Wisconsin Public Service Corporation
700 North Adams Street
Green Bay, WI 54301
www.wisconsinpublicservice.com

November 29, 2017

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Dear Ms. Bose:

SUBJECT: 2017 Water Quality Monitoring Report

Hydro	FERC Project No.	NATDAM No.	License Article
Grand Rapids	**2433**	**MI00022**	**407**

In accordance with the Order Approving Water Quality Monitoring Plan under Article 407, dated April 7, 1999, Wisconsin Public Service (WPS) is submitting water quality monitoring data collected during the 2017 monitoring season at the Grand Rapids Hydroelectric project.

At the Grand Rapids facility, WPS is required to ensure that flow releases from the Grand Rapids Project maintain the State standards listed below except when the river flow in the Menominee River is less than the 95 percent exceedance flow or when natural conditions prohibit attainment of the standards:

(1) Monthly average temperatures downstream of the Grand Rapids Dam shall be no greater than those listed below:

January, February	38°F	August	81°F
March	41°F	September	74°F
April	56°F	October	64°F
May	70°F	November	49°F
June	80°F	December	39°F
July	83°F		

(2) Temperature downstream of the Grand Rapids Project Dam shall not exceed 89°F at any time.
(3) Dissolved Oxygen (DO) concentrations downstream of the project powerhouse must not be less than 5.0 milligrams per liter (mg/L) at any time.
(4) Maintain pH within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.

As described in the Water Quality Monitoring Plan, monitoring was conducted upstream and downstream of the powerhouse from June 1 through September 30. Monitoring for DO, temperature, and pH was conducted continuously on an hourly basis using portable water quality monitoring equipment manufactured by YSI Inc. The instrumentation was cleaned and calibrated according to manufacturer specification at least once every 14 days during the monitoring period. A post deployment calibration was conducted to determine the extent of calibration drift. Raw data was adjusted assuming a linear degradation of calibration based upon a post calibration of the equipment. The water quality monitoring equipment used to monitor DO has an accuracy of +/- 0.1 mg/l, per the

manufacturer. For compliance purposes, DO concentrations more than 0.1 mg/l below the applicable water quality standard are potential deviations.

No deviations from the DO, pH or temperature water quality standards were observed at the upstream or downstream monitoring locations during the 2017 monitoring season. Monitoring data is enclosed with this report in Appendix A. Field quality assurance data is enclosed in Appendix C.

Agency Consultation

WPS provided the 2017 water quality monitoring data to the Wisconsin Department of Natural Resources (WDNR), the Michigan Department of Environmental Quality (MDEQ) and the U.S. Fish and Wildlife Service (FWS) on October 10, 2017 for review and comment. WPS did not receive comments from the resource agencies on the 2017 water quality monitoring report. Documentation of Agency Consultation can be found in Appendix B.

As previously reported, WPS inadvertently missed water quality monitoring during the 2009 and 2014 monitoring seasons. To mitigate for the lost monitoring, WPS had proposed to conduct water quality monitoring in 2017 and 2018, and then resume the five-year monitoring cycle in 2019. On August 2, 2016 the FERC recommended consulting with the resource agencies to determine if the second year of mitigation monitoring should be conducted in 2018 or between the regularly scheduled 2019 and 2024 monitoring years. WPS did not receive recommendations from the resource agencies on when to conduct the second year of mitigation monitoring. Since no deviations from water quality standards were observed in 2017, WPS proposes to conduct the regularly scheduled monitoring in 2019 and then conduct the second year of mitigation monitoring in 2021.

Should you have any questions or concerns with this submittal, please do not hesitate to call Mr. Mark Metcalf at (920) 433-1833 or email at MWMetcalf@integrysgroup.com.

Sincerely,

Todd P. Jastremski
Asset Manager Hydro Operations
We Energies
800 Industrial Park Drive
Iron Mountain, MI 49801

MWM/rjv

Enc: Appendix A – 2017 Water Quality Monitoring Data (75 pages)
Appendix B – Documentation of Agency Consultation (16 pages)
Appendix C - Water Quality Monitoring Quality Assurance Data (57 pages)

cc: John Zygaj – FERC CRO
Elle Gulotty – MDNR
Amira Oun – MDEQ
Cheryl Laatsch – WDNR
Nicholas Utrup – USFW

APPENDIX A

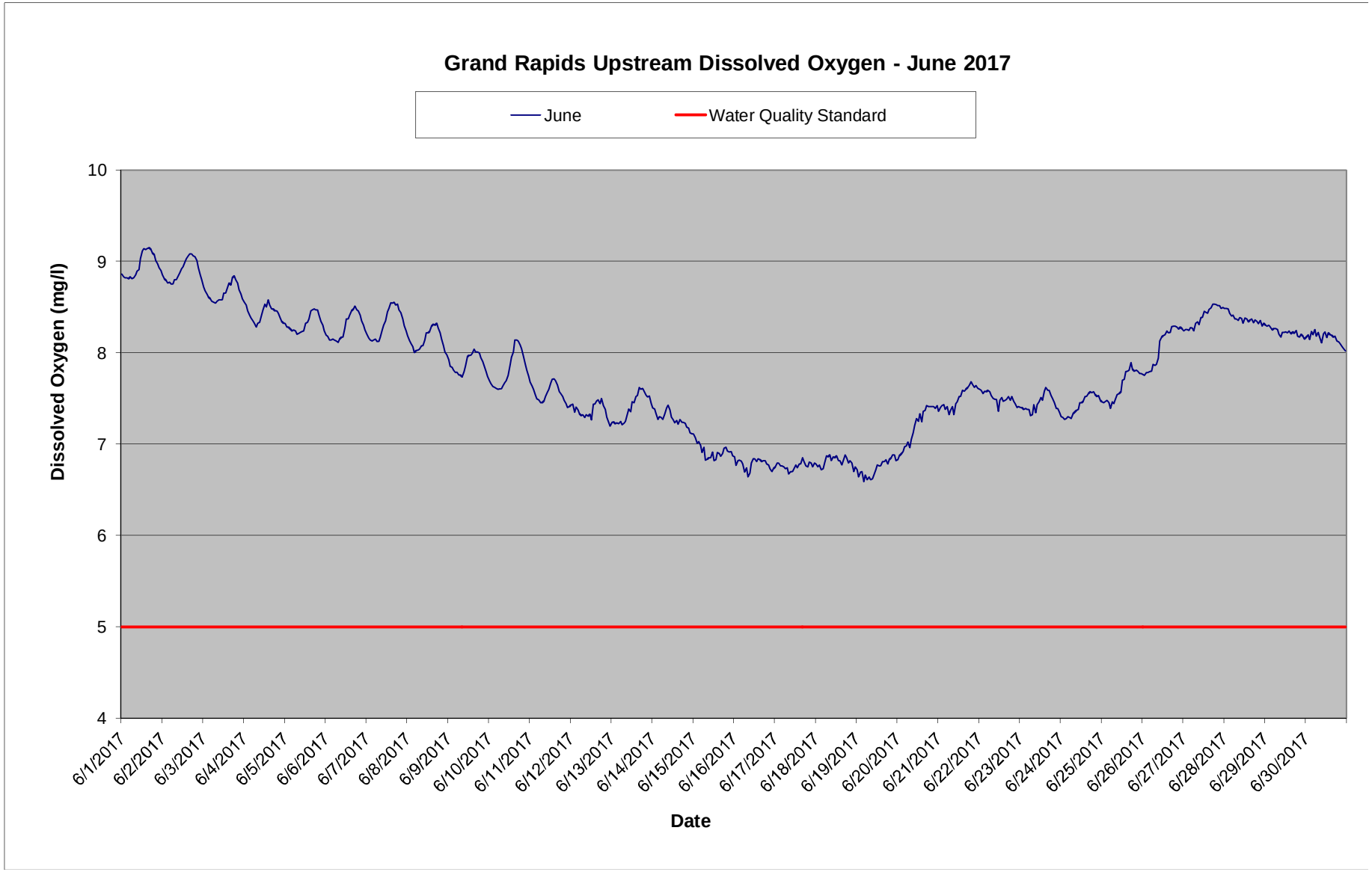
Wisconsin Public Service Corporation

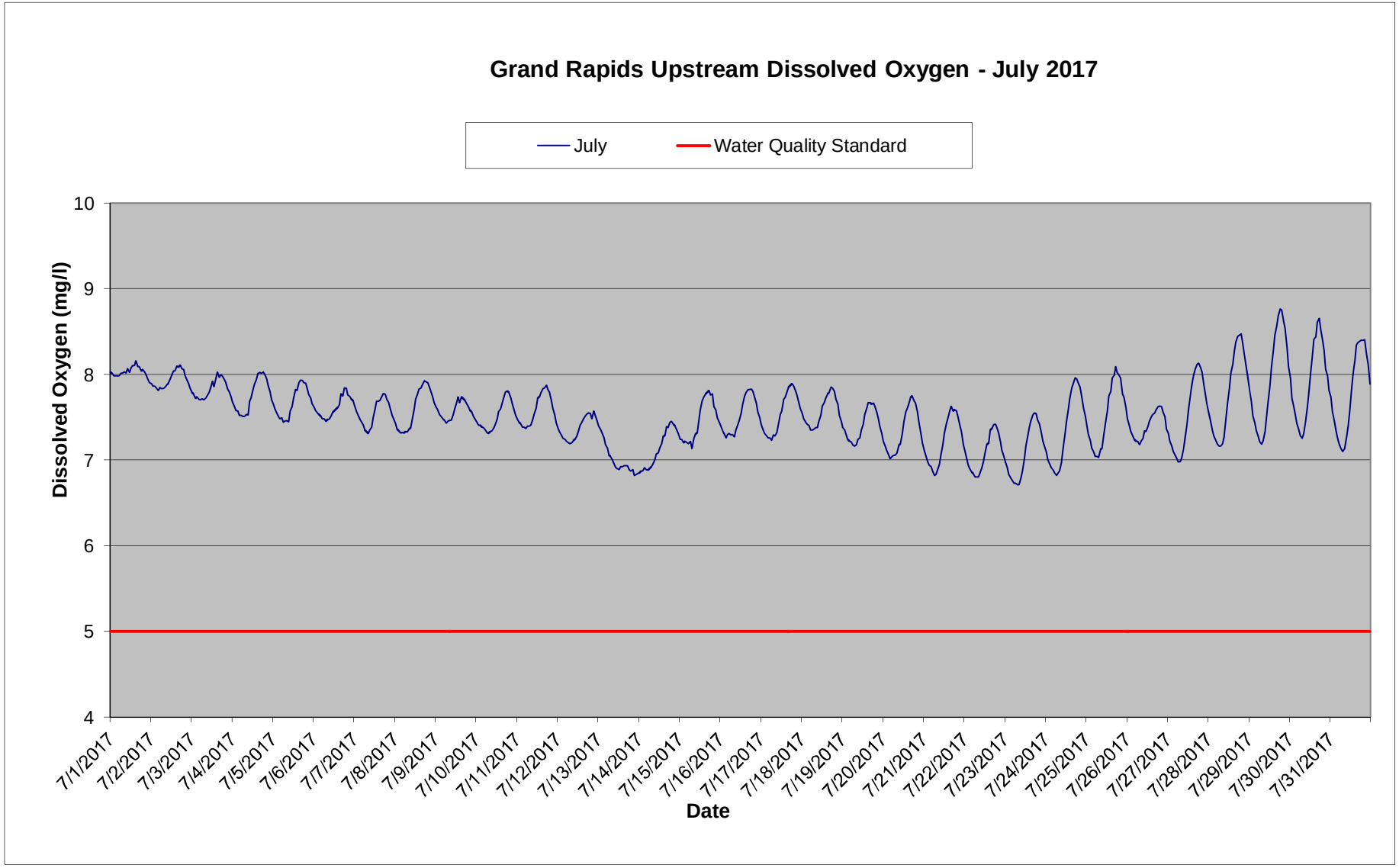
Grand Rapids Hydroelectric Project

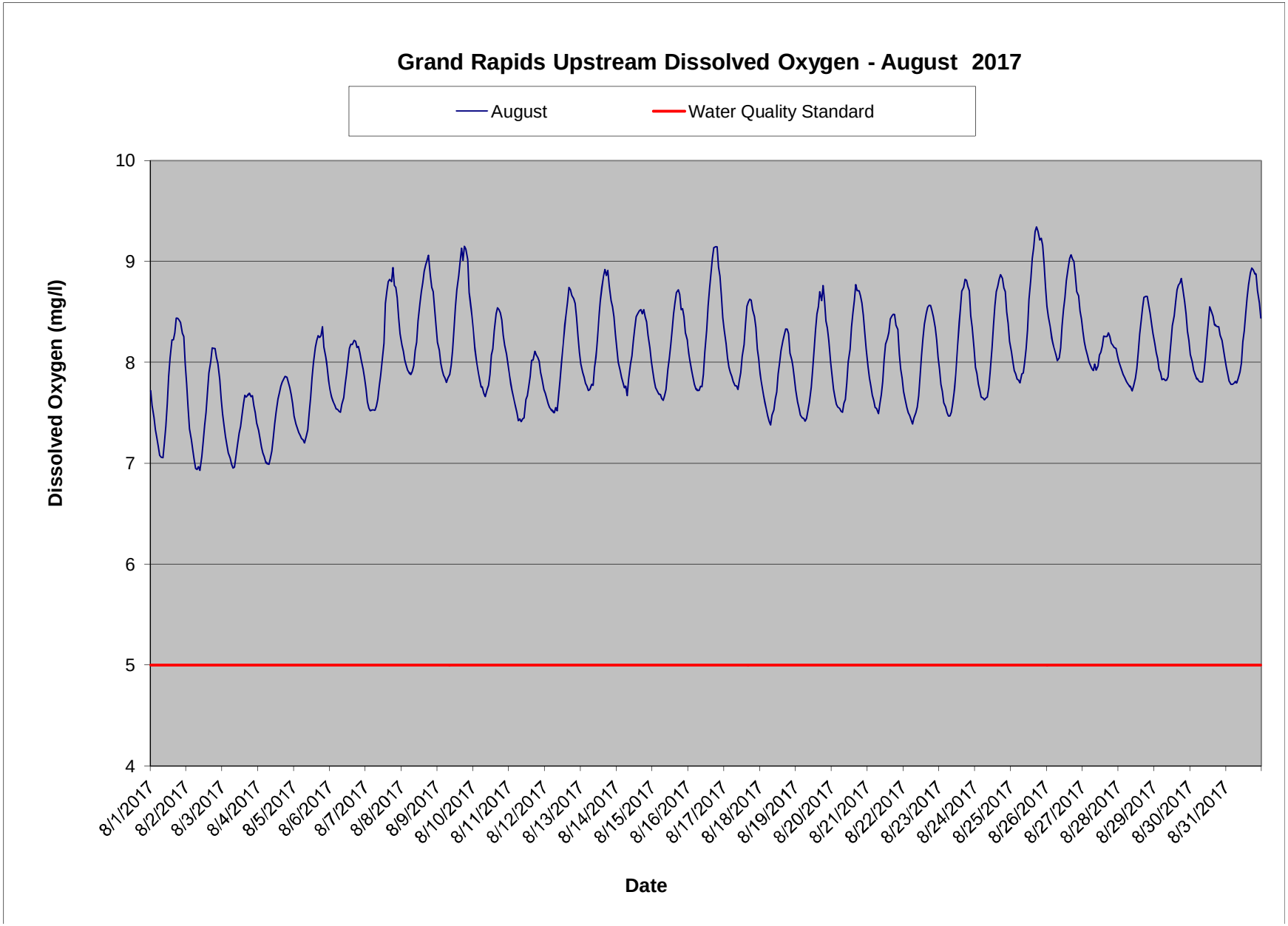
FERC Project No. 2433

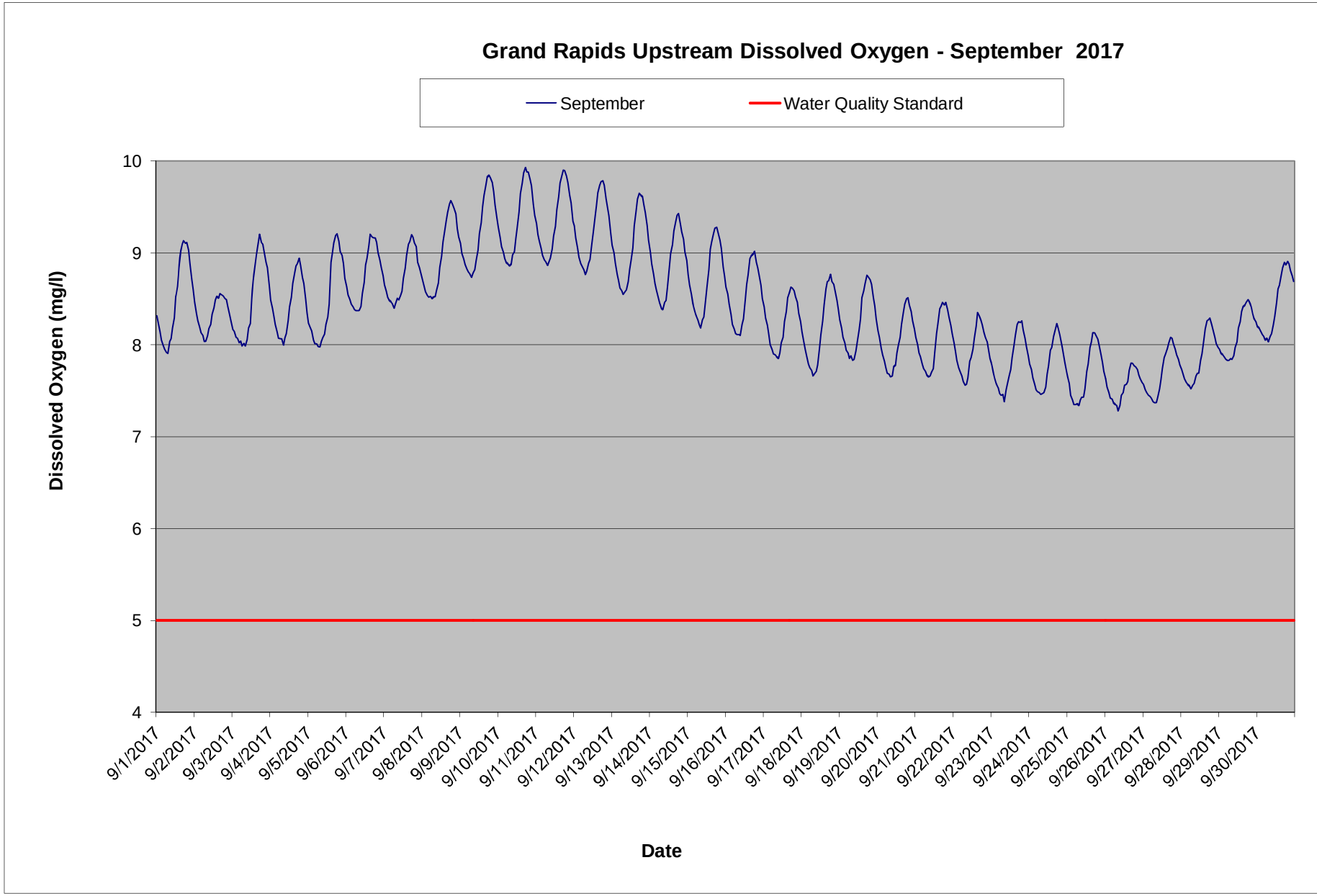
2017 Water Quality Monitoring Data

Upstream Monitoring Data









Grand Rapids Upstream Dissolved Oxygen Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	8.9	8.9	8.7	8.6	8.3	8.2	8.2	8.2	7.9	7.7	7.7	7.4	7.2	7.4	7.1	6.9
10000	8.8	8.8	8.7	8.5	8.3	8.2	8.2	8.1	7.9	7.7	7.6	7.4	7.2	7.4	7.1	6.8
20000	8.8	8.8	8.6	8.5	8.3	8.1	8.1	8.1	7.8	7.6	7.6	7.3	7.2	7.3	7.0	6.8
30000	8.8	8.8	8.6	8.4	8.3	8.1	8.1	8.1	7.8	7.6	7.5	7.4	7.2	7.3	7.0	6.8
40000	8.8	8.8	8.6	8.4	8.2	8.2	8.1	8.0	7.8	7.6	7.5	7.4	7.2	7.3	7.0	6.8
50000	8.8	8.8	8.6	8.4	8.3	8.1	8.2	8.0	7.8	7.6	7.5	7.3	7.3	7.3	6.9	6.8
60000	8.8	8.8	8.6	8.3	8.2	8.1	8.1	8.0	7.8	7.6	7.5	7.3	7.2	7.3	7.0	6.7
70000	8.8	8.8	8.5	8.3	8.2	8.1	8.1	8.0	7.8	7.6	7.5	7.3	7.2	7.3	6.8	6.7
80000	8.9	8.8	8.6	8.3	8.2	8.2	8.2	8.1	7.7	7.6	7.5	7.3	7.2	7.4	6.8	6.6
90000	8.9	8.8	8.6	8.3	8.2	8.2	8.2	8.1	7.8	7.7	7.5	7.3	7.3	7.4	6.9	6.7
100000	8.9	8.9	8.6	8.4	8.2	8.2	8.3	8.1	7.9	7.7	7.6	7.3	7.4	7.4	6.9	6.8
110000	9.0	8.9	8.6	8.5	8.2	8.3	8.3	8.2	8.0	7.8	7.6	7.3	7.4	7.3	6.9	6.8
120000	9.1	8.9	8.7	8.5	8.3	8.4	8.4	8.2	8.0	7.9	7.7	7.3	7.5	7.3	6.8	6.8
130000	9.1	9.0	8.7	8.5	8.3	8.4	8.5	8.2	8.0	7.9	7.7	7.4	7.5	7.2	6.8	6.8
140000	9.1	9.0	8.7	8.6	8.4	8.4	8.5	8.3	8.0	8.0	7.7	7.4	7.5	7.3	6.9	6.8
150000	9.1	9.1	8.8	8.5	8.5	8.5	8.5	8.3	8.0	8.1	7.7	7.5	7.5	7.2	6.9	6.8
160000	9.2	9.1	8.7	8.5	8.5	8.5	8.6	8.3	8.0	8.1	7.6	7.5	7.6	7.3	6.9	6.8
170000	9.1	9.1	8.8	8.5	8.5	8.5	8.5	8.3	8.0	8.1	7.6	7.4	7.6	7.2	6.9	6.8
180000	9.1	9.1	8.8	8.5	8.5	8.5	8.5	8.3	8.0	8.1	7.6	7.5	7.6	7.2	7.0	6.8
190000	9.1	9.1	8.8	8.5	8.5	8.5	8.5	8.2	7.9	8.0	7.5	7.4	7.6	7.2	7.0	6.8
200000	9.0	9.0	8.8	8.4	8.4	8.4	8.4	8.1	7.9	8.0	7.5	7.4	7.5	7.2	6.9	6.8
210000	9.0	8.9	8.7	8.4	8.3	8.4	8.4	8.1	7.9	7.9	7.4	7.3	7.5	7.2	6.9	6.7
220000	8.9	8.9	8.6	8.3	8.3	8.3	8.3	8.0	7.8	7.8	7.4	7.2	7.5	7.1	6.9	6.7
230000	8.9	8.8	8.6	8.3	8.2	8.3	8.2	8.0	7.7	7.7	7.4	7.2	7.4	7.1	6.9	6.7
Daily Max	9.2	9.1	8.8	8.6	8.5	8.5	8.6	8.3	8.0	8.1	7.7	7.5	7.6	7.4	7.1	6.9
Daily Min	8.8	8.8	8.5	8.3	8.2	8.1	8.1	8.0	7.7	7.6	7.4	7.2	7.2	7.1	6.8	6.6
Average	9.0	8.9	8.7	8.4	8.3	8.3	8.3	8.1	7.9	7.8	7.6	7.4	7.4	7.3	6.9	6.8

License Minimum DO: 5.0 mg/l

Grand Rapids Upstream Dissolved Oxygen Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	6.8	6.8	6.7	6.8	7.4	7.6	7.4	7.3	7.5	7.8	8.2	8.5	8.3	8.2
10000	6.8	6.8	6.6	6.9	7.4	7.6	7.4	7.3	7.5	7.8	8.3	8.5	8.3	8.2
20000	6.8	6.8	6.7	6.9	7.4	7.6	7.4	7.3	7.5	7.8	8.3	8.5	8.3	8.1
30000	6.8	6.7	6.7	6.9	7.4	7.6	7.4	7.3	7.5	7.8	8.2	8.4	8.3	8.2
40000	6.8	6.7	6.6	7.0	7.4	7.6	7.4	7.3	7.5	7.8	8.3	8.4	8.2	8.2
50000	6.8	6.8	6.7	7.0	7.4	7.6	7.4	7.3	7.4	7.8	8.3	8.4	8.3	8.3
60000	6.7	6.9	6.6	7.0	7.3	7.6	7.3	7.3	7.5	7.9	8.2	8.4	8.3	8.2
70000	6.7	6.9	6.6	7.0	7.4	7.5	7.3	7.3	7.4	7.9	8.3	8.4	8.3	8.2
80000	6.7	6.9	6.6	7.1	7.4	7.5	7.4	7.4	7.5	7.9	8.3	8.4	8.2	8.2
90000	6.7	6.8	6.6	7.1	7.3	7.5	7.3	7.4	7.5	7.9	8.3	8.4	8.2	8.1
100000	6.7	6.9	6.7	7.2	7.4	7.5	7.4	7.4	7.6	8.1	8.4	8.4	8.2	8.2
110000	6.7	6.9	6.7	7.3	7.5	7.4	7.5	7.5	7.6	8.2	8.4	8.3	8.2	8.2
120000	6.8	6.9	6.8	7.3	7.5	7.5	7.5	7.5	7.7	8.2	8.5	8.4	8.2	8.2
130000	6.7	6.8	6.8	7.3	7.5	7.5	7.5	7.5	7.7	8.2	8.4	8.4	8.2	8.2
140000	6.8	6.8	6.8	7.2	7.6	7.5	7.6	7.5	7.8	8.2	8.4	8.3	8.2	8.2
150000	6.8	6.8	6.8	7.4	7.6	7.5	7.6	7.5	7.8	8.2	8.5	8.4	8.2	8.2
160000	6.9	6.8	6.8	7.4	7.6	7.5	7.6	7.6	7.8	8.2	8.5	8.4	8.2	8.2
170000	6.8	6.9	6.8	7.4	7.6	7.5	7.6	7.6	7.9	8.3	8.5	8.3	8.2	8.2
180000	6.8	6.9	6.8	7.4	7.6	7.5	7.5	7.6	7.8	8.3	8.5	8.4	8.2	8.1
190000	6.8	6.8	6.8	7.4	7.7	7.5	7.5	7.6	7.8	8.3	8.5	8.3	8.2	8.1
200000	6.8	6.8	6.9	7.4	7.7	7.5	7.5	7.5	7.8	8.3	8.5	8.3	8.2	8.1
210000	6.8	6.8	6.9	7.4	7.6	7.4	7.4	7.5	7.8	8.3	8.5	8.4	8.2	8.1
220000	6.8	6.7	6.9	7.4	7.6	7.4	7.4	7.5	7.8	8.3	8.5	8.3	8.2	8.0
230000	6.8	6.8	6.8	7.4	7.6	7.4	7.3	7.5	7.8	8.3	8.5	8.3	8.1	8.0
Daily Max	6.9	6.9	6.9	7.4	7.7	7.6	7.6	7.6	7.9	8.3	8.5	8.5	8.3	8.3
Daily Min	6.7	6.7	6.6	6.8	7.3	7.4	7.3	7.3	7.4	7.8	8.2	8.3	8.1	8.0
Average	6.8	6.8	6.7	7.2	7.5	7.5	7.4	7.4	7.6	8.1	8.4	8.4	8.2	8.2

Grand Rapids Upstream Dissolved Oxygen Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	8.0	7.9	7.8	7.7	7.6	7.6	7.6	7.4	7.6	7.4	7.5	7.4	7.4	6.9	7.2	7.4
10000	8.0	7.9	7.8	7.6	7.6	7.6	7.6	7.4	7.6	7.4	7.4	7.3	7.4	6.9	7.2	7.3
20000	8.0	7.9	7.7	7.6	7.5	7.5	7.5	7.3	7.5	7.4	7.4	7.3	7.3	6.9	7.2	7.3
30000	8.0	7.8	7.7	7.6	7.5	7.5	7.5	7.3	7.5	7.4	7.4	7.2	7.3	6.9	7.2	7.3
40000	8.0	7.8	7.7	7.5	7.5	7.5	7.4	7.3	7.5	7.4	7.4	7.2	7.2	6.9	7.2	7.3
50000	8.0	7.8	7.7	7.5	7.5	7.5	7.4	7.3	7.5	7.3	7.4	7.2	7.1	6.9	7.2	7.3
60000	8.0	7.8	7.7	7.5	7.4	7.5	7.3	7.3	7.4	7.3	7.4	7.2	7.1	6.9	7.2	7.3
70000	8.0	7.8	7.7	7.5	7.5	7.5	7.3	7.3	7.5	7.3	7.4	7.2	7.0	6.9	7.1	7.3
80000	8.0	7.8	7.7	7.5	7.5	7.5	7.3	7.4	7.5	7.3	7.4	7.2	7.0	7.0	7.3	7.3
90000	8.0	7.9	7.8	7.5	7.4	7.5	7.3	7.4	7.5	7.3	7.5	7.2	7.0	7.0	7.3	7.4
100000	8.1	7.9	7.8	7.7	7.6	7.5	7.4	7.5	7.5	7.4	7.5	7.2	6.9	7.1	7.3	7.4
110000	8.0	7.9	7.8	7.7	7.6	7.6	7.5	7.6	7.6	7.4	7.6	7.3	6.9	7.1	7.5	7.5
120000	8.1	8.0	7.9	7.8	7.7	7.6	7.6	7.7	7.7	7.5	7.7	7.3	6.9	7.1	7.6	7.6
130000	8.1	8.0	7.9	7.9	7.8	7.6	7.7	7.8	7.7	7.6	7.7	7.4	6.9	7.2	7.7	7.7
140000	8.1	8.0	8.0	7.9	7.8	7.6	7.7	7.8	7.7	7.6	7.8	7.4	6.9	7.3	7.7	7.8
150000	8.2	8.1	8.0	8.0	7.9	7.6	7.7	7.8	7.7	7.7	7.8	7.5	6.9	7.3	7.8	7.8
160000	8.1	8.1	8.0	8.0	7.9	7.8	7.7	7.9	7.7	7.7	7.8	7.5	6.9	7.4	7.8	7.8
170000	8.1	8.1	8.0	8.0	7.9	7.7	7.8	7.9	7.7	7.8	7.9	7.5	6.9	7.4	7.8	7.8
180000	8.0	8.1	8.0	8.0	7.9	7.8	7.8	7.9	7.7	7.8	7.8	7.5	6.9	7.4	7.8	7.8
190000	8.1	8.1	7.9	8.0	7.9	7.8	7.7	7.9	7.6	7.8	7.8	7.5	6.9	7.5	7.8	7.8
200000	8.0	8.0	7.9	7.9	7.8	7.8	7.7	7.9	7.6	7.7	7.7	7.5	6.9	7.4	7.6	7.7
210000	8.0	7.9	7.8	7.9	7.8	7.7	7.6	7.8	7.6	7.7	7.6	7.6	6.8	7.4	7.6	7.7
220000	7.9	7.9	7.8	7.8	7.7	7.7	7.5	7.7	7.5	7.6	7.5	7.5	6.8	7.4	7.5	7.6
230000	7.9	7.8	7.7	7.7	7.7	7.7	7.5	7.7	7.5	7.5	7.4	7.5	6.8	7.3	7.4	7.5
Daily Max	8.2	8.1	8.0	8.0	7.9	7.8	7.8	7.9	7.7	7.8	7.9	7.6	7.4	7.5	7.8	7.8
Daily Min	7.9	7.8	7.7	7.5	7.4	7.5	7.3	7.3	7.4	7.3	7.4	7.2	6.8	6.9	7.1	7.3
Average	8.0	7.9	7.8	7.8	7.7	7.6	7.5	7.6	7.6	7.5	7.6	7.4	7.0	7.1	7.5	7.5

License Minimum Dissolved Oxygen: 5.0 mg/l

Grand Rapids Upstream Dissolved Oxygen Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	7.4	7.5	7.4	7.2	7.1	7.1	7.0	7.1	7.4	7.5	7.3	7.5	7.8	8.0	7.7
10000	7.4	7.5	7.4	7.2	7.1	7.0	6.9	7.0	7.3	7.4	7.2	7.5	7.7	7.7	7.6
20000	7.3	7.4	7.3	7.1	7.0	6.9	6.8	7.0	7.2	7.3	7.2	7.4	7.5	7.6	7.4
30000	7.3	7.4	7.2	7.1	6.9	6.9	6.8	6.9	7.1	7.3	7.1	7.3	7.4	7.5	7.4
40000	7.3	7.4	7.2	7.0	6.9	6.9	6.8	6.9	7.1	7.2	7.1	7.2	7.3	7.4	7.2
50000	7.3	7.4	7.2	7.0	6.9	6.8	6.7	6.9	7.0	7.2	7.0	7.2	7.3	7.4	7.2
60000	7.2	7.4	7.2	7.1	6.8	6.8	6.7	6.8	7.0	7.2	7.0	7.2	7.2	7.3	7.1
70000	7.3	7.4	7.2	7.1	6.8	6.8	6.7	6.9	7.0	7.2	7.0	7.2	7.2	7.3	7.1
80000	7.3	7.4	7.2	7.1	6.9	6.8	6.7	6.9	7.1	7.2	7.0	7.2	7.2	7.3	7.1
90000	7.3	7.4	7.2	7.2	7.0	6.9	6.8	7.0	7.1	7.3	7.1	7.3	7.3	7.5	7.2
100000	7.4	7.5	7.3	7.2	7.1	6.9	6.9	7.1	7.3	7.3	7.3	7.5	7.5	7.6	7.4
110000	7.5	7.5	7.4	7.3	7.2	7.0	7.0	7.3	7.4	7.3	7.4	7.7	7.7	7.8	7.6
120000	7.6	7.6	7.4	7.4	7.3	7.1	7.2	7.4	7.6	7.4	7.6	7.8	7.9	8.0	7.8
130000	7.7	7.7	7.5	7.6	7.4	7.2	7.3	7.6	7.8	7.5	7.8	8.0	8.1	8.2	8.0
140000	7.7	7.7	7.6	7.6	7.5	7.2	7.4	7.7	7.8	7.5	7.9	8.1	8.3	8.4	8.2
150000	7.8	7.8	7.7	7.7	7.6	7.4	7.5	7.8	8.0	7.5	8.0	8.3	8.5	8.4	8.3
160000	7.9	7.8	7.7	7.7	7.6	7.4	7.5	7.9	8.0	7.6	8.1	8.4	8.6	8.6	8.4
170000	7.9	7.9	7.7	7.8	7.6	7.4	7.6	8.0	8.1	7.6	8.1	8.4	8.7	8.7	8.4
180000	7.9	7.8	7.7	7.7	7.6	7.4	7.5	8.0	8.0	7.6	8.1	8.5	8.8	8.5	8.4
190000	7.9	7.8	7.6	7.7	7.6	7.4	7.5	7.9	8.0	7.6	8.1	8.5	8.8	8.4	8.4
200000	7.8	7.7	7.6	7.6	7.5	7.3	7.4	7.9	8.0	7.6	8.0	8.4	8.6	8.3	8.4
210000	7.8	7.7	7.5	7.4	7.4	7.2	7.3	7.7	7.8	7.6	7.9	8.2	8.5	8.1	8.2
220000	7.7	7.5	7.4	7.3	7.3	7.1	7.2	7.6	7.7	7.5	7.8	8.1	8.3	8.0	8.1
230000	7.6	7.5	7.3	7.2	7.2	7.0	7.2	7.5	7.6	7.4	7.6	8.0	8.1	7.8	7.9
Daily Max	7.9	7.9	7.7	7.8	7.6	7.4	7.6	8.0	8.1	7.6	8.1	8.5	8.8	8.7	8.4
Daily Min	7.2	7.4	7.2	7.0	6.8	6.8	6.7	6.8	7.0	7.2	7.0	7.2	7.2	7.3	7.1
Average	7.5	7.6	7.4	7.3	7.2	7.1	7.1	7.4	7.5	7.4	7.5	7.8	7.9	7.9	7.8

Grand Rapids Upstream Dissolved Oxygen Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	7.7	7.8	7.5	7.3	7.5	7.7	7.7	8.2	8.2	8.3	7.9	7.7	8.0	8.1	7.9	8.1
10000	7.6	7.6	7.4	7.2	7.4	7.7	7.6	8.1	8.1	8.1	7.8	7.6	7.9	8.0	7.8	8.0
20000	7.5	7.3	7.3	7.2	7.3	7.6	7.5	8.0	8.0	8.0	7.7	7.6	7.9	7.9	7.8	7.9
30000	7.3	7.2	7.2	7.1	7.3	7.6	7.5	8.0	7.9	7.9	7.7	7.6	7.8	7.9	7.7	7.9
40000	7.2	7.1	7.1	7.1	7.3	7.5	7.5	7.9	7.9	7.8	7.6	7.5	7.8	7.8	7.7	7.8
50000	7.2	7.0	7.1	7.0	7.2	7.5	7.5	7.9	7.8	7.8	7.5	7.5	7.7	7.8	7.7	7.7
60000	7.1	6.9	7.0	7.0	7.2	7.5	7.5	7.9	7.8	7.8	7.4	7.5	7.7	7.8	7.6	7.7
70000	7.1	6.9	6.9	7.0	7.2	7.5	7.6	7.9	7.8	7.7	7.4	7.6	7.8	7.7	7.6	7.7
80000	7.1	7.0	7.0	7.0	7.3	7.6	7.6	8.0	7.9	7.7	7.4	7.5	7.8	7.8	7.7	7.8
90000	7.2	6.9	7.1	7.1	7.3	7.7	7.8	8.1	8.0	7.7	7.4	7.7	8.0	8.0	7.7	7.8
100000	7.4	7.1	7.2	7.2	7.5	7.8	7.9	8.2	8.1	7.8	7.5	7.8	8.1	8.1	7.9	7.9
110000	7.6	7.2	7.3	7.4	7.6	7.9	8.1	8.4	8.3	7.9	7.6	8.0	8.2	8.2	8.0	8.1
120000	7.9	7.4	7.4	7.5	7.8	8.0	8.2	8.6	8.6	8.1	7.7	8.2	8.4	8.3	8.2	8.3
130000	8.0	7.5	7.5	7.6	8.0	8.1	8.6	8.7	8.7	8.1	7.8	8.4	8.6	8.5	8.3	8.6
140000	8.2	7.7	7.6	7.7	8.1	8.2	8.7	8.8	8.9	8.3	7.9	8.5	8.8	8.5	8.5	8.7
150000	8.2	7.9	7.7	7.8	8.2	8.2	8.8	8.9	9.0	8.5	8.0	8.6	8.9	8.5	8.6	8.9
160000	8.3	8.0	7.7	7.8	8.3	8.2	8.8	9.0	9.1	8.5	8.0	8.7	8.9	8.5	8.7	9.0
170000	8.4	8.1	7.7	7.8	8.2	8.2	8.8	9.0	9.0	8.5	8.1	8.7	8.9	8.5	8.7	9.1
180000	8.4	8.1	7.7	7.9	8.3	8.1	8.9	9.1	9.2	8.5	8.1	8.7	8.9	8.5	8.7	9.1
190000	8.4	8.1	7.7	7.9	8.4	8.2	8.8	8.9	9.1	8.4	8.1	8.6	8.8	8.5	8.5	9.1
200000	8.4	8.0	7.7	7.8	8.2	8.1	8.7	8.7	9.0	8.3	8.0	8.6	8.6	8.4	8.5	8.9
210000	8.3	8.0	7.6	7.7	8.1	8.0	8.6	8.7	8.7	8.2	7.9	8.4	8.6	8.3	8.5	8.9
220000	8.3	7.8	7.5	7.7	7.9	7.9	8.4	8.5	8.6	8.1	7.8	8.3	8.5	8.1	8.3	8.7
230000	8.0	7.6	7.4	7.6	7.8	7.8	8.3	8.4	8.5	8.0	7.7	8.1	8.3	8.0	8.2	8.4
Daily Max	8.4	8.1	7.7	7.9	8.4	8.2	8.9	9.1	9.2	8.5	8.1	8.7	8.9	8.5	8.7	9.1
Daily Min	7.1	6.9	6.9	7.0	7.2	7.5	7.5	7.9	7.8	7.7	7.4	7.5	7.7	7.7	7.6	7.7
Average	7.8	7.5	7.4	7.4	7.7	7.9	8.1	8.4	8.4	8.1	7.7	8.1	8.3	8.1	8.1	8.3

