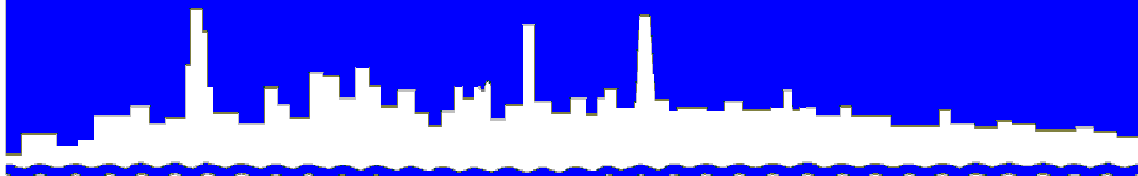


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 11-30

CONTINUOUS DISSOLVED OXYGEN MONITORING

IN CHICAGO AREA WADEABLE STREAMS

DURING 2010

August 2011

Metropolitan Water Reclamation District of Greater Chicago

100 East Erie Street Chicago, Illinois 60611-2803 312-751-5600

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DURING 2010**

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August 2011

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Particular thanks are due to Pamela Slaby 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 Area Waterway System 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), stormwater 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, 2010).

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. Wadeable sites were chosen within the Chicago River system, Upper Des Plaines River System, and Calumet River system.

One monitoring location is 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).

Seven monitoring locations are in the Upper Des Plaines River system. Four sites are on the Upper Des Plaines River and three 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, 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.

Three monitoring locations are in the Calumet River system including one location on the Grand Calumet River and two locations on 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. 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 1, 2010, through December 31, 2010 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 supplies the District with water quality data throughout the year for both the wadeable streams and deep-draft waterways within its jurisdiction. The CDOM stations are shown in [Figure 1](#). Descriptions of the wadeable CDOM stations are listed in [Table 1](#).

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, 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 Chicago Sanitary and Ship Canal, 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 Chicago Sanitary and Ship Canal 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. On December 18, 2008, 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 7 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 7 days from March through July. For this report, we have selected the any time standard when calculating percent compliance.

FIGURE 1: 2010 CONTINUOUS DISSOLVED OXYGEN MONITORING STATIONS

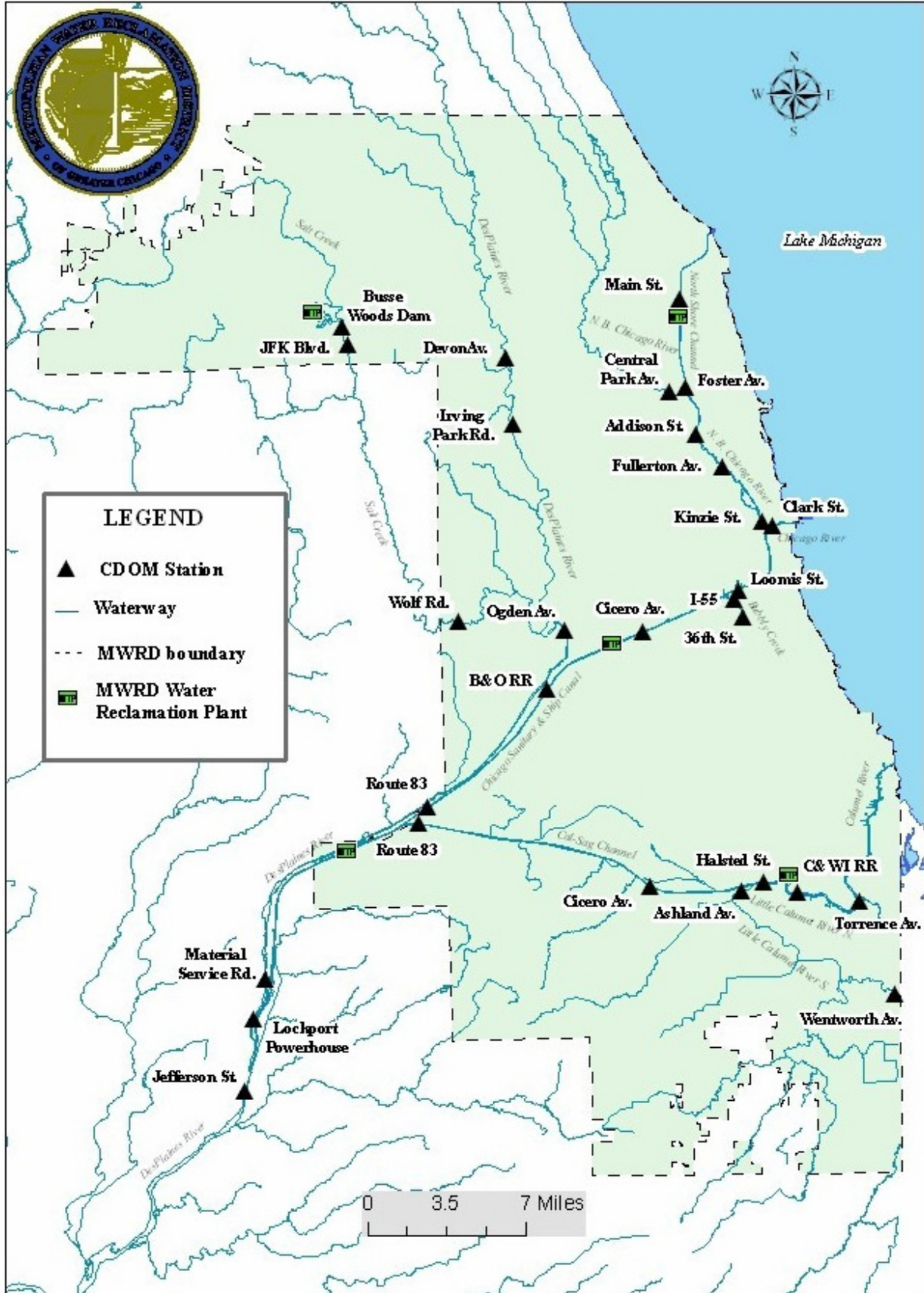


TABLE 1: WADEABLE STREAM CONTINUOUS DISSOLVED OXYGEN
MONITORING STATIONS DURING 2010

Monitoring Station	Waterway	Description of Monitoring Station
<u>Chicago River System</u>		
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.
<u>Des Plaines River System</u>		
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 DURING 2010

Monitoring Station	Waterway	Description of Monitoring Station
<u>Des Plaines River System (Continued)</u>		
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.
J. F. Kennedy Boulevard	Salt Creek	0.8 mile below Egan WRP outfall, water quality monitor on southeast side of J. F. Kennedy Boulevard 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.
<u>Calumet River System</u>		
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 DURING 2010

Monitoring Station	Waterway	Description of Monitoring Station
<u>Calumet River System (Continued)</u>		
Wentworth Avenue	Little Calumet River	12.4 miles above junction with Calumet-Sag Channel, water quality monitor on center of east side of Wentworth Avenue bridge, 2 feet below water surface.
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.

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 through June and then moved to a bi-weekly schedule for the rest of 2010. Industrial Waste Division personnel retrieved each monitor from the field following 7 or 14 days of continuous monitoring. Prior to retrieval, a water sample for winkler 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 monitor that was retrieved. The monitors that were retrieved were returned to the laboratory, and the data was downloaded, exterior cleaned, serviced, and the DO sensor was calibrated. 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. All 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 2010, 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 (Table A-12). 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 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 11 stations during 2010 are shown in Table 2.

The number and percent of measured DO concentrations rejected and removed from the Access[®] database following review during 2010 are summarized in Table 3. The percent of DO values rejected increased compared to past years, largely due to changing the monitor service and exchange frequency from weekly to biweekly in 2010.

The number and percent of DO concentrations above the applicable IPCB DO standard for each waterway during 2010 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 2010. The current national one-day minimum dissolved oxygen criterion for adult life stages of fish is 3.0 mg/L (USEPA, 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 2010 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.

Dissolved Oxygen Fluctuations

DO concentrations fluctuate seasonally and daily in the aquatic environment. DO is more soluble in cold water 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. 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, 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 can also flush organic materials into the waterway. This is most evident during heavy rain storms that result in CSO events containing untreated waste and stormwater. More information on CSOs can be found on the District website at (www.mwrd.org).

TABLE 2: MINIMUM, MAXIMUM, AND MEAN HOURLY DISSOLVED OXYGEN CONCENTRATIONS DURING 2010¹

Monitoring Station	Waterway	DO Concentration (mg/L)		
		Minimum	Maximum	Mean
<u>Chicago River System</u>				
Central Park Avenue	North Branch Chicago River	1.2	17.6	9.1
<u>Des Plaines River System</u>				
Devon Avenue	Des Plaines River	2.8	16.6	9.0
Irving Park Road	Des Plaines River	2.5	16.6	9.3
Ogden Avenue	Des Plaines River	5.3	17.0	10.2
Material Service Road	Des Plaines River	3.7	20.5	10.8
Busse Lake Dam	Salt Creek	0.0	15.8	9.0
J. F. Kennedy Boulevard	Salt Creek	0.0	13.8	8.3
Wolf Road	Salt Creek	0.7	16.4	9.2
<u>Calumet River System</u>				
Torrence Avenue	Grand Calumet River	0.0	20.4	8.7
Ashland Avenue	Little Calumet River	0.2	16.5	8.6
Wentworth Avenue	Little Calumet River	0.1	14.0	8.3

¹Dissolved 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 2010¹

Monitoring Station	Waterway	Number of DO Values Rejected	Percent of DO Values Rejected
<u>Chicago River System</u>			
Central Park Avenue	North Branch Chicago River	1,035	12
<u>Des Plaines River System</u>			
Devon Avenue	Des Plaines River	2,480	28
Irving Park Road	Des Plaines River	1,010	12
Ogden Avenue	Des Plaines River	1,178	13
Material Service Road	Des Plaines River	339	4
Busse Lake Dam	Salt Creek	1,014	12
J. F. Kennedy Boulevard	Salt Creek	681	8
Wolf Road	Salt Creek	13	<1
<u>Calumet River System</u>			
Torrence Avenue	Grand Calumet River	6,745	77
Ashland Avenue	Little Calumet River	2,718	31
Wentworth Avenue	Little Calumet River	4,765	54

¹Dissolved 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 2010¹

Monitoring Station	Waterway	IPCB DO Standard	Number of DO Values	Number Above Standard	Percent Above Standard
<u>Chicago River System</u>					
Central Park Avenue	North Branch Chicago River	3.5-5.0*	7,725	7,228	94
<u>Des Plaines River System</u>					
Devon Avenue	Des Plaines River	3.5-5.0*	6,280	6,208	99
Irving Park Road	Des Plaines River	3.5-5.0*	7,750	7,351	95
Ogden Avenue	Des Plaines River	3.5-5.0*	7,582	7,582	100
Material Service Road	Des Plaines River	3.5-5.0*	8,421	8,261	98
Busse Lake Dam	Salt Creek	3.5-5.0*	7,746	6,901	89
J. F. Kennedy Boulevard	Salt Creek	3.5-5.0*	8,079	7,960	99
Wolf Road	Salt Creek	3.5-5.0*	8,747	8,608	98
<u>Calumet River System</u>					
Torrence Avenue	Grand Calumet River	4.0	2,015	1,791	89
Ashland Avenue	Little Calumet River	3.5-5.0*	6,042	5,455	90
Wentworth Avenue	Little Calumet River	3.5-5.0*	3,995	3,526	88

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

*IPCB general use DO standard is 5.0 mg/L from March through July and 3.5 mg/L for the balance of the year.

