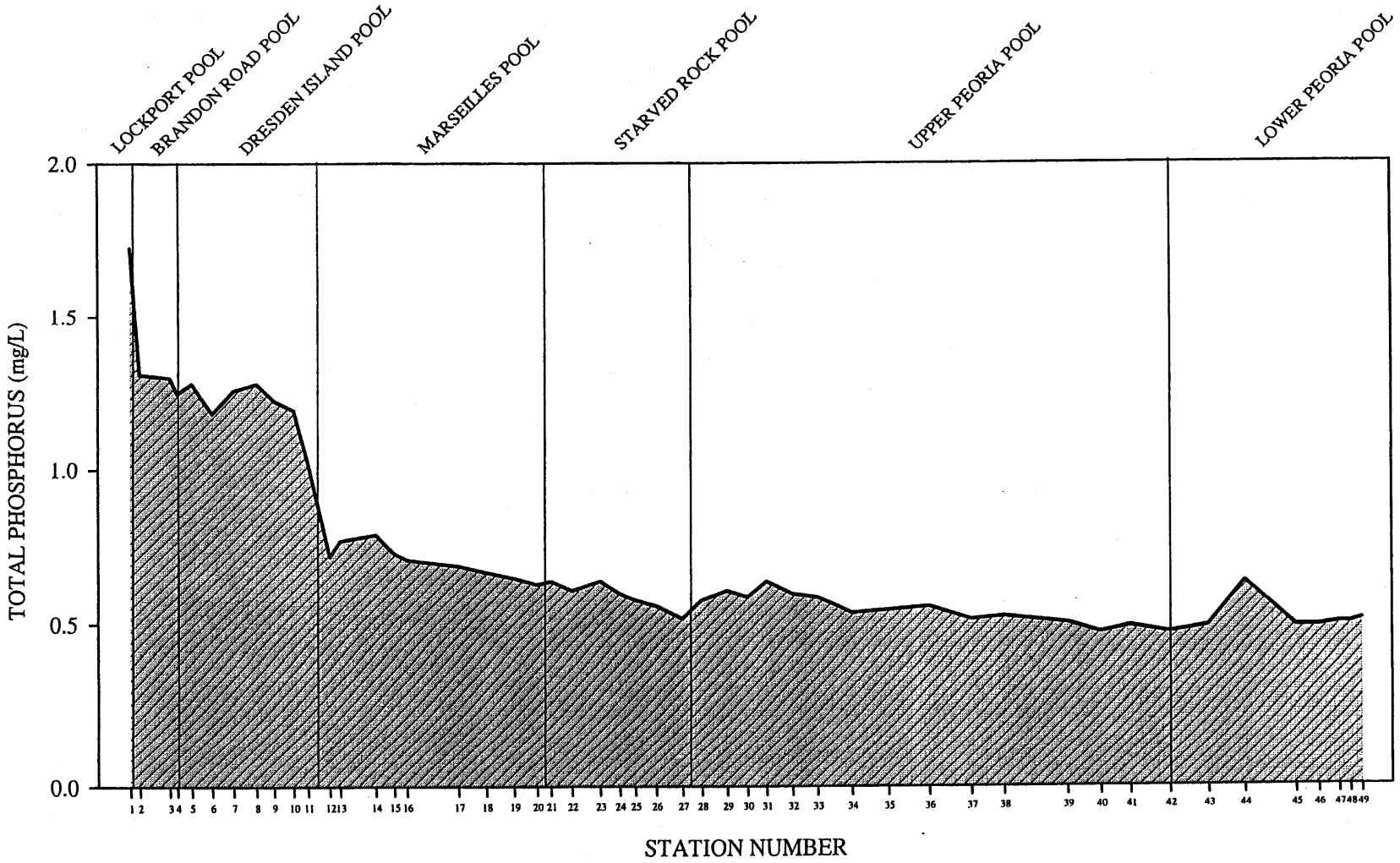

FIGURE 8: GEOMETRIC MEAN FECAL COLIFORM AT 49 STATIONS ALONG THE ILLINOIS WATERWAY FROM THE LOCKPORT LOCK TO THE PEORIA LOCK DURING MAY, AUGUST, AND OCTOBER, 2004

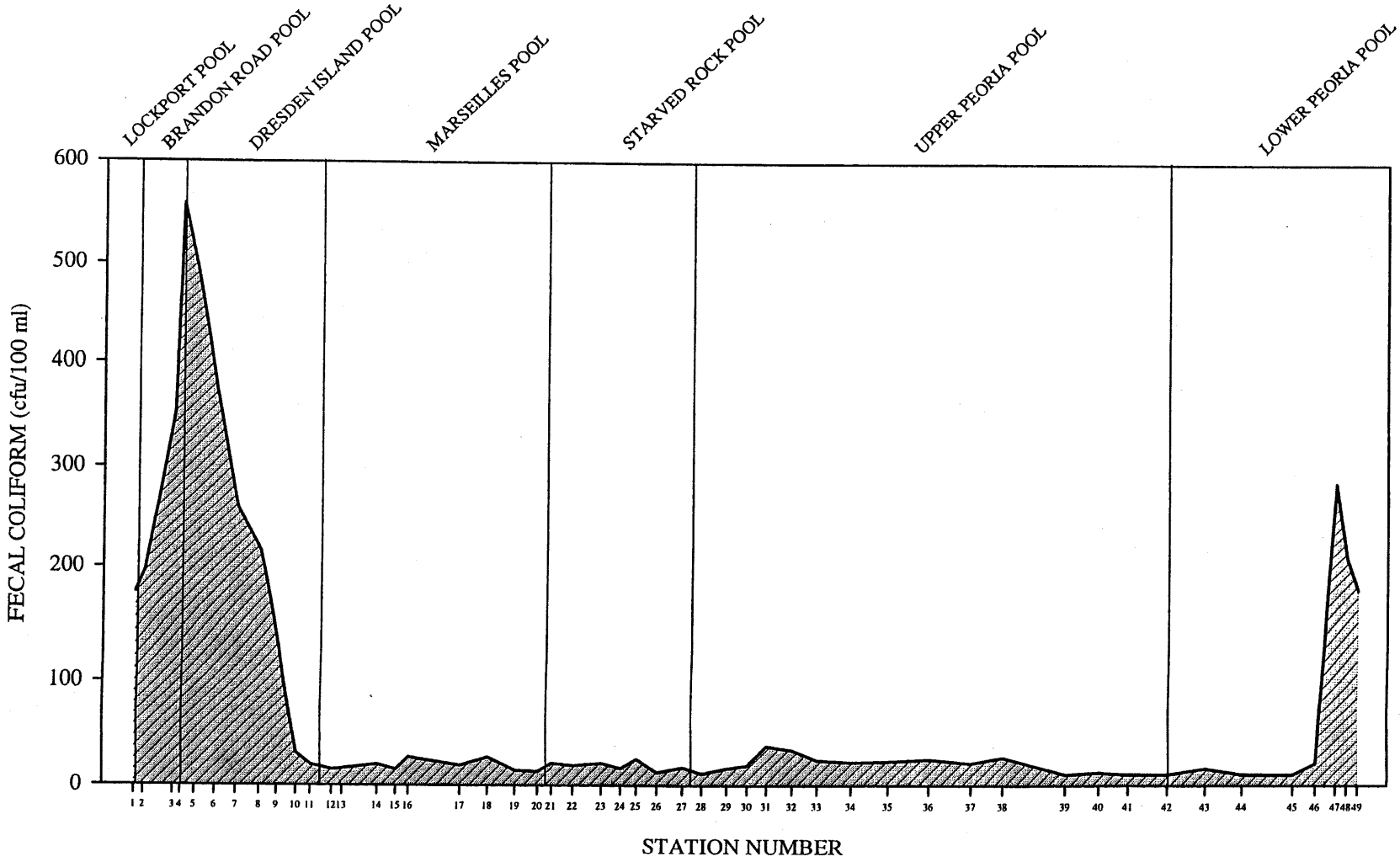

TABLE 6: SUMMARY OF METALS CONCENTRATIONS FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Lockport	Total Arsenic	All values <0.003	0.003
	Dissolved Arsenic	All values <0.002	0.002
	Total Cadmium	<0.004 – 0.0045	0.0010
	Dissolved Cadmium	<0.003 – 0.0004	0.0003
	Total Chromium	<0.004 – 0.061	0.012
	Dissolved Chromium	0.0008 – 0.0021	0.0013
	Total Copper	0.011 – 0.091	0.029
	Dissolved Copper	<0.002 – 0.010	0.004
	Total Iron	0.206 – 11.391	2.187
	Dissolved Iron	0.009 – 0.075	0.026
	Total Lead	0.009 – 0.103	0.027
	Dissolved Lead	0.0032 – 0.0088	0.0059
	Total Manganese	0.0207 – 0.2354	0.0612
	Dissolved Manganese	0.0117 – 0.0454	0.0232
	Total Mercury (µg/L)	<0.06 – 0.07	0.06
	Dissolved Mercury (µg/L)	All values <0.06	0.06
	Total Nickel	0.005 – 0.020	0.009
	Dissolved Nickel	0.003 – 0.004	0.004
	Total Silver	<0.0008 – 0.0004	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.031 – 0.439	0.107
	Dissolved Zinc	0.012 – 0.022	0.018
Brandon Road	Total Arsenic	<0.003 – 0.006	0.003
	Dissolved Arsenic	All values <0.002	0.002
	Total Cadmium	<0.0004 – 0.0009	0.0004
	Dissolved Cadmium	<0.0003 – 0.0003	0.0003
	Total Chromium	<0.004 – 0.005	0.004
	Dissolved Chromium	0.0007 – 0.0018	0.0012
	Total Copper	0.010 – 0.023	0.017
	Dissolved Copper	<0.002 – 0.007	0.003
	Total Iron	0.339 – 1.246	0.578
	Dissolved Iron	0.010 – 0.056	0.023
	Total Lead	0.008 – 0.015	0.011
	Dissolved Lead	0.0026 – 0.0092	0.0049
	Total Manganese	0.0220 – 0.0633	0.0346
	Dissolved Manganese	0.0122 – 0.0382	0.0204

TABLE 6 (Continued): SUMMARY OF METALS CONCENTRATIONS FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Brandon Road (Continued)	Total Mercury (µg/L)	<0.06 – 0.20	0.06
	Dissolved Mercury (µg/L)	<0.06 – 0.21	0.08
	Total Nickel	0.004 – 0.009	0.006
	Dissolved Nickel	0.002 – 0.005	0.004
	Total Silver	All values <0.0008	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.030 – 0.065	0.043
	Dissolved Zinc	0.011 – 0.024	0.018
Dresden Island	Total Arsenic	<0.003 – 0.007	0.003
	Dissolved Arsenic	All values <0.002	0.002
	Total Cadmium	<0.0004 – 0.0010	0.0004
	Dissolved Cadmium	<0.0003 – 0.0005	0.0003
	Total Chromium	<0.004 – 0.009	0.004
	Dissolved Chromium	<0.0007 – 0.0017	0.0010
	Total Copper	0.0009 – 0.029	0.016
	Dissolved Copper	<0.002 – 0.006	0.003
	Total Iron	0.283 – 5.436	0.908
	Dissolved Iron	0.004 – 0.057	0.016
	Total Lead	0.007 – 0.018	0.011
	Dissolved Lead	0.0021 – 0.0126	0.0060
	Total Manganese	0.0193 – 0.1272	0.0402
	Dissolved Manganese	0.0010 – 0.0303	0.0121
	Total Mercury (µg/L)	<0.06 – 0.75	0.12
	Dissolved Mercury (µg/L)	<0.06 – 0.48	0.15
	Total Nickel	0.003 – 0.010	0.006
	Dissolved Nickel	0.002 – 0.009	0.004
	Total Silver	<0.0008 – 0.0321	0.0009
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.024 – 0.071	0.040
	Dissolved Zinc	0.005 – 0.021	0.014
Marseilles	Total Arsenic	<0.003 – 0.008	0.003
	Dissolved Arsenic	All values <0.002	0.002
	Total Cadmium	<0.0004 – 0.0018	0.0004
	Dissolved Cadmium	<0.0003 – 0.0005	0.0003

TABLE 6 (Continued): SUMMARY OF METALS CONENTRATIONS FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Marseilles (Continued)	Total Chromium	<0.004 – 0.004	0.004
	Dissolved Chromium	<0.0007 – 0.0012	0.0008
	Total Copper	0.007 – 0.020	0.012
	Dissolved Copper	<0.002 – 0.004	0.002
	Total Iron	0.242 – 1.576	0.562
	Dissolved Iron	0.003 – 0.058	0.010
	Total Lead	0.005 – 0.012	0.008
	Dissolved Lead	0.0009 – 0.0123	0.0053
	Total Manganese	0.0181 – 0.0751	0.0401
	Dissolved Manganese	<0.0004 – 0.0095	0.0019
	Total Mercury (µg/L)	<0.06 – 0.32	0.06
	Dissolved Mercury (µg/L)	0.06 – 0.10	0.06
	Total Nickel	0.002 – 0.011	0.004
	Dissolved Nickel	<0.002 – 0.003	0.002
	Total Silver	<0.0008 – 0.0119	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.016 – 0.039	0.024
	Dissolved Zinc	0.003 – 0.014	0.008
Starved Rock	Total Arsenic	<0.003 – 0.007	0.003
	Dissolved Arsenic	All values <0.002	0.002
	Total Cadmium	<0.0004 – 0.0008	0.0004
	Dissolved Cadmium	<0.0003 – 0.0004	0.0003
	Total Chromium	<0.004 – 0.005	0.004
	Dissolved Chromium	<0.0007 – 0.0012	0.0008
	Total Copper	0.007 – 0.026	0.012
	Dissolved Copper	<0.002 – 0.010	0.002
	Total Iron	0.190 – 1.546	0.518
	Dissolved Iron	0.004 – 0.025	0.008
	Total Lead	0.004 – 0.014	0.008
	Dissolved Lead	0.0010 – 0.0125	0.0052
	Total Manganese	0.0161 – 0.0969	0.0385
	Dissolved Manganese	<0.0004 – 0.0040	0.0013
	Total Mercury (µg/L)	<0.06 – 0.15	0.06
	Dissolved Mercury (µg/L)	<0.06 – 0.10	0.06
	Total Nickel	0.002 – 0.006	0.003
	Dissolved Nickel	<0.002 – 0.003	0.002

