Metropolitan Water Reclamation District of Greater Chicago

MONITORING AND RESEARCH DEPARTMENT

REPORT NO. 09-49

CONTINUOUS DISSOLVED OXYGEN MONITORING IN CHICAGO AREA WADEABLE STREAMS DURING 2008

August 2009

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August 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

ACKNOWLEDGMENT

Thanks are extended to staff from the Industrial Waste Division who deployed and retrieved the water quality monitors weekly during the study. Special thanks to Richard Schackart, Justin Vick, Colleen Joyce, Angel Whitington, and Panu Lansiri, for downloading and servicing the monitors.

Thanks are also extended to Dr. Thomas Granato, Assistant Director of Research and Development, Environmental Monitoring and Research Division, for his helpful review of the draft report.

We thank Robert Larson, Illinois State Water Survey, for designing the Access® database program, and Roger Smith, Senior Program Analyst, Information Technology Department, for modifying the database program. Their help with the Access® program is greatly appreciated.

We thank Dr. Zainul Abedin, Biostatistician, for modifying the database program and for performing the calculations for the data summaries used in this report.

Particular thanks are due to Rhonda Griffith for formatting, editing, and preparing the report for print.

DISCLAIMER

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

INTRODUCTION

The Metropolitan Water Reclamation District of Greater Chicago (District) began monitoring the Chicago Waterway System (CWS) (Lanyon 2002) with continuous dissolved oxygen monitors in 1998. The initial project involved monitoring the Chicago River System and later expanded into the Calumet River System. The Continuous Dissolved Oxygen Monitoring (CDOM) program was developed to identify reaches of the waterways where the dissolved oxygen (DO) concentrations were below the DO standards established by the Illinois Pollution Control Board (IPCB). In 2005 the CDOM program expanded again and started monitoring the Chicago area wadeable streams.

Low DO levels can be caused by a multitude of sources including low gradient streams, dams, combined sewer overflow (CSO), storm water runoff, wastewater effluents, thermal discharges, respiration, decomposition, and chemical reactions. Illinois streams that are found to not meet the state DO standards are placed on the 303(d) list of impaired waters by the Illinois Environmental Protection Agency (IEPA, 2008).

To better understand the DO concentrations in the wadeable streams within the Chicago area, monitoring locations were chosen to measure DO levels above and below discharges, impoundments, and major confluences. Thirteen wadeable sites were chosen within the Chicago River System, Upper Des Plaines River System, and Calumet River System.

One monitoring location was chosen on the North Branch of the Chicago River. This location is upstream of the North Branch Dam. The North Branch watershed encompasses 113 square miles and is located both in Lake and Cook counties (Ogata, 1975).

Eight monitoring locations were chosen in the Upper Des Plaines River System. Four sites are on the Upper Des Plaines River and four sites are in Salt Creek. The entire Des Plaines River watershed covers approximately 700 square miles and originates in Wisconsin. The area within the District's jurisdiction flows southward through a highly urbanized watershed from the Lake-Cook County line to Highway 171, at which point it flows southwestward, parallel and adjacent to the Chicago Sanitary and Ship Canal (CSSC), to Lockport (Schmeelk, et al., 1979). Salt Creek is an approximately 150 square mile watershed originating with the confluence of several small streams west of Palatine, Illinois (Polls, Lanyon, and Lue-Hing, 1979). Salt Creek is a tributary to the Des Plaines River and their confluence is located in the town of Lyons.

Four monitoring locations were chosen in the Calumet River System including two locations on both the Grand Calumet River and the Little Calumet River. The Grand Calumet River originates in Gary, Indiana and flows 13 miles through the heavily industrialized cities of Gary, East Chicago, and Hammond before entering the District's jurisdiction. The Little Calumet River basin is located in northeastern Illinois and northwestern Indiana. The watershed drains an area of 242 square miles, 151.2 square miles of which are in Illinois (Northeastern Illinois Planning Commission, 1981).

This report covers the monitoring results for the period January 2008 through December 2008 for wadeable streams in the Chicago River System, Upper Des Plaines River System, and Calumet River System.

MONITORING STATIONS

Locations and Descriptions

The CDOM Program and the Ambient Water Quality Monitoring (AWQM) Program supply the District with water quality data throughout the year for both the wadeable streams and deep-draft waterways within its jurisdiction. All stations for both programs are shown in Figure 1. Descriptions of the wadeable CDOM stations are listed in Table 1.

Continuous monitoring at Hohman Avenue on the Grand Calumet River and Wentworth Avenue on the Little Calumet River was discontinued in 2008 due to difficulties with sediment interference. Continuous monitoring at Ogden Avenue and Material Service Road on the Des Plaines River was suspended from the end of April until the beginning of December 2008 to allow for additional continuous monitoring in the Calumet-Sag Channel.

Designated Uses

The IPCB has assigned water uses for specific water bodies within the state of Illinois. All waters in Illinois are designated for General Use, except those selected as Secondary Contact and Indigenous Aquatic Life Waters (Secondary Contact).

In the Chicago and Calumet River Systems, General Use Waters include the North Shore Channel from Lake Michigan to the North Side Water Reclamation Plant (WRP), the deep-draft Chicago and Calumet Rivers, and the wadeable streams of the Chicago, Des Plaines, and Calumet River Systems.

Secondary Contact Waters include the North Shore Channel from the North Side WRP to the North Branch Chicago River, the North Branch Chicago River from the North Shore Channel to the Chicago River, the South Branch Chicago River, Bubbly Creek, the CSSC, the Grand Calumet River, the deep-draft portion of the Little Calumet River, the Calumet-Sag Channel, and the Des Plaines River from its confluence with the CSSC to the Interstate Highway 55 bridge southwest of Joliet.

Water Quality Standards

The IPCB has established water quality standards for DO in both General Use and Secondary Contact Waters. In General Use Waters, the DO shall not be less than 6.0 mg/L during 16 hours of any 24-hour period, nor less than 5.0 mg/L at any time. In Secondary Contact Waters, the DO shall not be less than 4.0 mg/L at any time, except in the Calumet-Sag Channel where the DO shall not be less than 3.0 mg/L at any time. For this report, we have selected the 5.0 mg/L DO standard when calculating percent compliance for General Use Waters. On December 18, 2008 the United States Environmental Protection Agency approved new DO standards for General Use Waters in the state of Illinois. These new General Use DO standards will be used in the 2009 CDOM report.

MATERIALS AND METHODS

Water Quality Monitor

The continuous water quality monitors (monitor) used to collect these data were manufactured by YSI Incorporated (YSI) of Yellow Springs, Ohio. DO was measured hourly using the YSI Model 6920 or Model 6600 monitor. In order to protect and safeguard the monitors from marine navigation and vandalism, the monitors were deployed in the field in stainless steel pipes. Installation designs resulted in a fixed length of pipe at each location with multiple 2-inch circular openings on the submerged end to allow sufficient flow of water through the pipe. Each monitor housing was vertically mounted on the side of a bridge abutment with an access hatch on the top end to allow for the exchange of monitors.

Servicing the monitors followed a weekly schedule. Industrial Waste Division personnel retrieved each monitor from the field following seven days of continuous monitoring. Prior to retrieval, a water sample for DO analysis was collected next to the protective housing. An additional monitor, that had been previously calibrated and serviced in the laboratory, was then deployed to replace the retrieved monitor. The retrieved monitors were returned to the laboratory for data downloading, exterior cleaning, servicing, and calibration of the DO sensors. The monitors were temporarily stored in holding tanks containing tap water for subsequent deployment during the following week.

Data Management and Review

Hourly DO data were directly exported electronically from individual monitors to a specially designed Access® database for data processing and storage. Following data downloading, the weekly DO data were carefully reviewed for accuracy.

The review process included the following:

1. Comparing a grab sample DO concentration measured in the field with a DO concentration recorded by a retrieved monitor (DO rejection criteria = difference greater than 2.0 mg/L).

2. Comparing the last hourly DO concentration measured by a retrieved monitor with the first hourly DO concentration recorded by a deployed monitor (DO rejection criteria = difference greater than 2.0 mg/L).

3. Comparing a DO concentration measured in a laboratory holding tank and a DO concentration recorded by a retrieved monitor (DO rejection criteria = difference greater than 1.0 mg/L).

Criterion 3 would entail rejection of all hourly readings; criteria 1 and 2 may or may not reject all readings.

After careful review of the DO data, weekly summary statistics (mean, minimum, maximum, and percent observations above DO standard), and individual line drawings for each monitoring station showing hourly DO concentrations were prepared.

Verification of Representative Data

During the spring, summer, and fall of 2008, cross-sectional DO surveys were conducted in the Chicago River System, Calumet River System, and Des Plaines River System to determine if a fixed continuous monitoring location represented the DO concentration across the waterway. Verification was achieved by comparing the DO concentrations measured in grab samples at multiple fixed locations and depths across the waterway with the fixed monitor measurements. The results from the cross-sectional surveys clearly showed that the differences across the waterway were generally minimal (coefficient of variation < 10%) and equivalent (< 2 mg/L difference) to the DO concentration measured by the monitor at the fixed locations.

RESULTS

The annual minimum, maximum, and mean DO concentrations measured at all 11 stations during 2008 are shown in Table 2.

The number and percent of measured DO concentrations rejected and removed from the Access® database following review during 2008 are summarized in Table 3.

The number and percent of DO concentrations above the applicable IPCB DO standard for each waterway during 2008 are presented in Table 4. The DO data shown in Table 4 do not include the DO concentrations rejected during the data review.

Table 5 shows the percent distribution of DO concentrations from <1.0 mg/L to >5.0 mg/L at the 11 monitoring stations during 2008. The current national one-day minimum dissolved oxygen criterion for adult life stages of fish is 3.0 mg/L (Chapman, 1986).

Individual line drawings showing hourly DO concentrations at each monitoring station are indicated in Figure 2 through Figure 12.

Weekly DO summary statistics during 2008 are presented for each monitoring station in Appendix A, Tables A-1 through A-11.

Summary statistics for dissolved oxygen measurements made during cross-sectional surveys are shown in Appendix Table A-12.

DO Fluctuations

DO concentrations fluctuate seasonally and daily in the aquatic environment. Cold water holds more DO than warm water, a trend that can typically be seen in annual DO graphs where the colder months have higher mean DO concentrations than the warmer months. Daily fluctuations in DO can be caused by photosynthesis during daylight hours causing a surplus of DO, and conversely, respiration by aquatic plants and algae during the night, resulting in a deficiency of DO. Other deficiencies of DO can occur when oxygen demanding materials are introduced into a waterway or by thermal discharges. Oxygen demanding materials enter a waterway most often through wastewater treatment effluents, CSOs, and stormwater run-off. Wastewater treatment effluents and CSOs contain organic materials that are decomposed by microorganisms which consume DO in the process. Stormwater run-off also can flush organic materials into the waterway. This is most evident during heavy rain storms that result in CSO events containing untreated waste and stormwater. The District Web site (www.mwrd.org) has information regarding CSO events which can be found in the Services and Facilites Section under the title “Combined Sewer Overflows.”

TABLE 1: WADEABLE STREAM CONTINUOUS DISSOLVED OXYGEN MONITORING STATIONS

Monitoring Station	Waterway	Description of Monitoring Station
	Chicago River System	
Central Park Avenue	North Branch Chicago River	0.8 mile above junction with North Shore Channel, water quality monitor on northeast side of Central Park Avenue bridge, 2 feet below water surface.
	Des Plaines River System	
Devon Avenue	Des Plaines River	0.7 mile above junction with Willow Creek, water quality monitor on northwest side of Devon Avenue bridge, 2 feet below water surface.
Irving Park Road	Des Plaines River	3.1 miles below junction with Willow Creek, water quality monitor on northeast side of Irving Park Road bridge, 2 feet below water surface.
Ogden Avenue	Des Plaines River	1.7 miles below junction with Salt Creek, 25.8 miles above junction with Chicago Sanitary and Ship Canal, water quality monitor on center of south side of Ogden Avenue bridge, 2 feet below water surface.
Material Service Road	Des Plaines River	3.2 miles above junction with Chicago Sanitary & Ship Canal, water quality monitor on center of northwest side of Material Service Road bridge, 2 feet below water surface.

TABLE 1 (Continued): WADEABLE STREAM CONTINUOUS DISSOLVED OXYGEN MONITORING STATIONS

Monitoring Station	Waterway	Description of Monitoring Station
	Des Plaines River System (Continued)	
Busse Lake Dam	Salt Creek	0.1 mile above Egan WRP outfall, water quality monitor on bike path bridge support, downstream of Busse Woods South Dam, in center of creek, 2 feet below water surface.
JFK Boulevard	Salt Creek	0.8 mile below Egan WRP outfall, water quality monitor on southeast side of JFK Boulevard bridge, 2 feet below water surface.
Thorndale Avenue	Salt Creek	2.6 miles below Egan WRP outfall, water quality monitor on southeast side of Thorndale Avenue bridge, 2 feet below water surface.
Wolf Road	Salt Creek	8.0 miles above junction with Des Plaines River, water quality monitor on northwest side of Wolf Road bridge, 1 foot below water surface.
	Calumet River System	
Torrence Avenue	Grand Calumet River	150 feet above junction with Calumet River, 100 feet below Torrence Avenue bridge, water quality monitor attached to bridge abutment on southeast side of river, 2 feet below water surface.

TABLE 1 (Continued): WADEABLE STREAM CONTINUOUS DISSOLVED OXYGEN MONITORING STATIONS

Monitoring Station	Waterway	Description of Monitoring Station
	Calumet River System (Continued)	
Ashland Avenue	Little Calumet River	0.5 mile above junction with Calumet-Sag Channel, water quality monitor attached to east side of Ashland Avenue bridge, 2 feet below water surface.

