Appendix 4. Calibration Dataset and Model Results for Streamgage 04296280—Barton River Near Coventry—Total Phosphorus Concentration

SITE NUMBER—04296280

SITE NAME—Barton River near Coventry, VT

DATE CREATED—2/4/2014

MODEL DEVELOPMENT DATA PERIOD—8/31/2010 – 5/31/2013

MODEL CALIBRATION DATA SET— Water samples were collected from the upstream side of the bridge over Coventry Station Road using a handheld DH-59 sampler, using USGS protocols and are stored in the NWIS database. The regression model is based on 47 concurrent measurements of total phosphorus concentration (TP), streamflow (Q), and acoustic backscatter for samples collected from 08-31-2010 through 05-31-2013. Sample collection targeted the range of continuously observed hydrologic conditions. Discharge over the sample period ranged from 28 to 6,070 cubic feet per second (ft³/s) and instantaneous discharge during sample collection ranged from 39 to 4,550 ft³/s. Summary statistics and complete model-calibration datasets are provided. None of the TP samples were considered outliers.

The acoustic data were collected using a Sontek Argonaut SL 1.5 MHz (serial no. E3132) fixed on the right bank and configured with a blanking distance of 0.5 m and 5 cells of 1.22 m each.

MODEL DEVELOPMENT—Regression analysis was done using the USGS SAID (the Surrogate Analysis and Index Developer Tool, v. 20131101) computer program, which applied various OLS linear regression models to estimate TP concentration from several different independent variables. Output from SAID included a variety of statistical and graphical tools that enabled the user to determine model validity and to make comparisons among regression models. Different combinations of untransformed and log₁₀-transformed data were evaluated. The regression model to estimate the log₁₀ TP concentration from two predictor variables, discharge and a binary marker for discharge hysteresis, was selected based on residual plots, RMSE, and R².

MODEL SUMMARY—Summary of the final regression analysis for TP concentration at site number 04296280. Total phosphorus concentration-based model:

$$\log_{10}TP = 0.84 + (0.44 \times \log_{10}O) - (0.45 - HystO), \tag{4-1}$$

where

TP = total phosphorus concentration, in mg/L; Q = discharge, in cubic feet per second; and

HystQ = marker to indicate position of sample on the hydrograph (0=rising limb and 1=falling limb or flat) for potential hysteresis effect

The use of discharge and HystQ as explanatory variables makes sense both physically and statistically. Physically because a predominant mechanism for phosphorus transport in streamwater is via attachment to suspended sediment, which has a strong positive relation to discharge. Accounting for the hysteretic effect makes sense because suspended-sediment concentration (and thus, TP) frequently is higher for a given discharge within a storm near the beginning when discharge is rising, compared to after the storm peak when discharge is falling as the sediment supply is diminished. Discharge and hysteresis make statistical sense as explanatory variables because they resulted in a model with low RMSE and relatively high R^2 values.

TOTAL PHOSPHORUS CONCENTRATION RECORD The record was computed using the Surrogate Analysis and Index Developer Tool (SAID; version 20131101). The ADP functioned well and collected continuous acoustic data during the study period except for the following. From 1/19/2011 to 2/8/2011 the ADP was influenced by the presence of shore ice at the sensor. From 12/26/2012 to 1/15/2013 and 4/11/2013 to 4/14/2013 there was a communication issue between the ADP and data logger. On April 15, 2013 a second solar panel was installed and is believed to be introducing a voltage spike during peak sunlight hours from approximately 9 to 11 am. The increase in voltage is believed to be causing a momentary spike in the water temperature being reported by the ADP. Water temperature spikes were within the maximum allowable limits for continuous water-quality monitoring sensors and were not removed.