TABLE 6 (Continued): SUMMARY OF METALS CONCENTRATIONS FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Starved Rock (Continued)	Total Silver	All values <0.0008	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.013 – 0.050	0.023
	Dissolved Zinc	0.004 – 0.022	0.007
Upper Peoria	Total Arsenic	<0.003 – 0.011	0.003
	Dissolved Arsenic	<0.002 – 0.004	0.002
	Total Cadmium	<0.0004 – 0.0019	0.0004
	Dissolved Cadmium	<0.0003 – 0.0005	0.0003
	Total Chromium	<0.004 – 0.006	0.004
	Dissolved Chromium	<0.0007 – 0.0012	0.0008
	Total Copper	0.005 – 0.030	0.011
	Dissolved Copper	<0.002 – 0.010	0.002
	Total Iron	0.399 – 3.015	0.911
	Dissolved Iron	0.002 – 0.134	0.011
	Total Lead	0.003 – 0.021	0.009
	Dissolved Lead	<0.0009 – 0.0109	0.0050
	Total Manganese	0.0259 – 0.1466	0.0639
	Dissolved Manganese	0.0005 – 0.0128	0.0021
	Total Mercury (µg/L)	<0.06 – 0.34	0.06
	Dissolved Mercury (µg/L)	<0.06 – 0.26	0.06
	Total Nickel	0.002 – 0.009	0.004
	Dissolved Nickel	<0.002 – 0.004	0.002
	Total Silver	<0.0008 – 0.0247	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.014 – 0.051	0.023
	Dissolved Zinc	0.002 – 0.014	0.005
Lower Peoria	Total Arsenic	<0.003 – 0.007	0.003
	Dissolved Arsenic	<0.002 – 0.004	0.002
	Total Cadmium	<0.0004 – 0.0016	0.0004
	Dissolved Cadmium	<0.0003 – 0.0008	0.0003
	Total Chromium	<0.004 – 0.021	0.004
	Dissolved Chromium	<0.007 – 0.0014	0.0008
	Total Copper	0.006 – 0.046	0.015
	Dissolved Copper	<0.002 – 0.008	0.003

TABLE 6 (Continued): SUMMARY OF METALS CONCENTRATIONS FROM THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, MAY, AUGUST, AND OCTOBER 2004

Navigational Pool	Constituents[a]	Range	Average
Lower Peoria (Continued)	Total Iron	0.766 – 11.786	1.900
	Dissolved Iron	0.002 – 0.328	0.015
	Total Lead	0.006 – 0.025	0.011
	Dissolved Lead	<0.0009 – 0.0114	0.0057
	Total Manganese	0.0576 – 0.3771	0.1156
	Dissolved Manganese	0.0006 – 0.0341	0.0034
	Total Mercury (µg/L)	<0.06 – 0.16	0.06
	Dissolved Mercury (µg/L)	<0.06 – 0.10	0.06
	Total Nickel	0.002 – 0.016	0.005
	Dissolved Nickel	<0.002 – 0.004	0.002
	Total Silver	<0.0008 – 0.0304	0.0008
	Dissolved Silver	All values <0.0003	0.0003
	Total Zinc	0.018 – 0.126	0.032
	Dissolved Zinc	<0.002 – 0.009	0.004

[a]Expressed in mg/L except where noted.

in Illinois are designated as General Use except those designated as Secondary Contact and Indigenous Aquatic Life waters. The CSSC and the Des Plaines River from its confluence with the CSSC to the Interstate Highway 55 (I-55) bridge are classified as Secondary Contact waters (Stations 1–8). The Des Plaines River downstream of the I-55 bridge (Station 9) and the Illinois River are General Use waters (Stations 10–49).

Water Quality Violations. *Dissolved Oxygen.* The DO standard for Secondary Contact waters was not achieved on May 14 in the Lockport Pool. Water quality monitors measured 3.0 mg/L while the standard is 4.0 mg/L.

Fecal Coliform. During spring monitoring (May), FC exceeded the General Use Standard of 400 cfu/100 mL at Station 9 in the Dresden Island Pool with a measured FC value of 1,200 cfu/100 mL. During summer monitoring (August), FC exceeded 400 cfu/100 mL at Station 9 in the Dresden Island Pool and Stations 34 and 35 in the upper Peoria Pool. The measured range of FC at these stations during August was 430–560 cfu/100 mL. During fall monitoring (October), FC exceeded 400 cfu/100 mL six times, all in the lower Peoria Pool. The measured FC values in the lower Peoria Pool during October ranged from 1,500–10,000 cfu/100 mL. The highest measured value was detected at Station 47 on October 12, 2004.

Total Iron. Total iron concentrations exceeded the Secondary Contact water quality standard of 2.000 mg/L at five stations in May of 2004. The range of measured total iron at Stations 1, 5, 6, 7, and 8 was 2.482–11.391 mg/L.

Total Lead. Station 1 in the Lockport Pool exceeded the Secondary Contact water quality standard of 0.100 mg/L for total lead on May 14, 2004, with a value of 0.103 mg/L.

Total Mercury. The Water Quality Standard for the Protection of Human Health for total mercury is 0.012 µg/L. All but five stations in the sampling area exceeded this standard at some time during 2004. The standard was exceeded more than once during May, August, or October at Stations 11, 12, 16, 17, 19, 20, 22–25, 42, and 44–49 during 2004. The total mercury values for the remaining stations and dates were less than the MDLs, so it is not known whether they were in violation of the Human Health Standard.

Total Silver. During May of 2004, Station 19 from the Marseilles Pool exceeded the General Use water quality standard of 0.005 mg/L for total silver. During August, Stations 36 and 49 from the Peoria Pool exceeded 0.005 mg/L. The range of these measured values was 0.0119–0.0304 mg/L.

Sediment Quality

Sediment quality can considerably impact overlying water quality, benthic community structure, food chain dynamics, and other elements of freshwater ecosystems. Since sediment acts as a reservoir for persistent or bioaccumulative contaminants, sediment data reflects a long-term record of quality.

The concentrations of the eight general chemistry constituents measured in sediment at each of the 14 selected monitoring stations are presented in Table 7. The concentrations of 11 measured trace metals for these same stations are presented in Table 8.

Lockport Pool. *General Chemistry.* The TS and TVS in sediment at Station 1 during October of 2004 were 41.9 and 10 percent, respectively. Nutrient levels measured in sediment included NH_4-N (127 mg/kg), TKN (3,169 mg/kg), NO_2+NO_3-N (6.57 mg/kg),

TABLE 7: CHEMICAL CHARACTERISTICS OF SEDIMENT COLLECTED FROM MONITORING STATIONS IN THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, OCTOBER 2004

Station Number	Navigational Pool	Constituents (Expressed on a dry weight basis)							
		Total Solids (%)	Total Volatile Solids (% of Total)	Ammonia Nitrogen (mg/kg)	Total Kjeldahl Nitrogen (mg/kg)	Nitrite + Nitrate Nitrogen (mg/kg)	Total Phos-phorus (mg/kg)	Total Cyanide (mg/kg)	Phenols (mg/kg)
1	Lockport	41.9	10	127	3,169	6.57	6,315	1.534	0.119
2	Brandon Road	40.7	11	79	3,323	10.69	3,257	1.958	0.167
5	Dresden Island	65.2	4	23	693	4.98	1,255	1.245	0.035
8	Dresden Island	25.4	15	77	8,673	9.68	1,142	0.122	0.020
12	Marseilles	75.9	1	6	163	1.67	628	0.041	0.211
18	Marseilles	74.3	4	19	886	2.68	722	0.028	0.042
23	Starved Rock	84.9	1	4	115	2.00	302	0.005	0.034
28	Peoria	76.6	<1	4	38	1.07	89	<0.002	0.112
32	Peoria	67.8	5	5	958	1.86	799	0.012	0.177
35	Peoria	56.7	9	56	2,703	3.15	1,532	0.190	0.240
38	Peoria	51.4	5	35	1,676	2.77	1,699	1.760	0.101
41	Peoria	52.4	7	73	2,251	3.05	1,442	0.042	0.120
44	Peoria	52.4	7	28	2,365	4.71	863	No Data	No Data
48	Peoria	64.1	3	18	924	3.21	523	No Data	No Data

TABLE 8: TRACE METALS IN SEDIMENT COLLECTED FROM MONITORING STATIONS IN THE LOCKPORT, BRANDON ROAD, DRESDEN ISLAND, MARSEILLES, STARVED ROCK, AND PEORIA POOLS OF THE ILLINOIS WATERWAY, OCTOBER 2004

Station Number	Navigational Pool	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
		(mg/kg dry weight)										
1	Lockport	4	8.5	170	148	27,782	173	438	0.6352	79	0.9	738
2	Brandon Road	6	16.7	189	313	28,321	221	439	0.9349	88	1.7	961
5	Dresden Island	<1	4.2	133	58	21,045	65	284	0.3513.	72	<0.3	278
8	Dresden Island	3	0.8	28	37	16,521	22	226	0.1324	24	<0.3	110
12	Marseilles	<1	0.2	21	7	5,665	14	183	0.0162	13	<0.3	42
18	Marseilles	<1	0.6	25	16	12,389	23	387	0.1365	13	<0.3	76
23	Starved Rock	<1	0.2	42	7	13,655	16	489	0.0295	27	<0.3	68
28	Peoria	<1	<0.1	36	2	3,579	9	86	0.0707	19	<0.3	18
32	Peoria	6	1.1	41	19	26,474	18	1,527	0.0596	35	<0.3	108
35	Peoria	20	1.6	84	67	28,632	73	377	1.2743	36	<0.3	298
38	Peoria	1	1.4	52	33	19,776	29	459	0.1435	50	<0.3	152
41	Peoria	1	2.0	38	32	19,248	33	585	0.2464	25	<0.3	183
44	Peoria	<1	0.8	39	48	24,167	19	566	0.0925	56	<0.3	114
48	Peoria	1	1.0	32	21	17,203	26	437	0.1897	22	<0.3	130

and TP (6,315 mg/kg). Concentrations of total cyanide and phenols in sediment were 1.534 and 0.119 mg/kg, respectively.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment at Station 1 were 4, 8.5, 170, 148, 27,782, 173, 438, 0.6352, 79, 0.9, and 738 mg/kg, respectively.

Brandon Road Pool. *General Chemistry.* The TS and TVS in sediment at Station 2 during October of 2004 were 40.7 and 11 percent, respectively. Nutrient levels measured in sediment included NH_4-N (79 mg/kg), TKN (3,323 mg/kg), NO_2+NO_3-N (10.69 mg/kg), and TP (3,257 mg/kg). Concentrations of total cyanide and phenols in sediment were 1.958 and 0.167 mg/kg, respectively.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment at Station 2 were 6, 16.7, 189, 313, 28,321, 221, 439, 0.9349, 88, 1.7, and 961 mg/kg, respectively.

Dresden Island Pool. *General Chemistry.* The TS in sediment at Stations 5 and 8 were 65.2 and 25.4 percent, respectively, while TVS were 4 and 15 percent, respectively, during October of 2004. Ammonia nitrogen, TKN, NO_2+NO_3-N, and TP in sediment measured 23, 693, 4.98, and 1,255 mg/kg, respectively, at Station 5, and 77, 8,673, 9.68, and 1,142 mg/kg, respectively, at Station 8. The total cyanide concentration in sediment was 1.245 mg/kg at Station 5 and 0.122 mg/kg at Station 8. The concentration of phenols was 0.035 mg/kg at Station 5 and 0.020 mg/kg at Station 8.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment were <1, 4.2, 133, 58, 21,045, 65, 284, 0.3513, 72, <0.3, and 278 mg/kg, respectively, at Station 5, and 3, 0.8, 28, 37, 16,521, 22, 226, 0.1324, 24, <0.3, and 110 mg/kg, respectively, at Station 8.

Marseilles Pool. *General Chemistry.* Total solids in sediment at Stations 12 and 18 were 75.9 and 74.3 percent, respectively, during October of 2004, while TVS were 1 and 4 percent, respectively. Ammonia nitrogen, TKN, NO_2+NO_3-N, and TP in sediment were 6, 163, 1.67, and 628 mg/kg, respectively, at Station 12, and 19, 886, 2.68 and 722 mg/kg, respectively, at Station 18. The total cyanide concentration in sediment was 0.028 mg/kg at Station 18 and 0.041 mg/kg at Station 12. Concentrations of phenols were 0.042 mg/kg at Station 18 and 0.211 mg/kg at Station 12.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment were <1, 0.2, 21, 7, 5,665, 14, 183, 0.0162, 13, <0.3, and 42 mg/kg, respectively, at Station 12, and <1, 0.6, 25, 16, 12,389, 23, 387, 0.1365, 13, <0.3, and 76 mg/kg, respectively, at Station 18.