TABLE 2: MINIMUM, MAXIMUM, AND MEAN HOURLY DISSOLVED OXYGEN CONCENTRATIONS[1]

Monitoring Station	Waterway	DO Concentration (mg/L)		
		Minimum	Maximum	Mean
	Chicago River System			
Central Park Avenue	North Branch Chicago River	3.0	13.4	8.4
	Des Plaines River System			
Devon Avenue	Des Plaines River	4.1	17.2	9.7
Irving Park Road	Des Plaines River	3.6	14.7	8.7
Ogden Avenue	Des Plaines River	9.0	15.0	12.3
Material Service Road	Des Plaines River	8.7	17.2	12.5
Busse Lake Dam	Salt Creek	2.1	14.8	10.2
JFK Boulevard	Salt Creek	4.6	13.4	9.4
Thorndale Avenue	Salt Creek	4.5	15.6	9.4
Wolf Road	Salt Creek	2.5	21.3	9.7
	Calumet River System			
Torrence Avenue	Grand Calumet River	0.0	34.9	8.6
Ashland Avenue	Little Calumet River	0.0	18.8	8.1

[1]Dissolved oxygen was measured hourly using a YSI Model 6920 or Model 6600 continuous water quality monitor.

TABLE 3: NUMBER AND PERCENT OF DISSOLVED OXYGEN VALUES NOT MEETING ACCEPTANCE CRITERIA[1]

Monitoring Station	Waterway	Number of DO Values Rejected	Percent of DO Values Rejected
	Chicago River System		
Central Park Avenue	North Branch Chicago River	1,014	12
	Des Plaines River System		
Devon Avenue	Des Plaines River	841	10
Irving Park Road	Des Plaines River	1,188	14
Ogden Avenue	Des Plaines River	1,006	42
Material Service Road	Des Plaines River	0	0
Busse Lake Dam	Salt Creek	1,249	14
JFK Boulevard	Salt Creek	170	2
Thorndale Avenue	Salt Creek	537	6
Wolf Road	Salt Creek	579	7
	Calumet River System		
Torrence Avenue	Grand Calumet River	852	10
Ashland Avenue	Little Calumet River	341	4

[1]Dissolved oxygen was measured hourly using a YSI Model 6920 or Model 6600 continuous water quality monitor. DO values were rejected based on quality control check and/or operational problems with monitor.

TABLE 4: NUMBER AND PERCENT OF DISSOLVED OXYGEN VALUES MEASURED ABOVE THE ILLINOIS POLLUTION CONTROL BOARD'S WATER QUALITY STANDARD[1]

Monitoring Station	Waterway	IPCB DO Standard	Number of DO Values	Number Above Standard	Percent Above Standard
	Chicago River System				
Central Park Avenue	North Branch Chicago River	5.0	7,770	7,116	92
	Des Plaines River System				
Devon Avenue	Des Plaines River	5.0	7,943	7,809	98
Irving Park Road	Des Plaines River	5.0	7,596	7,257	96
Ogden Avenue	Des Plaines River	5.0	2,399	2,399	100
Material Service Road	Des Plaines River	5.0	3,405	3,405	100
Busse Lake Dam	Salt Creek	5.0	7,535	7,440	99
JFK Boulevard	Salt Creek	5.0	8,614	8,583	>99
Thorndale Avenue	Salt Creek	5.0	8,247	8,208	>99
Wolf Road	Salt Creek	5.0	8,205	8,066	98
	Calumet River System				
Torrence Avenue	Grand Calumet River	4.0	7,932	6,093	77
Ashland Avenue	Little Calumet River	5.0	8,443	6,447	76

[1]Dissolved oxygen was measured hourly using a YSI Model 6920 or Model 6600 continuous water quality monitor.

TABLE 5: PERCENT OF DISSOLVED OXYGEN VALUES IN SELECTED RANGES

Monitoring Station	Waterway	Percent of DO Values in Range (mg/L) 0-<1	1-<2	2-<3	3-<4	4-<5	≥5
	Chicago River System						
Central Park Avenue	North Branch Chicago River	0	0	0	1	7	92
	Des Plaines River System						
Devon Avenue	Des Plaines River	0	0	0	0	2	98
Irving Park Road	Des Plaines River	0	0	0	<1	4	96
Ogden Avenue	Des Plaines River	0	0	0	0	0	100
Material Service Road	Des Plaines River	0	0	0	0	0	100
Busse Lake Dam	Salt Creek	0	0	<1	<1	1	99
JFK Boulevard	Salt Creek	0	0	0	0	<1	>99
Thorndale Avenue	Salt Creek	0	0	0	0	<1	>99
Wolf Road	Salt Creek	0	0	<1	<1	1	98
	Calumet River System						
Torrence Avenue	Grand Calumet River	7	5	6	6	5	71
Ashland Avenue	Little Calumet River	<1	<1	1	9	13	76

FIGURE 1: CONTINUOUS DISSOLVED OXYGEN MONITORING AND AMBIENT WATER QUALITY MONITORING SAMPLE STATIONS

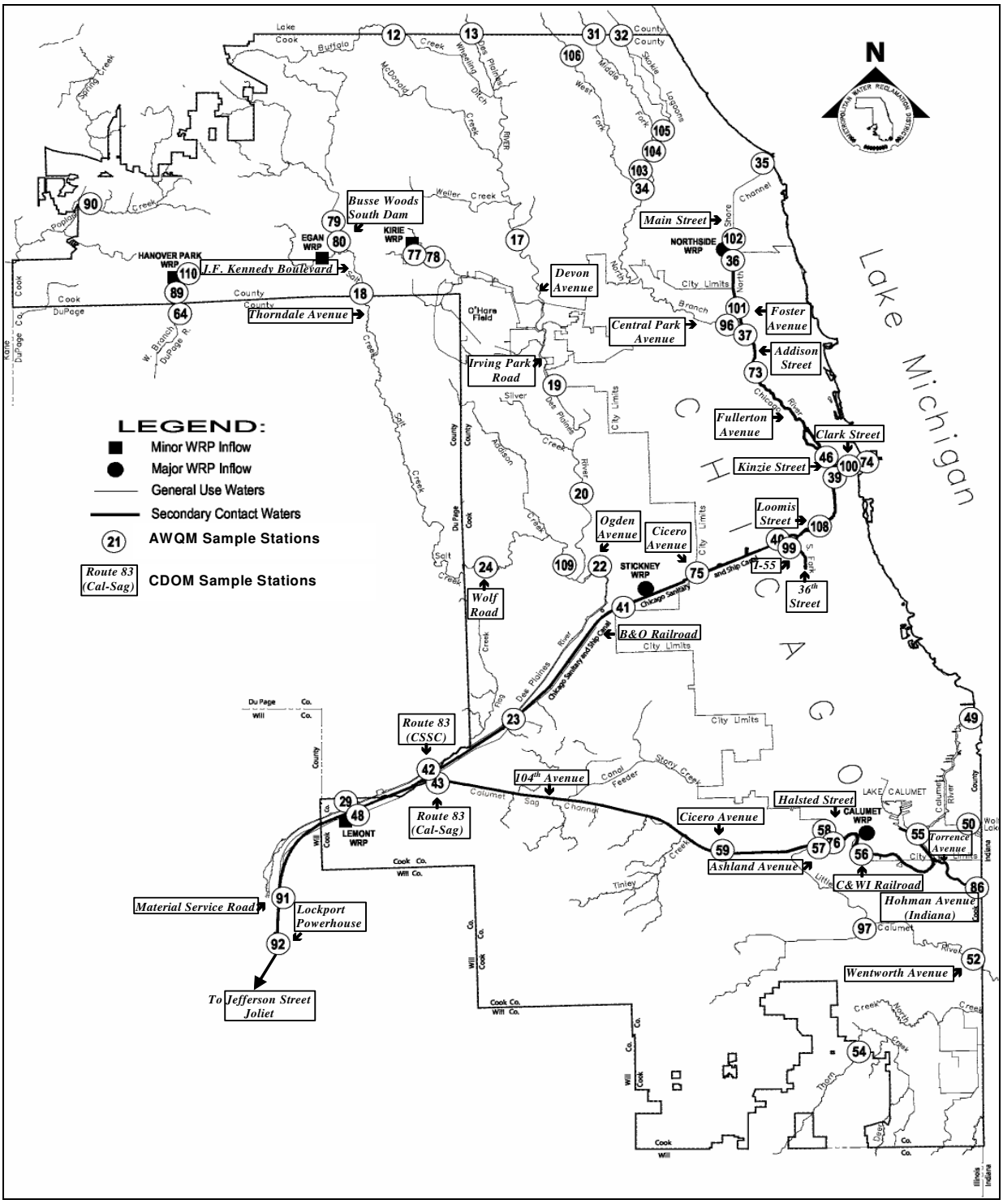


FIGURE 2: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT CENTRAL PARK AVENUE ON THE NORTH BRANCH CHICAGO RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

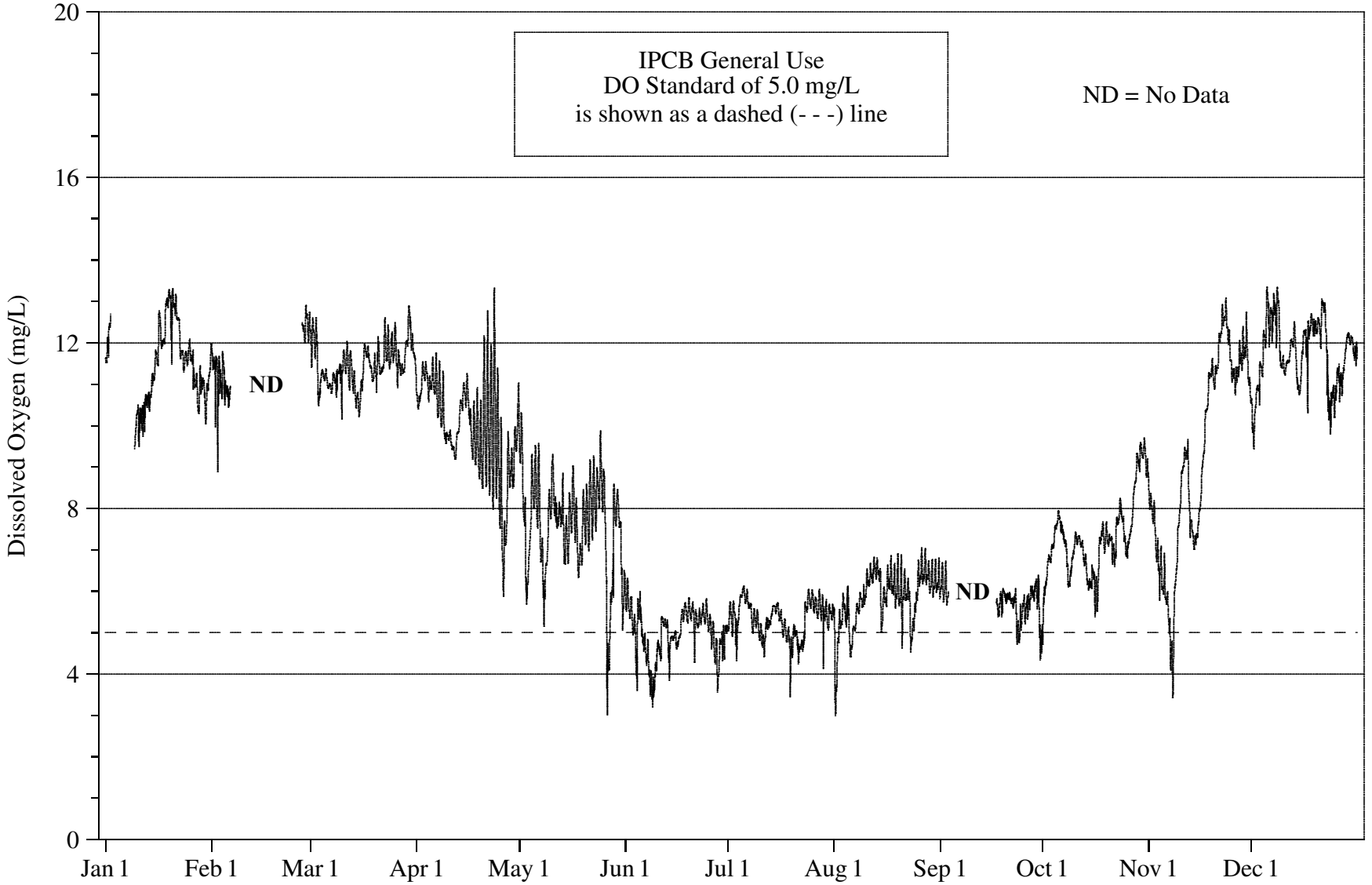


FIGURE 3: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT DEVON AVENUE ON THE DES PLAINES RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