TABLE 5: PERCENT OF DISSOLVED OXYGEN VALUES IN
SELECTED RANGES DURING 2010

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>							
Central Park Avenue	North Branch Chicago River	0	<1	<1	1	6	92
<u>Des Plaines River System</u>							
Devon Avenue	Des Plaines River	0	0	<1	<1	2	98
Irving Park Road	Des Plaines River	0	0	<1	1	6	93
Ogden Avenue	Des Plaines River	0	0	0	0	0	100
Material Service Road	Des Plaines River	0	0	0	<1	2	98
Busse Lake Dam	Salt Creek	3	2	3	3	4	85
J. F. Kennedy Boulevard	Salt Creek	<1	<1	<1	<1	2	97
Wolf Road	Salt Creek	<1	0	<1	<1	2	98
<u>Calumet River System</u>							
Torrence Avenue	Grand Calumet River	2	2	3	4	4	85
Ashland Avenue	Little Calumet River	2	<1	<1	3	17	77
Wentworth Avenue	Little Calumet River	6	1	1	1	7	84

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

FIGURE 2: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT CENTRAL PARK AVENUE ON THE NORTH BRANCH CHICAGO RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

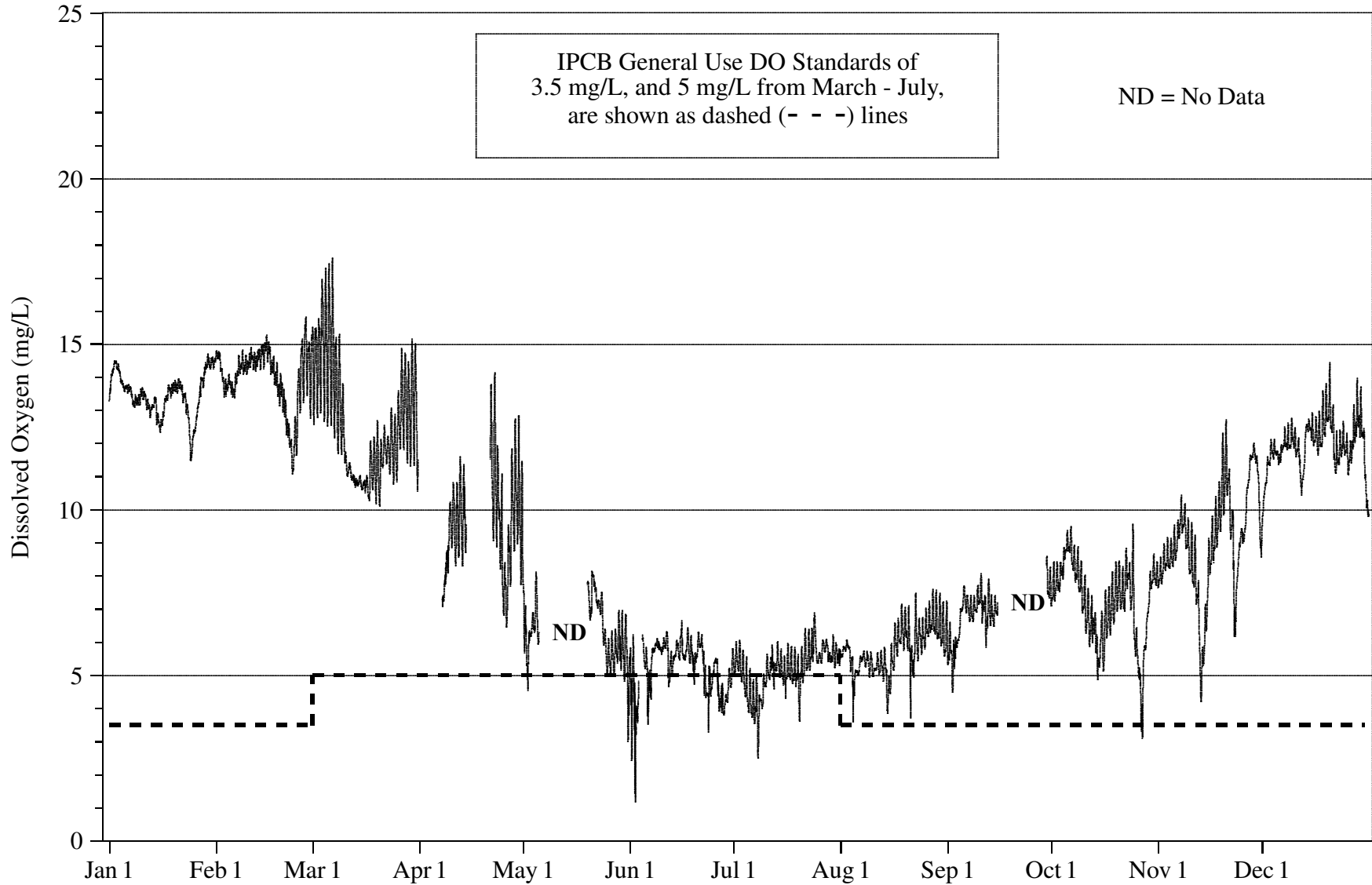


FIGURE 3: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT DEVON AVENUE ON THE DES PLAINES RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

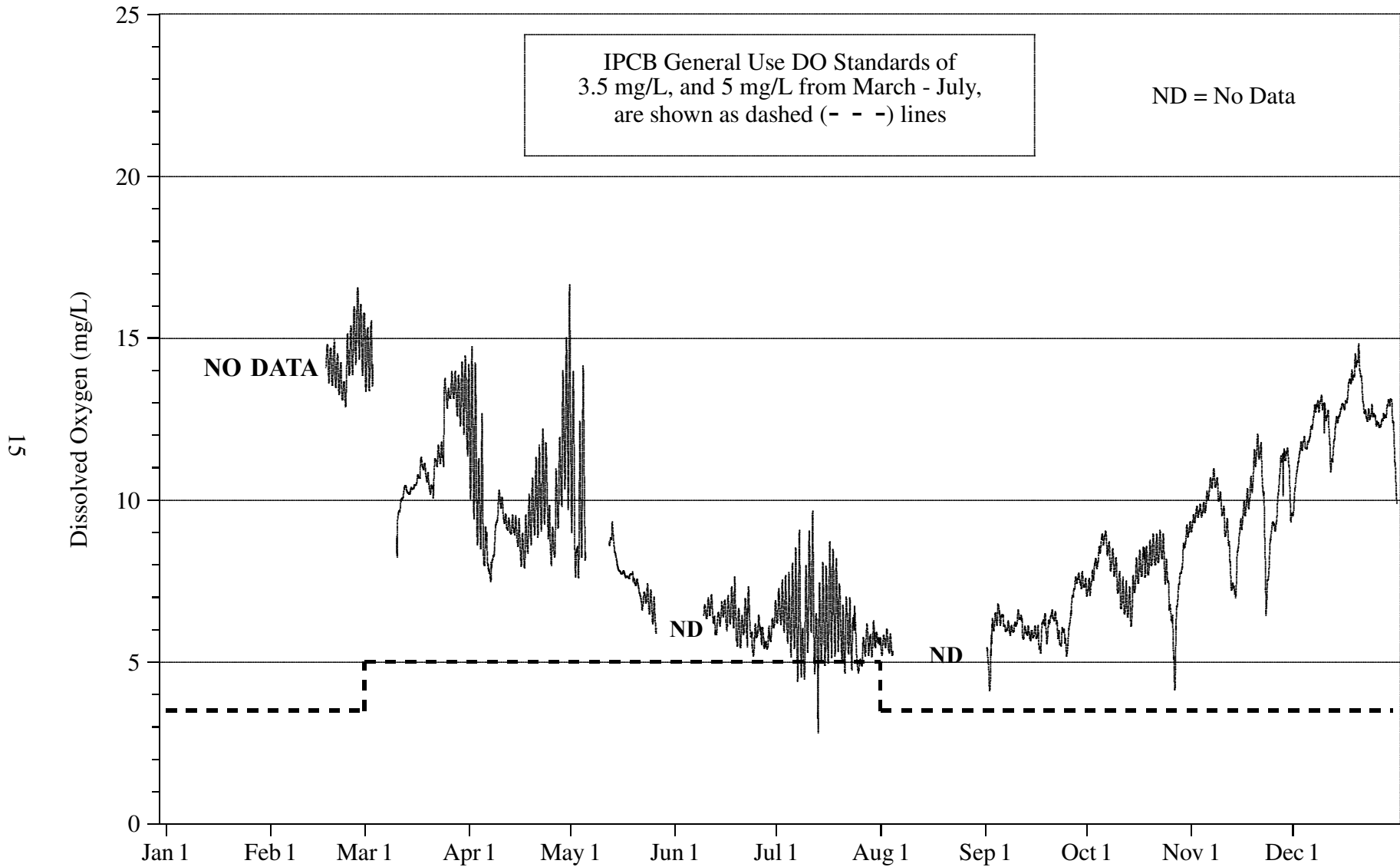


FIGURE 4: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT IRVING PARK ROAD ON THE DES PLAINES RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

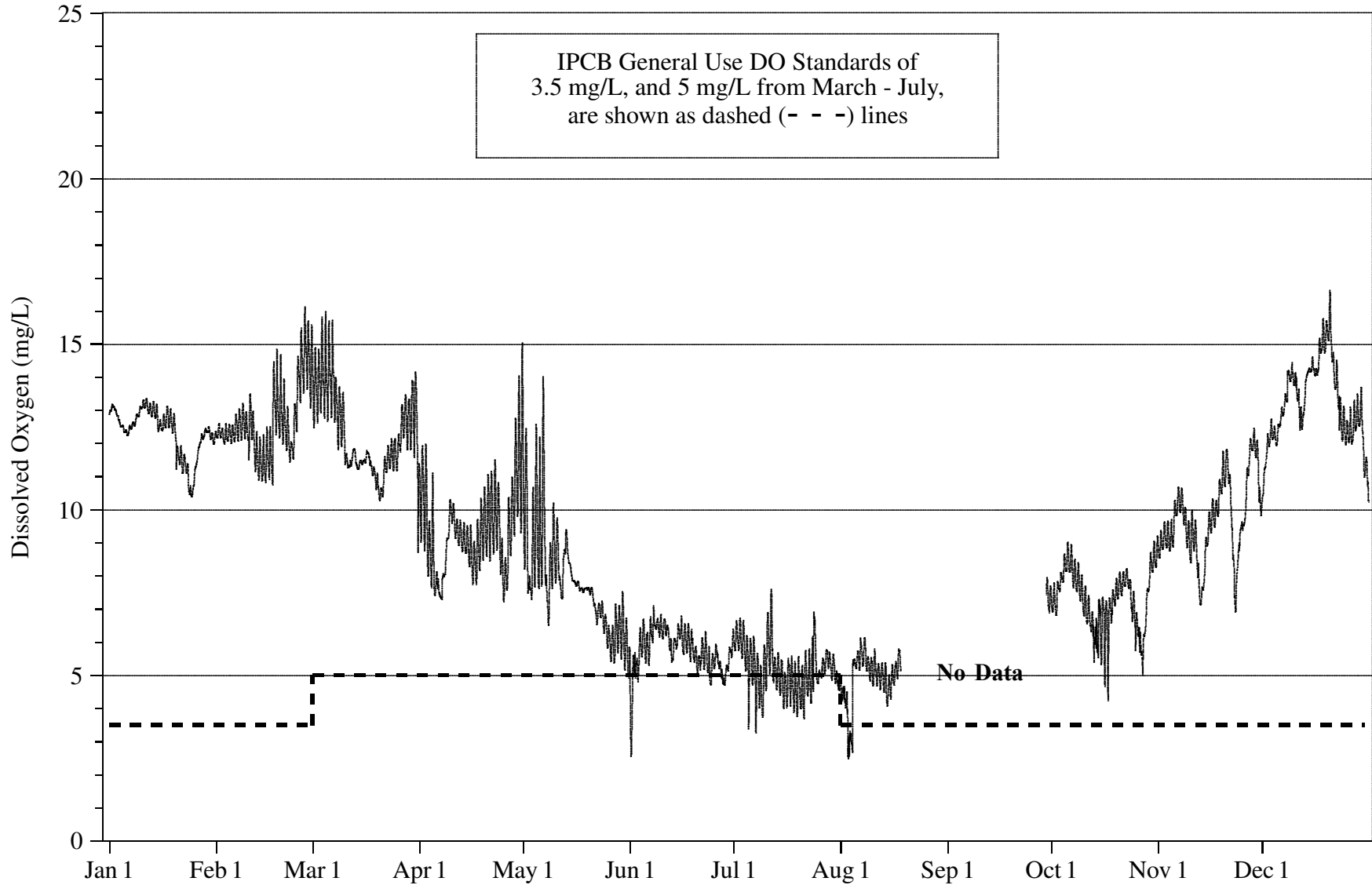


FIGURE 6: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT MATERIAL SERVICE ROAD ON THE DES PLAINES RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