License Minimum Dissolved Oxygen: 5.0 mg/l

Grand Rapids Upstream Dissolved Oxygen Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	8.3	7.9	7.7	7.9	8.0	7.7	7.9	7.9	8.1	8.6	8.3	8.0	8.2	8.1	8.0
10000	8.2	7.8	7.6	7.7	7.8	7.6	7.8	7.9	8.0	8.5	8.2	8.0	8.1	8.0	7.9
20000	8.0	7.7	7.5	7.7	7.8	7.6	7.7	7.8	7.9	8.4	8.1	7.9	8.0	7.9	7.8
30000	8.0	7.6	7.5	7.6	7.7	7.5	7.6	7.7	7.9	8.2	8.1	7.9	7.9	7.9	7.8
40000	7.9	7.5	7.4	7.6	7.6	7.5	7.6	7.7	7.8	8.2	8.0	7.8	7.9	7.8	7.8
50000	7.9	7.5	7.4	7.5	7.6	7.4	7.5	7.6	7.8	8.1	8.0	7.8	7.8	7.8	7.8
60000	7.8	7.4	7.4	7.5	7.5	7.4	7.5	7.6	7.8	8.1	7.9	7.8	7.8	7.8	7.8
70000	7.8	7.4	7.4	7.5	7.5	7.4	7.5	7.6	7.9	8.0	7.9	7.8	7.8	7.8	7.8
80000	7.8	7.5	7.5	7.6	7.6	7.5	7.5	7.7	7.9	8.0	8.0	7.8	7.8	7.8	7.8
90000	7.7	7.5	7.6	7.6	7.7	7.6	7.6	7.7	8.0	8.1	7.9	7.7	7.9	7.9	7.9
100000	7.8	7.6	7.8	7.8	7.8	7.7	7.7	7.9	8.1	8.4	8.0	7.8	8.0	8.1	8.0
110000	7.9	7.7	7.9	8.0	8.0	7.9	7.9	8.1	8.3	8.5	8.1	7.8	8.2	8.2	8.2
120000	8.1	7.9	8.1	8.1	8.2	8.1	8.2	8.4	8.6	8.6	8.1	7.9	8.4	8.4	8.3
130000	8.2	8.0	8.3	8.3	8.2	8.2	8.3	8.6	8.8	8.8	8.2	8.1	8.5	8.5	8.5
140000	8.4	8.1	8.5	8.5	8.3	8.4	8.5	8.7	9.0	8.9	8.3	8.3	8.6	8.5	8.6
150000	8.6	8.2	8.6	8.6	8.4	8.5	8.7	8.8	9.1	9.0	8.3	8.4	8.7	8.5	8.8
160000	8.6	8.3	8.7	8.8	8.5	8.5	8.7	8.8	9.3	9.1	8.3	8.5	8.8	8.4	8.9
170000	8.6	8.3	8.6	8.7	8.5	8.6	8.8	8.9	9.3	9.0	8.3	8.6	8.8	8.4	8.9
180000	8.6	8.3	8.8	8.7	8.5	8.6	8.8	8.8	9.3	9.0	8.3	8.7	8.8	8.4	8.9
190000	8.5	8.3	8.6	8.7	8.4	8.5	8.8	8.7	9.2	8.9	8.2	8.7	8.7	8.4	8.9
200000	8.5	8.1	8.4	8.6	8.3	8.5	8.7	8.7	9.2	8.7	8.2	8.6	8.6	8.3	8.9
210000	8.3	8.0	8.3	8.5	8.1	8.3	8.5	8.5	9.2	8.7	8.1	8.5	8.5	8.2	8.7
220000	8.1	7.9	8.2	8.3	7.9	8.2	8.3	8.4	9.0	8.5	8.1	8.4	8.3	8.1	8.6
230000	8.0	7.8	8.0	8.1	7.8	8.1	8.1	8.2	8.7	8.4	8.1	8.3	8.2	8.0	8.4
Daily Max	8.6	8.3	8.8	8.8	8.5	8.6	8.8	8.9	9.3	9.1	8.3	8.7	8.8	8.5	8.9
Daily Min	7.7	7.4	7.4	7.5	7.5	7.4	7.5	7.6	7.8	8.0	7.9	7.7	7.8	7.8	7.8
Average	8.1	7.8	8.0	8.1	8.0	8.0	8.1	8.2	8.5	8.5	8.1	8.1	8.3	8.1	8.3

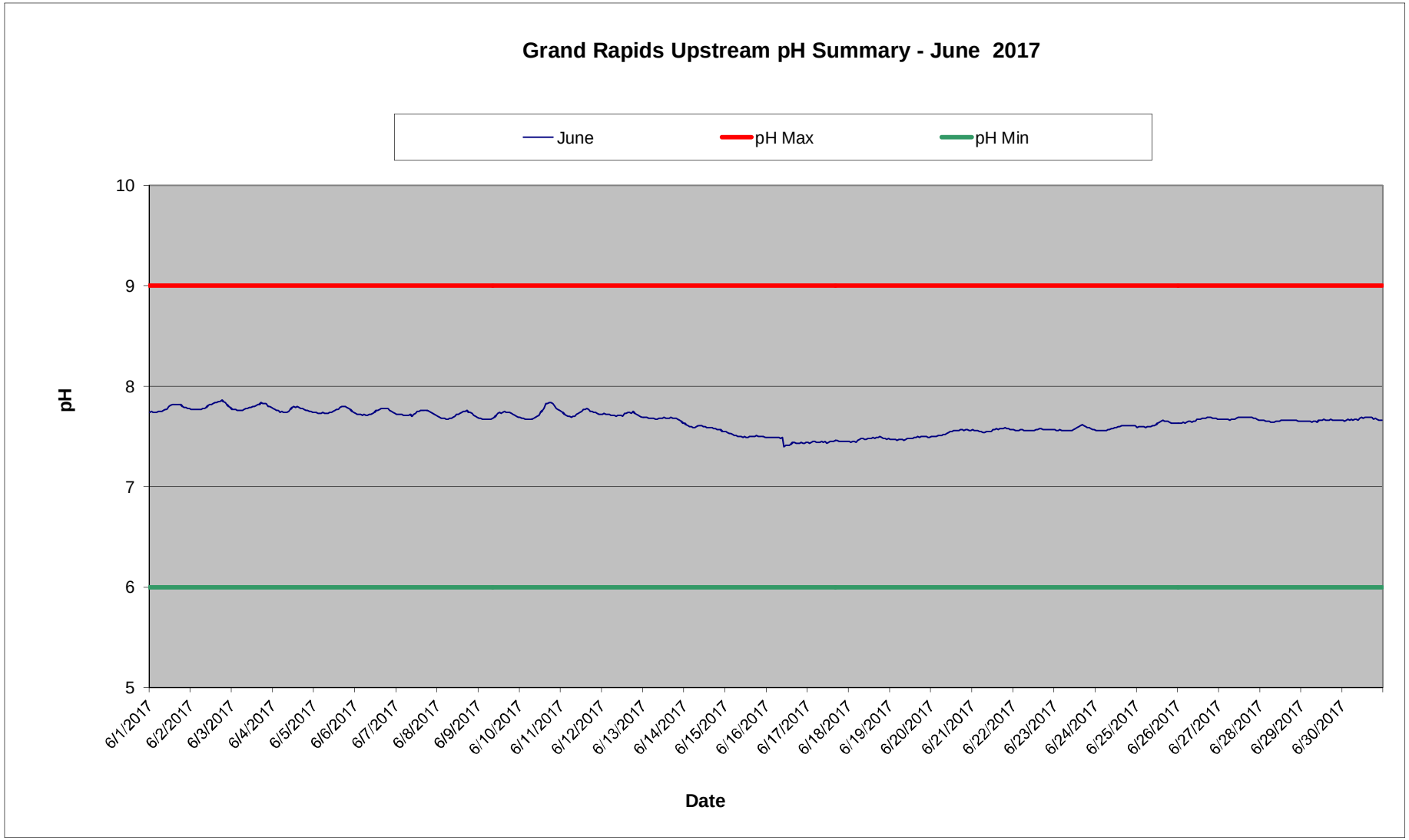
Grand Rapids Upstream Dissolved Oxygen Summary - September 2017

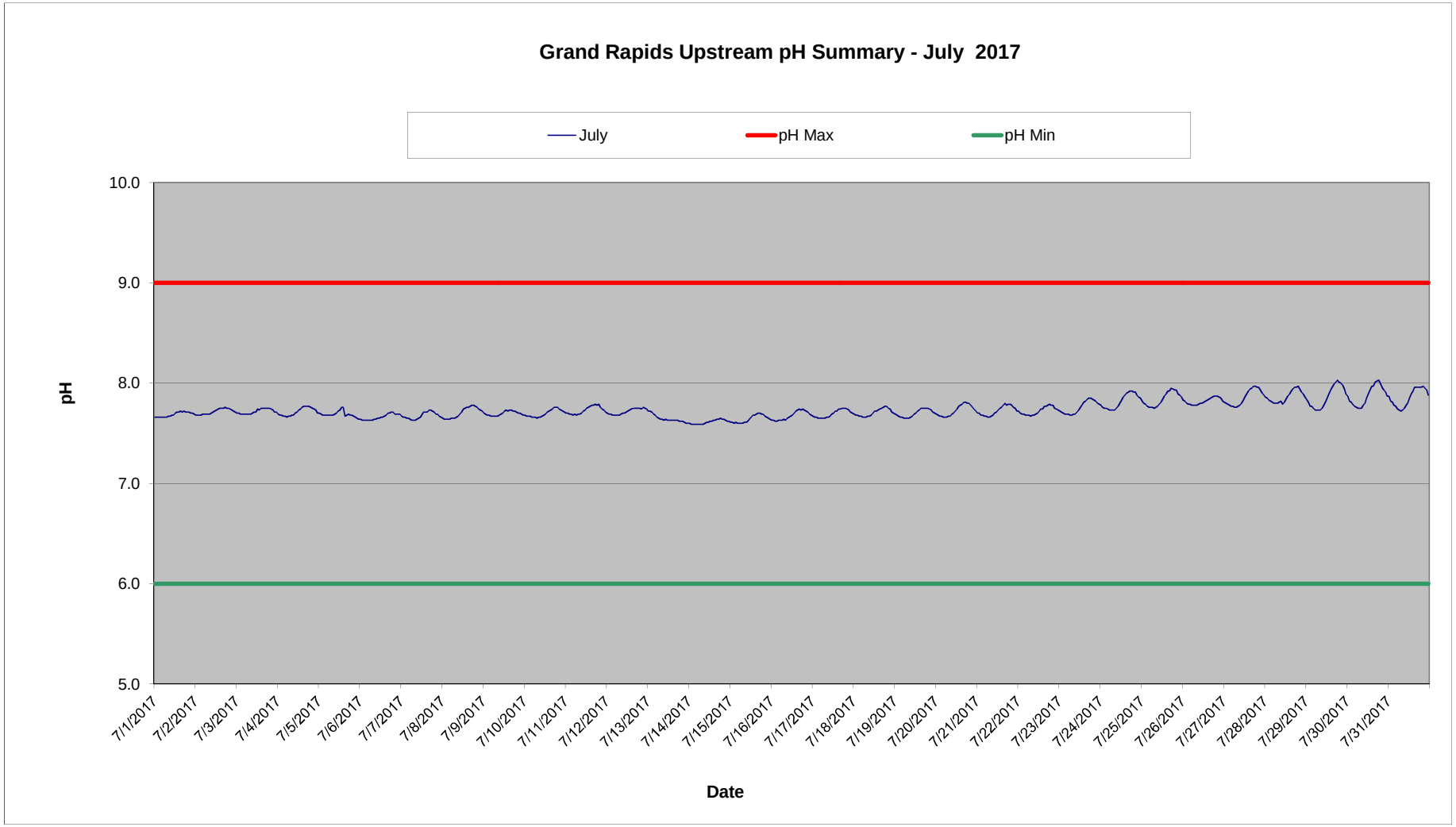
Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	8.3	8.5	8.2	8.5	8.2	8.6	8.7	8.7	9.1	9.3	9.3	9.3	9.1	9.0	8.8	8.6
10000	8.2	8.3	8.1	8.4	8.2	8.5	8.6	8.6	9.0	9.2	9.2	9.2	9.0	8.9	8.7	8.6
20000	8.1	8.3	8.1	8.3	8.2	8.5	8.5	8.6	8.9	9.1	9.1	9.1	8.9	8.8	8.6	8.4
30000	8.1	8.2	8.1	8.2	8.1	8.4	8.5	8.5	8.9	9.0	9.0	9.0	8.8	8.7	8.5	8.3
40000	8.0	8.1	8.0	8.1	8.0	8.4	8.5	8.5	8.8	8.9	9.0	8.9	8.7	8.6	8.4	8.2
50000	7.9	8.1	8.0	8.1	8.0	8.4	8.4	8.5	8.8	8.9	8.9	8.9	8.6	8.5	8.3	8.2
60000	7.9	8.0	8.0	8.1	8.0	8.4	8.4	8.5	8.8	8.9	8.9	8.8	8.6	8.5	8.3	8.1
70000	7.9	8.0	8.0	8.1	8.0	8.4	8.4	8.5	8.7	8.9	8.9	8.8	8.5	8.4	8.2	8.1
80000	8.0	8.1	8.0	8.0	8.0	8.4	8.5	8.5	8.8	8.9	8.9	8.8	8.6	8.4	8.2	8.1
90000	8.1	8.2	8.1	8.1	8.1	8.4	8.5	8.6	8.8	9.0	8.9	8.9	8.6	8.5	8.3	8.1
100000	8.2	8.2	8.2	8.1	8.1	8.6	8.5	8.7	8.9	9.0	9.0	8.9	8.7	8.5	8.3	8.2
110000	8.3	8.3	8.2	8.3	8.2	8.7	8.6	8.8	9.0	9.2	9.2	9.1	8.8	8.6	8.5	8.3
120000	8.5	8.4	8.5	8.4	8.3	8.9	8.7	9.0	9.2	9.3	9.3	9.2	8.9	8.8	8.6	8.5
130000	8.6	8.5	8.7	8.5	8.4	8.9	8.8	9.1	9.3	9.4	9.5	9.4	9.1	9.0	8.8	8.7
140000	8.8	8.5	8.9	8.7	8.9	9.1	9.0	9.2	9.5	9.6	9.6	9.5	9.3	9.1	9.0	8.8
150000	9.0	8.5	9.0	8.8	9.0	9.2	9.1	9.3	9.6	9.8	9.8	9.7	9.5	9.2	9.1	8.9
160000	9.1	8.6	9.1	8.9	9.1	9.2	9.1	9.4	9.7	9.9	9.8	9.7	9.6	9.3	9.2	9.0
170000	9.1	8.5	9.2	8.9	9.2	9.2	9.2	9.5	9.8	9.9	9.9	9.8	9.7	9.4	9.3	9.0
180000	9.1	8.5	9.1	8.9	9.2	9.2	9.2	9.6	9.8	9.9	9.9	9.8	9.6	9.4	9.3	9.0
190000	9.1	8.5	9.1	8.9	9.1	9.1	9.1	9.5	9.8	9.9	9.8	9.7	9.6	9.3	9.2	8.9
200000	9.0	8.5	9.0	8.7	9.0	9.0	9.1	9.5	9.8	9.8	9.8	9.6	9.5	9.2	9.1	8.8
210000	8.9	8.4	8.9	8.7	9.0	8.9	8.9	9.4	9.7	9.7	9.6	9.5	9.4	9.1	9.1	8.8
220000	8.7	8.3	8.8	8.5	8.9	8.8	8.8	9.3	9.5	9.5	9.5	9.4	9.3	9.0	8.9	8.7
230000	8.6	8.3	8.6	8.3	8.7	8.8	8.8	9.2	9.4	9.4	9.3	9.2	9.1	8.9	8.8	8.5
Daily Max	9.1	8.6	9.2	8.9	9.2	9.2	9.2	9.6	9.8	9.9	9.9	9.8	9.7	9.4	9.3	9.0
Daily Min	7.9	8.0	8.0	8.0	8.0	8.4	8.4	8.5	8.7	8.9	8.9	8.8	8.5	8.4	8.2	8.1
Average	8.5	8.3	8.5	8.4	8.5	8.7	8.7	9.0	9.2	9.3	9.3	9.2	9.1	8.9	8.7	8.5

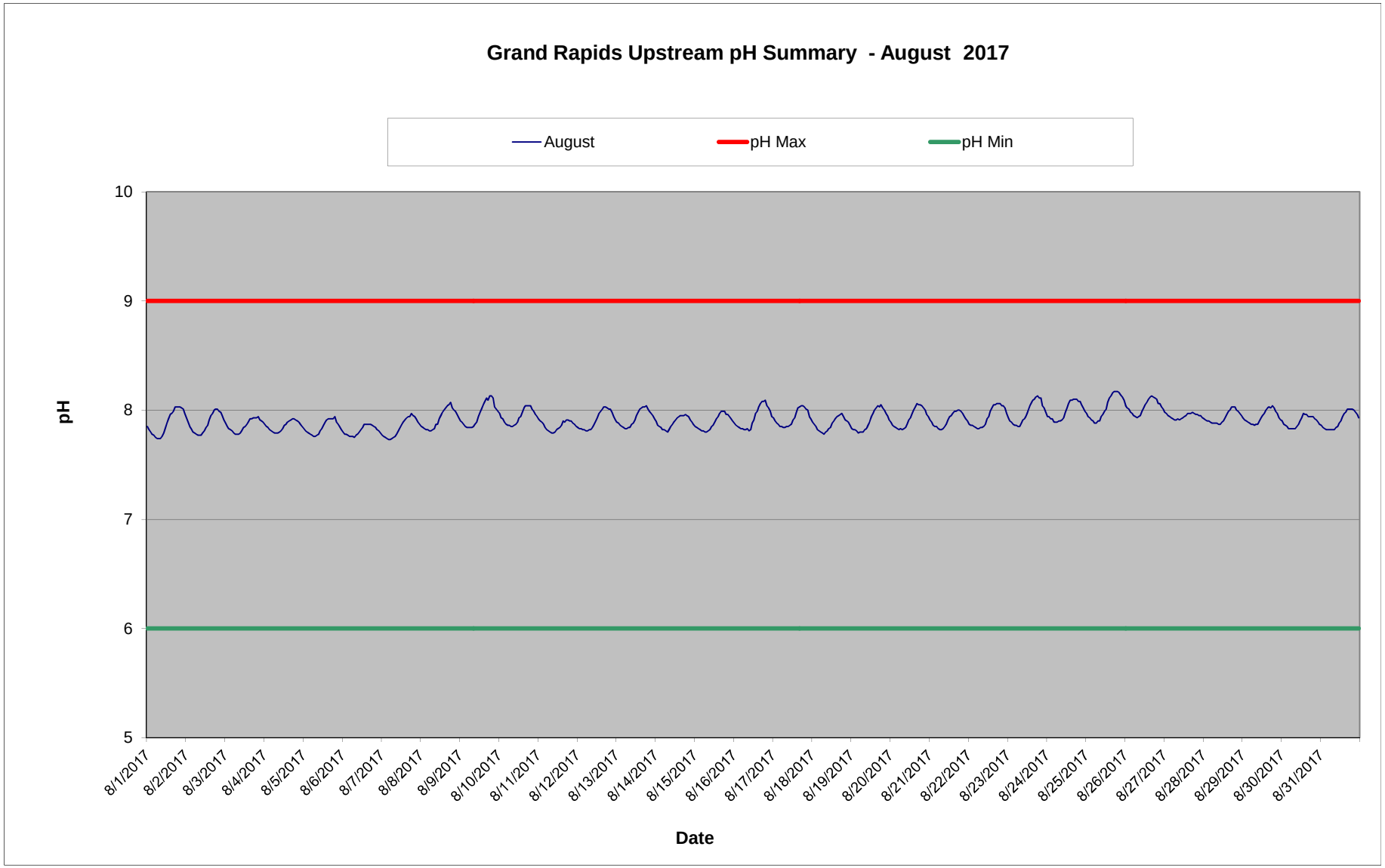
License Minimum Dissolved Oxygen: 5.0 mg/l

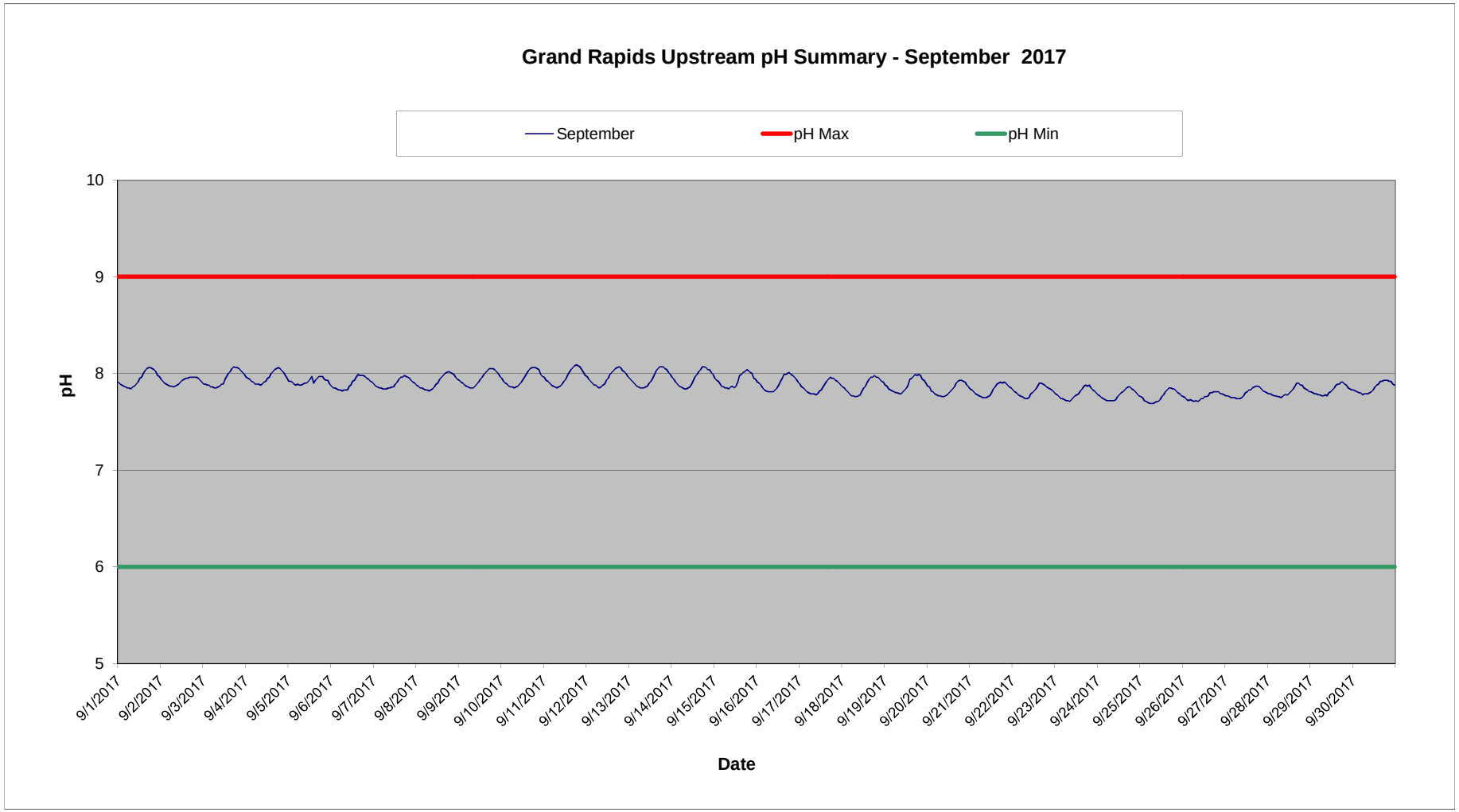
Grand Rapids Upstream Dissolved Oxygen Summary - September 2017

Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	8.4	8.1	8.3	8.2	8.1	8.0	7.8	7.8	7.7	7.6	7.6	7.7	8.0	8.2
10000	8.3	8.0	8.2	8.1	8.0	7.9	7.7	7.7	7.6	7.5	7.5	7.7	7.9	8.2
20000	8.2	8.0	8.1	8.0	7.9	7.8	7.6	7.6	7.5	7.5	7.5	7.6	7.9	8.2
30000	8.1	7.9	8.0	7.9	7.9	7.8	7.6	7.6	7.4	7.4	7.5	7.6	7.9	8.1
40000	8.0	7.8	7.9	7.8	7.8	7.7	7.5	7.5	7.4	7.4	7.4	7.6	7.8	8.1
50000	8.0	7.8	7.9	7.8	7.7	7.7	7.5	7.5	7.4	7.4	7.4	7.6	7.8	8.1
60000	7.9	7.7	7.9	7.7	7.7	7.6	7.5	7.5	7.4	7.4	7.4	7.5	7.8	8.1
70000	7.9	7.7	7.9	7.7	7.7	7.6	7.5	7.5	7.3	7.3	7.4	7.6	7.9	8.0
80000	7.9	7.7	7.8	7.7	7.7	7.6	7.4	7.5	7.4	7.3	7.4	7.6	7.8	8.1
90000	7.9	7.7	7.8	7.7	7.7	7.6	7.5	7.5	7.4	7.3	7.4	7.7	7.9	8.1
100000	7.9	7.8	7.9	7.8	7.7	7.8	7.6	7.5	7.4	7.5	7.5	7.7	8.0	8.2
110000	8.0	8.0	8.0	7.8	7.7	7.9	7.7	7.7	7.5	7.5	7.6	7.7	8.0	8.3
120000	8.1	8.1	8.2	7.9	7.9	8.0	7.7	7.8	7.7	7.6	7.7	7.8	8.2	8.5
130000	8.3	8.3	8.3	8.0	8.1	8.1	7.9	7.9	7.8	7.6	7.9	7.9	8.3	8.6
140000	8.4	8.4	8.5	8.1	8.2	8.2	8.0	8.0	8.0	7.6	7.9	8.1	8.4	8.7
150000	8.5	8.6	8.6	8.2	8.4	8.4	8.1	8.1	8.0	7.7	8.0	8.2	8.4	8.8
160000	8.6	8.7	8.7	8.4	8.4	8.3	8.2	8.2	8.1	7.8	8.0	8.3	8.4	8.8
170000	8.6	8.7	8.8	8.4	8.5	8.3	8.3	8.2	8.1	7.8	8.1	8.3	8.5	8.9
180000	8.6	8.8	8.7	8.5	8.4	8.2	8.2	8.2	8.1	7.8	8.1	8.3	8.5	8.9
190000	8.6	8.7	8.7	8.5	8.5	8.1	8.3	8.1	8.1	7.8	8.0	8.2	8.5	8.9
200000	8.5	8.7	8.7	8.4	8.4	8.1	8.2	8.0	8.0	7.7	8.0	8.2	8.4	8.9
210000	8.5	8.6	8.5	8.4	8.3	8.0	8.1	7.9	7.9	7.7	7.9	8.1	8.3	8.8
220000	8.3	8.5	8.4	8.3	8.2	7.9	8.0	7.8	7.8	7.6	7.8	8.0	8.3	8.8
230000	8.3	8.4	8.3	8.2	8.1	7.9	7.9	7.7	7.7	7.6	7.8	8.0	8.3	8.7
Daily Max	8.6	8.8	8.8	8.5	8.5	8.4	8.3	8.2	8.1	7.8	8.1	8.3	8.5	8.9
Daily Min	7.9	7.7	7.8	7.7	7.7	7.6	7.4	7.5	7.3	7.3	7.4	7.5	7.8	8.0
Average	8.2	8.2	8.3	8.0	8.0	7.9	7.8	7.8	7.7	7.6	7.7	7.9	8.1	8.4









Grand Rapids Upstream pH Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.7	7.7	7.6	7.6	7.5
10000	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
20000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
30000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
40000	7.7	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
50000	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
60000	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
70000	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
80000	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
90000	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5
100000	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4
110000	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4
120000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.6	7.5	7.4
130000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.8	7.7	7.7	7.6	7.5	7.4
140000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.8	7.7	7.7	7.6	7.5	7.4
150000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.6	7.5	7.4
160000	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.7	7.7	7.6	7.5	7.4
170000	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.7	7.7	7.6	7.5	7.4
180000	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.8	7.8	7.7	7.6	7.5	7.4
190000	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.5	7.4
200000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.5	7.4
210000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.5	7.4
220000	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.6	7.5	7.4
230000	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.7	7.7	7.6	7.6	7.5	7.4
Daily Max	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.6	7.6	7.5
Daily Min	7.7	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.5	7.4
Average	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.5

License maximum pH: 9
License minimum pH: 6

Grand Rapids Upstream pH Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
10000	7.4	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
20000	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
30000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
40000	7.5	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
50000	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7
60000	7.4	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.6	7.6	7.7
70000	7.4	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.6	7.7	7.7
80000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.7	7.7
90000	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.6	7.7
100000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
110000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
120000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
130000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
140000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
150000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
160000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
170000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
180000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
190000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
200000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
210000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
220000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
230000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7
Daily Max	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
Daily Min	7.4	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.7
Average	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7

Grand Rapids Upstream pH Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
10000	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
20000	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
30000	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
40000	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
50000	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
60000	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6
70000	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.6
80000	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.6
90000	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.7
100000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.7
110000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.7
120000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.7	7.6	7.6	7.7	7.7
130000	7.7	7.7	7.7	7.7	7.8	7.7	7.7	7.8	7.7	7.7	7.8	7.7	7.6	7.6	7.7	7.7
140000	7.7	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.7	7.7	7.8	7.7	7.6	7.6	7.7	7.7
150000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.8	7.8	7.6	7.6	7.7	7.7
160000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.8	7.8	7.6	7.6	7.7	7.7
170000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.6	7.6	7.7	7.7
180000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.6	7.7	7.7	7.7
190000	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.6	7.6	7.7	7.7
200000	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.8	7.7	7.6	7.6	7.7	7.7
210000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.6	7.6	7.7	7.7
220000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.6	7.6	7.7	7.7
230000	7.7	7.7	7.7	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.7
Daily Max	7.7	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.7	7.7	7.7	7.7
Daily Min	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.6
Average	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.6	7.6	7.7

License maximum pH: 9
License minimum pH: 6

Grand Rapids Upstream pH Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.8	7.9	7.9
10000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.8	7.8	7.8
20000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
30000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
40000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8
50000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8	7.7
60000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8	7.7
70000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8	7.7
80000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8	7.7
90000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
100000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
110000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8
120000	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.8	7.9	7.9	7.9
130000	7.7	7.7	7.7	7.8	7.8	7.7	7.8	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
140000	7.7	7.7	7.7	7.8	7.8	7.7	7.8	7.9	7.9	7.8	7.9	7.9	7.9	8.0	7.9
150000	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.8	7.9	7.9	8.0	8.0	8.0
160000	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	8.0	7.9	8.0	8.0	8.0
170000	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	8.0	7.9	8.0	8.0	8.0	8.0	8.0
180000	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0
190000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0
200000	7.7	7.8	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	8.0	7.9	8.0	8.0	8.0
210000	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	8.0
220000	7.7	7.7	7.7	7.7	7.8	7.7	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
230000	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
Daily Max	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	8.0	7.9	8.0	8.0	8.0	8.0	8.0
Daily Min	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.8	7.7
Average	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9

Grand Rapids Upstream pH Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	8.0	7.9	7.8	7.9	7.9	7.9	7.9
10000	7.8	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.8	7.9
20000	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.8	7.9
30000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.9	7.9	7.9	7.8	7.9	7.8	7.8	7.8
40000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8
50000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8
60000	7.7	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8
70000	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8
80000	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
90000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.8	7.9	7.9	7.8	7.8
100000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.8
110000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
120000	7.9	7.8	7.9	7.9	7.9	7.8	7.9	8.0	8.0	7.9	7.8	7.9	8.0	7.9	7.9	7.9
130000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.8	8.0	8.0	7.9	7.9	8.0
140000	8.0	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.1	8.0	7.9	8.0	8.0	7.9	7.9	8.0
150000	8.0	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.0
160000	8.0	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
170000	8.0	8.0	7.9	7.9	7.9	7.9	7.9	8.1	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
180000	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.1	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
190000	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
200000	8.0	8.0	7.9	7.9	7.9	7.8	7.9	8.0	8.1	8.0	7.9	8.0	8.0	7.9	8.0	8.0
210000	8.0	8.0	7.9	7.9	7.9	7.8	7.9	8.0	8.0	8.0	7.9	8.0	8.0	7.9	7.9	8.0
220000	8.0	8.0	7.9	7.9	7.9	7.8	7.9	8.0	8.0	8.0	7.9	7.9	8.0	7.9	7.9	8.0
230000	8.0	7.9	7.9	7.9	7.8	7.8	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9
Daily Max	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.1	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
Daily Min	7.7	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8
Average	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9

License maximum pH: 9
License minimum pH: 6

Grand Rapids Upstream pH Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.9	7.9	7.9
10000	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.8
20000	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.8
30000	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8
40000	7.9	7.8	7.8	7.8	7.9	7.8	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.8	7.8
50000	7.9	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.8	7.8
60000	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
70000	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
80000	7.9	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
90000	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8
100000	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.9
110000	7.9	7.8	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9
120000	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.1	7.9	7.9	8.0	7.9	7.9
130000	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.0	7.9	8.0	8.0	7.9
140000	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.0	8.0	8.0	8.0
150000	8.0	7.9	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.0	8.0	8.0	8.0	8.0
160000	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.1	8.2	8.1	8.0	8.0	8.0	7.9	8.0
170000	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.1	8.2	8.1	8.0	8.0	8.0	7.9	8.0
180000	8.0	8.0	8.1	8.1	8.0	8.1	8.1	8.1	8.2	8.1	8.0	8.0	8.0	7.9	8.0
190000	8.0	7.9	8.0	8.0	8.0	8.1	8.1	8.1	8.2	8.1	8.0	8.0	8.0	7.9	8.0
200000	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.2	8.1	8.0	8.0	8.0	7.9	8.0
210000	8.0	7.9	8.0	8.0	7.9	8.0	8.0	8.1	8.1	8.1	8.0	8.0	8.0	7.9	8.0
220000	7.9	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.1	8.0	8.0	8.0	7.9	7.9	8.0
230000	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.1	8.0	7.9	8.0	7.9	7.9	7.9
Daily Max	8.0	8.0	8.1	8.1	8.0	8.1	8.1	8.1	8.2	8.1	8.0	8.0	8.0	8.0	8.0
Daily Min	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
Average	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9

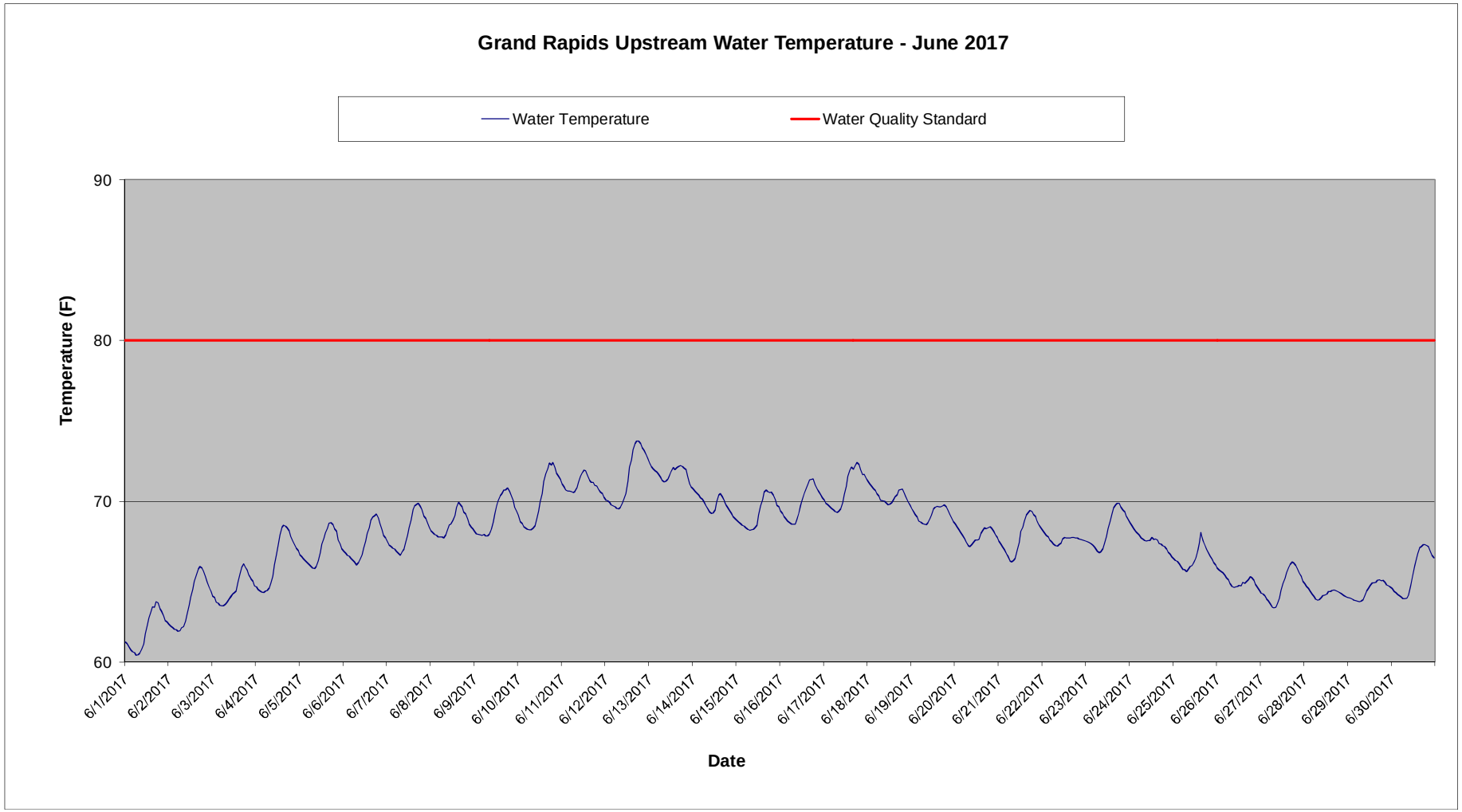
Grand Rapids Upstream pH Summary - September 2017