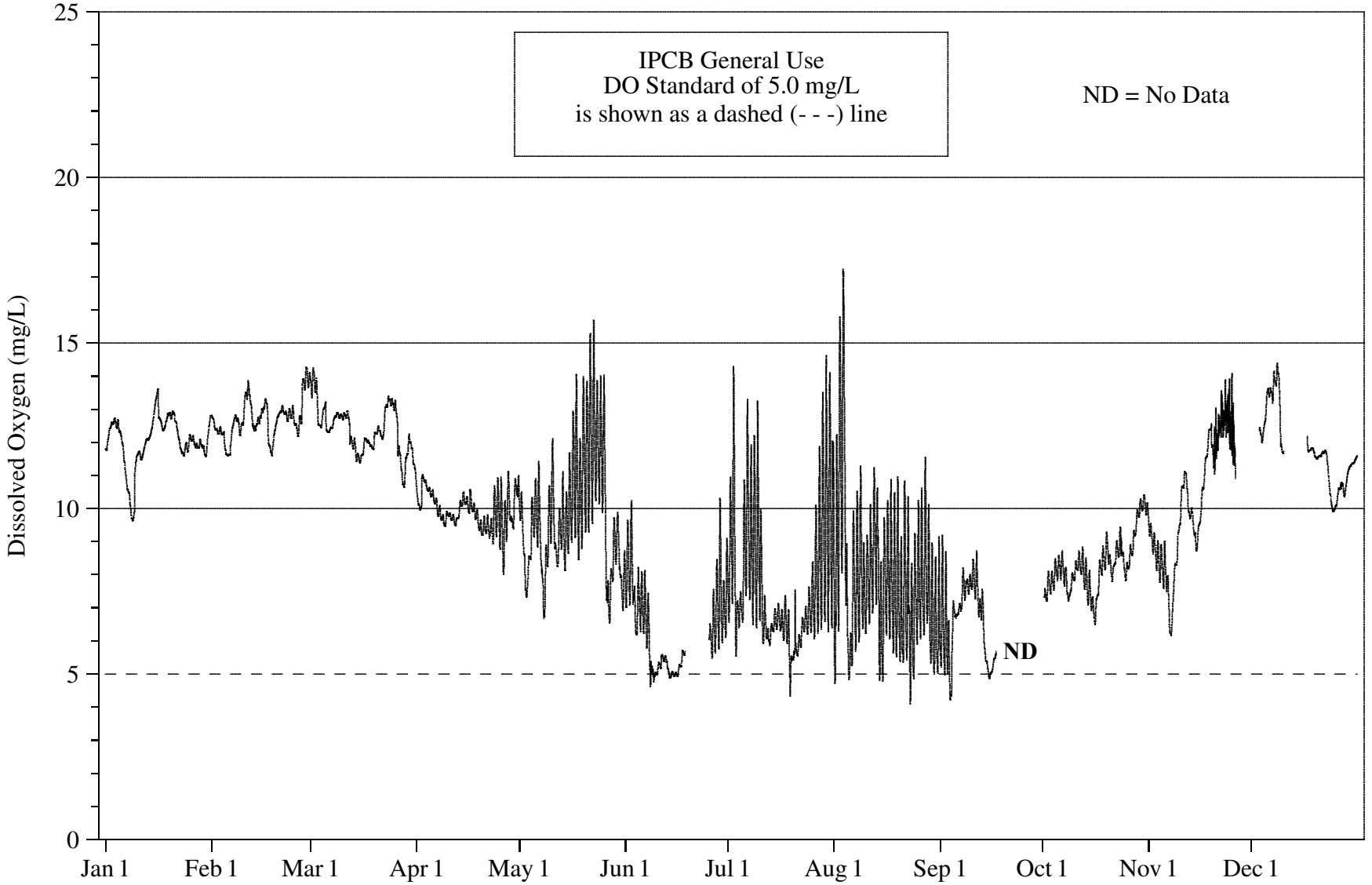


FIGURE 4: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT IRVING PARK ROAD ON THE DES PLAINES RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

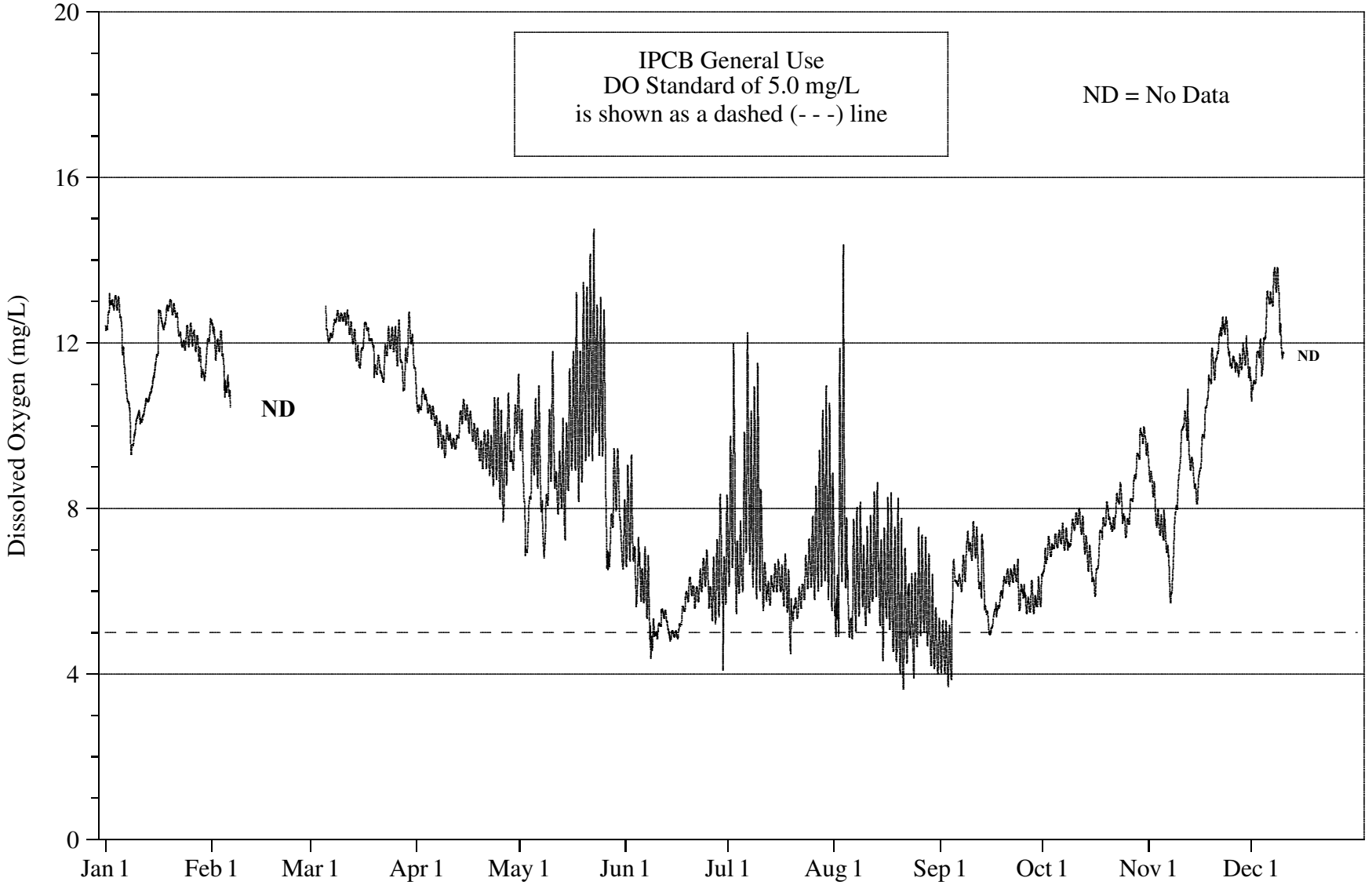


FIGURE 5: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT OGDEN AVENUE
ON THE DES PLAINES RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

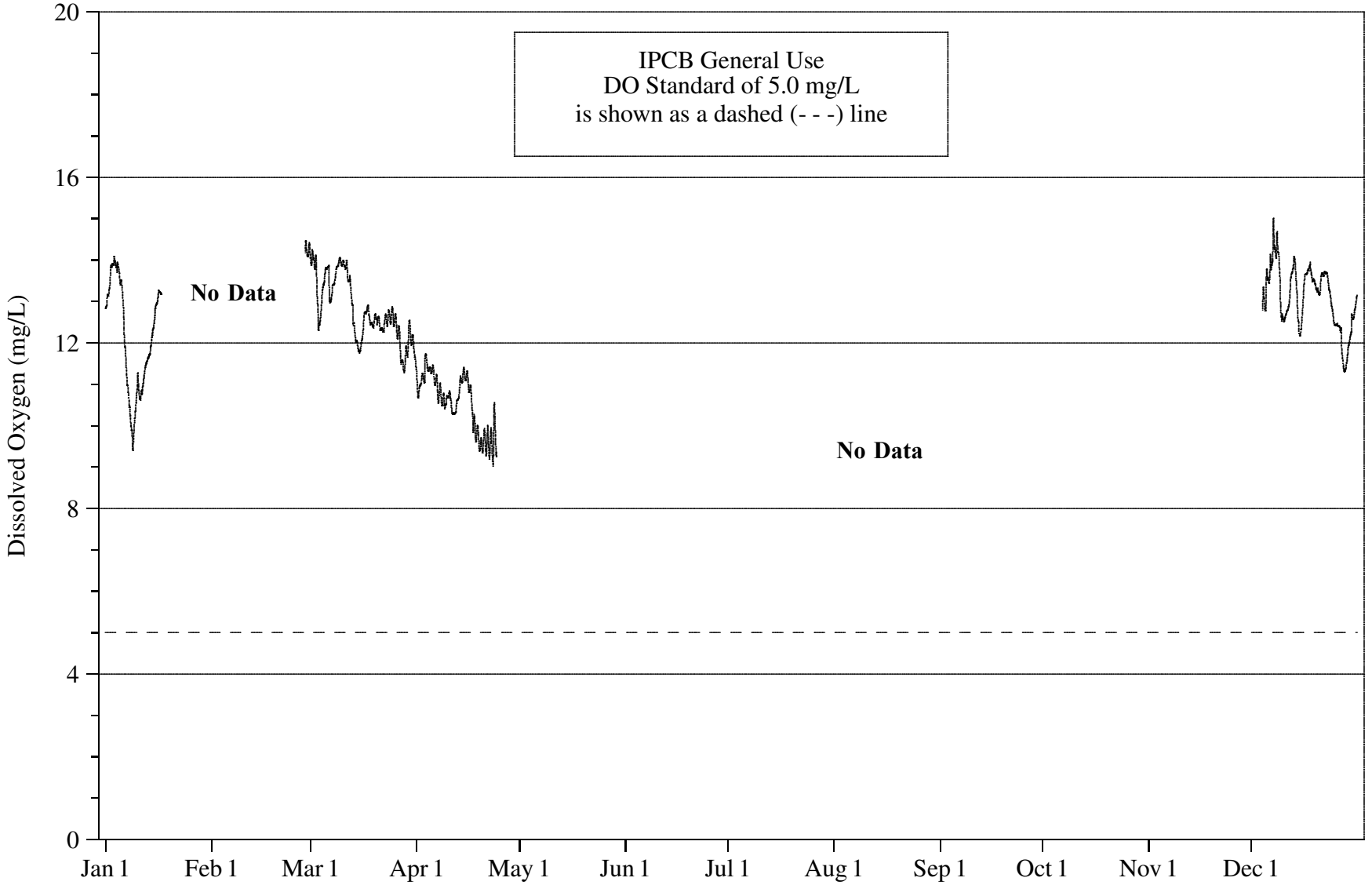


FIGURE 6: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT MATERIAL SERVICE ROAD ON THE DES PLAINES RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

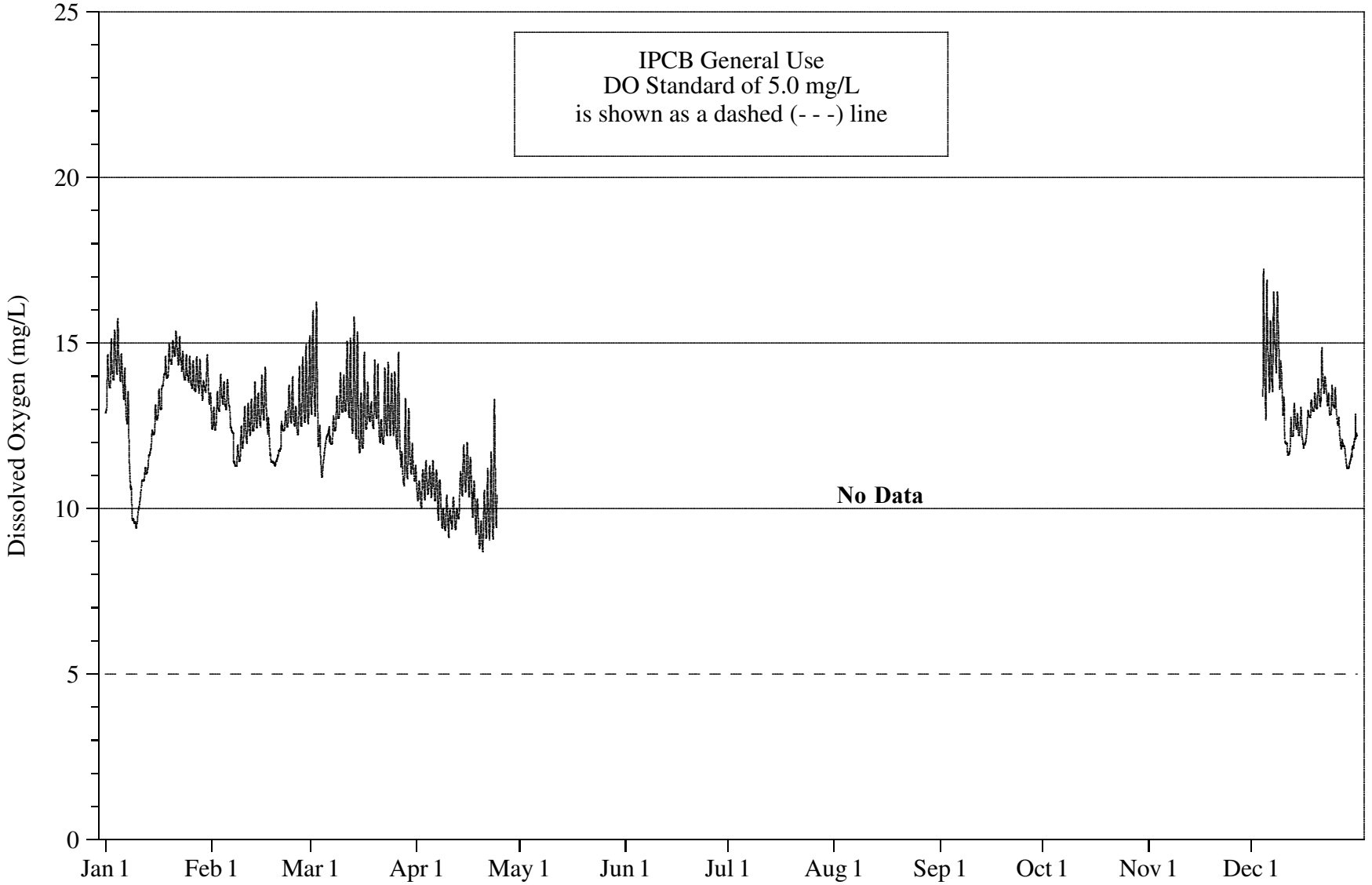


FIGURE 7: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT BUSSE LAKE DAM ON SALT CREEK FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