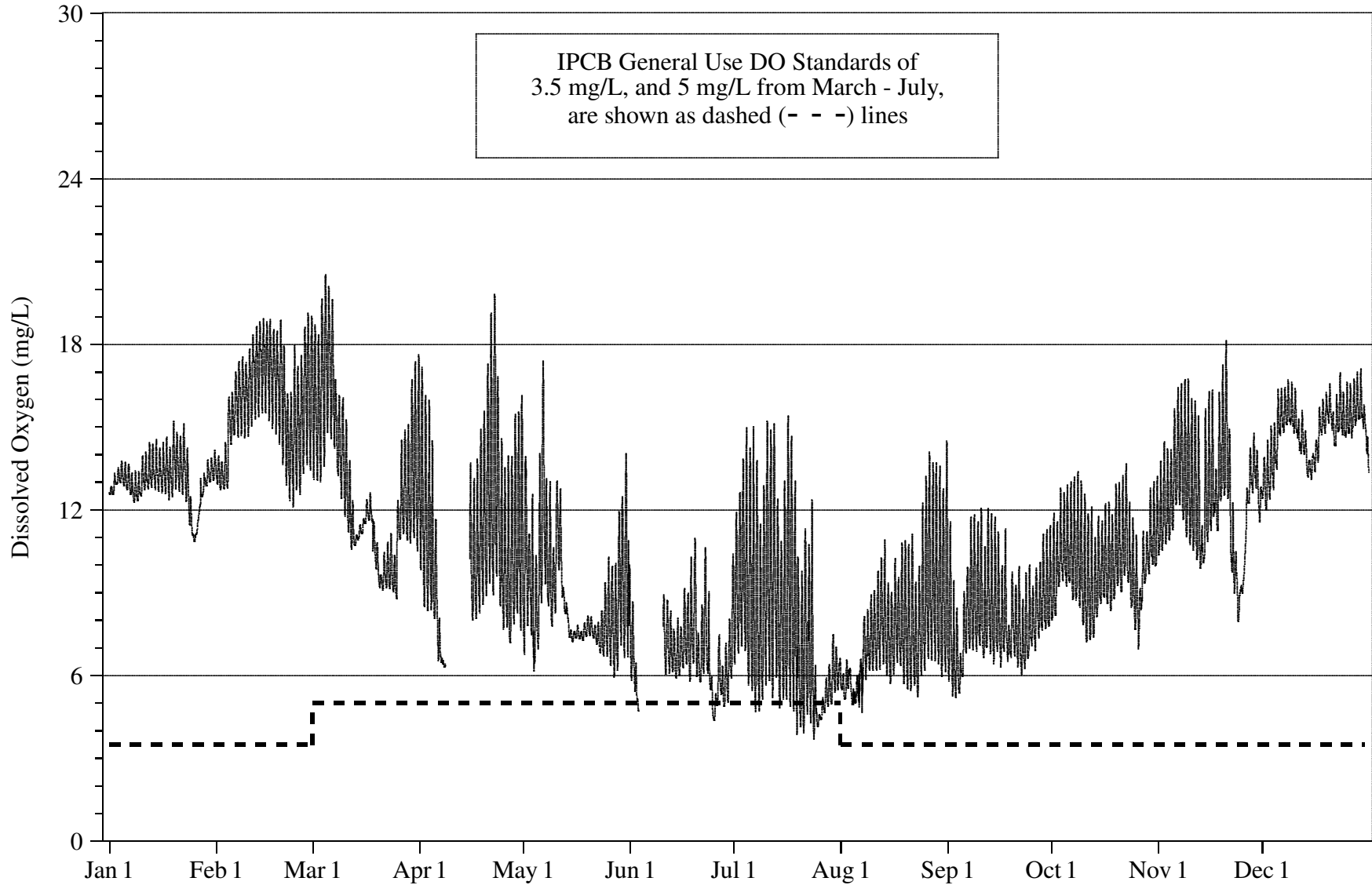


FIGURE 7: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT BUSSE LAKE DAM ON SALT CREEK FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

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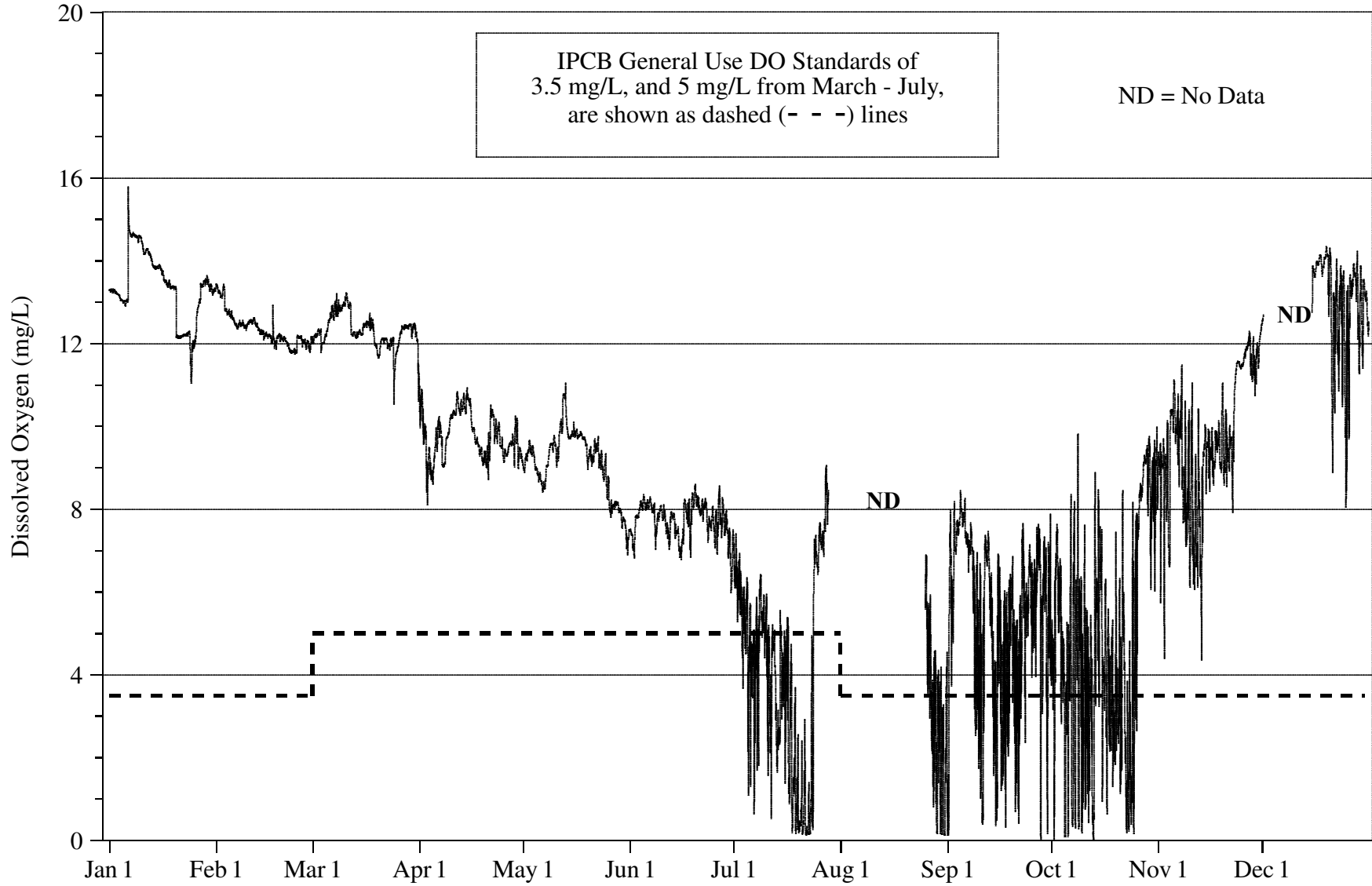


FIGURE 8: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT J. F. KENNEDY BOULEVARD ON SALT CREEK FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

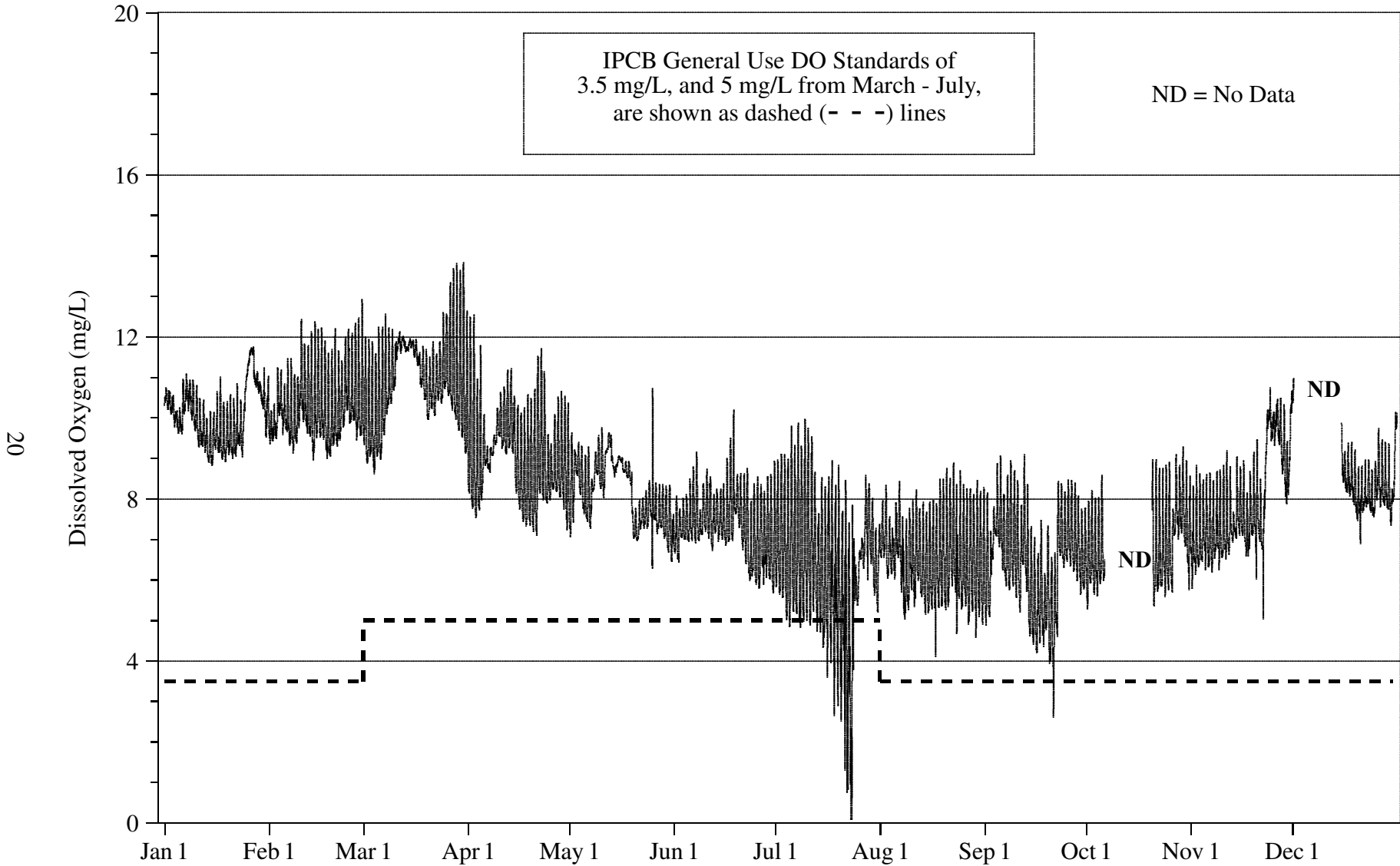


FIGURE 9: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT WOLF ROAD ON SALT CREEK FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