Starved Rock Pool. *General Chemistry.* The TS and TVS in sediment at Station 23 during October of 2004 were 84.9 and 1 percent, respectively. Nutrient concentrations measured in sediment included 4 mg/kg of NH_4-N, 115 mg/kg of TKN, 2.00 mg/kg of NO_2+NO_3-N, and 302 mg/kg of TP. Total cyanide and phenols concentrations were 0.005 and 0.034 mg/kg, respectively.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment at Station 23 were <1, 0.2, 42, 7, 13,655, 16, 489, 0.0295, 27, <0.3, and 68 mg/kg, respectively.

Upper Peoria Pool. *General Chemistry.* Total solids and TVS in sediment at Stations 28, 32, 35, 38, and 41 ranged from 51.4–76.6 and <1–9 percent, respectively, during October of 2004. Ammonia nitrogen, TKN, NO_2+NO_3-N, and TP in sediment ranged from 4–73, 38–2,703, 1.07–3.15, and 89–1,699 mg/kg, respectively. The total cyanide concentrations in sediment ranged from <0.002 mg/kg to 1.760 mg/kg. The phenols concentrations ranged from 0.101–0.240 mg/kg.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations measured in sediment ranged from <1–20, <0.1–2.0, 36–84, 2–67, 3,579–28,632, 9–73, 86–1,527, 0.0596–1.2743, 19–50, <0.3 (all stations), and 18–298 mg/kg, respectively.

Lower Peoria Pool. *General Chemistry.* Total solids in sediment at Stations 44 and 48 were 52.4 and 64.1 percent, respectively, during October of 2004, while TVS concentrations were 7 and 3 percent, respectively. Ammonia nitrogen, TKN, NO_2+NO_3-N, and TP concentrations in sediment were 28, 2,365, 4.71, and 863 mg/kg, respectively, at Station 44 and 18, 924, 3.21, and 523 mg/kg, respectively, at Station 48. No data are available for total cyanide and phenols at Stations 44 and 48 in the lower Peoria Pool during October of 2004.

Trace Metals. During October of 2004, total arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc concentrations in sediment were <1, 0.8, 39, 48, 24,167, 19, 566, 0.0925, 56, <0.3, and 114 mg/kg, respectively, at Station 44, and 1, 1.0, 32, 21, 17,203, 26, 437, 0.1897, 22, <0.3, and 130 mg/kg, respectively, at Station 48.

APPENDIX I

WATER QUALITY AT STATION 1 IN THE LOCKPORT POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AI-1: WATER QUALITY AT STATION 1 IN THE CHICAGO SANITARY AND SHIP CANAL MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	19.2[b]	28.0[b]	23.8[b]
Total Suspended Solids	7	760	140
Turbidity (NTU)	12[b]	447[b]	88[b]
Conductivity (µS/cm)	629[b]	1,151[b]	862[b]
Five-Day Biochemical Oxygen Demand	<2	5	2
Dissolved Oxygen	3.0[b]	4.8[b]	4.4[b]
pH (units)	7.0[b]	7.3[b]	7.2[b]
Ammonia Nitrogen	0.37	1.76	0.71
Un-ionized Ammonia	0.004	0.008	0.006
Total Kjeldahl Nitrogen	0.66	4.98	1.67
Nitrite plus Nitrate Nitrogen	3.80	6.87	5.48
Total Nitrogen	4.88	9.86	7.15
Total Phosphorus	0.87	4.45	1.72
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	0.002	0.007	0.003
Phenols	0.005	0.012	0.009
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0045	0.0011
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.061	0.014
Dissolved Chromium	0.0008	0.0021	0.0013
Total Copper	0.011	0.091	0.029
Dissolved Copper	<0.002	0.010	0.004
Total Iron	0.206	11.391	2.187
Dissolved Iron	0.009	0.075	0.026
Total Lead	0.009	0.103	0.027
Dissolved Lead	0.0032	0.0088	0.0059
Total Manganese	0.0207	0.2354	0.0612
Dissolved Manganese	0.0117	0.0454	0.0232
Total Mercury	<0.00006	0.00007	0.00006
Total Nickel	0.005	0.020	0.009
Dissolved Nickel	0.003	0.004	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.031	0.439	0.107
Dissolved Zinc	0.012	0.022	0.018
Fecal Coliform (cfu/100 mL)	30	600	176[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX II

WATER QUALITY AT STATIONS 2–4 IN THE BRANDON ROAD POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AII-1: WATER QUALITY AT STATION 2 IN THE CHICAGO SANITARY AND SHIP CANAL MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	18.4[b]	27.7[b]	23.7[b]
Total Suspended Solids	14	33	23
Turbidity (NTU)	17[b]	32[b]	24[b]
Conductivity (µS/cm)	633[b]	1,155[b]	872[b]
Five-Day Biochemical Oxygen Demand	<2	7	3
Dissolved Oxygen	4.5[b]	5.8[b]	5.3[b]
pH (units)	7.0[b]	7.8[b]	7.3[b]
Ammonia Nitrogen	0.32	1.15	0.55
Un-ionized Ammonia	0.004	0.012	0.007
Total Kjeldahl Nitrogen	0.58	2.29	1.20
Nitrite plus Nitrate Nitrogen	3.78	6.96	5.74
Total Nitrogen	4.81	8.38	6.94
Total Phosphorus	0.86	1.83	1.30
Chlorophyll a (µg/L)	2.5	8.2	4.1
Total Cyanide	0.002	0.008	0.004
Phenols	0.007	0.011	0.009
Total Arsenic	<0.003	0.006	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0009	0.0006
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.005	0.004
Dissolved Chromium	0.0008	0.0018	0.0013
Total Copper	0.013	0.021	0.018
Dissolved Copper	<0.002	0.007	0.004
Total Iron	0.339	0.848	0.578
Dissolved Iron	0.010	0.041	0.024
Total Lead	0.009	0.013	0.011
Dissolved Lead	0.0026	0.0081	0.0047
Total Manganese	0.0220	0.0534	0.0334
Dissolved Manganese	0.0122	0.0382	0.0215
Total Mercury	<0.00006	0.00020	0.00009
Total Nickel	0.005	0.008	0.006
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.033	0.065	0.047
Dissolved Zinc	0.011	0.024	0.018
Fecal Coliform (cfu/100 mL)	50	460	196[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AII-2: WATER QUALITY AT STATION 3 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	17.2[b]	27.6[b]	22.9[b]
Total Suspended Solids	13	45	24
Turbidity (NTU)	16[b]	52[b]	24[b]
Conductivity (µS/cm)	685[b]	1,213[b]	905[b]
Five-Day Biochemical Oxygen Demand	<2	6	2
Dissolved Oxygen	4.6[b]	8.7[b]	5.9[b]
pH (units)	7.1[b]	7.6[b]	7.3[b]
Ammonia Nitrogen	0.24	0.96	0.48
Un-ionized Ammonia	0.003	0.007	0.005
Total Kjeldahl Nitrogen	0.69	2.17	1.16
Nitrite plus Nitrate Nitrogen	4.33	7.30	5.86
Total Nitrogen	5.17	8.64	7.01
Total Phosphorus	0.95	1.78	1.29
Chlorophyll a (µg/L)	2.8	40.8	12.3
Total Cyanide	0.002	0.005	0.003
Phenols	0.006	0.010	0.009
Total Arsenic	<0.003	0.004	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0018	0.0012
Total Copper	0.010	0.021	0.016
Dissolved Copper	0.002	0.006	0.003
Total Iron	0.342	1.246	0.613
Dissolved Iron	0.010	0.032	0.019
Total Lead	0.008	0.015	0.011
Dissolved Lead	0.0028	0.0075	0.0051
Total Manganese	0.0230	0.0633	0.0361
Dissolved Manganese	0.0126	0.0336	0.0195
Total Mercury	<0.00005	0.00007	0.00006
Total Nickel	0.004	0.007	0.005
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.030	0.054	0.042
Dissolved Zinc	0.012	0.023	0.018
Fecal Coliform (cfu/100 mL)	40	2,500	351[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AII-3 WATER QUALITY AT STATION 4 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	18.5[b]	27.7[b]	23.1[b]
Total Suspended Solids	15	41	23
Turbidity (NTU)	15[b]	54[b]	27[b]
Conductivity (µS/cm)	673[b]	1,194[b]	893[b]
Five-Day Biochemical Oxygen Demand	<2	6	3
Dissolved Oxygen	4.5[b]	7.5[b]	5.8[b]
pH (units)	7.1[b]	7.6[b]	7.3[b]
Ammonia Nitrogen	0.26	0.82	0.43
Un-ionized Ammonia	0.003	0.007	0.005
Total Kjeldahl Nitrogen	0.72	1.76	1.09
Nitrite plus Nitrate Nitrogen	4.75	7.31	5.99
Total Nitrogen	5.71	8.54	7.08
Total Phosphorus	1.00	1.60	1.24
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	0.002	0.004	0.003
Phenols	0.007	0.012	0.009
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0008	0.0005
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0009	0.0014	0.0011
Total Copper	0.011	0.023	0.017
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.359	1.020	0.542
Dissolved Iron	0.012	0.056	0.027
Total Lead	0.008	0.014	0.011
Dissolved Lead	0.0032	0.0092	0.0049
Total Manganese	0.0239	0.0557	0.0344
Dissolved Manganese	0.0135	0.0284	0.0202
Total Mercury	<0.00006	0.00014	0.00007
Total Nickel	0.004	0.009	0.006
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.034	0.053	0.040
Dissolved Zinc	0.012	0.023	0.017
Fecal Coliform (cfu/100 mL)	210	2,300	558[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX III