Computed: Laura Medalie Reviewed: Richard Kiah

Model Form: $\log_{10}TP = 0.84 + (0.44 \times log_{10}Q) - (0.45 \times HystQ)$

Model Calibration

Basic Data

 Number of Measurements:
 55

 RMSE:
 0.219

 R²:
 0.704

 Adj R²:
 0.693

 Duan's BCF:
 1.169

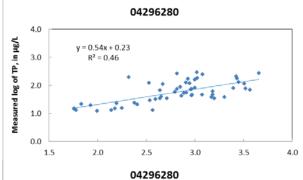
 PPCC:
 0.953

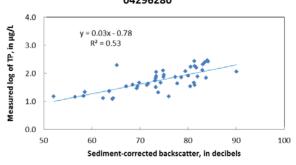
Explanatory Variables

Variable	Value	Standard Error
Intercept	0.843	0.194
$Log_{10}Q$	0.441	0.062
HystQ	-0.446	0.068

Test Criteria

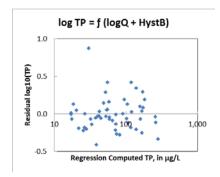
Leverage	Cook's D	DFFITS
0.164	2.044	0.467

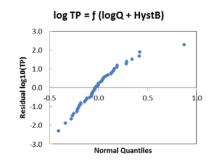




Observations exceeding at least one test criterion

Observation	Observed log(TP)	Predicted log(TP)	Residuals	Leverage	Cook's D	DFFITS
14	2.05	2.39	-0.34	0.088	0.084	-0.508
27	2.43	2.01	0.42	0.098	0.149	0.689
46	2.29	1.42	0.87	0.037	0.214	0.961





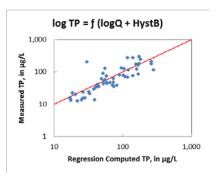


Table 4–1. Calibration dataset and computed values for total phosphorus concentration at streamgage 04296280 in the Barton River near Coventry, Vermont, from July 2010 through May 2013.

[TP, total phosphorus concentration; µg/L, micrograms per liter; Q, discharge; ft3/s, cubic feet per second; MB, measured backscatter; dB, decibels; WCB, water-corrected backscatter; HystQ, marker to indicate position of sample on the hydrograph; dB/m, decibels per meter; °F, degrees Fahrenheit; SCB, sediment-corrected backscatter; AlphaS, sediment-driven attenuation coefficient; --, no data]