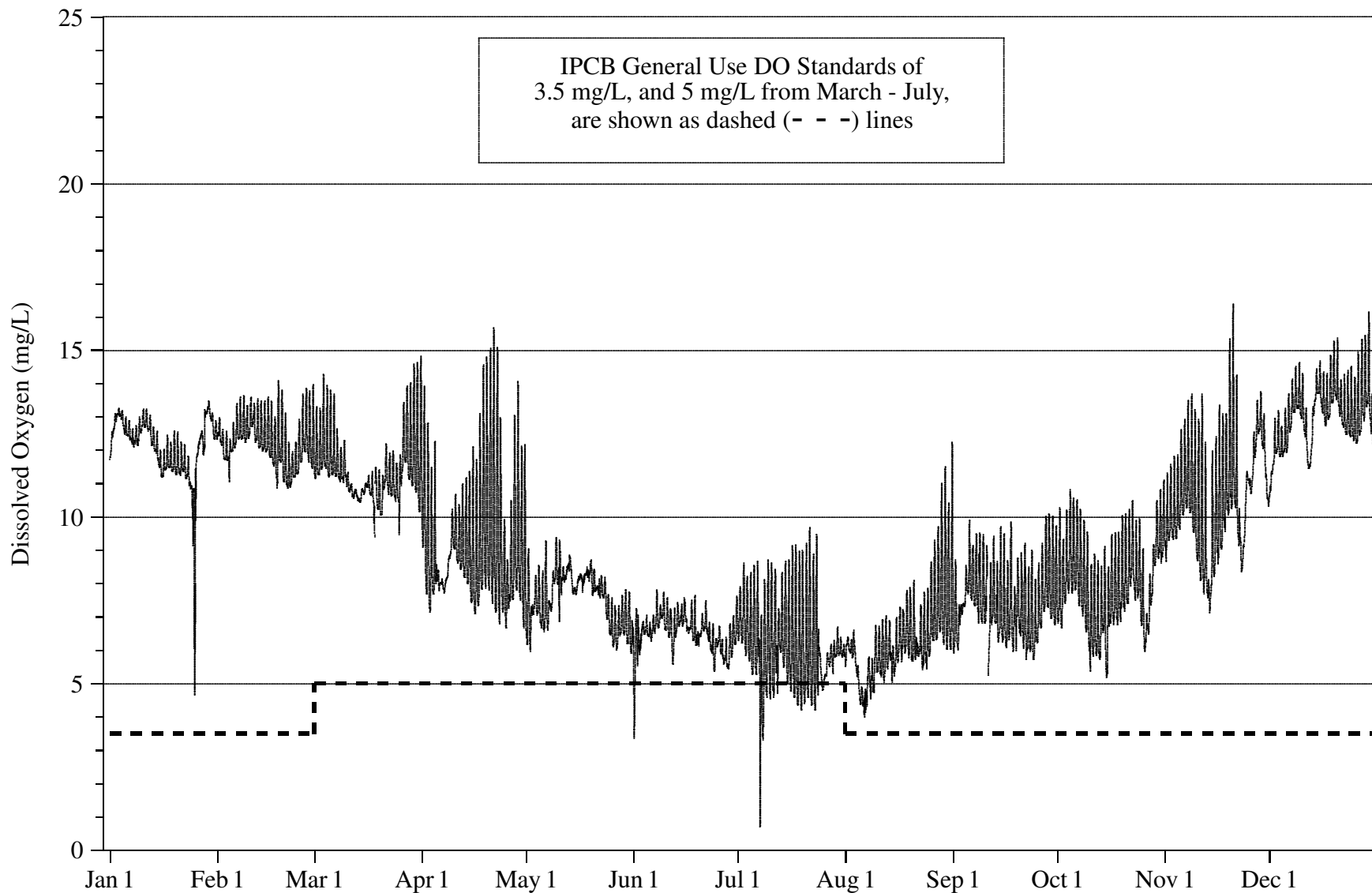


FIGURE 10: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT TORRENCE AVENUE ON THE GRAND CALUMET RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

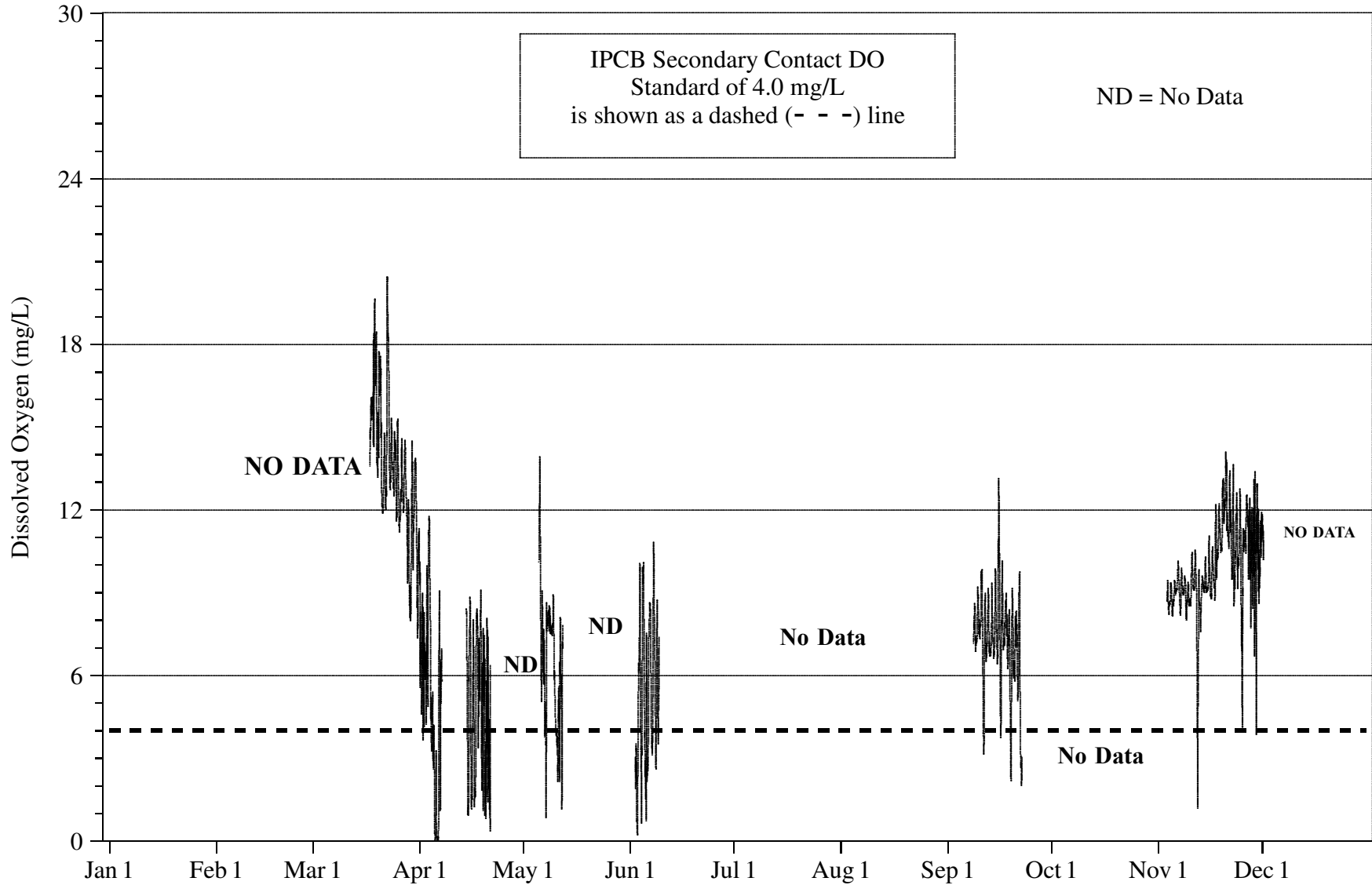


FIGURE 11: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT ASHLAND AVENUE ON THE LITTLE CALUMET RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010

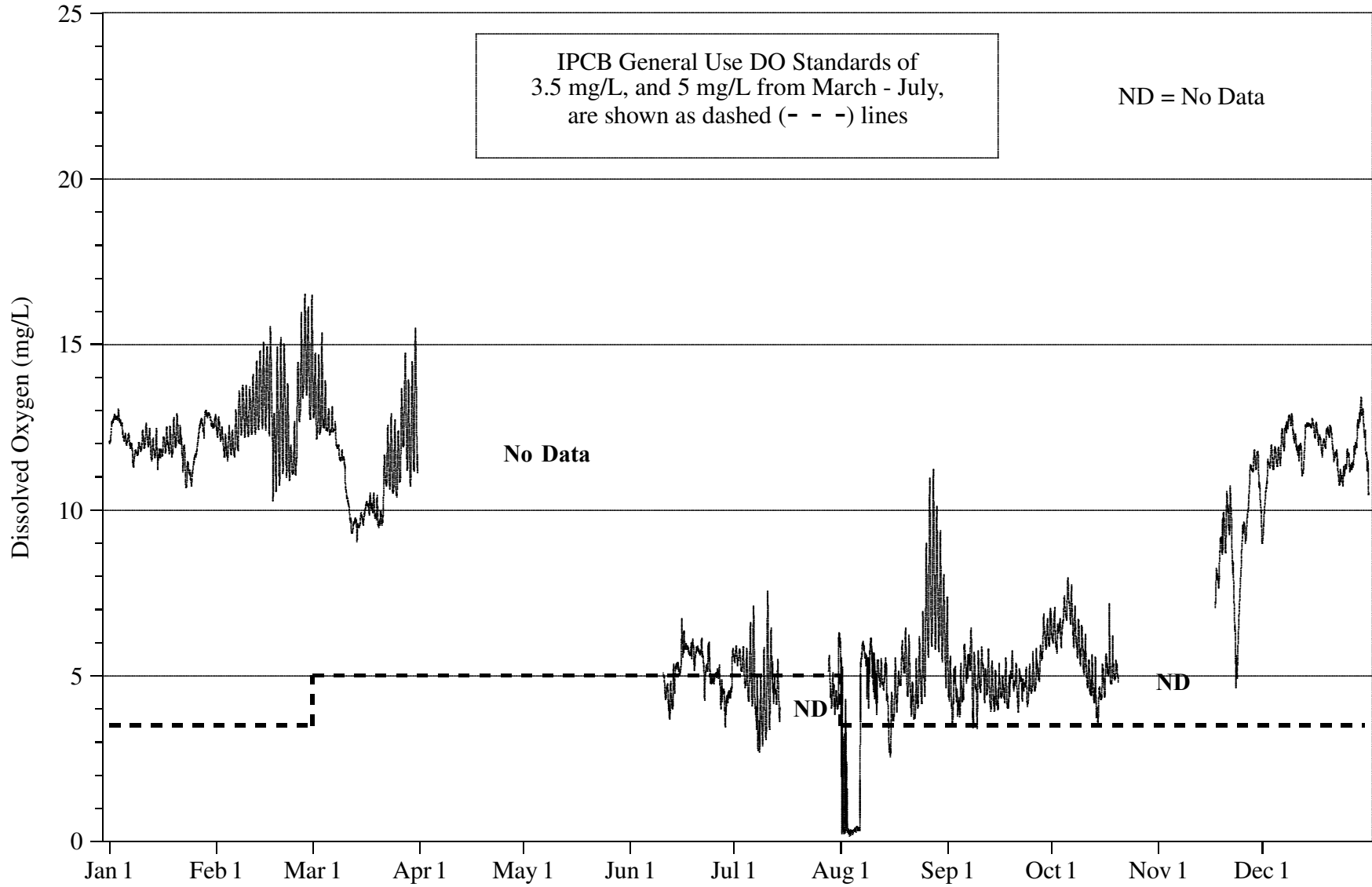
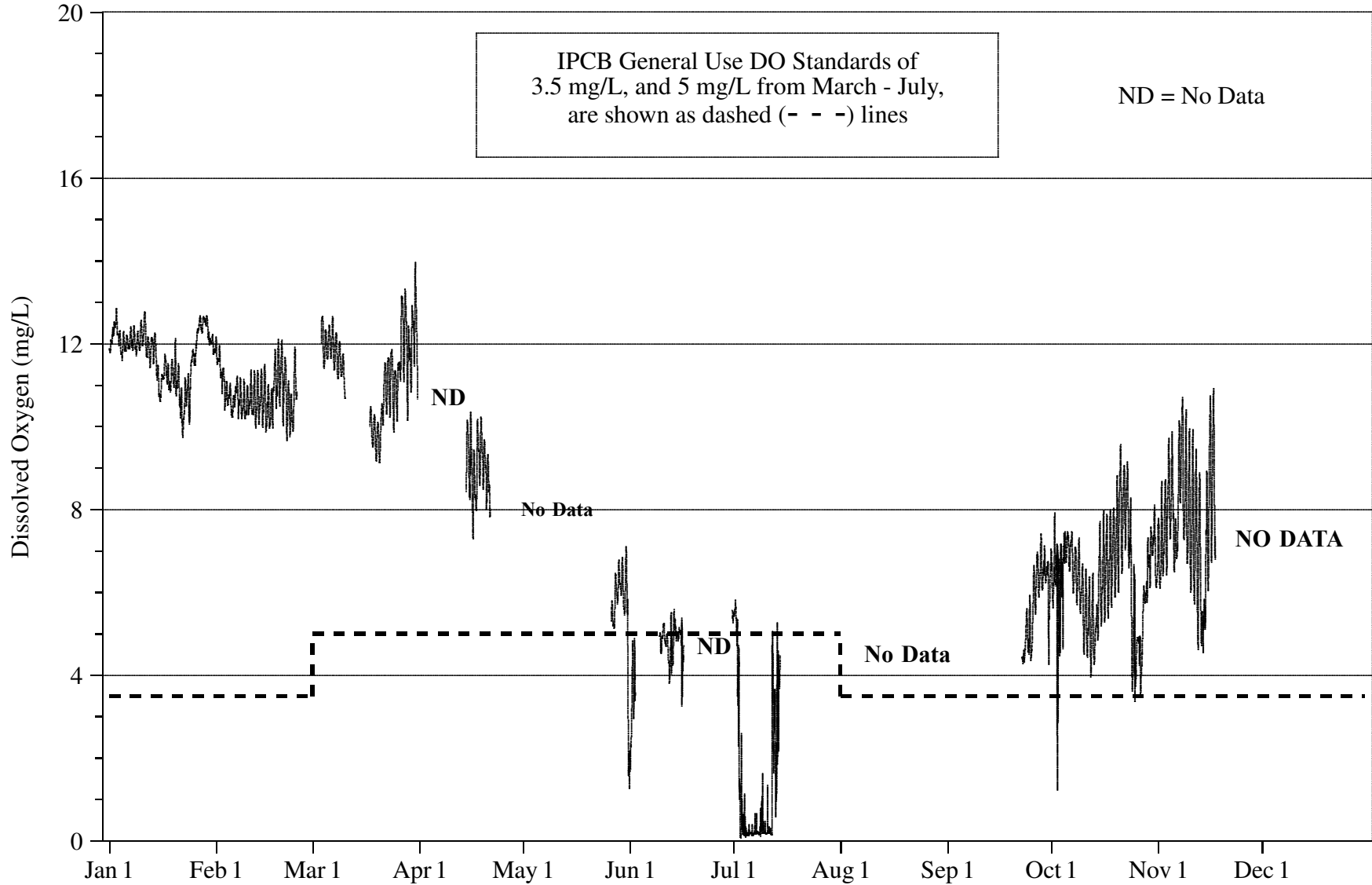