WATER QUALITY AT STATIONS 5–11 IN THE DRESDEN ISLAND POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AIII-1: WATER QUALITY AT STATION 5 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	19.0[b]	27.9[b]	22.8[b]
Total Suspended Solids	19	185	64
Turbidity (NTU)	24[b]	864[b]	209[b]
Conductivity (µS/cm)	699[b]	1,219[b]	886[b]
Five-Day Biochemical Oxygen Demand	<2	9	4
Dissolved Oxygen	7.3[b]	10.1[b]	8.3[b]
pH (units)	7.2[b]	8.0[b]	7.6[b]
Ammonia Nitrogen	0.23	0.58	0.36
Un-ionized Ammonia	0.004	0.020	0.009
Total Kjeldahl Nitrogen	0.68	2.85	1.34
Nitrite plus Nitrate Nitrogen	4.74	7.00	5.75
Total Nitrogen	5.61	8.62	7.09
Total Phosphorus	0.96	1.68	1.27
Chlorophyll a (µg/L)	3.1	31.0	12.1
Total Cyanide	0.002	0.006	0.004
Phenols	0.006	0.011	0.008
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0008	0.0006
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	0.004	0.007	0.005
Dissolved Chromium	0.0008	0.0015	0.0012
Total Copper	0.013	0.029	0.019
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.450	5.436	1.548
Dissolved Iron	0.009	0.057	0.024
Total Lead	0.010	0.018	0.014
Dissolved Lead	0.0037	0.0084	0.0059
Total Manganese	0.0261	0.1272	0.0529
Dissolved Manganese	0.0126	0.0253	0.0176
Total Mercury	<0.00005	0.00054	0.00014
Total Nickel	0.003	0.009	0.006
Dissolved Nickel	0.003	0.009	0.005
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.033	0.070	0.051
Dissolved Zinc	0.013	0.021	0.016
Fecal Coliform (cfu/100 mL)	210	1,800	494[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-2: WATER QUALITY AT STATION 6 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	20.7[b]	32.1[b]	25.6[b]
Total Suspended Solids	12	59	25
Turbidity (NTU)	17[b]	131[b]	43[b]
Conductivity (µS/cm)	690[b]	1,197[b]	893[b]
Five-Day Biochemical Oxygen Demand	<2	7	4
Dissolved Oxygen	7.1[b]	10.7[b]	8.0[b]
pH (units)	7.2[b]	8.0[b]	7.6[b]
Ammonia Nitrogen	0.19	0.52	0.35
Un-ionized Ammonia	0.004	0.017	0.009
Total Kjeldahl Nitrogen	0.62	1.93	1.04
Nitrite plus Nitrate Nitrogen	4.53	6.83	5.82
Total Nitrogen	5.36	8.39	6.86
Total Phosphorus	0.91	1.51	1.18
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.006	0.003
Phenols	0.005	0.012	0.009
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0006	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0017	0.0011
Total Copper	0.010	0.024	0.016
Dissolved Copper	0.002	0.004	0.003
Total Iron	0.299	2.748	0.857
Dissolved Iron	0.006	0.042	0.019
Total Lead	0.009	0.014	0.011
Dissolved Lead	0.0021	0.0125	0.0065
Total Manganese	0.0227	0.0710	0.0369
Dissolved Manganese	0.0077	0.0249	0.0161
Total Mercury	<0.00005	0.00036	0.00011
Total Nickel	0.004	0.007	0.005
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	0.0321	0.0060
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.030	0.048	0.037
Dissolved Zinc	0.011	0.019	0.016
Fecal Coliform (cfu/100 mL)	80	1,700	375[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-3: WATER QUALITY AT STATION 7 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	19.2[b]	31.2[b]	25.4[b]
Total Suspended Solids	14	73	31
Turbidity (NTU)	15[b]	134[b]	42[b]
Conductivity (µS/cm)	700[b]	1,180[b]	897[b]
Five-Day Biochemical Oxygen Demand	<2	6	3
Dissolved Oxygen	6.2[b]	11.5[b]	7.7[b]
pH (units)	7.2[b]	8.0[b]	7.6[b]
Ammonia Nitrogen	0.24	0.54	0.37
Un-ionized Ammonia	0.005	0.017	0.010
Total Kjeldahl Nitrogen	0.55	1.99	1.07
Nitrite plus Nitrate Nitrogen	4.45	6.99	5.95
Total Nitrogen	5.15	8.84	7.02
Total Phosphorus	0.91	1.84	1.25
Chlorophyll a (µg/L)	2.2	30.0	13.2
Total Cyanide	<0.002	0.004	0.002
Phenols	0.008	0.012	0.010
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0007	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	0.0007	0.0016	0.0010
Total Copper	0.010	0.019	0.016
Dissolved Copper	0.002	0.004	0.003
Total Iron	0.283	2.482	0.806
Dissolved Iron	0.005	0.035	0.016
Total Lead	0.009	0.013	0.010
Dissolved Lead	0.0028	0.0126	0.0068
Total Manganese	0.0227	0.0812	0.0404
Dissolved Manganese	0.0069	0.0232	0.0151
Total Mercury	<0.00005	0.00060	0.00020
Total Nickel	0.003	0.008	0.006
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.027	0.058	0.041
Dissolved Zinc	0.009	0.018	0.015
Fecal Coliform (cfu/100 mL)	30	2,900	260[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-4: WATER QUALITY AT STATION 8 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	17.6[b]	31.2[b]	24.6[b]
Total Suspended Solids	13	95	34
Turbidity (NTU)	16[b]	164[b]	46[b]
Conductivity (µS/cm)	698[b]	1,179[b]	899[b]
Five-Day Biochemical Oxygen Demand	<2	5	2
Dissolved Oxygen	5.9[b]	10.0[b]	7.4[b]
pH (units)	7.2[b]	8.0[b]	7.6[b]
Ammonia Nitrogen	0.22	0.62	0.33
Un-ionized Ammonia	0.004	0.018	0.009
Total Kjeldahl Nitrogen	0.76	1.90	1.09
Nitrite plus Nitrate Nitrogen	4.41	7.51	6.10
Total Nitrogen	5.19	8.93	7.19
Total Phosphorus	0.85	2.05	1.27
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.006	0.010	0.008
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0007	0.0005
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0008	0.0015	0.0011
Total Copper	0.011	0.020	0.015
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.314	3.500	0.964
Dissolved Iron	0.005	0.041	0.017
Total Lead	0.010	0.013	0.011
Dissolved Lead	0.0028	0.0091	0.0057
Total Manganese	0.0226	0.0802	0.0387
Dissolved Manganese	0.0029	0.0191	0.0108
Total Mercury	<0.00005	0.00075	0.00020
Total Nickel	0.004	0.008	0.006
Dissolved Nickel	0.002	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.029	0.071	0.041
Dissolved Zinc	0.009	0.019	0.015
Fecal Coliform (cfu/100 mL)	50	1,000	216[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-5: WATER QUALITY AT STATION 9 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	17.7[b]	30.6[b]	23.7[b]
Total Suspended Solids	12	88	34
Turbidity (NTU)	17[b]	193[b]	70[b]
Conductivity (µS/cm)	699[b]	1,159[b]	901[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	6.2[b]	9.8[b]	7.7[b]
pH (units)	7.2[b]	8.1[b]	7.6[b]
Ammonia Nitrogen	0.13	0.54	0.28
Un-ionized Ammonia	0.003	0.011	0.007
Total Kjeldahl Nitrogen	0.51	1.56	1.00
Nitrite plus Nitrate Nitrogen	3.78	7.48	5.91
Total Nitrogen	4.73	8.82	6.91
Total Phosphorus	0.85	2.05	1.22
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	0.002	0.005	0.003
Phenols	0.006	0.015	0.009
Total Arsenic	<0.003	0.004	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0006	0.0005
Dissolved Cadmium	<0.0003	0.0005	0.0003
Total Chromium	<0.004	0.006	0.004
Dissolved Chromium	<0.0007	0.0014	0.0010
Total Copper	0.009	0.020	0.016
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.324	3.151	1.030
Dissolved Iron	0.004	0.040	0.018
Total Lead	0.007	0.015	0.011
Dissolved Lead	0.0025	0.0098	0.0055
Total Manganese	0.0213	0.0761	0.0403
Dissolved Manganese	0.0022	0.0247	0.0111
Total Mercury	<0.00006	0.00052	0.00013
Total Nickel	0.004	0.010	0.007
Dissolved Nickel	0.003	0.005	0.004
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.028	0.063	0.041
Dissolved Zinc	0.009	0.019	0.014
Fecal Coliform (cfu/100 mL)	<10	1,200	134[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-6: WATER QUALITY AT STATION 10 IN THE DES PLAINES RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.8[b]	30.1[b]	23.4[b]
Total Suspended Solids	10	26	19
Turbidity (NTU)	18[b]	40[b]	25[b]
Conductivity (µS/cm)	717[b]	1,189[b]	935[b]
Five-Day Biochemical Oxygen Demand	3	8	5
Dissolved Oxygen	6.6[b]	9.3[b]	7.4[b]
pH (units)	7.4[b]	7.9[b]	7.7[b]
Ammonia Nitrogen	0.08	0.46	0.23
Un-ionized Ammonia	0.003	0.009	0.006
Total Kjeldahl Nitrogen	0.67	1.54	1.00
Nitrite plus Nitrate Nitrogen	4.25	7.41	5.93
Total Nitrogen	5.06	8.89	6.93
Total Phosphorus	0.87	1.91	1.19
Chlorophyll a (µg/L)	10.2	35.1	22.7
Total Cyanide	<0.002	0.003	0.002
Phenols	0.005	0.011	0.009
Total Arsenic	<0.003	0.005	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0006	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0014	0.0010
Total Copper	0.012	0.022	0.016
Dissolved Copper	<0.002	0.006	0.004
Total Iron	0.315	0.574	0.484
Dissolved Iron	0.005	0.017	0.012
Total Lead	0.008	0.012	0.010
Dissolved Lead	0.0030	0.0088	0.0057
Total Manganese	0.0197	0.0447	0.0311
Dissolved Manganese	0.0010	0.0141	0.0062
Total Mercury	<0.00006	0.00025	0.00012
Total Nickel	0.004	0.006	0.005
Dissolved Nickel	0.003	0.005	0.004
Total Silver	<0.0008	0.0009	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.028	0.044	0.035
Dissolved Zinc	0.009	0.019	0.014
Fecal Coliform (cfu/100 mL)	10	340	31[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIII-7: WATER QUALITY AT STATION 11 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.1[b]	30.1[b]	22.8[b]
Total Suspended Solids	10	86	27
Turbidity (NTU)	16[b]	85[b]	32[b]
Conductivity (µS/cm)	721[b]	1,159[b]	899[b]
Five-Day Biochemical Oxygen Demand	3	19	7
Dissolved Oxygen	6.8[b]	9.1[b]	7.9[b]
pH (units)	7.5[b]	8.1[b]	7.8[b]
Ammonia Nitrogen	0.07	0.36	0.18
Un-ionized Ammonia	0.004	0.011	0.007
Total Kjeldahl Nitrogen	0.45	1.35	0.85
Nitrite plus Nitrate Nitrogen	3.30	6.71	5.36
Total Nitrogen	4.07	8.06	6.21
Total Phosphorus	0.58	1.71	1.02
Chlorophyll a (µg/L)	8.5	43.6	23.8
Total Cyanide	<0.002	0.004	0.002
Phenols	0.004	0.011	0.008
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0010	0.0005
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.009	0.005
Dissolved Chromium	0.0007	0.0012	0.0009
Total Copper	0.009	0.020	0.015
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.312	1.900	0.666
Dissolved Iron	0.006	0.013	0.010
Total Lead	0.007	0.017	0.010
Dissolved Lead	0.0030	0.0099	0.0055
Total Manganese	0.0193	0.1024	0.0416
Dissolved Manganese	0.0010	0.0303	0.0076
Total Mercury	<0.00006	0.00023	0.00009
Total Nickel	0.003	0.010	0.006
Dissolved Nickel	0.002	0.004	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.024	0.061	0.037
Dissolved Zinc	0.005	0.016	0.011
Fecal Coliform (cfu/100 mL)	<10	170	20[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX IV