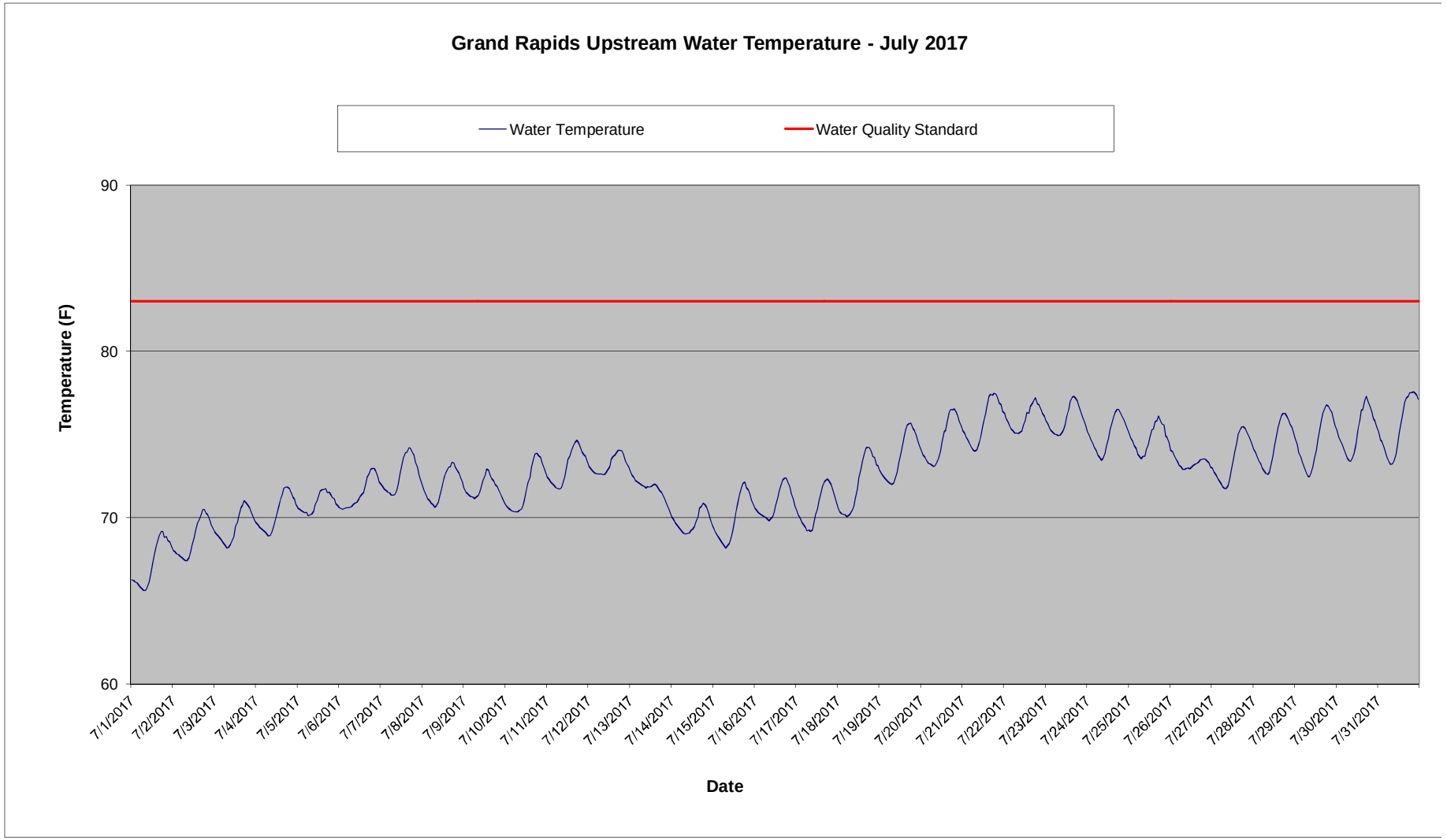
Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9
10000	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
20000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
30000	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
40000	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8
50000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8
60000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8
70000	7.8	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.8
80000	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8
90000	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8
100000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8
110000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
120000	8.0	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9
130000	8.0	7.9	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9
140000	8.0	8.0	8.0	8.0	7.9	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
150000	8.0	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
160000	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.0	8.0
170000	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
180000	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
190000	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
200000	8.0	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.0	8.1	8.0	8.0	8.0
210000	8.0	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
220000	8.0	7.9	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9
230000	8.0	7.9	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9
Daily Max	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
Daily Min	7.8	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8
Average	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.9

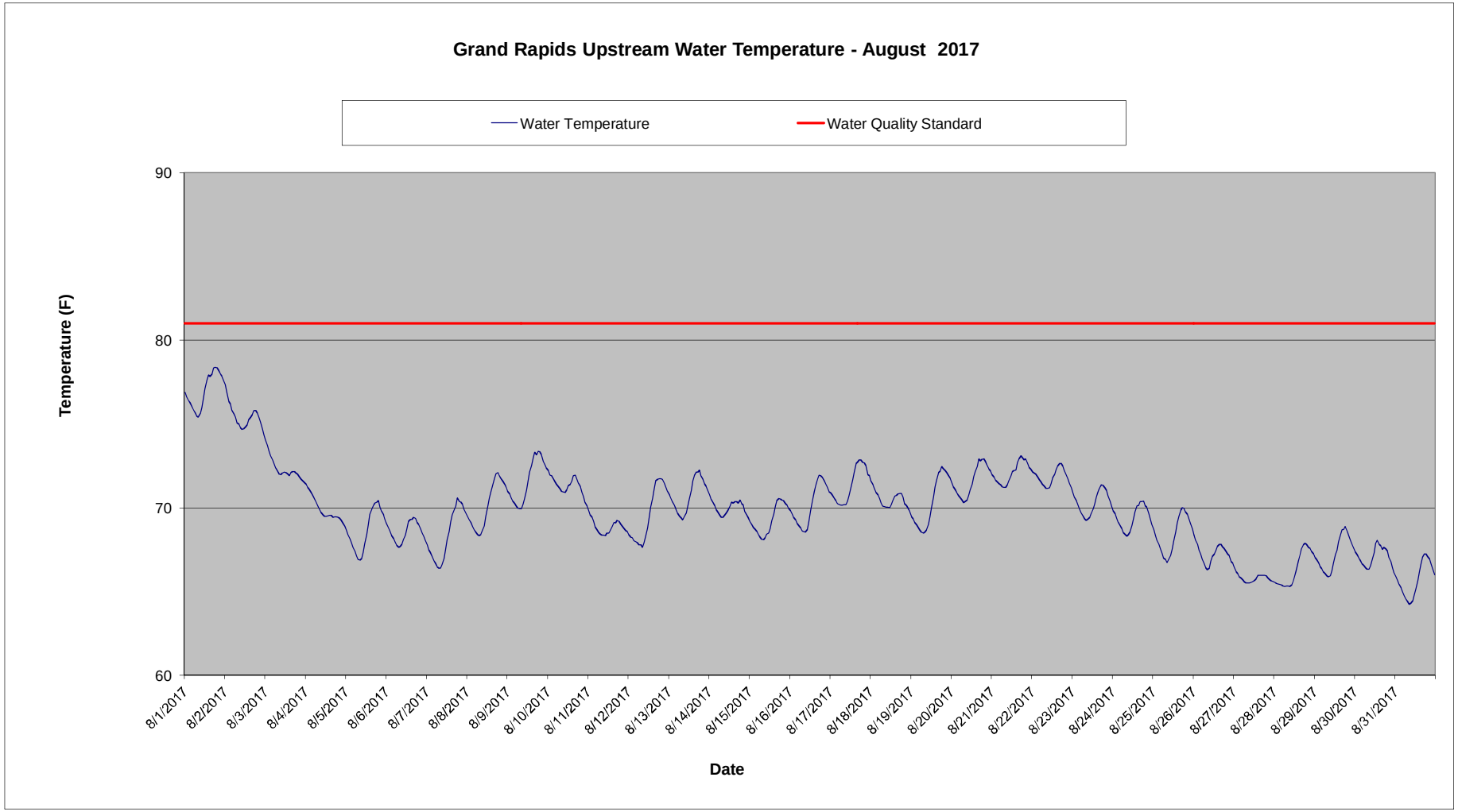
License maximum pH: 9
License minimum pH: 6

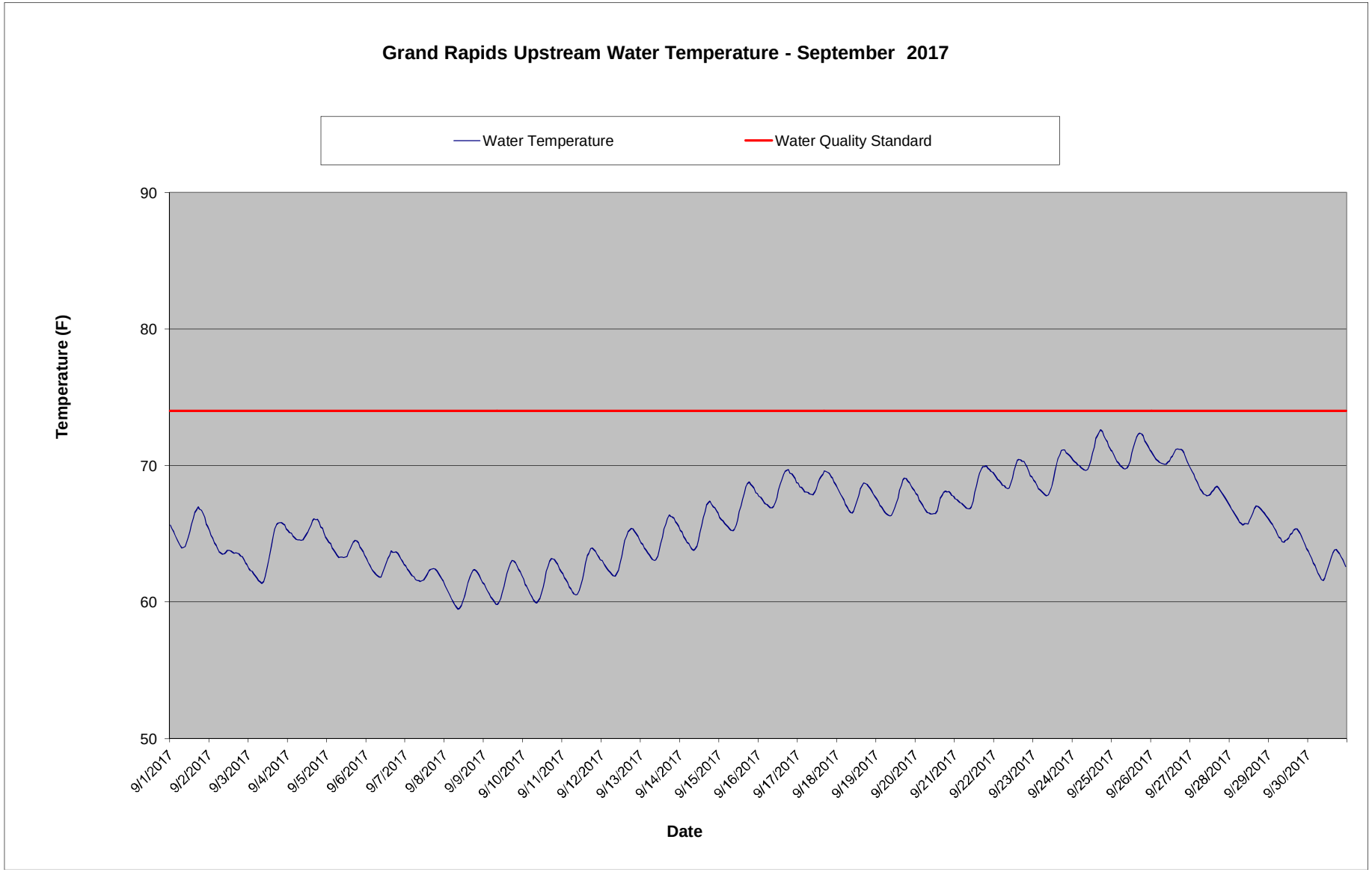
Grand Rapids Upstream pH Summary - September 2017

Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
10000	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
20000	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.8	7.8	7.8
30000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
40000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
50000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
60000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8
70000	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8
80000	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8
90000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
100000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.8	7.8	7.8
110000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.8	7.8	7.8	7.8
120000	7.8	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
130000	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9
140000	7.9	7.9	7.9	7.8	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9
150000	7.9	7.9	8.0	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9
160000	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
170000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
180000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.9	7.9	7.9	7.9
190000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9
200000	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.9	7.9	7.9
210000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9
220000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
230000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
Daily Max	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
Daily Min	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8
Average	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9









Grand Rapids Upstream Temperature Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	61.3	62.3	64.1	64.7	66.7	66.9	67.5	68.2	68.1	69.2	71.1	70.1	72.4	70.8	68.8	69.4
10000	61.2	62.2	64.0	64.5	66.6	66.8	67.3	68.0	68.0	68.7	70.9	70.0	72.2	70.6	68.7	69.2
20000	60.9	62.1	63.7	64.4	66.4	66.6	67.2	67.9	67.9	68.6	70.7	69.9	72.0	70.5	68.6	69.0
30000	60.8	62.1	63.7	64.3	66.3	66.6	67.1	67.9	67.9	68.4	70.6	69.8	71.9	70.4	68.5	68.9
40000	60.6	62.0	63.5	64.3	66.2	66.5	67.0	67.8	67.9	68.3	70.7	69.7	71.8	70.2	68.4	68.8
50000	60.6	61.9	63.5	64.4	66.1	66.3	66.9	67.8	67.9	68.2	70.6	69.6	71.7	70.1	68.3	68.7
60000	60.4	61.9	63.5	64.5	65.9	66.2	66.8	67.8	67.8	68.2	70.5	69.5	71.5	70.0	68.3	68.6
70000	60.5	62.1	63.6	64.6	65.8	66.1	66.7	67.7	67.8	68.2	70.6	69.5	71.3	69.7	68.2	68.6
80000	60.5	62.2	63.8	64.9	65.8	66.2	66.8	67.9	68.0	68.3	70.8	69.6	71.2	69.5	68.2	68.6
90000	60.8	62.5	63.9	65.4	65.9	66.4	67.0	68.2	68.2	68.5	71.2	69.9	71.2	69.3	68.3	68.9
100000	61.1	63.0	64.1	66.0	66.3	66.7	67.4	68.5	68.7	68.9	71.6	70.1	71.4	69.2	68.3	69.2
110000	61.8	63.5	64.2	66.7	66.8	67.1	67.9	68.6	69.2	69.4	71.7	70.5	71.7	69.3	68.5	69.7
120000	62.3	64.1	64.3	67.4	67.3	67.5	68.4	68.8	69.7	70.0	71.9	71.2	71.9	69.5	69.1	70.1
130000	62.8	64.5	64.4	67.9	67.7	68.0	68.8	69.1	70.1	70.5	71.9	72.1	72.1	70.0	69.7	70.5
140000	63.1	65.0	65.0	68.4	68.0	68.4	69.5	69.6	70.3	71.2	71.6	72.6	72.0	70.4	70.1	70.8
150000	63.4	65.4	65.5	68.5	68.3	68.8	69.7	69.9	70.5	71.7	71.3	73.2	72.1	70.5	70.6	71.1
160000	63.4	65.8	65.9	68.4	68.6	69.0	69.8	69.8	70.7	72.0	71.2	73.6	72.2	70.3	70.7	71.3
170000	63.8	65.9	66.1	68.4	68.7	69.1	69.9	69.7	70.7	72.4	71.2	73.7	72.2	70.0	70.6	71.4
180000	63.7	65.9	65.9	68.2	68.5	69.2	69.7	69.4	70.8	72.3	71.0	73.7	72.2	69.8	70.5	71.4
190000	63.3	65.6	65.7	67.8	68.3	69.0	69.5	69.2	70.6	72.4	70.9	73.6	72.1	69.6	70.6	71.0
200000	63.1	65.3	65.4	67.5	68.1	68.6	69.1	68.9	70.4	72.1	70.8	73.3	72.0	69.4	70.4	70.8
210000	62.9	65.0	65.2	67.3	67.6	68.2	68.9	68.6	70.1	71.8	70.6	73.2	71.6	69.2	70.1	70.6
220000	62.6	64.7	65.0	67.1	67.3	67.9	68.7	68.4	69.6	71.6	70.5	73.0	71.1	69.1	69.7	70.4
230000	62.5	64.4	64.7	66.9	67.1	67.7	68.4	68.3	69.4	71.3	70.3	72.7	70.9	68.9	69.6	70.2
Daily Max	63.8	65.9	66.1	68.5	68.7	69.2	69.9	69.9	70.8	72.4	71.9	73.7	72.4	70.8	70.7	71.4
Daily Min	60.4	61.9	63.5	64.3	65.8	66.1	66.7	67.7	67.8	68.2	70.3	69.5	70.9	68.9	68.2	68.6
Average	62.0	63.7	64.5	66.4	67.1	67.5	68.2	68.6	69.2	70.1	71.0	71.4	71.8	69.8	69.3	69.9

Monthly Average Temp: 67.0
License Maximum Temperature: 80 F

Grand Rapids Upstream Temperature Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	70.1	71.3	69.6	68.6	67.5	68.2	67.5	68.7	66.4	65.9	64.3	64.9	64.0	64.6
10000	69.9	71.1	69.3	68.4	67.3	68.0	67.5	68.5	66.3	65.7	64.2	64.7	64.0	64.4
20000	69.8	70.9	69.2	68.2	67.2	67.9	67.4	68.3	66.3	65.6	64.1	64.6	63.9	64.3
30000	69.7	70.8	69.0	68.1	67.0	67.8	67.3	68.1	66.1	65.6	63.9	64.4	63.9	64.2
40000	69.6	70.7	68.8	67.9	66.7	67.6	67.2	68.0	65.9	65.4	63.8	64.2	63.8	64.1
50000	69.5	70.5	68.7	67.7	66.6	67.5	67.1	67.9	65.8	65.2	63.6	64.1	63.8	64.0
60000	69.4	70.3	68.6	67.5	66.3	67.3	66.9	67.7	65.7	65.1	63.4	63.9	63.8	64.0
70000	69.3	70.1	68.6	67.2	66.2	67.2	66.8	67.7	65.6	64.9	63.4	63.8	63.8	63.9
80000	69.4	70.0	68.6	67.2	66.3	67.2	66.9	67.6	65.8	64.7	63.4	63.9	63.9	64.0
90000	69.5	70.0	68.7	67.3	66.5	67.3	67.1	67.5	65.9	64.6	63.6	64.0	64.1	64.2
100000	69.9	69.9	68.9	67.4	67.0	67.4	67.4	67.6	66.0	64.7	64.0	64.1	64.4	64.7
110000	70.4	69.8	69.2	67.6	67.4	67.6	67.8	67.6	66.2	64.7	64.5	64.2	64.6	65.2
120000	70.9	69.8	69.5	67.6	68.1	67.7	68.3	67.8	66.5	64.8	64.9	64.2	64.8	65.8
130000	71.6	69.9	69.6	67.6	68.4	67.7	68.7	67.6	66.8	64.8	65.2	64.4	64.9	66.2
140000	71.9	70.1	69.7	68.0	68.8	67.7	69.3	67.6	67.4	65.0	65.6	64.4	64.9	66.7
150000	72.1	70.3	69.7	68.2	69.2	67.7	69.6	67.6	68.1	64.9	65.9	64.5	65.0	67.1
160000	72.0	70.4	69.7	68.3	69.3	67.8	69.8	67.4	67.5	65.0	66.1	64.5	65.1	67.2
170000	72.3	70.7	69.7	68.3	69.4	67.7	69.9	67.3	67.3	65.1	66.2	64.5	65.1	67.3
180000	72.4	70.7	69.8	68.4	69.4	67.7	69.9	67.2	67.0	65.3	66.2	64.4	65.1	67.3
190000	72.3	70.8	69.6	68.4	69.2	67.7	69.7	67.2	66.8	65.2	66.0	64.3	65.1	67.2
200000	72.0	70.5	69.5	68.3	69.0	67.7	69.5	67.0	66.6	65.1	65.8	64.3	65.0	67.2
210000	71.6	70.2	69.2	68.1	68.8	67.6	69.3	66.8	66.4	64.8	65.5	64.2	64.8	66.9
220000	71.7	70.0	68.9	67.9	68.5	67.6	69.1	66.7	66.2	64.6	65.3	64.1	64.7	66.6
230000	71.4	69.7	68.7	67.8	68.4	67.6	68.8	66.5	66.0	64.4	65.0	64.0	64.7	66.5
Daily Max	72.4	71.3	69.8	68.6	69.4	68.2	69.9	68.7	68.1	65.9	66.2	64.9	65.1	67.3
Daily Min	69.3	69.7	68.6	67.2	66.2	67.2	66.8	66.5	65.6	64.4	63.4	63.8	63.8	63.9
Average	70.8	70.4	69.2	67.9	67.9	67.6	68.3	67.6	66.4	65.1	64.8	64.3	64.5	65.6

Grand Rapids Upstream Temperature Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	66.3	68.0	69.1	69.7	70.6	70.6	72.0	71.9	71.8	70.8	72.4	73.1	72.8	70.1	69.4	70.6
10000	66.2	68.0	69.0	69.6	70.5	70.5	71.9	71.6	71.5	70.6	72.3	73.0	72.6	69.9	69.1	70.4
20000	66.1	67.8	68.9	69.4	70.4	70.5	71.7	71.4	71.4	70.5	72.2	72.8	72.4	69.7	68.9	70.3
30000	66.1	67.8	68.8	69.3	70.4	70.6	71.6	71.1	71.3	70.5	72.0	72.7	72.2	69.5	68.8	70.2
40000	66.0	67.7	68.6	69.2	70.3	70.6	71.5	71.0	71.3	70.4	71.9	72.7	72.1	69.4	68.6	70.1
50000	65.8	67.6	68.5	69.1	70.3	70.6	71.5	70.9	71.2	70.4	71.8	72.6	72.1	69.3	68.5	70.1
60000	65.7	67.5	68.3	69.0	70.1	70.6	71.4	70.8	71.1	70.3	71.7	72.6	72.0	69.2	68.4	70.0
70000	65.6	67.4	68.2	68.9	70.2	70.7	71.4	70.6	71.2	70.3	71.7	72.6	71.9	69.0	68.2	69.9
80000	65.6	67.4	68.2	68.9	70.2	70.8	71.4	70.7	71.3	70.4	71.8	72.6	71.9	69.0	68.3	69.8
90000	65.8	67.6	68.4	69.1	70.4	70.9	71.7	70.9	71.5	70.5	72.1	72.6	71.8	69.0	68.4	69.9
100000	66.1	67.9	68.6	69.5	70.8	70.9	72.0	71.3	71.9	70.7	72.5	72.7	71.9	69.1	68.7	70.1
110000	66.6	68.3	68.9	69.9	71.0	71.1	72.6	71.8	72.2	71.2	73.0	72.9	71.8	69.2	69.2	70.3
120000	67.1	68.8	69.5	70.3	71.3	71.3	73.2	72.2	72.5	71.7	73.5	73.1	71.9	69.3	69.7	70.7
130000	67.7	69.2	69.7	70.7	71.6	71.4	73.6	72.6	72.9	72.1	73.7	73.5	72.0	69.5	70.3	71.2
140000	68.2	69.7	70.1	71.1	71.7	71.5	73.9	72.8	72.9	72.4	74.0	73.7	72.0	69.8	70.9	71.6
150000	68.6	69.9	70.6	71.4	71.7	72.0	73.9	73.1	72.5	73.1	74.3	73.8	71.9	70.0	71.3	72.0
160000	68.9	70.2	70.8	71.8	71.7	72.4	74.2	73.1	72.4	73.5	74.5	73.9	71.8	70.6	71.8	72.3
170000	69.2	70.5	71.0	71.8	71.5	72.6	74.2	73.3	72.2	73.8	74.7	74.0	71.6	70.7	72.0	72.4
180000	69.2	70.5	70.9	71.9	71.5	72.9	74.0	73.3	72.0	73.9	74.5	74.1	71.5	70.9	72.1	72.4
190000	68.8	70.3	70.8	71.8	71.4	73.0	73.7	73.0	71.9	73.7	74.3	74.0	71.3	70.8	71.8	72.1
200000	68.9	70.2	70.6	71.5	71.2	73.0	73.3	72.8	71.6	73.6	74.0	73.9	71.0	70.6	71.7	71.9
210000	68.6	69.9	70.4	71.2	71.1	72.8	73.0	72.7	71.4	73.3	73.8	73.4	70.8	70.3	71.4	71.4
220000	68.5	69.6	70.1	71.1	70.8	72.5	72.6	72.4	71.2	73.1	73.7	73.2	70.5	70.0	71.0	71.1
230000	68.3	69.3	69.8	70.8	70.7	72.1	72.2	72.2	71.0	72.7	73.4	73.0	70.3	69.7	70.8	70.7
Daily Max	69.2	70.5	71.0	71.9	71.7	73.0	74.2	73.3	72.9	73.9	74.7	74.1	72.8	70.9	72.1	72.4
Daily Min	65.6	67.4	68.2	68.9	70.1	70.5	71.4	70.6	71.0	70.3	71.7	72.6	70.3	69.0	68.2	69.8
Average	67.2	68.8	69.5	70.3	70.9	71.5	72.6	72.0	71.8	71.8	73.1	73.2	71.8	69.8	70.0	70.9

Monthly Average Temp: 72.6
License Maximum Temperature: 83 F

Grand Rapids Upstream Temperature Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	70.4	70.6	72.8	74.0	75.2	76.3	75.8	75.2	75.1	74.0	72.9	74.1	74.7	75.2	75.2
10000	70.1	70.3	72.6	73.8	75.1	75.9	75.6	74.9	74.8	74.0	72.7	73.9	74.4	74.9	74.7
20000	69.9	70.2	72.5	73.6	74.8	75.7	75.4	74.7	74.6	73.7	72.6	73.6	73.9	74.6	74.6
30000	69.7	70.2	72.3	73.4	74.6	75.5	75.2	74.4	74.3	73.5	72.4	73.4	73.7	74.4	74.2
40000	69.6	70.2	72.2	73.3	74.4	75.3	75.1	74.2	74.1	73.3	72.2	73.2	73.3	74.1	73.9
50000	69.4	70.1	72.1	73.2	74.2	75.2	75.0	74.0	73.8	73.2	72.1	73.0	73.0	73.9	73.6
60000	69.2	70.2	72.1	73.2	74.0	75.1	75.0	73.8	73.7	73.0	71.9	72.8	72.8	73.6	73.4
70000	69.2	70.2	72.0	73.1	74.0	75.1	74.9	73.6	73.5	72.9	71.7	72.6	72.5	73.4	73.2
80000	69.2	70.4	72.1	73.1	74.1	75.1	75.0	73.4	73.7	72.9	71.7	72.6	72.4	73.4	73.2
90000	69.3	70.7	72.4	73.4	74.4	75.1	75.1	73.6	73.7	73.0	71.9	72.7	72.7	73.6	73.4
100000	69.7	71.2	72.8	73.6	74.7	75.2	75.2	73.9	74.1	73.0	72.3	73.2	73.0	73.9	73.8
110000	70.2	71.7	73.3	74.0	75.3	75.6	75.6	74.3	74.4	72.9	72.8	73.7	73.5	74.5	74.4
120000	70.5	72.4	73.8	74.6	75.7	75.9	76.1	74.8	74.8	73.0	73.4	74.3	74.1	75.2	75.0
130000	71.0	72.9	74.3	75.1	76.2	76.3	76.5	75.3	75.3	73.1	73.9	74.9	74.7	75.8	75.7
140000	71.5	73.4	74.9	75.3	76.7	76.3	77.0	75.7	75.3	73.2	74.5	75.4	75.4	76.4	76.2
150000	71.9	73.9	75.3	75.8	77.3	76.7	77.2	76.1	75.7	73.3	75.0	75.9	75.9	76.5	76.9
160000	72.2	74.2	75.6	76.3	77.4	76.9	77.3	76.3	75.8	73.3	75.3	76.1	76.3	77.0	77.2
170000	72.3	74.2	75.7	76.5	77.4	77.1	77.2	76.5	76.1	73.5	75.4	76.3	76.6	77.3	77.3
180000	72.3	74.2	75.7	76.5	77.5	77.2	77.0	76.5	75.8	73.5	75.5	76.3	76.8	76.9	77.5
190000	72.2	74.0	75.4	76.5	77.4	76.9	76.7	76.3	75.6	73.5	75.4	76.1	76.7	76.7	77.5
200000	72.0	73.7	75.2	76.3	77.2	76.8	76.4	76.1	75.6	73.5	75.2	75.9	76.5	76.3	77.6
210000	71.6	73.6	74.9	76.1	76.9	76.5	76.1	75.8	74.9	73.4	74.9	75.6	76.3	76.0	77.5
220000	71.3	73.2	74.6	75.8	76.8	76.3	75.8	75.6	74.8	73.3	74.7	75.4	75.9	75.8	77.4
230000	70.9	73.1	74.3	75.5	76.4	76.1	75.5	75.3	74.5	73.0	74.3	75.1	75.5	75.4	77.1
Daily Max	72.3	74.2	75.7	76.5	77.5	77.2	77.3	76.5	76.1	74.0	75.5	76.3	76.8	77.3	77.6
Daily Min	69.2	70.1	72.0	73.1	74.0	75.1	74.9	73.4	73.5	72.9	71.7	72.6	72.4	73.4	73.2
Average	70.6	72.0	73.7	74.7	75.7	76.0	75.9	75.0	74.8	73.3	73.5	74.4	74.6	75.2	75.4

Grand Rapids Upstream Temperature Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	76.9	77.3	74.0	71.4	68.7	69.0	67.8	69.5	71.0	72.2	69.9	68.4	70.8	70.8	69.2	69.8
10000	76.6	76.9	73.7	71.2	68.4	68.8	67.5	69.3	70.8	72.0	69.6	68.2	70.6	70.5	69.0	69.6
20000	76.4	76.4	73.4	71.1	68.1	68.6	67.3	69.1	70.6	71.9	69.4	68.2	70.3	70.3	68.8	69.4
30000	76.3	76.2	73.1	70.9	67.9	68.4	67.1	68.9	70.4	71.7	69.2	68.0	70.1	70.1	68.7	69.3
40000	76.1	75.8	72.9	70.7	67.7	68.1	66.9	68.7	70.3	71.6	68.9	68.0	69.9	69.9	68.6	69.1
50000	75.9	75.6	72.6	70.5	67.4	67.9	66.7	68.5	70.1	71.4	68.7	67.9	69.7	69.7	68.4	68.9
60000	75.7	75.4	72.4	70.3	67.1	67.8	66.5	68.4	70.0	71.3	68.5	67.8	69.5	69.6	68.2	68.8
70000	75.5	75.1	72.2	70.1	66.9	67.6	66.4	68.4	69.9	71.1	68.4	67.8	69.4	69.4	68.1	68.6
80000	75.4	75.0	72.0	69.9	66.9	67.7	66.4	68.4	69.9	71.0	68.4	67.7	69.3	69.4	68.1	68.6
90000	75.6	74.8	72.0	69.7	67.0	67.8	66.6	68.7	70.2	71.0	68.4	67.9	69.5	69.6	68.2	68.6
100000	76.0	74.7	72.1	69.6	67.3	68.1	67.0	68.9	70.5	70.9	68.3	68.3	69.7	69.7	68.4	68.7
110000	76.5	74.7	72.1	69.5	67.9	68.4	67.5	69.5	71.1	71.1	68.5	68.8	70.1	69.9	68.5	69.2
120000	77.1	74.8	72.1	69.5	68.4	68.8	68.1	70.1	71.6	71.3	68.5	69.4	70.5	70.1	68.8	69.8
130000	77.6	75.0	72.0	69.5	69.0	69.2	68.6	70.6	72.1	71.4	68.7	70.0	71.0	70.3	69.2	70.4
140000	77.9	75.3	71.9	69.6	69.6	69.3	69.2	70.9	72.5	71.6	68.8	70.6	71.6	70.3	69.6	70.8
150000	77.8	75.4	72.1	69.5	69.9	69.3	69.6	71.4	72.9	71.9	69.1	71.1	71.9	70.4	70.1	71.3
160000	78.0	75.6	72.2	69.4	70.1	69.4	69.9	71.8	73.3	71.9	69.1	71.6	72.1	70.4	70.4	71.7
170000	78.4	75.8	72.2	69.5	70.3	69.4	70.1	72.0	73.2	71.7	69.3	71.7	72.1	70.3	70.6	71.9
180000	78.4	75.8	72.1	69.5	70.3	69.1	70.6	72.1	73.4	71.5	69.2	71.7	72.2	70.5	70.5	71.9
190000	78.4	75.7	72.0	69.4	70.4	69.0	70.4	71.9	73.4	71.3	69.0	71.7	71.9	70.3	70.5	71.8
200000	78.2	75.4	71.8	69.4	70.0	68.7	70.3	71.7	73.2	70.9	68.9	71.7	71.7	70.2	70.4	71.6
210000	78.0	75.1	71.7	69.2	69.8	68.5	70.2	71.6	72.8	70.7	68.8	71.5	71.5	69.8	70.3	71.4
220000	77.9	74.7	71.6	69.1	69.6	68.3	69.9	71.4	72.6	70.3	68.7	71.2	71.3	69.6	70.2	71.3
230000	77.6	74.4	71.5	68.9	69.3	68.1	69.7	71.2	72.4	70.1	68.6	71.0	71.0	69.4	70.0	71.0
Daily Max	78.4	77.3	74.0	71.4	70.4	69.4	70.6	72.1	73.4	72.2	69.9	71.7	72.2	70.8	70.6	71.9
Daily Min	75.4	74.4	71.5	68.9	66.9	67.6	66.4	68.4	69.9	70.1	68.3	67.7	69.3	69.4	68.1	68.6
Average	77.0	75.4	72.3	69.9	68.7	68.6	68.3	70.1	71.6	71.3	68.9	69.6	70.7	70.0	69.3	70.2

Monthly Average Temp: 69.9
License Maximum Temperature: 81 F

Grand Rapids Upstream Temperature Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	70.9	71.6	69.5	71.5	72.0	72.1	70.9	69.8	68.7	68.4	66.5	65.5	67.0	67.4	65.9
10000	70.8	71.4	69.3	71.3	71.8	72.1	70.6	69.7	68.4	68.1	66.2	65.5	66.9	67.2	65.7
20000	70.6	71.1	69.1	71.1	71.6	72.0	70.4	69.4	68.1	67.8	66.1	65.5	66.7	67.0	65.4
30000	70.4	70.9	69.0	70.9	71.6	71.8	70.2	69.1	67.8	67.5	65.9	65.4	66.5	66.8	65.2
40000	70.3	70.8	68.8	70.7	71.4	71.7	69.9	68.9	67.5	67.3	65.8	65.4	66.4	66.7	65.0
50000	70.2	70.6	68.7	70.6	71.4	71.5	69.7	68.8	67.3	66.9	65.7	65.3	66.2	66.6	64.8
60000	70.2	70.3	68.6	70.5	71.3	71.4	69.5	68.5	67.0	66.7	65.6	65.3	66.1	66.4	64.6
70000	70.2	70.1	68.5	70.3	71.2	71.3	69.3	68.4	66.9	66.4	65.5	65.3	65.9	66.3	64.4
80000	70.2	70.1	68.6	70.4	71.2	71.2	69.3	68.3	66.7	66.3	65.5	65.3	65.9	66.3	64.2
90000	70.2	70.0	68.7	70.5	71.4	71.2	69.3	68.4	66.9	66.4	65.5	65.3	65.9	66.6	64.3
100000	70.4	70.0	69.0	70.7	71.6	71.2	69.4	68.6	67.2	66.8	65.5	65.4	66.3	66.9	64.5
110000	70.7	70.0	69.5	71.1	71.9	71.4	69.7	69.0	67.5	67.1	65.6	65.6	66.7	67.3	64.8
120000	71.2	70.2	70.0	71.4	72.2	71.8	70.0	69.3	68.0	67.3	65.7	65.9	67.2	67.9	65.1
130000	71.6	70.4	70.6	71.9	72.2	72.0	70.2	69.8	68.6	67.5	65.8	66.4	67.5	68.1	65.7
140000	72.1	70.7	71.2	72.2	72.3	72.3	70.6	70.1	69.1	67.7	66.0	66.8	68.0	67.8	66.2
150000	72.6	70.7	71.6	72.5	72.7	72.5	71.0	70.1	69.5	67.8	66.0	67.1	68.4	67.7	66.6
160000	72.8	70.8	72.1	72.9	72.9	72.6	71.2	70.4	69.8	67.8	66.0	67.6	68.7	67.5	67.0
170000	72.9	70.8	72.2	72.8	73.1	72.7	71.4	70.4	70.0	67.7	66.0	67.8	68.7	67.7	67.2
180000	72.9	70.9	72.5	72.9	73.0	72.5	71.3	70.4	70.0	67.6	66.0	67.9	68.9	67.6	67.2
190000	72.7	70.7	72.4	72.9	72.8	72.2	71.2	70.1	69.8	67.4	65.9	67.8	68.6	67.4	67.1
200000	72.7	70.3	72.2	72.8	72.9	72.0	71.1	70.0	69.6	67.2	65.8	67.6	68.4	67.0	66.9
210000	72.5	70.1	72.1	72.6	72.7	71.8	70.7	69.7	69.3	67.1	65.7	67.6	68.1	66.8	66.6
220000	72.0	70.0	72.0	72.3	72.4	71.5	70.4	69.4	69.1	66.8	65.7	67.4	67.8	66.4	66.4
230000	71.9	69.8	71.7	72.2	72.3	71.2	70.1	69.0	68.7	66.7	65.6	67.2	67.6	66.1	66.0
Daily Max	72.9	71.6	72.5	72.9	73.1	72.7	71.4	70.4	70.0	68.4	66.5	67.9	68.9	68.1	67.2
Daily Min	70.2	69.8	68.5	70.3	71.2	71.2	69.3	68.3	66.7	66.3	65.5	65.3	65.9	66.1	64.2
Average	71.4	70.5	70.3	71.6	72.1	71.8	70.3	69.4	68.4	67.3	65.8	66.3	67.3	67.1	65.7