FIGURE 12: DISSOLVED OXYGEN CONCENTRATION MEASURED HOURLY AT WENTWORTH AVENUE ON THE LITTLE CALUMET RIVER FROM JANUARY 1, 2010, THROUGH DECEMBER 31, 2010



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APPENDIX A

WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS AT ALL
WADEABLE STREAM MONITORING STATIONS DURING 2010

TABLE A-1: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT CENTRAL PARK AVENUE ON THE
 NORTH BRANCH CHICAGO RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	13.3	14.5	14.2	100
01/04/10 - 01/10/10	168	13.1	14.2	13.5	100
01/11/10 - 01/17/10	168	12.3	13.6	13.1	100
01/18/10 - 01/24/10	168	11.5	14.0	13.3	100
01/25/10 - 01/31/10	168	11.8	14.7	13.8	100
02/01/10 - 02/07/10	168	13.4	14.8	14.0	100
02/08/10 - 02/14/10	168	14.1	15.0	14.5	100
02/15/10 - 02/21/10	168	12.2	15.3	13.9	100
02/22/10 - 02/28/10	168	11.1	15.8	13.5	100
03/01/10 - 03/07/10	168	12.2	17.6	14.8	100
03/08/10 - 03/14/10	168	10.7	15.3	11.6	100
03/15/10 - 03/21/10	167	10.1	12.7	11.2	100
03/22/10 - 03/28/10	168	10.8	14.9	12.5	100
03/29/10 - 04/04/10	59	10.6	15.1	13.0	100
04/05/10 - 04/11/10	108	7.1	10.8	9.0	100
04/12/10 - 04/18/10	59	8.3	11.6	9.8	100
04/19/10 - 04/25/10	109	6.8	14.1	10.0	100
04/26/10 - 05/02/10	168	4.6	12.8	8.6	98
05/03/10 - 05/09/10	60	5.9	8.1	6.7	100
05/10/10 - 05/16/10			NO DATA		
05/17/10 - 05/23/10	108	6.7	8.1	7.4	100
05/24/10 - 05/30/10	168	4.8	7.0	5.8	98
05/31/10 - 06/06/10	144	1.2	6.2	4.7	46
06/07/10 - 06/13/10	168	4.5	6.3	5.7	92
06/14/10 - 06/20/10	168	4.7	6.6	5.7	99
06/21/10 - 06/27/10	168	3.3	6.2	4.9	45
06/28/10 - 07/04/10	168	3.8	6.0	5.0	52
07/05/10 - 07/11/10	168	2.5	5.6	4.4	23
07/12/10 - 07/18/10	168	4.3	6.0	5.2	64
07/19/10 - 07/25/10	168	3.6	6.9	5.5	81
07/26/10 - 08/01/10	168	5.2	6.2	5.7	100
08/02/10 - 08/08/10	168	3.6	6.1	5.4	100
08/09/10 - 08/15/10	168	3.8	6.0	5.2	100
08/16/10 - 08/22/10	168	3.7	7.5	6.1	100

TABLE A-1 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT CENTRAL PARK AVENUE ON THE
 NORTH BRANCH CHICAGO RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
08/23/10 - 08/29/10	168	5.4	7.6	6.5	100
08/30/10 - 09/05/10	168	4.5	7.7	6.2	100
09/06/10 - 09/12/10	168	5.9	8.1	7.1	100
09/13/10 - 09/19/10	59	6.5	7.4	6.9	100
09/20/10 - 09/26/10		NO DATA			
09/27/10 - 10/03/10	109	7.1	8.6	7.8	100
10/04/10 - 10/10/10	168	6.3	9.5	8.3	100
10/11/10 - 10/17/10	168	4.9	7.7	6.4	100
10/18/10 - 10/24/10	168	6.1	9.6	7.6	100
10/25/10 - 10/31/10	168	3.1	8.7	6.5	97
11/01/10 - 11/07/10	168	7.7	10.4	8.7	100
11/08/10 - 11/14/10	168	4.2	10.2	7.7	100
11/15/10 - 11/21/10	168	6.7	12.7	9.8	100
11/22/10 - 11/28/10	167	6.2	12.0	9.6	100
11/29/10 - 12/05/10	168	8.6	12.1	11.0	100
12/06/10 - 12/12/10	168	10.5	12.8	11.8	100
12/13/10 - 12/19/10	168	11.1	13.8	12.4	100
12/20/10 - 12/26/10	168	11.1	14.4	12.0	100
12/27/10 - 12/31/10	120	9.8	14.0	12.0	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-2: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT DEVON AVENUE ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 02/14/10			NO DATA		
02/15/10 - 02/21/10	109	13.3	14.9	14.1	100
02/22/10 - 02/28/10	168	12.9	16.6	14.6	100
03/01/10 - 03/07/10	59	13.4	15.5	14.4	100
03/08/10 - 03/14/10	109	8.3	10.4	10.0	100
03/15/10 - 03/21/10	167	10.1	11.3	10.7	100
03/22/10 - 03/28/10	168	11.0	14.0	12.7	100
03/29/10 - 04/04/10	168	8.5	14.7	11.9	100
04/05/10 - 04/11/10	168	7.5	10.3	8.9	100
04/12/10 - 04/18/10	168	7.9	10.2	9.0	100
04/19/10 - 04/25/10	168	8.0	12.2	9.8	100
04/26/10 - 05/02/10	168	7.6	16.6	11.0	100
05/03/10 - 05/09/10	59	7.6	14.2	10.1	100
05/10/10 - 05/16/10	110	7.7	9.3	8.2	100
05/17/10 - 05/23/10	168	6.6	7.8	7.4	100
05/24/10 - 05/30/10	59	5.9	7.2	6.6	100
05/31/10 - 06/06/10			NO DATA		
06/07/10 - 06/13/10	109	5.8	7.1	6.5	100
06/14/10 - 06/20/10	168	5.4	7.6	6.4	100
06/21/10 - 06/27/10	168	5.2	7.3	6.0	100
06/28/10 - 07/04/10	168	5.4	7.8	6.4	100
07/05/10 - 07/11/10	168	4.4	9.7	6.6	89
07/12/10 - 07/18/10	168	2.8	8.7	6.3	91
07/19/10 - 07/25/10	168	4.7	7.4	5.8	83
07/26/10 - 08/01/10	168	4.9	6.3	5.6	94
08/02/10 - 08/08/10	61	5.2	6.0	5.6	100
08/09/10 - 08/29/10			NO DATA		
08/30/10 - 09/05/10	110	4.1	6.8	5.9	100
09/06/10 - 09/12/10	168	5.7	6.6	6.1	100
09/13/10 - 09/19/10	168	5.3	6.5	5.9	100
09/20/10 - 09/26/10	168	5.2	7.1	6.1	100
09/27/10 - 10/03/10	168	7.0	8.2	7.5	100
10/04/10 - 10/10/10	168	7.0	9.0	8.2	100
10/11/10 - 10/17/10	168	6.1	8.5	7.3	100

