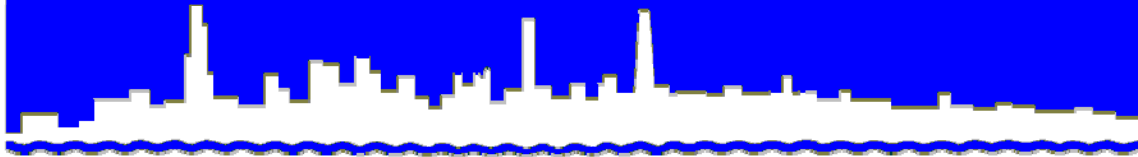


*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***MONITORING AND RESEARCH  
DEPARTMENT***

***REPORT NO. 12-33***

***CONTINUOUS DISSOLVED OXYGEN MONITORING  
IN THE DEEP-DRAFT CHICAGO WATERWAY SYSTEM  
DURING 2011***

***August 2012***

**Metropolitan Water Reclamation District of Greater Chicago**

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DURING 2011**

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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.



## INTRODUCTION

The Chicago Area Waterway System (CAWS) consists of 78 miles of canals, which serve the Chicago area for two principal purposes: the drainage of urban stormwater runoff and treated municipal wastewater effluent, and the support of commercial navigation. Approximately 75 percent of the length is composed of man-made canals, and the remainder is composed of natural streams that have been deepened, straightened and/or widened to such an extent that reversion to the natural state is not possible. The flow of water in the CAWS is artificially controlled by hydraulic structures. The CAWS has two river systems: the Calumet River System and the Chicago River System.

More than 30 years ago, the District determined that applicable Illinois Pollution Control Board (IPCB) dissolved oxygen (DO) standards for Chicago area waterways could not be met exclusively by advanced wastewater treatment at its three major regional water reclamation plants (WRPs), Calumet, North Side, and Stickney, and by the capture and treatment of combined sewer overflows (CSOs). In order to increase the DO concentration in the Chicago and Calumet River Systems, the District designed and constructed artificial aeration systems (instream diffuser and sidestream elevated pool aeration stations during the late 1970s and early 1990s, respectively).

From October 1994 through May 1996, the Monitoring and Research Department (M&R) conducted weekly DO surveys in the Chicago River System. Water samples were collected manually, chemically fixed in the field, and returned to the laboratory for analysis. The results from these surveys showed that DO concentrations in selected waterway reaches were less than IPCB DO standards applicable to these reaches.

In 1998, M&R initiated a comprehensive field-monitoring program in order to locate and identify reaches in the Chicago River System where the DO concentration is less than the applicable IPCB DO standard. Initially, the program was to focus on the Chicago River System for a two-year period and has since been extended. Subsequently, the scope of the monitoring program was first expanded to include the Calumet River System and then later the Chicago area wadeable streams. The resulting data have been used for the calibration and verification of a water quality model for the CAWS.

Data in this report are from 12 deep-draft continuous DO monitoring stations of the District's Continuous Dissolved Oxygen Monitoring (CDOM) Program. This report covers the monitoring results for the period January 1, 2011, through December 31, 2011, for the deep-draft waterways of the Chicago River System, and Calumet River System.

## MONITORING STATIONS

### Locations and Descriptions

The CDOM Program supplies the District with water quality data throughout the year for both the wadeable and deep-draft waterways within its jurisdiction. All of the 2011 CDOM stations are shown in [Figure 1](#). Descriptions of the locations for the deep-draft monitoring stations are listed in [Table 1](#).

Effective January 2011, the District executed a plan to improve the efficiency of the CDOM program. To eliminate redundancy in the program, the deep-draft CDOM stations at Main Street, Fullerton Avenue, Clark Street, and Route 83 in the Chicago River System, Jefferson Street in the Des Plaines River System, and Cicero Avenue in the Calumet River System were discontinued at the conclusion of 2010.

### 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 WRP, and the Chicago and Calumet Rivers. Secondary Contact Waters include the North Shore Channel from the North Side WRP to the North Branch Chicago River, the North Branch of the Chicago River from the North Shore Channel to the Chicago River, the South Branch of the Chicago River, Bubbly Creek, the Chicago Sanitary and Ship Canal (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 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 and in the portion of the North Shore Channel from the North Side WRP to the North Branch Chicago River where the DO shall not be less than 5.0 mg/L for 16 hours of any 24 hour period, nor less than 4.0 mg/L at any time. On December 18, 2009, the United States Environmental Protection Agency approved new DO standards for General Use Waters in the state of Illinois. In General Use Waters the DO shall not be less than 3.5 mg/L at any time and meet a 4.0 mg/L daily minimum averaged over seven days from August through February. In General Use Waters the DO shall not be less than 5.0 mg/L at any time and meet a 6.0 mg/L daily mean averaged over seven days from March through July. For this report, we have selected the any time standard when calculating percent compliance.

FIGURE 1: 2011 CONTINUOUS DISSOLVED OXYGEN MONITORING STATIONS

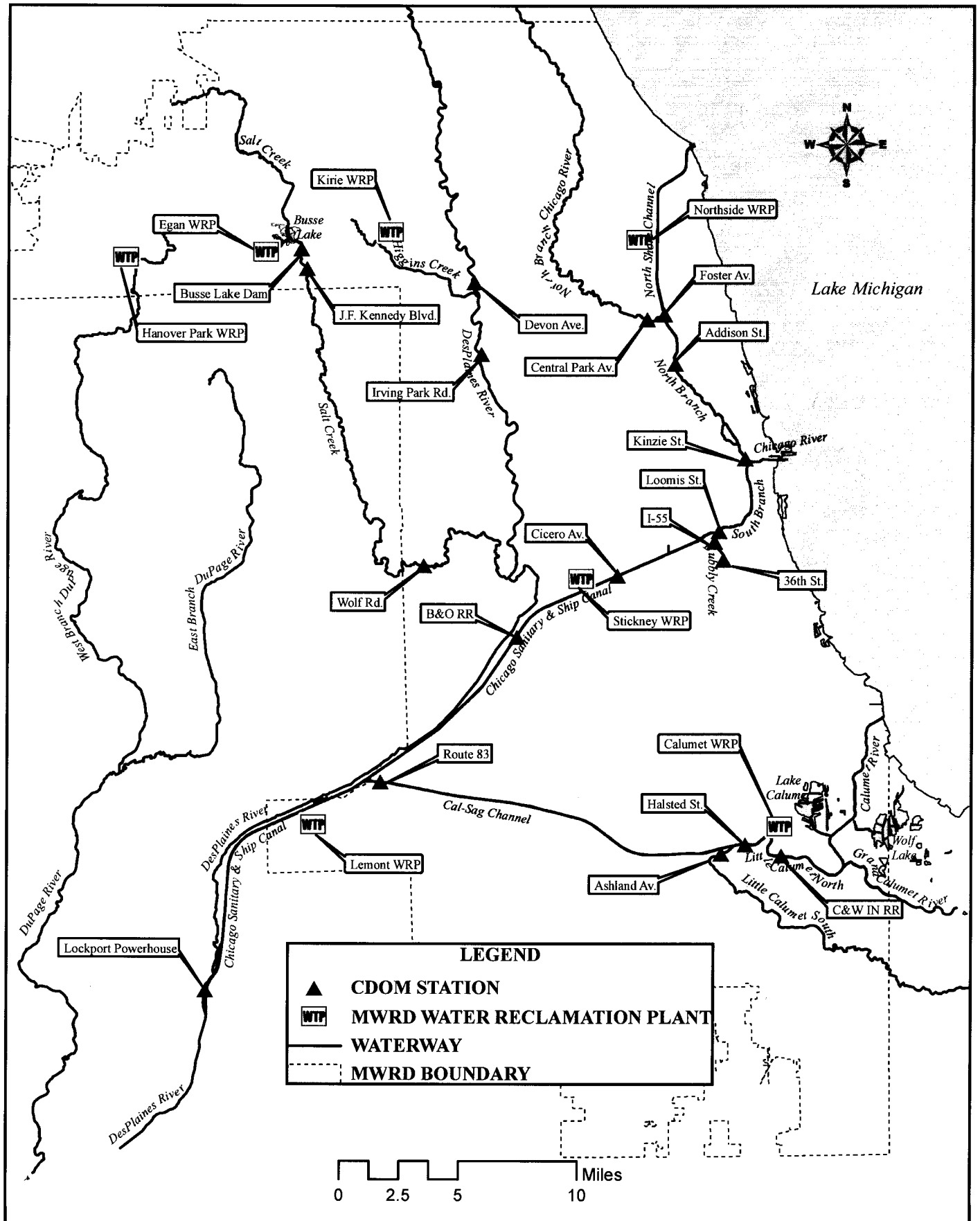


TABLE 1: DEEP-DRAFT CONTINUOUS DISSOLVED OXYGEN  
MONITORING STATIONS DURING 2011

Monitoring Station	Waterway	Description of Monitoring Station
<u>Chicago River System</u>		
Foster Avenue	North Shore Channel	3.2 miles below North Side WRP outfall, 1.5 miles below Devon Aeration Station, 0.1 mile above junction with North Branch Chicago River, water quality monitor on northwest side Foster Avenue bridge, 3 feet below water surface.
Addison Street	North Branch Chicago River	5.2 miles below North Side WRP outfall, water quality monitor on northwest side Addison Street bridge, 3 feet below water surface.
Kinzie Street	North Branch Chicago River	9.9 miles below North Side WRP outfall, 3.1 miles below Webster Aeration Station, 0.2 mile above junction with Chicago River, water quality monitor on northeast side Kinzie Street bridge, 3 feet below water surface.
Loomis Street	South Branch Chicago River	3.6 miles below junction with Chicago River, water quality monitor on northeast side Loomis Street bridge, 3 feet below water surface.

TABLE 1 (Continued): DEEP-DRAFT CONTINUOUS DISSOLVED OXYGEN  
MONITORING STATIONS DURING 2011

Monitoring Station	Waterway	Description of Monitoring Station
<u>Chicago River System (Continued)</u>		
36th Street	Bubbly Creek	0.2 mile below Racine Avenue Pumping Station, 1.2 miles above junction with South Branch of the Chicago River, water quality monitor attached to concrete wall on west side of river, 3 feet below water surface.
Interstate Highway 55	Bubbly Creek	1.0 mile below Racine Avenue Pumping Station, 0.4 mile above junction with South Branch of the Chicago River, water quality monitor on northwest side I-55 bridge, 3 feet below water surface.
Cicero Avenue	Chicago Sanitary and Ship Canal	1.5 miles above Stickney WRP outfall, 1.1 miles below Crawford Generating Station cooling water discharge, water quality monitor on northeast side Cicero Avenue bridge, 3 feet below water.
B&O Central Railroad	Chicago Sanitary and Ship Canal	3.6 miles below Stickney WRP outfall, water quality monitor in center of canal, east side B&O Central RR bridge, 3 feet below water surface.
Lockport Powerhouse	Chicago Sanitary and Ship Canal	0.1 mile above Lockport Powerhouse, 1.1 miles above junction with Des Plaines River, water quality monitor on north side of canal, in forebay area on fender wall, 3 feet below water surface.

TABLE 1 (Continued): DEEP-DRAFT CONTINUOUS DISSOLVED OXYGEN  
MONITORING STATIONS DURING 2011

Monitoring Station	Waterway	Description of Monitoring Station
<u>Calumet River System</u>		
C&W Indiana Railroad	Little Calumet River	5.2 miles below SEPA 1, 1.5 miles above SEPA 2, 3.6 miles below Thomas J. O'Brien Lock and Dam, 1.3 miles above Calumet WRP outfall, water quality monitor attached to northeast side C&W Indiana RR bridge, 3 feet below water surface.
Halsted Street	Little Calumet River	7.7 miles below SEPA 1, 1.0 mile below SEPA 2, 1.2 miles below Calumet WRP, 0.5 mile above junction with Calumet-Sag Channel, water quality monitor attached to southeast side Halsted Street bridge, 3 feet below water surface.
Route 83	Calumet-Sag Channel	0.4 mile above junction with Chicago Sanitary and Ship Canal, 0.3 mile above Canal Junction SEPA Station, water quality monitor on southwest side Illinois Central-Gulf RR bridge, 3 feet below water surface.

## MATERIALS AND METHODS

### Water Quality Monitor

The continuous water quality monitors (monitor) used to collect this data are 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 housings. A fixed length of 8-inch diameter stainless steel pipe is mounted on a bridge abutment with multiple 2-inch circular openings on the submerged end to allow sufficient flow of water through the pipe and an access hatch on the top end to allow for the exchange of monitors.

The District personnel retrieved each monitor from the field following 14 days of continuous monitoring. Prior to retrieval, a water sample was collected next to the protective housing for DO analysis using the Winkler method for subsequent comparison with the monitor results. 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 Oracle® database for data processing and storage. All DO data were carefully reviewed for accuracy.

The review process included the following:

1. Comparing the grab sample DO concentration measured in the field with a DO concentration recorded by the respective monitor retrieved in the field (DO rejection criteria = difference greater than 2.0 mg/L).
2. Comparing the last hourly DO concentration measured by the monitor retrieved in the field with the first hourly DO concentration recorded by the monitor that replaced it (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 monitor after retrieval from the field (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 result in rejection of all readings.

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

### **Verification of Representative Data**

During the spring, summer, and fall of 2011, cross-sectional DO surveys were conducted in the CAWS to determine if a fixed continuous monitoring location represented the DO concentration across the waterway (Table A-13). 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 showed that the differences across the waterway were generally minimal (coefficient of variation <10 percent) 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 12 stations during 2011 are shown in Table 2.

The number and percent of measured DO concentrations rejected and removed from the Oracle<sup>®</sup> database following review during 2011 are summarized in Table 3.

The number and percent of DO concentrations above the applicable IPCB DO standard for each waterway during 2011 are presented in Table 4. The DO data shown in Table 4 do not include the DO concentrations rejected during the data review.

The percent distribution of DO concentrations from <1.0 mg/L to >5.0 mg/L at the 12 deep-draft monitoring stations during 2011 are presented in Table 5. The current national one-day minimum DO criterion for adult life stages of fish is 3.0 mg/L (USEPA, 1986).

Individual graphs showing hourly DO concentrations at each monitoring station are presented in Figures 2 through 13. Weekly DO summary statistics during 2011 are presented for each monitoring station in Appendix A, Tables A-1 through A-12. Summary statistics for dissolved oxygen measurements made during cross-sectional surveys are shown in Appendix A, Table A-13.