Grand Rapids UpstreamTemperature Summary - September 2017

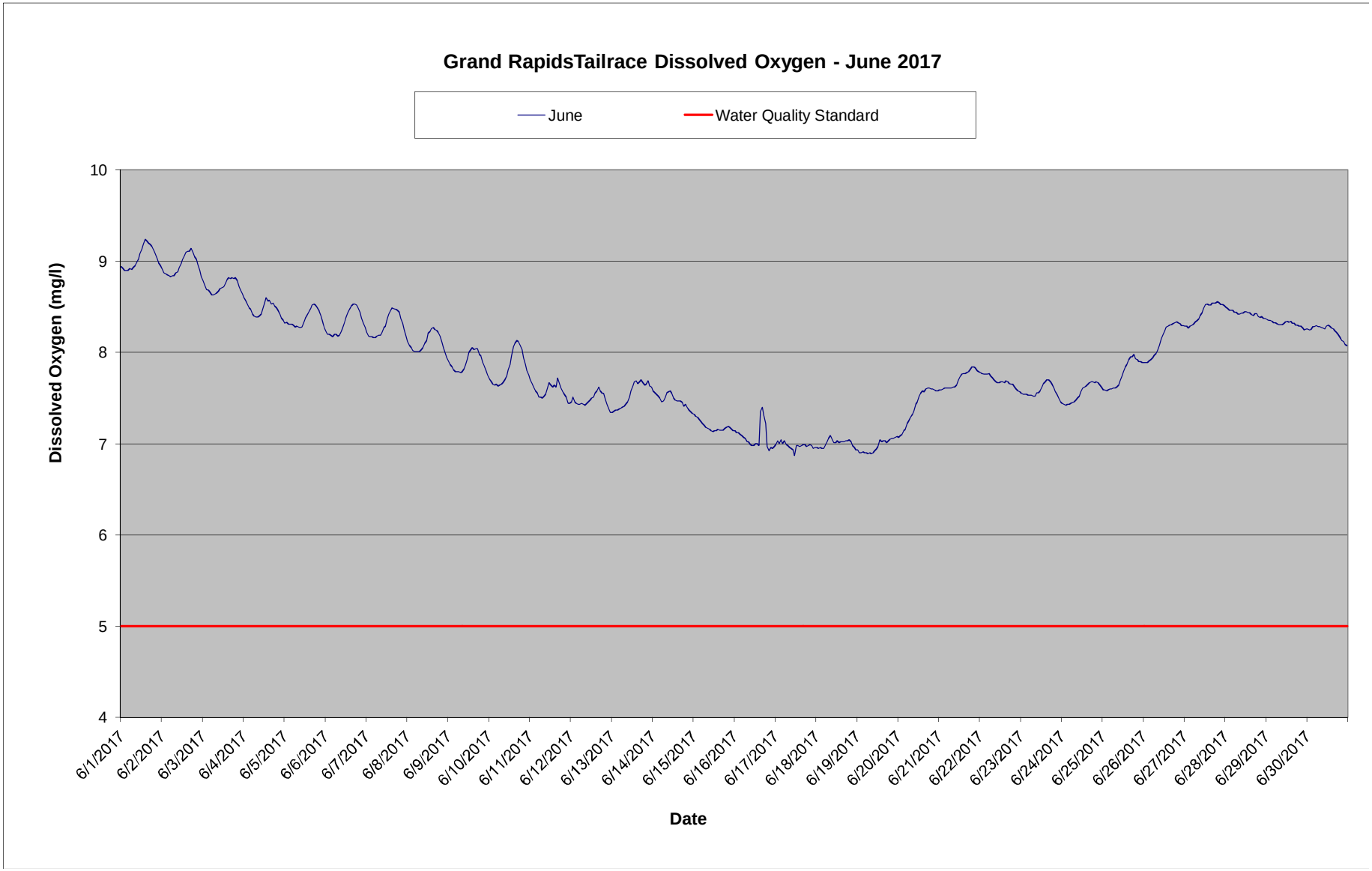
Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	65.7	65.2	62.4	65.2	64.6	63.2	62.6	61.2	61.3	61.7	62.1	63.0	64.3	65.3	66.2	67.8
10000	65.4	64.9	62.3	65.1	64.4	62.9	62.4	61.0	61.1	61.3	61.8	62.8	64.2	65.1	66.0	67.7
20000	65.2	64.6	62.2	65.0	64.3	62.7	62.3	60.7	60.8	61.1	61.7	62.6	64.0	64.8	66.0	67.5
30000	64.9	64.3	62.1	64.8	64.0	62.4	62.1	60.5	60.6	60.9	61.4	62.4	63.8	64.6	65.7	67.3
40000	64.6	64.1	61.9	64.7	63.8	62.3	61.9	60.2	60.4	60.6	61.1	62.3	63.6	64.4	65.6	67.2
50000	64.4	63.9	61.7	64.6	63.6	62.2	61.8	60.0	60.2	60.4	60.9	62.2	63.4	64.3	65.5	67.1
60000	64.2	63.7	61.6	64.6	63.4	62.0	61.7	59.8	60.1	60.2	60.8	62.0	63.3	64.0	65.4	67.0
70000	64.0	63.6	61.5	64.5	63.3	61.9	61.6	59.6	59.8	60.0	60.6	61.9	63.1	63.9	65.3	66.9
80000	64.0	63.5	61.4	64.5	63.3	61.8	61.6	59.5	59.8	59.9	60.5	61.9	63.1	63.8	65.2	66.9
90000	64.1	63.5	61.5	64.6	63.3	61.8	61.5	59.6	60.0	60.1	60.6	62.1	63.1	63.9	65.3	67.0
100000	64.4	63.7	61.9	64.7	63.3	62.2	61.6	59.7	60.2	60.3	60.8	62.3	63.3	64.1	65.7	67.3
110000	64.7	63.8	62.3	64.9	63.3	62.5	61.6	60.1	60.7	60.6	61.2	62.8	63.8	64.5	66.0	67.7
120000	65.2	63.8	63.0	65.1	63.3	62.9	61.8	60.4	61.1	61.1	61.7	63.4	64.3	65.1	66.6	68.2
130000	65.7	63.7	63.6	65.4	63.7	63.1	62.0	60.9	61.6	61.6	62.2	63.9	64.8	65.6	67.1	68.7
140000	66.1	63.7	64.2	65.7	63.9	63.4	62.3	61.4	62.1	62.2	62.8	64.5	65.4	66.2	67.5	68.9
150000	66.5	63.6	64.9	65.9	64.2	63.8	62.4	61.8	62.5	62.6	63.4	64.8	65.7	66.6	68.0	69.3
160000	66.7	63.6	65.3	66.1	64.4	63.6	62.4	62.0	62.8	63.0	63.6	65.2	66.1	67.1	68.4	69.6
170000	67.0	63.6	65.7	66.0	64.5	63.6	62.4	62.3	63.1	63.2	63.9	65.3	66.4	67.3	68.6	69.6
180000	66.8	63.6	65.8	66.1	64.5	63.7	62.4	62.4	63.0	63.2	63.9	65.4	66.3	67.4	68.8	69.7
190000	66.7	63.4	65.8	65.8	64.3	63.6	62.3	62.3	62.9	63.1	63.9	65.4	66.2	67.2	68.6	69.4
200000	66.5	63.3	65.8	65.5	64.0	63.4	62.1	62.1	62.7	62.9	63.7	65.1	66.1	67.0	68.5	69.4
210000	66.2	63.1	65.7	65.4	63.9	63.2	61.9	62.0	62.4	62.8	63.5	65.0	65.9	66.9	68.3	69.3
220000	65.7	62.9	65.6	65.0	63.7	63.0	61.7	61.6	62.2	62.4	63.3	64.8	65.7	66.6	68.0	69.0
230000	65.5	62.7	65.4	64.8	63.4	62.8	61.5	61.4	61.9	62.2	63.1	64.6	65.5	66.5	68.0	68.7
Daily Max	67.0	65.2	65.8	66.1	64.6	63.8	62.6	62.4	63.1	63.2	63.9	65.4	66.4	67.4	68.8	69.7
Daily Min	64.0	62.7	61.4	64.5	63.3	61.8	61.5	59.5	59.8	59.9	60.5	61.9	63.1	63.8	65.2	66.9
Average	65.4	63.7	63.5	65.2	63.8	62.8	62.0	60.9	61.4	61.6	62.2	63.6	64.6	65.5	66.8	68.2

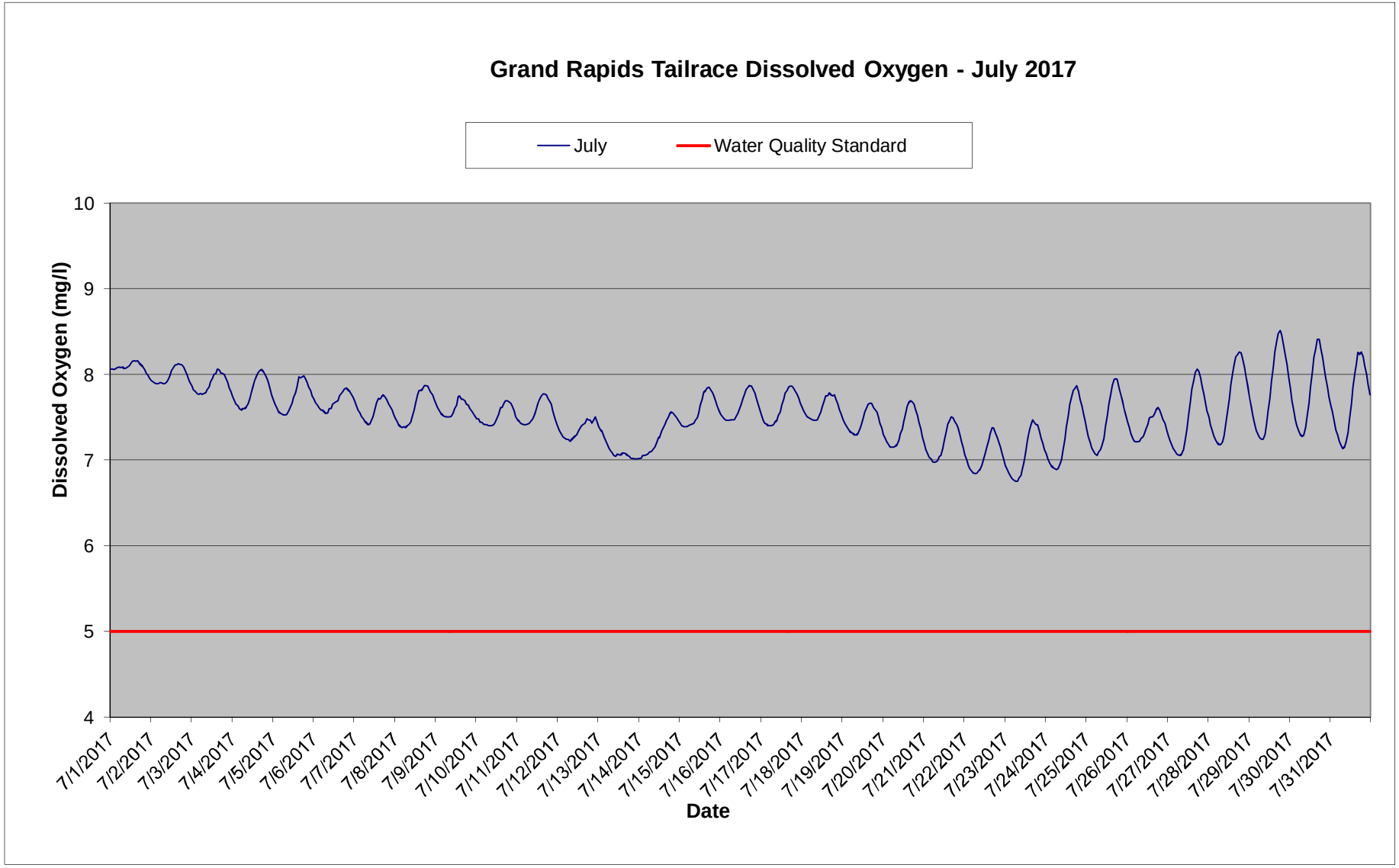
Monthly Average Temp: 65.8
License Maximum Temperature: 74 F

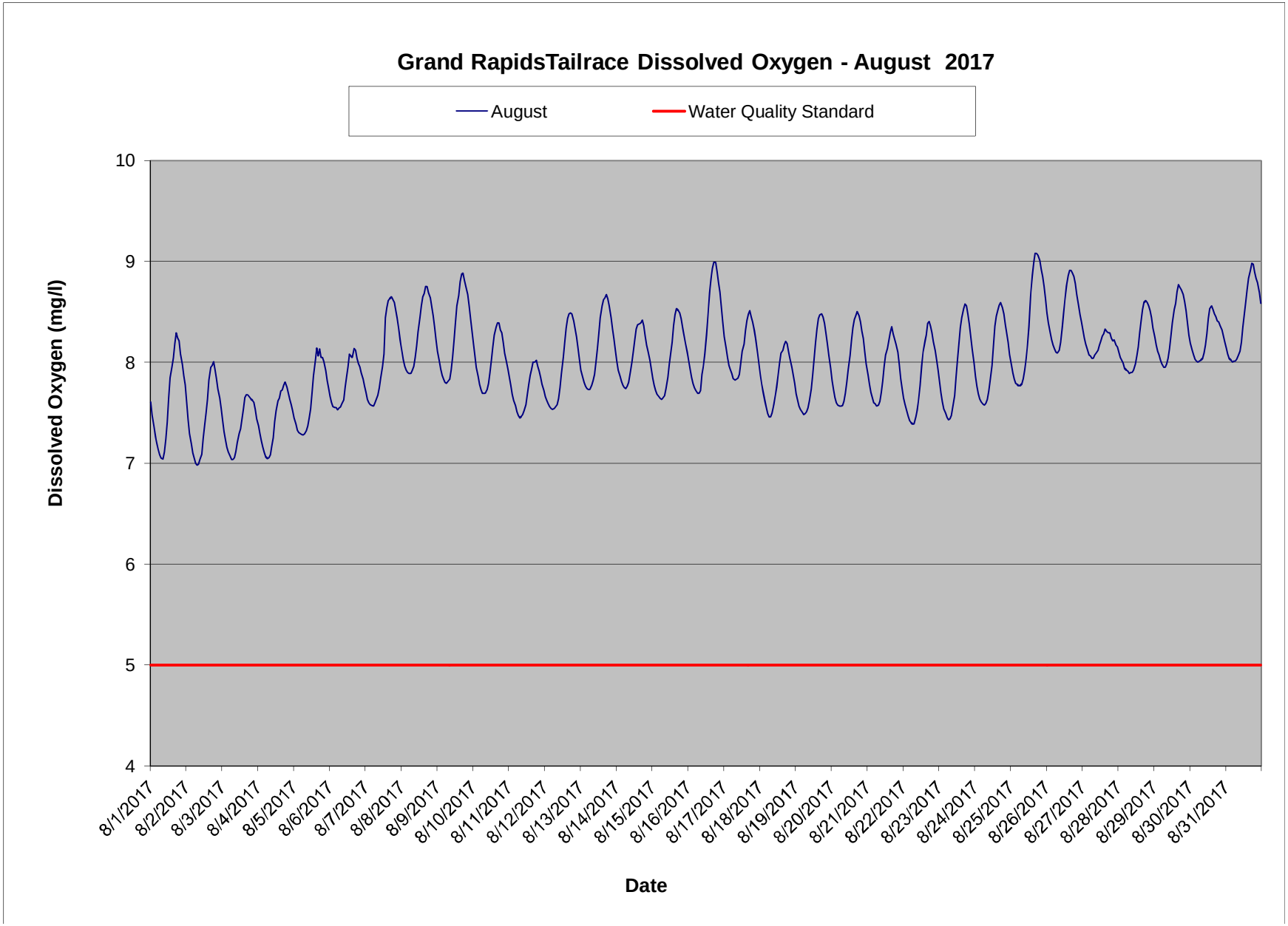
Grand Rapids UpstreamTemperature Summary - September 2017

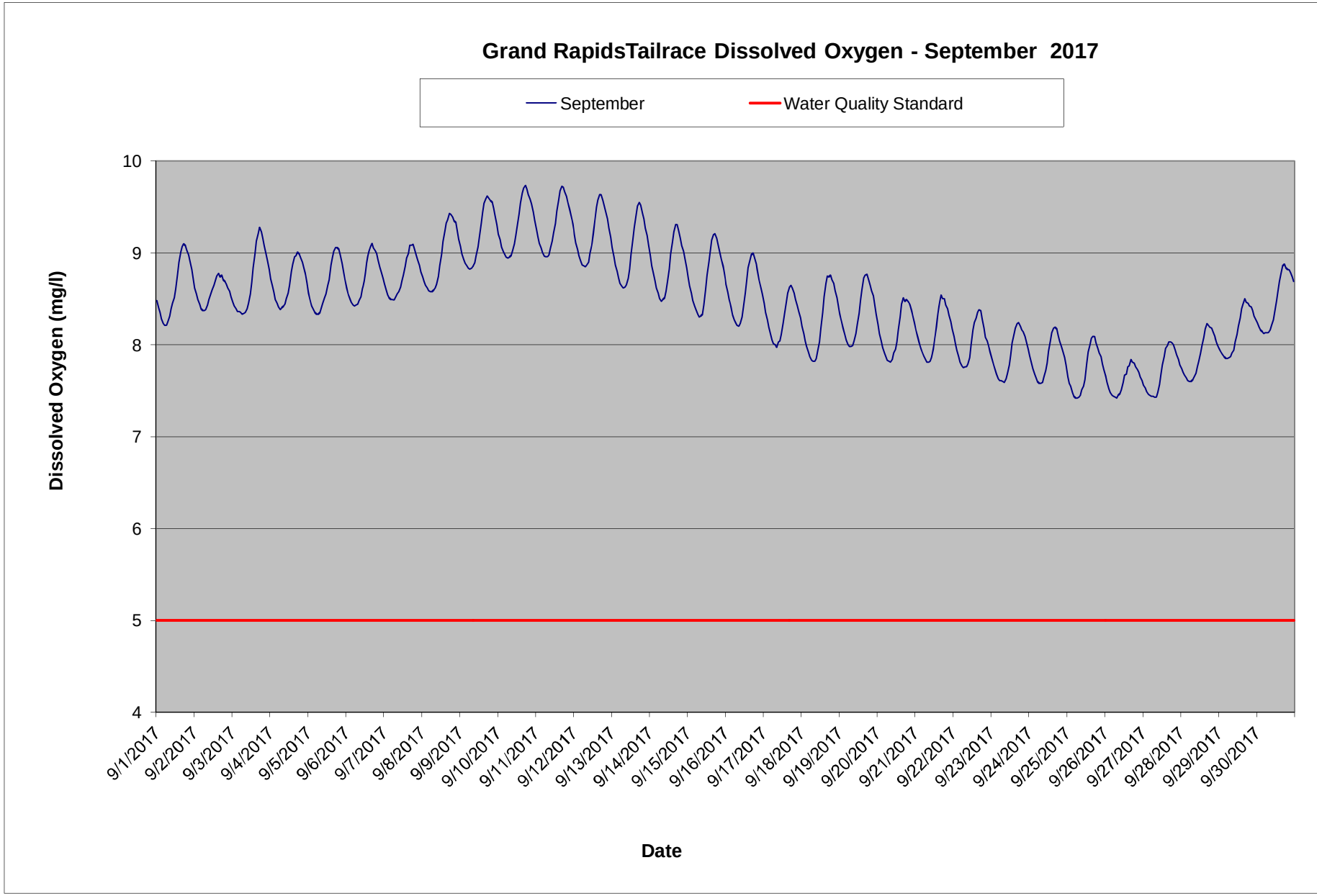
Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	68.7	68.4	67.6	67.9	67.6	69.4	68.9	70.4	71.0	71.0	69.8	67.0	66.0	63.7
10000	68.4	68.1	67.3	67.8	67.5	69.2	68.8	70.3	70.8	70.8	69.6	66.8	65.9	63.5
20000	68.4	67.9	67.1	67.5	67.4	69.0	68.6	70.2	70.5	70.6	69.3	66.6	65.7	63.2
30000	68.2	67.6	66.9	67.3	67.3	68.9	68.3	70.1	70.3	70.4	69.0	66.4	65.5	62.9
40000	68.0	67.5	66.8	67.1	67.2	68.7	68.2	70.0	70.2	70.3	68.8	66.2	65.2	62.6
50000	68.1	67.2	66.6	66.9	67.1	68.6	68.1	69.8	70.0	70.2	68.5	66.1	65.0	62.4
60000	68.0	66.9	66.5	66.7	67.0	68.5	68.0	69.7	69.9	70.2	68.3	65.9	64.8	62.1
70000	67.9	66.7	66.4	66.6	66.9	68.4	67.8	69.7	69.8	70.1	68.1	65.8	64.7	61.9
80000	67.9	66.6	66.3	66.5	66.8	68.3	67.8	69.6	69.8	70.1	67.9	65.6	64.4	61.7
90000	67.9	66.5	66.4	66.4	66.8	68.4	67.9	69.7	69.8	70.1	67.9	65.7	64.4	61.6
100000	68.1	66.7	66.6	66.4	67.0	68.7	68.1	70.0	70.0	70.2	67.8	65.8	64.5	61.7
110000	68.3	67.1	66.9	66.5	67.4	69.1	68.5	70.4	70.4	70.4	67.8	65.7	64.6	62.1
120000	68.7	67.4	67.2	66.5	68.0	69.6	68.9	70.9	70.9	70.6	67.9	66.0	64.7	62.5
130000	69.0	67.8	67.6	66.7	68.6	70.1	69.7	71.4	71.3	70.7	68.0	66.2	64.9	62.9
140000	69.2	68.3	68.2	67.1	69.0	70.4	70.0	72.0	71.7	71.0	68.2	66.5	65.1	63.3
150000	69.4	68.5	68.5	67.6	69.4	70.4	70.5	72.2	72.1	71.2	68.4	66.8	65.3	63.6
160000	69.6	68.7	68.9	67.8	69.7	70.4	70.8	72.5	72.3	71.2	68.5	67.1	65.4	63.8
170000	69.6	68.7	69.1	68.0	69.9	70.3	71.1	72.6	72.4	71.2	68.4	67.0	65.3	63.8
180000	69.5	68.6	69.0	68.1	69.9	70.3	71.1	72.5	72.3	71.2	68.2	66.9	65.2	63.7
190000	69.4	68.5	68.9	68.0	70.0	70.1	71.1	72.2	72.2	71.1	68.0	66.8	65.0	63.5
200000	69.2	68.3	68.7	68.1	69.8	69.9	70.9	72.0	71.8	70.9	67.8	66.6	64.8	63.3
210000	69.1	68.1	68.5	68.0	69.7	69.6	70.8	71.7	71.6	70.6	67.6	66.5	64.4	63.1
220000	68.8	67.9	68.3	67.8	69.6	69.3	70.7	71.4	71.4	70.3	67.4	66.4	64.2	62.9
230000	68.6	67.7	68.2	67.7	69.5	69.1	70.6	71.1	71.2	70.0	67.2	66.2	63.9	62.6
Daily Max	69.6	68.7	69.1	68.1	70.0	70.4	71.1	72.6	72.4	71.2	69.8	67.1	66.0	63.8
Daily Min	67.9	66.5	66.3	66.4	66.8	68.3	67.8	69.6	69.8	70.0	67.2	65.6	63.9	61.6
Average	68.7	67.7	67.6	67.3	68.3	69.4	69.4	70.9	71.0	70.6	68.3	66.4	64.9	62.8

Downstream Monitoring Data









Grand Rapids Tailrace Dissolved Oxygen Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	8.9	8.9	8.8	8.6	8.3	8.2	8.2	8.1	7.9	7.7	7.7	7.5	7.3	7.6	7.3	7.1
10000	8.9	8.9	8.7	8.6	8.3	8.2	8.2	8.1	7.9	7.7	7.7	7.5	7.4	7.6	7.3	7.1
20000	8.9	8.9	8.7	8.5	8.3	8.2	8.2	8.1	7.8	7.7	7.6	7.5	7.4	7.5	7.3	7.1
30000	8.9	8.9	8.7	8.5	8.3	8.2	8.2	8.0	7.8	7.6	7.6	7.4	7.4	7.5	7.3	7.1
40000	8.9	8.8	8.7	8.5	8.3	8.2	8.2	8.0	7.8	7.7	7.6	7.4	7.4	7.5	7.2	7.1
50000	8.9	8.8	8.6	8.4	8.3	8.2	8.2	8.0	7.8	7.6	7.5	7.4	7.4	7.5	7.2	7.1
60000	8.9	8.8	8.6	8.4	8.3	8.2	8.2	8.0	7.8	7.6	7.5	7.4	7.4	7.5	7.2	7.1
70000	8.9	8.8	8.6	8.4	8.3	8.2	8.2	8.0	7.8	7.7	7.5	7.4	7.4	7.5	7.2	7.0
80000	9.0	8.9	8.7	8.4	8.3	8.2	8.2	8.0	7.8	7.7	7.5	7.4	7.4	7.6	7.2	7.0
90000	9.0	8.9	8.7	8.4	8.3	8.2	8.2	8.1	7.8	7.7	7.5	7.4	7.5	7.6	7.2	7.0
100000	9.0	8.9	8.7	8.4	8.3	8.3	8.3	8.1	7.9	7.7	7.6	7.5	7.5	7.6	7.1	7.0
110000	9.1	9.0	8.7	8.5	8.3	8.3	8.3	8.1	7.9	7.8	7.7	7.5	7.6	7.6	7.1	7.0
120000	9.1	9.0	8.7	8.5	8.4	8.4	8.4	8.2	8.0	7.9	7.6	7.5	7.6	7.5	7.1	7.0
130000	9.2	9.1	8.8	8.6	8.4	8.4	8.4	8.2	8.0	8.0	7.6	7.5	7.7	7.5	7.1	7.0
140000	9.2	9.1	8.8	8.6	8.4	8.5	8.5	8.3	8.1	8.1	7.6	7.6	7.7	7.5	7.2	7.0
150000	9.2	9.1	8.8	8.6	8.5	8.5	8.5	8.3	8.0	8.1	7.6	7.6	7.7	7.5	7.2	7.4
160000	9.2	9.1	8.8	8.5	8.5	8.5	8.5	8.3	8.0	8.1	7.7	7.6	7.7	7.5	7.2	7.4
170000	9.2	9.1	8.8	8.5	8.5	8.5	8.5	8.2	8.0	8.1	7.7	7.6	7.7	7.5	7.2	7.3
180000	9.2	9.1	8.8	8.5	8.5	8.5	8.5	8.2	8.0	8.1	7.6	7.6	7.7	7.4	7.2	7.2
190000	9.1	9.1	8.8	8.5	8.5	8.5	8.4	8.2	8.0	8.0	7.6	7.6	7.6	7.4	7.2	7.0
200000	9.1	9.0	8.8	8.5	8.5	8.4	8.4	8.1	7.9	7.9	7.5	7.5	7.7	7.4	7.2	6.9
210000	9.0	9.0	8.7	8.4	8.4	8.4	8.3	8.1	7.9	7.9	7.5	7.4	7.7	7.4	7.2	7.0
220000	9.0	8.9	8.7	8.4	8.3	8.3	8.3	8.0	7.8	7.8	7.4	7.4	7.6	7.4	7.2	7.0
230000	9.0	8.8	8.6	8.4	8.3	8.3	8.2	7.9	7.8	7.8	7.4	7.3	7.6	7.3	7.1	7.0
Daily Max	9.2	9.1	8.8	8.6	8.5	8.5	8.5	8.3	8.1	8.1	7.7	7.6	7.7	7.6	7.3	7.4
Daily Min	8.9	8.8	8.6	8.4	8.3	8.2	8.2	7.9	7.8	7.6	7.4	7.3	7.3	7.3	7.1	6.9
Average	9.0	9.0	8.7	8.5	8.4	8.3	8.3	8.1	7.9	7.8	7.6	7.5	7.5	7.5	7.2	7.1

License Minimum DO: 5.0 mg/l

Grand Rapids Tailrace Dissolved Oxygen Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	7.0	7.0	6.9	7.1	7.6	7.8	7.6	7.4	7.6	7.9	8.3	8.5	8.4	8.3
10000	7.0	7.0	6.9	7.1	7.6	7.8	7.5	7.4	7.6	7.9	8.3	8.5	8.3	8.2
20000	7.0	7.0	6.9	7.1	7.6	7.8	7.5	7.4	7.6	7.9	8.3	8.5	8.3	8.3
30000	7.0	7.0	6.9	7.1	7.6	7.8	7.5	7.4	7.6	7.9	8.3	8.5	8.3	8.3
40000	7.0	7.0	6.9	7.2	7.6	7.8	7.5	7.4	7.6	7.9	8.3	8.5	8.3	8.3
50000	7.0	7.0	6.9	7.2	7.6	7.8	7.5	7.4	7.6	7.9	8.3	8.4	8.3	8.3
60000	7.0	7.0	6.9	7.3	7.6	7.7	7.5	7.5	7.6	8.0	8.3	8.4	8.3	8.3
70000	7.0	7.1	6.9	7.3	7.6	7.7	7.5	7.5	7.6	8.0	8.3	8.4	8.3	8.3
80000	7.0	7.1	6.9	7.3	7.6	7.7	7.5	7.5	7.6	8.0	8.4	8.4	8.3	8.3
90000	7.0	7.0	6.9	7.4	7.6	7.7	7.6	7.5	7.6	8.1	8.4	8.4	8.3	8.3
100000	6.9	7.0	6.9	7.4	7.6	7.7	7.6	7.5	7.7	8.1	8.4	8.4	8.3	8.3
110000	6.9	7.0	6.9	7.5	7.7	7.7	7.6	7.6	7.7	8.2	8.5	8.4	8.3	8.3
120000	7.0	7.0	7.0	7.5	7.7	7.7	7.6	7.6	7.8	8.2	8.5	8.4	8.3	8.3
130000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.6	7.8	8.3	8.5	8.4	8.3	8.3
140000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.6	7.9	8.3	8.5	8.4	8.3	8.3
150000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.7	7.9	8.3	8.5	8.4	8.3	8.3
160000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.7	8.0	8.3	8.5	8.4	8.3	8.2
170000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.7	8.0	8.3	8.5	8.4	8.3	8.2
180000	7.0	7.0	7.0	7.6	7.8	7.7	7.7	7.7	8.0	8.3	8.5	8.4	8.3	8.2
190000	7.0	7.0	7.1	7.6	7.8	7.7	7.6	7.7	7.9	8.3	8.6	8.4	8.3	8.2
200000	7.0	7.0	7.1	7.6	7.8	7.6	7.6	7.7	7.9	8.3	8.5	8.4	8.3	8.1
210000	7.0	7.0	7.1	7.6	7.8	7.6	7.5	7.7	7.9	8.3	8.5	8.4	8.3	8.1
220000	7.0	7.0	7.1	7.6	7.8	7.6	7.5	7.6	7.9	8.3	8.5	8.4	8.2	8.1
230000	7.0	6.9	7.1	7.6	7.8	7.6	7.5	7.6	7.9	8.3	8.5	8.4	8.3	8.1
Daily Max	7.0	7.1	7.1	7.6	7.8	7.8	7.7	7.7	8.0	8.3	8.6	8.5	8.4	8.3
Daily Min	6.9	6.9	6.9	7.1	7.6	7.6	7.5	7.4	7.6	7.9	8.3	8.4	8.2	8.1
Average	7.0	7.0	7.0	7.4	7.7	7.7	7.6	7.6	7.8	8.1	8.4	8.4	8.3	8.2

Grand Rapids Tailrace Dissolved Oxygen Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	8.1	7.9	7.9	7.7	7.7	7.7	7.7	7.5	7.7	7.5	7.5	7.4	7.4	7.0	7.4	7.5
10000	8.1	7.9	7.8	7.7	7.6	7.7	7.6	7.5	7.6	7.5	7.5	7.3	7.4	7.0	7.4	7.5
20000	8.1	7.9	7.8	7.7	7.6	7.6	7.6	7.4	7.6	7.4	7.4	7.3	7.3	7.1	7.4	7.5
30000	8.1	7.9	7.8	7.6	7.6	7.6	7.6	7.4	7.5	7.4	7.4	7.3	7.3	7.1	7.4	7.5
40000	8.1	7.9	7.8	7.6	7.5	7.6	7.5	7.4	7.5	7.4	7.4	7.3	7.2	7.1	7.4	7.5
50000	8.1	7.9	7.8	7.6	7.5	7.6	7.5	7.4	7.5	7.4	7.4	7.2	7.2	7.1	7.4	7.5
60000	8.1	7.9	7.8	7.6	7.5	7.6	7.5	7.4	7.5	7.4	7.4	7.2	7.1	7.1	7.4	7.5
70000	8.1	7.9	7.8	7.6	7.5	7.5	7.4	7.4	7.5	7.4	7.4	7.2	7.1	7.1	7.4	7.5
80000	8.1	7.9	7.8	7.6	7.5	7.6	7.4	7.4	7.5	7.4	7.5	7.2	7.1	7.1	7.4	7.5
90000	8.1	7.9	7.8	7.7	7.6	7.6	7.4	7.4	7.5	7.4	7.5	7.3	7.1	7.2	7.5	7.5
100000	8.1	7.9	7.9	7.7	7.6	7.6	7.5	7.5	7.6	7.4	7.5	7.3	7.0	7.2	7.5	7.5
110000	8.1	8.0	7.9	7.8	7.7	7.7	7.5	7.6	7.6	7.4	7.6	7.3	7.1	7.3	7.6	7.6
120000	8.1	8.0	8.0	7.9	7.7	7.7	7.6	7.7	7.6	7.5	7.7	7.3	7.1	7.3	7.6	7.7
130000	8.2	8.1	8.0	7.9	7.8	7.7	7.7	7.8	7.7	7.5	7.7	7.4	7.1	7.3	7.7	7.7
140000	8.2	8.1	8.0	8.0	7.9	7.7	7.7	7.8	7.8	7.6	7.7	7.4	7.1	7.4	7.8	7.8
150000	8.2	8.1	8.1	8.0	8.0	7.8	7.7	7.8	7.7	7.6	7.8	7.4	7.1	7.4	7.8	7.8
160000	8.2	8.1	8.0	8.0	8.0	7.8	7.7	7.8	7.7	7.7	7.8	7.4	7.1	7.5	7.8	7.9
170000	8.1	8.1	8.0	8.1	8.0	7.8	7.8	7.9	7.7	7.7	7.8	7.5	7.1	7.5	7.9	7.9
180000	8.1	8.1	8.0	8.0	8.0	7.8	7.7	7.9	7.7	7.7	7.7	7.5	7.0	7.5	7.8	7.9
190000	8.1	8.1	8.0	8.0	7.9	7.8	7.7	7.9	7.6	7.7	7.7	7.5	7.0	7.6	7.8	7.8
200000	8.1	8.0	8.0	8.0	7.9	7.8	7.7	7.8	7.6	7.7	7.7	7.4	7.0	7.5	7.8	7.8
210000	8.0	8.0	7.9	7.9	7.9	7.8	7.6	7.8	7.6	7.6	7.6	7.5	7.0	7.5	7.7	7.7
220000	8.0	7.9	7.8	7.8	7.8	7.8	7.6	7.8	7.5	7.6	7.5	7.5	7.0	7.5	7.6	7.7
230000	8.0	7.9	7.8	7.8	7.8	7.7	7.5	7.7	7.5	7.5	7.4	7.4	7.0	7.5	7.6	7.6
Daily Max	8.2	8.1	8.1	8.1	8.0	7.8	7.8	7.9	7.8	7.7	7.8	7.5	7.4	7.6	7.9	7.9
Daily Min	8.0	7.9	7.8	7.6	7.5	7.5	7.4	7.4	7.5	7.4	7.4	7.2	7.0	7.0	7.4	7.5
Average	8.1	8.0	7.9	7.8	7.7	7.7	7.6	7.6	7.6	7.5	7.6	7.4	7.1	7.3	7.6	7.6

License Minimum Dissolved Oxygen: 5.0 mg/l

Grand Rapids Tailrace Dissolved Oxygen Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	7.5	7.6	7.5	7.3	7.2	7.1	6.9	7.1	7.4	7.5	7.3	7.5	7.7	7.8	7.6
10000	7.5	7.6	7.4	7.3	7.1	7.0	6.9	7.0	7.3	7.4	7.2	7.4	7.6	7.7	7.6
20000	7.4	7.5	7.4	7.2	7.1	6.9	6.9	7.0	7.2	7.3	7.2	7.3	7.5	7.6	7.4
30000	7.4	7.5	7.4	7.2	7.0	6.9	6.8	6.9	7.1	7.3	7.1	7.3	7.4	7.5	7.3
40000	7.4	7.5	7.3	7.2	7.0	6.9	6.8	6.9	7.1	7.2	7.1	7.2	7.3	7.4	7.3
50000	7.4	7.5	7.3	7.2	7.0	6.9	6.8	6.9	7.1	7.2	7.1	7.2	7.3	7.3	7.2
60000	7.4	7.5	7.3	7.2	7.0	6.8	6.8	6.9	7.1	7.2	7.1	7.2	7.3	7.3	7.2
70000	7.4	7.5	7.3	7.2	7.0	6.8	6.8	6.9	7.1	7.2	7.1	7.2	7.2	7.3	7.1
80000	7.4	7.5	7.3	7.2	7.0	6.9	6.8	6.9	7.1	7.3	7.1	7.2	7.2	7.3	7.2
90000	7.5	7.5	7.3	7.2	7.0	6.9	6.8	7.0	7.2	7.3	7.1	7.3	7.3	7.4	7.2
100000	7.5	7.5	7.4	7.3	7.1	6.9	6.9	7.1	7.3	7.3	7.2	7.4	7.4	7.5	7.3
110000	7.6	7.6	7.4	7.4	7.1	7.0	7.0	7.2	7.4	7.4	7.4	7.6	7.6	7.7	7.5
120000	7.6	7.6	7.5	7.5	7.2	7.1	7.1	7.4	7.5	7.4	7.5	7.7	7.7	7.9	7.7
130000	7.7	7.7	7.6	7.6	7.3	7.2	7.2	7.5	7.7	7.5	7.7	7.9	7.9	8.0	7.8
140000	7.8	7.8	7.6	7.6	7.4	7.2	7.3	7.7	7.8	7.5	7.8	8.0	8.1	8.2	8.0
150000	7.8	7.8	7.7	7.7	7.5	7.3	7.4	7.7	7.9	7.5	7.9	8.1	8.3	8.3	8.1
160000	7.9	7.8	7.7	7.7	7.5	7.4	7.5	7.8	7.9	7.5	8.0	8.2	8.4	8.4	8.3
170000	7.9	7.8	7.7	7.7	7.5	7.4	7.4	7.8	8.0	7.6	8.1	8.2	8.5	8.4	8.2
180000	7.9	7.8	7.6	7.7	7.5	7.3	7.4	7.9	7.9	7.6	8.0	8.3	8.5	8.3	8.3
190000	7.8	7.8	7.6	7.6	7.4	7.3	7.4	7.8	7.8	7.6	8.0	8.3	8.5	8.2	8.2
200000	7.8	7.7	7.6	7.5	7.4	7.2	7.3	7.7	7.8	7.5	7.9	8.2	8.3	8.1	8.1
210000	7.8	7.7	7.5	7.4	7.3	7.2	7.3	7.6	7.7	7.5	7.8	8.1	8.2	8.0	8.0
220000	7.7	7.6	7.4	7.4	7.2	7.1	7.2	7.5	7.6	7.4	7.7	8.0	8.1	7.8	7.9
230000	7.7	7.5	7.4	7.3	7.1	7.0	7.1	7.4	7.5	7.4	7.6	7.9	8.0	7.7	7.8
Daily Max	7.9	7.8	7.7	7.7	7.5	7.4	7.5	7.9	8.0	7.6	8.1	8.3	8.5	8.4	8.3
Daily Min	7.4	7.5	7.3	7.2	7.0	6.8	6.8	6.9	7.1	7.2	7.1	7.2	7.2	7.3	7.1
Average	7.6	7.6	7.5	7.4	7.2	7.1	7.1	7.3	7.5	7.4	7.5	7.7	7.8	7.8	7.7