TABLE A-2 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT DEVON AVENUE ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
10/18/10 - 10/24/10	168	7.4	9.1	8.3	100
10/25/10 - 10/31/10	168	4.1	9.3	7.5	100
11/01/10 - 11/07/10	168	9.0	11.0	9.9	100
11/08/10 - 11/14/10	168	7.0	10.7	8.9	100
11/15/10 - 11/21/10	168	8.6	12.0	10.4	100
11/22/10 - 11/28/10	168	6.4	11.6	9.6	100
11/29/10 - 12/05/10	168	9.3	12.0	11.1	100
12/06/10 - 12/12/10	168	10.9	13.2	12.5	100
12/13/10 - 12/19/10	168	11.4	14.5	13.1	100
12/20/10 - 12/26/10	168	12.2	14.8	13.0	100
12/27/10 - 12/31/10	120	9.9	13.1	12.3	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-3: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
AT IRVING PARK ROAD ON THE
DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	12.7	13.2	13.0	100
01/04/10 - 01/10/10	168	12.2	13.3	12.6	100
01/11/10 - 01/17/10	168	12.4	13.4	12.9	100
01/18/10 - 01/24/10	168	10.4	13.1	11.7	100
01/25/10 - 01/31/10	168	10.4	12.5	11.9	100
02/01/10 - 02/07/10	168	12.0	13.1	12.4	100
02/08/10 - 02/14/10	168	10.9	13.5	12.1	100
02/15/10 - 02/21/10	168	10.8	14.8	12.5	100
02/22/10 - 02/28/10	168	11.5	16.1	13.7	100
03/01/10 - 03/07/10	168	12.5	16.0	13.9	100
03/08/10 - 03/14/10	168	11.2	13.7	11.9	100
03/15/10 - 03/21/10	167	10.3	11.8	11.1	100
03/22/10 - 03/28/10	168	11.1	13.5	12.1	100
03/29/10 - 04/04/10	168	7.7	14.2	10.9	100
04/05/10 - 04/11/10	168	7.3	10.3	8.7	100
04/12/10 - 04/18/10	168	7.8	10.3	8.9	100
04/19/10 - 04/25/10	168	7.2	11.5	9.4	100
04/26/10 - 05/02/10	168	7.5	15.0	10.2	100
05/03/10 - 05/09/10	168	6.5	14.0	9.0	100
05/10/10 - 05/16/10	168	7.3	9.8	8.2	100
05/17/10 - 05/23/10	168	6.5	7.8	7.3	100
05/24/10 - 05/30/10	168	5.2	7.5	6.3	100
05/31/10 - 06/06/10	168	2.5	6.8	5.5	85
06/07/10 - 06/13/10	168	5.4	7.1	6.3	100
06/14/10 - 06/20/10	168	5.0	6.8	5.9	100
06/21/10 - 06/27/10	168	4.7	6.3	5.4	86
06/28/10 - 07/04/10	168	4.7	6.7	5.8	92
07/05/10 - 07/11/10	168	3.3	7.6	5.3	62
07/12/10 - 07/18/10	168	3.9	6.6	4.9	45
07/19/10 - 07/25/10	168	3.7	6.9	5.0	44
07/26/10 - 08/01/10	168	4.2	5.8	5.1	69
08/02/10 - 08/08/10	168	2.5	6.1	4.8	80
08/09/10 - 08/15/10	168	4.1	5.8	5.0	100
08/16/10 - 08/22/10	58	4.7	5.8	5.2	100

TABLE A-3 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT IRVING PARK ROAD ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
08/23/10 - 09/26/10		NO DATA			
09/27/10 - 10/03/10	109	6.8	8.1	7.4	100
10/04/10 - 10/10/10	168	6.8	9.0	8.0	100
10/11/10 - 10/17/10	168	4.2	7.4	6.5	100
10/18/10 - 10/24/10	168	6.6	8.2	7.5	100
10/25/10 - 10/31/10	168	5.0	9.2	7.2	100
11/01/10 - 11/07/10	168	8.5	10.7	9.5	100
11/08/10 - 11/14/10	168	7.1	10.3	8.8	100
11/15/10 - 11/21/10	168	8.9	11.8	10.4	100
11/22/10 - 11/28/10	168	6.9	12.4	9.9	100
11/29/10 - 12/05/10	168	9.8	12.8	11.6	100
12/06/10 - 12/12/10	168	12.4	14.4	13.4	100
12/13/10 - 12/19/10	168	12.9	15.8	14.4	100
12/20/10 - 12/26/10	168	12.0	16.6	13.5	100
12/27/10 - 12/31/10	120	10.2	13.7	12.2	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-4: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT OGDEN AVENUE ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	13.2	14.3	13.9	100
01/04/10 - 01/10/10	168	13.1	14.1	13.6	100
01/11/10 - 01/17/10	168	13.1	14.1	13.7	100
01/18/10 - 01/24/10	168	10.2	13.9	12.4	100
01/25/10 - 01/31/10	168	10.1	12.4	11.6	100
02/01/10 - 02/07/10	168	11.8	15.3	13.2	100
02/08/10 - 02/14/10	168	13.8	15.1	14.2	100
02/15/10 - 02/21/10	81	13.1	14.5	13.9	100
02/22/10 - 02/28/10	86	13.2	15.1	14.1	100
03/01/10 - 03/07/10	168	12.6	15.4	13.7	100
03/08/10 - 03/14/10	81	11.1	13.3	12.2	100
03/15/10 - 03/21/10	86	11.0	11.8	11.4	100
03/22/10 - 03/28/10	168	11.2	12.9	11.8	100
03/29/10 - 04/04/10	168	8.9	13.4	11.2	100
04/05/10 - 04/11/10	168	7.1	11.2	9.0	100
04/12/10 - 04/18/10	168	8.6	10.6	9.5	100
04/19/10 - 04/25/10	168	8.0	11.3	9.6	100
04/26/10 - 05/02/10	168	7.5	12.4	9.4	100
05/03/10 - 05/09/10	168	6.9	11.4	8.8	100
05/10/10 - 05/16/10	168	7.8	10.7	8.7	100
05/17/10 - 05/23/10	81	7.8	8.2	7.9	100
05/24/10 - 05/30/10	87	7.0	8.4	7.6	100
05/31/10 - 06/06/10	168	5.3	7.8	6.5	100
06/07/10 - 06/13/10	168	6.7	7.7	7.3	100
06/14/10 - 06/20/10	168	6.4	7.8	7.2	100
06/21/10 - 06/27/10	168	5.6	7.4	6.5	100
06/28/10 - 07/04/10	168	5.5	7.6	6.8	100
07/05/10 - 07/11/10	57	6.0	7.8	6.7	100
07/12/10 - 08/01/10			NO DATA		
08/02/10 - 08/08/10	111	6.2	7.4	6.7	100
08/09/10 - 08/15/10	168	6.0	7.3	6.7	100
08/16/10 - 08/22/10	168	6.4	8.3	7.2	100
08/23/10 - 08/29/10	168	7.2	9.4	7.8	100
08/30/10 - 09/05/10	168	6.2	9.3	7.3	100

TABLE A-4 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT OGDEN AVENUE ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
09/06/10 - 09/12/10	168	7.5	9.4	8.0	100
09/13/10 - 09/19/10	168	7.2	9.6	8.2	100
09/20/10 - 09/26/10	168	7.6	9.6	8.3	100
09/27/10 - 10/03/10	168	8.2	10.6	9.0	100
10/04/10 - 10/10/10	168	8.1	10.9	9.1	100
10/11/10 - 10/17/10	168	7.5	10.6	8.5	100
10/18/10 - 10/24/10	168	8.3	10.9	9.1	100
10/25/10 - 10/31/10	168	7.1	11.4	9.3	100
11/01/10 - 11/07/10	168	10.3	13.0	11.2	100
11/08/10 - 11/14/10	168	9.1	12.8	10.5	100
11/15/10 - 11/21/10	168	9.6	13.9	11.3	100
11/22/10 - 11/28/10	168	9.1	14.0	11.5	100
11/29/10 - 12/05/10	168	11.5	14.3	13.1	100
12/06/10 - 12/12/10	168	13.6	15.7	14.8	100
12/13/10 - 12/19/10	168	13.8	16.4	14.9	100
12/20/10 - 12/26/10	168	14.0	17.0	15.3	100
12/27/10 - 12/31/10	120	11.7	16.1	14.4	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-5: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT MATERIAL SERVICE ROAD ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	12.6	13.5	12.9	100
01/04/10 - 01/10/10	168	12.3	14.0	13.0	100
01/11/10 - 01/17/10	168	12.6	14.6	13.4	100
01/18/10 - 01/24/10	168	11.2	15.2	13.3	100
01/25/10 - 01/31/10	167	10.9	14.1	12.5	100
02/01/10 - 02/07/10	168	12.7	17.4	14.5	100
02/08/10 - 02/14/10	168	14.6	18.9	16.8	100
02/15/10 - 02/21/10	168	12.9	18.9	16.5	100
02/22/10 - 02/28/10	168	12.1	19.1	15.5	100
03/01/10 - 03/07/10	168	13.0	20.5	16.5	100
03/08/10 - 03/14/10	168	10.6	16.1	12.5	100
03/15/10 - 03/21/10	167	9.1	12.6	10.9	100
03/22/10 - 03/28/10	168	8.8	15.1	11.1	100
03/29/10 - 04/04/10	168	8.3	17.6	12.5	100
04/05/10 - 04/11/10	82	6.3	11.7	7.6	100
04/12/10 - 04/18/10	86	8.0	14.9	10.8	100
04/19/10 - 04/25/10	168	7.7	19.8	12.2	100
04/26/10 - 05/02/10	168	6.8	16.2	10.6	100
05/03/10 - 05/09/10	168	6.2	17.4	10.0	100
05/10/10 - 05/16/10	168	7.2	13.0	8.8	100
05/17/10 - 05/23/10	168	6.8	8.3	7.6	100
05/24/10 - 05/30/10	168	5.9	14.0	8.6	100
05/31/10 - 06/06/10	82	4.7	10.9	6.9	93
06/07/10 - 06/13/10	85	6.0	8.9	7.2	100
06/14/10 - 06/20/10	168	5.8	11.0	7.3	100
06/21/10 - 06/27/10	168	4.4	10.6	6.3	85
06/28/10 - 07/04/10	168	4.9	15.0	8.4	96
07/05/10 - 07/11/10	168	4.7	15.2	9.0	95
07/12/10 - 07/18/10	168	4.7	15.4	8.9	96
07/19/10 - 07/25/10	168	3.7	12.4	6.3	58
07/26/10 - 08/01/10	168	4.4	7.5	5.6	79
08/02/10 - 08/08/10	168	4.7	8.4	6.0	100
08/09/10 - 08/15/10	168	5.7	10.9	7.7	100
08/16/10 - 08/22/10	168	5.4	11.1	7.8	100

TABLE A-5 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT MATERIAL SERVICE ROAD ON THE
 DES PLAINES RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
08/23/10 - 08/29/10	168	5.2	14.1	9.1	100
08/30/10 - 09/05/10	168	5.2	14.5	7.6	100
09/06/10 - 09/12/10	168	6.6	12.1	8.7	100
09/13/10 - 09/19/10	168	6.3	11.9	8.2	100
09/20/10 - 09/26/10	168	6.0	10.0	7.8	100
09/27/10 - 10/03/10	168	7.4	12.8	9.3	100
10/04/10 - 10/10/10	168	7.8	13.4	10.3	100
10/11/10 - 10/17/10	168	7.2	12.3	9.5	100
10/18/10 - 10/24/10	168	8.4	13.7	10.4	100
10/25/10 - 10/31/10	168	7.0	13.2	10.0	100
11/01/10 - 11/07/10	168	10.4	16.6	12.7	100
11/08/10 - 11/14/10	168	9.9	16.7	12.5	100
11/15/10 - 11/21/10	168	10.7	18.1	13.4	100
11/22/10 - 11/28/10	168	8.0	14.8	10.9	100
11/29/10 - 12/05/10	168	11.6	16.4	13.4	100
12/06/10 - 12/12/10	168	14.0	16.7	15.3	100
12/13/10 - 12/19/10	168	13.1	16.2	14.4	100
12/20/10 - 12/26/10	168	14.3	17.0	15.4	100
12/27/10 - 12/31/10	120	13.4	17.1	15.4	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-6: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
AT BUSSE LAKE DAM ON
SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	13.2	13.3	13.2	100
01/04/10 - 01/10/10	168	12.9	15.8	14.1	100
01/11/10 - 01/17/10	168	13.4	14.3	13.9	100
01/18/10 - 01/24/10	168	11.0	13.5	12.5	100
01/25/10 - 01/31/10	168	11.8	13.7	13.1	100
02/01/10 - 02/07/10	168	12.4	13.4	12.8	100
02/08/10 - 02/14/10	168	12.1	12.6	12.4	100
02/15/10 - 02/21/10	168	11.9	12.9	12.1	100
02/22/10 - 02/28/10	168	11.8	12.2	12.0	100
03/01/10 - 03/07/10	168	11.8	13.2	12.4	100
03/08/10 - 03/14/10	168	12.1	13.2	12.6	100
03/15/10 - 03/21/10	167	11.6	12.7	12.2	100
03/22/10 - 03/28/10	168	10.5	12.5	12.1	100
03/29/10 - 04/04/10	168	8.1	12.5	10.6	100
04/05/10 - 04/11/10	168	9.0	10.8	9.9	100
04/12/10 - 04/18/10	168	9.2	10.9	10.2	100
04/19/10 - 04/25/10	168	8.7	10.5	9.6	100
04/26/10 - 05/02/10	168	8.9	10.3	9.4	100
05/03/10 - 05/09/10	168	8.4	9.8	9.1	100
05/10/10 - 05/16/10	168	9.0	11.0	9.9	100
05/17/10 - 05/23/10	168	9.0	9.9	9.5	100
05/24/10 - 05/30/10	168	7.1	9.3	8.1	100
05/31/10 - 06/06/10	168	6.8	8.3	7.8	100
06/07/10 - 06/13/10	168	7.0	8.1	7.8	100
06/14/10 - 06/20/10	168	6.8	8.6	7.8	100
06/21/10 - 06/27/10	168	6.9	8.6	7.8	100
06/28/10 - 07/04/10	168	3.7	8.0	6.5	93
07/05/10 - 07/11/10	168	0.5	6.4	4.4	40
07/12/10 - 07/18/10	168	0.2	5.6	3.2	8
07/19/10 - 07/25/10	168	0.1	7.7	2.6	28
07/26/10 - 08/01/10	58	6.9	9.1	7.8	100
08/02/10 - 08/22/10			NO DATA		
08/23/10 - 08/29/10	109	0.2	6.9	3.5	56
08/30/10 - 09/05/10	168	0.1	8.4	5.3	70