### **Dissolved Oxygen Fluctuations**

DO concentrations fluctuate seasonally and daily in the aquatic environment. DO is more soluble in cold water than warmer 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. Slower moving canals absorb less oxygen from the atmosphere than faster moving streams and rivers. Thermal loads from sources such as used cooling water can increase the temperature of the waterway, thereby depleting DO. Other deficiencies of DO can occur when materials that exhibit an oxygen demand are introduced into a waterway. These materials enter a waterway most often through wastewater treatment effluents, CSOs, stormwater run-off, and directly from wildlife and plants for which the CAWS provides habitat. This is most evident during heavy rain storms. More information on CSOs can be found on the District website at ([www.mwrd.org](http://www.mwrd.org)).

TABLE 2: MINIMUM, MAXIMUM, AND MEAN HOURLY DISSOLVED OXYGEN CONCENTRATIONS DURING 2011<sup>1</sup>

Monitoring Station	Waterway	DO Concentration (mg/L)		
		Minimum	Maximum	Mean
<u>Chicago River System</u>				
Foster Avenue	North Shore Channel	3.4	11.6	7.5
Addison Street	North Branch Chicago River	0.5	11.6	7.2
Kinzie Street	North Branch Chicago River	0.4	11.6	6.2
Loomis Street	South Branch Chicago River	0.4	11.4	6.3
36 <sup>th</sup> Street	Bubbly Creek	0.0	21.4	2.6
Interstate Highway 55	Bubbly Creek	0.0	10.1	3.8
Cicero Avenue	Chicago Sanitary and Ship Canal	0.0	10.3	4.6
B&O Central Railroad	Chicago Sanitary and Ship Canal	0.8	10.6	6.1
Lockport Powerhouse	Chicago Sanitary and Ship Canal	0.3	10.4	5.8
<u>Calumet River System</u>				
C&W Indiana Railroad	Little Calumet River	0.9	15.0	8.3
Halsted Street	Little Calumet River	0.7	11.5	5.8
Route 83	Calumet-Sag Channel	1.0	11.6	6.3

<sup>1</sup>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 DURING 2011<sup>1</sup>

Monitoring Station	Waterway	Number of DO Values Rejected	Percent of DO Values Rejected
<u>Chicago River System</u>			
Foster Avenue	North Shore Channel	1,681	19
Addison Street	North Branch Chicago River	337	4
Kinzie Street	North Branch Chicago River	673	8
Loomis Street	South Branch Chicago River	1,936	22
36 <sup>th</sup> Street	Bubbly Creek	2,715	31
Interstate Highway 55	Bubbly Creek	1,643	19
Cicero Avenue	Chicago Sanitary and Ship Canal	1,938	22
B&O Central Railroad	Chicago Sanitary and Ship Canal	3,053	35
Lockport Powerhouse	Chicago Sanitary and Ship Canal	1,694	19
<u>Calumet River System</u>			
C&W Indiana Railroad	Little Calumet River	1,093	12
Halsted Street	Little Calumet River	1,599	18
Route 83	Calumet-Sag Channel	1,960	22

<sup>1</sup>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 DURING 2011<sup>1</sup>

Monitoring Station	Waterway	IPCB DO Standard	Number of DO Values	Number Above Standard	Percent Above Standard
<u>Chicago River System</u>					
Foster Avenue	North Shore Channel	4.0	7,079	7,068	>99
Addison Street	North Branch Chicago River	4.0	8,423	8,368	99
Kinzie Street	North Branch Chicago River	4.0	8,087	7,380	91
Loomis Street	South Branch Chicago River	4.0	6,824	6,220	91
36 <sup>th</sup> Street	Bubbly Creek	4.0	6,045	1,278	21
Interstate Highway 55	Bubbly Creek	4.0	7,117	3,450	48
Cicero Avenue	Chicago Sanitary and Ship Canal	4.0	6,822	4,232	62
B&O Central Railroad	Chicago Sanitary and Ship Canal	4.0	5,707	5,031	88
Lockport Powerhouse	Chicago Sanitary and Ship Canal	4.0	7,066	5,729	81
<u>Calumet River System</u>					
C&W Indiana Railroad	Little Calumet River	4.0	7,667	7,257	95
Halsted Street	Little Calumet River	4.0	7,161	6,279	88
Route 83	Calumet-Sag Channel	3.0	6,800	6,727	99

<sup>1</sup>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 DURING 2011

Monitoring Station	Waterway	Percent of DO Values in Range (mg/L)*					
		0-<1	1-<2	2-<3	3-<4	4-<5	≥5
<u>Chicago River System</u>							
Foster Avenue	North Shore Channel	0	0	0	<1	1	99
Addison Street	North Branch Chicago River	<1	<1	<1	1	3	97
Kinzie Street	North Branch Chicago River	<1	<1	2	6	16	75
Loomis Street	South Branch Chicago River	<1	<1	2	6	13	78
36 <sup>th</sup> Street	Bubbly Creek	50	10	8	11	6	15
Interstate Highway 55	Bubbly Creek	21	9	9	13	13	35
Cicero Avenue	Chicago Sanitary and Ship Canal	7	8	9	13	14	48
B&O Central Railroad	Chicago Sanitary and Ship Canal	<1	2	3	7	16	72
Lockport Powerhouse	Chicago Sanitary and Ship Canal	1	3	7	8	15	66
<u>Calumet River System</u>							
C&W Indiana Railroad	Little Calumet River	<1	1	2	3	4	90
Halsted Street	Little Calumet River	<1	<1	3	9	13	75
Route 83	Calumet-Sag Channel	<1	<1	1	8	15	77

\* Percentages greater than one are rounded to nearest whole number.

FIGURE 2: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT FOSTER AVENUE ON THE NORTH SHORE CHANNEL FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

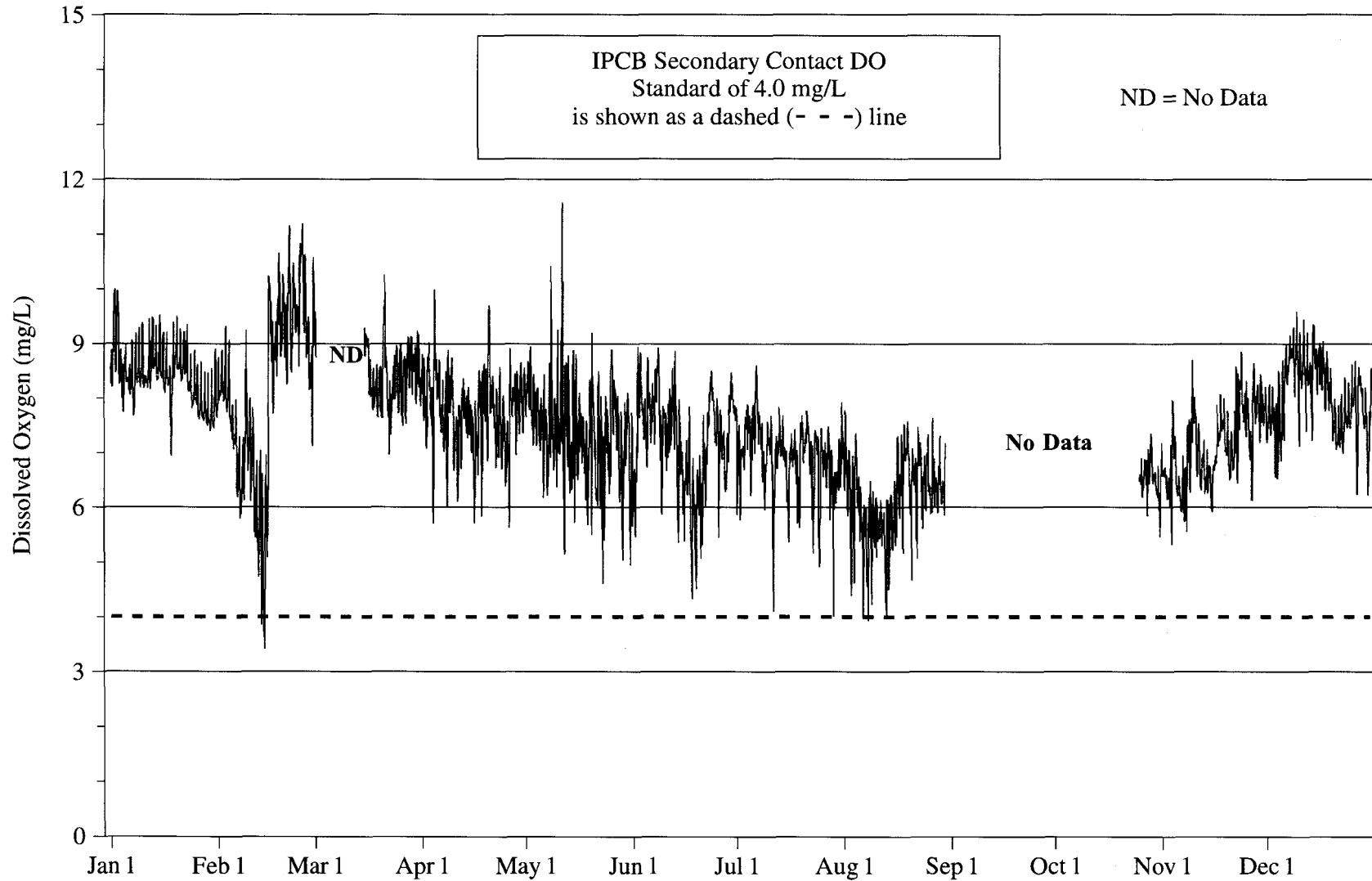


FIGURE 3: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT ADDISON STREET ON THE NORTH BRANCH CHICAGO RIVER FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

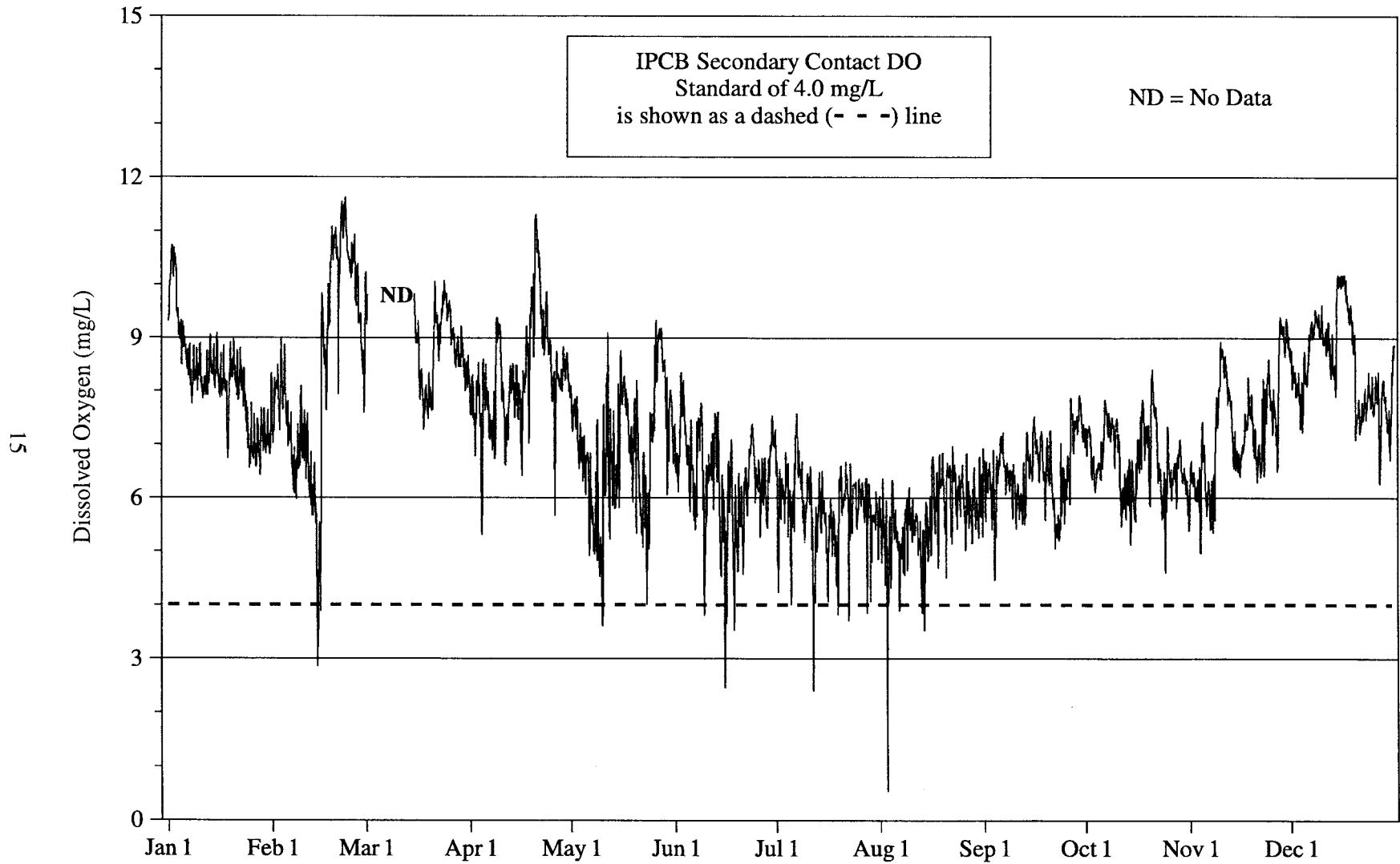


FIGURE 4: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT KINZIE STREET ON THE NORTH BRANCH CHICAGO RIVER FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