WATER QUALITY AT STATIONS 12–20 IN THE MARSEILLES POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AIV-1: WATER QUALITY AT STATION 12 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	29.9[b]	21.9[b]
Total Suspended Solids	11	32	23
Turbidity (NTU)	22[b]	37[b]	27[b]
Conductivity (µS/cm)	715[b]	940[b]	819[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	7.1[b]	10.2[b]	8.8[b]
pH (units)	7.8[b]	8.3[b]	8.1[b]
Ammonia Nitrogen	0.07	0.38	0.15
Un-ionized Ammonia	0.006	0.010	0.008
Total Kjeldahl Nitrogen	0.03	1.13	0.73
Nitrite plus Nitrate Nitrogen	3.45	5.67	4.39
Total Nitrogen	4.30	6.54	5.12
Total Phosphorus	0.44	1.11	0.72
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.006	0.009	0.007
Total Arsenic	<0.003	0.004	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0006	0.0005
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0012	0.0009
Total Copper	0.010	0.020	0.012
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.463	0.882	0.621
Dissolved Iron	0.004	0.013	0.008
Total Lead	0.007	0.012	0.009
Dissolved Lead	0.0027	0.0109	0.0061
Total Manganese	0.0257	0.0539	0.0406
Dissolved Manganese	0.0005	0.0095	0.0036
Total Mercury	<0.00006	0.00012	0.00007
Total Nickel	0.002	0.005	0.003
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.020	0.030	0.026
Dissolved Zinc	0.005	0.010	0.008
Fecal Coliform (cfu/100 mL)	<10	60	15[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-2: WATER QUALITY AT STATION 13 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	29.9[b]	21.9[b]
Total Suspended Solids	5	24	17
Turbidity (NTU)	17[b]	35[b]	25[b]
Conductivity (µS/cm)	715[b]	991[b]	835[b]
Five-Day Biochemical Oxygen Demand	<2	4	3
Dissolved Oxygen	7.4[b]	10.1[b]	8.8[b]
pH (units)	7.8[b]	8.3[b]	8.1[b]
Ammonia Nitrogen	0.06	0.26	0.13
Un-ionized Ammonia	0.004	0.008	0.007
Total Kjeldahl Nitrogen	0.35	1.05	0.76
Nitrite plus Nitrate Nitrogen	3.38	5.97	4.53
Total Nitrogen	4.30	6.83	5.29
Total Phosphorus	0.49	1.30	0.77
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	<0.003	0.008	0.005
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0015	0.0006
Dissolved Cadmium	<0.0003	0.0005	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.009	0.017	0.013
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.308	0.854	0.532
Dissolved Iron	0.004	0.019	0.009
Total Lead	0.007	0.011	0.009
Dissolved Lead	0.0009	0.0087	0.0050
Total Manganese	0.0209	0.0511	0.0381
Dissolved Manganese	0.0004	0.0072	0.0024
Total Mercury	<0.00005	<0.00006	0.00005
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0032	0.0012
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.022	0.033	0.026
Dissolved Zinc	0.006	0.010	0.008
Fecal Coliform (cfu/100 mL)	<10	50	16[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-3: WATER QUALITY AT STATION 14 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.7[b]	29.7[b]	21.7[b]
Total Suspended Solids	11	33	25
Turbidity (NTU)	21[b]	1,263[b]	233[b]
Conductivity (µS/cm)	716[b]	1,022[b]	837[b]
Five-Day Biochemical Oxygen Demand	<2	4	3
Dissolved Oxygen	7.6[b]	10.0[b]	8.7[b]
pH (units)	7.7[b]	8.3[b]	8.0[b]
Ammonia Nitrogen	0.03	0.24	0.11
Un-ionized Ammonia	0.003	0.007	0.005
Total Kjeldahl Nitrogen	0.32	1.06	0.78
Nitrite plus Nitrate Nitrogen	3.49	6.24	4.70
Total Nitrogen	4.37	7.18	5.48
Total Phosphorus	0.51	1.19	0.79
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.003	0.009	0.007
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.007	0.016	0.013
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.310	0.936	0.604
Dissolved Iron	0.006	0.018	0.010
Total Lead	0.006	0.010	0.008
Dissolved Lead	0.0025	0.0056	0.0044
Total Manganese	0.0249	0.0534	0.0423
Dissolved Manganese	<0.0004	0.0043	0.0019
Total Mercury	<0.00005	0.00010	0.00006
Total Nickel	0.003	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.018	0.033	0.026
Dissolved Zinc	0.006	0.010	0.008
Fecal Coliform (cfu/100 mL)	<10	70	20[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-4: WATER QUALITY AT STATION 15 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.7[b]	29.4[b]	21.6[b]
Total Suspended Solids	12	38	27
Turbidity (NTU)	21[b]	31[b]	26[b]
Conductivity (µS/cm)	716[b]	986[b]	827[b]
Five-Day Biochemical Oxygen Demand	3	9	5
Dissolved Oxygen	7.6[b]	10.2[b]	8.8[b]
pH (units)	7.8[b]	8.3[b]	8.1[b]
Ammonia Nitrogen	0.03	0.25	0.12
Un-ionized Ammonia	0.003	0.009	0.006
Total Kjeldahl Nitrogen	0.42	1.33	0.86
Nitrite plus Nitrate Nitrogen	3.44	7.40	4.73
Total Nitrogen	4.54	8.38	5.59
Total Phosphorus	0.46	1.08	0.73
Chlorophyll a (µg/L)	9.8	31.7	21.0
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.009	0.006
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0012	0.0009
Total Copper	0.009	0.017	0.012
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.314	0.964	0.624
Dissolved Iron	<0.004	0.014	0.008
Total Lead	0.008	0.011	0.009
Dissolved Lead	0.0027	0.0091	0.0051
Total Manganese	0.0287	0.0506	0.0429
Dissolved Manganese	0.0006	0.0044	0.0019
Total Mercury	<0.00005	0.00014	0.00007
Total Nickel	0.002	0.006	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.017	0.030	0.023
Dissolved Zinc	0.005	0.009	0.008
Fecal Coliform (cfu/100 mL)	<10	40	15[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-5: WATER QUALITY AT STATION 16 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	29.4[b]	21.7[b]
Total Suspended Solids	10	54	27
Turbidity (NTU)	15[b]	46[b]	27[b]
Conductivity (µS/cm)	714[b]	966[b]	819[b]
Five-Day Biochemical Oxygen Demand	<2	4	2
Dissolved Oxygen	7.5[b]	10.2[b]	8.9[b]
pH (units)	7.8[b]	8.3[b]	8.1[b]
Ammonia Nitrogen	0.01	0.14	0.08
Un-ionized Ammonia	0.001	0.008	0.005
Total Kjeldahl Nitrogen	0.30	1.08	0.76
Nitrite plus Nitrate Nitrogen	3.30	7.13	4.82
Total Nitrogen	3.95	8.10	5.57
Total Phosphorus	0.41	1.04	0.71
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.009	0.006
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0011	0.0008
Total Copper	0.010	0.014	0.012
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.261	1.576	0.678
Dissolved Iron	<0.004	0.051	0.014
Total Lead	0.006	0.011	0.009
Dissolved Lead	0.0027	0.0123	0.0058
Total Manganese	0.0236	0.0751	0.0446
Dissolved Manganese	0.0005	0.0025	0.0013
Total Mercury	<0.00005	0.00028	0.00009
Total Nickel	0.002	0.011	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.019	0.036	0.025
Dissolved Zinc	0.006	0.010	0.008
Fecal Coliform (cfu/100 mL)	10	80	27[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-6: WATER QUALITY AT STATION 17 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	29.2[b]	21.7[b]
Total Suspended Solids	6	34	25
Turbidity (NTU)	16[b]	37[b]	27[b]
Conductivity (µS/cm)	707[b]	965[b]	816[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	7.7[b]	10.7[b]	9.2[b]
pH (units)	7.9[b]	8.4[b]	8.1[b]
Ammonia Nitrogen	0.03	0.22	0.10
Un-ionized Ammonia	0.004	0.007	0.005
Total Kjeldahl Nitrogen	0.24	1.72	0.98
Nitrite plus Nitrate Nitrogen	3.16	6.52	4.71
Total Nitrogen	4.43	7.63	5.68
Total Phosphorus	0.43	1.06	0.69
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.008	0.006
Total Arsenic	<0.003	0.008	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0007	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	0.0007	0.0010	0.0009
Total Copper	0.009	0.015	0.012
Dissolved Copper	<0.002	0.004	0.002
Total Iron	0.251	0.755	0.516
Dissolved Iron	0.005	0.014	0.009
Total Lead	0.007	0.011	0.009
Dissolved Lead	0.0026	0.0098	0.0059
Total Manganese	0.0250	0.0646	0.0415
Dissolved Manganese	0.0004	0.0023	0.0013
Total Mercury	<0.00006	0.00016	0.00009
Total Nickel	0.003	0.004	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.019	0.031	0.024
Dissolved Zinc	0.005	0.014	0.008
Fecal Coliform (cfu/100 mL)	10	40	19[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-7: WATER QUALITY AT STATION 18 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.4[b]	29.3[b]	21.6[b]
Total Suspended Solids	10	30	21
Turbidity (NTU)	15[b]	29[b]	23[b]
Conductivity (µS/cm)	709[b]	943[b]	811[b]
Five-Day Biochemical Oxygen Demand	3	5	3
Dissolved Oxygen	7.7[b]	11.5[b]	9.3[b]
pH (units)	7.8[b]	8.5[b]	8.1[b]
Ammonia Nitrogen	0.03	0.14	0.08
Un-ionized Ammonia	0.002	0.012	0.006
Total Kjeldahl Nitrogen	0.29	1.22	0.91
Nitrite plus Nitrate Nitrogen	3.44	6.29	4.72
Total Nitrogen	4.45	7.34	5.62
Total Phosphorus	0.39	1.03	0.67
Chlorophyll a (µg/L)	17.7	53.4	30.6
Total Cyanide	<0.002	0.003	0.002
Phenols	<0.003	0.009	0.007
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0018	0.0006
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0009
Total Copper	0.010	0.015	0.012
Dissolved Copper	<0.002	0.004	0.002
Total Iron	0.242	0.611	0.405
Dissolved Iron	0.005	0.058	0.016
Total Lead	0.005	0.010	0.008
Dissolved Lead	0.0025	0.0079	0.0048
Total Manganese	0.0221	0.0538	0.0333
Dissolved Manganese	0.0007	0.0020	0.0013
Total Mercury	<0.00005	0.00011	0.00006
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0013	0.0009
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.018	0.039	0.022
Dissolved Zinc	0.006	0.009	0.007
Fecal Coliform (cfu/100 mL)	<10	80	27[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-8: WATER QUALITY AT STATION 19 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	29.4[b]	21.5[b]
Total Suspended Solids	10	50	29
Turbidity (NTU)	16[b]	33[b]	26[b]
Conductivity (µS/cm)	702[b]	899[b]	801[b]
Five-Day Biochemical Oxygen Demand	3	12	5
Dissolved Oxygen	7.7[b]	11.7[b]	9.6[b]
pH (units)	8.0[b]	8.5[b]	8.2[b]
Ammonia Nitrogen	0.04	0.39	0.15
Un-ionized Ammonia	0.001	0.032	0.012
Total Kjeldahl Nitrogen	0.29	2.77	1.04
Nitrite plus Nitrate Nitrogen	3.29	6.09	4.60
Total Nitrogen	4.21	7.24	5.64
Total Phosphorus	0.38	1.05	0.65
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.007	0.005
Total Arsenic	<0.003	0.005	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0013	0.0006
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.010	0.014	0.012
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.266	0.950	0.488
Dissolved Iron	0.005	0.011	0.007
Total Lead	0.005	0.010	0.008
Dissolved Lead	0.0034	0.0086	0.0056
Total Manganese	0.0183	0.0543	0.0368
Dissolved Manganese	<0.0004	0.0055	0.0021
Total Mercury	<0.00005	0.00014	0.00008
Total Nickel	0.002	0.004	0.003
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0119	0.0027
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.019	0.032	0.023
Dissolved Zinc	0.003	0.009	0.007