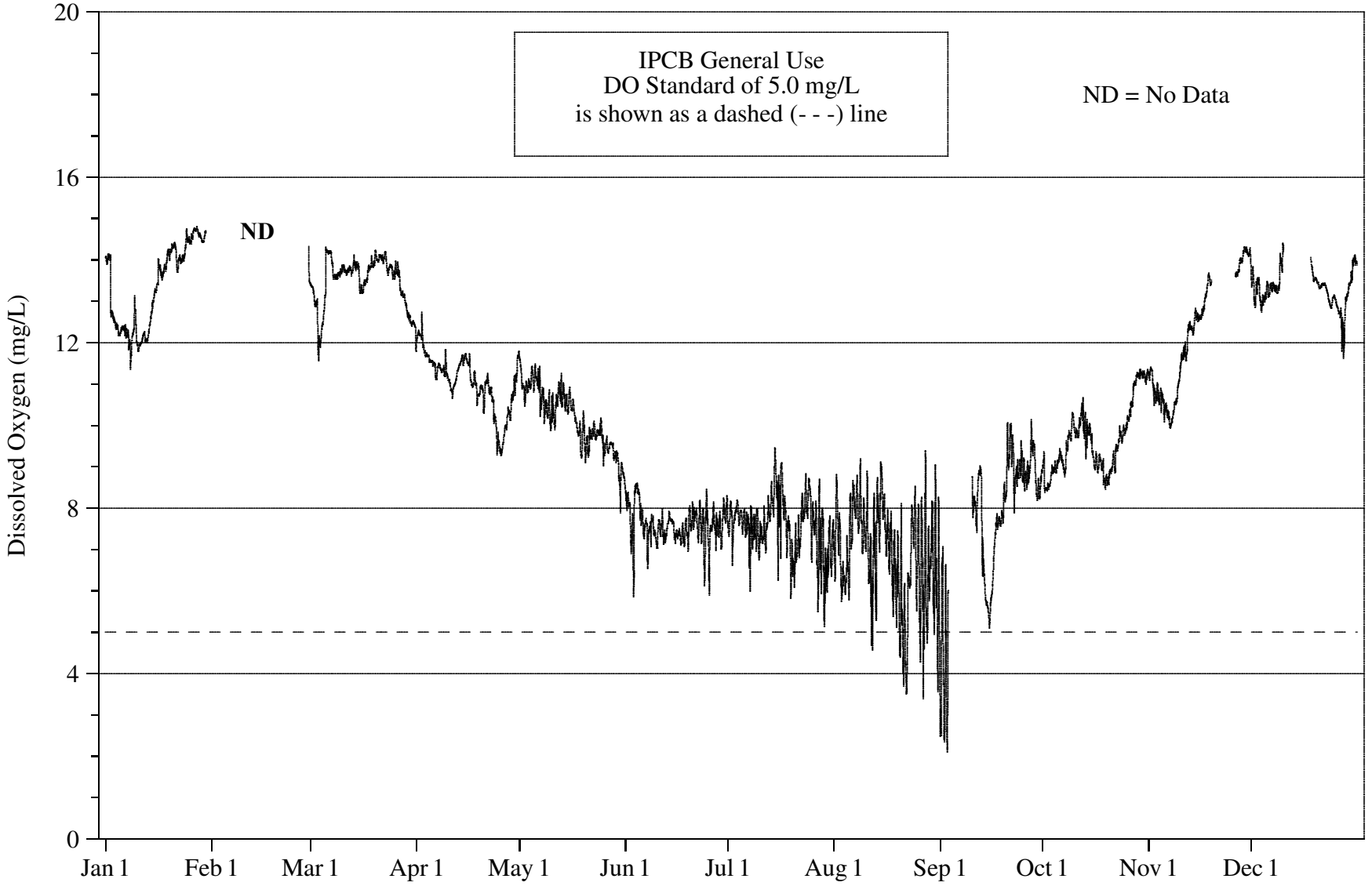


FIGURE 8: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT JFK BOULEVARD ON SALT CREEK FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

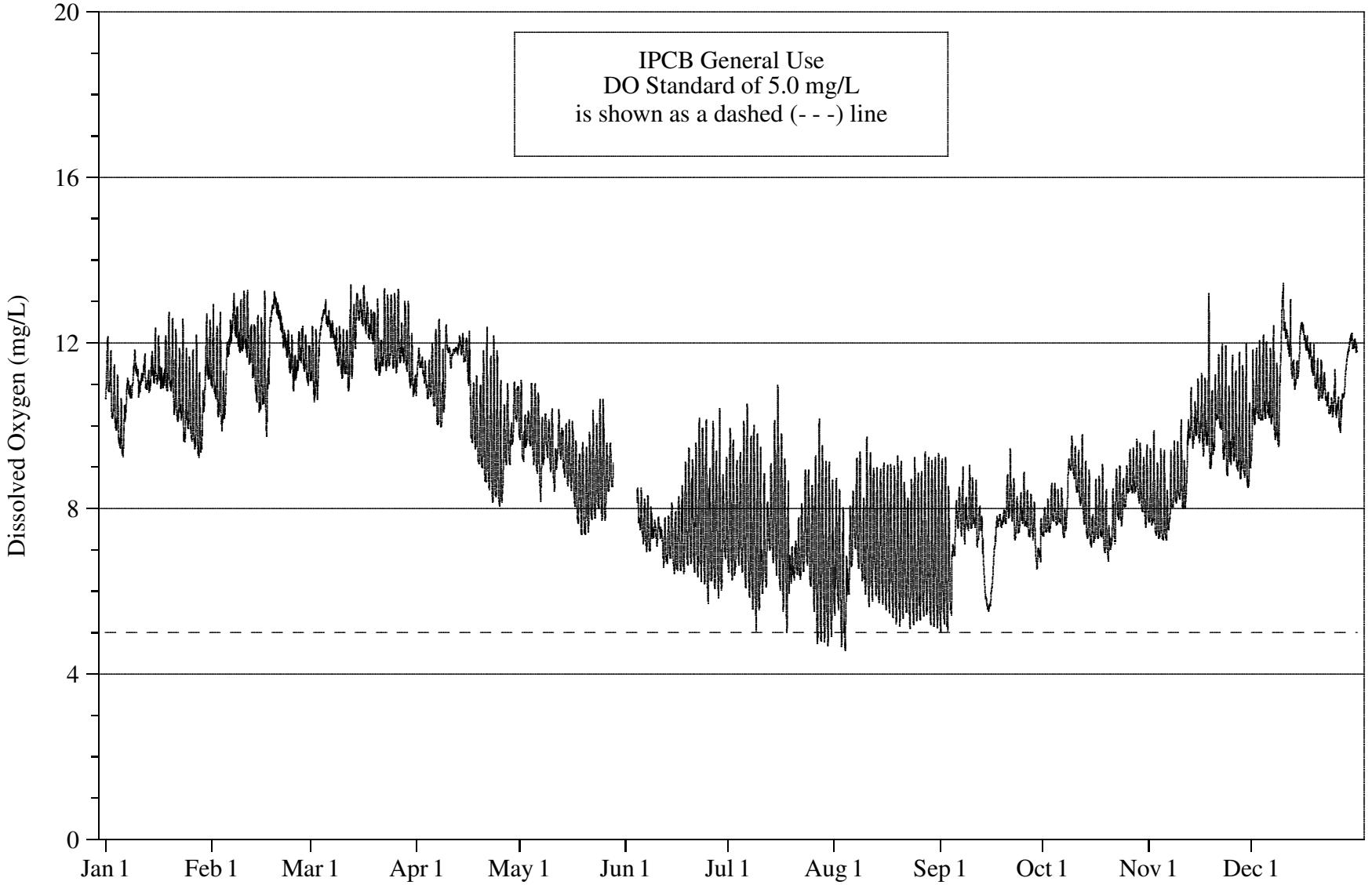


FIGURE 9: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT THORNDALE AVENUE ON SALT CREEK FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

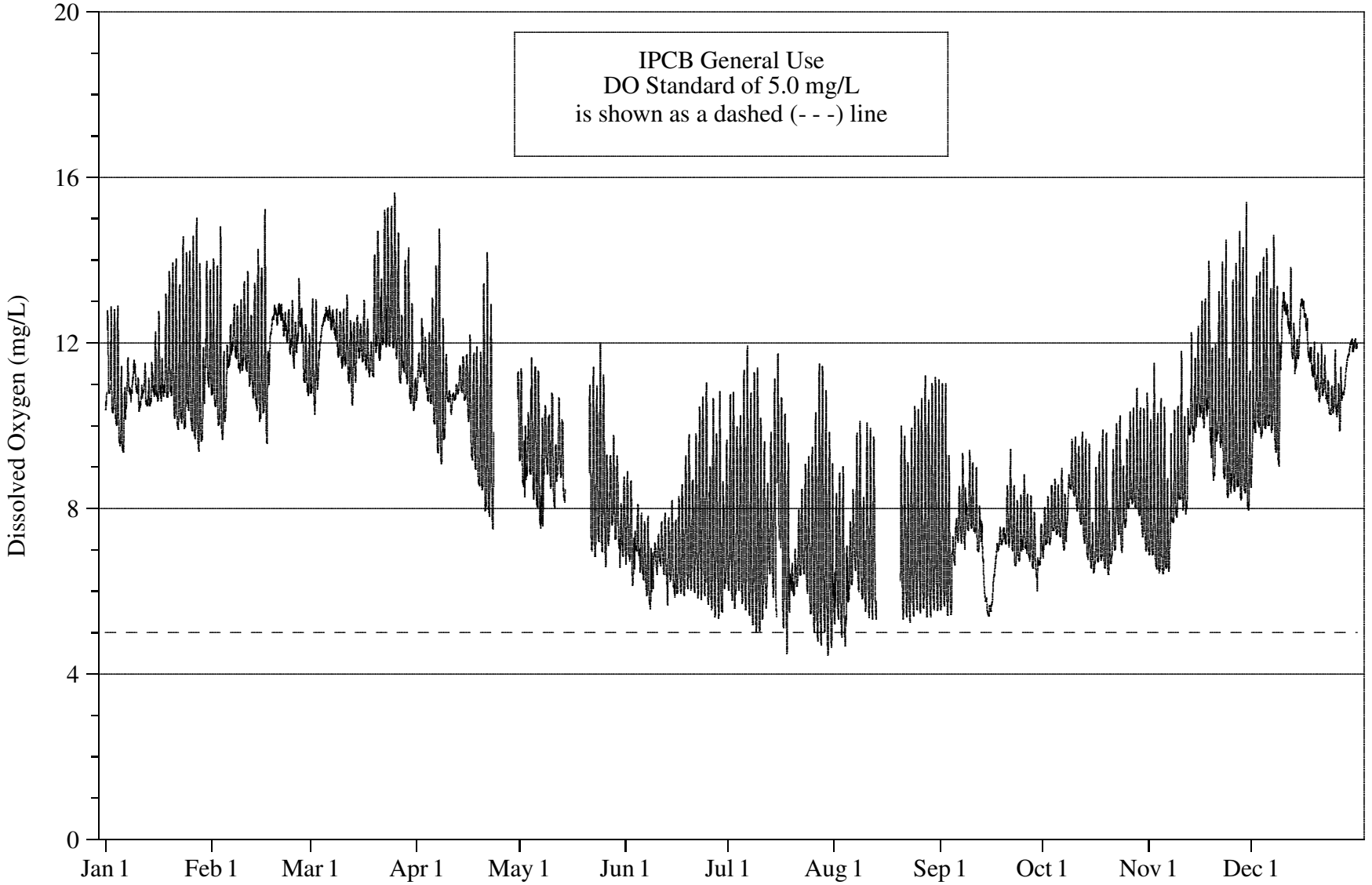


FIGURE 10: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT WOLF ROAD ON SALT CREEK FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