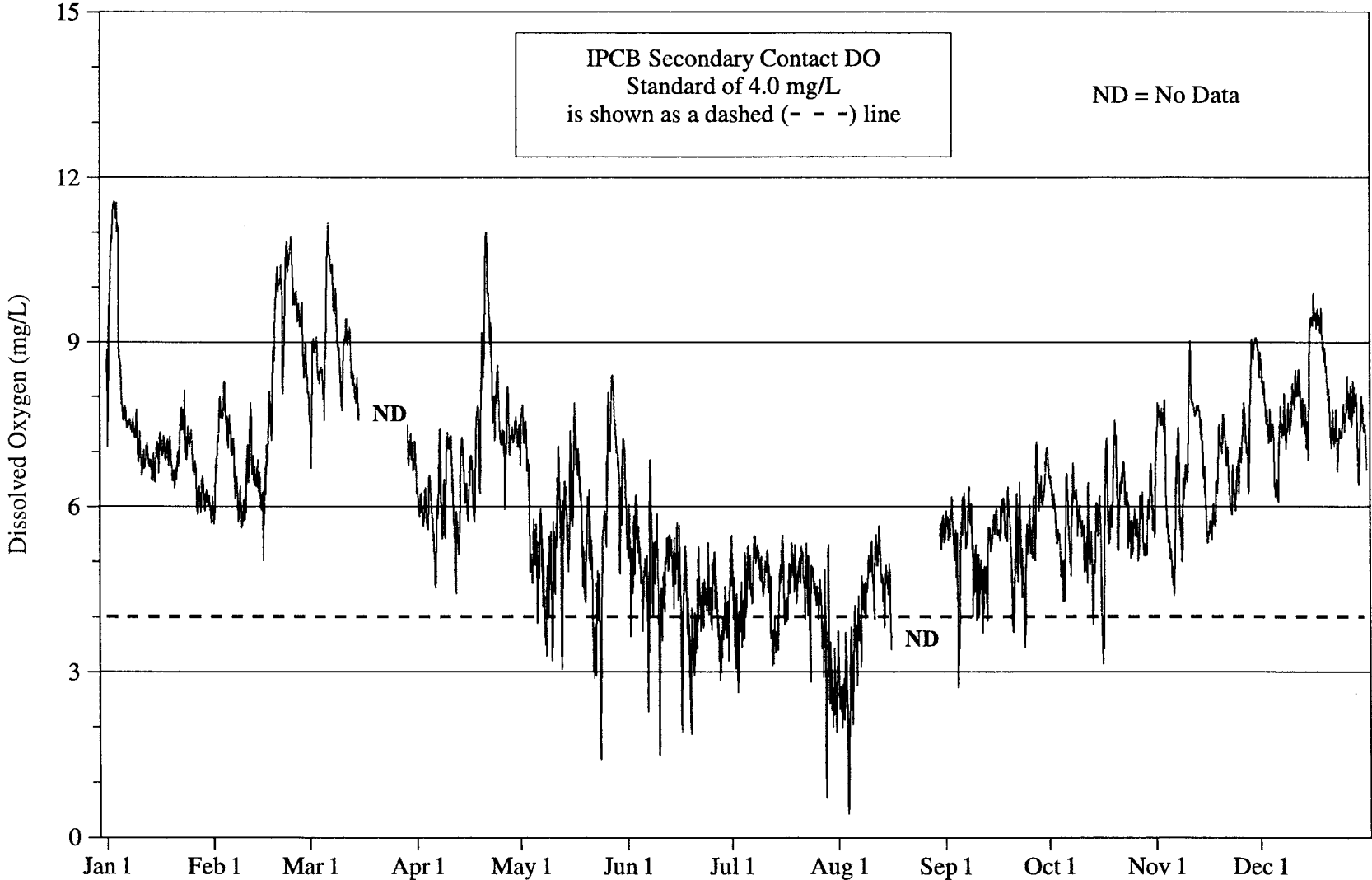




FIGURE 5: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT LOOMIS STREET ON THE SOUTH BRANCH CHICAGO RIVER FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

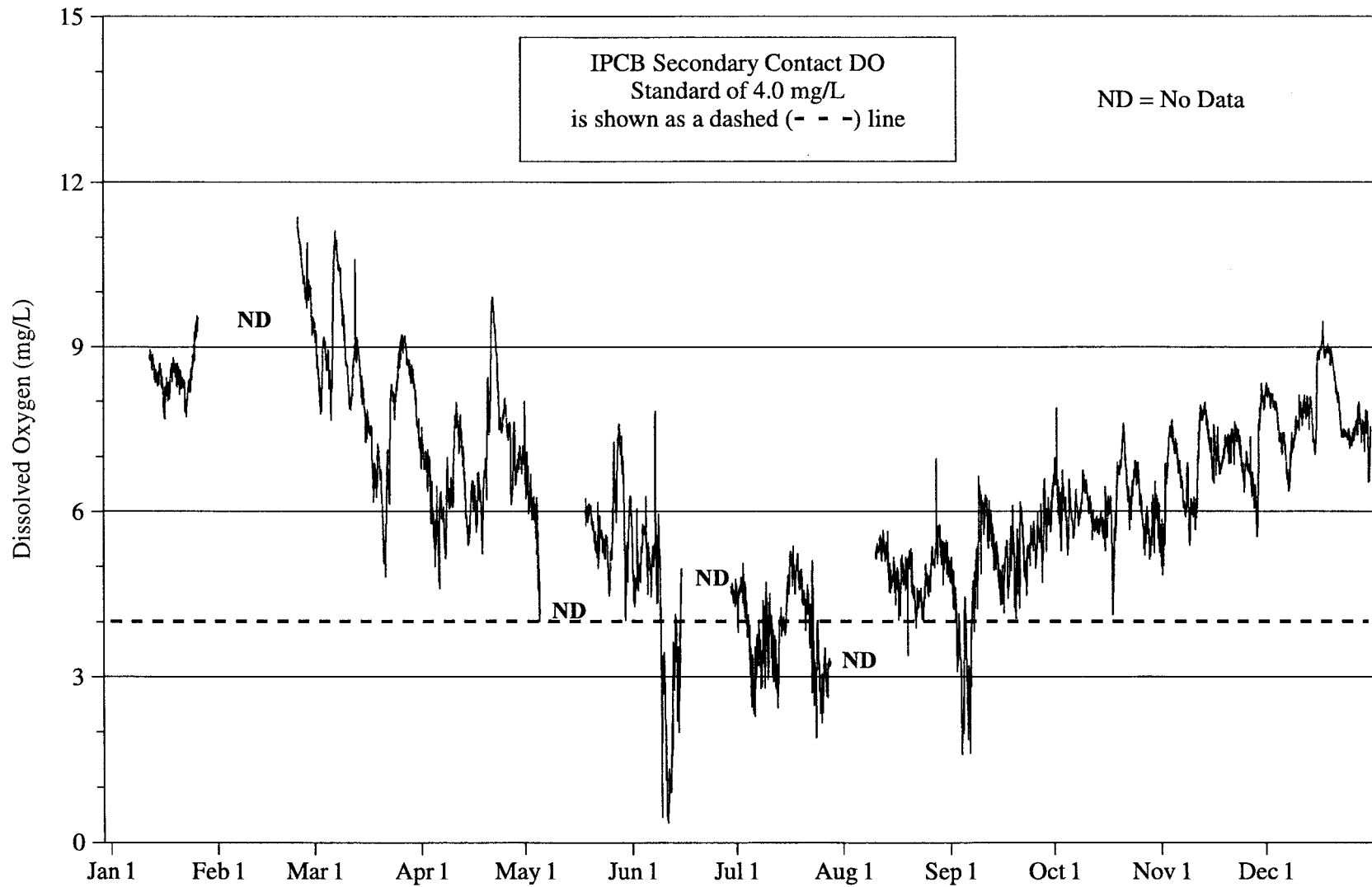


FIGURE 6: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT 36TH STREET ON BUBBLY CREEK FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

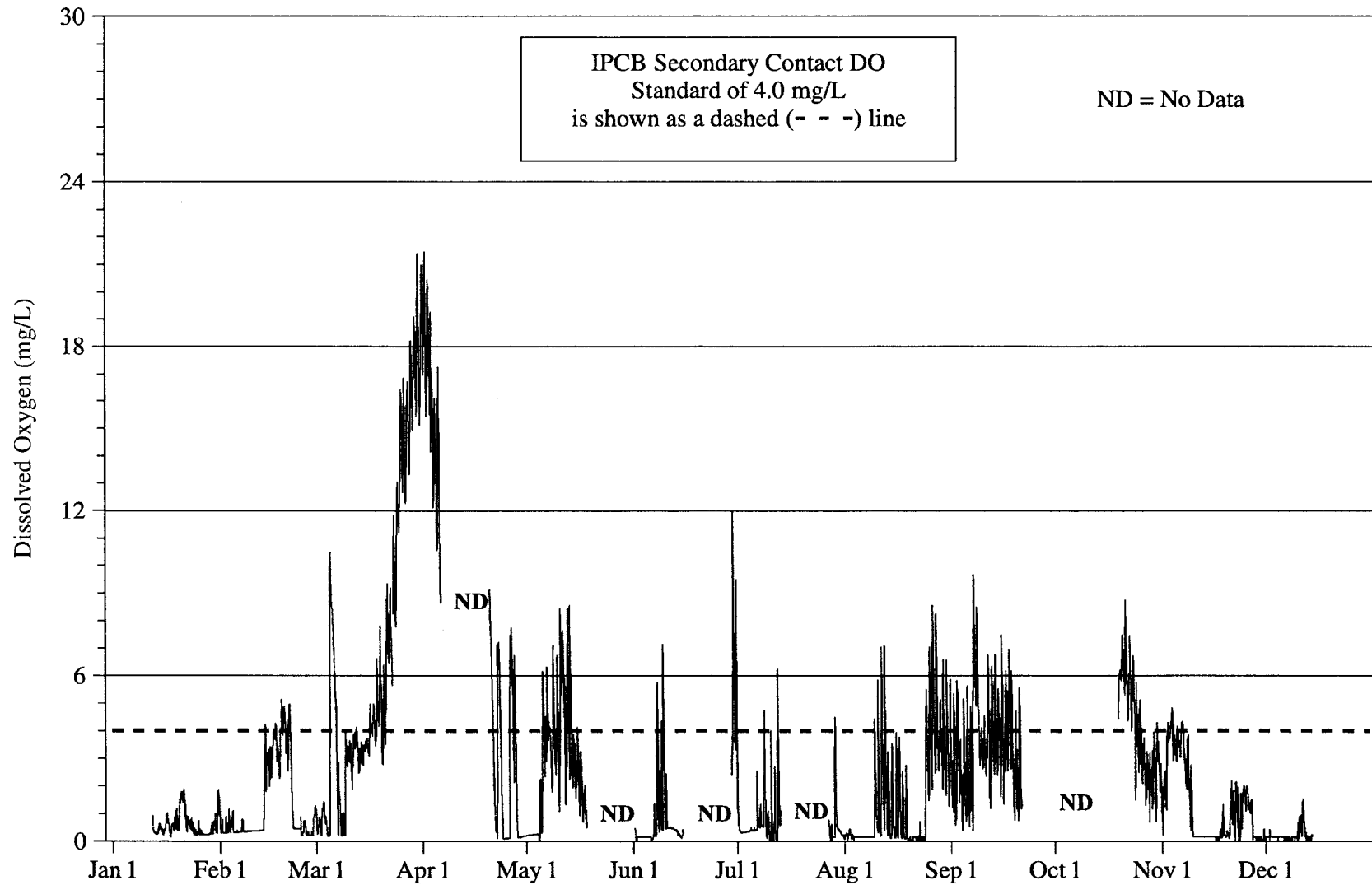


FIGURE 7: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT INTERSTATE HIGHWAY 55 ON BUBBLY CREEK FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

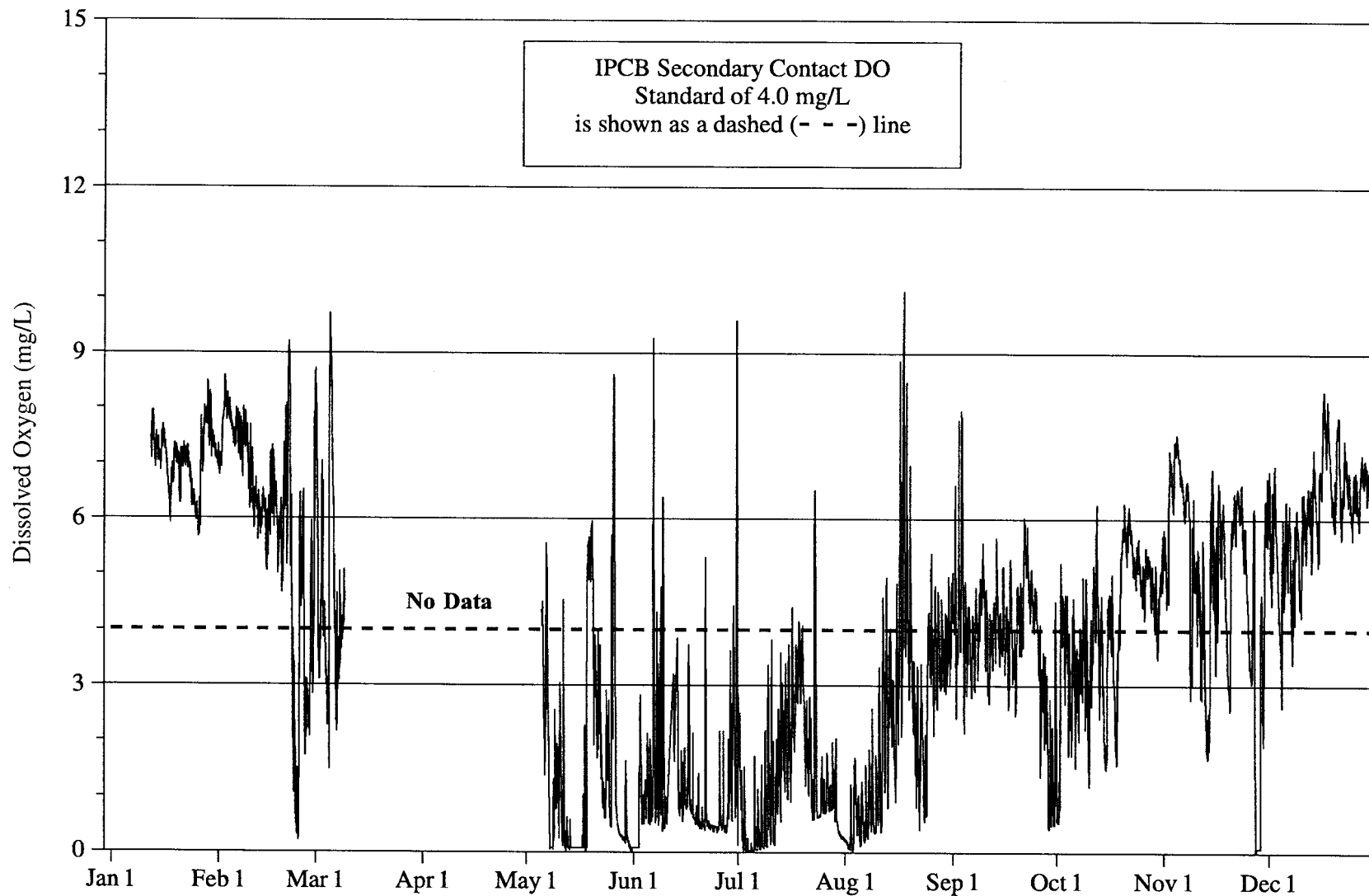


FIGURE 8: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT CICERO AVENUE ON THE CHICAGO SANITARY AND SHIP CANAL FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