Fecal Coliform (cfu/100 mL)	<10	40	14[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AIV-9: WATER QUALITY AT STATION 20 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	29.5[b]	21.6[b]
Total Suspended Solids	18	62	30
Turbidity (NTU)	11[b]	1,263[b]	229[b]
Conductivity (µS/cm)	715[b]	920[b]	810[b]
Five-Day Biochemical Oxygen Demand	<2	7	4
Dissolved Oxygen	7.8[b]	12.1[b]	10.0[b]
pH (units)	8.1[b]	8.5[b]	8.2[b]
Ammonia Nitrogen	0.03	0.29	0.10
Un-ionized Ammonia	0.003	0.020	0.008
Total Kjeldahl Nitrogen	0.46	1.70	0.93
Nitrite plus Nitrate Nitrogen	3.09	6.10	4.41
Total Nitrogen	4.05	7.01	5.34
Total Phosphorus	0.46	0.87	0.63
Chlorophyll a (µg/L)	15	39	27.8
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.007	0.005
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0015	0.0006
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0009	0.0008
Total Copper	0.007	0.016	0.012
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.305	1.041	0.592
Dissolved Iron	0.004	0.017	0.008
Total Lead	0.006	0.011	0.008
Dissolved Lead	0.0022	0.0079	0.0053
Total Manganese	0.0181	0.0663	0.0410
Dissolved Manganese	<0.0004	0.0022	0.0012
Total Mercury	<0.00005	0.00032	0.00012
Total Nickel	0.003	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0051	0.0015
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.016	0.028	0.023
Dissolved Zinc	0.005	0.013	0.007
Fecal Coliform (cfu/100 mL)	<10	40	13[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX V

WATER QUALITY AT STATION 21–27 IN THE STARVED ROCK POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AV-1: WATER QUALITY AT STATION 21 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.2[b]	28.8[b]	21.4[b]
Total Suspended Solids	10	60	28
Turbidity (NTU)	13[b]	48[b]	32[b]
Conductivity (µS/cm)	722[b]	947[b]	824[b]
Five-Day Biochemical Oxygen Demand	<2	7	4
Dissolved Oxygen	7.6[b]	12.2[b]	9.7[b]
pH (units)	8.1[b]	8.6[b]	8.2[b]
Ammonia Nitrogen	0.06	0.29	0.17
Un-ionized Ammonia	0.003	0.035	0.017
Total Kjeldahl Nitrogen	0.24	2.62	1.03
Nitrite plus Nitrate Nitrogen	2.97	5.95	4.39
Total Nitrogen	3.73	6.93	5.42
Total Phosphorus	0.50	0.88	0.64
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.004	0.008	0.006
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0008	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.005	0.004
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.008	0.026	0.016
Dissolved Copper	<0.002	0.010	0.004
Total Iron	0.273	1.417	0.653
Dissolved Iron	0.005	0.007	0.006
Total Lead	0.004	0.012	0.009
Dissolved Lead	0.0023	0.0074	0.0052
Total Manganese	0.0161	0.0969	0.0440
Dissolved Manganese	0.0006	0.0022	0.0015
Total Mercury	<0.00005	0.00010	0.00006
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.018	0.036	0.027
Dissolved Zinc	0.005	0.021	0.008
Fecal Coliform (cfu/100 mL)	10	40	21[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-2: WATER QUALITY AT STATION 22 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.6[b]	29.5[b]	21.5[b]
Total Suspended Solids	16	70	30
Turbidity (NTU)	18[b]	50[b]	26[b]
Conductivity (µS/cm)	715[b]	930[b]	813[b]
Five-Day Biochemical Oxygen Demand	<2	7	4
Dissolved Oxygen	7.9[b]	12.1[b]	9.9[b]
pH (units)	8.0[b]	8.6[b]	8.3[b]
Ammonia Nitrogen	0.05	0.31	0.11
Un-ionized Ammonia	0.002	0.022	0.010
Total Kjeldahl Nitrogen	0.31	1.52	0.85
Nitrite plus Nitrate Nitrogen	2.96	6.23	4.42
Total Nitrogen	3.86	7.32	5.27
Total Phosphorus	0.47	0.84	0.61
Chlorophyll a (µg/L)	20.0	51.6	33.5
Total Cyanide	<0.002	0.004	0.002
Phenols	<0.003	0.007	0.005
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0008
Total Copper	0.008	0.016	0.014
Dissolved Copper	<0.002	0.006	0.003
Total Iron	0.239	1.096	0.504
Dissolved Iron	0.007	0.012	0.008
Total Lead	0.005	0.014	0.009
Dissolved Lead	0.0024	0.0091	0.0052
Total Manganese	0.0208	0.0580	0.0333
Dissolved Manganese	<0.0004	0.0019	0.0011
Total Mercury	<0.00005	0.00009	0.00006
Total Nickel	0.003	0.004	0.003
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.016	0.031	0.022
Dissolved Zinc	0.005	0.009	0.007
Fecal Coliform (cfu/100 mL)	<10	60	19[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-3: WATER QUALITY AT STATION 23 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.5[b]	29.9[b]	21.5[b]
Total Suspended Solids	12	41	27
Turbidity (NTU)	15[b]	61[b]	28[b]
Conductivity (µS/cm)	715[b]	940[b]	816[b]
Five-Day Biochemical Oxygen Demand	3	8	5
Dissolved Oxygen	7.4[b]	12.9[b]	10.0[b]
pH (units)	8.1[b]	8.6[b]	8.3[b]
Ammonia Nitrogen	0.04	0.31	0.15
Un-ionized Ammonia	0.002	0.092	0.023
Total Kjeldahl Nitrogen	0.37	1.54	0.86
Nitrite plus Nitrate Nitrogen	3.01	6.08	4.47
Total Nitrogen	3.75	7.17	5.34
Total Phosphorus	0.49	0.90	0.64
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	<0.003	0.007	0.005
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0011	0.0008
Total Copper	0.010	0.016	0.013
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.190	1.289	0.590
Dissolved Iron	0.006	0.016	0.009
Total Lead	0.005	0.009	0.008
Dissolved Lead	0.0028	0.0089	0.0053
Total Manganese	0.0177	0.0623	0.0382
Dissolved Manganese	0.0005	0.0031	0.0011
Total Mercury	<0.00005	0.00013	0.00007
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.013	0.048	0.026
Dissolved Zinc	0.006	0.014	0.008
Fecal Coliform (cfu/100 mL)	<10	80	21[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-4: WATER QUALITY AT STATION 24 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	29.7[b]	21.1[b]
Total Suspended Solids	16	43	26
Turbidity (NTU)	16[b]	66[b]	29[b]
Conductivity (µS/cm)	719[b]	929[b]	825[b]
Five-Day Biochemical Oxygen Demand	<2	6	4
Dissolved Oxygen	7.8[b]	13.7[b]	10.8[b]
pH (units)	8.2[b]	8.8[b]	8.5[b]
Ammonia Nitrogen	0.02	0.31	0.13
Un-ionized Ammonia	0.001	0.115	0.030
Total Kjeldahl Nitrogen	0.38	1.85	1.18
Nitrite plus Nitrate Nitrogen	2.66	5.18	3.80
Total Nitrogen	3.86	6.85	4.98
Total Phosphorus	0.36	0.93	0.60
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.003	0.008	0.006
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0007	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0010	0.0008
Total Copper	0.009	0.015	0.011
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.228	1.546	0.534
Dissolved Iron	0.005	0.010	0.008
Total Lead	0.005	0.010	0.007
Dissolved Lead	0.0022	0.0076	0.0050
Total Manganese	0.0227	0.0832	0.0415
Dissolved Manganese	0.0005	0.0020	0.0011
Total Mercury	<0.00005	0.00009	0.00006
Total Nickel	0.003	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.050	0.024
Dissolved Zinc	0.004	0.008	0.006
Fecal Coliform (cfu/100 mL)	<10	180	16[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-5: WATER QUALITY AT STATION 25 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	30.2[b]	21.3[b]
Total Suspended Solids	14	44	28
Turbidity (NTU)	17[b]	36[b]	23[b]
Conductivity (µS/cm)	722[b]	930[b]	822[b]
Five-Day Biochemical Oxygen Demand	<2	7	4
Dissolved Oxygen	7.9[b]	15.3[b]	11.0[b]
pH (units)	8.2[b]	8.9[b]	8.5[b]
Ammonia Nitrogen	0.06	0.38	0.20
Un-ionized Ammonia	0.007	0.134	0.033
Total Kjeldahl Nitrogen	0.49	2.00	1.22
Nitrite plus Nitrate Nitrogen	2.74	5.45	3.99
Total Nitrogen	3.87	6.80	5.22
Total Phosphorus	0.39	0.74	0.58
Chlorophyll a (µg/L)	41.5	124.7	66.2
Total Cyanide	<0.002	0.003	0.002
Phenols	0.004	0.014	0.008
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.008	0.018	0.011
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.239	0.919	0.479
Dissolved Iron	0.004	0.009	0.007
Total Lead	0.005	0.009	0.007
Dissolved Lead	0.0022	0.0125	0.0057
Total Manganese	0.0186	0.0588	0.0369
Dissolved Manganese	0.0004	0.0018	0.0010
Total Mercury	<0.00005	0.00015	0.00007
Total Nickel	0.003	0.006	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.036	0.023
Dissolved Zinc	0.004	0.008	0.006
Fecal Coliform (cfu/100 mL)	<10	100	25[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-6: WATER QUALITY AT STATION 26 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.2[b]	28.9[b]	21.0[b]
Total Suspended Solids	18	34	27
Turbidity (NTU)	19[b]	35[b]	26[b]
Conductivity (µS/cm)	716[b]	934[b]	824[b]
Five-Day Biochemical Oxygen Demand	3	9	5
Dissolved Oxygen	8.2[b]	13.5[b]	10.5[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.05	0.25	0.12
Un-ionized Ammonia	0.006	0.068	0.019
Total Kjeldahl Nitrogen	0.44	2.08	1.31
Nitrite plus Nitrate Nitrogen	2.63	5.48	3.95
Total Nitrogen	4.14	7.34	5.25
Total Phosphorus	0.36	0.79	0.56
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.003	0.008	0.006
Total Arsenic	<0.003	0.004	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.007	0.012	0.010
Dissolved Copper	<0.002	0.004	0.002
Total Iron	0.205	0.778	0.419
Dissolved Iron	0.005	0.025	0.011
Total Lead	0.005	0.010	0.008
Dissolved Lead	0.0010	0.0096	0.0044
Total Manganese	0.0190	0.0524	0.0362
Dissolved Manganese	0.0007	0.0040	0.0019
Total Mercury	<0.00005	<0.00006	0.00005
Total Nickel	0.002	0.003	0.003
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.031	0.021
Dissolved Zinc	0.004	0.007	0.006
Fecal Coliform (cfu/100 mL)	<10	30	12[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AV-7: WATER QUALITY AT STATION 27 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.9[b]	27.9[b]	20.9[b]
Total Suspended Solids	17	32	25
Turbidity (NTU)	16[b]	29[b]	23[b]
Conductivity (µS/cm)	714[b]	932[b]	821[b]
Five-Day Biochemical Oxygen Demand	<2	8	5
Dissolved Oxygen	8.6[b]	12.9[b]	11.0[b]
pH (units)	8.2[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.02	0.24	0.09
Un-ionized Ammonia	0.005	0.016	0.011
Total Kjeldahl Nitrogen	0.72	1.47	1.21
Nitrite plus Nitrate Nitrogen	2.24	5.26	3.65
Total Nitrogen	3.34	5.98	4.86
Total Phosphorus	0.33	0.73	0.52
Chlorophyll a (µg/L)	34.8	99.1	62.8
Total Cyanide	<0.002	0.005	0.002
Phenols	0.005	0.011	0.009
Total Arsenic	<0.003	0.006	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.007	0.013	0.010
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.328	0.525	0.445
Dissolved Iron	0.004	0.007	0.006
Total Lead	0.004	0.010	0.008
Dissolved Lead	0.0021	0.0086	0.0054
Total Manganese	0.0272	0.0487	0.0393
Dissolved Manganese	0.0006	0.0026	0.0014
Total Mercury	<0.00005	0.00009	0.00006
Total Nickel	0.002	0.004	0.003
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.015	0.020	0.018
Dissolved Zinc	0.005	0.022	0.009
Fecal Coliform (cfu/100 mL)	<10	50	17[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX VI