Pate and time Page		Calibration dataset							Computed values						
8.73/101 1-00	Date and time	-		-		HystQ		temperature,		-		-	computed	log(TP),	
8.44201011.45S	7/29/2010 14:30	13	60	41.3	54.46	1	0.39		1.11	1.78			18	-0.07	-0.32
SS200101215	8/3/2010 14:00	122				0	0.48		2.09				106		0.74
Section 1-40 Section 1-72 2-88 Section Section 1-72 2-88 Section Section 1-73 2-88 Section Section 1-74 Section	8/4/2010 11:45	174	2,710	69.7	83.54	0	0.48		2.24	3.43			266	-0.12	-0.58
8/11/2010 13-96 24 23-8 49.5 63-02 1 0.46 137 23-8 33 0.07 0.47 8/13/2010 12-13 15 57 41.1 54-51 1 0.42 72 17 17.6 56.52 53 71 0.00 0.14 101/2010 11-45 24 1.90 65.4 79.74 0 0.55 60.3 2.39 3.08 81.53 0.89 18-53 0.19 1.09 105/2010 13-25 34 51.5 52.4 67.0 1 0.62 55.52 153 2.71 67.17 67.9 46 6.06 6.02 3.12 12/22010 13-00 46 93.2 51.6 76.6 0 0.56 0.56 37.8 2.20 3.00 81.69 1.06 1.07 1.00 0.42 45/2011 14-55 11-8 88 58.7 77.43 0 1.05 34.2 2.07 2.94 79.49 0.90 1.02 0.07 0.42 45/2011 13-30 73 94.6 59.3 77.93 1 107 33.7 1.86 2.06 78.65 80.5 59.9 0.16 1.01 4/11/2011 13-30 13 3.20 64.3 83.59 0 1.06 34.4 1.85 3.57 83.79 1.44 1.90 4.12 2.47 4.14 4.11	8/5/2010 12:15		1,520			1	0.45							-0.01	
	8/6/2010 14:30					1	0.45						55		
	8/11/2010 13:06	24			63.02	1	0.46			2.38				-0.07	
105/2010 13-25	8/31/2010 12:31	15	57	41.1	54.51	1	0.42			1.76	56.52	0.53	17	0.00	0.14
122201013:00 160 993 611 7865 0 006 378 220 3.00 81.60 106 171 0.04 0.42 372201114:55 118 881 587 7743 0 1.05 342 2.07 2.94 79.49 0.90 162 0.07 0.42 46201113:20 3 904 593 77.93 0 1.06 34 2.05 3.15 90.01 3.22 2.87 0.34 0.42 46201113:20 3 904 593 77.93 0 1.06 34 2.05 3.15 90.03 1.42 2.87 0.34 0.94			,			0									
32120111849 46 932 516 7069 1 1 112 32 166 297 69.86 0.00 59 0.01 -91 0.04 -0.14 4550111455 188 88 87 77.87 0 1165 342 2.07 2.94 79.09 162 -0.07 -0.02 4.0620111320 73 90. 643 83.59 0 1.06 334 2.05 3.51 90.03 14.2 287 -0.34 -1.90 1.01 47120111330 13 3,210 643 83.59 0 1.06 34 2.05 3.51 90.03 14.2 287 -0.34 -1.90 1.01 47120111345 70 3,60 60.8 77.00 1 0.95 38.4 1.85 3.57 83.79 1.34 1.09 -0.12 -0.63 47420111340 38 1.07 61.1 79.09 1 0.007 37.6 1.58 3.15 90.03 14.2 2.07 -0.04 1.01 47120111340 38 1.07 61.1 79.09 1 0.007 37.6 1.58 3.15 90.00 1 73 0.00 1 73 0.02 1.01 47120111615 38 1.70 51 1.50 58 1.50 58.7 6.04 1 0.05 38.7 1.54 3.00 1 73 0.00 1 73 0.02 1.01 47120111615 38 1.50 58 1.50 58.7 6.04 1 0.05 38.7 1.54 3.00 9 1 73 0.02 1.01 4.02 1.01 4.02 1.01 1.01 4.02 1.01 1.00 1 1.01 4.02 1.00 1 1.01 4.02 1.00 1 1.01 4.02 1.00 1 1.00 1 1.01 4.02 1.00 1 1.00															
48/2011 14/55															
46/2011 13-20															