Grand Rapids Tailrace Dissolved Oxygen Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	7.6	7.6	7.4	7.4	7.4	7.7	7.7	8.1	8.1	8.2	7.9	7.7	7.9	8.0	7.8	8.0
10000	7.5	7.4	7.3	7.3	7.4	7.6	7.6	8.0	8.0	8.1	7.8	7.6	7.9	7.9	7.8	7.9
20000	7.4	7.3	7.2	7.2	7.3	7.6	7.6	8.0	7.9	8.0	7.7	7.6	7.8	7.9	7.7	7.9
30000	7.3	7.2	7.2	7.2	7.3	7.6	7.6	7.9	7.9	7.9	7.6	7.6	7.8	7.8	7.7	7.8
40000	7.2	7.1	7.1	7.1	7.3	7.6	7.6	7.9	7.8	7.8	7.6	7.5	7.7	7.8	7.7	7.8
50000	7.1	7.1	7.1	7.1	7.3	7.5	7.6	7.9	7.8	7.7	7.5	7.5	7.7	7.8	7.6	7.7
60000	7.1	7.0	7.0	7.0	7.3	7.5	7.6	7.9	7.8	7.7	7.5	7.5	7.7	7.7	7.6	7.7
70000	7.1	7.0	7.0	7.1	7.3	7.6	7.6	7.9	7.8	7.7	7.5	7.6	7.8	7.8	7.7	7.7
80000	7.0	7.0	7.1	7.1	7.3	7.6	7.7	8.0	7.8	7.7	7.5	7.6	7.8	7.8	7.7	7.7
90000	7.1	7.0	7.1	7.2	7.4	7.6	7.7	8.1	7.9	7.7	7.5	7.6	7.9	7.9	7.7	7.9
100000	7.2	7.1	7.2	7.3	7.4	7.8	7.8	8.2	8.1	7.8	7.5	7.8	8.0	8.0	7.9	8.0
110000	7.4	7.2	7.3	7.4	7.5	7.9	8.0	8.3	8.2	7.9	7.6	7.9	8.1	8.1	8.0	8.1
120000	7.6	7.4	7.3	7.5	7.7	8.0	8.1	8.4	8.4	8.0	7.7	8.1	8.3	8.2	8.1	8.3
130000	7.8	7.5	7.4	7.6	7.9	8.1	8.4	8.6	8.6	8.2	7.8	8.2	8.4	8.3	8.2	8.5
140000	8.0	7.6	7.5	7.6	8.0	8.1	8.5	8.7	8.7	8.3	7.9	8.3	8.6	8.4	8.4	8.7
150000	8.0	7.8	7.6	7.7	8.1	8.0	8.6	8.7	8.8	8.4	7.9	8.4	8.6	8.4	8.5	8.8
160000	8.2	7.9	7.7	7.7	8.1	8.1	8.6	8.8	8.9	8.4	8.0	8.5	8.6	8.4	8.5	8.9
170000	8.3	8.0	7.7	7.8	8.1	8.1	8.7	8.8	8.9	8.4	8.0	8.5	8.7	8.4	8.5	9.0
180000	8.2	8.0	7.7	7.8	8.0	8.0	8.6	8.7	8.8	8.3	8.0	8.5	8.6	8.4	8.5	9.0
190000	8.2	7.9	7.6	7.8	8.0	8.0	8.6	8.6	8.8	8.3	8.0	8.4	8.6	8.3	8.4	8.9
200000	8.1	7.8	7.6	7.7	8.0	8.0	8.5	8.6	8.7	8.2	7.9	8.3	8.4	8.2	8.4	8.8
210000	8.0	7.7	7.6	7.6	7.9	7.9	8.4	8.5	8.6	8.1	7.9	8.3	8.3	8.1	8.3	8.7
220000	7.9	7.6	7.5	7.6	7.8	7.8	8.3	8.4	8.4	8.0	7.8	8.1	8.2	8.0	8.2	8.5
230000	7.8	7.5	7.4	7.5	7.7	7.8	8.2	8.2	8.3	7.9	7.7	8.0	8.1	7.9	8.1	8.4
Daily Max	8.3	8.0	7.7	7.8	8.1	8.1	8.7	8.8	8.9	8.4	8.0	8.5	8.7	8.4	8.5	9.0
Daily Min	7.0	7.0	7.0	7.0	7.3	7.5	7.6	7.9	7.8	7.7	7.5	7.5	7.7	7.7	7.6	7.7
Average	7.6	7.5	7.4	7.4	7.7	7.8	8.1	8.3	8.3	8.0	7.7	8.0	8.2	8.1	8.0	8.3

License Minimum Dissolved Oxygen: 5.0 mg/l

Grand Rapids Tailrace Dissolved Oxygen Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	8.3	7.9	7.7	7.8	7.9	7.6	7.8	7.9	8.0	8.5	8.3	8.1	8.3	8.2	8.1
10000	8.1	7.8	7.6	7.7	7.8	7.6	7.7	7.8	7.9	8.4	8.2	8.1	8.2	8.1	8.1
20000	8.0	7.7	7.6	7.6	7.7	7.5	7.6	7.7	7.8	8.3	8.2	8.0	8.1	8.1	8.0
30000	8.0	7.6	7.5	7.6	7.6	7.5	7.5	7.6	7.8	8.2	8.1	8.0	8.1	8.0	8.0
40000	7.9	7.6	7.5	7.6	7.6	7.4	7.5	7.6	7.8	8.2	8.1	7.9	8.0	8.0	8.0
50000	7.9	7.5	7.5	7.6	7.6	7.4	7.5	7.6	7.8	8.1	8.1	7.9	8.0	8.0	8.0
60000	7.8	7.5	7.5	7.6	7.6	7.4	7.4	7.6	7.8	8.1	8.0	7.9	8.0	8.0	8.0
70000	7.8	7.5	7.5	7.6	7.6	7.4	7.4	7.6	7.8	8.1	8.0	7.9	8.0	8.0	8.0
80000	7.8	7.5	7.5	7.6	7.6	7.5	7.5	7.6	7.8	8.1	8.1	7.9	8.0	8.0	8.1
90000	7.8	7.6	7.6	7.7	7.7	7.5	7.6	7.7	7.9	8.2	8.1	7.9	8.0	8.1	8.1
100000	7.9	7.7	7.7	7.8	7.8	7.6	7.7	7.8	8.0	8.3	8.1	7.9	8.1	8.2	8.2
110000	8.0	7.8	7.9	7.9	8.0	7.8	7.9	8.0	8.2	8.5	8.2	8.0	8.3	8.3	8.4
120000	8.1	7.9	8.0	8.1	8.1	7.9	8.0	8.2	8.4	8.6	8.2	8.1	8.4	8.4	8.5
130000	8.2	8.0	8.2	8.2	8.1	8.1	8.2	8.4	8.7	8.8	8.3	8.2	8.5	8.5	8.6
140000	8.3	8.1	8.3	8.3	8.2	8.2	8.3	8.5	8.9	8.9	8.3	8.3	8.6	8.6	8.7
150000	8.4	8.1	8.4	8.4	8.3	8.3	8.4	8.5	9.0	8.9	8.3	8.4	8.7	8.5	8.8
160000	8.5	8.2	8.5	8.5	8.4	8.4	8.5	8.6	9.1	8.9	8.3	8.5	8.8	8.5	8.9
170000	8.5	8.2	8.5	8.5	8.3	8.4	8.6	8.6	9.1	8.9	8.3	8.6	8.7	8.5	9.0
180000	8.5	8.2	8.4	8.5	8.2	8.4	8.6	8.5	9.1	8.9	8.3	8.6	8.7	8.4	9.0
190000	8.4	8.1	8.4	8.4	8.2	8.3	8.5	8.5	9.0	8.8	8.2	8.6	8.7	8.4	8.9
200000	8.3	8.0	8.3	8.3	8.1	8.2	8.4	8.4	8.9	8.7	8.2	8.6	8.6	8.4	8.8
210000	8.2	8.0	8.2	8.2	8.0	8.1	8.3	8.3	8.9	8.6	8.2	8.5	8.5	8.3	8.8
220000	8.1	7.9	8.1	8.1	7.8	8.0	8.1	8.2	8.8	8.5	8.2	8.4	8.4	8.3	8.7
230000	8.0	7.8	7.9	8.0	7.7	7.9	8.0	8.1	8.6	8.4	8.2	8.3	8.3	8.2	8.6
Daily Max	8.5	8.2	8.5	8.5	8.4	8.4	8.6	8.6	9.1	8.9	8.3	8.6	8.8	8.6	9.0
Daily Min	7.8	7.5	7.5	7.6	7.6	7.4	7.4	7.6	7.8	8.1	8.0	7.9	8.0	8.0	8.0
Average	8.1	7.8	7.9	8.0	7.9	7.8	8.0	8.0	8.4	8.5	8.2	8.2	8.3	8.2	8.4

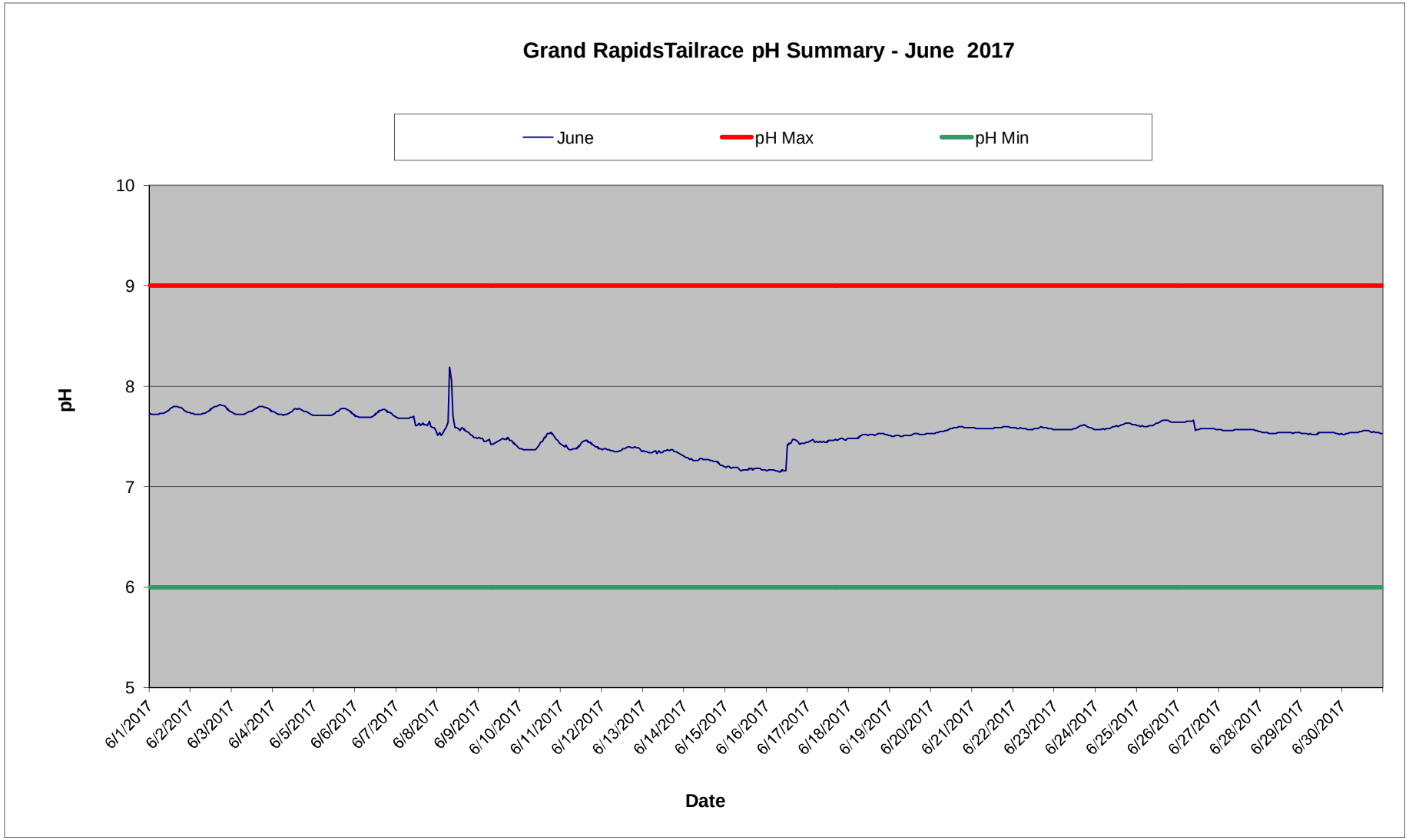
Grand Rapids Tailrace Dissolved Oxygen Summary - September 2017

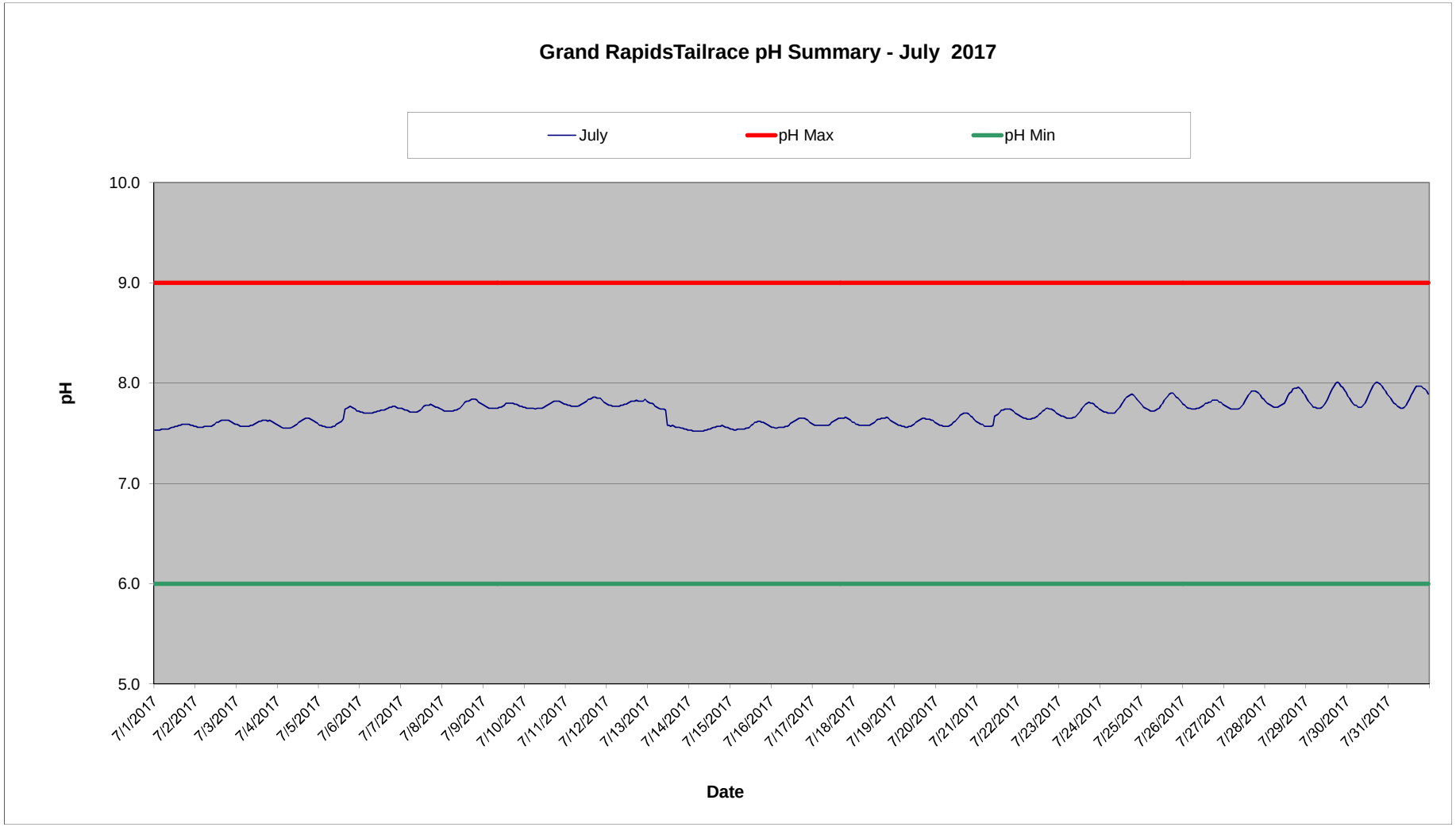
Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	8.5	8.6	8.5	8.7	8.6	8.6	8.7	8.7	9.1	9.2	9.3	9.2	9.1	9.0	8.7	8.7
10000	8.4	8.6	8.4	8.6	8.5	8.6	8.6	8.7	9.0	9.1	9.2	9.1	9.0	8.9	8.6	8.6
20000	8.4	8.5	8.4	8.6	8.4	8.5	8.5	8.6	8.9	9.1	9.1	9.0	8.9	8.8	8.6	8.5
30000	8.3	8.4	8.4	8.5	8.4	8.5	8.5	8.6	8.9	9.0	9.1	9.0	8.8	8.7	8.5	8.4
40000	8.2	8.4	8.4	8.5	8.4	8.4	8.5	8.6	8.9	9.0	9.0	8.9	8.7	8.6	8.4	8.3
50000	8.2	8.4	8.4	8.4	8.3	8.4	8.5	8.6	8.8	9.0	9.0	8.9	8.7	8.6	8.4	8.3
60000	8.2	8.4	8.3	8.4	8.3	8.4	8.5	8.6	8.8	8.9	9.0	8.9	8.6	8.5	8.3	8.2
70000	8.3	8.4	8.3	8.4	8.4	8.4	8.5	8.6	8.8	9.0	9.0	8.8	8.6	8.5	8.3	8.2
80000	8.3	8.4	8.4	8.4	8.4	8.5	8.6	8.6	8.9	9.0	9.0	8.9	8.6	8.5	8.3	8.2
90000	8.4	8.5	8.4	8.4	8.5	8.5	8.6	8.7	8.9	9.0	9.0	8.9	8.7	8.5	8.3	8.2
100000	8.5	8.6	8.5	8.5	8.5	8.6	8.6	8.7	9.0	9.1	9.1	9.0	8.7	8.6	8.4	8.3
110000	8.5	8.6	8.6	8.6	8.6	8.7	8.7	8.9	9.1	9.2	9.2	9.1	8.8	8.7	8.6	8.4
120000	8.6	8.7	8.7	8.7	8.7	8.8	8.8	9.0	9.2	9.3	9.3	9.2	9.0	8.8	8.8	8.6
130000	8.8	8.7	8.8	8.8	8.7	8.9	8.9	9.1	9.3	9.4	9.5	9.4	9.1	9.0	8.9	8.7
140000	8.9	8.8	9.0	8.9	8.9	9.0	8.9	9.2	9.4	9.5	9.6	9.5	9.3	9.1	9.0	8.8
150000	9.0	8.8	9.1	9.0	8.9	9.1	9.0	9.3	9.5	9.6	9.7	9.6	9.4	9.2	9.1	8.9
160000	9.1	8.7	9.2	9.0	9.0	9.1	9.1	9.4	9.6	9.7	9.7	9.6	9.5	9.3	9.2	9.0
170000	9.1	8.8	9.3	9.0	9.1	9.1	9.1	9.4	9.6	9.7	9.7	9.6	9.6	9.3	9.2	9.0
180000	9.1	8.7	9.2	9.0	9.1	9.0	9.1	9.4	9.6	9.7	9.7	9.6	9.5	9.2	9.2	9.0
190000	9.0	8.7	9.2	9.0	9.0	9.0	9.0	9.4	9.6	9.6	9.6	9.5	9.4	9.2	9.1	8.9
200000	9.0	8.7	9.1	8.9	9.0	8.9	9.0	9.4	9.5	9.6	9.5	9.4	9.4	9.1	9.0	8.8
210000	8.9	8.6	9.0	8.8	8.9	8.8	8.9	9.3	9.5	9.5	9.5	9.4	9.3	9.0	8.9	8.7
220000	8.8	8.6	8.9	8.8	8.8	8.8	8.9	9.2	9.4	9.4	9.4	9.3	9.2	8.9	8.9	8.6
230000	8.7	8.5	8.8	8.7	8.7	8.7	8.8	9.1	9.3	9.4	9.3	9.2	9.1	8.8	8.8	8.6
Daily Max	9.1	8.8	9.3	9.0	9.1	9.1	9.1	9.4	9.6	9.7	9.7	9.6	9.6	9.3	9.2	9.0
Daily Min	8.2	8.4	8.3	8.4	8.3	8.4	8.5	8.6	8.8	8.9	9.0	8.8	8.6	8.5	8.3	8.2
Average	8.6	8.6	8.7	8.7	8.7	8.7	8.8	9.0	9.2	9.3	9.3	9.2	9.0	8.9	8.7	8.6

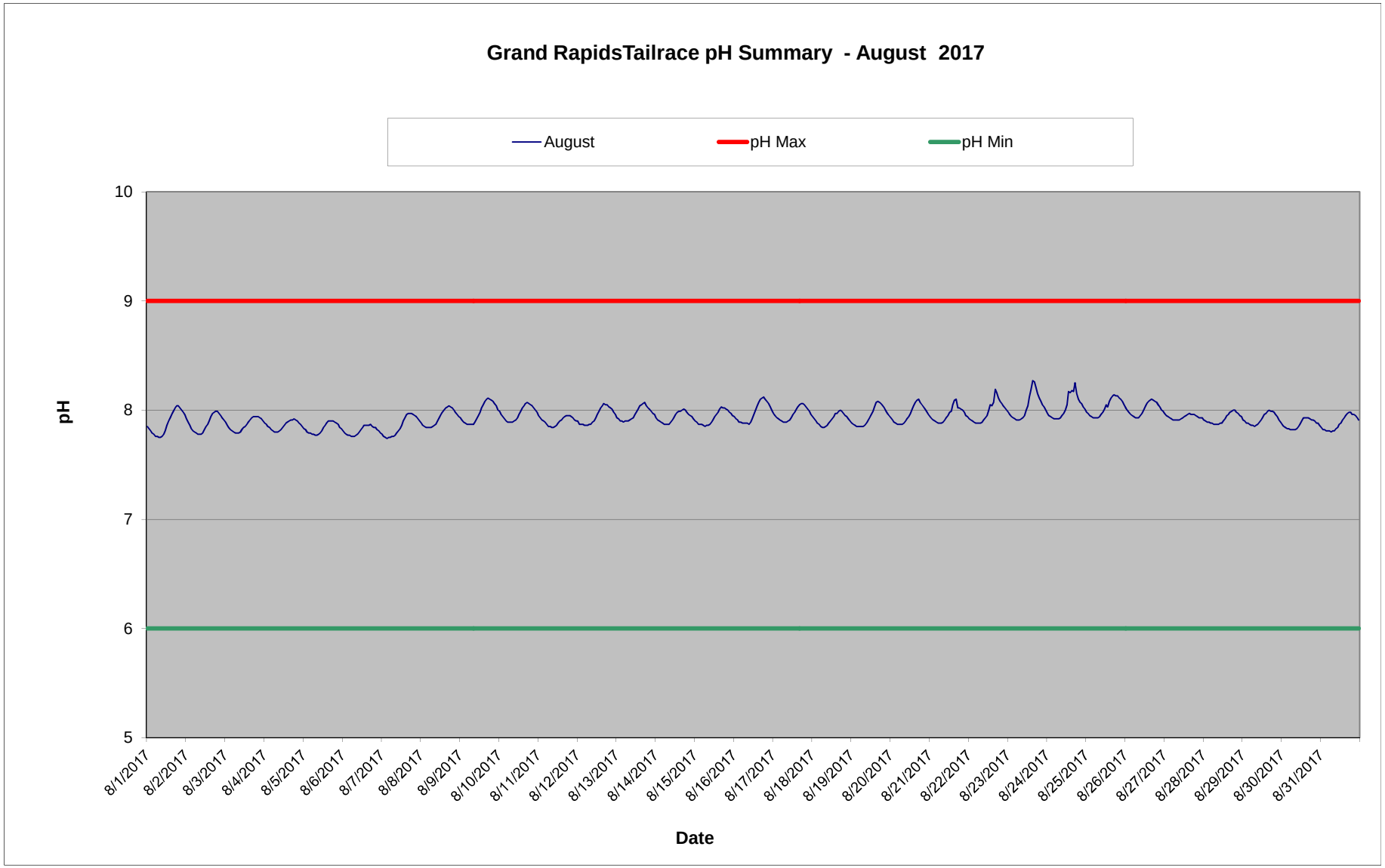
License Minimum Dissolved Oxygen: 5.0 mg/l

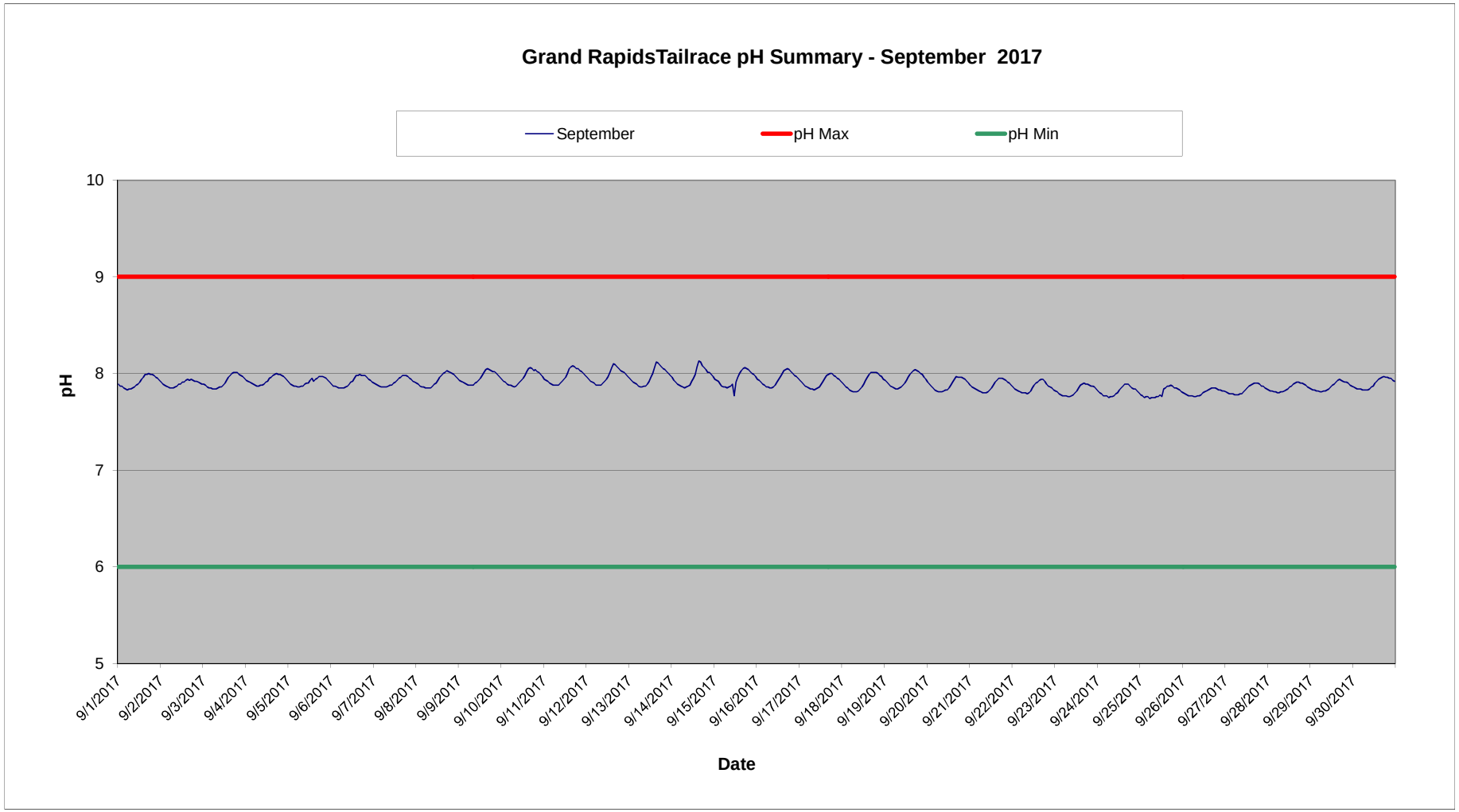
Grand Rapids Tailrace Dissolved Oxygen Summary - September 2017

Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	8.5	8.2	8.3	8.2	8.2	8.1	7.9	7.9	7.7	7.7	7.6	7.7	8.0	8.2
10000	8.4	8.1	8.3	8.1	8.1	8.0	7.8	7.8	7.6	7.6	7.5	7.7	7.9	8.2
20000	8.3	8.0	8.2	8.0	8.0	7.9	7.7	7.7	7.6	7.5	7.5	7.7	7.9	8.2
30000	8.2	8.0	8.1	8.0	8.0	7.9	7.7	7.7	7.5	7.5	7.5	7.6	7.9	8.1
40000	8.1	7.9	8.1	7.9	7.9	7.8	7.6	7.6	7.4	7.5	7.5	7.6	7.9	8.1
50000	8.1	7.9	8.0	7.9	7.9	7.8	7.6	7.6	7.4	7.4	7.4	7.6	7.9	8.1
60000	8.0	7.8	8.0	7.8	7.8	7.8	7.6	7.6	7.4	7.4	7.4	7.6	7.9	8.1
70000	8.0	7.8	8.0	7.8	7.8	7.8	7.6	7.6	7.4	7.4	7.4	7.6	7.9	8.1
80000	8.0	7.8	8.0	7.8	7.8	7.8	7.6	7.6	7.5	7.5	7.4	7.7	7.9	8.2
90000	8.0	7.9	8.0	7.8	7.8	7.8	7.6	7.7	7.5	7.5	7.5	7.7	7.9	8.2
100000	8.0	7.9	8.1	7.9	7.9	7.9	7.7	7.7	7.6	7.5	7.6	7.8	8.0	8.3
110000	8.1	8.0	8.2	8.0	8.0	8.0	7.8	7.8	7.6	7.6	7.7	7.8	8.1	8.4
120000	8.2	8.2	8.3	8.0	8.1	8.2	7.9	7.9	7.8	7.7	7.8	7.9	8.2	8.5
130000	8.3	8.4	8.5	8.2	8.2	8.2	8.0	8.0	7.9	7.7	7.9	8.0	8.3	8.6
140000	8.5	8.5	8.6	8.3	8.3	8.3	8.1	8.1	8.0	7.8	8.0	8.1	8.4	8.7
150000	8.6	8.7	8.7	8.4	8.5	8.4	8.2	8.2	8.1	7.8	8.0	8.2	8.4	8.8
160000	8.6	8.8	8.8	8.5	8.5	8.4	8.2	8.2	8.1	7.8	8.0	8.2	8.5	8.9
170000	8.7	8.7	8.8	8.5	8.5	8.4	8.2	8.2	8.1	7.8	8.0	8.2	8.5	8.9
180000	8.6	8.8	8.7	8.5	8.5	8.3	8.2	8.1	8.0	7.8	8.0	8.2	8.5	8.8
190000	8.6	8.7	8.7	8.5	8.4	8.2	8.2	8.0	8.0	7.8	8.0	8.2	8.4	8.8
200000	8.5	8.7	8.6	8.5	8.4	8.1	8.1	8.0	7.9	7.7	7.9	8.1	8.4	8.8
210000	8.4	8.6	8.5	8.4	8.3	8.0	8.1	7.9	7.9	7.7	7.9	8.1	8.4	8.8
220000	8.4	8.5	8.4	8.3	8.3	8.0	8.0	7.9	7.8	7.7	7.8	8.0	8.3	8.7
230000	8.3	8.4	8.3	8.2	8.2	7.9	8.0	7.8	7.7	7.6	7.8	8.0	8.3	8.7
Daily Max	8.7	8.8	8.8	8.5	8.5	8.4	8.2	8.2	8.1	7.8	8.0	8.2	8.5	8.9
Daily Min	8.0	7.8	8.0	7.8	7.8	7.8	7.6	7.6	7.4	7.4	7.4	7.6	7.9	8.1
Average	8.3	8.3	8.3	8.1	8.1	8.0	7.9	7.9	7.7	7.6	7.7	7.9	8.1	8.5









Grand Rapids Tailrace pH Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.5	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2
10000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2
20000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2
30000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.2
40000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.2
50000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.2
60000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2
70000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	8.2	7.4	7.4	7.4	7.4	7.4	7.3	7.2	7.2
80000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	8.1	7.4	7.4	7.4	7.4	7.3	7.3	7.2	7.2
90000	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.4	7.4	7.4	7.4	7.4	7.3	7.2	7.2
100000	7.8	7.8	7.8	7.7	7.7	7.7	7.7	7.6	7.4	7.4	7.4	7.4	7.3	7.3	7.2	7.2
110000	7.8	7.8	7.8	7.8	7.7	7.7	7.6	7.6	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.2
120000	7.8	7.8	7.8	7.8	7.7	7.7	7.6	7.6	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.4
130000	7.8	7.8	7.8	7.8	7.8	7.7	7.6	7.6	7.5	7.5	7.5	7.4	7.4	7.3	7.2	7.4
140000	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.5	7.5	7.5	7.4	7.4	7.3	7.2	7.4
150000	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.5	7.5	7.5	7.4	7.4	7.3	7.2	7.5
160000	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.5	7.5	7.4	7.4	7.4	7.3	7.2	7.5
170000	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.5	7.5	7.4	7.4	7.4	7.3	7.2	7.5
180000	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.5	7.5	7.5	7.4	7.4	7.4	7.3	7.2	7.5
190000	7.8	7.8	7.8	7.8	7.8	7.7	7.7	7.5	7.5	7.5	7.4	7.4	7.4	7.3	7.2	7.4
200000	7.8	7.8	7.8	7.7	7.8	7.7	7.6	7.5	7.4	7.5	7.4	7.4	7.3	7.2	7.2	7.4
210000	7.8	7.8	7.8	7.7	7.8	7.7	7.6	7.5	7.4	7.5	7.4	7.4	7.3	7.2	7.2	7.4
220000	7.7	7.8	7.8	7.7	7.7	7.7	7.6	7.5	7.4	7.5	7.4	7.4	7.3	7.2	7.2	7.4
230000	7.7	7.8	7.8	7.7	7.7	7.7	7.6	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2	7.4
Daily Max	7.8	7.8	7.8	7.8	7.8	7.8	7.7	8.2	7.5	7.5	7.5	7.4	7.4	7.3	7.2	7.5
Daily Min	7.7	7.7	7.7	7.7	7.7	7.7	7.6	7.5	7.4	7.4	7.4	7.4	7.3	7.2	7.2	7.2
Average	7.8	7.8	7.8	7.7	7.7	7.7	7.6	7.6	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.3

License maximum pH: 9
License minimum pH: 6

Grand Rapids Tailrace pH Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5
10000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
20000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
30000	7.5	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
40000	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
50000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.5	7.5	7.5
60000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.5	7.5	7.5
70000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.5	7.5	7.5
80000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.5	7.5	7.5
90000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.5	7.5	7.5
100000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6
110000	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6
120000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6
130000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6
140000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.6
150000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.6
160000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.6
170000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.5
180000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.6
190000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.5	7.5
200000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
210000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
220000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
230000	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
Daily Max	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.6	7.6	7.5	7.6
Daily Min	7.4	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
Average	7.5	7.5	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5

Grand Rapids Tailrace pH Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	7.5	7.6	7.6	7.6	7.6	7.7	7.8	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
10000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
20000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
30000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
40000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
50000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.5	7.6
60000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.5	7.5	7.6
70000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.5	7.5	7.6
80000	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.5	7.5	7.6
90000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.5	7.6	7.6
100000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.7	7.5	7.6	7.6
110000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.6	7.5	7.6	7.6
120000	7.6	7.6	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.5	7.6	7.6
130000	7.6	7.6	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.6	7.6
140000	7.6	7.6	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.6	7.6	7.6	7.6
150000	7.6	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.6
160000	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.7
170000	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.7
180000	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.7
190000	7.6	7.6	7.6	7.6	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.7
200000	7.6	7.6	7.6	7.6	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.6	7.6
210000	7.6	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.5	7.6	7.6	7.6
220000	7.6	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.5	7.6	7.6	7.6
230000	7.6	7.6	7.6	7.6	7.7	7.8	7.7	7.8	7.8	7.8	7.8	7.8	7.5	7.6	7.6	7.6
Daily Max	7.6	7.6	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.8	7.6	7.6	7.7
Daily Min	7.5	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.5	7.5	7.5	7.6
Average	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.7	7.5	7.6	7.6

License maximum pH: 9
License minimum pH: 6

Grand Rapids Tailrace pH Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9
10000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.9	7.9
20000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8
30000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8
40000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.8
50000	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
60000	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
70000	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
80000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.7	7.8	7.8	7.8	7.8
90000	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8
100000	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8
110000	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
120000	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8
130000	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9
140000	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.9	7.8	7.9	7.9	7.9	8.0	7.9
150000	7.7	7.6	7.6	7.7	7.7	7.7	7.8	7.9	7.9	7.8	7.9	7.9	7.9	8.0	7.9
160000	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.9	7.9	7.8	7.9	7.9	8.0	8.0	8.0
170000	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0
180000	7.7	7.7	7.6	7.7	7.7	7.7	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0
190000	7.7	7.7	7.6	7.7	7.7	7.7	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0
200000	7.7	7.7	7.6	7.7	7.7	7.7	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0
210000	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.9	7.8	7.9	7.9	8.0	7.9	7.9
220000	7.6	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9
230000	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9
Daily Max	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0
Daily Min	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
Average	7.6	7.6	7.6	7.6	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9

Grand Rapids Tailrace pH Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.9
10000	7.8	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9
20000	7.8	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
30000	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
40000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
50000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
60000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
70000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
80000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
90000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
100000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
110000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9	8.0	7.9	7.9	7.9	8.0	7.9	7.9	7.9
120000	7.9	7.9	7.9	7.9	7.8	7.8	7.9	8.0	8.0	8.0	7.9	8.0	8.0	8.0	7.9	8.0
130000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0
140000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.0
150000	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.0	7.9	8.0	8.1	8.0	8.0	8.1
160000	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.1	7.9	8.1	8.1	8.0	8.0	8.1
170000	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.1	8.0	8.1	8.1	8.0	8.0	8.1
180000	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.1	8.0	8.1	8.0	8.0	8.0	8.1
190000	8.0	8.0	7.9	7.9	7.9	7.8	8.0	8.0	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.1
200000	8.0	8.0	7.9	7.9	7.9	7.8	8.0	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
210000	8.0	8.0	7.9	7.9	7.9	7.8	7.9	8.0	8.1	8.0	7.9	8.0	8.0	8.0	8.0	8.1
220000	8.0	7.9	7.9	7.9	7.8	7.8	7.9	8.0	8.0	8.0	7.9	8.0	8.0	7.9	8.0	8.0
230000	8.0	7.9	7.9	7.9	7.8	7.8	7.9	7.9	8.0	8.0	7.9	8.0	8.0	7.9	8.0	8.0
Daily Max	8.0	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.1	8.1	8.0	8.1	8.1	8.0	8.0	8.1
Daily Min	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9
Average	7.9	7.9	7.9	7.9	7.8	7.8	7.9	7.9	8.0	8.0	7.9	7.9	8.0	7.9	7.9	8.0

License maximum pH: 9
License minimum pH: 6

Grand Rapids Tailrace pH Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.8
10000	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.8
20000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.8	7.8
30000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.8	7.8
40000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.8	7.8
50000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
60000	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
70000	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
80000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
90000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.9	7.9	7.8	7.8
100000	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.8
110000	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9
120000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.0	7.9	7.9	7.9	7.9	7.9
130000	8.0	7.9	8.0	8.0	8.0	8.1	8.1	8.2	8.0	8.1	8.0	7.9	8.0	7.9	7.9
140000	8.0	8.0	8.0	8.0	8.1	8.0	8.2	8.2	8.1	8.1	8.0	8.0	8.0	7.9	7.9
150000	8.0	8.0	8.1	8.1	8.1	8.1	8.3	8.2	8.1	8.1	8.0	8.0	8.0	7.9	8.0
160000	8.1	8.0	8.1	8.1	8.1	8.2	8.3	8.2	8.1	8.1	8.0	8.0	8.0	7.9	8.0
170000	8.1	8.0	8.1	8.1	8.0	8.2	8.2	8.3	8.1	8.1	8.0	8.0	8.0	7.9	8.0
180000	8.1	8.0	8.1	8.1	8.0	8.1	8.2	8.2	8.1	8.1	8.0	8.0	8.0	7.9	8.0
190000	8.1	8.0	8.0	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.0	8.0	8.0	7.9	8.0
200000	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	7.9	8.0	8.0	7.9	8.0
210000	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.0	7.9	8.0	7.9	7.9	8.0
220000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	7.9	8.0	7.9	7.9	7.9
230000	8.0	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.1	8.0	7.9	7.9	7.9	7.9	7.9
Daily Max	8.1	8.0	8.1	8.1	8.1	8.2	8.3	8.3	8.1	8.1	8.0	8.0	8.0	7.9	8.0
Daily Min	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
Average	8.0	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9