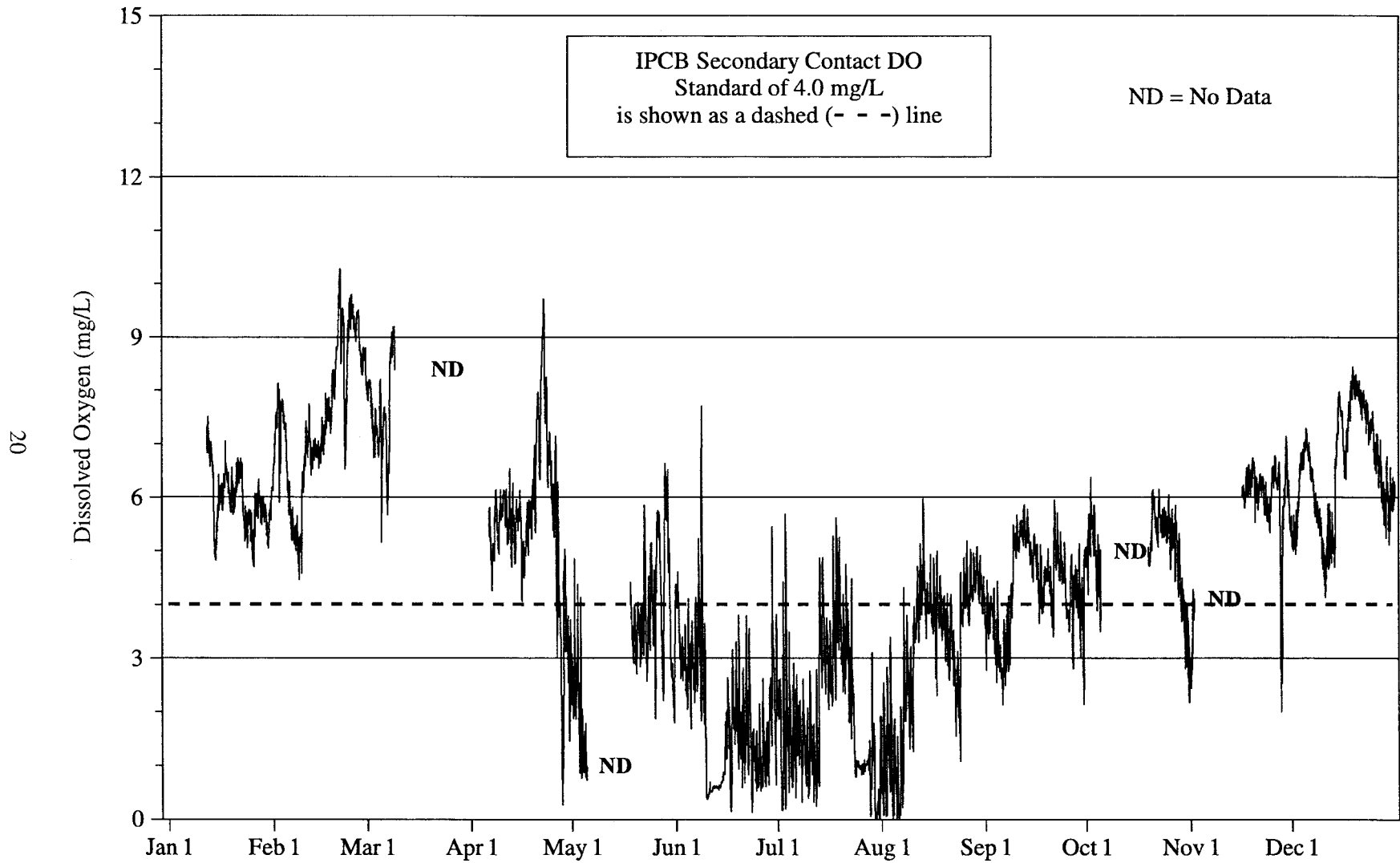


FIGURE 9: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT B&O CENTRAL RAILROAD ON THE CHICAGO SANITARY AND SHIP CANAL FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

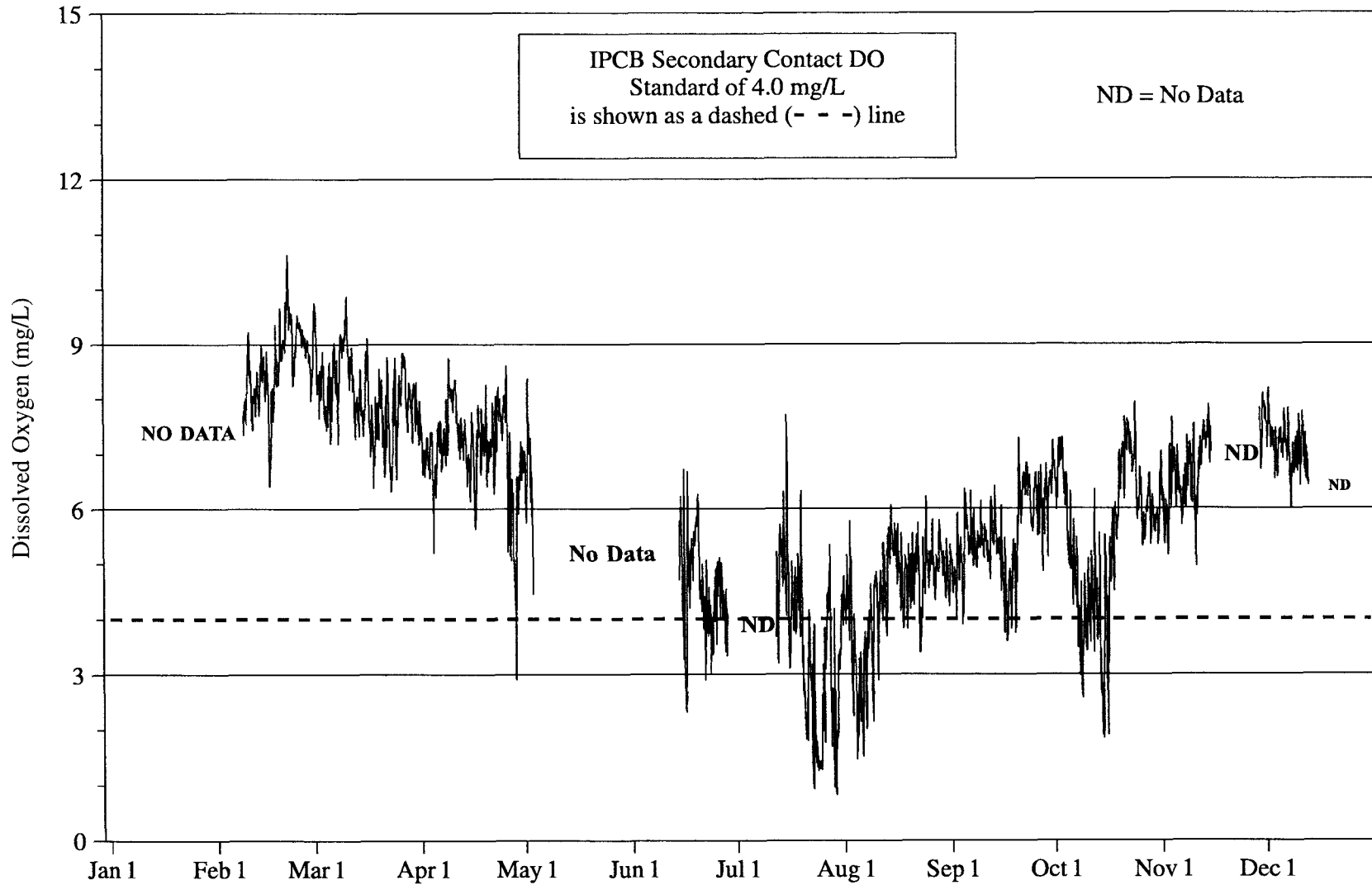


FIGURE 10: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT LOCKPORT POWERHOUSE ON THE CHICAGO SANITARY AND SHIP CANAL FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

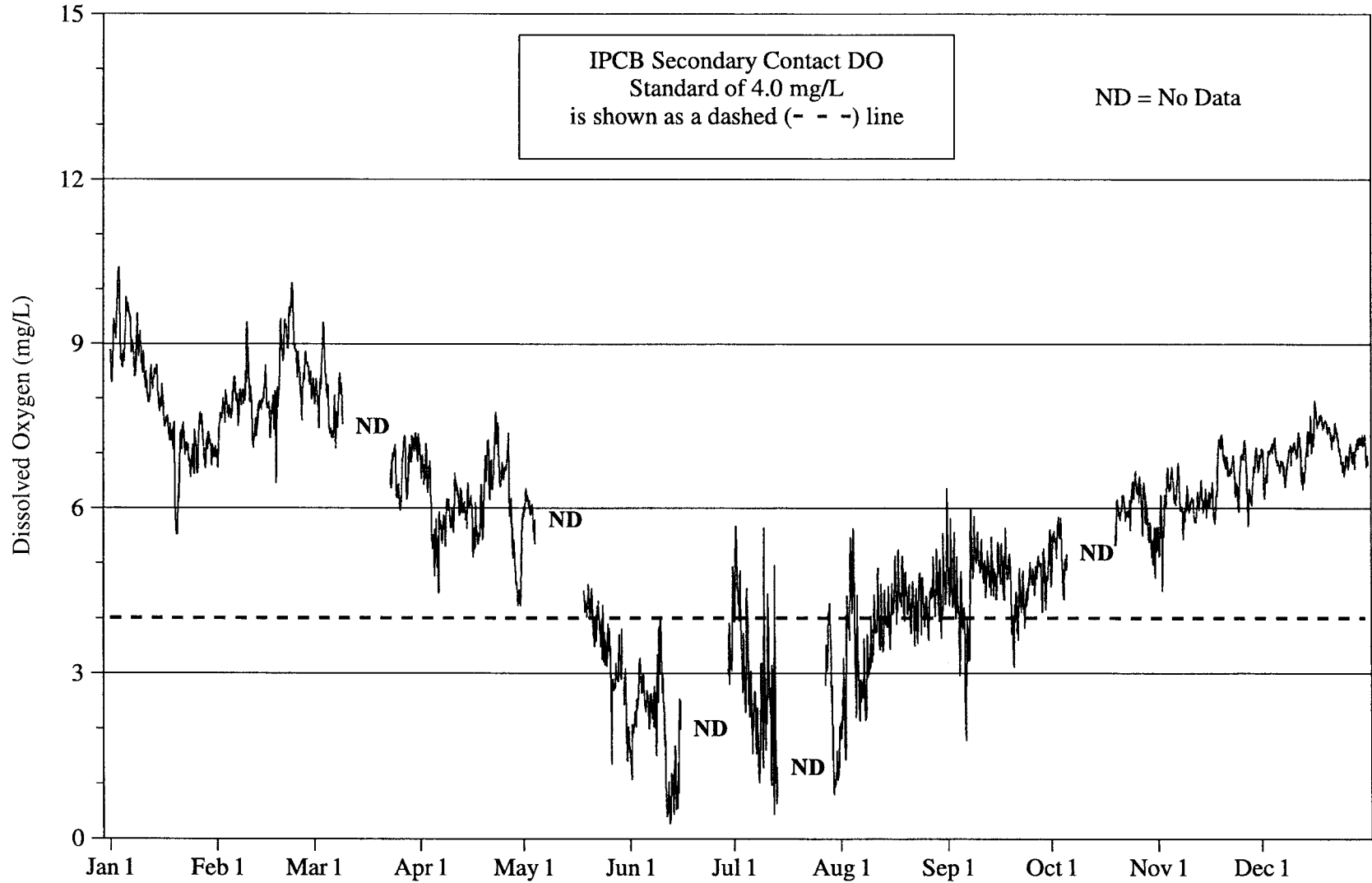


FIGURE 11: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT C&W INDIANA RAILROAD ON THE LITTLE CALUMET RIVER FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

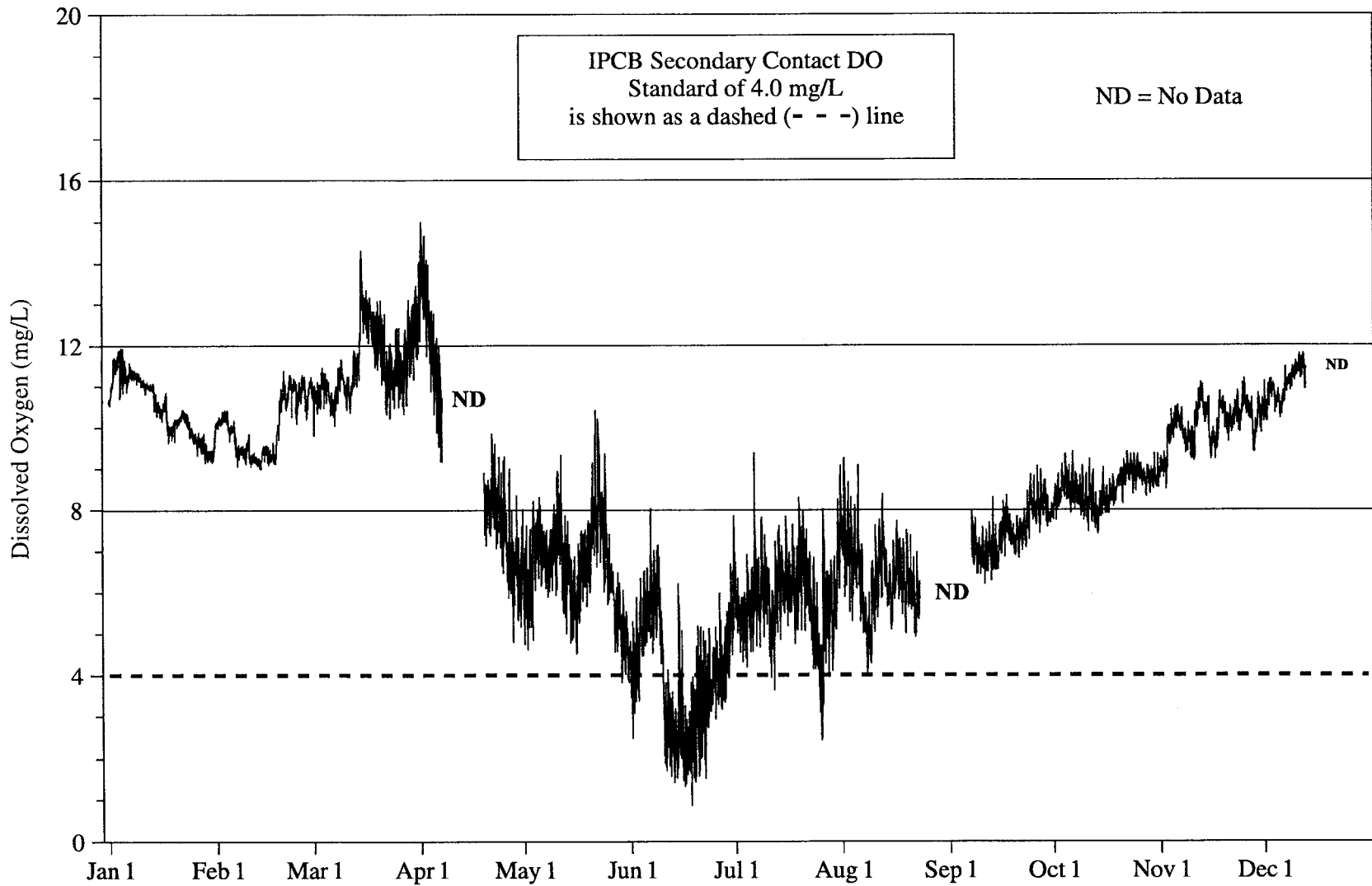


FIGURE 12: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT HALSTED STREET ON THE LITTLE CALUMET RIVER FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011

