



Wisconsin Public Service Corporation

700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001

www.wisconsinpublicservice.com

June 21, 2017

FERC Project No. 2433
NATDAM No. MI00022

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

Dear Ms. Bose:

Grand Rapids Hydroelectric Project
Article 407 - Water Quality Monitoring

In accordance with the Order Approving Water Quality Monitoring Plan under Article 407, dated April 7, 1999, WPS is required to conduct water quality monitoring upstream and downstream of the Grand Rapids hydroelectric project. As required by the monitoring plan, WPS is monitoring for pH, dissolved oxygen, and temperature on an hourly basis during the months of June through September.

As described in the monitoring plan, the results will be supplied to the Federal Energy Regulatory Commission (FERC), Wisconsin Department of Natural Resources (WDNR), Michigan Department of Natural Resources (MDNR), and the U.S. Fish and Wildlife Service (USFWS) in an Excel spreadsheet format every three weeks during the summer monitoring period. Enclosed please find monitoring data collected from June 1 through June 16, 2017. There are no deviations from water quality standards to note. The monitoring data was provided to the resource agencies on June 16, 2017. Documentation of agency consultation is attached.

If you have any questions about this submittal, please feel free to contact Mr. Mark Metcalf at (920) 433-1833.

Sincerely,

A handwritten signature in blue ink that reads 'Todd P. Jastremski'.

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

MWM/rjv

Enc: Agency Consultation

cc: Ms. Cheryl Laatsch – WDNR
Mr. Elle Gulotty – MDNR
Mr. Nick Utrup - USFWS

AGENCY CONSULTATION

From: [Metcalf, Mark W](#)
To: [Laatsch, Cheryl](#); [Utrup, Nick](#); "GulottyE@michigan.gov"; [Kruger, Kyle](#)
Cc: [Brandt, Edward S](#); [Nuthals, James D](#); [Grisar, Mike](#)
Subject: WPS Grand Rapids Hydro - Water Quality Monitoring Data
Date: Friday, June 16, 2017 3:59:49 PM
Attachments: [GRR WQM Locations.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](#)

Good afternoon,

Per Article 407 of the project License for the Grand Rapids Hydroelectric facility, WPS is conducting water quality monitoring upstream and downstream of the facility in 2017.