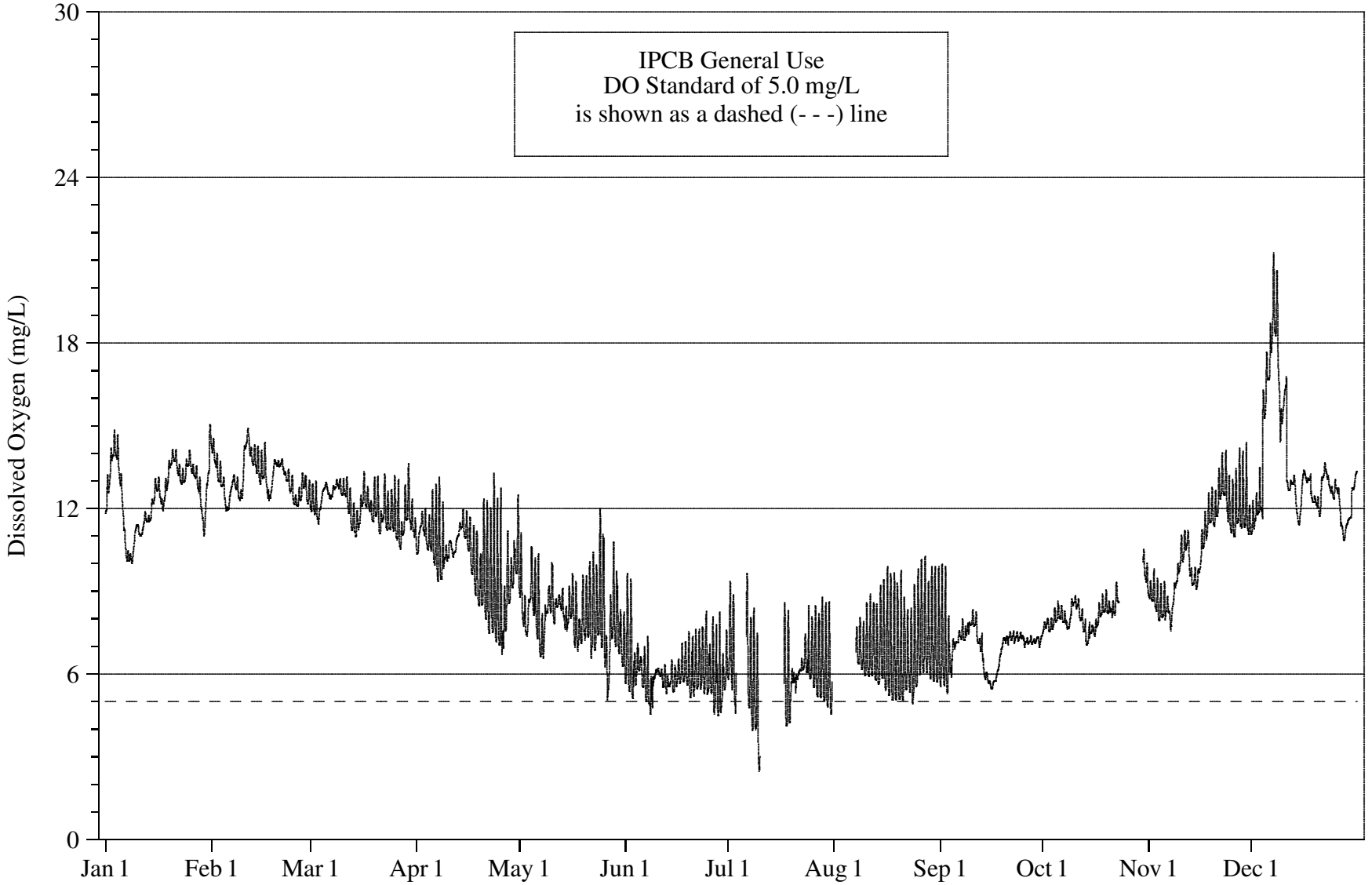


FIGURE 11: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT TORRENCE AVENUE ON THE GRAND CALUMET RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008

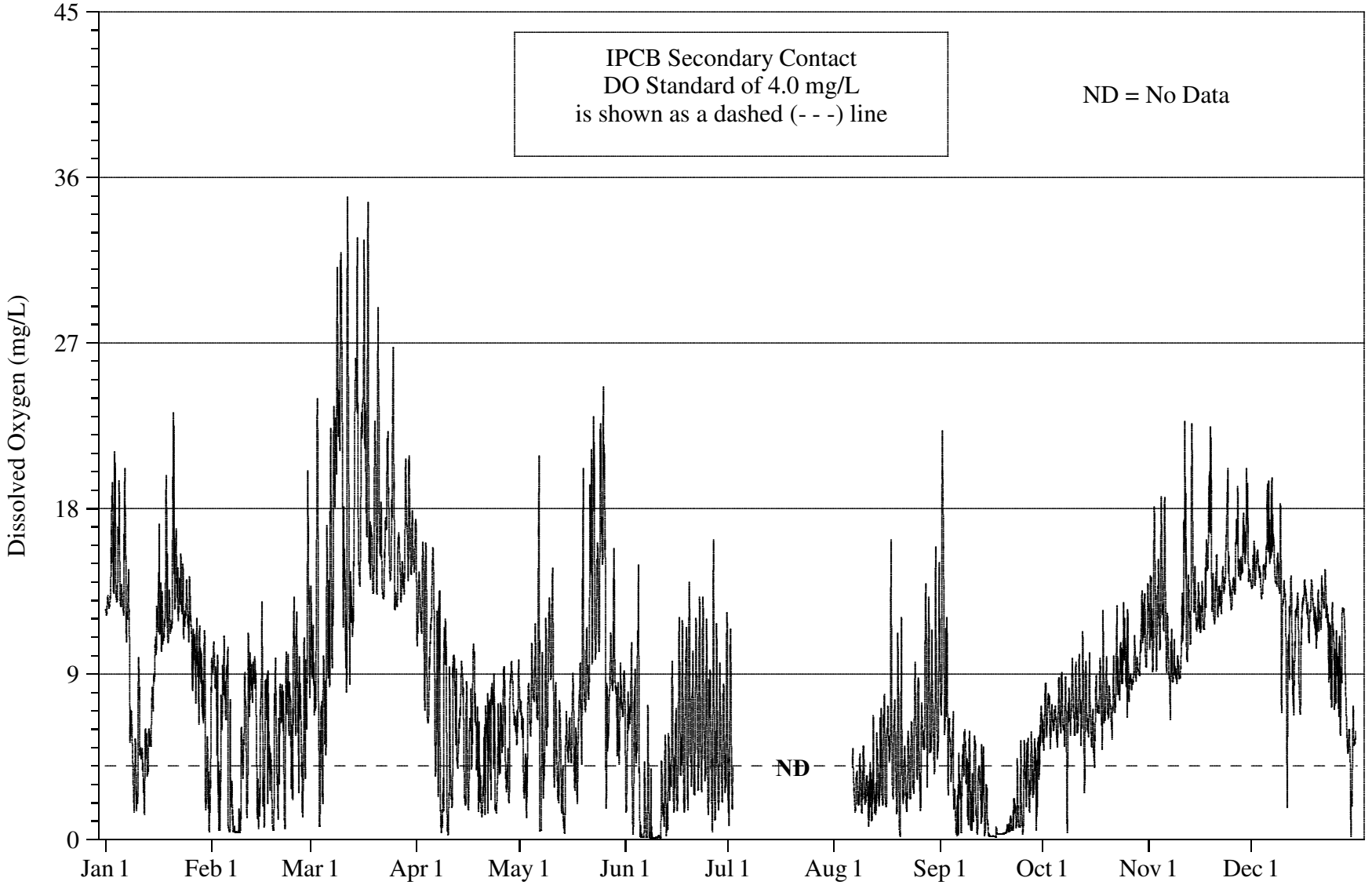
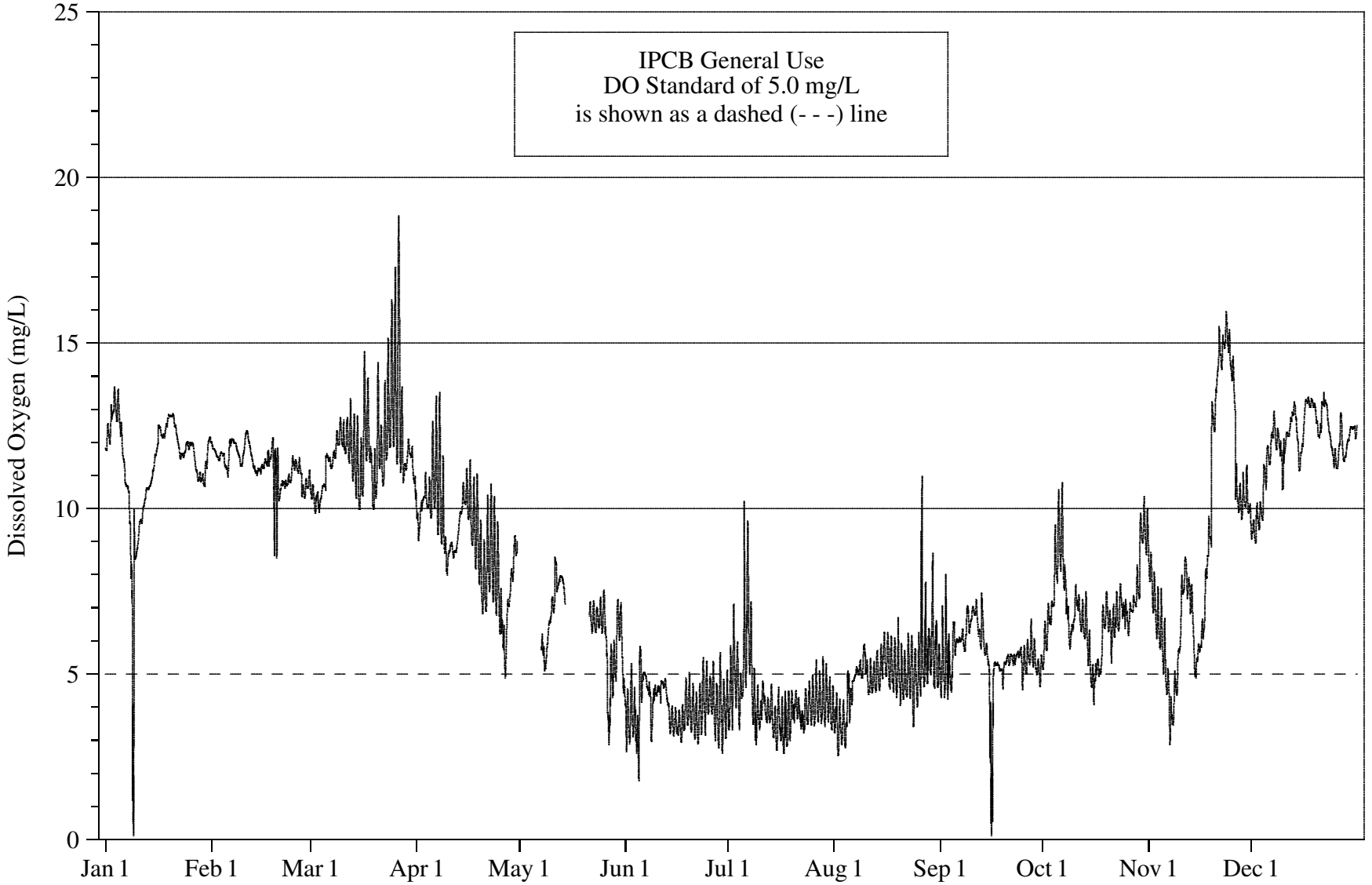


FIGURE 12: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT ASHLAND AVENUE ON THE LITTLE CALUMET RIVER FROM JANUARY 1, 2008 THROUGH DECEMBER 31, 2008



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APPENDIX A

WEEKLY DO SUMMARY STATISTICS AT ALL WADEABLE STREAM MONITORING STATIONS DURING 2008

TABLE A-1: WEEKLY DO SUMMARY STATISTICS AT CENTRAL PARK AVENUE ON THE NORTH BRANCH CHICAGO RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	35	11.5	12.7	12.0	100
01/07/08 - 01/13/08	108	9.4	10.8	10.3	100
01/14/08 - 01/20/08	167	10.6	13.3	12.2	100
01/21/08 - 01/27/08	168	10.5	13.2	11.8	100
01/28/08 - 02/03/08	168	8.9	12.0	11.1	100
02/04/08 - 02/10/08	61	10.4	11.8	11.0	100
02/11/08 - 02/24/08			NO DATA		
02/25/08 - 03/02/08	108	11.4	12.9	12.3	100
03/03/08 - 03/09/08	168	10.5	11.5	11.1	100
03/10/08 - 03/16/08	167	10.2	12.0	11.2	100
03/17/08 - 03/23/08	167	10.8	12.6	11.6	100
03/24/08 - 03/30/08	168	10.9	12.9	11.8	100
03/31/08 - 04/06/08	168	10.4	11.8	11.1	100
04/07/08 - 04/13/08	168	9.2	11.6	10.0	100
04/14/08 - 04/20/08	168	8.5	12.2	10.1	100
04/21/08 - 04/27/08	168	5.9	13.3	9.2	100
04/28/08 - 05/04/08	168	5.7	11.0	8.6	100
05/05/08 - 05/11/08	168	5.1	9.6	7.7	100
05/12/08 - 05/18/08	168	6.3	9.0	7.6	100
05/19/08 - 05/25/08	168	6.6	9.9	8.2	100
05/26/08 - 06/01/08	168	3.0	8.6	6.4	87
06/02/08 - 06/08/08	168	3.2	6.0	4.8	43
06/09/08 - 06/15/08	168	3.4	5.4	4.7	31
06/16/08 - 06/22/08	168	4.3	5.8	5.3	80
06/23/08 - 06/29/08	168	3.6	5.8	5.0	53
06/30/08 - 07/06/08	168	4.3	6.1	5.5	90
07/07/08 - 07/13/08	168	4.4	5.7	5.2	75
07/14/08 - 07/20/08	168	3.4	5.7	5.1	64
07/21/08 - 07/27/08	168	4.2	6.0	5.4	67
07/28/08 - 08/03/08	168	3.0	6.0	5.2	81
08/04/08 - 08/10/08	168	4.4	6.5	5.5	85
08/11/08 - 08/17/08	168	5.0	6.9	6.2	100
08/18/08 - 08/24/08	168	4.5	6.9	5.8	90
08/25/08 - 08/31/08	168	5.7	7.0	6.3	100