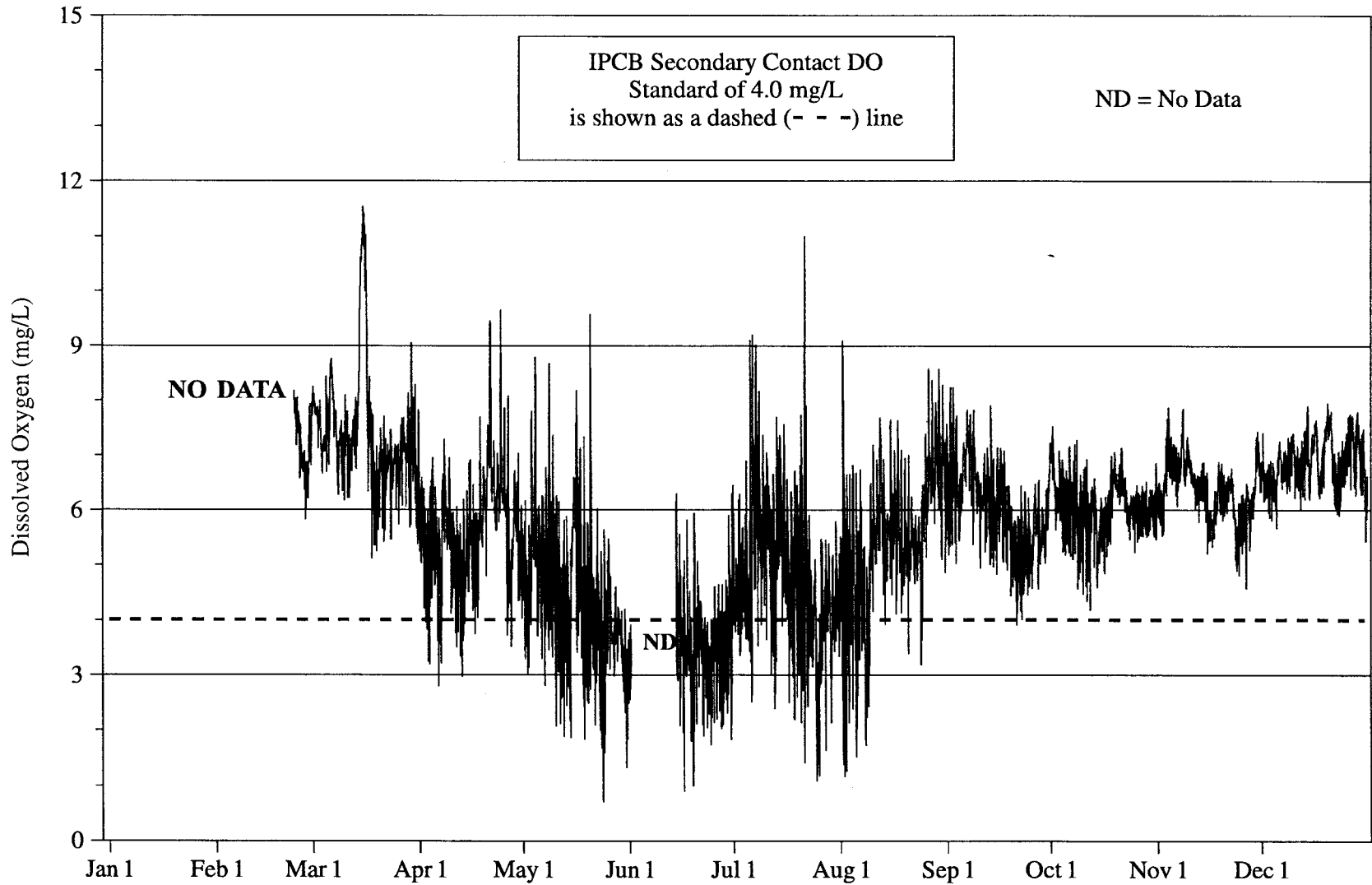
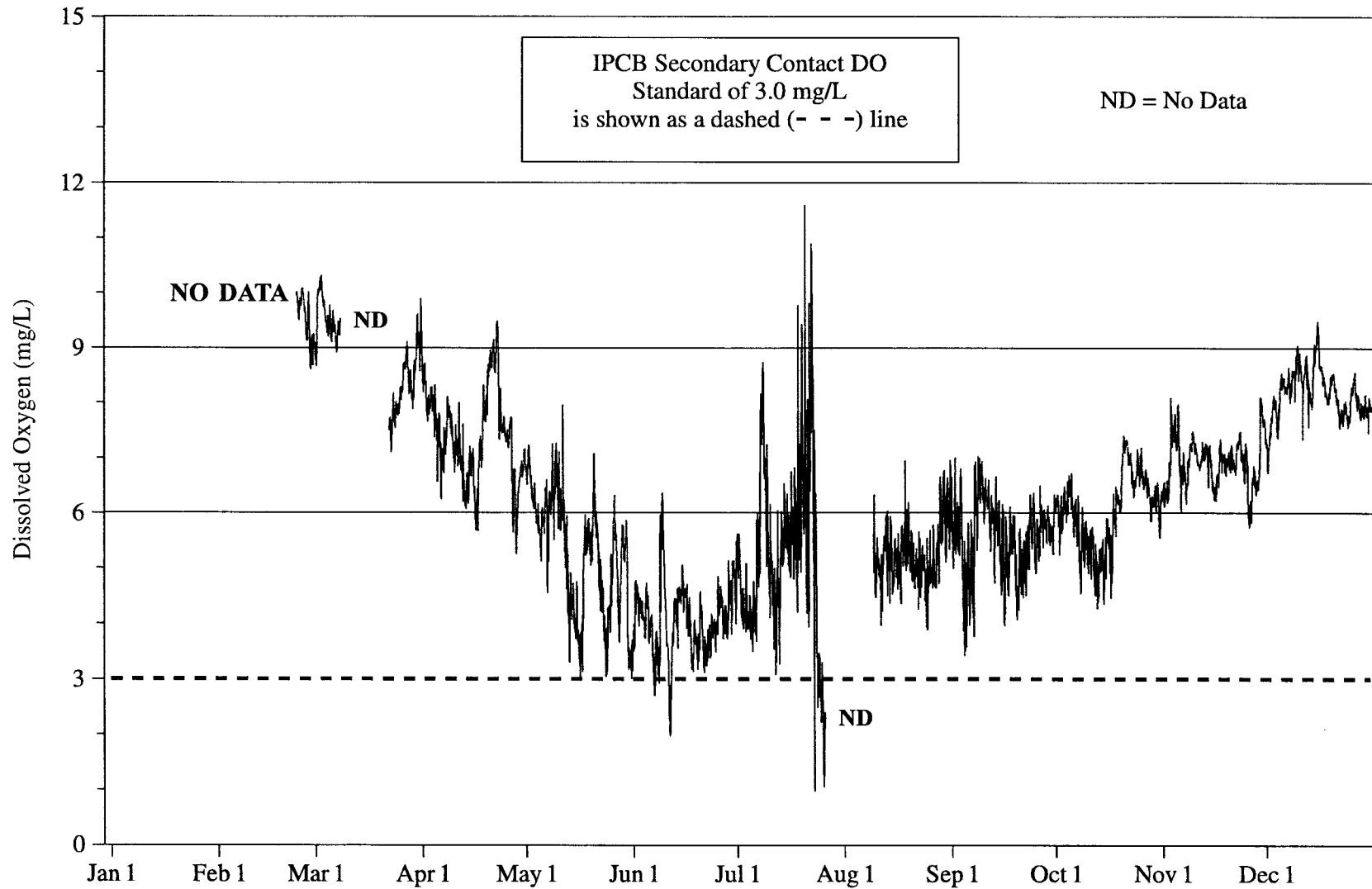




FIGURE 13: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT ROUTE 83 ON THE CALUMET-SAG CHANNEL FROM JANUARY 1, 2011, THROUGH DECEMBER 31, 2011



## REFERENCES

United States Environmental Protection Agency (USEPA), "Ambient Water Quality Criteria for Dissolved Oxygen," EPA 440/5-86-003, United States Environmental Protection Agency, Office of Water Regulations and Standards, Washington, D.C., 1986.

APPENDIX A

WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS AT ALL DEEP-DRAFT  
MONITORING STATIONS DURING 2011

TABLE A-1: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
AT FOSTER AVENUE ON THE  
NORTH SHORE CHANNEL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/02/11	48	8.2	10.0	9.1	100
01/03/11 - 01/09/11	168	7.7	9.8	8.4	100
01/10/11 - 01/16/11	168	8.1	9.5	8.6	100
01/17/11 - 01/23/11	168	7.0	9.5	8.5	100
01/24/11 - 01/30/11	168	7.4	8.9	7.9	100
01/31/11 - 02/06/11	168	6.2	9.3	7.8	100
02/07/11 - 02/13/11	168	3.9	9.2	6.5	99
02/14/11 - 02/20/11	168	3.4	10.7	8.4	95
02/21/11 - 02/27/11	168	8.2	11.2	9.7	100
02/28/11 - 03/06/11	35	7.1	10.6	9.0	100
03/07/11 - 03/13/11			NO DATA		
03/14/11 - 03/20/11	132	7.6	9.3	8.3	100
03/21/11 - 03/27/11	168	7.0	10.3	8.3	100
03/28/11 - 04/03/11	168	7.1	9.2	8.4	100
04/04/11 - 04/10/11	168	5.7	10.0	7.8	100
04/11/11 - 04/17/11	168	5.7	8.5	7.5	100
04/18/11 - 04/24/11	168	5.8	9.7	7.8	100
04/25/11 - 05/01/11	168	5.6	8.9	7.8	100
05/02/11 - 05/08/11	168	6.2	10.4	7.7	100
05/09/11 - 05/15/11	168	5.2	11.6	7.4	100
05/16/11 - 05/22/11	168	5.5	9.2	7.2	100
05/23/11 - 05/29/11	168	4.6	8.9	7.2	100
05/30/11 - 06/05/11	168	5.0	8.9	7.3	100
06/06/11 - 06/12/11	168	5.9	8.9	7.7	100
06/13/11 - 06/19/11	168	4.3	8.9	6.5	100
06/20/11 - 06/26/11	168	5.1	8.5	7.1	100
06/27/11 - 07/03/11	168	5.8	8.5	7.2	100
07/04/11 - 07/10/11	168	6.0	8.6	7.3	100
07/11/11 - 07/17/11	168	4.1	7.8	6.8	100
07/18/11 - 07/24/11	168	5.2	7.8	6.9	100
07/25/11 - 07/31/11	168	4.0	7.9	6.7	100
08/01/11 - 08/07/11	168	4.0	7.8	6.1	100
08/08/11 - 08/14/11	168	3.9	6.5	5.6	99
08/15/11 - 08/21/11	168	4.7	7.6	6.5	100

TABLE A-1 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT FOSTER AVENUE ON THE  
 NORTH SHORE CHANNEL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/22/11 - 08/28/11	168	5.1	7.6	6.5	100
08/29/11 - 09/04/11	36	5.9	7.2	6.4	100
09/05/11 - 10/23/11		NO DATA			
10/24/11 - 10/30/11	131	5.9	7.4	6.6	100
10/31/11 - 11/06/11	168	5.3	8.0	6.5	100
11/07/11 - 11/13/11	168	5.6	8.7	6.9	100
11/14/11 - 11/20/11	168	5.9	8.1	7.0	100
11/21/11 - 11/27/11	168	6.1	8.9	7.6	100
11/28/11 - 12/04/11	168	6.5	8.5	7.6	100
12/05/11 - 12/11/11	168	6.9	9.6	8.5	100
12/12/11 - 12/18/11	168	7.2	9.4	8.5	100
12/19/11 - 12/25/11	168	7.0	8.6	7.7	100
12/26/11 - 12/31/11	144	6.2	8.7	7.8	100

TABLE A-2: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT ADDISON STREET ON THE  
 NORTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/02/11	48	9.3	10.7	10.3	100
01/03/11 - 01/09/11	168	7.8	10.6	8.8	100
01/10/11 - 01/16/11	168	7.9	9.1	8.4	100
01/17/11 - 01/23/11	168	6.7	9.0	8.2	100
01/24/11 - 01/30/11	168	6.4	7.8	7.1	100
01/31/11 - 02/06/11	168	6.4	9.0	7.7	100
02/07/11 - 02/13/11	168	5.5	8.1	6.6	100
02/14/11 - 02/20/11	168	2.9	11.1	8.6	92
02/21/11 - 02/27/11	168	8.4	11.6	10.4	100
02/28/11 - 03/06/11	35	7.6	10.2	9.1	100
03/07/11 - 03/13/11			NO DATA		
03/14/11 - 03/20/11	133	7.3	9.8	8.2	100
03/21/11 - 03/27/11	168	8.1	10.1	9.3	100
03/28/11 - 04/03/11	168	6.8	9.2	8.2	100
04/04/11 - 04/10/11	168	5.3	9.4	7.8	100
04/11/11 - 04/17/11	167	6.4	9.2	7.8	100
04/18/11 - 04/24/11	168	7.0	11.3	9.5	100
04/25/11 - 05/01/11	168	5.7	8.9	8.1	100
05/02/11 - 05/08/11	168	4.8	7.9	6.5	100
05/09/11 - 05/15/11	168	3.6	9.1	6.4	96
05/16/11 - 05/22/11	168	5.1	8.4	7.0	100
05/23/11 - 05/29/11	168	4.0	9.3	7.6	100
05/30/11 - 06/05/11	168	5.7	8.4	7.1	100
06/06/11 - 06/12/11	168	3.8	7.8	6.5	99
06/13/11 - 06/19/11	168	2.5	7.6	5.7	95
06/20/11 - 06/26/11	168	4.6	7.4	6.3	100
06/27/11 - 07/03/11	168	4.2	7.5	6.3	100
07/04/11 - 07/10/11	168	4.0	7.6	6.2	100
07/11/11 - 07/17/11	168	2.4	6.6	5.4	96
07/18/11 - 07/24/11	168	3.7	6.7	5.8	98
07/25/11 - 07/31/11	168	3.9	6.4	5.8	99
08/01/11 - 08/07/11	168	0.5	6.4	5.1	95
08/08/11 - 08/14/11	168	3.5	6.2	5.3	96
08/15/11 - 08/21/11	168	4.5	6.8	6.0	100