TABLE A-6 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT BUSSE LAKE DAM ON
 SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
09/06/10 - 09/12/10	168	0.4	7.7	5.7	83
09/13/10 - 09/19/10	168	0.3	6.9	4.3	68
09/20/10 - 09/26/10	168	0.4	7.7	5.3	86
09/27/10 - 10/03/10	168	0.0	7.9	5.3	88
10/04/10 - 10/10/10	168	0.0	9.8	3.8	61
10/11/10 - 10/17/10	168	0.0	8.9	4.2	67
10/18/10 - 10/24/10	168	0.2	8.5	3.1	35
10/25/10 - 10/31/10	168	2.6	10.0	8.2	98
11/01/10 - 11/07/10	168	4.4	11.5	9.4	100
11/08/10 - 11/14/10	168	4.4	11.1	8.2	100
11/15/10 - 11/21/10	168	8.4	11.0	9.5	100
11/22/10 - 11/28/10	168	7.9	12.3	11.3	100
11/29/10 - 12/05/10	58	11.0	12.7	12.0	100
12/06/10 - 12/12/10			NO DATA		
12/13/10 - 12/19/10	106	12.8	14.3	13.9	100
12/20/10 - 12/26/10	168	8.0	14.3	12.5	100
12/27/10 - 12/31/10	120	11.3	14.2	13.1	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-7: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
AT J. F. KENNEDY BOULEVARD ON
SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	9.9	10.8	10.4	100
01/04/10 - 01/10/10	168	9.5	11.1	10.2	100
01/11/10 - 01/17/10	168	8.8	11.0	9.6	100
01/18/10 - 01/24/10	167	8.9	10.9	9.6	100
01/25/10 - 01/31/10	168	9.5	11.8	10.9	100
02/01/10 - 02/07/10	168	9.3	11.5	10.1	100
02/08/10 - 02/14/10	168	9.0	12.4	10.4	100
02/15/10 - 02/21/10	168	9.0	12.2	10.2	100
02/22/10 - 02/28/10	168	9.5	12.9	10.6	100
03/01/10 - 03/07/10	168	8.6	12.6	10.1	100
03/08/10 - 03/14/10	168	10.3	12.2	11.5	100
03/15/10 - 03/21/10	167	10.0	11.9	11.1	100
03/22/10 - 03/28/10	168	9.8	13.8	11.2	100
03/29/10 - 04/04/10	167	7.5	13.8	9.9	100
04/05/10 - 04/11/10	168	8.2	10.8	9.4	100
04/12/10 - 04/18/10	168	7.3	11.2	9.2	100
04/19/10 - 04/25/10	168	7.1	11.7	8.8	100
04/26/10 - 05/02/10	168	7.1	10.6	8.7	100
05/03/10 - 05/09/10	168	7.3	9.6	8.5	100
05/10/10 - 05/16/10	168	8.0	9.7	8.9	100
05/17/10 - 05/23/10	168	7.0	8.9	7.9	100
05/24/10 - 05/30/10	168	6.3	10.7	7.6	100
05/31/10 - 06/06/10	168	6.4	8.8	7.3	100
06/07/10 - 06/13/10	168	6.7	9.2	7.6	100
06/14/10 - 06/20/10	168	6.9	10.2	7.8	100
06/21/10 - 06/27/10	168	5.8	8.8	7.0	100
06/28/10 - 07/04/10	168	5.0	9.1	7.0	100
07/05/10 - 07/11/10	168	4.8	10.0	7.0	93
07/12/10 - 07/18/10	168	2.7	8.9	6.2	78
07/19/10 - 07/25/10	168	0.0	8.8	5.1	61
07/26/10 - 08/01/10	168	5.2	8.6	6.9	100
08/02/10 - 08/08/10	168	5.0	8.4	6.7	100
08/09/10 - 08/15/10	168	5.2	8.2	6.5	100
08/16/10 - 08/22/10	168	4.1	8.9	6.6	100

TABLE A-7 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT J. F. KENNEDY BOULEVARD ON
 SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
08/23/10 - 08/29/10	168	4.6	8.7	6.5	100
08/30/10 - 09/05/10	168	4.9	9.1	6.7	100
09/06/10 - 09/12/10	168	5.2	9.1	6.9	100
09/13/10 - 09/19/10	168	4.2	8.4	5.6	100
09/20/10 - 09/26/10	168	2.6	8.5	6.4	97
09/27/10 - 10/03/10	168	5.3	8.4	6.7	100
10/04/10 - 10/10/10	58	5.6	8.6	6.6	100
10/11/10 - 10/17/10			NO DATA		
10/18/10 - 10/24/10	108	5.4	9.0	6.8	100
10/25/10 - 10/31/10	168	5.7	9.3	7.3	100
11/01/10 - 11/07/10	168	5.8	8.8	7.1	100
11/08/10 - 11/14/10	168	6.3	9.2	7.4	100
11/15/10 - 11/21/10	168	6.0	9.5	7.5	100
11/22/10 - 11/28/10	168	5.1	10.7	9.3	100
11/29/10 - 12/05/10	58	7.9	11.0	9.4	100
12/06/10 - 12/12/10			NO DATA		
12/13/10 - 12/19/10	106	7.7	9.9	8.5	100
12/20/10 - 12/26/10	168	6.9	9.7	8.1	100
12/27/10 - 12/31/10	120	7.4	10.1	8.4	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-8: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
AT WOLF ROAD ON
SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	11.7	13.3	12.7	100
01/04/10 - 01/10/10	168	12.1	13.2	12.6	100
01/11/10 - 01/17/10	168	11.2	13.2	12.1	100
01/18/10 - 01/24/10	168	9.1	12.6	11.5	100
01/25/10 - 01/31/10	168	4.7	13.5	12.2	100
02/01/10 - 02/07/10	168	11.1	13.6	12.3	100
02/08/10 - 02/14/10	167	12.0	13.6	12.7	100
02/15/10 - 02/21/10	168	10.9	14.1	12.0	100
02/22/10 - 02/28/10	168	10.9	14.0	12.1	100
03/01/10 - 03/07/10	168	11.2	14.3	12.0	100
03/08/10 - 03/14/10	168	10.4	12.3	11.0	100
03/15/10 - 03/21/10	166	9.4	12.2	10.8	100
03/22/10 - 03/28/10	168	9.5	14.0	11.5	100
03/29/10 - 04/04/10	168	7.2	14.8	10.5	100
04/05/10 - 04/11/10	168	7.7	10.7	8.7	100
04/12/10 - 04/18/10	168	7.1	14.6	9.3	100
04/19/10 - 04/25/10	168	6.7	15.7	9.5	100
04/26/10 - 05/02/10	168	6.0	14.1	8.5	100
05/03/10 - 05/09/10	168	6.6	9.4	7.6	100
05/10/10 - 05/16/10	168	6.9	9.3	8.2	100
05/17/10 - 05/23/10	168	7.2	8.7	8.0	100
05/24/10 - 05/30/10	168	6.0	7.8	6.8	100
05/31/10 - 06/06/10	168	3.4	7.2	6.4	96
06/07/10 - 06/13/10	168	5.6	7.8	6.9	100
06/14/10 - 06/20/10	168	6.1	7.6	6.8	100
06/21/10 - 06/27/10	168	5.4	7.5	6.2	100
06/28/10 - 07/04/10	168	5.4	8.6	6.6	100
07/05/10 - 07/11/10	168	0.7	8.7	6.0	73
07/12/10 - 07/18/10	168	4.4	9.2	6.4	83
07/19/10 - 07/25/10	168	4.2	9.7	6.0	65
07/26/10 - 08/01/10	168	5.2	6.7	5.9	100
08/02/10 - 08/08/10	168	4.0	6.6	5.2	100
08/09/10 - 08/15/10	168	4.7	7.0	5.9	100
08/16/10 - 08/22/10	168	5.6	8.1	6.4	100

TABLE A-8 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT WOLF ROAD ON
 SALT CREEK DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
08/23/10 - 08/29/10	168	5.4	11.5	7.2	100
08/30/10 - 09/05/10	168	5.9	12.3	7.5	100
09/06/10 - 09/12/10	163	5.2	9.5	7.7	100
09/13/10 - 09/19/10	167	6.0	9.9	7.3	100
09/20/10 - 09/26/10	168	5.7	9.2	7.1	100
09/27/10 - 10/03/10	165	6.7	10.3	8.1	100
10/04/10 - 10/10/10	168	5.4	10.8	8.2	100
10/11/10 - 10/17/10	168	5.2	9.5	7.1	100
10/18/10 - 10/24/10	168	6.8	10.5	8.3	100
10/25/10 - 10/31/10	168	6.0	11.1	8.3	100
11/01/10 - 11/07/10	168	8.7	13.5	10.5	100
11/08/10 - 11/14/10	168	7.1	13.7	9.7	100
11/15/10 - 11/21/10	168	8.2	16.4	10.9	100
11/22/10 - 11/28/10	168	8.4	13.8	11.0	100
11/29/10 - 12/05/10	167	10.3	13.3	11.8	100
12/06/10 - 12/12/10	168	11.5	14.7	13.0	100
12/13/10 - 12/19/10	168	11.9	15.3	13.5	100
12/20/10 - 12/26/10	168	12.2	15.4	13.2	100
12/27/10 - 12/31/10	120	11.0	16.2	13.1	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-9: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT TORRENCE AVENUE ON THE
 GRAND CALUMET RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ 4.0 mg/L IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 03/14/10			NO DATA		
03/15/10 - 03/21/10	109	11.9	19.6	15.2	100
03/22/10 - 03/28/10	168	9.1	20.4	13.4	100
03/29/10 - 04/04/10	168	2.6	14.5	8.5	93
04/05/10 - 04/11/10	58	0.0	9.1	3.0	38
04/12/10 - 04/18/10	109	0.9	9.1	5.4	71
04/19/10 - 04/25/10	60	0.4	8.1	4.2	52
04/26/10 - 05/02/10			NO DATA		
05/03/10 - 05/09/10	110	0.8	13.9	7.6	95
05/10/10 - 05/16/10	59	1.2	8.1	4.9	61
05/17/10 - 05/30/10			NO DATA		
05/31/10 - 06/06/10	109	0.2	10.1	5.1	58
06/07/10 - 06/13/10	58	2.6	10.8	5.8	78
06/14/10 - 09/05/10			NO DATA		
09/06/10 - 09/12/10	109	3.2	9.9	7.6	94
09/13/10 - 09/19/10	168	2.2	13.1	7.4	95
09/20/10 - 09/26/10	58	2.0	9.8	6.2	81
09/27/10 - 10/31/10			NO DATA		
11/01/10 - 11/07/10	109	8.2	10.1	9.0	100
11/08/10 - 11/14/10	168	1.2	10.6	8.9	99
11/15/10 - 11/21/10	168	8.7	14.1	10.9	100
11/22/10 - 11/28/10	168	4.0	13.7	10.7	100
11/29/10 - 12/05/10	59	3.9	12.9	10.7	98
12/06/10 - 12/31/10			NO DATA		