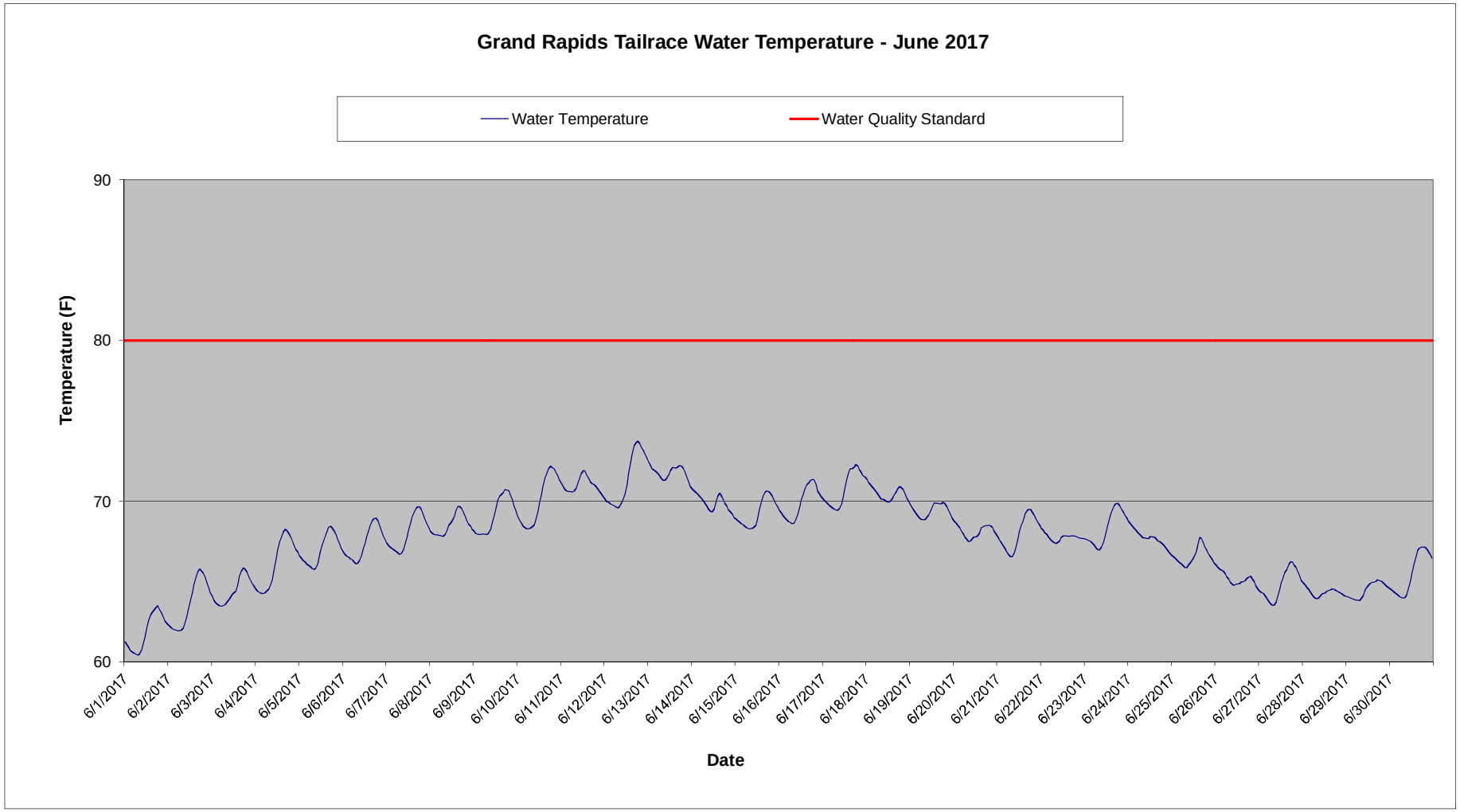
Grand Rapids Tailrace pH Summary - September 2017

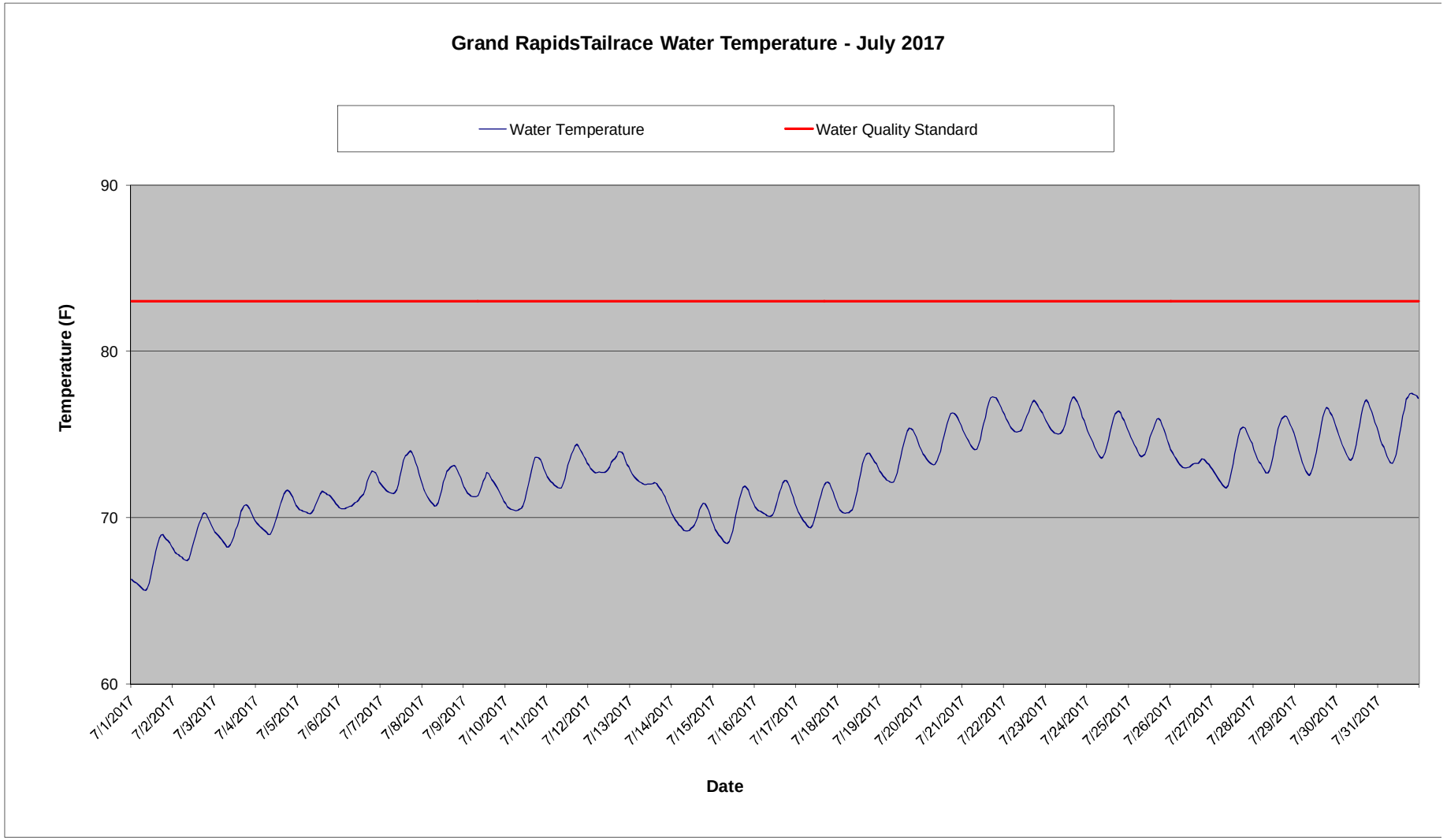
Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.9	7.9
10000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
20000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
30000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
40000	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
50000	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
60000	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
70000	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
80000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
90000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
100000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
110000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9
120000	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9
130000	7.9	7.9	7.9	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
140000	8.0	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.0
150000	8.0	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.0	8.0
160000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.0
170000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1
180000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.0
190000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.0
200000	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
210000	8.0	7.9	8.0	8.0	8.0	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
220000	8.0	7.9	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
230000	7.9	7.9	8.0	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Daily Max	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Daily Min	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9
Average	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9

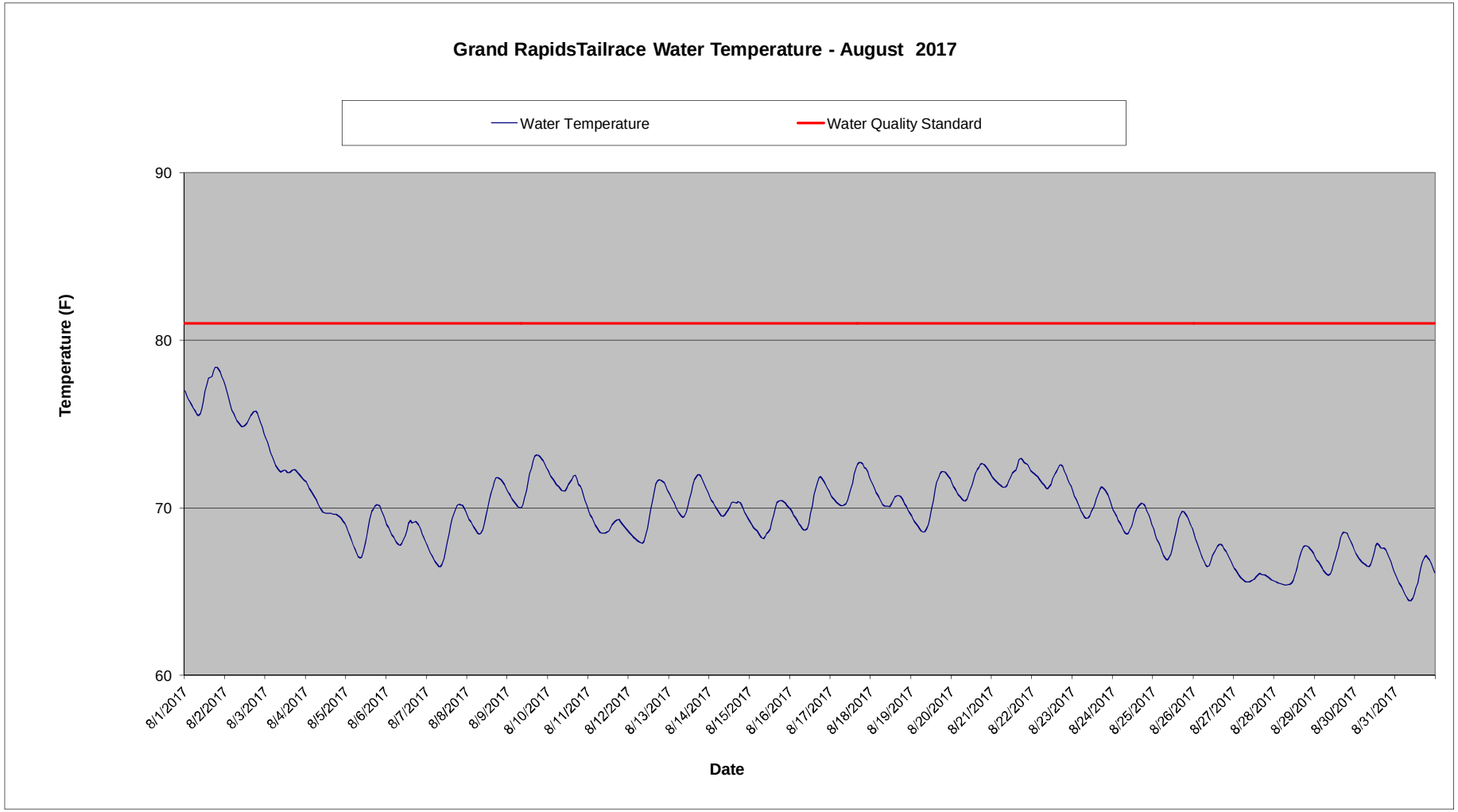
License maximum pH: 9
License minimum pH: 6

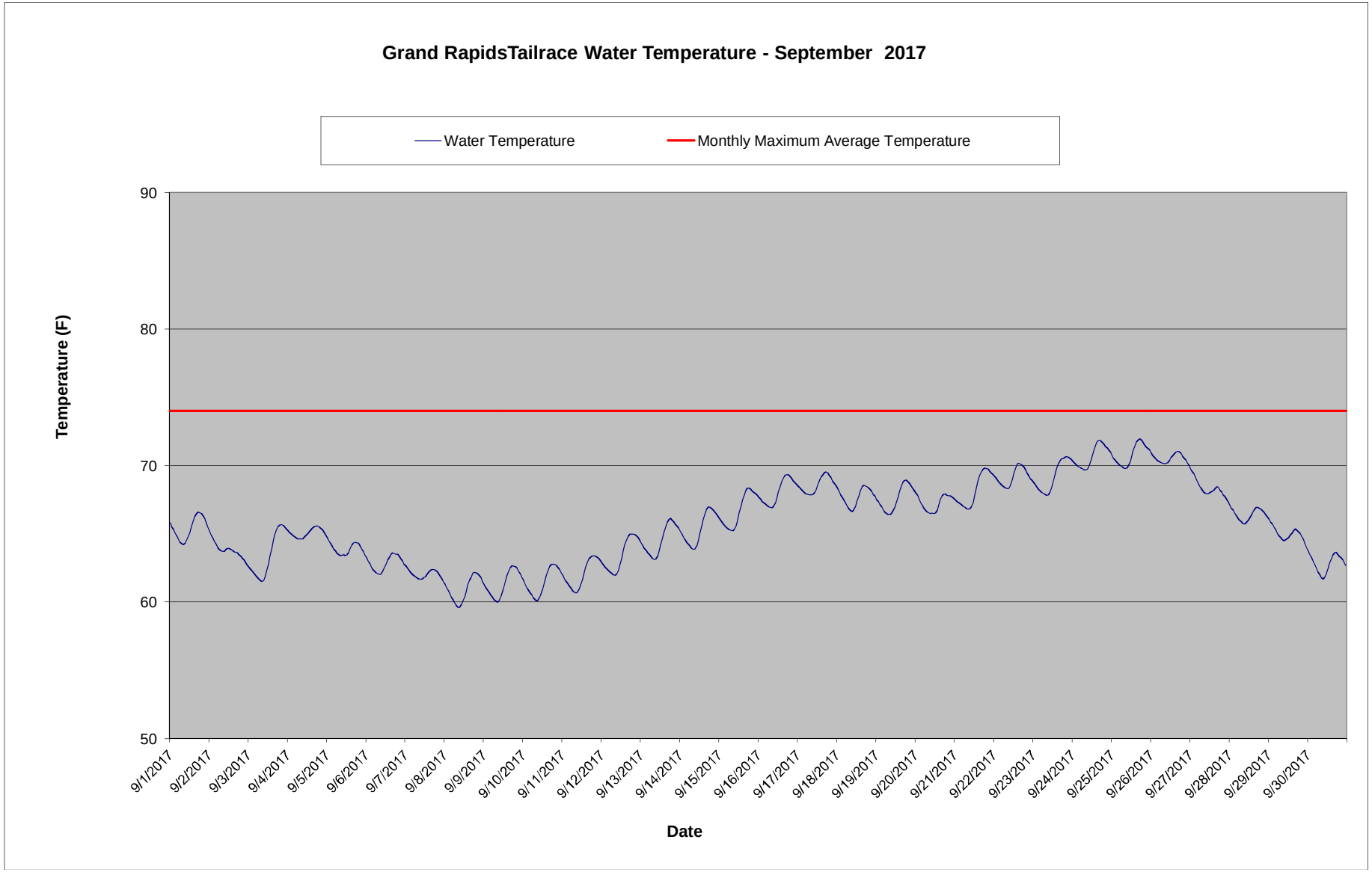
Grand Rapids Tailrace pH Summary - September 2017

Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
10000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
20000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
30000	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
40000	7.9	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
50000	7.9	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.8	7.8	7.8
60000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
70000	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
80000	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
90000	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
100000	7.9	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.9
110000	7.9	7.9	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9
120000	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.9
130000	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.9	7.9	7.9	7.9
140000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
150000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	8.0
160000	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0
170000	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0
180000	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0
190000	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	8.0
200000	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.9	7.9	8.0
210000	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	8.0
220000	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9	7.9
230000	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9
Daily Max	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0
Daily Min	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.8	7.8	7.8
Average	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.9	7.9	7.9









Grand Rapids Tailrace Temperature Summary - June 2017

Time HHMMSS	06/01/17	06/02/17	06/03/17	06/04/17	06/05/17	06/06/17	06/07/17	06/08/17	06/09/17	06/10/17	06/11/17	06/12/17	06/13/17	06/14/17	06/15/17	06/16/17
0	61.2	62.3	64.1	64.5	66.6	66.8	67.4	68.1	68.1	69.1	71.1	70.1	72.4	70.7	68.9	69.4
10000	61.1	62.2	63.8	64.4	66.4	66.7	67.2	68.0	68.0	68.8	70.9	70.0	72.2	70.6	68.8	69.3
20000	60.9	62.1	63.7	64.3	66.3	66.6	67.1	67.9	67.9	68.6	70.7	69.9	72.0	70.5	68.7	69.1
30000	60.7	62.0	63.5	64.2	66.2	66.5	67.0	67.9	67.9	68.4	70.6	69.8	71.9	70.4	68.6	69.0
40000	60.6	62.0	63.5	64.3	66.1	66.4	67.0	67.9	67.9	68.3	70.6	69.8	71.8	70.3	68.5	68.8
50000	60.5	61.9	63.5	64.3	66.0	66.3	66.9	67.9	68.0	68.3	70.6	69.7	71.7	70.2	68.4	68.7
60000	60.5	61.9	63.5	64.4	65.9	66.2	66.8	67.8	67.9	68.3	70.6	69.6	71.6	70.1	68.3	68.6
70000	60.4	62.0	63.5	64.6	65.8	66.1	66.7	67.8	67.9	68.3	70.6	69.6	71.4	69.9	68.3	68.6
80000	60.5	62.1	63.7	64.8	65.8	66.1	66.7	67.9	68.0	68.4	70.8	69.6	71.3	69.6	68.3	68.6
90000	60.7	62.4	63.9	65.1	65.8	66.3	67.0	68.1	68.2	68.5	71.1	69.9	71.3	69.5	68.3	68.8
100000	61.1	62.8	64.0	65.7	66.1	66.6	67.3	68.5	68.6	68.8	71.5	70.1	71.4	69.4	68.4	69.2
110000	61.6	63.3	64.2	66.3	66.6	67.0	67.7	68.6	69.1	69.3	71.7	70.4	71.6	69.3	68.5	69.6
120000	62.1	63.8	64.3	67.0	67.1	67.4	68.2	68.8	69.6	69.8	71.9	71.0	71.9	69.5	68.9	70.1
130000	62.6	64.3	64.4	67.5	67.5	67.8	68.6	69.0	70.0	70.4	71.9	71.7	72.1	69.9	69.5	70.4
140000	62.9	64.8	64.8	67.7	67.8	68.2	69.0	69.4	70.3	70.9	71.6	72.4	72.1	70.3	70.0	70.8
150000	63.1	65.3	65.3	68.1	68.1	68.5	69.3	69.7	70.4	71.5	71.4	72.9	72.0	70.5	70.3	71.0
160000	63.2	65.6	65.7	68.2	68.4	68.8	69.6	69.7	70.5	71.8	71.2	73.4	72.1	70.3	70.6	71.1
170000	63.4	65.8	65.8	68.2	68.4	68.9	69.6	69.6	70.7	72.0	71.1	73.6	72.2	70.1	70.6	71.3
180000	63.5	65.7	65.8	68.0	68.3	68.9	69.6	69.4	70.7	72.2	71.0	73.7	72.2	69.8	70.6	71.4
190000	63.3	65.5	65.6	67.8	68.1	68.8	69.5	69.1	70.7	72.1	70.9	73.6	72.1	69.7	70.5	71.3
200000	63.1	65.3	65.3	67.5	67.9	68.5	69.2	68.8	70.4	72.0	70.8	73.4	71.8	69.4	70.3	71.0
210000	62.8	64.9	65.1	67.3	67.6	68.2	68.9	68.6	70.1	71.8	70.6	73.1	71.5	69.3	70.0	70.6
220000	62.5	64.6	64.9	67.0	67.3	67.9	68.6	68.4	69.7	71.6	70.4	72.9	71.2	69.2	69.8	70.4
230000	62.4	64.3	64.7	66.8	67.0	67.6	68.3	68.2	69.4	71.3	70.3	72.7	70.9	69.0	69.6	70.3
Daily Max	63.5	65.8	65.8	68.2	68.4	68.9	69.6	69.7	70.7	72.2	71.9	73.7	72.4	70.7	70.6	71.4
Daily Min	60.4	61.9	63.5	64.2	65.8	66.1	66.7	67.8	67.9	68.3	70.3	69.6	70.9	69.0	68.3	68.6
Average	61.9	63.6	64.4	66.2	67.0	67.4	68.0	68.5	69.2	70.0	71.0	71.4	71.8	69.9	69.3	69.9

Monthly average Temp: 67.0

License Monthly Maximum Average Temperature: 80 F

Grand Rapids Tailrace Temperature Summary - June 2017

Time HHMMSS	06/17/17	06/18/17	06/19/17	06/20/17	06/21/17	06/22/17	06/23/17	06/24/17	06/25/17	06/26/17	06/27/17	06/28/17	06/29/17	06/30/17
0	70.1	71.3	69.8	68.8	67.8	68.3	67.6	68.8	66.6	66.0	64.4	64.9	64.1	64.5
10000	70.0	71.2	69.6	68.7	67.6	68.2	67.6	68.6	66.5	65.9	64.3	64.8	64.0	64.4
20000	69.9	71.0	69.4	68.5	67.4	68.0	67.6	68.4	66.4	65.8	64.2	64.6	64.0	64.3
30000	69.8	70.9	69.2	68.3	67.2	67.9	67.5	68.3	66.3	65.7	64.1	64.5	63.9	64.2
40000	69.7	70.8	69.1	68.2	67.1	67.8	67.4	68.2	66.2	65.6	64.0	64.3	63.9	64.2
50000	69.6	70.6	68.9	68.0	66.8	67.6	67.3	68.1	66.1	65.5	63.8	64.2	63.9	64.1
60000	69.5	70.4	68.9	67.8	66.7	67.5	67.1	67.9	66.0	65.3	63.6	64.0	63.8	64.0
70000	69.5	70.3	68.8	67.6	66.5	67.4	67.0	67.8	65.9	65.1	63.5	63.9	63.8	64.0
80000	69.4	70.1	68.8	67.5	66.5	67.4	67.0	67.7	65.9	65.0	63.5	63.9	63.9	64.0
90000	69.6	70.1	69.0	67.5	66.7	67.4	67.1	67.7	66.0	64.8	63.7	64.0	64.1	64.2
100000	69.8	70.1	69.1	67.7	67.1	67.5	67.4	67.7	66.2	64.8	64.1	64.2	64.4	64.6
110000	70.2	70.0	69.3	67.8	67.6	67.7	67.8	67.7	66.3	64.8	64.5	64.2	64.6	65.1
120000	70.9	69.9	69.6	67.8	68.1	67.9	68.3	67.8	66.5	64.9	64.9	64.3	64.8	65.6
130000	71.3	70.0	69.9	67.8	68.5	67.8	68.7	67.8	66.8	64.9	65.3	64.4	64.9	66.1
140000	71.8	70.2	69.9	68.0	68.7	67.8	69.2	67.8	67.3	65.0	65.6	64.5	64.9	66.5
150000	72.0	70.4	69.9	68.3	69.2	67.8	69.4	67.7	67.7	65.0	65.8	64.5	64.9	66.9
160000	72.0	70.6	69.8	68.4	69.4	67.8	69.7	67.5	67.7	65.0	66.1	64.5	65.0	67.1
170000	72.1	70.8	69.8	68.5	69.5	67.8	69.8	67.5	67.4	65.2	66.2	64.5	65.1	67.2
180000	72.3	70.9	69.9	68.5	69.5	67.8	69.9	67.4	67.1	65.3	66.2	64.5	65.1	67.1
190000	72.2	70.9	69.8	68.5	69.3	67.8	69.7	67.3	66.9	65.3	66.0	64.4	65.0	67.1
200000	72.0	70.7	69.7	68.5	69.1	67.8	69.5	67.2	66.7	65.2	65.9	64.3	64.9	67.0
210000	71.8	70.5	69.4	68.4	68.9	67.7	69.3	67.0	66.5	65.0	65.6	64.2	64.8	66.9
220000	71.6	70.2	69.2	68.2	68.7	67.7	69.1	66.8	66.3	64.7	65.4	64.2	64.7	66.6
230000	71.5	70.0	68.9	68.0	68.5	67.7	68.9	66.7	66.2	64.6	65.1	64.1	64.6	66.4
Daily Max	72.3	71.3	69.9	68.8	69.5	68.3	69.9	68.8	67.7	66.0	66.2	64.9	65.1	67.2
Daily Min	69.4	69.9	68.8	67.5	66.5	67.4	67.0	66.7	65.9	64.6	63.5	63.9	63.8	64.0
Average	70.8	70.5	69.4	68.1	68.0	67.8	68.3	67.7	66.6	65.2	64.8	64.3	64.5	65.5

Grand Rapids Tailrace Temperature Summary - July 2017

Time HHMMSS	07/01/17	07/02/17	07/03/17	07/04/17	07/05/17	07/06/17	07/07/17	07/08/17	07/09/17	07/10/17	07/11/17	07/12/17	07/13/17	07/14/17	07/15/17	07/16/17
0	66.3	68.1	69.2	69.7	70.6	70.6	72.0	72.0	71.8	70.8	72.5	73.1	72.8	70.2	69.6	70.6
10000	66.2	67.9	69.0	69.6	70.5	70.5	71.9	71.7	71.6	70.7	72.3	73.0	72.6	70.0	69.3	70.5
20000	66.1	67.8	68.9	69.5	70.4	70.5	71.8	71.4	71.5	70.6	72.2	72.8	72.5	69.9	69.1	70.4
30000	66.0	67.8	68.8	69.4	70.4	70.5	71.6	71.2	71.4	70.5	72.1	72.7	72.4	69.7	69.0	70.4
40000	66.0	67.7	68.7	69.3	70.4	70.6	71.6	71.1	71.3	70.5	72.0	72.7	72.3	69.6	68.8	70.3
50000	65.9	67.6	68.5	69.2	70.3	70.6	71.5	70.9	71.3	70.4	71.9	72.7	72.2	69.5	68.7	70.3
60000	65.7	67.5	68.4	69.1	70.3	70.7	71.5	70.8	71.3	70.4	71.8	72.7	72.1	69.3	68.6	70.2
70000	65.6	67.4	68.2	69.0	70.2	70.7	71.4	70.7	71.3	70.4	71.8	72.7	72.1	69.2	68.5	70.1
80000	65.6	67.4	68.2	69.0	70.3	70.8	71.5	70.7	71.3	70.5	71.8	72.7	72.0	69.2	68.5	70.1
90000	65.7	67.5	68.4	69.2	70.5	70.9	71.7	70.9	71.5	70.6	72.0	72.7	72.0	69.2	68.6	70.1
100000	66.0	67.8	68.6	69.5	70.7	71.0	72.0	71.2	71.9	70.7	72.3	72.8	72.0	69.2	68.8	70.2
110000	66.5	68.2	68.9	69.8	71.0	71.1	72.5	71.7	72.2	71.1	72.8	72.9	72.0	69.4	69.2	70.3
120000	67.0	68.6	69.2	70.1	71.2	71.2	73.0	72.1	72.4	71.5	73.2	73.0	72.0	69.4	69.7	70.7
130000	67.5	68.9	69.5	70.5	71.4	71.3	73.4	72.4	72.7	71.9	73.5	73.3	72.0	69.6	70.2	71.1
140000	68.0	69.4	69.8	70.8	71.6	71.4	73.7	72.8	72.7	72.4	73.8	73.5	72.1	69.8	70.7	71.5
150000	68.4	69.6	70.4	71.1	71.5	71.7	73.8	72.9	72.5	72.9	74.0	73.5	72.0	70.1	71.1	71.8
160000	68.8	69.9	70.5	71.4	71.5	72.2	73.9	73.0	72.3	73.3	74.3	73.7	71.9	70.5	71.5	72.1
170000	69.0	70.2	70.7	71.6	71.4	72.5	74.0	73.1	72.1	73.6	74.4	74.0	71.8	70.7	71.8	72.2
180000	69.0	70.3	70.8	71.7	71.3	72.7	73.9	73.1	72.0	73.6	74.3	74.0	71.6	70.9	71.9	72.2
190000	68.8	70.2	70.7	71.6	71.3	72.8	73.6	73.1	71.8	73.6	74.1	73.9	71.4	70.8	71.8	72.1
200000	68.7	70.0	70.5	71.4	71.1	72.7	73.3	72.8	71.6	73.5	73.9	73.8	71.2	70.7	71.6	71.8
210000	68.6	69.8	70.3	71.2	71.0	72.7	73.0	72.6	71.4	73.3	73.7	73.5	71.0	70.4	71.4	71.5
220000	68.5	69.6	70.1	71.0	70.8	72.5	72.6	72.4	71.2	73.0	73.5	73.2	70.7	70.2	71.1	71.2
230000	68.3	69.3	69.9	70.8	70.7	72.1	72.2	72.1	71.0	72.7	73.3	73.0	70.5	69.8	70.9	70.9
Daily Max	69.0	70.3	70.8	71.7	71.6	72.8	74.0	73.1	72.7	73.6	74.4	74.0	72.8	70.9	71.9	72.2
Daily Min	65.6	67.4	68.2	69.0	70.2	70.5	71.4	70.7	71.0	70.4	71.8	72.7	70.5	69.2	68.5	70.1
Average	67.2	68.7	69.4	70.2	70.9	71.4	72.6	71.9	71.7	71.8	73.0	73.2	71.9	69.9	70.0	70.9

Monthly average Temp: 72.6

License Monthly Maximum Average Temperature: 83 F

Grand Rapids Tailrace Temperature Summary - July 2017

Time HHMMSS	07/17/17	07/18/17	07/19/17	07/20/17	07/21/17	07/22/17	07/23/17	07/24/17	07/25/17	07/26/17	07/27/17	07/28/17	07/29/17	07/30/17	07/31/17
0	70.6	70.7	72.8	74.0	75.3	76.2	75.8	75.2	75.1	74.1	72.9	74.1	74.8	75.3	75.1
10000	70.3	70.5	72.7	73.8	75.0	75.9	75.6	75.0	74.8	73.9	72.7	73.8	74.4	75.0	74.7
20000	70.1	70.4	72.5	73.7	74.8	75.7	75.4	74.8	74.6	73.7	72.6	73.6	74.0	74.7	74.4
30000	70.0	70.3	72.4	73.5	74.6	75.5	75.3	74.5	74.4	73.5	72.4	73.4	73.7	74.4	74.2
40000	69.8	70.3	72.3	73.4	74.4	75.4	75.2	74.3	74.2	73.4	72.3	73.2	73.3	74.2	74.0
50000	69.7	70.3	72.2	73.3	74.3	75.3	75.1	74.0	74.0	73.2	72.1	73.0	73.0	73.9	73.7
60000	69.5	70.3	72.1	73.2	74.1	75.2	75.1	73.8	73.8	73.1	72.0	72.8	72.8	73.7	73.4
70000	69.4	70.4	72.1	73.2	74.1	75.2	75.0	73.7	73.7	73.0	71.8	72.7	72.6	73.5	73.3
80000	69.4	70.5	72.1	73.2	74.1	75.2	75.1	73.6	73.7	73.0	71.8	72.7	72.5	73.4	73.3
90000	69.5	70.7	72.4	73.4	74.4	75.2	75.1	73.7	73.8	73.0	71.9	72.8	72.7	73.6	73.4
100000	69.8	71.2	72.7	73.7	74.7	75.3	75.3	73.9	74.0	73.0	72.3	73.2	73.0	73.9	73.8
110000	70.1	71.6	73.1	74.0	75.2	75.5	75.6	74.2	74.4	73.1	72.7	73.7	73.4	74.4	74.3
120000	70.6	72.2	73.6	74.5	75.6	75.9	76.0	74.7	74.8	73.1	73.2	74.2	73.9	75.0	74.9
130000	71.0	72.7	74.1	74.9	76.0	76.1	76.5	75.2	75.2	73.2	73.8	74.8	74.5	75.6	75.5
140000	71.4	73.2	74.6	75.3	76.5	76.4	76.9	75.6	75.4	73.3	74.4	75.3	75.1	76.2	76.1
150000	71.7	73.6	74.9	75.7	77.0	76.7	77.2	76.0	75.6	73.3	74.9	75.7	75.6	76.6	76.5
160000	72.0	73.8	75.2	76.0	77.2	76.9	77.3	76.2	75.9	73.3	75.3	75.9	76.1	77.0	77.1
170000	72.1	73.9	75.4	76.3	77.3	77.0	77.1	76.4	76.0	73.4	75.4	76.0	76.5	77.1	77.3
180000	72.2	73.9	75.3	76.3	77.2	77.0	77.0	76.4	75.9	73.5	75.4	76.1	76.6	76.9	77.5
190000	72.1	73.7	75.3	76.3	77.2	76.8	76.7	76.3	75.6	73.5	75.4	76.1	76.5	76.6	77.5
200000	71.8	73.5	75.1	76.1	77.1	76.6	76.4	76.0	75.3	73.4	75.1	75.9	76.3	76.4	77.4
210000	71.5	73.4	74.8	76.0	76.9	76.4	76.0	75.8	75.0	73.3	74.9	75.6	76.1	76.0	77.4
220000	71.2	73.2	74.6	75.8	76.6	76.3	75.8	75.6	74.7	73.2	74.7	75.4	75.9	75.7	77.3
230000	70.9	73.0	74.3	75.5	76.4	76.0	75.5	75.4	74.4	73.0	74.4	75.1	75.6	75.5	77.2
Daily Max	72.2	73.9	75.4	76.3	77.3	77.0	77.3	76.4	76.0	74.1	75.4	76.1	76.6	77.1	77.5
Daily Min	69.4	70.3	72.1	73.2	74.1	75.2	75.0	73.6	73.7	73.0	71.8	72.7	72.5	73.4	73.3
Average	70.7	72.0	73.6	74.6	75.7	76.0	75.9	75.0	74.8	73.3	73.5	74.4	74.6	75.2	75.4

Grand Rapids Tailrace Temperature Summary - August 2017

Time HHMMSS	08/01/17	08/02/17	08/03/17	08/04/17	08/05/17	08/06/17	08/07/17	08/08/17	08/09/17	08/10/17	08/11/17	08/12/17	08/13/17	08/14/17	08/15/17	08/16/17
0	77.0	77.3	74.2	71.5	68.9	69.0	67.8	69.5	71.0	72.2	69.8	68.6	70.8	70.7	69.2	69.9
10000	76.7	77.0	73.9	71.4	68.6	68.8	67.5	69.3	70.8	72.0	69.6	68.4	70.6	70.5	69.0	69.8
20000	76.5	76.5	73.6	71.2	68.3	68.6	67.3	69.1	70.6	71.8	69.4	68.3	70.5	70.3	68.8	69.6
30000	76.3	76.1	73.3	71.0	68.1	68.4	67.1	69.0	70.5	71.7	69.2	68.2	70.2	70.1	68.7	69.4
40000	76.1	75.8	73.0	70.8	67.8	68.2	66.9	68.8	70.3	71.5	69.0	68.1	70.0	70.0	68.6	69.2
50000	76.0	75.6	72.8	70.7	67.6	68.1	66.8	68.6	70.2	71.4	68.8	68.0	69.8	69.8	68.5	69.1
60000	75.8	75.4	72.5	70.5	67.3	67.9	66.6	68.5	70.1	71.3	68.6	68.0	69.6	69.6	68.3	68.9
70000	75.6	75.2	72.3	70.3	67.1	67.8	66.5	68.4	70.0	71.2	68.5	67.9	69.5	69.5	68.2	68.8
80000	75.5	75.1	72.2	70.1	67.0	67.8	66.5	68.5	70.0	71.1	68.5	67.9	69.4	69.5	68.2	68.7
90000	75.6	74.9	72.1	69.9	67.1	67.9	66.6	68.7	70.2	71.0	68.5	68.0	69.5	69.6	68.3	68.7
100000	75.9	74.8	72.2	69.7	67.3	68.1	67.0	69.0	70.6	71.0	68.5	68.3	69.7	69.7	68.5	68.8
110000	76.4	74.9	72.2	69.7	67.7	68.3	67.4	69.5	71.0	71.2	68.6	68.8	70.1	69.9	68.6	69.1
120000	77.0	75.0	72.2	69.7	68.3	68.6	67.9	70.0	71.5	71.4	68.6	69.3	70.5	70.1	68.7	69.6
130000	77.4	75.1	72.1	69.7	68.9	69.1	68.5	70.5	72.0	71.6	68.8	69.9	70.9	70.3	69.1	70.1
140000	77.7	75.3	72.1	69.7	69.3	69.3	69.0	70.9	72.4	71.7	69.0	70.5	71.4	70.3	69.6	70.8
150000	77.8	75.5	72.2	69.7	69.8	69.1	69.4	71.2	72.8	71.9	69.1	71.0	71.7	70.3	70.0	71.1
160000	77.8	75.6	72.3	69.6	69.9	69.1	69.7	71.6	73.1	72.0	69.2	71.4	71.9	70.3	70.3	71.5
170000	78.2	75.7	72.3	69.6	70.1	69.2	70.0	71.8	73.2	71.7	69.3	71.6	72.0	70.4	70.4	71.8
180000	78.4	75.8	72.2	69.6	70.2	69.1	70.2	71.8	73.1	71.4	69.3	71.7	72.0	70.3	70.4	71.9
190000	78.4	75.7	72.1	69.5	70.1	69.0	70.2	71.7	73.1	71.3	69.2	71.7	71.8	70.2	70.4	71.7
200000	78.3	75.4	72.0	69.5	70.1	68.7	70.2	71.7	72.9	71.1	69.0	71.6	71.6	69.9	70.4	71.6
210000	78.1	75.1	71.9	69.4	69.8	68.4	70.2	71.5	72.8	70.8	68.9	71.5	71.4	69.7	70.3	71.4
220000	77.8	74.8	71.7	69.2	69.5	68.2	70.0	71.4	72.6	70.4	68.8	71.3	71.1	69.5	70.1	71.2
230000	77.6	74.4	71.7	69.1	69.3	68.0	69.8	71.2	72.4	70.1	68.7	71.0	70.9	69.3	70.1	71.0
Daily Max	78.4	77.3	74.2	71.5	70.2	69.3	70.2	71.8	73.2	72.2	69.8	71.7	72.0	70.7	70.4	71.9
Daily Min	75.5	74.4	71.7	69.1	67.0	67.8	66.5	68.4	70.0	70.1	68.5	67.9	69.4	69.3	68.2	68.7
Average	77.0	75.5	72.5	70.0	68.7	68.5	68.3	70.1	71.5	71.4	69.0	69.6	70.7	70.0	69.3	70.1

Monthly average Temp	Monthly Average Temp:	69.9
License Monthly Maxir	License Maximum Temperature:	81 F