TABLE A-1 (Continued): WEEKLY DO SUMMARY STATISTICS AT CENTRAL PARK AVENUE ON THE NORTH BRANCH CHICAGO RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/01/08 - 09/07/08	60	5.7	6.7	6.1	100
09/08/08 - 09/14/08			NO DATA		
09/15/08 - 09/21/08	107	5.4	6.1	5.8	100
09/22/08 - 09/28/08	168	4.7	6.2	5.6	91
09/29/08 - 10/05/08	168	4.4	8.0	6.5	89
10/06/08 - 10/12/08	168	6.1	7.8	7.0	100
10/13/08 - 10/19/08	168	5.4	7.7	6.6	100
10/20/08 - 10/26/08	168	6.6	8.2	7.3	100
10/27/08 - 11/02/08	168	7.5	9.7	8.7	100
11/03/08 - 11/09/08	168	3.4	7.7	6.0	84
11/10/08 - 11/16/08	168	7.0	9.7	8.2	100
11/17/08 - 11/23/08	168	9.2	13.1	11.4	100
11/24/08 - 11/30/08	167	10.6	12.7	11.6	100
12/01/08 - 12/07/08	168	9.4	13.4	11.6	100
12/08/08 - 12/14/08	167	10.9	13.3	11.8	100
12/15/08 - 12/21/08	168	10.3	13.1	12.2	100
12/22/08 - 12/28/08	168	9.8	13.0	11.3	100
12/29/08 - 12/31/08	72	11.4	12.2	12.0	100

TABLE A-2: WEEKLY DO SUMMARY STATISTICS AT DEVON AVENUE
ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	11.0	12.7	12.2	100
01/07/08 - 01/13/08	168	9.6	12.2	11.2	100
01/14/08 - 01/20/08	168	12.2	13.6	12.8	100
01/21/08 - 01/27/08	168	11.6	12.9	12.0	100
01/28/08 - 02/03/08	168	11.6	12.8	12.2	100
02/04/08 - 02/10/08	168	11.6	13.5	12.3	100
02/11/08 - 02/17/08	168	11.9	13.8	12.9	100
02/18/08 - 02/24/08	168	11.6	13.1	12.6	100
02/25/08 - 03/02/08	168	12.2	14.3	13.4	100
03/03/08 - 03/09/08	168	12.3	13.2	12.7	100
03/10/08 - 03/16/08	167	11.4	12.9	12.1	100
03/17/08 - 03/23/08	168	11.8	13.4	12.3	100
03/24/08 - 03/30/08	168	10.6	13.3	12.1	100
03/31/08 - 04/06/08	168	10.0	11.4	10.5	100
04/07/08 - 04/13/08	168	9.5	10.2	9.8	100
04/14/08 - 04/20/08	168	9.2	10.6	9.9	100
04/21/08 - 04/27/08	168	8.0	11.1	9.6	100
04/28/08 - 05/04/08	168	7.3	11.0	9.4	100
05/05/08 - 05/11/08	168	6.7	12.1	9.2	100
05/12/08 - 05/18/08	168	8.1	14.0	10.1	100
05/19/08 - 05/25/08	168	8.8	15.7	11.9	100
05/26/08 - 06/01/08	168	6.5	11.4	8.2	100
06/02/08 - 06/08/08	168	4.6	10.2	7.0	97
06/09/08 - 06/15/08	168	4.8	5.6	5.2	68
06/16/08 - 06/22/08	60	4.9	5.7	5.3	82
06/23/08 - 06/29/08	109	5.5	10.3	6.9	100
06/30/08 - 07/06/08	168	5.5	14.3	8.3	100
07/07/08 - 07/13/08	168	5.9	13.2	7.9	100
07/14/08 - 07/20/08	168	4.3	7.5	6.3	96
07/21/08 - 07/27/08	167	5.6	11.9	7.0	100
07/28/08 - 08/03/08	168	4.7	17.2	10.1	98
08/04/08 - 08/10/08	168	4.8	13.2	7.6	96
08/11/08 - 08/17/08	168	4.8	11.2	8.0	96
08/18/08 - 08/24/08	168	4.1	11.0	7.2	95

TABLE A-2 (Continued): WEEKLY DO SUMMARY STATISTICS AT DEVON AVENUE ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/25/08 - 08/31/08	168	5.0	11.5	7.4	100
09/01/08 - 09/07/08	168	4.2	9.2	6.5	89
09/08/08 - 09/14/08	168	5.2	8.7	7.2	100
09/15/08 - 09/21/08	60	4.9	5.7	5.2	77
09/22/08 - 09/28/08			NO DATA		
09/29/08 - 10/05/08	108	7.2	8.6	7.8	100
10/06/08 - 10/12/08	168	7.2	8.8	8.0	100
10/13/08 - 10/19/08	168	6.5	9.3	7.8	100
10/20/08 - 10/26/08	168	7.8	9.4	8.5	100
10/27/08 - 11/02/08	168	8.6	10.4	9.6	100
11/03/08 - 11/09/08	168	6.2	9.4	8.0	100
11/10/08 - 11/16/08	168	8.7	11.1	9.9	100
11/17/08 - 11/23/08	168	10.6	13.9	12.1	100
11/24/08 - 11/30/08	58	10.9	14.1	12.3	100
12/01/08 - 12/07/08	109	12.0	14.1	13.1	100
12/08/08 - 12/14/08	60	11.7	14.4	13.1	100
12/15/08 - 12/21/08	109	11.5	12.2	11.7	100
12/22/08 - 12/28/08	168	9.9	11.7	10.7	100
12/29/08 - 12/31/08	72	10.9	11.6	11.3	100

TABLE A-3: WEEKLY DO SUMMARY STATISTICS AT IRVING PARK ROAD ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	11.0	13.2	12.6	100
01/07/08 - 01/13/08	168	9.3	10.9	10.2	100
01/14/08 - 01/20/08	168	10.7	13.0	12.2	100
01/21/08 - 01/27/08	168	11.8	12.9	12.2	100
01/28/08 - 02/03/08	168	11.1	12.6	11.9	100
02/04/08 - 02/10/08	60	10.4	11.9	11.1	100
02/11/08 - 03/02/08			NO DATA		
03/03/08 - 03/09/08	109	12.0	12.9	12.4	100
03/10/08 - 03/16/08	167	11.4	12.8	12.2	100
03/17/08 - 03/23/08	168	11.1	12.5	11.8	100
03/24/08 - 03/30/08	168	10.9	12.7	11.9	100
03/31/08 - 04/06/08	168	10.0	11.7	10.6	100
04/07/08 - 04/13/08	168	9.2	10.3	9.7	100
04/14/08 - 04/20/08	168	9.0	10.6	9.9	100
04/21/08 - 04/27/08	168	7.7	10.8	9.3	100
04/28/08 - 05/04/08	168	6.9	11.2	9.1	100
05/05/08 - 05/11/08	168	6.8	11.8	9.0	100
05/12/08 - 05/18/08	168	7.3	13.2	9.6	100
05/19/08 - 05/25/08	168	8.6	14.7	11.3	100
05/26/08 - 06/01/08	168	6.5	10.7	7.8	100
06/02/08 - 06/08/08	168	4.4	9.3	6.4	89
06/09/08 - 06/15/08	168	4.8	5.6	5.1	61
06/16/08 - 06/22/08	168	4.9	6.5	5.7	92
06/23/08 - 06/29/08	168	4.1	8.3	6.3	99
06/30/08 - 07/06/08	168	5.5	12.2	7.6	100
07/07/08 - 07/13/08	168	5.5	11.5	7.3	100
07/14/08 - 07/20/08	168	4.5	6.9	6.0	95
07/21/08 - 07/27/08	168	5.3	9.4	6.6	100
07/28/08 - 08/03/08	168	4.9	14.4	7.8	98
08/04/08 - 08/10/08	168	4.8	9.0	6.3	94
08/11/08 - 08/17/08	168	4.3	8.6	6.5	95
08/18/08 - 08/24/08	168	3.6	8.3	5.5	58
08/25/08 - 08/31/08	168	4.0	7.5	5.4	64
09/01/08 - 09/07/08	168	3.7	6.9	5.4	60

TABLE A-3 (Continued): WEEKLY DO SUMMARY STATISTICS AT
IRVING PARK ROAD ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/08/08 - 09/14/08	168	5.4	7.7	6.7	100
09/15/08 - 09/21/08	168	5.0	6.5	5.8	93
09/22/08 - 09/28/08	168	5.5	6.8	6.0	100
09/29/08 - 10/05/08	168	5.6	7.5	6.7	100
10/06/08 - 10/12/08	168	7.0	8.0	7.5	100
10/13/08 - 10/19/08	168	5.9	8.1	7.0	100
10/20/08 - 10/26/08	168	7.3	8.6	7.9	100
10/27/08 - 11/02/08	168	8.0	10.0	9.1	100
11/03/08 - 11/09/08	168	5.7	8.9	7.3	100
11/10/08 - 11/16/08	168	8.1	10.9	9.3	100
11/17/08 - 11/23/08	168	9.7	12.6	11.5	100
11/24/08 - 11/30/08	168	11.0	12.4	11.6	100
12/01/08 - 12/07/08	168	10.6	13.8	12.1	100
12/08/08 - 12/14/08	60	11.6	13.8	12.8	100
12/15/08 - 12/31/08			NO DATA		

TABLE A-4: WEEKLY DO SUMMARY STATISTICS AT OGDEN AVENUE
ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	11.5	14.1	13.4	100
01/07/08 - 01/13/08	168	9.4	11.7	10.8	100
01/14/08 - 01/20/08	81	11.7	13.3	12.7	100
01/21/08 - 02/24/08			NO DATA		
02/25/08 - 03/02/08	87	13.0	14.5	14.0	100
03/03/08 - 03/09/08	168	12.3	14.1	13.4	100
03/10/08 - 03/16/08	167	11.8	14.0	12.9	100
03/17/08 - 03/23/08	168	12.3	12.9	12.5	100
03/24/08 - 03/30/08	168	11.3	12.9	12.1	100
03/31/08 - 04/06/08	168	10.7	12.1	11.3	100
04/07/08 - 04/13/08	168	10.3	11.2	10.6	100
04/14/08 - 04/20/08	168	9.3	11.4	10.4	100
04/21/08 - 04/27/08	81	9.0	10.6	9.6	100
04/28/08 - 11/30/08			NO DATA		
12/01/08 - 12/07/08	87	12.8	15.0	13.7	100
12/08/08 - 12/14/08	168	12.3	14.7	13.3	100
12/15/08 - 12/21/08	168	12.2	13.9	13.3	100
12/22/08 - 12/28/08	168	11.3	13.7	12.6	100
12/29/08 - 12/31/08	72	11.6	13.2	12.4	100

TABLE A-5: WEEKLY DO SUMMARY STATISTICS AT MATERIAL SERVICE ROAD ON THE DES PLAINES RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	12.9	15.7	14.1	100
01/07/08 - 01/13/08	167	9.4	13.5	10.8	100
01/14/08 - 01/20/08	168	11.7	15.1	13.5	100
01/21/08 - 01/27/08	168	13.5	15.3	14.3	100
01/28/08 - 02/03/08	168	12.4	14.6	13.4	100
02/04/08 - 02/10/08	167	11.3	13.9	12.4	100
02/11/08 - 02/17/08	168	12.0	14.3	12.9	100
02/18/08 - 02/24/08	168	11.3	14.0	12.2	100
02/25/08 - 03/02/08	168	12.2	16.2	13.5	100
03/03/08 - 03/09/08	168	10.9	14.1	12.3	100
03/10/08 - 03/16/08	167	11.7	15.8	13.3	100
03/17/08 - 03/23/08	168	11.9	14.5	12.9	100
03/24/08 - 03/30/08	167	10.7	14.7	12.2	100
03/31/08 - 04/06/08	168	10.0	11.5	10.7	100
04/07/08 - 04/13/08	168	9.1	11.1	9.9	100
04/14/08 - 04/20/08	168	8.7	12.0	10.3	100
04/21/08 - 04/27/08	83	9.1	13.3	10.3	100
04/28/08 - 11/30/08			NO DATA		
12/01/08 - 12/07/08	86	12.7	17.2	14.7	100
12/08/08 - 12/14/08	168	11.6	16.5	13.1	100
12/15/08 - 12/21/08	168	11.8	14.9	12.9	100
12/22/08 - 12/28/08	168	11.3	14.0	12.8	100
12/29/08 - 12/31/08	72	11.2	12.9	11.7	100

TABLE A-6: WEEKLY DO SUMMARY STATISTICS AT BUSSE LAKE DAM ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	12.1	14.1	12.8	100
01/07/08 - 01/13/08	168	11.4	13.1	12.1	100
01/14/08 - 01/20/08	168	12.4	14.4	13.7	100
01/21/08 - 01/27/08	168	13.7	14.8	14.3	100
01/28/08 - 02/03/08	58	14.4	14.7	14.6	100
02/04/08 - 02/24/08			NO DATA		
02/25/08 - 03/02/08	62	12.7	14.3	13.2	100
03/03/08 - 03/09/08	168	11.6	14.3	13.3	100
03/10/08 - 03/16/08	167	13.2	14.1	13.7	100
03/17/08 - 03/23/08	168	13.4	14.2	13.9	100
03/24/08 - 03/30/08	168	12.4	14.0	13.2	100
03/31/08 - 04/06/08	168	11.1	12.7	11.8	100
04/07/08 - 04/13/08	168	10.6	11.8	11.2	100
04/14/08 - 04/20/08	168	10.3	11.7	11.1	100
04/21/08 - 04/27/08	168	9.3	11.3	10.2	100
04/28/08 - 05/04/08	168	10.1	11.8	11.0	100
05/05/08 - 05/11/08	168	9.9	11.5	10.6	100
05/12/08 - 05/18/08	168	9.3	11.2	10.4	100
05/19/08 - 05/25/08	168	9.0	10.3	9.7	100
05/26/08 - 06/01/08	168	7.9	9.7	9.1	100
06/02/08 - 06/08/08	168	5.9	8.6	7.7	100
06/09/08 - 06/15/08	168	7.0	8.0	7.5	100
06/16/08 - 06/22/08	168	7.0	8.2	7.5	100
06/23/08 - 06/29/08	168	5.9	8.5	7.5	100
06/30/08 - 07/06/08	168	6.6	8.3	7.8	100
07/07/08 - 07/13/08	168	6.0	8.6	7.5	100
07/14/08 - 07/20/08	167	5.8	9.5	7.8	100
07/21/08 - 07/27/08	168	5.5	8.8	7.7	100
07/28/08 - 08/03/08	168	5.1	8.8	7.0	100
08/04/08 - 08/10/08	168	5.8	9.2	7.5	100
08/11/08 - 08/17/08	168	4.6	9.1	7.3	99
08/18/08 - 08/24/08	168	3.5	8.5	6.1	82
08/25/08 - 08/31/08	168	3.4	9.4	6.4	88
09/01/08 - 09/07/08	59	2.1	7.1	4.2	31