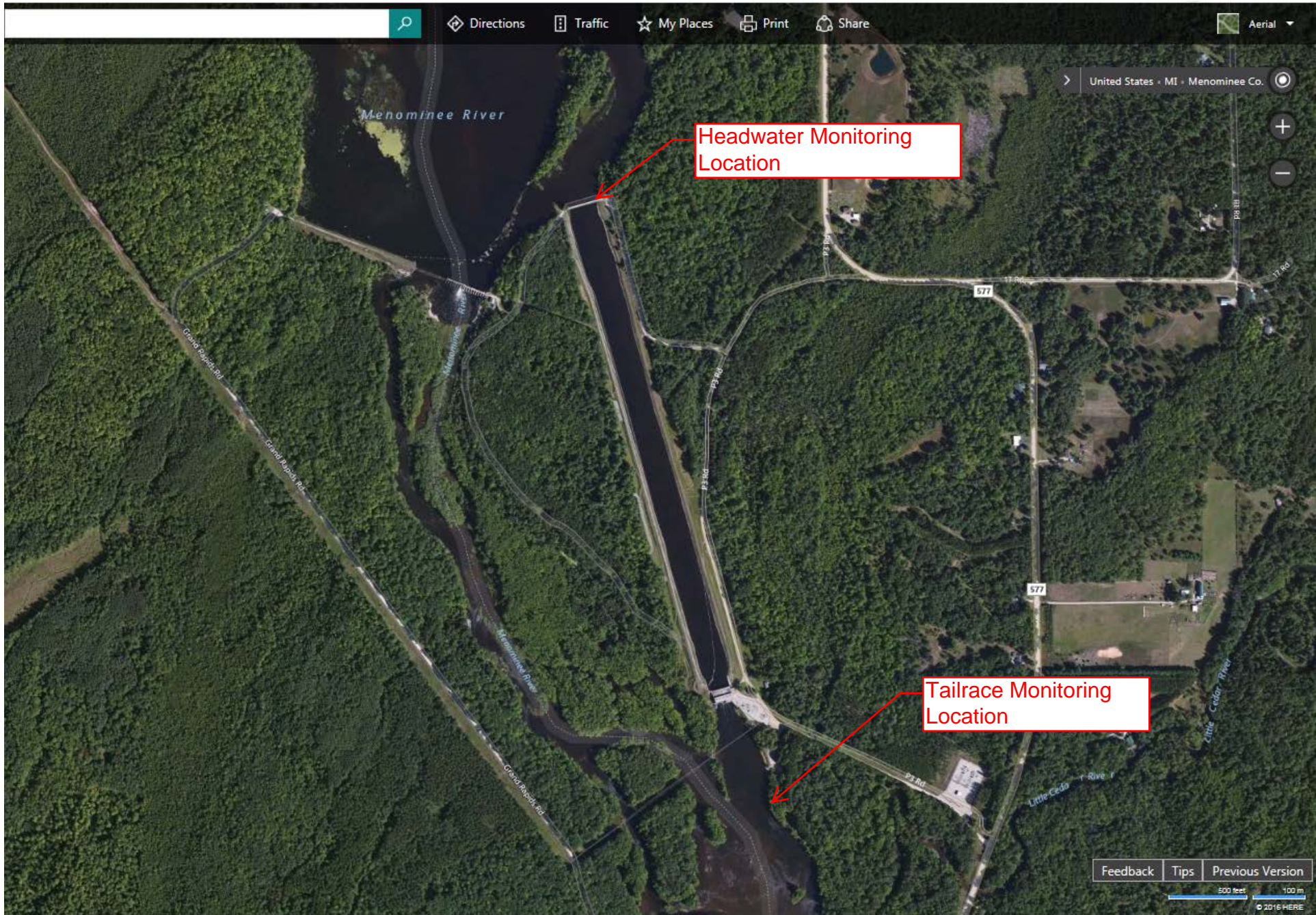
As described in the monitoring plan, WPS is monitoring for pH, dissolved oxygen, and temperature on an hourly basis from June 1 through September 30. In accordance with the data submittal and review section of the plan, WPS will be providing the monitoring data to the resource agencies every 3 weeks throughout the monitoring season. Attached for your review is monitoring data collected from June 1 to June 16 at the two monitoring locations. There are no water quality deviations to note. For your reference, attached is an aerial photo showing the monitoring locations.

If you have any questions about the monitoring data, please feel free to contact me.

Thanks,
Mark

Mark Metcalf

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



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

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

Grand Rapids Upstream Dissolved Oxygen - June 2017



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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	2.8