Grand Rapids Tailrace Temperature Summary - August 2017

Time HHMMSS	08/17/17	08/18/17	08/19/17	08/20/17	08/21/17	08/22/17	08/23/17	08/24/17	08/25/17	08/26/17	08/27/17	08/28/17	08/29/17	08/30/17	08/31/17
0	70.8	71.6	69.5	71.5	71.9	72.1	71.0	69.9	68.7	68.5	66.4	65.6	67.1	67.3	66.0
10000	70.6	71.4	69.3	71.3	71.7	72.0	70.7	69.7	68.4	68.1	66.2	65.6	66.9	67.1	65.7
20000	70.5	71.1	69.2	71.1	71.6	72.0	70.5	69.5	68.1	67.8	66.1	65.5	66.8	67.0	65.5
30000	70.4	70.9	69.0	70.9	71.5	71.9	70.3	69.3	67.9	67.6	65.9	65.5	66.6	66.9	65.3
40000	70.3	70.7	68.9	70.8	71.4	71.7	70.0	69.1	67.7	67.3	65.8	65.5	66.5	66.8	65.2
50000	70.2	70.5	68.7	70.6	71.3	71.6	69.8	68.9	67.4	67.0	65.7	65.4	66.3	66.7	64.9
60000	70.1	70.4	68.6	70.5	71.3	71.5	69.6	68.7	67.2	66.8	65.7	65.4	66.1	66.6	64.7
70000	70.1	70.2	68.6	70.4	71.2	71.3	69.4	68.5	67.0	66.6	65.6	65.4	66.0	66.5	64.6
80000	70.2	70.1	68.6	70.4	71.3	71.2	69.4	68.4	66.9	66.5	65.6	65.4	66.0	66.5	64.4
90000	70.3	70.1	68.7	70.5	71.4	71.1	69.4	68.5	67.0	66.6	65.6	65.4	66.1	66.6	64.5
100000	70.4	70.1	69.0	70.8	71.6	71.3	69.5	68.7	67.2	66.8	65.6	65.5	66.3	66.9	64.6
110000	70.8	70.1	69.4	71.1	71.9	71.4	69.8	68.9	67.5	67.1	65.7	65.7	66.7	67.3	64.9
120000	71.2	70.2	69.9	71.4	72.1	71.8	70.0	69.3	68.0	67.3	65.8	66.0	67.0	67.7	65.2
130000	71.5	70.4	70.5	71.7	72.2	72.0	70.2	69.7	68.5	67.5	65.9	66.3	67.4	67.9	65.5
140000	72.0	70.7	71.1	72.0	72.3	72.1	70.6	70.0	68.9	67.7	66.0	66.8	67.6	67.8	66.0
150000	72.4	70.7	71.5	72.3	72.5	72.3	70.9	70.1	69.4	67.8	66.1	67.1	68.2	67.6	66.5
160000	72.6	70.7	71.8	72.4	72.9	72.6	71.1	70.2	69.6	67.8	66.0	67.4	68.4	67.6	66.8
170000	72.7	70.7	72.1	72.6	73.0	72.6	71.3	70.3	69.8	67.7	66.0	67.7	68.6	67.6	67.1
180000	72.7	70.6	72.2	72.6	72.9	72.5	71.2	70.2	69.8	67.6	66.0	67.7	68.5	67.5	67.2
190000	72.6	70.5	72.2	72.6	72.7	72.2	71.1	70.1	69.7	67.4	65.9	67.7	68.5	67.3	67.1
200000	72.4	70.3	72.1	72.5	72.6	71.9	70.9	69.8	69.5	67.2	65.9	67.7	68.3	67.1	66.9
210000	72.3	70.1	72.0	72.4	72.6	71.7	70.8	69.6	69.3	67.0	65.8	67.5	68.1	66.8	66.7
220000	72.1	69.9	71.9	72.2	72.4	71.5	70.4	69.3	69.0	66.8	65.7	67.5	67.8	66.5	66.5
230000	71.8	69.7	71.7	72.0	72.2	71.2	70.1	69.0	68.8	66.6	65.7	67.3	67.6	66.2	66.1
Daily Max	72.7	71.6	72.2	72.6	73.0	72.6	71.3	70.3	69.8	68.5	66.4	67.7	68.6	67.9	67.2
Daily Min	70.1	69.7	68.6	70.4	71.2	71.1	69.4	68.4	66.9	66.5	65.6	65.4	66.0	66.2	64.4
Average	71.3	70.5	70.3	71.5	72.0	71.8	70.3	69.4	68.4	67.3	65.9	66.4	67.2	67.1	65.7

Grand Rapids Tailrace Temperature Summary - September 2017

Time HHMMSS	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17	09/15/17	09/16/17
0	65.8	65.2	62.5	65.2	64.7	63.2	62.7	61.3	61.2	61.6	61.9	62.8	64.3	65.2	66.1	67.7
10000	65.5	64.9	62.4	65.1	64.5	63.0	62.5	61.1	61.1	61.3	61.7	62.7	64.1	65.0	65.9	67.5
20000	65.3	64.7	62.3	65.0	64.3	62.8	62.3	60.8	60.9	61.1	61.5	62.6	63.9	64.7	65.8	67.4
30000	65.1	64.4	62.1	64.9	64.1	62.6	62.2	60.6	60.7	60.9	61.4	62.4	63.8	64.5	65.6	67.3
40000	64.8	64.2	62.0	64.8	63.9	62.4	62.0	60.4	60.5	60.7	61.2	62.3	63.6	64.4	65.5	67.2
50000	64.6	64.0	61.8	64.7	63.7	62.3	61.9	60.1	60.3	60.5	61.0	62.2	63.5	64.2	65.4	67.1
60000	64.4	63.9	61.7	64.6	63.6	62.2	61.8	59.9	60.2	60.3	60.8	62.1	63.3	64.1	65.3	67.0
70000	64.3	63.8	61.6	64.6	63.5	62.1	61.8	59.7	60.1	60.2	60.7	62.0	63.2	63.9	65.2	66.9
80000	64.2	63.7	61.5	64.6	63.4	62.0	61.7	59.6	60.0	60.1	60.7	62.0	63.1	63.8	65.2	66.9
90000	64.3	63.7	61.6	64.6	63.4	62.0	61.7	59.6	60.1	60.1	60.7	62.0	63.2	63.9	65.3	67.0
100000	64.5	63.8	61.8	64.8	63.5	62.3	61.7	59.8	60.4	60.4	60.9	62.3	63.4	64.1	65.6	67.3
110000	64.8	63.9	62.3	64.9	63.4	62.5	61.8	60.1	60.7	60.7	61.3	62.7	63.7	64.5	66.0	67.7
120000	65.1	63.9	62.8	65.0	63.5	62.8	61.9	60.4	61.1	61.1	61.7	63.2	64.2	65.0	66.6	68.1
130000	65.5	63.9	63.4	65.2	63.6	63.1	62.0	60.8	61.5	61.5	62.1	63.8	64.7	65.6	67.0	68.5
140000	65.9	63.8	63.9	65.3	64.0	63.3	62.2	61.2	62.0	61.9	62.5	64.2	65.1	66.1	67.5	68.8
150000	66.3	63.7	64.5	65.4	64.2	63.5	62.3	61.6	62.3	62.3	62.9	64.6	65.5	66.5	67.9	69.1
160000	66.5	63.6	64.9	65.5	64.3	63.6	62.4	61.8	62.5	62.6	63.2	64.8	65.8	66.8	68.2	69.3
170000	66.6	63.6	65.3	65.6	64.4	63.5	62.4	62.1	62.6	62.8	63.3	65.0	66.1	67.0	68.3	69.3
180000	66.6	63.5	65.5	65.6	64.4	63.5	62.3	62.2	62.6	62.8	63.4	65.0	66.1	67.0	68.3	69.3
190000	66.5	63.4	65.6	65.5	64.3	63.5	62.2	62.1	62.6	62.8	63.4	65.0	66.0	66.9	68.3	69.2
200000	66.3	63.2	65.7	65.4	64.1	63.4	62.1	62.1	62.5	62.7	63.4	64.9	65.8	66.7	68.1	69.0
210000	66.1	63.1	65.6	65.3	63.9	63.2	61.9	62.0	62.3	62.6	63.3	64.9	65.7	66.6	68.0	68.9
220000	65.8	62.9	65.5	65.1	63.7	63.0	61.7	61.8	62.1	62.4	63.2	64.7	65.5	66.5	67.9	68.7
230000	65.5	62.7	65.3	64.9	63.5	62.8	61.5	61.5	61.8	62.2	63.0	64.6	65.4	66.3	67.8	68.6
Daily Max	66.6	65.2	65.7	65.6	64.7	63.6	62.7	62.2	62.6	62.8	63.4	65.0	66.1	67.0	68.3	69.3
Daily Min	64.2	62.7	61.5	64.6	63.4	62.0	61.5	59.6	60.0	60.1	60.7	62.0	63.1	63.8	65.2	66.9
Average	65.4	63.8	63.4	65.1	63.9	62.9	62.0	60.9	61.3	61.5	62.1	63.4	64.5	65.4	66.7	68.1

Monthly average Temp: 65.8

License Monthly Maximum Average Temperature: 74 F

Grand Rapids Tailrace Temperature Summary - September 2017

Time HHMMSS	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17	09/28/17	09/29/17	09/30/17
0	68.5	68.4	67.5	68.0	67.5	69.2	68.8	70.3	70.7	70.9	69.7	67.1	66.1	63.7
10000	68.4	68.1	67.3	67.8	67.4	69.1	68.6	70.2	70.5	70.7	69.6	66.9	65.9	63.5
20000	68.2	67.9	67.1	67.5	67.3	68.9	68.4	70.1	70.4	70.6	69.4	66.7	65.7	63.2
30000	68.1	67.6	67.0	67.3	67.2	68.8	68.3	70.0	70.2	70.4	69.1	66.5	65.5	63.0
40000	68.0	67.5	66.8	67.1	67.1	68.6	68.1	69.9	70.1	70.3	68.8	66.3	65.3	62.7
50000	67.9	67.2	66.6	66.9	67.0	68.5	68.0	69.8	70.0	70.3	68.6	66.2	65.1	62.4
60000	67.9	67.0	66.5	66.7	66.9	68.4	68.0	69.7	69.9	70.2	68.4	66.0	64.9	62.2
70000	67.9	66.8	66.4	66.6	66.8	68.3	67.9	69.7	69.8	70.2	68.2	65.9	64.7	62.0
80000	67.9	66.7	66.4	66.5	66.8	68.3	67.8	69.7	69.8	70.1	68.1	65.8	64.6	61.8
90000	67.9	66.6	66.5	66.5	66.8	68.3	67.8	69.8	69.8	70.2	68.0	65.7	64.5	61.7
100000	68.0	66.7	66.6	66.5	67.0	68.6	68.0	70.0	70.0	70.2	67.9	65.8	64.6	61.8
110000	68.2	67.0	66.9	66.5	67.3	69.0	68.4	70.4	70.3	70.4	67.9	66.0	64.6	62.0
120000	68.6	67.4	67.3	66.5	67.8	69.5	68.8	70.8	70.7	70.6	68.0	66.1	64.7	62.5
130000	68.9	67.8	67.7	66.7	68.4	69.9	69.3	71.2	71.1	70.7	68.1	66.3	64.9	62.8
140000	69.1	68.1	68.1	67.1	68.9	70.1	69.8	71.5	71.5	70.9	68.2	66.6	65.1	63.2
150000	69.3	68.4	68.5	67.5	69.3	70.2	70.1	71.8	71.7	71.0	68.3	66.8	65.2	63.4
160000	69.4	68.5	68.8	67.8	69.5	70.1	70.3	71.9	71.9	71.0	68.4	66.9	65.3	63.6
170000	69.5	68.5	68.9	67.9	69.7	70.0	70.5	71.8	72.0	71.0	68.4	66.9	65.3	63.6
180000	69.5	68.5	69.0	67.9	69.8	69.9	70.5	71.7	71.8	70.9	68.2	66.9	65.2	63.5
190000	69.3	68.4	68.8	67.8	69.8	69.7	70.6	71.6	71.7	70.7	68.0	66.8	65.0	63.3
200000	69.1	68.2	68.7	67.8	69.7	69.5	70.6	71.4	71.5	70.5	67.9	66.7	64.8	63.2
210000	68.9	68.1	68.5	67.8	69.6	69.2	70.6	71.3	71.3	70.4	67.7	66.5	64.6	63.1
220000	68.7	67.9	68.3	67.7	69.5	69.0	70.6	71.2	71.2	70.2	67.5	66.4	64.3	62.9
230000	68.6	67.7	68.2	67.6	69.4	68.9	70.5	71.0	71.1	70.0	67.3	66.2	64.0	62.7
Daily Max	69.5	68.5	69.0	68.0	69.8	70.2	70.6	71.9	72.0	71.0	69.7	67.1	66.1	63.7
Daily Min	67.9	66.6	66.4	66.5	66.8	68.3	67.8	69.7	69.8	70.0	67.3	65.7	64.0	61.7
Average	68.6	67.7	67.6	67.2	68.2	69.2	69.2	70.7	70.8	70.5	68.3	66.4	65.0	62.8

APPENDIX B

Documentation of Agency Consultation

From:	Metcalf, Mark W
To:	Laatsch, Cheryl
Cc:	Bosacki, William K; Brandt, Edward S; Nuthals, James D
Subject:	Grand Rapids - Annual water quality monitoring report (FERC No. 2433)
Date:	Tuesday, October 10, 2017 1:09:01 PM
Attachments:	2017-10-10 WDNR GRR Annual WQM Rpt.pdf Grand Rapids Tailrace DO Summary 2017.xlsx Grand Rapids Tailrace pH Summary 2017.xlsx Grand Rapids Tailrace Temp Summary 2017.xlsx Grand Rapids Upstream DO Summary 2017.xlsx Grand Rapids Upstream pH Summary 2017.xlsx Grand Rapids Upstream Temp Summary 2017.xlsx

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Good afternoon Cheryl,

Pursuant to the water quality monitoring plan for the Wisconsin Public Service (WPS) Grand Rapids hydroelectric facility, WPS is submitting water quality monitoring data collected during the 2017 monitoring season for your review and comment.

During the 2017 monitoring season, no deviations from the water quality standards for dissolved oxygen, pH, or temperature were observed upstream or downstream of the project. The monitoring data can be found in the attached excel spreadsheets. Please review the enclosed monitoring report and data, and provide any comments you may have within 30 days. Should you have any questions or concerns, please do not hesitate to call me at (920) 433-1833.

Thanks,
Mark

Mark Metcalf
Principal Environmental Consultant
office: 920-433-1833
mobile: 920-246-2717

Please note my email address has changed. My new address is mark.metcalf@wecenergygroup.com.

Wisconsin Public Service Corporation
700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001
www.wisconsinpublicservice.com

October 10, 2017

Ms. Cheryl Laatch
Wisconsin Department of Natural Resources
101 S. Webster St.
Madison, WI 53703

Dear Ms. Laatch:

SUBJECT: 2017 Water Quality Monitoring Report

Hydro	FERC Project No.	NATDAM No.	License Article
Grand Rapids	**2433**	**MI00022**	**407**

In accordance with the Order Approving Water Quality Monitoring Plan under Article 407, dated April 7, 1999, Wisconsin Public Service Corporation (WPSC) is submitting water quality monitoring data collected during the 2017 monitoring season at the Grand Rapids Hydroelectric project for your review and comment.

At the Grand Rapids facility, WPS is required to ensure that flow releases from the Grand Rapids Project maintain the state standards listed below except when the river flow in the Menominee River is less than the 95 percent exceedance flow or when natural conditions prohibit attainment of the standards:

(1) Monthly average temperatures downstream of the Grand Rapids Dam shall be no greater than those listed below:

January, February	38°F
March	41°F
April	56°F
May	70°F
June	80°F
July	83°F
August	81°F
September	74°F
October	64°F
November	49°F
December	39°F

(2) Temperature downstream of the Grand Rapids Project Dam shall not exceed 89°F at any time.
(3) DO concentrations downstream of the project powerhouse must not be less than 5.0 milligrams per liter (mg/L) at any time.
(4) Maintain pH within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.

As described in the water quality monitoring plan, monitoring was conducted upstream and downstream of the powerhouse from June 1 through September 30. A photo showing the monitoring locations can be found in Figure 1. Monitoring for DO, temperature, and pH was conducted continuously on an hourly basis using portable water quality monitoring equipment manufactured by YSI, Inc. The instrumentation was cleaned and calibrated according to manufacturer specification at least once every 14 days during the monitoring period. A post deployment calibration was conducted to determine the extent of calibration drift. Raw data was adjusted assuming a linear degradation of calibration based upon a post calibration of the equipment. The water quality monitoring equipment used to monitor DO has an accuracy of +/- 0.1 mg/l, per the manufacturer. For compliance purposes, DO concentrations more than 0.1 mg/l below the applicable water quality standard are potential deviations.

No deviations from the dissolved oxygen, pH or temperature water quality standards were observed at the upstream or downstream monitoring locations during the 2017 monitoring season. Enclosed with this report are excel spreadsheets containing the monitoring data, in both tabular and graphical format, with the periods of missing data identified.

As previously reported, WPS inadvertently missed water quality monitoring during the 2009 and 2014 monitoring seasons. To mitigate for the lost monitoring, WPS proposed to conduct water quality monitoring in 2017 and 2018, and then resume the five-year monitoring cycle in 2019. On August 2, 2016 the FERC recommended consulting with the resource agencies to determine if the second year of mitigation monitoring should be conducted in 2018 or between the regularly scheduled 2019 and 2024 monitoring years. WPS requests your recommendation on whether monitoring should be conducted in 2018, or in between the next regularly scheduled monitoring years, such as in year 2021 or 2022.

Please review the enclosed data and provide any comments you may have within 30 days of this letter. Should you have any questions or concerns, feel free to call me at (920) 433-1833.

Sincerely,

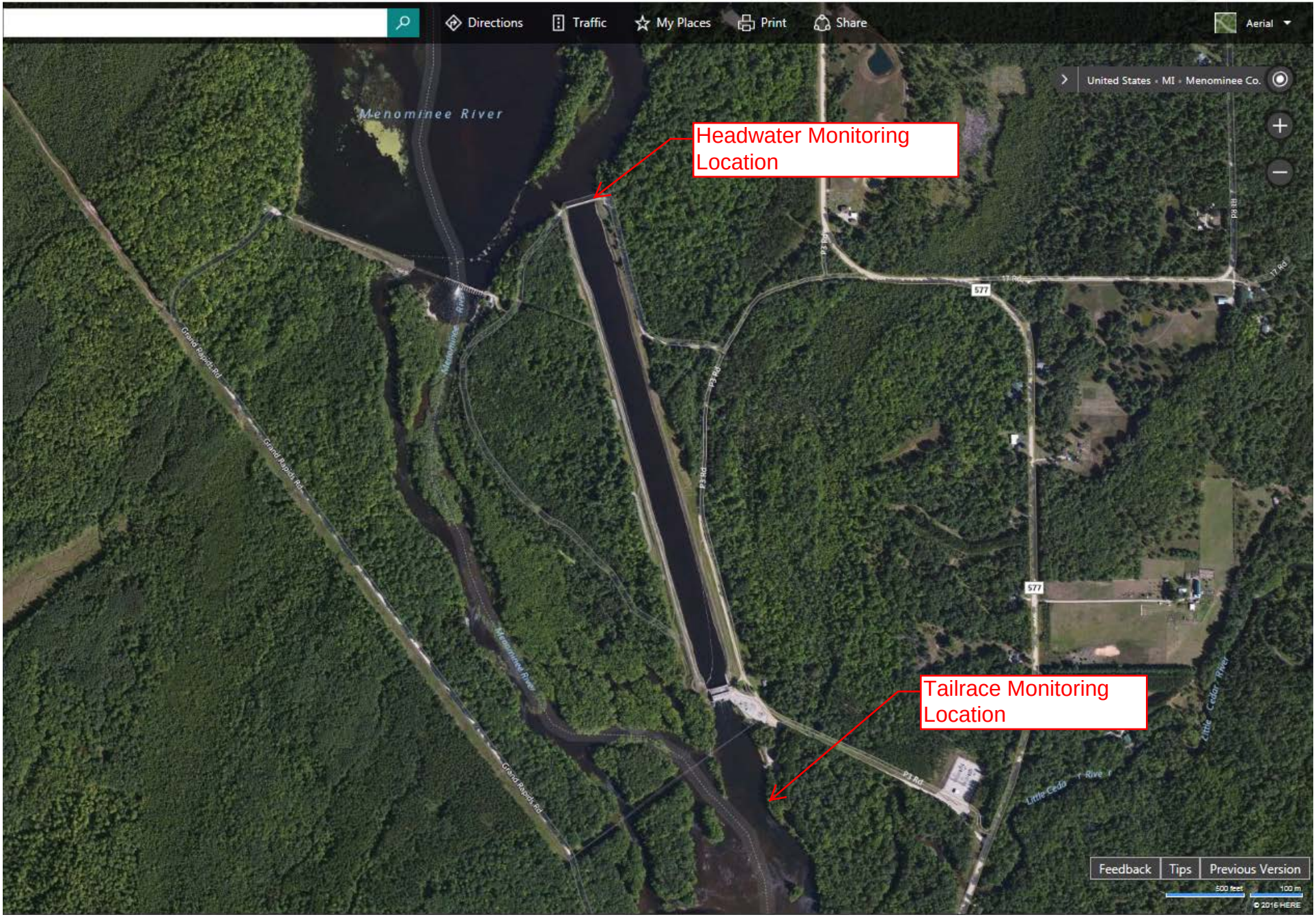
Mark Metcalf

Mark Metcalf
Principal Environmental Consultant

Enc.

cc: Mr. Ed Brandt - WPS
Mr. Bill Bosacki – WPS
Mr. Jamie Nuthals – WBS

Figure 1 - Grand Rapids Hydroelectric Project - Water Quality Monitoring Locations



Headwater Monitoring Location: Approx. 45 21'49", 87 39' 9"

Tailrace Monitoring Location: Approx. 45 21'10", 87 38' 53"

Response to Comments from the Wisconsin Department of Natural Resources

The Wisconsin Department of Natural Resources did not provide comments on the 2017 water quality monitoring report.

From:	Metcalf, Mark W
To:	Oun, Amira
Cc:	Bosacki, William K; Brandt, Edward S; Nuthals, James D
Subject:	Grand Rapids - Annual water quality monitoring report (FERC No. 2433)
Date:	Tuesday, October 10, 2017 1:11:34 PM
Attachments:	2017-10-10 MDEQ GRR Annual WQM Rpt.pdf Grand Rapids Tailrace DO Summary 2017.xlsx Grand Rapids Tailrace pH Summary 2017.xlsx Grand Rapids Tailrace Temp Summary 2017.xlsx Grand Rapids Upstream DO Summary 2017.xlsx Grand Rapids Upstream pH Summary 2017.xlsx Grand Rapids Upstream Temp Summary 2017.xlsx

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Good afternoon Amira,

Pursuant to the water quality monitoring plan for the Wisconsin Public Service (WPS) Grand Rapids hydroelectric facility, WPS is submitting water quality monitoring data collected during the 2017 monitoring season for your review and comment.

During the 2017 monitoring season, no deviations from the water quality standards for dissolved oxygen, pH, or temperature were observed upstream or downstream of the project. The monitoring data can be found in the attached excel spreadsheets. Please review the enclosed monitoring report and data, and provide any comments you may have within 30 days. Should you have any questions or concerns, please do not hesitate to call me at (920) 433-1833.

Thanks,
Mark

Mark Metcalf
Principal Environmental Consultant
office: 920-433-1833
mobile: 920-246-2717

Please note my email address has changed. My new address is mark.metcalf@wecenergygroup.com.

Wisconsin Public Service Corporation
700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001
www.wisconsinpublicservice.com

October 10, 2017

Ms. Amira Oun
Michigan Department of Environmental Quality
Constitution Hall, Third floor
525 Allegan Street
Lansing, Michigan 48909-7958

Dear Ms. Oun:

SUBJECT: 2017 Water Quality Monitoring Report

Hydro	FERC Project No.	NATDAM No.	License Article
Grand Rapids	**2433**	**MI00022**	**407**

In accordance with the Order Approving Water Quality Monitoring Plan under Article 407, dated April 7, 1999, Wisconsin Public Service Corporation (WPSC) is submitting water quality monitoring data collected during the 2017 monitoring season at the Grand Rapids Hydroelectric project for your review and comment.

At the Grand Rapids facility, WPS is required to ensure that flow releases from the Grand Rapids Project maintain the state standards listed below except when the river flow in the Menominee River is less than the 95 percent exceedance flow or when natural conditions prohibit attainment of the standards:

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December	39°F

(2) Temperature downstream of the Grand Rapids Project Dam shall not exceed 89°F at any time.
(3) DO concentrations downstream of the project powerhouse must not be less than 5.0 milligrams per liter (mg/L) at any time.
(4) Maintain pH within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.

As described in the water quality monitoring plan, monitoring was conducted upstream and downstream of the powerhouse from June 1 through September 30. A photo showing the monitoring locations can be found in Figure 1. Monitoring for DO, temperature, and pH was conducted continuously on an hourly basis using portable water quality monitoring equipment manufactured by YSI, Inc. The instrumentation was cleaned and calibrated according to manufacturer specification at least once every 14 days during the monitoring period. A post deployment calibration was conducted to determine the extent of calibration drift. Raw data was adjusted assuming a linear degradation of calibration based upon a post calibration of the equipment. The water quality monitoring equipment used to monitor DO has an accuracy of +/- 0.1 mg/l, per the manufacturer. For compliance purposes, DO concentrations more than 0.1 mg/l below the applicable water quality standard are potential deviations.

No deviations from the dissolved oxygen, pH or temperature water quality standards were observed at the upstream or downstream monitoring locations during the 2017 monitoring season. Enclosed with this report are excel spreadsheets containing the monitoring data, in both tabular and graphical format, with the periods of missing data identified.

As previously reported, WPS inadvertently missed water quality monitoring during the 2009 and 2014 monitoring seasons. To mitigate for the lost monitoring, WPS proposed to conduct water quality monitoring in 2017 and 2018, and then resume the five-year monitoring cycle in 2019. On August 2, 2016 the FERC recommended consulting with the resource agencies to determine if the second year of mitigation monitoring should be conducted in 2018 or between the regularly scheduled 2019 and 2024 monitoring years. WPS requests your recommendation on whether monitoring should be conducted in 2018, or in between the next regularly scheduled monitoring years, such as in year 2021 or 2022.

Please review the enclosed data and provide any comments you may have within 30 days of this letter. Should you have any questions or concerns, feel free to call me at (920) 433-1833.

Sincerely,

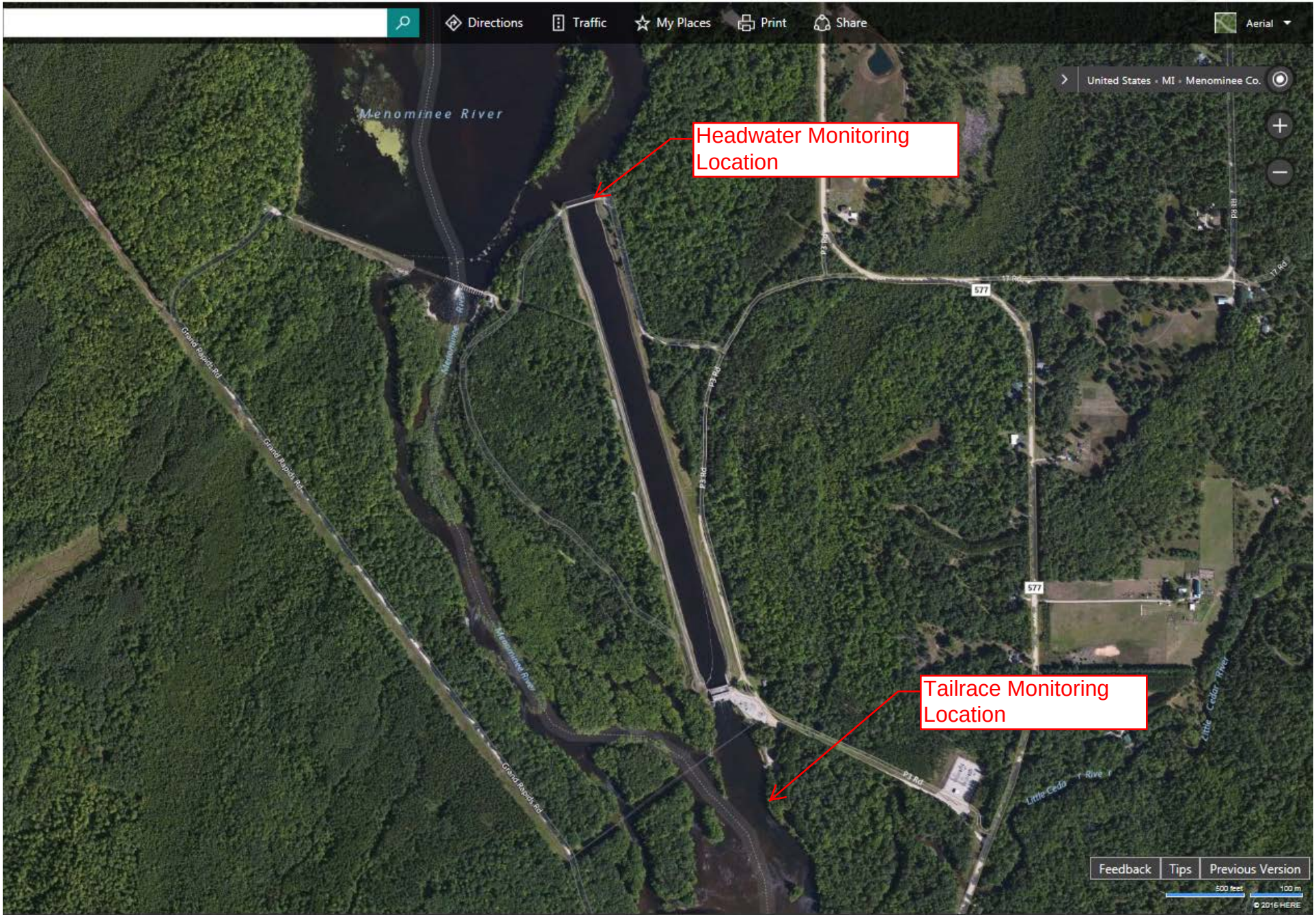
Mark Metcalf

Mark Metcalf
Principal Environmental Consultant

Enc.

cc: Mr. Ed Brandt - WPS
Mr. Bill Bosacki – WPS
Mr. Jamie Nuthals – WBS

Figure 1 - Grand Rapids Hydroelectric Project - Water Quality Monitoring Locations



Headwater Monitoring Location: Approx. 45 21'49", 87 39' 9"

Tailrace Monitoring Location: Approx. 45 21'10", 87 38' 53"

Response to Comments from the Michigan Department of Environmental Quality

The Michigan Department of Environmental Quality did not provide comments on the 2017 water quality monitoring report.

From:	Metcalf, Mark W
To:	Utrup, Nick
Cc:	Bosacki, William K; Brandt, Edward S; Nuthals, James D
Subject:	Grand Rapids - Annual water quality monitoring report (FERC No. 2433)
Date:	Tuesday, October 10, 2017 1:10:16 PM
Attachments:	2017-10-10 FWS GRR Annual WQM Rpt.pdf Grand Rapids Tailrace DO Summary 2017.xlsx Grand Rapids Tailrace pH Summary 2017.xlsx Grand Rapids Tailrace Temp Summary 2017.xlsx Grand Rapids Upstream DO Summary 2017.xlsx Grand Rapids Upstream pH Summary 2017.xlsx Grand Rapids Upstream Temp Summary 2017.xlsx

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Good afternoon Nick,

Pursuant to the water quality monitoring plan for the Wisconsin Public Service (WPS) Grand Rapids hydroelectric facility, WPS is submitting water quality monitoring data collected during the 2017 monitoring season for your review and comment.

During the 2017 monitoring season, no deviations from the water quality standards for dissolved oxygen, pH, or temperature were observed upstream or downstream of the project. The monitoring data can be found in the attached excel spreadsheets. Please review the enclosed monitoring report and data, and provide any comments you may have within 30 days. Should you have any questions or concerns, please do not hesitate to call me at (920) 433-1833.

Thanks,
Mark

Mark Metcalf
Principal Environmental Consultant
office: 920-433-1833
mobile: 920-246-2717

Please note my email address has changed. My new address is mark.metcalf@wecenergygroup.com.

Wisconsin Public Service Corporation
700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001
www.wisconsinpublicservice.com

October 10, 2017

Mr. Nicholas Utrup
U.S. Fish & Wildlife Service
4101 American Blvd East
Bloomington, MN 55425

Dear Mr. Utrup:

SUBJECT: 2017 Water Quality Monitoring Report

Hydro	FERC Project No.	NATDAM No.	License Article
Grand Rapids	**2433**	**MI00022**	**407**

In accordance with the Order Approving Water Quality Monitoring Plan under Article 407, dated April 7, 1999, Wisconsin Public Service Corporation (WPSC) is submitting water quality monitoring data collected during the 2017 monitoring season at the Grand Rapids Hydroelectric project for your review and comment.

At the Grand Rapids facility, WPS is required to ensure that flow releases from the Grand Rapids Project maintain the state standards listed below except when the river flow in the Menominee River is less than the 95 percent exceedance flow or when natural conditions prohibit attainment of the standards:

(1) Monthly average temperatures downstream of the Grand Rapids Dam shall be no greater than those listed below:

January, February	38°F
March	41°F
April	56°F
May	70°F
June	80°F
July	83°F
August	81°F
September	74°F
October	64°F
November	49°F
December	39°F

(2) Temperature downstream of the Grand Rapids Project Dam shall not exceed 89°F at any time.

(3) DO concentrations downstream of the project powerhouse must not be less than 5.0 milligrams per liter (mg/L) at any time.
(4) Maintain pH within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum.

As described in the water quality monitoring plan, monitoring was conducted upstream and downstream of the powerhouse from June 1 through September 30. A photo showing the monitoring locations can be found in Figure 1. Monitoring for DO, temperature, and pH was conducted continuously on an hourly basis using portable water quality monitoring equipment manufactured by YSI, Inc. The instrumentation was cleaned and calibrated according to manufacturer specification at least once every 14 days during the monitoring period. A post deployment calibration was conducted to determine the extent of calibration drift. Raw data was adjusted assuming a linear degradation of calibration based upon a post calibration of the equipment. The water quality monitoring equipment used to monitor DO has an accuracy of +/- 0.1 mg/l, per the manufacturer. For compliance purposes, DO concentrations more than 0.1 mg/l below the applicable water quality standard are potential deviations.

No deviations from the dissolved oxygen, pH or temperature water quality standards were observed at the upstream or downstream monitoring locations during the 2017 monitoring season. Enclosed with this report are excel spreadsheets containing the monitoring data, in both tabular and graphical format, with the periods of missing data identified.

As previously reported, WPS inadvertently missed water quality monitoring during the 2009 and 2014 monitoring seasons. To mitigate for the lost monitoring, WPS proposed to conduct water quality monitoring in 2017 and 2018, and then resume the five-year monitoring cycle in 2019. On August 2, 2016 the FERC recommended consulting with the resource agencies to determine if the second year of mitigation monitoring should be conducted in 2018 or between the regularly scheduled 2019 and 2024 monitoring years. WPS requests your recommendation on whether monitoring should be conducted in 2018, or in between the next regularly scheduled monitoring years, such as in year 2021 or 2022.

Please review the enclosed data and provide any comments you may have within 30 days of this letter. Should you have any questions or concerns, feel free to call me at (920) 433-1833.

Sincerely,

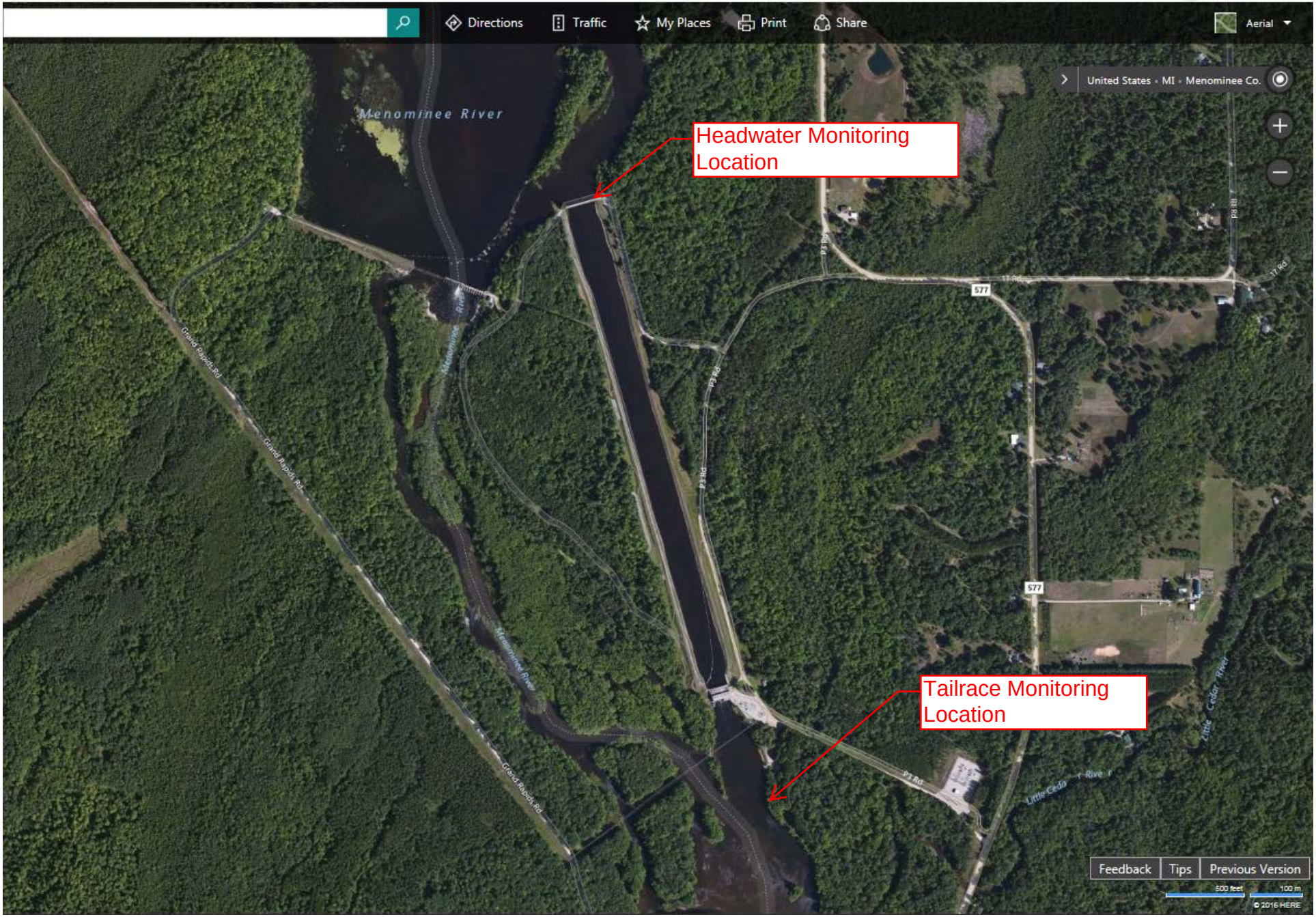
Mark Metcalf

Mark Metcalf
Principal Environmental Consultant

Enc.

cc: Mr. Ed Brandt - WPS
Mr. Bill Bosacki – WPS
Mr. Jamie Nuthals - WBS

Figure 1 - Grand Rapids Hydroelectric Project - Water Quality Monitoring Locations



Headwater Monitoring Location: Approx. 45 21'49", 87 39' 9"

Tailrace Monitoring Location: Approx. 45 21'10", 87 38' 53"

Response to Comments from the United States Fish & Wildlife Service

The US Fish & Wildlife Service did not provide comments on the 2017 water quality monitoring report.