TABLE A-6 (Continued): WEEKLY DO SUMMARY STATISTICS AT BUSSE LAKE DAM ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/08/08 - 09/14/08	110	5.6	9.0	7.5	100
09/15/08 - 09/21/08	168	5.1	10.1	7.6	100
09/22/08 - 09/28/08	168	7.9	10.1	9.0	100
09/29/08 - 10/05/08	168	8.2	9.4	8.7	100
10/06/08 - 10/12/08	168	8.8	10.7	9.7	100
10/13/08 - 10/19/08	168	8.5	10.3	9.3	100
10/20/08 - 10/26/08	168	8.6	10.6	9.6	100
10/27/08 - 11/02/08	168	10.4	11.4	11.1	100
11/03/08 - 11/09/08	168	9.9	11.1	10.5	100
11/10/08 - 11/16/08	168	11.1	12.8	12.2	100
11/17/08 - 11/23/08	58	12.8	13.7	13.3	100
11/24/08 - 11/30/08	110	13.6	14.3	14.0	100
12/01/08 - 12/07/08	168	12.7	13.8	13.3	100
12/08/08 - 12/14/08	59	13.2	14.4	13.6	100
12/15/08 - 12/21/08	85	13.3	14.1	13.5	100
12/22/08 - 12/28/08	168	11.6	13.4	12.9	100
12/29/08 - 12/31/08	72	13.1	14.1	13.7	100

TABLE A-7: WEEKLY DO SUMMARY STATISTICS AT JFK BOULEVARD ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	9.2	12.2	10.4	100
01/07/08 - 01/13/08	168	10.5	11.8	11.1	100
01/14/08 - 01/20/08	168	10.6	12.7	11.3	100
01/21/08 - 01/27/08	168	9.4	12.6	10.5	100
01/28/08 - 02/03/08	168	9.2	12.9	11.0	100
02/04/08 - 02/10/08	168	9.9	13.2	12.0	100
02/11/08 - 02/17/08	168	9.7	13.3	11.5	100
02/18/08 - 02/24/08	168	10.9	13.2	12.3	100
02/25/08 - 03/02/08	168	10.6	12.4	11.5	100
03/03/08 - 03/09/08	168	11.0	13.0	12.2	100
03/10/08 - 03/16/08	167	10.8	13.4	12.2	100
03/17/08 - 03/23/08	168	11.2	13.3	12.1	100
03/24/08 - 03/30/08	168	10.8	13.3	11.9	100
03/31/08 - 04/06/08	168	10.1	12.3	11.2	100
04/07/08 - 04/13/08	168	10.0	12.6	11.5	100
04/14/08 - 04/20/08	168	8.7	12.3	10.6	100
04/21/08 - 04/27/08	168	8.1	12.4	9.6	100
04/28/08 - 05/04/08	168	9.1	11.1	10.0	100
05/05/08 - 05/11/08	168	8.2	11.0	9.5	100
05/12/08 - 05/18/08	168	7.6	10.4	9.1	100
05/19/08 - 05/25/08	168	7.4	10.6	8.6	100
05/26/08 - 06/01/08	58	7.7	9.6	8.8	100
06/02/08 - 06/08/08	110	7.0	8.5	7.7	100
06/09/08 - 06/15/08	168	6.4	8.1	7.3	100
06/16/08 - 06/22/08	168	6.3	10.2	7.6	100
06/23/08 - 06/29/08	168	5.7	10.4	7.6	100
06/30/08 - 07/06/08	168	6.1	10.5	7.8	100
07/07/08 - 07/13/08	168	5.0	10.0	7.3	100
07/14/08 - 07/20/08	168	5.0	11.0	7.3	100
07/21/08 - 07/27/08	167	4.7	10.2	7.2	97
07/28/08 - 08/03/08	168	4.7	9.5	6.6	89
08/04/08 - 08/10/08	168	4.6	9.7	7.1	96
08/11/08 - 08/17/08	168	5.5	9.3	7.1	100
08/18/08 - 08/24/08	168	5.1	9.3	6.8	100

TABLE A-7 (Continued): WEEKLY DO SUMMARY STATISTICS AT JFK BOULEVARD ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/25/08 - 08/31/08	168	5.1	9.4	6.8	100
09/01/08 - 09/07/08	168	5.0	9.2	7.1	100
09/08/08 - 09/14/08	168	5.6	9.0	7.4	100
09/15/08 - 09/21/08	168	5.5	9.4	7.4	100
09/22/08 - 09/28/08	168	7.0	8.9	7.8	100
09/29/08 - 10/05/08	168	6.5	8.6	7.6	100
10/06/08 - 10/12/08	168	7.3	9.8	8.5	100
10/13/08 - 10/19/08	168	6.9	9.1	7.7	100
10/20/08 - 10/26/08	168	6.7	9.4	8.0	100
10/27/08 - 11/02/08	168	7.5	9.9	8.4	100
11/03/08 - 11/09/08	168	7.2	9.6	8.1	100
11/10/08 - 11/16/08	168	8.0	11.3	9.5	100
11/17/08 - 11/23/08	168	8.8	13.2	10.2	100
11/24/08 - 11/30/08	168	8.5	12.0	9.6	100
12/01/08 - 12/07/08	168	9.2	12.4	10.7	100
12/08/08 - 12/14/08	168	9.5	13.4	11.5	100
12/15/08 - 12/21/08	168	10.6	12.5	11.6	100
12/22/08 - 12/28/08	168	9.8	11.6	10.6	100
12/29/08 - 12/31/08	72	11.6	12.2	11.9	100

TABLE A-8: WEEKLY DO SUMMARY STATISTICS AT THORNDALE AVENUE ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	131	9.4	12.9	10.7	100
01/07/08 - 01/13/08	168	10.3	11.6	10.9	100
01/14/08 - 01/20/08	168	10.5	13.9	11.3	100
01/21/08 - 01/27/08	168	9.7	15.0	11.3	100
01/28/08 - 02/03/08	168	9.4	14.8	11.4	100
02/04/08 - 02/10/08	168	9.7	13.5	11.7	100
02/11/08 - 02/17/08	168	9.6	15.2	11.6	100
02/18/08 - 02/24/08	167	11.6	13.0	12.5	100
02/25/08 - 03/02/08	168	10.3	13.6	11.8	100
03/03/08 - 03/09/08	168	11.0	12.9	12.3	100
03/10/08 - 03/16/08	167	10.5	13.2	11.9	100
03/17/08 - 03/23/08	167	11.2	15.3	12.5	100
03/24/08 - 03/30/08	168	10.5	15.6	12.3	100
03/31/08 - 04/06/08	168	9.6	13.9	11.3	100
04/07/08 - 04/13/08	168	9.1	14.7	10.8	100
04/14/08 - 04/20/08	168	8.1	13.4	10.4	100
04/21/08 - 04/27/08	59	7.5	14.2	9.5	100
04/28/08 - 05/04/08	110	8.3	11.6	9.7	100
05/05/08 - 05/11/08	168	7.5	11.4	9.2	100
05/12/08 - 05/18/08	58	8.1	10.7	9.2	100
05/19/08 - 05/25/08	110	6.8	12.0	8.8	100
05/26/08 - 06/01/08	168	6.6	9.8	7.9	100
06/02/08 - 06/08/08	168	5.6	8.7	6.9	100
06/09/08 - 06/15/08	168	5.7	8.2	6.8	100
06/16/08 - 06/22/08	168	5.8	10.4	7.3	100
06/23/08 - 06/29/08	168	5.3	11.0	7.5	100
06/30/08 - 07/06/08	168	5.5	11.9	7.7	100
07/07/08 - 07/13/08	168	5.0	11.4	7.3	100
07/14/08 - 07/20/08	153	4.5	11.7	7.3	96
07/21/08 - 07/27/08	168	4.8	11.5	7.2	97
07/28/08 - 08/03/08	168	4.5	11.4	6.8	88
08/04/08 - 08/10/08	168	4.7	10.1	6.9	95
08/11/08 - 08/17/08	58	5.3	9.9	6.9	100
08/18/08 - 08/24/08	110	5.2	10.5	7.3	100

TABLE A-8 (Continued): WEEKLY DO SUMMARY STATISTICS AT THORNDALE AVENUE ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/25/08 - 08/31/08	168	5.4	11.2	7.5	100
09/01/08 - 09/07/08	168	5.4	11.0	7.3	100
09/08/08 - 09/14/08	168	5.5	9.4	7.4	100
09/15/08 - 09/21/08	168	5.4	9.4	6.9	100
09/22/08 - 09/28/08	168	6.6	8.8	7.3	100
09/29/08 - 10/05/08	168	6.0	8.7	7.4	100
10/06/08 - 10/12/08	168	7.0	9.8	8.3	100
10/13/08 - 10/19/08	167	6.4	9.9	7.5	100
10/20/08 - 10/26/08	168	6.4	10.3	7.9	100
10/27/08 - 11/02/08	168	6.9	11.5	8.4	100
11/03/08 - 11/09/08	168	6.4	10.6	7.9	100
11/10/08 - 11/16/08	168	7.9	13.0	10.0	100
11/17/08 - 11/23/08	168	8.4	14.5	10.6	100
11/24/08 - 11/30/08	168	8.0	15.4	9.8	100
12/01/08 - 12/07/08	168	8.6	14.6	11.0	100
12/08/08 - 12/14/08	167	9.0	13.8	11.9	100
12/15/08 - 12/21/08	167	10.6	13.1	11.8	100
12/22/08 - 12/28/08	168	9.9	11.8	10.8	100
12/29/08 - 12/31/08	72	11.5	12.1	11.9	100

TABLE A-9: WEEKLY DO SUMMARY STATISTICS AT WOLF ROAD
ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	10.5	14.8	13.0	100
01/07/08 - 01/13/08	168	10.0	11.9	11.0	100
01/14/08 - 01/20/08	168	11.6	14.1	12.8	100
01/21/08 - 01/27/08	168	12.8	14.1	13.4	100
01/28/08 - 02/03/08	168	11.0	15.0	13.1	100
02/04/08 - 02/10/08	168	11.9	14.3	12.7	100
02/11/08 - 02/17/08	168	12.3	14.9	13.6	100
02/18/08 - 02/24/08	168	12.3	13.8	13.2	100
02/25/08 - 03/02/08	168	11.6	13.3	12.4	100
03/03/08 - 03/09/08	168	11.4	13.1	12.6	100
03/10/08 - 03/16/08	167	11.0	13.3	12.1	100
03/17/08 - 03/23/08	168	11.1	13.3	12.0	100
03/24/08 - 03/30/08	168	10.5	13.6	11.7	100
03/31/08 - 04/06/08	168	9.7	12.9	11.1	100
04/07/08 - 04/13/08	168	9.4	13.1	10.6	100
04/14/08 - 04/20/08	168	8.4	12.4	10.3	100
04/21/08 - 04/27/08	168	6.7	13.3	8.9	100
04/28/08 - 05/04/08	168	7.4	12.5	9.2	100
05/05/08 - 05/11/08	168	6.5	10.4	8.2	100
05/12/08 - 05/18/08	168	6.8	9.6	8.2	100
05/19/08 - 05/25/08	168	6.6	12.0	8.3	100
05/26/08 - 06/01/08	168	5.1	10.8	7.3	100
06/02/08 - 06/08/08	168	4.5	9.4	6.0	90
06/09/08 - 06/15/08	168	4.9	6.5	5.8	99
06/16/08 - 06/22/08	168	5.1	7.6	6.1	100
06/23/08 - 06/29/08	168	4.5	8.3	6.0	82
06/30/08 - 07/06/08	96	4.6	9.7	6.7	95
07/07/08 - 07/13/08	81	2.5	8.4	5.2	43
07/14/08 - 07/20/08	87	4.1	8.6	5.8	75
07/21/08 - 07/27/08	168	5.2	8.5	6.4	100
07/28/08 - 08/03/08	82	4.5	8.8	6.1	82
08/04/08 - 08/10/08	86	5.9	8.6	6.9	100
08/11/08 - 08/17/08	168	5.2	9.9	6.9	100
08/18/08 - 08/24/08	168	4.9	9.7	6.6	98

TABLE A-9 (Continued): WEEKLY DO SUMMARY STATISTICS AT WOLF ROAD ON SALT CREEK DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/25/08 - 08/31/08	168	5.5	10.3	7.3	100
09/01/08 - 09/07/08	168	5.3	10.0	7.0	100
09/08/08 - 09/14/08	168	5.8	8.3	7.2	100
09/15/08 - 09/21/08	168	5.5	7.5	6.5	100
09/22/08 - 09/28/08	168	7.0	7.6	7.3	100
09/29/08 - 10/05/08	167	7.0	8.6	7.7	100
10/06/08 - 10/12/08	168	7.5	8.8	8.2	100
10/13/08 - 10/19/08	168	7.0	9.0	7.9	100
10/20/08 - 10/26/08	81	8.1	9.3	8.5	100
10/27/08 - 11/02/08	87	8.4	10.5	9.3	100
11/03/08 - 11/09/08	168	7.6	10.0	8.6	100
11/10/08 - 11/16/08	167	9.1	11.2	10.1	100
11/17/08 - 11/23/08	168	10.6	14.1	12.1	100
11/24/08 - 11/30/08	168	11.0	14.4	12.0	100
12/01/08 - 12/07/08	168	11.1	21.3	14.7	100
12/08/08 - 12/14/08	168	11.4	20.6	14.6	100
12/15/08 - 12/21/08	168	11.4	13.4	12.6	100
12/22/08 - 12/28/08	168	10.8	13.7	12.4	100
12/29/08 - 12/31/08	72	11.4	13.4	12.3	100