License Minimum DO: 5.0 mg/l

Grand Rapids Upstream pH Summary - June 2017



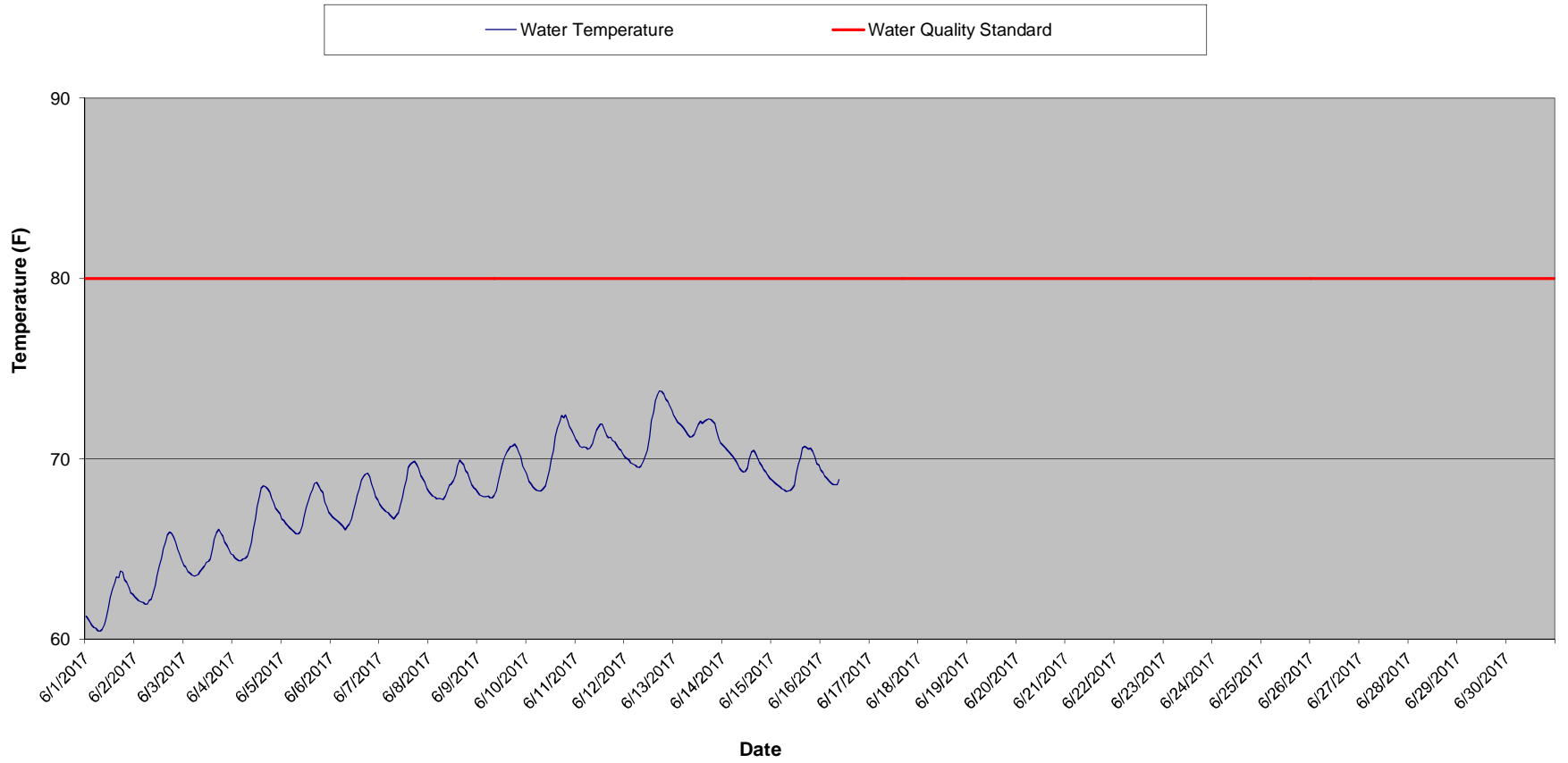
Grand Rapids Upstream pH Summary - June 2017

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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	3.1

License maximum pH: 9

License minimum pH: 6

Grand Rapids Upstream Water Temperature - June 2017



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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	69.4
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	0.0
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	28.7

Monthly average Temp: 26.1
 License Maximum Temperature: 89 F

Grand RapidsTailrace Dissolved Oxygen - June 2017



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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	7.1
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	0.0
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	3.5