APPENDIX C

Water Quality Monitoring Quality Assurance Data

Field Notes for Datasonde Deployment

Date/Time: 5/30/17 Analyst: MW4

Location: GRAND Tail Datasonde Serial #: 13L/100689

Datasonde Battery [volts]: 3.1

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.58	7.00
10.00 Std	9.70	10.00

pH Cal. Temp.: 69.1°F

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.2871 Std	0.3085	0.2871	5.44	Before — After —

Barometric Pressure (mm Hg) 739

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	106.4	97.3	0.95
mg/L D.O.	9.96	9.11	
Temp – °F	65.3	65.4	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 8:39 **End Test:** 8:57

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	89.3	91.6
mg/L D.O.	8.78	8.75
Temp – °F	61.6	~~62~~ 61.2

(Must be within 0.5 mg/L D.O.) - OK Deploy

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 5/30/17 10:00 Battery Life (Number of Days): 616.4

Notes: pH 7 Buffer - Oakton lot TC1 Exp 10/19
pH 10 Buffer - Burrell Scientific lot 751.2343 Exp 12/19

Field Notes for Datasonde Deployment

Date/Time: 5/30/17 8:40 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 14D1G1264

Calibration Information Datasonde Battery [volts]: 3.1

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.71	7.00
10.00 Std	9.75	10.00

pH Cal. Temp.: 68.0

Conductivity (mS/cm) Before Cal. After Cal. Cell Constant Zero Conductivity Calibration (optional)

0.287 Std 0.2896 0.2874 5.54 Before — After —

Barometric Pressure (mm Hg) 739

YSI Datasonde Dissolved Oxygen

	Before Calibration	After Calibration	DO Probe Gain
% Saturation	108.2	97.2	0.95
mg/L D.O.	10.44	9.37	
Temp – °F	62.7	62.9	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 08:54 **End Test:** 9:18

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	88.7	91.8	
mg/L D.O.	8.71	8.77	ok - Deploy
Temp – °F	61.2	61.6	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 5/30/17 10:00 Battery Life (Number of Days): 616.4

Notes:

Field Notes for Datasonde Deployment

Date/Time: 6/7/17 8:15 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13L100688

Datasonde Battery [volts]: 3.2

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.87	7.00
10.00 Std	9.84	10.00

pH Cal. Temp.: 67.0

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.287 Std	0.2794	0.2872	5.45	Before — After —

Barometric Pressure (mm Hg) 747

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	110.2	98.3	0.92
mg/L D.O.	10.38	9.26	
Temp – °F	64.8	64.9	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	101.5	100.0
mg/L D.O.	8.85	8.71
Temp – °F	70.5	70.9

Post Calibration Slope = 100.8

Create File for Test Program ✓ **Start Test:** 8:30 **End Test:** 8:51

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	89.1	90.2	
mg/L D.O.	8.20	8.17	ok - Deploy
Temp – °F	66.9	67.3	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/7/17 9:00 Battery Life (Number of Days): 6/6.4

Notes: pH buffer - Oakton lot TQ1, pH7 Exp. 10/17
Barrell Scientific pH10 lot 751343 Exp 12/17
Deployed @ 8:55 a.m.

Field Notes for Datasonde Deployment

Date/Time: 6/7/17 8:30 Analyst: MCM

Location: GRAND Tailrace Datasonde Serial #: 13L/00327

Calibration Information Datasonde Battery [volts]: 3.1

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.22	7.00
10.00 Std	10.23	10.00

pH Cal. Temp.: _____

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.287 Std	0.2907	0.2871	5.00	Before — After —

Barometric Pressure (mm Hg) 746

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	95.0	98.2	0.92
mg/L D.O.	8.93	9.24	
Temp – °F	65.0	65.0	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

- See Grand upstream

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 8:42 **End Test:** 9:03

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	88.8	90.7
mg/L D.O.	8.17	8.16
Temp – °F	66.9	67.4

(Must be within 0.5 mg/L D.O.) ok- Deploy

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/7/17 10:00 Battery Life (Number of Days): 616.4

Notes: Deployed @ 10:02 A.M.

Field Notes for Datasonde Post Calibration

Date/Time: 6/7/17 8:58 Analyst: MWM

Location: Grand upstream Datasonde Serial #: 14D10264

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	—
10.00 Std.	—

pH Temp Reading.: —

Conductivity (mS/cm) : 0.287 Std. Conc. 0.2816 Observed

Barometric Pressure (mm Hg) 748

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	~~92~~ 98.2	98.4	
mg/L D.O.	9.26	9.24	0.96
Temp – °F	64.8	65.2	

Notes:

191 readings - Data OK

Field Notes for Datasonde Post Calibration

Date/Time: 6/7/17 11:45 Analyst: MWH

Location: GRAND Tail Datasonde Serial #: 13C100697

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.04
10.00 Std.	10.02

pH Temp Reading.: 71.0

Conductivity (mS/cm) : 0.287 Std. Conc. 0.2955 Observed

Barometric Pressure (mm Hg) 734

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	96.5	96.5	
mg/L D.O.	8.06	8.04	0.95
Temp – °F	76.0	76.2	

Notes:

194 readings All D.O. 98 mg/L

Post Cal @ Twin Falls

Field Notes for Datasonde Deployment

Date/Time: 6/16/17 9:00 Analyst: MWM

Location: GRAND Rapids Upstream Datasonde Serial #: 14D10C261

Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	~~6.56~~ 6.59	7.00
10.00 Std	9.61	10.00

pH Cal. Temp.: 72.7 F

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.289 Std	0.3173	0.2893	5.26	Before — After —

Barometric Pressure (mm Hg) 736

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.8	96.9	0.98
mg/L D.O.	8.75	8.63	
Temp – °F	69.5	69.9	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	100.4	100.0
mg/L D.O.	8.85	8.80
Temp – °F	68.4	68.5

Post Calibration Slope = 95.7

Create File for Test Program ✓ **Start Test:** 9:12 **End Test:** 9:27

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	76	69.9	
mg/L D.O.	6.83	6.83	
Temp – °F	69.0	~~7.92~~ 69.2	OK - Deploy

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/16/17 10:02 Battery Life (Number of Days): 6/6.4

Notes:

Field Notes for Datasonde Deployment

Date/Time: 6/16/17 9:12 Analyst: MWM

Location: GRAND Rapids Tailrace Datasonde Serial #: 14D 101264

Calibration Information Datasonde Battery [volts]: 3.0

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.10	7.00
10.00 Std	10.03	10.00

pH Cal. Temp.: 72.5

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.289 Std	0.2814	0.2892	5.76	Before ~ After ~

Barometric Pressure (mm Hg) 736

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.4	96.9	0.95
mg/L D.O.	8.41	8.44	
Temp – °F	71.8	72.0	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** ✓ 9:24 **End Test:** 9:42

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	76.9	78.5	
mg/L D.O.	6.90	6.81	OK Deploy
Temp – °F	69.2	69.5	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/16/17 10:00 Battery Life (Number of Days): 607.6

Notes: Deployed @ ~~10~~ 11:45

River up over stream Bank, Entire tube under water

Field Notes for Datasonde Post Calibration

Date/Time: 6/16/17 9:38 Analyst: AWM

Location: Grand Rapids upstream Datasonde Serial #: 13L 6889

Ending Datasonde Battery [volts]: 3.1

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.08
10.00 Std.	10.02

pH Temp Reading.: 73.7

Conductivity (mS/cm) : 0.289 Std. Conc. 0.3042 Observed

Barometric Pressure (mm Hg) 735

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	93.1	96.6	
mg/L D.O.	8.69	8.99	0.91
Temp – °F	70.4	71.1	

Notes:

217 reading: All D.O. ↑ 6.7 mg/L

Light bio fouling on sonde

Field Notes for Datasonde Post Calibration

Date/Time: 6/16/17 11:52 Analyst: MWM

Location: Grand Tailrace Datasonde Serial #: 13L100327

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	6.83
10.00 Std.	9.81

pH Temp Reading.: 78.2

Conductivity (mS/cm) : 0.298 Std. Conc. 0.3212 Observed

Barometric Pressure (mm Hg) 730

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	96.7	96.8	
mg/L D.O.	8.40	8.34	0.92
Temp – °F	72.3	73.1	

Notes:

218 readings - All D.O. 6.98 or higher

Field Notes for Datasonde Deployment

Date/Time: 6/26/17 8:50 Analyst: MGM

Location: GRAND Rapids Upstream Datasonde Serial #: 13A100691

Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.01	7.00
10.00 Std	9.87	10.00

pH Cal. Temp.: 65.9

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.285 Std	0.2592	0.2850	5.83	Before — After —

Barometric Pressure (mm Hg) 743

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.0	97.8	0.97
mg/L D.O.	8.98	9.14	
Temp – °F	65.4	65.6	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

Calibrated 6/23/17

	Before Calibration	After Calibration
% Saturation	100.4	100.0
mg/L D.O.	8.44	8.39
Temp – °F	72.3	72.4

Post Calibration Slope = 95.2

Create File for Test Program ✓ **Start Test:** 9:00 **End Test:** 9:12

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	85.2	86.3	
mg/L D.O.	8.04	7.96	OK- Deploy
Temp – °F	69.6	65.0	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/26/17 10:00 Battery Life (Number of Days): 603.9

Notes: Deployed @ 9:20

Field Notes for Datasonde Deployment

Date/Time: 6/26/17 9:05 Analyst: MWM

Location: Grand Tailrace Datasonde Serial #: 13C100326

Calibration Information Datasonde Battery [volts]: 3.0

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.03	7.00
10.00 Std	9.96	10.00

pH Cal. Temp.: 65.4

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.285 Std	0.2581	0.2951	5.75	Before — After —

Barometric Pressure (mm Hg) 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	95.9	97.6	1.04
mg/L D.O.	7.04	9.22	
Temp – °F	64.7	64.6	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 9:12 **End Test:** 9:30

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	85.1	86.8	
mg/L D.O.	8.03	7.99	OK - Deploy
Temp – °F	64.7	65.0	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight**_____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 6/26/17 10:00 Battery Life (Number of Days): 599.7

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 6/20/17 9:25 Analyst: MWM

Location: GRAND Upstream Datasonde Serial #: 14D101261

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.17
10.00 Std.	10.12

pH Temp Reading.: 64.2

Conductivity (mS/cm) : 0.285 Std. Conc. 0.3564 Observed

Barometric Pressure (mm Hg) 743

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.1	97.9	
mg/L D.O.	9.68	9.69	0.99
Temp – °F	60.0	60.5	

Notes:

24 hr reading - All D.O. > 6.5 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 6/26/17 9:55 Analyst: MWH

Location: ERAND Tailrace Datasonde Serial #: 14D101264

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.12
10.00 Std.	10.03

pH Temp Reading.: 63.7

Conductivity (mS/cm) : 0.285 Std. Conc. 0.2807 Observed

Barometric Pressure (mm Hg) 743

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.0	97.8	
mg/L D.O.	9.94	9.99	0.96
Temp – °F	57.7	58.0	

Notes:

240 readings - All D.O. > 6.8 mg/L

Field Notes for Datasonde Deployment

Date/Time: 7/5/17 14:19 Analyst: MWM

Location: GRAND Lep Datasonde Serial #: 14D10CC01

Calibration Information Datasonde Battery [volts]: 3.0

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.06	7.0
10.00 Std	9.96	10.0

pH Cal. Temp.: 80.0

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.287 Std	0.3110	0.2873	4.86	Before — After —

Barometric Pressure (mm Hg) 743

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	~~979~~ 97.9	97.8	
mg/L D.O.	8.26	8.20	6.98
Temp – °F	75.0	75.6	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 14:30 **End Test:** _____

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	96.0	94.9	
mg/L D.O.	7.85	8.04	OK - Replay
Temp – °F	~~72.0~~ 71.8	72.10	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/5/17 15:00 Battery Life (Number of Days): 603.1

Notes: _____

Field Notes for Datasonde Deployment

Date/Time: 7/5/17 11:14 Analyst: KWM

Location: GRAND Teton Datasonde Serial #: 13L100689

Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.04	7.00
10.00 Std	9.97	10.00

pH Cal. Temp.: 75.0

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.287 Std	0.2979	0.2871		Before — After —

Barometric Pressure (mm Hg) 732

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	94.8	96.4	0.95
mg/L D.O.	7.71	7.82	
Temp – °F	78.6	78.8	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 11:24 **End Test:** _____

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	91.7	96.6	
mg/L D.O.	8.26	8.36	ok - Deploy
Temp – °F	68.9	69.0	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/6/17 13:00 Battery Life (Number of Days): 592.1

Notes: Calibrate @ Twin Falls

Deployed @ 14:05

Field Notes for Datasonde Post Calibration

Date/Time: 7/5/17 14:45 Analyst: MGM

Location: GRAND up Datasonde Serial #: 13C1CR691

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.18
10.00 Std.	10.07

pH Temp Reading.: 80.0

Conductivity (mS/cm) : 0.287 Std. Conc. 0.3551 Observed

Barometric Pressure (mm Hg) 743

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	99.3	97.8	
mg/L D.O.	8.54	8.33	0.95
Temp – °F	73.3	74.1	

Notes:

221 readings - All D.O. ↑ 7 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 7/5/17 14:32 Analyst: MGM

Location: GRAND Tank Datasonde Serial #: 13L ICB326

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	6.98
10.00 Std.	9.88

pH Temp Reading.: 80.0

Conductivity (mS/cm) : 0.287 Std. Conc. 0.3101 Observed

Barometric Pressure (mm Hg) 743

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.7	97.7	
mg/L D.O.	8.20	8.06	1.03
Temp – °F	76.6	77.3	

Notes:

22L data points - D.O. ↑ 7

Field Notes for Datasonde Deployment

Date/Time: 7/13/17 9:00 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13E100690

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.85	7.0
10.00 Std	9.73	10.0

pH Cal. Temp.: 68.9

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.283 Std	0.2753	0.2831	5.48	Before ~ After ~

Barometric Pressure (mm Hg) 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	98.0	97.6	1.07
mg/L D.O.	8.96	8.92	
Temp – °F	67.6	67.4	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	100.1	100.0
mg/L D.O.	8.36	8.35
Temp – °F	73.9	73.5

Post Calibration Slope = 94.1

Create File for Test Program ✓ **Start Test:** 9:12 **End Test:**

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	79.2	80.9	
mg/L D.O.	6.91	6.83	CL - Deploy
Temp – °F	71.8	72.2	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/13/17 10:00 Battery Life (Number of Days): 596.3

Notes:

Field Notes for Datasonde Deployment

Date/Time: 7/13/17 9:16 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13L100327

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.74	7.00
10.00 Std	9.69	10.00

pH Cal. Temp.: 69.0

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.283 Std	0.2794	0.2830	5.42	Before — After —

Barometric Pressure (mm Hg) 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.3	97.7	0.93
mg/L D.O.	8.92	8.95	
Temp – °F	67.3	67.3	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 9:27 **End Test:** 9:42

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	79.4	80.9	
mg/L D.O.	6.92	6.85	OK - Deploy
Temp – °F	71.8	72.2	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/13/17 10:00 Battery Life (Number of Days): 594.5

Notes: Deployed @ 10105

Field Notes for Datasonde Post Calibration

Date/Time: 7/13/17 9:35 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 14D101261

Ending Datasonde Battery [volts]: 3.8

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.11
10.00 Std.	10.08

pH Temp Reading.: 68.1

Conductivity (mS/cm) : 0.283 Std. Conc. 0.2591 Observed

Barometric Pressure (mm Hg) 742

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	96.0	97.5	
mg/L D.O.	8.79	8.92	0.99
Temp – °F	67.4	67.4	

Notes:

187 readings - All D.O. ↑ 6.8 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 7/13/17 10:10 Analyst: MWM

Location: Grand Tail Datasonde Serial #: 13L100689

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.24
10.00 Std.	10.16

pH Temp Reading.: 68.3

Conductivity (mS/cm) : 0.283 Std. Conc. 0.1647 Observed

Barometric Pressure (mm Hg) 742

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.2	97.7	
mg/L D.O.	8.96	8.99	0.95
Temp – °F	66.8	66.9	

Notes:

190 readings - All D.O. ↑ .7 mg/L

Field Notes for Datasonde Deployment

Date/Time: 7/21/17 8:23 Analyst: MLW

Location: Grand upstream Datasonde Serial #: 13E100326

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.97	7.00
10.00 Std	9.89	10.00

pH Cal. Temp.: 76.6

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.284 Std	0.5123	0.2841	5.22	Before – After –

Barometric Pressure (mm Hg) 741

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.4	97.5	1.03
mg/L D.O.	8.58	8.65	
Temp – °F	70.0	70.2	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	8.44 98.6	100.0
mg/L D.O.	8.41	8.51
Temp – °F	72.0	72.1

Post Calibration Slope = 95.4

Create File for Test Program ✓ **Start Test:** 8:36 **End Test:**

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	81.8	84.4
mg/L D.O.	6.95	6.96
Temp – °F	74.3	74.7

(Must be within 0.5 mg/L D.O.) OK - Deploy

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/21/17 10:00 Battery Life (Number of Days): 589.7

Notes:

Field Notes for Datasonde Deployment

Date/Time: 7/21/17 8:35 Analyst: MWH

Location: Gravel Tailrace Datasonde Serial #: 13L100691

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.13	7.00
10.00 Std	10.07	10.00

pH Cal. Temp.: 72.4

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.284 Std	0.3077	0.2841	5.10	Before ~ After ~

Barometric Pressure (mm Hg) 741

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.7	97.5	0.96
mg/L D.O.	8.46	8.50	
Temp – °F	71.6	71.9	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 8:51 **End Test:** 9:09

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	81.5	84.6
mg/L D.O.	6.91	6.96
Temp – °F	74.4	74.8

(Must be within 0.5 mg/L D.O.) OK. Deploy

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/21/17 10:00 Battery Life (Number of Days): 5790

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 7/21/17 9:04 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13L/100680

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.14
10.00 Std.	10.06

pH Temp Reading.: 73.8

Conductivity (mS/cm) : 0.289 Std. Conc. 0.3051 Observed

Barometric Pressure (mm Hg) 741

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.6	97.8	
mg/L D.O.	8.37	8.35	1.07
Temp – °F	73.5	73.8	

Notes:

HR readings - All D.O. ↑ 6.5 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 7/6/17 9:35 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13L100327

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.10
10.00 Std.	10.06

pH Temp Reading.: 73.8°F

Conductivity (mS/cm) : 0.284 Std. Conc. 0.2979 Observed

Barometric Pressure (mm Hg) 741

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.1	97.5	
mg/L D.O.	8.39	8.31	0.92
Temp – °F	73.8	74.1	

Notes:

192 readings - All D.O. ↑ 6.8 mg/L

Field Notes for Datasonde Deployment

Date/Time: 7/28/17 8:45 Analyst: MWM

Location: GRAND (8 Stream Datasonde Serial #: 14D 101261

Calibration Information Datasonde Battery [volts]: 12.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.11	7.00
10.00 Std	10.09	10.00

pH Cal. Temp.: 68.1

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.286 Std	0.2769	0.2861	5.50	Before — After —

Barometric Pressure (mm Hg) 745

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	95.3	98.1	1.00
mg/L D.O.	8.65	8.90	
Temp – °F	68.2	68.2	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	103.5	100.0
mg/L D.O.	8.91	8.60
Temp – °F	71.2	71.3

Post Calibration Slope = 91.6 %

Create File for Test Program ✓ **Start Test:** 9:00 **End Test:** 9:15

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	85.3	86.3	
mg/L D.O.	7.36	7.26	ok - Deploy
Temp – °F	72.9	73.3	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight**

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/28/17 10:00 Battery Life (Number of Days): 595.5

Notes:

Field Notes for Datasonde Deployment

Date/Time: 7/28/17 9:00 Analyst: MWM

Location: GRAND Tailrace Datasonde Serial #: 13L/100688

Calibration Information Datasonde Battery [volts]: 3.0

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.27	7.00
10.00 Std	10.11	10.00

pH Cal. Temp.: 68.4

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
745 0.28 Std	0.2739	0.2861	5.49	Before — After —

Barometric Pressure (mm Hg) 745

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.6	98.0	
mg/L D.O.	8.91	8.94	0.92
Temp – °F	67.7	67.9	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 9:12 **End Test:** _____

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	85.2	86.9	
mg/L D.O.	~~7.34~~ 7.34	7.27	ok - Deploy
Temp – °F	72.9	75.2	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 7/28/17 10:00 Battery Life (Number of Days): 597.3

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 7/28/17 9:24 Analyst: MWM

Location: GRAND UPSTREAM Datasonde Serial #: 13C100326

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.18
10.00 Std.	10.12

pH Temp Reading.: 69.9

Conductivity (mS/cm) : 0.286 Std. Conc. 0.2784 Observed

Barometric Pressure (mm Hg) 745

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.7	98.0	
mg/L D.O.	8.91	8.83	1.03
Temp – °F	68.7	68.9	

Notes:

168 readings - Air D.O. ↑ 6.5 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 7/28/17 9:52 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13C100691

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.14
10.00 Std.	10.08

pH Temp Reading.: 69.1

Conductivity (mS/cm) : 0.296 Std. Conc. 0.2733 Observed

Barometric Pressure (mm Hg) 745

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.0	97.9	
mg/L D.O.	8.75	8.70	0.96
Temp – °F	69.7	70.1	

Notes:

168 readings. All D.O. ↑ 6.5 mg/L

Field Notes for Datasonde Deployment

Date/Time: 8/7/17 12:00 Analyst: KWM

Location: GRAND upstream Datasonde Serial #: 13E100690

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.09	7.00
10.00 Std	10.06	10.00

pH Cal. Temp.: 73.8

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.286 Std	0.2861	0.2863	5.22	Before — After —

Barometric Pressure (mm Hg) 743

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.1	97.1	1.08
mg/L D.O.	8.48	8.49	
Temp – °F	71.8	72.2	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	100.2	100.0
mg/L D.O.	8.60	8.57
Temp – °F	72.0	72.0

Post Calibration Slope = 98.7

Create File for Test Program ✓ **Start Test:** 12:15 **End Test:** 12:24

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	94.0	95.5
mg/L D.O.	8.51	8.45
Temp – °F	68.4	68.7

(Must be within 0.5 mg/L D.O.)

OK - Deploy

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8/7/17 13:00 Battery Life (Number of Days): 586.3

Notes: _____

Field Notes for Datasonde Deployment

Date/Time: 8/7/17 12:15 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13A100527

Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.95	7.00
10.00 Std	9.94	10.00

pH Cal. Temp.: 73.4

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant
0.2860 Std	0.2858	0.2861	5.16

Zero Conductivity Calibration (optional) Before — After —

Barometric Pressure (mm Hg) 744

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	98.2	97.9	0.92
mg/L D.O.	8.38	8.33	
Temp – °F	74.0	74.2	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 12:27 **End Test:** 12:39

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	94.2	96.5
mg/L D.O.	8.50	8.47
Temp – °F	68.6	68.9

(Must be within 0.5 mg/L D.O.) OK - Deploy

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8/7/17 13:00 Battery Life (Number of Days): 580.8

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 8/2/17 12:32 Analyst: HCM

Location: GRAND upstream Datasonde Serial #: 14D101261

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.14
10.00 Std.	10.10

pH Temp Reading.: 73.3

Conductivity (mS/cm) : 0.280 Std. Conc. 0.3128 Observed

Barometric Pressure (mm Hg) 744

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	99.3	979	
mg/L D.O.	8.91	8.72	0.98
Temp – °F	69.3	70.0	

Notes:

243 readings - All D.O. ↑ 7 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 8/2/17 12:57 Analyst: RELEASM

Location: GRAND Tail Datasonde Serial #: 13C/00688

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	6.97
10.00 Std.	10.00

pH Temp Reading.: 73.7

Conductivity (mS/cm) : 0.286 Std. Conc. 0.3810 Observed

Barometric Pressure (mm Hg) 744

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	99.2	97.9	
mg/L D.O.	9.04	8.81	0.90
Temp – °F	67.9	69.0	

Notes:

243 readings - All D.O. 7 7 mg/L

Field Notes for Datasonde Deployment

Date/Time: 8/16/17 7:45 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13C100691

Datasonde Battery [volts]: 3.2

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.00	7.00
10.00 Std	10.01	10.00

pH Cal. Temp.: 67.9

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.284 Std	0.2799	0.2840	5.48	Before — After —

Barometric Pressure (mm Hg) 745

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.0	98.2	0.97
mg/L D.O.	8.87	9.02	
Temp – °F	67.2	67.1	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 2

	Before Calibration	After Calibration
% Saturation	100.3	100.0
mg/L D.O.	8.43	8.40
Temp – °F	73.4	73.4

Post Calibration Slope = 100.6

Create File for Test Program ✓ **Start Test:** 8:00 **End Test:** 8:19

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	85.2	87.1	
mg/L D.O.	7.70	7.73	ok - Deploy
Temp – °F	68.5	68.5	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8/16/17 9:00 Battery Life (Number of Days): 61.4

Notes:

Field Notes for Datasonde Deployment

Date/Time: 8/16/17 8:02 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13C100326

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.06	7.00
10.00 Std	10.04	10.00

pH Cal. Temp.: 67.3

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.284 Std	0.2742	0.2841	5.58	Before — After —

Barometric Pressure (mm Hg) 745

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.0	98.0	1.04
mg/L D.O.	9.00	9.22	
Temp – °F	65.2	65.0	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 8:15 **End Test:** 8:27

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	**(Must be within 0.5 mg/L D.O.)**
% Saturation	85.4	86.2	
mg/L D.O.	7.72	7.64	OK - Deploy
Temp – °F	68.5	68.7	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8/16/17 9:02 Battery Life (Number of Days): 585.8

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 8/10/17 8:32 Analyst: MWM

Location: GRAND GP Datasonde Serial #: 13L/C6690

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.13
10.00 Std.	10.12

pH Temp Reading.: 66.9

Conductivity (mS/cm) : 0.284 Std. Conc. 0.2608 Observed

Barometric Pressure (mm Hg) 745

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.0	98.1	
mg/L D.O.	9.31	9.32	1.08
Temp – °F	64.0	64.1	

Notes:

2/2 readings - Air D.O. ↑ 1 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 8/10/17 8:55 Analyst: MWM

Location: GRAND Tail Datasonde Serial #: 13L/00327

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.15
10.00 Std.	10.05

pH Temp Reading.: 66.3

Conductivity (mS/cm) : 0.284 Std. Conc. 0.2610 Observed

Barometric Pressure (mm Hg) 745

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.3	98.0	
mg/L D.O.	9.36	9.41	0.93
Temp – °F	63.1	63.2	

Notes:

212 readings - All D.O. ↑ 7 mg/L

Field Notes for Datasonde Deployment

Date/Time: August 25, 2017 11:10 Analyst: HP

Location: Grand Rapids Headwater Datasonde Serial #: 13L100690

Calibration Information Datasonde Battery [volts]: 2.9v

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	6.93	7.00 ✓
10.00 Std	10.06	10.00

pH Cal. Temp.: 70.8°F

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.290 Std	0.2655	0.290	5.54	Before 0.0010 After ———

Barometric Pressure (mm Hg) 749.2 mm Hg

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.1%	98.4%	1.07
mg/L D.O.	———	8.78 mg/L	
Temp – °F	———	69.7°F	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	101.1%	100.0%
mg/L D.O.	9.01 mg/L	8.90 mg/L
Temp – °F	68.9°F	69.0°F

Post Calibration Slope = 95.8%

Create File for Test Program ✓ **Start Test:** 11:27 **End Test:** 1145

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	94.3%	94.9%
mg/L D.O.	8.58 mg/L	8.50 mg/L
Temp – °F	67.9°F	68.1°F

(Must be within 0.5 mg/L D.O.)

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation	———	———	———	———
mg/L D.O.	———	———	———	———
Temp – °F	———	———	———	———

Check File Status

File Start 8/25/17 1200 Battery Life (Number of Days): 578.5

Notes: ———

Field Notes for Datasonde Deployment

Date/Time: August 25, 2017 1135 Analyst: HP

Location: Grand Rapids Tailwater Datasonde Serial #: 13L600327

Datasonde Battery [volts]: 2.9v

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.01	10.08
10.00 Std	7.00	10.00

pH Cal. Temp.: 70.1 °F

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.290 Std	0.2614	0.290	5.59	Before 0.0010 After —

Barometric Pressure (mm Hg) 749.6 manHg

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.9%	98.6%	0.92
mg/L D.O.	8.92 mg/L	8.91 mg/L	
Temp – °F	68.0°F	68.6°F	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	101.1%	100.0%
mg/L D.O.	9.01 mg/L	8.90 mg/L
Temp – °F	68.9°F	69.0°F

Post Calibration Slope = 95.8%

Create File for Test Program ✓ **Start Test:** 1148 **End Test:** 1203

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	94.7%	95.7%
mg/L D.O.	8.60 mg/L	5.56 mg/L
Temp – °F	68.1°F	68.3°F

(Must be within 0.5 mg/L D.O.)

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation	Deployed			
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8/25/17 1300 Battery Life (Number of Days): 569.8

Notes:

Field Notes for Datasonde Post Calibration

Date/Time: Aug. 25, 2017 1151 Analyst: HP

Location: Grand Rapids Head Datasonde Serial #: 13L100691

Ending Datasonde Battery [volts]: 3.1 v

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.05
10.00 Std.	10.04

pH Temp Reading.: 69.8

Conductivity (mS/cm) : 0.290 Std. Conc. 0.2803 Observed

Barometric Pressure (mm Hg) 750.3 mm Hg

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	99.4%	98.8%	
mg/L D.O.	9.23 mg/L	9.12 mg/L	0.96
Temp – °F	66.2	66.7°F	

Notes:

File complete, D.O. reading all above 7.0 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: Aug. 25, 2017 1230 Analyst: HP

Location: Grand Rapids Tail Datasonde Serial #: 13L100326

Ending Datasonde Battery [volts]: 2.9v

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.06
10.00 Std.	10.00

pH Temp Reading.: 69.0

Conductivity (mS/cm) : 0.280 Std. Conc. 0.2834 Observed

Barometric Pressure (mm Hg) 751.0 mm Hg

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	100.1%	98.9%	
mg/L D.O.	9.30 mg/L	9.05 mg/L	1.03
Temp – °F	66.1°F	67.5°F	

Notes:

File complete. All D.O. readings above 7.0 mg/L

Field Notes for Datasonde Deployment

Date/Time: 9/5/17 12:35 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 14D10564

Calibration Information Datasonde Battery [volts]: 3.1

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.20	7.00
10.00 Std	10.15	10.02

pH Cal. Temp.: 66.9

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.293 Std	0.2846	0.2931	5.74	Before — After —

Barometric Pressure (mm Hg) 738

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	95.3	97.1	0.95
mg/L D.O.	8.74	8.89	
Temp – °F	67.2	67.5	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	100.3	100.0
mg/L D.O.	8.71	8.66
Temp – °F	69.8	70.0

Post Calibration Slope = 96.8

Create File for Test Program V **Start Test:** 12:48 **End Test:** 13:00

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	92.1	94.1	
mg/L D.O.	8.79	8.71	ok- Deploy
Temp – °F	63.7	64.1	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight** _____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 8: 9/5/17 14:20 Battery Life (Number of Days): 616.4

Notes: _____

Field Notes for Datasonde Deployment

Date/Time: 9/5/17 12:48 Analyst: MWH

Location: GRAND Tailrace Datasonde Serial #: 13L 100688

Calibration Information Datasonde Battery [volts]: 8.1

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.02	7.00
10.00 Std	9.97	10.00

pH Cal. Temp.: 66.6

Conductivity (mS/cm) Before Cal. After Cal. Cell Constant Zero Conductivity Calibration (optional)

0.293 Std 0.2826 0.2930 5.73 Before — After —

Barometric Pressure (mm Hg) 738

YSI Datasonde Dissolved Oxygen

	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.0	97.1	0.92
mg/L D.O.	8.86	8.96	
Temp – °F	66.7	66.6	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope =

Create File for Test Program ✓ **Start Test:** 12:57 **End Test:** 13:15

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	92.6	94.4	
mg/L D.O.	8.82	8.71	OK - Deploy
Temp – °F	63.8	64.2	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** —

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 9/5/17 14:00 Battery Life (Number of Days): 616.4

Notes:

Field Notes for Datasonde Post Calibration

Date/Time: 9/6/17 13:[illegible] Analyst: MWH

Location: GRAND tailstream Datasonde Serial #: 13C/00690

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.21
10.00 Std.	10.07

pH Temp Reading.: 65.8

Conductivity (mS/cm) : 0.293 Std. Conc. 6.2811 Observed

Barometric Pressure (mm Hg) 738

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	99.6	97.2	
mg/L D.O.	9.99	9.606	1.04
Temp – °F	59.9	60.2	

Notes:

266 readings: All D.O. > 7.5 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 9/5/17 13:40 Analyst: MM

Location: GRAND Tank Datasonde Serial #: 13L/00327

Ending Datasonde Battery [volts]: 28

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.02
10.00 Std.	9.95

pH Temp Reading.: 65.8

Conductivity (mS/cm) : 0.293 Std. Conc. 0.2483 Observed

Barometric Pressure (mm Hg) 738

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	97.2	97.1	
mg/L D.O.	9.88	9.80	0.92
Temp – °F	58.4	59.0	

Notes:

265 readings. All D.O. ↑ 7.5 mg/L

- lots of sediment/organics around sensors

Field Notes for Datasonde Deployment

Date/Time: 9/15/17 9:45 Analyst: MLW

Location: GRAND Rapids upstream Datasonde Serial #: 13E100670

Calibration Information Datasonde Battery [volts]: 2.9

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.13	7.00
10.00 Std	10.03	10.00

pH Cal. Temp.: 70.7

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.294 Std	0.3143	0.2941	5.48	Before — After —

Barometric Pressure (mm Hg) 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	95.9	97.7	1.00
mg/L D.O.	8.49	8.63	
Temp – °F	70.4	70.6	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	97.2	100.0
mg/L D.O.	8.09	8.32
Temp – °F	73.5	73.8

Post Calibration Slope = 99.5

Create File for Test Program ✓ **Start Test:** 9:59 **End Test:** 10:06

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter
% Saturation	89.1	92.5
mg/L D.O.	8.31	8.42
Temp – °F	65.6	66.0

(Must be within 0.5 mg/L D.O.) ok - Deploy

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 9/15/17 11:00 Battery Life (Number of Days): 563.3

Notes:

Field Notes for Datasonde Deployment

Date/Time: 9/15/17 10:00 Analyst: MWM

Location: GRAND Tailrace Datasonde Serial #: 14D1612G1

Calibration Information Datasonde Battery [volts]: 3.0

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.03	7.00
10.00 Std	10.02	10.00

pH Cal. Temp.: 71.0

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.294 Std	0.3141	0.2941	5.44	Before — After —

Barometric Pressure (mm Hg) 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.5	97.6	0.99
mg/L D.O.	8.47	8.56	
Temp – °F	71.3	71.4	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 10:09 **End Test:** 10:21

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	89.2	93.8	
mg/L D.O.	8.32	8.47	at Deploy
Temp – °F	65.0	64.2	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 9/15/17 @ 11:00 Battery Life (Number of Days): 616.4

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 9/15/17 -10:15 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 14D101641

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.03
10.00 Std.	10.01

pH Temp Reading.: 71.0

Conductivity (mS/cm) : 0.294 Std. Conc. 0.2840 Observed

Barometric Pressure (mm Hg) 742

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.5	97.6	
mg/L D.O.	8.94	8.81	0.95
Temp – °F	68.2	68.7	

Notes:

237 readings - All D.O. ↑ 8 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 9/15/17 10:48 Analyst: RWM

Location: GRAND Tailrace Datasonde Serial #: 13C100688

Ending Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.02
10.00 Std.	10.09

pH Temp Reading.: 71.2

Conductivity (mS/cm) : 0.294 Std. Conc. 0.3053 Observed

Barometric Pressure (mm Hg) 742

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.7	97.7	
mg/L D.O.	8.86	8.74	0.91
Temp – °F	69.2	69.5	

Notes:

237 readings - All D.O. ↑ 8 mg/L

Field Notes for Datasonde Deployment

Date/Time: 9/25/17 10:17 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13L600691

Calibration Information Datasonde Battery [volts]: 3.6

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.05	7.00
10.00 Std	10.02	10.00

pH Cal. Temp.: 72.2

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
5.292 Std	0.3088	0.2922	5.29	Before — After —

Barometric Pressure (mm Hg): 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	96.2	97.6	0.96
mg/L D.O.	8.28	8.35	
Temp – °F	73.1	73.4	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter # 1

	Before Calibration	After Calibration
% Saturation	101.5	100.0
mg/L D.O.	8.61	8.50
Temp – °F	72.3	72.3

Post Calibration Slope = 98.2 %

Create File for Test Program ✓ **Start Test:** 10:27 **End Test:** 10:51

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	89.6	86.4%	
mg/L D.O.	7.50	7.46	Ok- Deploy
Temp – °F	70.3	70.7	

Create File for Datasonde ✓ **Remove calibration cup, Replace with weight** ✓

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 9/25/17 12:00 Battery Life (Number of Days): 606.5

Notes:

Field Notes for Datasonde Deployment

Date/Time: 9/25/17 10:30 Analyst: MWH

Location: GRAND Tailrace Datasonde Serial #: 13C100326

Datasonde Battery [volts]: 3.0

Calibration Information

pH (s.u.)	Before Cal.	After Cal.
7.00 Std	7.02	7.00
10.00 Std	10.06	10.00

pH Cal. Temp.: 73.1

Conductivity (mS/cm)	Before Cal.	After Cal.	Cell Constant	Zero Conductivity Calibration (optional)
0.292 Std	0.3136	0.2921	5.26	Before — After —

Barometric Pressure (mm Hg): 742

YSI Datasonde Dissolved Oxygen	Before Calibration	After Calibration	DO Probe Gain
% Saturation	97.5	97.6	1.03
mg/L D.O.	8.35	8.34	
Temp – °F	73.7	73.8	

DO Handheld Meter Calibration - DO Meter Model: Hach HQ30d Meter #

	Before Calibration	After Calibration
% Saturation		
mg/L D.O.		
Temp – °F		

Post Calibration Slope = _____

Create File for Test Program ✓ **Start Test:** 10:39 **End Test:** 10:54

Test Program Readings

	YSI Datasonde	Hach HQ30d Meter	(Must be within 0.5 mg/L D.O.)
% Saturation	84.0	86.5	
mg/L D.O.	7.45	7.45	ok - Deploy
Temp – °F	76.3	70.7	

Create File for Datasonde _____ **Remove calibration cup, Replace with weight**_____

Re-calibration - REQUIRED if outside 0.5 mg/l limit

	Before Cal.	After Cal.	Datasonde	Hach HQ30d Meter
% Saturation				
mg/L D.O.				
Temp – °F				

Check File Status

File Start 9/25/17 12:00 Battery Life (Number of Days): 597.9

Notes: _____

Field Notes for Datasonde Post Calibration

Date/Time: 9/25/17 10:46 Analyst: MAM

Location: GRAND Tail Datasonde Serial #: 14D101261

Ending Datasonde Battery [volts]: 5.0

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.24
10.00 Std.	10.04

pH Temp Reading.: 73.3

Conductivity (mS/cm) : 0.292 Std. Conc. 0.3028 Observed

Barometric Pressure (mm Hg) 742

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.4	97.6	
mg/L D.O.	8.48	8.38	0.98
Temp – °F	73.0	73.3	

Notes:

24r readings - Air D.O. ↑ 7 mg/L

Heavy Biofouling

Field Notes for Datasonde Post Calibration

Date/Time: 9/25/17 11:06 Analyst: MWM

Location: GRAND upstream Datasonde Serial #: 13C100690

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.02
10.00 Std.	10.01

pH Temp Reading.: 74.5

Conductivity (mS/cm) : 0.292 Std. Conc. 0.3027 Observed

Barometric Pressure (mm Hg) 741

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.1	97.5	
mg/L D.O.	8.50	8.41	1.06
Temp – °F	72.4	73.0	

Notes:

24hr readings - All D.O. ↑ 1 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 10/2/17 9:15 Analyst: MWM

Location: GRAND Tarl Datasonde Serial #: 13C103256

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.13
10.00 Std.	10.00

pH Temp Reading.: 67.0

Conductivity (mS/cm) : 0.294 Std. Conc. 0.2763 Observed

Barometric Pressure (mm Hg) 747

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.2	98.3	
mg/L D.O.	9.30	9.35	1.03
Temp – °F	63.8	64.0	

Notes:

166 readings - All D.O. ↑ 7 mg/L

Field Notes for Datasonde Post Calibration

Date/Time: 10/2/17 9:23 Analyst: MWM

Location: GRANDS Upstream Datasonde Serial #: 13C/10691

Ending Datasonde Battery [volts]: 2.9

Calibration Information

pH (s.u.):	Observed
7.00 Std.	7.05
10.00 Std.	10.09

pH Temp Reading.: 67.1 F

Conductivity (mS/cm) : 0.294 Std. Conc. 0.2753 Observed

Barometric Pressure (mm Hg) 747

Dissolved Oxygen	Before Calibrate	After Calibrate	Gain
% Saturation	98.3	98.3	
mg/L D.O.	9.11	9.11	0.96
Temp – °F	66.3	66.3	

Notes:

166 readings - All D.O. ↑ 1 mg/L

Document Content(s)