TABLE A-10: WEEKLY DO SUMMARY STATISTICS AT TORRENCE AVENUE ON THE GRAND CALUMET RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	12.2	21.1	14.6	100
01/07/08 - 01/13/08	168	1.4	14.7	5.8	67
01/14/08 - 01/20/08	168	5.1	23.2	11.7	100
01/21/08 - 01/27/08	168	7.4	16.9	12.4	100
01/28/08 - 02/03/08	168	0.4	11.6	6.8	71
02/04/08 - 02/10/08	168	0.4	11.1	3.9	45
02/11/08 - 02/17/08	168	0.6	12.9	6.5	73
02/18/08 - 02/24/08	168	0.5	11.3	5.5	67
02/25/08 - 03/02/08	168	1.2	24.0	9.3	92
03/03/08 - 03/09/08	168	0.7	31.9	14.8	92
03/10/08 - 03/16/08	167	8.0	34.9	19.0	100
03/17/08 - 03/23/08	168	13.1	34.7	18.3	100
03/24/08 - 03/30/08	168	12.5	26.8	16.2	100
03/31/08 - 04/06/08	168	3.5	17.4	11.9	98
04/07/08 - 04/13/08	168	0.3	13.5	5.7	62
04/14/08 - 04/20/08	168	1.2	10.6	5.1	55
04/21/08 - 04/27/08	168	1.4	9.4	5.2	68
04/28/08 - 05/04/08	168	1.2	10.7	6.6	83
05/05/08 - 05/11/08	168	0.5	20.9	7.9	83
05/12/08 - 05/18/08	168	0.3	9.6	4.8	63
05/19/08 - 05/25/08	168	4.1	24.6	13.6	100
05/26/08 - 06/01/08	168	1.5	16.6	7.4	90
06/02/08 - 06/08/08	168	0.1	14.9	3.6	40
06/09/08 - 06/15/08	168	0.0	9.7	2.4	27
06/16/08 - 06/22/08	168	1.5	14.0	6.5	70
06/23/08 - 06/29/08	168	0.5	16.3	5.9	65
06/30/08 - 07/06/08	59	0.8	12.3	5.3	51
07/07/08 - 08/03/08			NO DATA		
08/04/08 - 08/10/08	109	1.4	5.1	2.9	12
08/11/08 - 08/17/08	168	0.7	16.3	4.1	43
08/18/08 - 08/24/08	168	0.2	12.1	4.4	49
08/25/08 - 08/31/08	168	1.6	15.9	7.1	87
09/01/08 - 09/07/08	168	0.2	22.2	5.8	59
09/08/08 - 09/14/08	168	0.2	6.0	2.8	28

TABLE A-10 (Continued): WEEKLY DO SUMMARY STATISTICS AT TORRENCE AVENUE ON THE GRAND CALUMET RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/15/08 - 09/21/08	168	0.1	1.3	0.4	0
09/22/08 - 09/28/08	168	0.3	5.9	2.7	26
09/29/08 - 10/05/08	168	0.5	8.8	6.1	91
10/06/08 - 10/12/08	167	0.4	11.3	7.0	96
10/13/08 - 10/19/08	168	2.5	12.4	7.1	96
10/20/08 - 10/26/08	168	5.5	12.9	8.7	100
10/27/08 - 11/02/08	168	8.1	18.1	11.0	100
11/03/08 - 11/09/08	168	6.5	18.6	11.2	100
11/10/08 - 11/16/08	168	8.7	22.7	13.0	100
11/17/08 - 11/23/08	168	11.4	22.4	14.4	100
11/24/08 - 11/30/08	168	12.5	20.2	15.2	100
12/01/08 - 12/07/08	168	13.1	19.7	15.2	100
12/08/08 - 12/14/08	168	1.8	18.3	12.0	99
12/15/08 - 12/21/08	168	6.8	14.3	12.1	100
12/22/08 - 12/28/08	168	5.7	14.7	10.5	100
12/29/08 - 12/31/08	62	0.2	7.3	4.7	79

TABLE A-11: WEEKLY DO SUMMARY STATISTICS AT WENTWORTH AVENUE ON THE LITTLE CALUMET RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 03/16/08			NO DATA		
03/17/08 - 03/23/08	109	9.3	12.0	10.8	100
03/24/08 - 03/30/08	168	9.8	10.8	10.3	100
03/31/08 - 04/06/08	59	9.0	10.1	9.4	100
04/07/08 - 12/31/08			NO DATA		

TABLE A-12: WEEKLY DO SUMMARY STATISTICS AT ASHLAND AVENUE ON THE LITTLE CALUMET RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/08 - 01/06/08	144	10.7	13.7	12.4	100
01/07/08 - 01/13/08	168	0.0	10.7	9.2	94
01/14/08 - 01/20/08	168	10.7	12.9	12.1	100
01/21/08 - 01/27/08	168	10.9	12.7	11.8	100
01/28/08 - 02/03/08	168	10.7	12.1	11.5	100
02/04/08 - 02/10/08	168	10.9	12.2	11.7	100
02/11/08 - 02/17/08	168	11.0	12.3	11.5	100
02/18/08 - 02/24/08	168	8.5	12.1	10.9	100
02/25/08 - 03/02/08	168	9.8	11.5	10.8	100
03/03/08 - 03/09/08	168	9.9	12.7	11.3	100
03/10/08 - 03/16/08	167	10.0	14.7	11.8	100
03/17/08 - 03/23/08	168	10.0	15.1	11.9	100
03/24/08 - 03/30/08	168	10.8	18.8	12.7	100
03/31/08 - 04/06/08	168	9.0	13.4	10.4	100
04/07/08 - 04/13/08	168	8.0	13.5	9.3	100
04/14/08 - 04/20/08	168	6.8	11.5	9.4	100
04/21/08 - 04/27/08	168	4.9	10.7	7.5	99
04/28/08 - 05/04/08	58	7.1	9.2	8.2	100
05/05/08 - 05/11/08	110	5.1	8.5	6.5	100
05/12/08 - 05/18/08	58	7.1	8.0	7.7	100
05/19/08 - 05/25/08	108	6.2	7.5	6.7	100
05/26/08 - 06/01/08	168	2.7	7.3	5.2	51
06/02/08 - 06/08/08	168	1.8	5.8	4.1	17
06/09/08 - 06/15/08	167	3.1	4.9	4.2	0
06/16/08 - 06/22/08	168	2.9	5.0	3.7	1
06/23/08 - 06/29/08	168	2.6	5.7	4.1	15
06/30/08 - 07/06/08	168	3.1	10.2	5.0	38
07/07/08 - 07/13/08	168	2.9	7.2	4.3	15
07/14/08 - 07/20/08	168	2.6	4.6	3.6	0
07/21/08 - 07/27/08	168	3.2	5.4	4.0	2
07/28/08 - 08/03/08	168	2.5	5.5	3.9	5
08/04/08 - 08/10/08	168	2.8	5.9	4.7	43
08/11/08 - 08/17/08	168	4.4	6.3	5.2	56
08/18/08 - 08/24/08	168	3.4	6.7	5.0	46

TABLE A-12 (Continued): WEEKLY DO SUMMARY STATISTICS AT ASHLAND AVENUE ON THE LITTLE CALUMET RIVER DURING 2008

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 5.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/25/08 - 08/31/08	168	4.0	11.0	5.6	64
09/01/08 - 09/07/08	168	4.2	8.0	5.6	71
09/08/08 - 09/14/08	168	5.4	7.5	6.4	100
09/15/08 - 09/21/08	168	0.1	5.6	4.8	79
09/22/08 - 09/28/08	168	4.5	6.6	5.5	96
09/29/08 - 10/05/08	167	4.6	10.6	6.6	92
10/06/08 - 10/12/08	168	5.8	10.8	7.2	100
10/13/08 - 10/19/08	168	4.1	7.5	5.8	80
10/20/08 - 10/26/08	168	5.3	7.7	6.7	100
10/27/08 - 11/02/08	168	6.8	10.4	8.2	100
11/03/08 - 11/09/08	168	2.9	7.6	5.2	54
11/10/08 - 11/16/08	168	4.9	8.5	6.7	95
11/17/08 - 11/23/08	168	6.1	15.9	12.1	100
11/24/08 - 11/30/08	168	9.5	15.4	11.7	100
12/01/08 - 12/07/08	168	8.9	12.9	10.6	100
12/08/08 - 12/14/08	168	10.6	13.2	12.2	100
12/15/08 - 12/21/08	168	11.1	13.4	12.7	100
12/22/08 - 12/28/08	168	11.2	13.5	12.1	100
12/29/08 - 12/31/08	72	11.9	12.5	12.3	100

TABLE A-13: SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS MADE DURING CROSS-SECTIONAL SURVEYS

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional Dissolved Oxygen Samples						
		Cross Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
SALT CREEK								
Busse Woods S. Dam								
04/04/08	11.67	0.7 – 3.1	6	11.26	11.33	11.29	0.03	0.25
08/15/08	7.73	1.6 – 2.5	6	8.03	8.10	8.06	0.03	0.37
11/14/08	12.66	1.5 – 3.0	6	11.55	11.65	11.60	0.04	0.31
J. F. Kennedy Blvd.								
04/04/08	10.79	1.0 – 2.6	6	10.27	10.34	10.31	0.03	0.30
08/15/08	7.31	0.2 – 1.6	6	7.01	7.88	7.38	0.40	5.46
11/14/08	10.10	0.7 – 2.0	6	9.95	10.03	9.98	0.03	0.29
Thorndale Ave.								
04/04/08	10.88	1.5 – 3.1	6	10.37	10.48	10.40	0.04	0.39
08/15/08	NA**	0.3 – 2.3	6	6.40	6.54	6.49	0.05	0.81
11/14/08	10.93	1.1 – 2.6	6	10.02	10.10	10.06	0.03	0.33
Wolf Rd.								
04/07/08	11.63	1.2 – 1.7	6	11.71	11.91	11.81	0.08	0.65
08/18/08	6.94	1.1 – 1.5	6	6.75	6.85	6.81	0.04	0.61
11/17/08	11.41	1.6 – 2.1	6	11.31	11.81	11.42	0.19	1.71

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS MADE DURING CROSS-SECTIONAL SURVEYS

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional Dissolved Oxygen Samples						
		Cross Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
DES PLAINES RIVER								
Devon Ave								
04/04/08	10.56	8.2 – 9.5	12	10.25	10.32	10.28	0.02	0.18
08/15/08	6.17	1.0 – 2.5	6	6.36	6.50	6.43	0.05	0.79
11/14/08	9.21	1.3 – 2.5	6	8.96	9.04	9.00	0.03	0.30
Irving Park Rd.								
04/04/08	10.34	7.2–10.0	11	10.13	10.20	10.16	0.02	0.19
08/15/08	4.49	1.2 – 1.7	6	4.52	4.76	4.67	0.09	1.89
11/14/08	8.51	1.7 – 1.9	6	8.36	8.50	8.46	0.05	0.58
Ogden Ave.								
04/07/08	10.72	4.9 – 5.7	9	10.21	10.24	10.23	0.01	0.09
08/18/08	NA	0.5 – 1.3	6	6.81	7.54	7.24	0.34	4.64
11/17/08	NA	2.0 – 2.2	6	11.07	13.41	11.66	0.87	7.43
Material Service Rd.								
04/07/08	9.66	1.4 – 3.7	8	9.68	9.72	9.71	0.02	0.16
08/18/08	NA	1.7 – 3.9	7	9.04	9.63	9.35	0.22	2.38
11/17/08	NA	2.9 – 3.4	6	12.54	12.99	12.72	0.19	1.51

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS MADE DURING CROSS-SECTIONAL SURVEYS

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional Dissolved Oxygen Samples: Cross Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
LITTLE CALUMET RIVER								
Wentworth Ave.								
04/11/08	NA	2.0 – 4.7	7	9.27	9.29	9.28	0.01	0.10
08/22/08	NA	0.5 – 1.0	6	4.00	4.18	4.09	0.08	1.97
11/21/08	NA	1.1 – 3.0	6	10.86	11.00	10.94	0.06	0.52
Ashland Ave.								
04/11/08	8.86	1.0 – 1.4	6	9.00	9.03	9.02	0.01	0.15
08/22/08	4.56	1.5 – 2.5	6	4.58	4.74	4.64	0.08	1.63
11/21/08	14.41	1.6 – 2.0	6	10.17	10.35	10.25	0.07	0.67
GRAND CALUMET RIVER								
Hohman Avenue								
04/11/08	NA	0.7 – 1.2	6	6.60	9.14	7.49	1.05	14.05
Torrence Ave.								
04/11/08	2.25	0.8 – 1.5	6	2.79	3.34	3.07	0.22	7.26
08/22/08	2.24	0.5 – 0.9	6	2.76	3.36	3.07	0.27	8.76
11/21/08	13.55	1.0 – 3.0	6	13.69	14.49	14.03	0.35	2.52

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS MADE DURING CROSS-SECTIONAL SURVEYS

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional Dissolved Oxygen Samples						
		Cross Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation
NORTH BRANCH CHICAGO RIVER								
Central Park Ave.								
04/04/08	10.71	10.5	6	10.47	10.52	10.49	0.02	0.18
08/15/08	5.95	6.1 – 6.2	6	6.05	6.21	6.12	0.07	1.16
11/14/08	7.28	7.7 – 7.8	6	7.71	7.76	7.73	0.02	0.25

*Number of DO measurements made across transect during cross-sectional survey.
**NA = No Analysis.