License Minimum DO: 5.0 mg/l

Grand RapidsTailrace pH Summary - June 2017



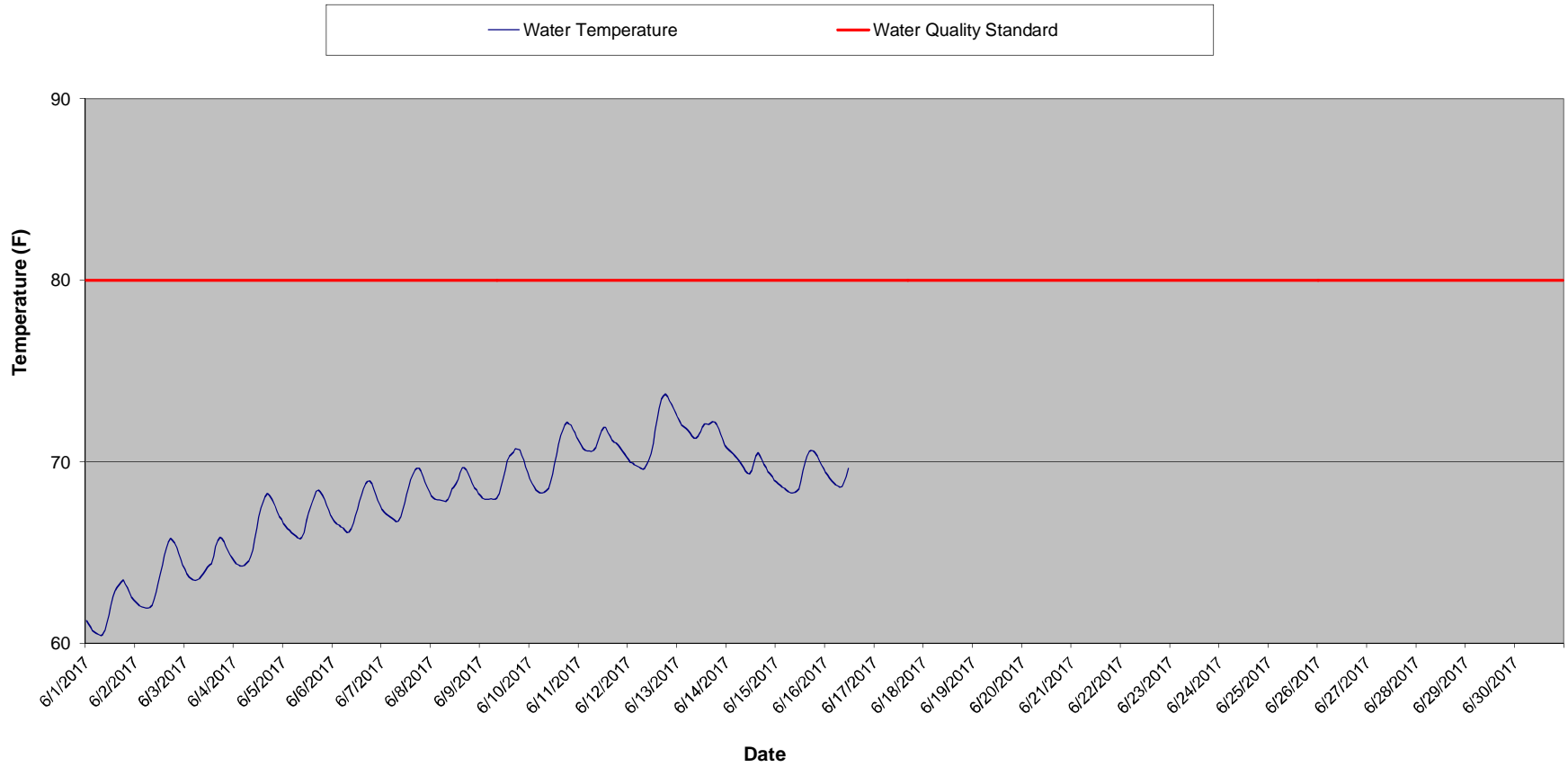
Grand Rapids Tailrace pH Summary - June 2017

Time	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
HHMMSS																
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	7.2
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	0.0
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	3.6

License maximum pH: 9

License minimum pH: 6

Grand Rapids Tailrace Water Temperature - June 2017



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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	0.0
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	69.6
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	0.0
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	34.5

Monthly average Temp: 26.3
 License Monthly Maximum Average Temperature: 80 F

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20170621 GRR Env out.PDF.....1-1
20170621 GRR ENV out attach a .PDF.....2-16