WATER QUALITY AT STATIONS 28–41 IN THE UPPER PEORIA POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AVI-1: WATER QUALITY AT STATION 28 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.9[b]	27.8[b]	20.6[b]
Total Suspended Solids	30	46	37
Turbidity (NTU)	24[b]	47[b]	38[b]
Conductivity (µS/cm)	720[b]	931[b]	822[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	8.4[b]	12.6[b]	10.4[b]
pH (units)	8.1[b]	8.6[b]	8.4[b]
Ammonia Nitrogen	0.03	0.18	0.11
Un-ionized Ammonia	0.005	0.015	0.010
Total Kjeldahl Nitrogen	0.68	1.79	1.39
Nitrite plus Nitrate Nitrogen	2.27	5.36	3.81
Total Nitrogen	4.05	6.96	5.20
Total Phosphorus	0.36	0.83	0.58
Chlorophyll a (µg/L)	24.0	101.8	60.0
Total Cyanides	<0.002	0.004	0.002
Phenols	0.007	0.014	0.010
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0019	0.0007
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0010	0.0008
Total Copper	0.008	0.017	0.011
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.644	1.080	0.783
Dissolved Iron	<0.004	0.017	0.008
Total Lead	0.005	0.011	0.008
Dissolved Lead	0.0028	0.0106	0.0047
Total Manganese	0.0340	0.0625	0.0531
Dissolved Manganese	0.0008	0.0028	0.0016
Total Mercury	<0.00005	<0.00006	0.00005
Total Nickel	0.003	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.019	0.027	0.023
Dissolved Zinc	0.003	0.007	0.005
Fecal Coliform (cfu/100 mL)	<10	20	11[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-2: WATER QUALITY AT STATION 29 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	27.8[b]	20.6[b]
Total Suspended Solids	19	56	38
Turbidity (NTU)	22[b]	51[b]	36[b]
Conductivity (µS/cm)	720[b]	931[b]	823[b]
Five-Day Biochemical Oxygen Demand	3	6	4
Dissolved Oxygen	8.3[b]	12.3[b]	10.4[b]
pH (units)	8.0[b]	8.7[b]	8.4[b]
Ammonia Nitrogen	0.02	0.14	0.09
Un-ionized Ammonia	0.004	0.019	0.010
Total Kjeldahl Nitrogen	0.84	1.76	1.31
Nitrite plus Nitrate Nitrogen	2.32	5.30	3.82
Total Nitrogen	3.60	6.87	5.13
Total Phosphorus	0.41	0.94	0.61
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.004	0.014	0.009
Total Arsenic	<0.003	0.006	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0008
Total Copper	0.009	0.013	0.011
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.458	1.104	0.784
Dissolved Iron	<0.004	0.010	0.007
Total Lead	0.006	0.011	0.009
Dissolved Lead	0.0024	0.0079	0.0052
Total Manganese	0.0259	0.0662	0.0525
Dissolved Manganese	0.0006	0.0024	0.0014
Total Mercury	<0.00005	0.00024	0.00008
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.025	0.020
Dissolved Zinc	0.005	0.007	0.006
Fecal Coliform (cfu/100 mL)	<10	30	16[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-3: WATER QUALITY AT STATION 30 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.8[b]	27.7[b]	20.5[b]
Total Suspended Solids	19	67	40
Turbidity (NTU)	23[b]	47[b]	35[b]
Conductivity (µS/cm)	719[b]	905[b]	818[b]
Five-Day Biochemical Oxygen Demand	<2	6	4
Dissolved Oxygen	8.0[b]	12.5[b]	10.3[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	<0.02	0.16	0.07
Un-ionized Ammonia	<0.001	0.013	0.008
Total Kjeldahl Nitrogen	0.70	1.85	1.35
Nitrite plus Nitrate Nitrogen	2.31	6.65	4.10
Total Nitrogen	3.47	7.60	5.45
Total Phosphorus	0.30	0.95	0.59
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.002
Phenols	0.005	0.012	0.009
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0007	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.006	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.007	0.013	0.011
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.408	1.918	0.925
Dissolved Iron	0.004	0.008	0.006
Total Lead	0.007	0.012	0.010
Dissolved Lead	0.0029	0.0087	0.0055
Total Manganese	0.0315	0.0898	0.0567
Dissolved Manganese	0.0009	0.0022	0.0013
Total Mercury	<0.00005	0.00009	0.00006
Total Nickel	0.003	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.015	0.034	0.024
Dissolved Zinc	0.004	0.007	0.006
Fecal Coliform (cfu/100 mL)	<10	120	19[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-4: WATER QUALITY AT STATION 31 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.7[b]	27.9[b]	20.5[b]
Total Suspended Solids	24	48	35
Turbidity (NTU)	29[b]	58[b]	37[b]
Conductivity (µS/cm)	722[b]	902[b]	822[b]
Five-Day Biochemical Oxygen Demand	4	6	5
Dissolved Oxygen	8.3[b]	11.4[b]	10.1[b]
pH (units)	8.0[b]	8.6[b]	8.4[b]
Ammonia Nitrogen	0.07	0.16	0.10
Un-ionized Ammonia	0.005	0.023	0.013
Total Kjeldahl Nitrogen	0.71	1.58	1.23
Nitrite plus Nitrate Nitrogen	2.29	6.49	4.15
Total Nitrogen	3.53	7.70	5.37
Total Phosphorus	0.30	1.31	0.64
Chlorophyll a (µg/L)	35.8	102.5	62.1
Total Cyanide	<0.002	0.004	0.003
Phenols	0.007	0.034	0.013
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	0.0007	0.0011	0.0009
Total Copper	0.010	0.019	0.013
Dissolved Copper	<0.002	0.003	0.003
Total Iron	0.425	1.048	0.769
Dissolved Iron	0.004	0.023	0.009
Total Lead	0.005	0.011	0.009
Dissolved Lead	0.0028	0.0090	0.0055
Total Manganese	0.0331	0.0643	0.0528
Dissolved Manganese	0.0011	0.0031	0.0020
Total Mercury	<0.00005	0.00028	0.00009
Total Nickel	0.002	0.005	0.003
Dissolved Nickel	<0.002	0.003	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.039	0.026
Dissolved Zinc	0.005	0.008	0.006
Fecal Coliform (cfu/100 mL)	<10	200	38[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-5: WATER QUALITY AT STATION 32 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.6[b]	28.0[b]	20.6[b]
Total Suspended Solids	32	121	55
Turbidity (NTU)	28[b]	50[b]	39[b]
Conductivity (µS/cm)	727[b]	902[b]	821[b]
Five-Day Biochemical Oxygen Demand	3	6	5
Dissolved Oxygen	8.2[b]	12.6[b]	10.5[b]
pH (units)	8.2[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.06	0.12	0.09
Un-ionized Ammonia	0.006	0.029	0.017
Total Kjeldahl Nitrogen	0.75	1.80	1.34
Nitrite plus Nitrate Nitrogen	2.25	6.48	4.08
Total Nitrogen	3.80	7.80	5.42
Total Phosphorus	0.28	0.96	0.60
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	0.003	0.012	0.008
Total Arsenic	<0.003	0.005	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0010	0.0005
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.006	0.005
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.007	0.021	0.012
Dissolved Copper	<0.002	0.004	0.003
Total Iron	0.591	3.015	1.309
Dissolved Iron	<0.004	0.033	0.014
Total Lead	0.007	0.021	0.011
Dissolved Lead	0.0015	0.0109	0.0051
Total Manganese	0.0400	0.1237	0.0700
Dissolved Manganese	0.0007	0.0030	0.0017
Total Mercury	<0.00005	0.00006	0.00006
Total Nickel	0.002	0.007	0.004
Dissolved Nickel	<0.002	0.003	0.003
Total Silver	<0.0008	0.0017	0.0010
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.018	0.051	0.028
Dissolved Zinc	0.004	0.010	0.006
Fecal Coliform (cfu/100 mL)	10	320	34[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-6: WATER QUALITY AT STATION 33 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	28.3[b]	20.7[b]
Total Suspended Solids	28	120	50
Turbidity (NTU)	31[b]	61[b]	39[b]
Conductivity (µS/cm)	730[b]	895[b]	822[b]
Five-Day Biochemical Oxygen Demand	<2	6	4
Dissolved Oxygen	8.0[b]	12.5[b]	10.7[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.06	0.25	0.11
Un-ionized Ammonia	0.004	0.023	0.013
Total Kjeldahl Nitrogen	0.73	1.65	1.25
Nitrite plus Nitrate Nitrogen	2.23	6.66	4.08
Total Nitrogen	3.52	7.66	5.33
Total Phosphorus	0.31	1.05	0.59
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.006	0.012	0.009
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0008
Total Copper	0.005	0.014	0.010
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.464	1.260	0.720
Dissolved Iron	0.005	0.021	0.009
Total Lead	0.005	0.012	0.009
Dissolved Lead	0.0034	0.0066	0.0051
Total Manganese	0.0404	0.0908	0.0557
Dissolved Manganese	0.0009	0.0029	0.0014
Total Mercury	<0.00005	<0.00006	0.00005
Total Nickel	0.002	0.007	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.017	0.037	0.023
Dissolved Zinc	0.004	0.006	0.005
Fecal Coliform (cfu/100 mL)	<10	400	21[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-7: WATER QUALITY AT STATION 34 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.2[b]	27.9[b]	20.7[b]
Total Suspended Solids	23	55	36
Turbidity (NTU)	25[b]	65[b]	43[b]
Conductivity (µS/cm)	741[b]	908[b]	827[b]
Five-Day Biochemical Oxygen Demand	4	8	5
Dissolved Oxygen	8.0[b]	12.2[b]	10.5[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.08	0.14	0.10
Un-ionized Ammonia	0.005	0.034	0.016
Total Kjeldahl Nitrogen	0.61	1.82	1.18
Nitrite plus Nitrate Nitrogen	2.20	6.50	3.99
Total Nitrogen	3.68	7.77	5.17
Total Phosphorus	0.28	0.94	0.54
Chlorophyll a (µg/L)	22.7	98.4	59.2
Total Cyanide	<0.002	0.004	0.002
Phenols	<0.003	0.013	0.008
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	0.004	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0005	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	0.0007	0.0012	0.0009
Total Copper	0.008	0.013	0.011
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.399	1.233	0.779
Dissolved Iron	<0.004	0.016	0.008
Total Lead	0.005	0.010	0.008
Dissolved Lead	0.0028	0.0078	0.0046
Total Manganese	0.0366	0.0880	0.0593
Dissolved Manganese	0.0011	0.0021	0.0016
Total Mercury	<0.00005	0.00034	0.00010
Total Nickel	0.002	0.007	0.004
Dissolved Nickel	<0.002	0.004	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.032	0.025
Dissolved Zinc	0.004	0.009	0.005
Fecal Coliform (cfu/100 mL)	<10	560	22[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-8: WATER QUALITY AT STATION 35 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	14.5[b]	27.5[b]	20.5[b]
Total Suspended Solids	29	68	41
Turbidity (NTU)	29[b]	82[b]	47[b]
Conductivity (µS/cm)	729[b]	928[b]	829[b]
Five-Day Biochemical Oxygen Demand	4	7	6
Dissolved Oxygen	7.5[b]	12.3[b]	10.3[b]
pH (units)	8.3[b]	8.8[b]	8.5[b]
Ammonia Nitrogen	0.08	0.18	0.13
Un-ionized Ammonia	0.005	0.037	0.019
Total Kjeldahl Nitrogen	0.83	1.63	1.16
Nitrite plus Nitrate Nitrogen	2.05	6.16	3.80
Total Nitrogen	3.43	7.39	4.96
Total Phosphorus	0.33	0.91	0.55
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	<0.003	0.012	0.007
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0009
Total Copper	0.009	0.013	0.010
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.586	1.831	0.930
Dissolved Iron	0.004	0.017	0.008
Total Lead	0.004	0.011	0.008
Dissolved Lead	0.0026	0.0083	0.0052
Total Manganese	0.0484	0.1016	0.0632
Dissolved Manganese	0.0009	0.0055	0.0020
Total Mercury	<0.00005	0.00007	0.00006
Total Nickel	0.003	0.008	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.017	0.033	0.025
Dissolved Zinc	0.004	0.007	0.005
Fecal Coliform (cfu/100 mL)	<10	520	23[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-9: WATER QUALITY AT STATION 36 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.7[b]	27.9[b]	21.3[b]
Total Suspended Solids	26	76	43
Turbidity (NTU)	30[b]	58[b]	40[b]
Conductivity (µS/cm)	722[b]	926[b]	826[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	7.9[b]	12.4[b]	10.3[b]
pH (units)	8.2[b]	8.8[b]	8.5[b]
Ammonia Nitrogen	0.05	0.19	0.12
Un-ionized Ammonia	0.006	0.035	0.020
Total Kjeldahl Nitrogen	0.91	1.47	1.20
Nitrite plus Nitrate Nitrogen	2.02	6.30	3.83
Total Nitrogen	3.21	7.56	5.03
Total Phosphorus	0.36	0.91	0.56
Chlorophyll a (µg/L)	35.0	74.5	53.9
Total Cyanide	<0.002	0.004	0.002
Phenols	0.004	0.010	0.007
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0010	0.0008
Total Copper	0.008	0.018	0.011
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.535	1.163	0.731
Dissolved Iron	<0.004	0.055	0.014
Total Lead	0.003	0.011	0.007
Dissolved Lead	0.0008	0.0064	0.0037
Total Manganese	0.0451	0.0886	0.0589
Dissolved Manganese	0.0005	0.0024	0.0016
Total Mercury	<0.00005	0.00006	0.00006
Total Nickel	0.003	0.007	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0247	0.0048
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.032	0.022
Dissolved Zinc	0.002	0.014	0.006
Fecal Coliform (cfu/100 mL)	<10	330	25[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-10: WATER QUALITY AT STATION 37 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	17.2[b]	28.0[b]	21.3[b]
Total Suspended Solids	28	69	40
Turbidity (NTU)	24[b]	69[b]	39[b]
Conductivity (µS/cm)	724[b]	912[b]	823[b]
Five-Day Biochemical Oxygen Demand	<2	6	3
Dissolved Oxygen	7.4[b]	13.4[b]	10.3[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.06	0.16	0.11
Un-ionized Ammonia	0.005	0.037	0.019
Total Kjeldahl Nitrogen	0.67	1.50	1.06
Nitrite plus Nitrate Nitrogen	2.08	6.28	3.86
Total Nitrogen	3.19	7.53	4.93
Total Phosphorus	0.27	0.87	0.52
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.004	0.002
Phenols	0.004	0.011	0.008
Total Arsenic	<0.003	0.005	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0008
Total Copper	0.007	0.012	0.010
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.474	1.035	0.729
Dissolved Iron	<0.004	0.012	0.008
Total Lead	0.004	0.012	0.008
Dissolved Lead	0.0028	0.0073	0.0050
Total Manganese	0.0464	0.0778	0.0579
Dissolved Manganese	0.0006	0.0027	0.0015
Total Mercury	<0.00005	0.00006	0.00006
Total Nickel	0.002	0.007	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.024	0.019
Dissolved Zinc	0.003	0.006	0.005
Fecal Coliform (cfu/100 mL)	<10	240	21[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-11: WATER QUALITY AT STATION 38 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.9[b]	28.0[b]	21.4[b]
Total Suspended Solids	34	64	45
Turbidity (NTU)	33[b]	78[b]	52[b]
Conductivity (µS/cm)	726[b]	905[b]	819[b]
Five-Day Biochemical Oxygen Demand	<2	5	3
Dissolved Oxygen	7.3[b]	13.3[b]	10.1[b]
pH (units)	8.3[b]	8.7[b]	8.6[b]
Ammonia Nitrogen	0.07	0.22	0.13
Un-ionized Ammonia	0.005	0.053	0.026
Total Kjeldahl Nitrogen	0.84	1.76	1.25
Nitrite plus Nitrate Nitrogen	2.06	5.86	3.68
Total Nitrogen	3.27	7.61	4.93
Total Phosphorus	0.26	0.81	0.53
Chlorophyll a (µg/L)	36.2	89.7	60.9
Total Cyanide	<0.002	0.003	0.002
Phenols	0.006	0.012	0.009
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0010	0.0005
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.007	0.030	0.013
Dissolved Copper	<0.002	0.003	0.002
Total Iron	0.532	1.170	0.816
Dissolved Iron	0.005	0.023	0.011
Total Lead	0.004	0.011	0.008
Dissolved Lead	0.0034	0.0074	0.0051
Total Manganese	0.0497	0.0879	0.0645
Dissolved Manganese	0.0013	0.0107	0.0036
Total Mercury	<0.00005	0.00008	0.00006
Total Nickel	0.002	0.008	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.016	0.032	0.021
Dissolved Zinc	0.003	0.006	0.004
Fecal Coliform (cfu/100 mL)	<10	270	27[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-12: WATER QUALITY AT STATION 39 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.5[b]	27.5[b]	20.8[b]
Total Suspended Solids	36	78	54
Turbidity (NTU)	42[b]	80[b]	54[b]
Conductivity (µS/cm)	742[b]	892[b]	814[b]
Five-Day Biochemical Oxygen Demand	<2	6	4
Dissolved Oxygen	6.7[b]	12.4[b]	9.8[b]
pH (units)	8.3[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.07	0.22	0.14
Un-ionized Ammonia	0.004	0.049	0.022
Total Kjeldahl Nitrogen	0.74	1.79	1.26
Nitrite plus Nitrate Nitrogen	2.04	5.67	3.51
Total Nitrogen	3.29	7.45	4.77
Total Phosphorus	0.27	0.78	0.51
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	0.005	0.010	0.008
Total Arsenic	<0.003	0.008	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.005	0.004
Dissolved Chromium	0.0007	0.0011	0.0008
Total Copper	0.007	0.020	0.011
Dissolved Copper	<0.002	0.002	0.002
Total Iron	0.647	2.285	1.191
Dissolved Iron	<0.004	0.134	0.028
Total Lead	0.004	0.013	0.009
Dissolved Lead	0.0024	0.0078	0.0053
Total Manganese	0.0552	0.1225	0.0788
Dissolved Manganese	0.0010	0.0128	0.0037
Total Mercury	<0.00005	<0.00006	0.00005
Total Nickel	0.002	0.009	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.014	0.031	0.023
Dissolved Zinc	0.003	0.006	0.004
Fecal Coliform (cfu/100 mL)	<10	10	10[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-13: WATER QUALITY AT STATION 40 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.6[b]	27.4[b]	20.8[b]
Total Suspended Solids	41	62	48
Turbidity (NTU)	40[b]	83[b]	59[b]
Conductivity (µS/cm)	746[b]	903[b]	815[b]
Five-Day Biochemical Oxygen Demand	3	7	5
Dissolved Oxygen	6.4[b]	13.5[b]	9.8[b]
pH (units)	8.4[b]	8.7[b]	8.6[b]
Ammonia Nitrogen	0.07	0.35	0.17
Un-ionized Ammonia	0.006	0.060	0.030
Total Kjeldahl Nitrogen	0.70	1.72	1.16
Nitrite plus Nitrate Nitrogen	1.86	5.69	3.42
Total Nitrogen	2.87	7.34	4.58
Total Phosphorus	0.29	0.64	0.48
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.006	0.003
Phenols	0.006	0.008	0.007
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0005	0.0003
Total Chromium	<0.004	<0.004	0.004
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.008	0.018	0.013
Dissolved Copper	<0.002	0.010	0.004
Total Iron	0.552	1.281	0.920
Dissolved Iron	<0.004	0.035	0.012
Total Lead	0.007	0.010	0.009
Dissolved Lead	0.0031	0.0076	0.0050
Total Manganese	0.0480	0.1319	0.0771
Dissolved Manganese	0.0017	0.0041	0.0026
Total Mercury	<0.00005	0.00020	0.00008
Total Nickel	0.002	0.005	0.004
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.016	0.032	0.022
Dissolved Zinc	0.002	0.011	0.005
Fecal Coliform (cfu/100 mL)	<10	30	12[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVI-14: WATER QUALITY AT STATION 41 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.5[b]	27.7[b]	20.7[b]
Total Suspended Solids	42	86	61
Turbidity (NTU)	42[b]	84[b]	64[b]
Conductivity (µS/cm)	740[b]	899[b]	811[b]
Five-Day Biochemical Oxygen Demand	3	7	5
Dissolved Oxygen	6.4[b]	12.2[b]	9.1[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.1	0.37	0.18
Un-ionized Ammonia	0.007	0.081	0.031
Total Kjeldahl Nitrogen	0.73	2.00	1.31
Nitrite plus Nitrate Nitrogen	1.92	5.65	3.34
Total Nitrogen	3.07	7.44	4.65
Total Phosphorus	0.30	0.68	0.50
Chlorophyll a (µg/L)	43.0	86.9	61.4
Total Cyanide	<0.002	0.004	0.002
Phenols	0.006	0.010	0.008
Total Arsenic	<0.003	0.011	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0009	0.0005
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.005	0.004
Dissolved Chromium	0.0007	0.0012	0.0009
Total Copper	0.007	0.016	0.012
Dissolved Copper	<0.002	0.010	0.004
Total Iron	0.894	2.452	1.366
Dissolved Iron	<0.004	0.022	0.009
Total Lead	0.006	0.014	0.010
Dissolved Lead	0.0013	0.0084	0.0047
Total Manganese	0.0601	0.1466	0.0942
Dissolved Manganese	0.0011	0.0055	0.0029
Total Mercury	<0.00005	0.00020	0.00008
Total Nickel	0.003	0.008	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.022	0.034	0.026
Dissolved Zinc	0.003	0.006	0.004
Fecal Coliform (cfu/100 mL)	<10	10	10[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