TABLE A-2 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT ADDISON STREET ON THE  
 NORTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/22/11 - 08/28/11	168	5.0	7.0	6.0	100
08/29/11 - 09/04/11	168	4.5	6.9	6.1	100
09/05/11 - 09/11/11	168	5.4	7.2	6.4	100
09/12/11 - 09/18/11	168	5.5	7.5	6.6	100
09/19/11 - 09/25/11	168	5.1	7.3	6.1	100
09/26/11 - 10/02/11	168	5.9	7.9	7.2	100
10/03/11 - 10/09/11	168	6.1	7.8	7.0	100
10/10/11 - 10/16/11	168	5.1	7.5	6.3	100
10/17/11 - 10/23/11	168	5.6	8.4	7.1	100
10/24/11 - 10/30/11	168	4.6	7.3	6.4	100
10/31/11 - 11/06/11	168	5.0	7.4	6.2	100
11/07/11 - 11/13/11	168	5.4	8.9	7.5	100
11/14/11 - 11/20/11	168	6.4	8.3	7.1	100
11/21/11 - 11/27/11	168	6.3	9.4	7.5	100
11/28/11 - 12/04/11	168	7.2	9.4	8.5	100
12/05/11 - 12/11/11	168	8.1	9.6	9.0	100
12/12/11 - 12/18/11	168	7.9	10.2	9.4	100
12/19/11 - 12/25/11	168	7.1	9.6	8.0	100
12/26/11 - 12/31/11	144	6.3	8.9	7.7	100

TABLE A-3: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT KINZIE STREET ON THE  
 NORTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/02/11	48	7.1	11.5	9.9	100
01/03/11 - 01/09/11	168	7.1	11.6	8.5	100
01/10/11 - 01/16/11	168	6.5	7.4	6.9	100
01/17/11 - 01/23/11	168	6.3	8.1	7.0	100
01/24/11 - 01/30/11	168	5.9	7.5	6.5	100
01/31/11 - 02/06/11	168	5.7	8.3	7.1	100
02/07/11 - 02/13/11	168	5.6	7.9	6.5	100
02/14/11 - 02/20/11	168	5.0	10.4	8.0	100
02/21/11 - 02/27/11	168	8.1	10.9	9.7	100
02/28/11 - 03/06/11	168	6.7	11.2	8.7	100
03/07/11 - 03/13/11	168	7.8	10.5	9.1	100
03/14/11 - 03/20/11	34	7.6	8.3	8.0	100
03/21/11 - 03/27/11			NO DATA		
03/28/11 - 04/03/11	134	5.7	7.5	6.4	100
04/04/11 - 04/10/11	168	4.5	7.4	6.2	100
04/11/11 - 04/17/11	168	4.4	7.3	6.2	100
04/18/11 - 04/24/11	168	6.2	11.0	8.5	100
04/25/11 - 05/01/11	168	6.0	8.2	7.3	100
05/02/11 - 05/08/11	168	3.3	7.6	5.4	90
05/09/11 - 05/15/11	168	3.1	7.4	5.5	90
05/16/11 - 05/22/11	168	2.9	7.9	5.5	83
05/23/11 - 05/29/11	168	1.4	8.4	6.1	89
05/30/11 - 06/05/11	168	3.6	7.2	5.5	98
06/06/11 - 06/12/11	168	1.5	6.9	4.7	85
06/13/11 - 06/19/11	168	1.9	5.7	4.3	69
06/20/11 - 06/26/11	168	2.9	5.3	4.3	74
06/27/11 - 07/03/11	168	2.6	5.5	4.0	42
07/04/11 - 07/10/11	168	3.5	5.5	4.7	93
07/11/11 - 07/17/11	168	3.1	5.5	4.3	65
07/18/11 - 07/24/11	168	2.8	5.3	4.7	95
07/25/11 - 07/31/11	168	0.7	5.3	3.4	36
08/01/11 - 08/07/11	168	0.4	4.7	2.9	8
08/08/11 - 08/14/11	168	3.8	5.7	4.8	97
08/15/11 - 08/21/11	34	3.4	5.0	4.5	79



TABLE A-3 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT KINZIE STREET ON THE  
 NORTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/22/11 - 08/28/11		NO DATA			
08/29/11 - 09/04/11	133	2.7	6.2	5.4	93
09/05/11 - 09/11/11	168	3.4	6.4	5.2	95
09/12/11 - 09/18/11	168	3.9	6.2	5.4	99
09/19/11 - 09/25/11	168	3.5	6.5	5.1	88
09/26/11 - 10/02/11	168	5.0	7.2	6.2	100
10/03/11 - 10/09/11	168	4.3	6.8	5.6	100
10/10/11 - 10/16/11	168	3.2	6.4	5.2	90
10/17/11 - 10/23/11	168	3.9	7.6	6.3	99
10/24/11 - 10/30/11	168	5.0	6.8	5.7	100
10/31/11 - 11/06/11	168	4.4	7.9	6.3	100
11/07/11 - 11/13/11	168	5.0	9.0	7.1	100
11/14/11 - 11/20/11	168	5.3	7.7	6.5	100
11/21/11 - 11/27/11	168	5.9	7.9	6.7	100
11/28/11 - 12/04/11	168	6.9	9.1	8.2	100
12/05/11 - 12/11/11	168	6.1	8.5	7.4	100
12/12/11 - 12/18/11	168	6.9	9.9	8.6	100
12/19/11 - 12/25/11	168	6.6	9.3	7.7	100
12/26/11 - 12/31/11	144	6.4	8.4	7.6	100

TABLE A-4: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
AT LOOMIS STREET ON THE  
SOUTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/09/11			NO DATA		
01/10/11 - 01/16/11	108	7.7	8.9	8.5	100
01/17/11 - 01/23/11	168	7.7	8.8	8.3	100
01/24/11 - 01/30/11	58	8.2	9.6	8.9	100
01/31/11 - 02/20/11			NO DATA		
02/21/11 - 02/27/11	86	9.7	11.4	10.4	100
02/28/11 - 03/06/11	168	7.7	10.7	8.9	100
03/07/11 - 03/13/11	168	7.9	11.1	9.3	100
03/14/11 - 03/20/11	168	5.7	9.0	7.3	100
03/21/11 - 03/27/11	167	4.8	9.2	7.8	100
03/28/11 - 04/03/11	168	5.8	8.8	7.6	100
04/04/11 - 04/10/11	168	4.6	7.7	6.0	100
04/11/11 - 04/17/11	168	5.4	8.0	6.6	100
04/18/11 - 04/24/11	168	5.2	9.9	7.8	100
04/25/11 - 05/01/11	168	6.1	8.1	7.1	100
05/02/11 - 05/08/11	82	4.0	6.8	5.8	100
05/09/11 - 05/15/11			NO DATA		
05/16/11 - 05/22/11	108	5.0	6.2	5.7	100
05/23/11 - 05/29/11	168	4.5	7.6	6.0	100
05/30/11 - 06/05/11	168	4.0	6.3	5.2	100
06/06/11 - 06/12/11	168	0.4	7.8	3.4	48
06/13/11 - 06/19/11	58	2.0	5.0	3.6	24
06/20/11 - 06/26/11			NO DATA		
06/27/11 - 07/03/11	109	3.8	5.1	4.5	98
07/04/11 - 07/10/11	168	2.3	4.7	3.5	14
07/11/11 - 07/17/11	168	2.4	5.4	4.0	46
07/18/11 - 07/24/11	168	1.9	5.2	4.2	69
07/25/11 - 07/31/11	82	2.2	3.5	3.0	0
08/01/11 - 08/07/11			NO DATA		
08/08/11 - 08/14/11	110	4.5	5.7	5.2	100
08/15/11 - 08/21/11	168	3.4	5.3	4.8	99
08/22/11 - 08/28/11	168	3.9	7.0	4.8	98
08/29/11 - 09/04/11	168	1.6	5.7	4.4	70
09/05/11 - 09/11/11	168	1.6	6.6	4.8	72

TABLE A-4 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT LOOMIS STREET ON THE  
 SOUTH BRANCH CHICAGO RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/12/11 - 09/18/11	168	4.2	6.2	5.1	100
09/19/11 - 09/25/11	168	4.1	6.2	5.3	100
09/26/11 - 10/02/11	168	4.7	7.9	6.0	100
10/03/11 - 10/09/11	168	5.2	6.8	6.0	100
10/10/11 - 10/16/11	168	5.3	6.6	5.9	100
10/17/11 - 10/23/11	168	4.1	7.6	6.3	100
10/24/11 - 10/30/11	168	5.1	6.9	6.1	100
10/31/11 - 11/06/11	168	4.9	7.7	6.6	100
11/07/11 - 11/13/11	168	5.4	8.0	6.6	100
11/14/11 - 11/20/11	168	6.5	7.8	7.1	100
11/21/11 - 11/27/11	168	6.1	7.6	7.0	100
11/28/11 - 12/04/11	168	5.5	8.3	7.6	100
12/05/11 - 12/11/11	168	6.4	8.1	7.3	100
12/12/11 - 12/18/11	168	7.0	9.5	8.2	100
12/19/11 - 12/25/11	168	7.2	9.1	8.1	100
12/26/11 - 12/31/11	144	6.5	8.0	7.5	100

TABLE A-5: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
AT 36TH STREET ON  
BUBBLY CREEK DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/09/11			NO DATA		
01/10/11 - 01/16/11	110	0.2	1.0	0.5	0
01/17/11 - 01/23/11	168	0.2	1.9	0.8	0
01/24/11 - 01/30/11	168	0.2	1.0	0.3	0
01/31/11 - 02/06/11	168	0.3	1.9	0.6	0
02/07/11 - 02/13/11	168	0.3	3.0	0.4	0
02/14/11 - 02/20/11	168	1.8	5.1	3.5	26
02/21/11 - 02/27/11	168	0.2	5.0	0.8	6
02/28/11 - 03/06/11	168	0.2	10.5	2.7	29
03/07/11 - 03/13/11	168	0.2	4.1	2.4	3
03/14/11 - 03/20/11	168	2.8	7.8	4.2	51
03/21/11 - 03/27/11	166	3.5	16.8	10.9	99
03/28/11 - 04/03/11	168	13.3	21.4	17.6	100
04/04/11 - 04/10/11	58	8.7	17.2	13.2	100
04/11/11 - 04/17/11			NO DATA		
04/18/11 - 04/24/11	111	0.1	9.1	3.4	42
04/25/11 - 05/01/11	168	0.1	7.7	1.7	23
05/02/11 - 05/08/11	168	0.1	7.1	2.2	23
05/09/11 - 05/15/11	168	1.1	8.5	4.1	45
05/16/11 - 05/22/11	58	0.5	3.3	1.7	0
05/23/11 - 05/29/11			NO DATA		
05/30/11 - 06/05/11	111	0.0	0.5	0.0	0
06/06/11 - 06/12/11	168	0.0	7.1	1.2	10
06/13/11 - 06/19/11	57	0.1	0.4	0.3	0
06/20/11 - 06/26/11			NO DATA		
06/27/11 - 07/03/11	111	0.3	12.0	2.4	23
07/04/11 - 07/10/11	168	0.0	4.7	0.7	2
07/11/11 - 07/17/11	60	0.0	6.2	1.0	5
07/18/11 - 07/24/11			NO DATA		
07/25/11 - 07/31/11	111	0.0	4.5	0.5	2
08/01/11 - 08/07/11	168	0.0	0.5	0.1	0
08/08/11 - 08/14/11	168	0.0	7.1	1.5	10
08/15/11 - 08/21/11	168	0.0	3.9	0.5	0
08/22/11 - 08/28/11	168	0.0	8.6	2.8	34

TABLE A-5 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT 36TH STREET ON  
 BUBBLY CREEK DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/29/11 - 09/04/11	168	0.4	6.6	3.0	24
09/05/11 - 09/11/11	168	0.4	9.7	3.9	40
09/12/11 - 09/18/11	168	1.2	7.5	4.1	47
09/19/11 - 09/25/11	57	0.8	5.6	2.4	16
09/26/11 - 10/16/11		NO DATA			
10/17/11 - 10/23/11	110	4.0	8.7	6.0	100
10/24/11 - 10/30/11	168	0.7	5.8	2.9	17
10/31/11 - 11/06/11	167	0.2	4.8	3.1	20
11/07/11 - 11/13/11	168	0.0	4.2	1.0	2
11/14/11 - 11/20/11	168	0.0	1.6	0.2	0
11/21/11 - 11/27/11	166	0.0	2.2	1.1	0
11/28/11 - 12/04/11	167	0.0	0.5	0.0	0
12/05/11 - 12/11/11	168	0.0	1.5	0.2	0
12/12/11 - 12/18/11	57	0.0	1.1	0.2	0
12/19/11 - 12/31/11		NO DATA			

TABLE A-6: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT INTERSTATE HIGHWAY 55 ON  
 BUBBLY CREEK DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/09/11			NO DATA		
01/10/11 - 01/16/11	109	6.9	8.0	7.3	100
01/17/11 - 01/23/11	168	5.9	7.4	6.9	100
01/24/11 - 01/30/11	168	5.7	8.5	7.0	100
01/31/11 - 02/06/11	168	6.8	8.6	7.6	100
02/07/11 - 02/13/11	168	5.6	8.0	6.8	100
02/14/11 - 02/20/11	168	4.7	8.1	6.2	100
02/21/11 - 02/27/11	168	0.2	9.2	3.9	42
02/28/11 - 03/06/11	168	1.5	9.7	5.3	66
03/07/11 - 03/13/11	59	2.2	5.1	3.7	39
03/14/11 - 05/01/11			NO DATA		
05/02/11 - 05/08/11	86	0.0	5.6	2.1	23
05/09/11 - 05/15/11	168	0.0	4.5	0.6	1
05/16/11 - 05/22/11	167	0.0	6.0	2.5	28
05/23/11 - 05/29/11	168	0.2	8.6	1.6	12
05/30/11 - 06/05/11	168	0.0	2.8	0.6	0
06/06/11 - 06/12/11	168	0.4	9.3	2.1	12
06/13/11 - 06/19/11	168	0.4	3.9	1.3	0
06/20/11 - 06/26/11	168	0.4	5.3	0.7	1
06/27/11 - 07/03/11	168	0.0	9.6	1.5	7
07/04/11 - 07/10/11	168	0.0	3.8	0.5	0
07/11/11 - 07/17/11	168	0.1	4.4	1.9	1
07/18/11 - 07/24/11	168	0.6	6.5	2.2	8
07/25/11 - 07/31/11	168	0.2	2.1	0.8	0
08/01/11 - 08/07/11	168	0.0	1.9	0.5	0
08/08/11 - 08/14/11	168	0.3	4.9	2.0	5
08/15/11 - 08/21/11	168	0.8	10.1	3.8	38
08/22/11 - 08/28/11	168	0.4	5.4	2.9	26
08/29/11 - 09/04/11	168	2.2	8.0	4.1	46
09/05/11 - 09/11/11	168	2.7	5.6	4.0	52
09/12/11 - 09/18/11	168	2.6	5.7	4.0	44
09/19/11 - 09/25/11	168	2.5	6.0	4.5	81
09/26/11 - 10/02/11	168	0.4	5.2	2.2	12
10/03/11 - 10/09/11	168	1.5	5.0	3.4	23