TABLE A-10: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT ASHLAND AVENUE ON THE
 LITTLE CALUMET RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	12.0	13.0	12.6	100
01/04/10 - 01/10/10	168	11.3	12.7	12.0	100
01/11/10 - 01/17/10	168	11.2	12.6	11.9	100
01/18/10 - 01/24/10	168	10.7	12.9	11.8	100
01/25/10 - 01/31/10	168	11.0	13.0	12.4	100
02/01/10 - 02/07/10	168	11.5	13.6	12.2	100
02/08/10 - 02/14/10	168	12.2	15.1	13.2	100
02/15/10 - 02/21/10	167	10.3	15.5	12.9	100
02/22/10 - 02/28/10	168	10.9	16.5	13.3	100
03/01/10 - 03/07/10	168	11.9	15.4	12.9	100
03/08/10 - 03/14/10	168	9.1	12.0	10.4	100
03/15/10 - 03/21/10	167	9.5	11.7	10.0	100
03/22/10 - 03/28/10	168	10.4	14.7	11.9	100
03/29/10 - 04/04/10	58	10.7	15.5	12.6	100
04/05/10 - 06/06/10			NO DATA		
06/07/10 - 06/13/10	83	3.7	5.3	4.5	10
06/14/10 - 06/20/10	168	5.0	6.7	5.7	99
06/21/10 - 06/27/10	168	4.0	6.1	5.1	58
06/28/10 - 07/04/10	168	3.5	5.9	5.1	58
07/05/10 - 07/11/10	168	2.7	7.5	4.6	30
07/12/10 - 07/18/10	58	3.6	5.5	4.6	24
07/19/10 - 07/25/10			NO DATA		
07/26/10 - 08/01/10	110	0.2	6.3	4.2	32
08/02/10 - 08/08/10	168	0.2	6.0	2.3	36
08/09/10 - 08/15/10	168	2.6	6.1	4.8	89
08/16/10 - 08/22/10	168	3.6	6.4	4.8	100
08/23/10 - 08/29/10	168	4.0	11.2	6.8	100
08/30/10 - 09/05/10	168	3.4	8.0	5.1	98
09/06/10 - 09/12/10	168	3.4	6.4	5.0	98
09/13/10 - 09/19/10	168	3.9	5.8	4.6	100
09/20/10 - 09/26/10	168	3.9	5.8	4.8	100
09/27/10 - 10/03/10	168	4.8	7.1	6.1	100
10/04/10 - 10/10/10	168	5.1	7.9	6.4	100
10/11/10 - 10/17/10	168	3.4	7.2	4.8	99

TABLE A-10 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT ASHLAND AVENUE ON THE
 LITTLE CALUMET RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
10/18/10 - 10/24/10	58	4.7	6.2	5.1	100
10/25/10 - 11/14/10			NO DATA		
11/15/10 - 11/21/10	109	7.1	10.7	9.1	100
11/22/10 - 11/28/10	168	4.6	11.8	8.9	100
11/29/10 - 12/05/10	168	9.0	12.0	11.0	100
12/06/10 - 12/12/10	168	11.0	12.9	12.1	100
12/13/10 - 12/19/10	168	11.3	12.8	12.3	100
12/20/10 - 12/26/10	168	10.7	12.6	11.5	100
12/27/10 - 12/31/10	120	10.5	13.4	12.1	100

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-11: WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT WENTWORTH AVENUE ON THE
 LITTLE CALUMET RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
01/01/10 - 01/03/10	72	11.8	12.9	12.2	100
01/04/10 - 01/10/10	168	11.6	12.6	12.1	100
01/11/10 - 01/17/10	168	10.6	12.8	11.6	100
01/18/10 - 01/24/10	168	9.7	12.1	10.9	100
01/25/10 - 01/31/10	168	11.5	12.7	12.2	100
02/01/10 - 02/07/10	167	10.2	12.1	11.0	100
02/08/10 - 02/14/10	168	10.0	11.4	10.6	100
02/15/10 - 02/21/10	168	9.7	12.1	10.9	100
02/22/10 - 02/28/10	58	9.8	11.9	10.7	100
03/01/10 - 03/07/10	109	11.4	12.7	12.0	100
03/08/10 - 03/14/10	59	10.7	12.1	11.4	100
03/15/10 - 03/21/10	109	9.1	11.5	10.0	100
03/22/10 - 03/28/10	168	9.9	13.3	11.5	100
03/29/10 - 04/04/10	58	10.7	14.0	12.2	100
04/05/10 - 04/11/10			NO DATA		
04/12/10 - 04/18/10	110	7.3	10.3	9.1	100
04/19/10 - 04/25/10	59	7.8	9.7	8.8	100
04/26/10 - 05/23/10			NO DATA		
05/24/10 - 05/30/10	110	5.1	7.1	6.0	100
05/31/10 - 06/06/10	59	1.3	5.8	3.3	8
06/07/10 - 06/13/10	109	3.8	5.6	4.8	28
06/14/10 - 06/20/10	58	3.3	5.4	4.8	40
06/21/10 - 06/27/10			NO DATA		
06/28/10 - 07/04/10	109	0.1	5.8	2.5	33
07/05/10 - 07/11/10	168	0.1	1.6	0.3	0
07/12/10 - 07/18/10	59	0.2	5.3	3.1	3
07/19/10 - 09/19/10			NO DATA		
09/20/10 - 09/26/10	110	4.3	7.0	5.2	100
09/27/10 - 10/03/10	168	1.2	7.9	6.3	98
10/04/10 - 10/10/10	168	4.5	7.5	6.5	100
10/11/10 - 10/17/10	168	4.0	8.0	5.8	100
10/18/10 - 10/24/10	168	3.6	9.6	7.3	100
10/25/10 - 10/31/10	168	3.4	8.1	5.9	99
11/01/10 - 11/07/10	168	6.1	10.7	7.9	100

TABLE A-11 (Continued): WEEKLY DISSOLVED OXYGEN SUMMARY STATISTICS
 AT WENTWORTH AVENUE ON THE
 LITTLE CALUMET RIVER DURING 2010

Monitoring Dates	Number of DO Values	DO Concentration (mg/L)			Percent DO Values ≥ (3.5, 5.0) mg/L ¹ IPCB Standard
		Minimum	Maximum	Mean	
11/08/10 - 11/14/10	168	4.5	10.6	7.3	100
11/15/10 - 11/21/10	60	6.0	10.9	8.5	100
11/22/10 - 12/31/10			NO DATA		

¹IPCB general use DO standard is 3.5 mg/L, and 5.0 mg/L from March - July.

TABLE A-12: SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS
MADE DURING CROSS-SECTIONAL SURVEYS IN 2010

Waterway, Station, and Date	Field Monitor Dissolved Oxygen (mg/L)	Cross-Sectional DO Samples						Coefficient of Variation (%)
		Cross Section Depth Range (feet)	N*	Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	
SALT CREEK								
<u>Busse Woods S. Dam</u>								
04/02/2010	10.05	1.0 – 2.0	6	10.21	10.39	10.33	0.07	0.73
09/13/2010	5.98	1.5 – 2.7	6	8.98	9.06	9.00	0.03	0.34
11/08/2010	8.93	0.7 – 1.8	6	10.26	10.89	10.54	0.25	2.40
<u>J. F. Kennedy Blvd.</u>								
04/02/2010	10.36	0.2 – 1.3	6	10.50	11.04	10.77	0.18	1.70
09/13/2010	7.16	0.6 – 1.8	6	7.63	7.86	7.73	0.10	1.32
11/08/2010	7.60	0.1 – 1.0	6	8.09	8.30	8.19	0.09	1.04
<u>Wolf Rd.</u>								
04/05/2010	8.24	3.1 – 3.7	9	8.07	8.20	8.11	0.04	0.49
09/13/2010	7.66	0.4 – 1.0	6	7.40	7.50	7.45	0.04	0.55
11/08/2010	10.69	0.3 – 0.8	6	10.71	10.85	10.79	0.06	0.55

TABLE A-12 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS
MADE DURING CROSS-SECTIONAL SURVEYS IN 2010

Waterway, Station, and Date	Field Monitor Dissolved Oxygen (mg/L)	Cross Section Depth Range (feet)	N*	Cross-Sectional DO Samples				
				Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation (%)
DES PLAINES RIVER								
<u>Devon Ave</u>								
04/02/2010	10.42	1.0 – 2.0	6	10.31	10.35	10.33	0.02	0.18
09/15/2010	5.88	0.8 – 2.0	6	5.79	5.83	5.81	0.02	0.29
11/10/2010	9.61	0.8 – 1.5	6	9.43	9.51	9.47	0.03	0.29
<u>Irving Park Rd.</u>								
04/02/010	9.32	1.0 – 1.9	6	10.14	10.23	10.17	0.04	0.35
09/15/2010	NA	0.6 – 1.4	6	5.91	6.02	5.97	0.05	0.81
11/10/2010	8.51	0.4 – 1.2	5	8.62	8.73	8.70	0.05	0.54
<u>Ogden Ave.</u>								
04/05/2010	8.34	2.9 – 3.9	6	8.61	8.66	8.64	0.02	0.22
09/13/2010	7.69	0.6 – 1.2	6	7.61	8.03	7.89	0.15	1.91
11/08/2010	11.62	0.6 – 1.2	6	11.15	11.56	11.35	0.18	1.56
<u>Material Service Rd.</u>								
04/05/2010	11.09	2.8 – 5.8	8	10.83	10.98	10.90	0.06	0.52
09/16/2010	6.98	1.1 – 2.4	6	6.89	7.14	6.99	0.12	1.66
11/12/2010	13.52	1.5 – 3.4	7	12.86	12.98	12.91	0.04	0.30

TABLE A-12 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS
MADE DURING CROSS-SECTIONAL SURVEYS IN 2010

Waterway, Station, and Date	Field Monitor Dissolved Oxygen (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 (%)
LITTLE CALUMET RIVER								
<u>Wentworth Ave.</u>								
04/09/2010	NA	1.3 – 4.5	7	8.96	8.98	8.97	0.01	0.08
09/10/2010	NA	0.2 – 1.6	5	5.69	5.72	5.70	0.01	0.19
11/18/2010	NA	0.3 – 1.9	6	9.13	9.34	9.21	0.09	0.96
<u>Ashland Ave.</u>								
04/09/2010	NA	1.6 – 3.0	8	8.44	8.53	8.50	0.04	0.50
09/10/2010	4.50	1.7 – 2.9	6	4.77	5.33	4.94	0.22	4.52
11/18/2010	7.70	1.5 – 3.1	6	7.76	7.87	7.81	0.04	0.51
GRAND CALUMET RIVER								
<u>Torrence Ave.</u>								
04/09/2010	NA	0.7 – 1.9	6	4.60	7.67	6.12	1.26	20.55
09/10/2010	7.85	1.3 – 2.0	6	7.66	8.65	7.90	0.37	4.72
11/18/2010	11.37	1.2 – 2.1	6	10.65	11.24	10.91	0.23	2.08

TABLE A-12 (Continued): SUMMARY STATISTICS FOR DISSOLVED OXYGEN MEASUREMENTS
MADE DURING CROSS-SECTIONAL SURVEYS IN 2010

Waterway, Station, and Date	Field Monitor Dissolved Oxygen (mg/L)	Cross Section Depth Range (feet)	N*	Cross-Sectional DO Samples				
				Minimum (mg/L)	Maximum (mg/L)	Mean (mg/L)	Standard Deviation (mg/L)	Coefficient of Variation
NORTH BRANCH CHICAGO RIVER								
<u>Central Park Ave.</u>								
04/02/2010	NA	0.1 – 0.5	6	9.48	9.65	9.56	0.08	0.81
09/15/2010	7.19	0.3 – 1.1	6	7.14	7.35	7.23	0.10	1.32
11/10/2010	9.23	0.4 – 1.0	4	8.95	9.15	9.01	0.09	1.03

*Number of DO measurements made across transect during cross-sectional survey.
NA = Not Available.