APPENDIX VII

WATER QUALITY AT STATIONS 42–49 IN THE LOWER PEORIA POOL DURING MAY, AUGUST, AND OCTOBER 2004

TABLE AVII-1: WATER QUALITY AT STATION 42 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.4[b]	27.9[b]	21.0[b]
Total Suspended Solids	29	62	48
Turbidity (NTU)	45[b]	86[b]	57[b]
Conductivity (µS/cm)	756[b]	893[b]	812[b]
Five-Day Biochemical Oxygen Demand	3	8	4
Dissolved Oxygen	6.0[b]	13.5[b]	9.3[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.09	0.43	0.20
Un-ionized Ammonia	0.004	0.068	0.030
Total Kjeldahl Nitrogen	0.72	2.00	1.22
Nitrite plus Nitrate Nitrogen	2.00	5.73	3.45
Total Nitrogen	3.26	7.73	4.67
Total Phosphorus	0.26	0.62	0.48
Chlorophyll a (µg/L)	26.5	104.6	60.1
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.046	0.013
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0014	0.0009
Total Copper	0.012	0.046	0.019
Dissolved Copper	<0.002	0.008	0.004
Total Iron	0.852	1.354	1.056
Dissolved Iron	0.004	0.328	0.063
Total Lead	0.007	0.013	0.010
Dissolved Lead	0.0036	0.0093	0.0065
Total Manganese	0.0576	0.1128	0.0831
Dissolved Manganese	0.0008	0.0341	0.0071
Total Mercury	<0.00005	0.00016	0.00007
Total Nickel	0.003	0.010	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0012	0.0009
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.018	0.059	0.027
Dissolved Zinc	0.002	0.007	0.004
Fecal Coliform (cfu/100 mL)	<10	10	10[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-2: WATER QUALITY AT STATION 43 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	25.8[b]	20.4[b]
Total Suspended Solids	42	108	72
Turbidity (NTU)	60[b]	119[b]	82[b]
Conductivity (µS/cm)	746[b]	900[b]	813[b]
Five-Day Biochemical Oxygen Demand	<2	5	2
Dissolved Oxygen	5.6[b]	12.5[b]	8.7[b]
pH (units)	8.3[b]	8.7[b]	8.4[b]
Ammonia Nitrogen	0.09	0.26	0.18
Un-ionized Ammonia	0.006	0.043	0.024
Total Kjeldahl Nitrogen	0.74	1.92	1.27
Nitrite plus Nitrate Nitrogen	1.94	5.71	3.34
Total Nitrogen	3.20	7.63	4.61
Total Phosphorus	0.27	0.68	0.50
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	0.005	0.008	0.006
Total Arsenic	<0.003	0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	<0.0003	0.0003
Total Chromium	<0.004	0.007	0.005
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.012	0.022	0.015
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.774	3.493	1.787
Dissolved Iron	0.004	0.027	0.010
Total Lead	0.007	0.020	0.013
Dissolved Lead	<0.0009	0.0080	0.0051
Total Manganese	0.0635	0.1413	0.1032
Dissolved Manganese	0.0013	0.0075	0.0038
Total Mercury	<0.00005	0.00010	0.00006
Total Nickel	0.003	0.007	0.005
Dissolved Nickel	<0.002	0.004	0.003
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.023	0.043	0.034
Dissolved Zinc	0.001	0.006	0.003
Fecal Coliform (cfu/100 mL)	<10	90	16[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-3: WATER QUALITY AT STATION 44 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.0[b]	24.5[b]	19.9[b]
Total Suspended Solids	58	546	161
Turbidity (NTU)	67[b]	168[b]	99[b]
Conductivity (µS/cm)	732[b]	887[b]	804[b]
Five-Day Biochemical Oxygen Demand	<2	10	2
Dissolved Oxygen	6.4[b]	12.5[b]	8.8[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.05	0.31	0.17
Un-ionized Ammonia	0.004	0.042	0.022
Total Kjeldahl Nitrogen	0.75	2.31	1.59
Nitrite plus Nitrate Nitrogen	2.02	5.36	3.05
Total Nitrogen	3.00	7.19	4.64
Total Phosphorus	0.28	1.32	0.64
Chlorophyll a (µg/L)	42.7	175.3	81.1
Total Cyanide	<0.002	0.005	0.003
Phenols	0.003	0.008	0.006
Total Arsenic	<0.003	0.005	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0016	0.0006
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.021	0.008
Dissolved Chromium	<0.0007	0.0012	0.0009
Total Copper	0.012	0.028	0.018
Dissolved Copper	<0.002	0.006	0.003
Total Iron	1.302	11.786	4.047
Dissolved Iron	0.004	0.022	0.011
Total Lead	0.009	0.025	0.015
Dissolved Lead	0.0023	0.0079	0.0050
Total Manganese	0.0815	0.3771	0.1676
Dissolved Manganese	0.0014	0.0222	0.0086
Total Mercury	<0.00005	0.00007	0.00006
Total Nickel	0.004	0.016	0.008
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.025	0.126	0.050
Dissolved Zinc	0.002	0.008	0.005
Fecal Coliform (cfu/100 mL)	<10	10	10[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-4: WATER QUALITY AT STATION 45 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.5[b]	24.8[b]	20.0[b]
Total Suspended Solids	40	106	72
Turbidity (NTU)	59[b]	164[b]	105[b]
Conductivity (µS/cm)	726[b]	885[b]	799[b]
Five-Day Biochemical Oxygen Demand	<2	3	2
Dissolved Oxygen	6.4[b]	12.6[b]	8.9[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.08	0.3	0.16
Un-ionized Ammonia	0.007	0.076	0.028
Total Kjeldahl Nitrogen	0.62	2.20	1.38
Nitrite plus Nitrate Nitrogen	1.45	4.75	2.63
Total Nitrogen	2.30	6.95	4.00
Total Phosphorus	0.24	0.70	0.50
Chlorophyll a (µg/L)	33.7	138.4	82.2
Total Cyanide	<0.002	0.005	0.003
Phenols	0.005	0.008	0.006
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.006	0.005
Dissolved Chromium	<0.0007	0.0011	0.0009
Total Copper	0.009	0.019	0.014
Dissolved Copper	<0.002	0.005	0.003
Total Iron	1.180	3.114	2.011
Dissolved Iron	0.005	0.018	0.008
Total Lead	0.008	0.015	0.011
Dissolved Lead	0.0024	0.0101	0.0055
Total Manganese	0.0772	0.1900	0.1129
Dissolved Manganese	0.0008	0.0030	0.0016
Total Mercury	<0.00005	0.00006	0.00005
Total Nickel	0.004	0.007	0.006
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.021	0.039	0.029
Dissolved Zinc	0.003	0.004	0.004
Fecal Coliform (cfu/100 mL)	<10	10	10[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-5: WATER QUALITY AT STATION 46 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.0[b]	25.4[b]	20.1[b]
Total Suspended Solids	41	90	62
Turbidity (NTU)	60[b]	139[b]	85[b]
Conductivity (µS/cm)	728[b]	882[b]	799[b]
Five-Day Biochemical Oxygen Demand	<2	8	3
Dissolved Oxygen	6.8[b]	13.3[b]	9.0[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.04	0.24	0.13
Un-ionized Ammonia	0.003	0.065	0.022
Total Kjeldahl Nitrogen	0.65	2.09	1.35
Nitrite plus Nitrate Nitrogen	1.34	4.43	2.51
Total Nitrogen	2.22	6.46	3.85
Total Phosphorus	0.27	0.67	0.50
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	0.004	0.008	0.006
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	0.003	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	0.0008	0.0004
Total Chromium	<0.004	0.005	0.004
Dissolved Chromium	<0.0007	0.0010	0.0009
Total Copper	0.006	0.016	0.012
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.992	2.274	1.499
Dissolved Iron	<0.004	0.024	0.009
Total Lead	0.008	0.014	0.011
Dissolved Lead	0.0033	0.0081	0.0053
Total Manganese	0.0693	0.1830	0.1087
Dissolved Manganese	0.0009	0.0040	0.0022
Total Mercury	<0.00005	0.00008	0.00006
Total Nickel	0.003	0.006	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.020	0.036	0.026
Dissolved Zinc	0.002	0.007	0.004
Fecal Coliform (cfu/100 mL)	<10	50	21[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-6: WATER QUALITY AT STATION 47 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.9[b]	25.7[b]	20.7[b]
Total Suspended Solids	50	121	68
Turbidity (NTU)	52[b]	167[b]	87[b]
Conductivity (µS/cm)	738[b]	880[b]	802[b]
Five-Day Biochemical Oxygen Demand	<2	6	3
Dissolved Oxygen	6.3[b]	13.2[b]	9.0[b]
pH (units)	8.4[b]	8.7[b]	8.6[b]
Ammonia Nitrogen	0.06	0.18	0.13
Un-ionized Ammonia	0.008	0.071	0.029
Total Kjeldahl Nitrogen	0.63	2.03	1.27
Nitrite plus Nitrate Nitrogen	1.23	4.84	2.52
Total Nitrogen	2.34	6.81	3.79
Total Phosphorus	0.27	0.70	0.51
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.005	0.003
Phenols	0.003	0.008	0.006
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	0.004	0.002
Total Cadmium	<0.0004	<0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0003	0.0003
Total Chromium	<0.004	0.006	0.004
Dissolved Chromium	<0.0007	0.0009	0.0008
Total Copper	0.008	0.016	0.013
Dissolved Copper	<0.002	0.004	0.003
Total Iron	1.066	3.089	1.693
Dissolved Iron	<0.004	0.012	0.008
Total Lead	0.007	0.015	0.011
Dissolved Lead	0.0024	0.0114	0.0060
Total Manganese	0.0691	0.2136	0.1155
Dissolved Manganese	0.0008	0.0025	0.0014
Total Mercury	<0.00005	0.00015	0.00007
Total Nickel	0.003	0.010	0.005
Dissolved Nickel	<0.002	0.002	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.020	0.049	0.027
Dissolved Zinc	0.003	0.006	0.004
Fecal Coliform (cfu/100 mL)	20	10,000	286[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-7: WATER QUALITY AT STATION 48 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	16.1[b]	26.0[b]	20.7[b]
Total Suspended Solids	44	102	69
Turbidity (NTU)	55[b]	128[b]	78[b]
Conductivity (µS/cm)	741[b]	879[b]	808[b]
Five-Day Biochemical Oxygen Demand	<2	7	3
Dissolved Oxygen	6.2[b]	13.6[b]	9.0[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	<0.02	0.37	0.15
Un-ionized Ammonia	0.000	0.043	0.023
Total Kjeldahl Nitrogen	0.73	2.60	1.42
Nitrite plus Nitrate Nitrogen	1.30	4.93	2.54
Total Nitrogen	2.30	7.53	3.97
Total Phosphorus	0.26	0.73	0.51
Chlorophyll a (µg/L)	42.2	143.3	84.4
Total Cyanide	<0.002	0.005	0.002
Phenols	<0.003	0.007	0.005
Total Arsenic	<0.003	<0.003	0.003
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0005	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.004	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.008	0.016	0.013
Dissolved Copper	<0.002	0.005	0.003
Total Iron	1.244	2.060	1.591
Dissolved Iron	<0.004	0.020	0.009
Total Lead	0.007	0.012	0.011
Dissolved Lead	<0.0009	0.0105	0.0056
Total Manganese	0.0791	0.1829	0.1180
Dissolved Manganese	0.0007	0.0025	0.0014
Total Mercury	<0.00005	0.00007	0.00006
Total Nickel	0.002	0.006	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	<0.0008	0.0008
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.021	0.038	0.027
Dissolved Zinc	0.002	0.009	0.004
Fecal Coliform (cfu/100 mL)	10	3,000	210[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.

TABLE AVII-8: WATER QUALITY AT STATION 49 IN THE ILLINOIS RIVER
MAY, AUGUST, AND OCTOBER 2004

Constituents[a]	Minimum	Maximum	Mean
Water Temperature (°C)	15.8[b]	26.1[b]	20.7[b]
Total Suspended Solids	47	88	64
Turbidity (NTU)	2[b]	125[b]	69[b]
Conductivity (µS/cm)	742[b]	886[b]	808[b]
Five-Day Biochemical Oxygen Demand	3	6	4
Dissolved Oxygen	6.1[b]	13.6[b]	9.0[b]
pH (units)	8.4[b]	8.7[b]	8.5[b]
Ammonia Nitrogen	0.06	0.27	0.17
Un-ionized Ammonia	0.005	0.055	0.023
Total Kjeldahl Nitrogen	0.67	2.04	1.38
Nitrite plus Nitrate Nitrogen	1.31	4.89	2.54
Total Nitrogen	2.34	6.93	3.92
Total Phosphorus	0.29	0.69	0.52
Chlorophyll a (µg/L)	No Data	No Data	No Data
Total Cyanide	<0.002	0.003	0.002
Phenols	0.003	0.009	0.006
Total Arsenic	<0.003	0.007	0.004
Dissolved Arsenic	<0.002	<0.002	0.002
Total Cadmium	<0.0004	0.0004	0.0004
Dissolved Cadmium	<0.0003	0.0004	0.0003
Total Chromium	<0.004	0.006	0.004
Dissolved Chromium	<0.0007	0.0011	0.0008
Total Copper	0.009	0.018	0.014
Dissolved Copper	<0.002	0.005	0.003
Total Iron	0.766	2.562	1.514
Dissolved Iron	0.004	0.009	0.006
Total Lead	0.006	0.015	0.011
Dissolved Lead	0.0030	0.0101	0.0064
Total Manganese	0.0703	0.1862	0.1159
Dissolved Manganese	0.0006	0.0026	0.0012
Total Mercury	<0.00005	0.00008	0.00006
Total Nickel	0.004	0.007	0.005
Dissolved Nickel	<0.002	0.003	0.002
Total Silver	<0.0008	0.0304	0.0057
Dissolved Silver	<0.0003	<0.0003	0.0003
Total Zinc	0.022	0.067	0.036
Dissolved Zinc	0.003	0.005	0.004
Fecal Coliform (cfu/100 mL)	10	2,200	179[c]

[a]Expressed in mg/L except where noted.
[b]Field measurement.
[c]Geometric mean.