TABLE A-6 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT INTERSTATE HIGHWAY 55 ON  
 BUBBLY CREEK DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
10/10/11 - 10/16/11	168	1.2	6.3	3.5	38
10/17/11 - 10/23/11	168	1.6	6.3	4.7	71
10/24/11 - 10/30/11	168	3.5	5.6	4.8	92
10/31/11 - 11/06/11	168	4.4	7.5	6.2	100
11/07/11 - 11/13/11	168	1.7	6.7	4.5	65
11/14/11 - 11/20/11	168	1.9	6.9	4.9	77
11/21/11 - 11/27/11	168	0.0	6.6	4.6	68
11/28/11 - 12/04/11	168	0.0	7.0	4.5	68
12/05/11 - 12/11/11	168	3.4	6.5	5.3	96
12/12/11 - 12/18/11	168	5.1	8.3	6.7	100
12/19/11 - 12/25/11	168	5.6	7.9	6.5	100
12/26/11 - 12/31/11	144	5.8	7.2	6.5	100

TABLE A-7: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT CICERO AVENUE ON THE  
 CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/09/11			NO DATA		
01/10/11 - 01/16/11	110	4.8	7.5	6.2	100
01/17/11 - 01/23/11	168	5.2	7.1	6.1	100
01/24/11 - 01/30/11	168	4.7	6.3	5.6	100
01/31/11 - 02/06/11	168	5.2	8.1	6.7	100
02/07/11 - 02/13/11	168	4.5	7.7	6.2	100
02/14/11 - 02/20/11	168	6.5	10.1	7.7	100
02/21/11 - 02/27/11	168	6.5	10.3	8.9	100
02/28/11 - 03/06/11	168	5.2	8.8	7.5	100
03/07/11 - 03/13/11	58	5.7	9.2	8.0	100
03/14/11 - 04/03/11			NO DATA		
04/04/11 - 04/10/11	107	4.3	6.1	5.5	100
04/11/11 - 04/17/11	168	4.1	6.5	5.4	100
04/18/11 - 04/24/11	168	4.9	9.7	6.9	100
04/25/11 - 05/01/11	168	0.3	7.1	3.8	40
05/02/11 - 05/08/11	81	0.7	4.4	1.8	4
05/09/11 - 05/15/11			NO DATA		
05/16/11 - 05/22/11	110	2.7	5.9	3.7	17
05/23/11 - 05/29/11	168	1.9	6.6	4.4	61
05/30/11 - 06/05/11	168	1.7	5.2	3.1	16
06/06/11 - 06/12/11	168	0.4	7.7	1.9	10
06/13/11 - 06/19/11	168	0.1	3.8	1.4	0
06/20/11 - 06/26/11	168	0.1	3.8	1.5	0
06/27/11 - 07/03/11	168	0.2	5.7	1.9	4
07/04/11 - 07/10/11	168	0.3	3.5	1.5	0
07/11/11 - 07/17/11	168	0.2	5.3	2.5	12
07/18/11 - 07/24/11	168	0.8	5.6	2.9	17
07/25/11 - 07/31/11	168	0.0	3.1	0.9	0
08/01/11 - 08/07/11	168	0.0	4.3	1.1	1
08/08/11 - 08/14/11	168	1.3	6.0	3.4	29
08/15/11 - 08/21/11	168	2.3	5.0	3.8	32
08/22/11 - 08/28/11	168	1.1	5.2	3.7	46
08/29/11 - 09/04/11	168	2.6	5.1	4.0	51
09/05/11 - 09/11/11	168	2.1	5.7	4.0	49



TABLE A-7 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT CICERO AVENUE ON THE  
 CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
09/12/11 - 09/18/11	168	3.7	5.9	4.9	95
09/19/11 - 09/25/11	168	3.4	6.0	4.5	79
09/26/11 - 10/02/11	168	2.1	6.4	4.5	74
10/03/11 - 10/09/11	58	3.5	5.9	4.9	93
10/10/11 - 10/16/11			NO DATA		
10/17/11 - 10/23/11	107	4.7	6.2	5.5	100
10/24/11 - 10/30/11	168	2.8	6.1	4.9	83
10/31/11 - 11/06/11	57	2.2	4.3	3.2	18
11/07/11 - 11/13/11			NO DATA		
11/14/11 - 11/20/11	110	5.5	6.7	6.3	100
11/21/11 - 11/27/11	168	2.0	6.8	6.0	97
11/28/11 - 12/04/11	168	2.5	7.1	5.8	95
12/05/11 - 12/11/11	168	4.1	7.3	5.9	100
12/12/11 - 12/18/11	168	4.7	8.2	6.5	100
12/19/11 - 12/25/11	168	6.6	8.4	7.7	100
12/26/11 - 12/31/11	144	5.1	7.2	6.2	100

TABLE A-8: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT B&O CENTRAL RAILROAD ON THE  
 CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 02/06/11			NO DATA		
02/07/11 - 02/13/11	132	7.4	9.2	8.2	100
02/14/11 - 02/20/11	168	6.4	9.8	8.4	100
02/21/11 - 02/27/11	168	8.2	10.6	9.2	100
02/28/11 - 03/06/11	168	7.2	9.7	8.4	100
03/07/11 - 03/13/11	168	7.2	9.9	8.5	100
03/14/11 - 03/20/11	168	6.4	9.1	7.8	100
03/21/11 - 03/27/11	167	6.3	8.8	7.7	100
03/28/11 - 04/03/11	168	6.6	8.3	7.5	100
04/04/11 - 04/10/11	168	5.2	8.7	7.3	100
04/11/11 - 04/17/11	168	5.6	8.3	7.1	100
04/18/11 - 04/24/11	168	6.3	8.3	7.4	100
04/25/11 - 05/01/11	168	2.9	8.6	6.4	96
05/02/11 - 05/08/11	34	4.5	8.4	6.7	100
05/09/11 - 06/12/11			NO DATA		
06/13/11 - 06/19/11	135	2.3	6.7	5.0	84
06/20/11 - 06/26/11	168	2.9	6.1	4.3	70
06/27/11 - 07/03/11	34	3.3	4.5	4.1	71
07/04/11 - 07/10/11			NO DATA		
07/11/11 - 07/17/11	134	3.1	7.7	4.7	81
07/18/11 - 07/24/11	168	0.9	6.3	2.9	21
07/25/11 - 07/31/11	168	0.8	5.3	3.0	28
08/01/11 - 08/07/11	168	1.5	5.8	3.4	29
08/08/11 - 08/14/11	168	2.2	6.1	4.4	73
08/15/11 - 08/21/11	168	3.8	5.7	4.9	94
08/22/11 - 08/28/11	167	3.4	6.2	4.9	94
08/29/11 - 09/04/11	168	3.9	6.4	4.9	99
09/05/11 - 09/11/11	168	4.9	6.3	5.5	100
09/12/11 - 09/18/11	168	3.6	6.4	5.0	93
09/19/11 - 09/25/11	168	3.8	7.3	6.1	99
09/26/11 - 10/02/11	168	4.9	7.3	6.4	100
10/03/11 - 10/09/11	168	2.6	7.3	5.0	77
10/10/11 - 10/16/11	168	1.9	6.4	4.0	57
10/17/11 - 10/23/11	168	4.5	7.7	6.4	100

TABLE A-8 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT B&O CENTRAL RAILROAD ON THE  
 CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
10/24/11 - 10/30/11	168	5.3	7.9	6.1	100
10/31/11 - 11/06/11	168	5.2	7.7	6.3	100
11/07/11 - 11/13/11	168	5.0	7.6	6.7	100
11/14/11 - 11/20/11	35	6.8	7.9	7.4	100
11/21/11 - 11/27/11			NO DATA		
11/28/11 - 12/04/11	131	6.5	8.2	7.4	100
12/05/11 - 12/11/11	168	6.0	7.8	7.1	100
12/12/11 - 12/18/11	34	6.4	7.4	6.9	100
12/19/11 - 12/31/11			NO DATA		

TABLE A-9: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
AT LOCKPORT POWERHOUSE ON THE  
CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/02/11	48	8.3	9.7	9.0	100
01/03/11 - 01/09/11	168	8.4	10.4	9.2	100
01/10/11 - 01/16/11	167	7.5	8.9	8.2	100
01/17/11 - 01/23/11	168	5.5	7.7	7.0	100
01/24/11 - 01/30/11	168	6.6	7.8	7.1	100
01/31/11 - 02/06/11	168	6.7	8.4	7.7	100
02/07/11 - 02/13/11	168	7.1	9.4	7.9	100
02/14/11 - 02/20/11	168	6.5	9.5	8.2	100
02/21/11 - 02/27/11	168	7.6	10.1	8.8	100
02/28/11 - 03/06/11	168	7.3	9.4	8.1	100
03/07/11 - 03/13/11	60	7.1	8.5	7.9	100
03/14/11 - 03/20/11			NO DATA		
03/21/11 - 03/27/11	110	6.0	7.3	6.6	100
03/28/11 - 04/03/11	168	6.2	7.4	6.9	100
04/04/11 - 04/10/11	167	4.5	6.4	5.6	100
04/11/11 - 04/17/11	168	5.1	6.6	6.0	100
04/18/11 - 04/24/11	168	5.4	7.8	6.6	100
04/25/11 - 05/01/11	168	4.2	7.4	5.7	100
05/02/11 - 05/08/11	59	5.4	6.2	5.9	100
05/09/11 - 05/15/11			NO DATA		
05/16/11 - 05/22/11	108	3.5	4.6	4.1	75
05/23/11 - 05/29/11	159	1.4	4.2	3.2	1
05/30/11 - 06/05/11	164	1.1	3.3	2.3	0
06/06/11 - 06/12/11	168	0.3	4.0	2.1	1
06/13/11 - 06/19/11	60	0.4	2.5	1.2	0
06/20/11 - 06/26/11			NO DATA		
06/27/11 - 07/03/11	109	2.7	5.7	4.0	50
07/04/11 - 07/10/11	168	1.0	5.6	2.5	7
07/11/11 - 07/17/11	59	0.4	5.0	2.1	3
07/18/11 - 07/24/11			NO DATA		
07/25/11 - 07/31/11	109	0.8	4.3	2.3	10
08/01/11 - 08/07/11	168	1.4	5.6	3.3	29
08/08/11 - 08/14/11	168	2.2	4.9	3.7	30
08/15/11 - 08/21/11	168	3.4	5.2	4.4	86

TABLE A-9 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT LOCKPORT POWERHOUSE ON THE  
 CHICAGO SANITARY AND SHIP CANAL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/22/11 - 08/28/11	168	3.5	5.3	4.3	75
08/29/11 - 09/04/11	168	3.0	6.4	4.5	90
09/05/11 - 09/11/11	168	1.8	6.0	4.5	73
09/12/11 - 09/18/11	168	4.3	5.6	4.9	100
09/19/11 - 09/25/11	167	3.1	5.1	4.4	81
09/26/11 - 10/02/11	168	4.1	5.7	5.0	100
10/03/11 - 10/09/11	60	4.3	5.8	5.2	100
10/10/11 - 10/16/11			NO DATA		
10/17/11 - 10/23/11	108	5.3	6.2	5.9	100
10/24/11 - 10/30/11	168	5.0	6.7	6.0	100
10/31/11 - 11/06/11	168	4.5	6.8	6.0	100
11/07/11 - 11/13/11	168	5.4	6.8	6.1	100
11/14/11 - 11/20/11	168	5.7	7.3	6.5	100
11/21/11 - 11/27/11	168	5.7	7.2	6.6	100
11/28/11 - 12/04/11	168	6.1	7.3	6.8	100
12/05/11 - 12/11/11	168	6.4	7.4	6.9	100
12/12/11 - 12/18/11	168	6.4	8.0	7.3	100
12/19/11 - 12/25/11	168	6.6	7.6	7.2	100
12/26/11 - 12/31/11	144	6.7	7.3	7.1	100

TABLE A-10: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT C&W INDIANA RAILROAD ON THE  
 LITTLE CALUMET RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 01/02/11	48	10.5	11.7	11.1	100
01/03/11 - 01/09/11	168	10.7	11.9	11.4	100
01/10/11 - 01/16/11	168	10.2	11.2	10.8	100
01/17/11 - 01/23/11	168	9.6	10.9	10.2	100
01/24/11 - 01/30/11	168	9.2	10.1	9.6	100
01/31/11 - 02/06/11	168	9.2	10.4	10.0	100
02/07/11 - 02/13/11	168	9.0	9.9	9.3	100
02/14/11 - 02/20/11	168	9.1	11.4	9.8	100
02/21/11 - 02/27/11	168	10.1	11.3	10.8	100
02/28/11 - 03/06/11	168	9.8	11.5	10.9	100
03/07/11 - 03/13/11	168	10.1	11.9	11.0	100
03/14/11 - 03/20/11	168	11.2	14.3	12.5	100
03/21/11 - 03/27/11	167	10.2	12.8	11.4	100
03/28/11 - 04/03/11	168	10.6	15.0	12.7	100
04/04/11 - 04/10/11	85	9.2	12.9	11.2	100
04/11/11 - 04/17/11			NO DATA		
04/18/11 - 04/24/11	132	6.7	9.9	8.1	100
04/25/11 - 05/01/11	168	4.8	9.3	6.6	100
05/02/11 - 05/08/11	168	4.6	8.3	6.8	100
05/09/11 - 05/15/11	168	4.8	9.3	6.7	100
05/16/11 - 05/22/11	168	4.5	10.4	7.1	100
05/23/11 - 05/29/11	168	3.8	9.4	6.2	99
05/30/11 - 06/05/11	168	2.5	6.6	4.8	83
06/06/11 - 06/12/11	168	1.6	8.0	4.5	62
06/13/11 - 06/19/11	168	0.9	6.2	2.5	5
06/20/11 - 06/26/11	168	1.5	6.0	3.6	30
06/27/11 - 07/03/11	168	3.2	7.9	5.2	93
07/04/11 - 07/10/11	168	4.2	9.4	6.0	100
07/11/11 - 07/17/11	168	3.6	7.8	6.1	99
07/18/11 - 07/24/11	168	4.1	8.3	6.1	100
07/25/11 - 07/31/11	168	2.4	9.1	5.6	86
08/01/11 - 08/07/11	168	5.0	9.3	6.8	100
08/08/11 - 08/14/11	167	4.1	8.4	6.1	100
08/15/11 - 08/21/11	168	5.0	7.7	6.3	100

TABLE A-10 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT C&W INDIANA RAILROAD ON THE  
 LITTLE CALUMET RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
08/22/11 - 08/28/11	36	4.9	7.0	5.7	100
08/29/11 - 09/04/11			NO DATA		
09/05/11 - 09/11/11	108	6.2	8.0	7.0	100
09/12/11 - 09/18/11	168	6.3	8.4	7.3	100
09/19/11 - 09/25/11	168	6.8	8.9	7.6	100
09/26/11 - 10/02/11	168	7.4	9.1	8.1	100
10/03/11 - 10/09/11	168	7.8	9.4	8.5	100
10/10/11 - 10/16/11	168	7.4	9.2	8.2	100
10/17/11 - 10/23/11	168	7.9	9.4	8.7	100
10/24/11 - 10/30/11	168	8.3	9.4	8.8	100
10/31/11 - 11/06/11	168	8.5	10.6	9.5	100
11/07/11 - 11/13/11	168	9.2	11.1	10.0	100
11/14/11 - 11/20/11	168	9.2	10.9	10.1	100
11/21/11 - 11/27/11	168	9.7	11.2	10.4	100
11/28/11 - 12/04/11	168	9.4	11.2	10.5	100
12/05/11 - 12/11/11	168	10.2	11.8	11.1	100
12/12/11 - 12/18/11	36	10.9	11.8	11.5	100
12/19/11 - 12/31/11			NO DATA		

TABLE A-11: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT HALSTED STREET ON THE  
 LITTLE CALUMET RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 02/20/11			NO DATA		
02/21/11 - 02/27/11	108	5.8	8.2	7.2	100
02/28/11 - 03/06/11	168	6.7	8.8	7.7	100
03/07/11 - 03/13/11	168	6.2	8.2	7.3	100
03/14/11 - 03/20/11	168	5.1	11.5	8.1	100
03/21/11 - 03/27/11	167	5.4	7.7	6.9	100
03/28/11 - 04/03/11	168	3.2	9.1	6.3	95
04/04/11 - 04/10/11	168	2.8	7.3	5.5	96
04/11/11 - 04/17/11	168	3.0	6.9	5.0	91
04/18/11 - 04/24/11	168	4.4	9.7	6.5	100
04/25/11 - 05/01/11	168	3.3	8.1	5.5	96
05/02/11 - 05/08/11	168	2.8	8.8	5.2	88
05/09/11 - 05/15/11	168	1.9	7.4	4.5	71
05/16/11 - 05/22/11	168	1.8	9.6	4.7	67
05/23/11 - 05/29/11	168	0.7	5.6	3.8	39
05/30/11 - 06/05/11	60	1.3	4.2	3.0	2
06/06/11 - 06/12/11			NO DATA		
06/13/11 - 06/19/11	132	0.9	6.3	3.6	28
06/20/11 - 06/26/11	168	1.7	5.1	3.4	14
06/27/11 - 07/03/11	168	1.8	6.5	4.1	57
07/04/11 - 07/10/11	168	2.5	9.2	5.6	88
07/11/11 - 07/17/11	167	2.4	7.7	5.3	91
07/18/11 - 07/24/11	168	1.4	11.0	4.6	66
07/25/11 - 07/31/11	168	1.1	5.8	3.9	55
08/01/11 - 08/07/11	168	1.2	9.1	4.7	73
08/08/11 - 08/14/11	168	1.7	7.7	5.2	83
08/15/11 - 08/21/11	168	3.4	7.6	5.6	99
08/22/11 - 08/28/11	168	3.2	8.6	6.1	98
08/29/11 - 09/04/11	168	4.9	8.6	6.6	100
09/05/11 - 09/11/11	168	5.0	7.8	6.7	100
09/12/11 - 09/18/11	168	4.8	7.9	6.2	100
09/19/11 - 09/25/11	168	3.9	6.4	5.3	99
09/26/11 - 10/02/11	168	4.6	7.5	6.1	100
10/03/11 - 10/09/11	168	4.6	7.3	6.1	100



TABLE A-11 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT HALSTED STREET ON THE  
 LITTLE CALUMET RIVER DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
10/10/11 - 10/16/11	168	4.2	6.9	5.8	100
10/17/11 - 10/23/11	168	5.2	7.1	6.3	100
10/24/11 - 10/30/11	168	5.2	6.5	6.0	100
10/31/11 - 11/06/11	168	5.5	7.9	6.6	100
11/07/11 - 11/13/11	168	5.8	7.9	6.7	100
11/14/11 - 11/20/11	168	5.2	6.9	6.2	100
11/21/11 - 11/27/11	168	4.6	6.8	6.0	100
11/28/11 - 12/04/11	168	5.6	7.4	6.6	100
12/05/11 - 12/11/11	168	5.7	7.4	6.8	100
12/12/11 - 12/18/11	167	6.0	7.9	6.9	100
12/19/11 - 12/25/11	168	5.9	8.0	7.0	100
12/26/11 - 12/31/11	144	5.4	7.8	7.1	100

TABLE A-12: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT ROUTE 83 ON THE  
 CALUMET-SAG CHANNEL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 3.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/11 - 02/20/11			NO DATA		
02/21/11 - 02/27/11	109	8.6	10.1	9.6	100
02/28/11 - 03/06/11	168	8.7	10.3	9.5	100
03/07/11 - 03/13/11	34	8.9	9.5	9.2	100
03/14/11 - 03/20/11			NO DATA		
03/21/11 - 03/27/11	133	7.1	9.1	8.1	100
03/28/11 - 04/03/11	168	7.7	9.9	8.5	100
04/04/11 - 04/10/11	168	6.3	8.3	7.5	100
04/11/11 - 04/17/11	168	5.7	8.0	6.7	100
04/18/11 - 04/24/11	168	6.8	9.5	8.2	100
04/25/11 - 05/01/11	168	5.3	7.7	6.8	100
05/02/11 - 05/08/11	168	4.6	7.3	6.1	100
05/09/11 - 05/15/11	168	3.3	8.0	5.3	100
05/16/11 - 05/22/11	168	3.0	7.1	5.1	100
05/23/11 - 05/29/11	168	3.1	6.3	4.7	100
05/30/11 - 06/05/11	168	3.0	5.9	4.1	100
06/06/11 - 06/12/11	168	2.0	6.4	3.8	83
06/13/11 - 06/19/11	168	3.1	5.1	4.1	100
06/20/11 - 06/26/11	168	3.1	4.9	3.9	100
06/27/11 - 07/03/11	168	3.7	5.6	4.5	100
07/04/11 - 07/10/11	168	3.5	8.7	5.4	100
07/11/11 - 07/17/11	168	3.1	6.8	5.2	100
07/18/11 - 07/24/11	168	1.0	11.6	6.2	93
07/25/11 - 07/31/11	35	1.1	3.3	2.2	6
08/01/11 - 08/07/11			NO DATA		
08/08/11 - 08/14/11	131	4.0	6.3	5.1	100
08/15/11 - 08/21/11	168	4.4	6.9	5.3	100
08/22/11 - 08/28/11	168	3.9	6.7	5.1	100
08/29/11 - 09/04/11	168	3.4	7.0	5.7	100
09/05/11 - 09/11/11	167	3.6	7.0	5.8	100
09/12/11 - 09/18/11	168	4.0	6.7	5.5	100
09/19/11 - 09/25/11	167	4.1	6.4	5.3	100
09/26/11 - 10/02/11	168	5.1	6.5	5.8	100
10/03/11 - 10/09/11	168	4.5	6.7	5.9	100

TABLE A-12 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS  
 AT ROUTE 83 ON THE  
 CALUMET-SAG CHANNEL DURING 2011

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 3.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
10/10/11 - 10/16/11	168	4.3	5.9	5.2	100
10/17/11 - 10/23/11	168	4.5	7.4	6.5	100
10/24/11 - 10/30/11	168	5.9	7.2	6.5	100
10/31/11 - 11/06/11	168	5.6	8.1	6.8	100
11/07/11 - 11/13/11	168	6.2	7.5	7.0	100
11/14/11 - 11/20/11	168	6.2	7.3	6.8	100
11/21/11 - 11/27/11	168	5.7	7.5	6.8	100
11/28/11 - 12/04/11	168	6.3	8.1	7.4	100
12/05/11 - 12/11/11	168	7.3	9.0	8.4	100
12/12/11 - 12/18/11	168	7.6	9.5	8.5	100
12/19/11 - 12/25/11	168	7.5	8.5	8.0	100
12/26/11 - 12/31/11	144	7.5	8.6	8.0	100

TABLE A-13: SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS  
MADE DURING CROSS-SECTIONAL SURVEYS IN 2011

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Section Depth Range (feet)	N*	Cross-Sectional DO			Standard Deviation (mg/L)	Coefficient of Variation (%)
				Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)		
<b>North Shore Channel</b>								
<u>Foster Avenue</u>								
04/12/2011	6.99	4.4 – 9.1	10	7.16	7.32	7.24	0.05	0.68
08/16/2011	7.28	4.6 – 9.5	10	7.28	7.36	7.33	0.02	0.31
10/25/2011	NA	3.4 – 8.9	9	6.70	6.75	6.72	0.02	0.25
<b>North Branch Chicago River</b>								
<u>Addison Street</u>								
04/12/2011	7.97	4.0 – 8.6	11	7.32	7.62	7.38	0.09	1.23
08/16/2011	6.61	4.7 – 8.6	11	6.39	6.62	6.54	0.08	1.16
10/25/2011	7.33	5.9 – 9.5	11	7.17	7.29	7.22	0.04	0.61
<u>Kinzie Street</u>								
04/12/2011	5.91	9.6 – 20.8	12	5.27	5.44	5.39	0.05	0.95
08/16/2011	NA	11.3 – 20.4	12	4.01	4.22	4.10	0.08	1.83
10/25/2011	5.11	11.1 – 20.9	12	5.39	5.50	5.47	0.03	0.63

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS  
MADE DURING CROSS-SECTIONAL SURVEYS IN 2011

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional DO						
		Cross-Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
<b>South Branch Chicago River</b>								
<u>Loomis Street</u>								
04/06/2011	6.14	15.6 – 19.7	12	6.02	6.41	6.20	0.12	1.86
08/24/2011	4.28	18.1 – 21.4	12	4.20	5.02	4.71	0.29	6.23
10/19/2011	6.90	16.9 – 21.4	12	5.73	6.70	6.47	0.34	5.26
<b>Bubbly Creek</b>								
<u>36th Street</u>								
04/6/2011	8.65	1.7 – 4.6	8	11.41	13.52	12.57	0.78	6.23
08/24/2011	1.05	1.8 – 4.6	8	1.21	5.75	3.18	1.75	55.16
10/19/2011	5.33	3.0 – 3.9	8	3.51	4.24	3.84	0.31	7.98
<u>Interstate Highway 55</u>								
04/6/2011	NA	5.0 – 10.5	9	5.04	5.72	5.32	0.22	4.09
08/24/2011	2.33	5.7 – 11.1	11	2.05	3.33	2.54	0.39	15.42
10/19/2011	3.90	3.0 – 9.4	9	4.11	4.53	4.30	0.12	2.77

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS  
MADE DURING CROSS-SECTIONAL SURVEYS IN 2011

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional DO						
		Cross-Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
<b>Chicago Sanitary and Ship Canal</b>								
<u>Cicero Avenue</u>								
04/6/2011	5.74	7.5 – 17.6	11	5.51	5.99	5.78	0.14	2.37
08/24/2011	3.90	8.4 – 18.8	12	3.26	3.64	3.54	0.11	3.10
10/19/2011	4.98	5.0 – 18.0	11	5.01	5.20	5.12	0.06	1.27
<u>B&amp;O Railroad</u>								
04/6/2011	7.10	6.5 – 19.1	11	6.98	7.04	7.04	0.02	0.29
08/23/2011	3.68	7.1 – 20.4	11	4.31	4.39	4.36	0.03	0.62
10/18/2011	5.77	6.2 – 20.2	11	5.78	5.89	5.84	0.04	0.65
<u>Lockport Powerhouse</u>								
04/05/2011	5.40	23.6 – 27.5	12	5.81	6.08	5.90	0.08	1.43
08/22/2011	3.76	28.0 – 31.8	12	3.67	4.18	3.94	0.17	4.19
10/21/2011	5.95	25.1 – 28.9	12	5.72	5.82	5.78	0.03	0.57

TABLE A-13 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS  
MADE DURING CROSS-SECTIONAL SURVEYS IN 2011

Waterway, Station, and Date	Field Monitor DO (mg/L)	Cross-Sectional DO Samples						
		Cross-Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
<b>Little Calumet River</b>								
<u>C&amp;WI Railroad</u>								
04/6/2011	10.12	7.6 – 14.5	11	11.53	12.50	11.96	0.39	3.23
08/23/2011	6.01	7.4 – 13.5	11	6.96	7.19	7.08	0.08	1.10
10/18/2011	8.67	8.6 – 14.7	12	8.69	9.40	8.96	0.27	3.03
<u>Halsted Street</u>								
04/6/2011	5.49	5.0 – 14.2	10	4.98	5.90	5.62	0.26	4.56
08/23/2011	5.23	4.4 – 14.6	10	5.71	5.82	5.78	0.04	0.70
10/18/2011	6.43	4.2 – 13.2	11	6.85	7.03	6.92	0.05	0.69
<b>Calumet-Sag Channel</b>								
<u>Route 83</u>								
04/6/2011	6.75	6.2 – 12.9	11	6.83	6.93	6.87	0.03	0.44
08/23/2011	5.28	7.7 – 13.6	11	5.39	5.50	5.45	0.04	0.81
10/18/2011	6.48	8.0 – 13.5	12	6.08	6.39	6.29	0.11	1.80

\*Number of DO measurements made across transect during cross-sectional survey.

NA = Not Available.