AINSCALL 16-16 38 1,470 611 79.09 1 0.97 37.6 1.58 3.17 81.43 0.91 73 0.022 -1.18 4/21/2011 61.55 3 7.64 0.50 1 0.71 49.8 1.89 3.39 73.38 0.77 91 0.00 0.18 5/2/2011 3.50 43.9 2.50 64.9 63.8 1 0.74 48.1 1.64 2.97 77.76 0.70 59 0.007 0.37 5/17/2011 13.50 43.9 2.50 57.4 2.84 1 0.67 52.6 1.66 3.18 47.31 0.54 47.4 0.14 0.67 6/15/2011 3.55 6.50 6.50 6.59 1.32 2.41 73.77 0.31 3.4 0.14 0.74 0.67 6/30/2011 3.15 0.28 5.5 0.43 0.73 0.00 0.28 6/15/2011 3.15 0.56 0.59 0.50 0.68 8.136 0.19 0.63 0.43 1.7 0.01 0.28 0.25 0															
421 2011 161 5 35															
4/28/2011 13:00 78 2,470 54.4 69.50 1 0.71 49.8 1.89 3.39 73.38 0.77 91 0.00 0.18 5/17/2011 13:50 43 29.5 64.4 7.538 1 0.74 48.1 1.64 2.97 77.76 0.70 59 0.00 0.13 5/17/2011 17:10 46 1,520 57.4 72.84 1 0.67 52.6 1.166 3.18 74.3 0.54 74 -0.14 -0.09 6/30/2011 13:10 23 1.56 49.0 2.9 1 0.50 64.8 13.36 2.19 63.64 0.31 27 0.00 0.23 7/27/2011 15:13 15 57 36.3 49.77 1 0.40 75 1.18 1.76 50.43 117 0.01 0.42 8/24/2011 13:25 27 4,550 64.3 78.67 1 0.33 62.1 0.43 18.3 0.8 1.9															
5/22/2011 13:50 43 925 60-4 76,38 1 0.74 48.1 1.64 2.97 77,76 0.70 59 0.07 -0.37 5/17/2011 17:10 46 1,520 57.4 72.84 1 0.67 52.6 1.66 3.18 74.31 0.54 74 -0.14 -0.09 6/15/2011 13:15 21 256 59.1 73.82 1 0.50 64.8 1.36 2.19 63.64 0.31 27 0.00 0.23 7/27/2011 15:30 23 156 49.0 62.92 1 0.40 75 1.18 1.76 52.05 0.43 17 0.01 0.28 8/2/2011 15:0 22 68 43.2 57.24 1 0.48 66.4 1.14 1.18 1.76 52.05 0.43 17 0.01 0.28 8/2/2011 13:0 10 40.8 62.9 1.22 2.43 3.66 81.0 0.58 85.6 1.19															
5/17/2011 17:10 46 1,526 57.4 72.84 1 0.67 52.6 1.66 3.18 74.31 0.54 74 -0.14 -0.09 6/15/2011 13:45 21 256 59.1 73.82 1 0.56 59.9 1.32 2.41 73.77 0.31 34 -0.14 -0.74 6/30/2011 13:10 23 156 49.9 1 0.06 64.8 1.36 1.39 -21 0.00 0.23 7/27/2011 15:50 25 73.33 49.77 1 0.41 1.10 1.19 1.9 21 0.05 0.47 8/24/2011 13:25 27 4.50 64.3 78.67 1 0.53 62.1 2.43 3.66 81.30 0.58 120 0.042 1.90 9/21/2011 13:40 15 177 49 65.53 1 0.53 62.1 2.43 3.66 81.30 0.58 2.92 0.20 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>															
6/15/2011 13:45 21 256 59.1 73.82 1 0.56 59.9 1.32 2.41 73.77 0.31 34 -0.14 -0.74 6/30/2011 13:10 23 156 49.0 62.92 1 0.50 64.8 1.36 2.19 63.64 0.31 27 0.00 0.23 72/72/011 15:15 15 57 36.3 49.77 1 0.40 75 1.18 1.76 52.05 0.43 17 0.01 0.28 8/24/2011 15:20 22 68 43.2 57.24 1 0.48 66.4 1.34 1.83 88.57 0.44 19 0.03 0.88 8/29/2011 15:10 15 177 41.9 56.53 1 0.58 58.6 1.19 2.25 58.7 0.58 29 0.20 1.01 9/30/2011 14:30 15 177 41.9 56.5 78.13 0.05 78.13 0.05 61.33 1.01 50.															
6/30/2011 13:10 23 156 49.0 62.92 1 0.50 64.8 1.36 2.19 63.64 0.31 27 0.00 0.23 7/27/2011 15:30 20 85 1 0.41 1.30 1.93 21 0.05 0.47 8/24/2011 13:20 22 68 43.2 57.24 1 0.48 66.4 1.34 1.83 58.57 0.44 19 0.13 0.81 8/29/2011 10:45 270 4,550 64.3 78.67 1 0.53 66.1 1.34 1.83 3.86 0.58 1.00 0.42 1.19 9/20/2011 11:50 15 177 419 56.53 1 0.58 8.6 1.19 0.58 29 0.20 2.26 3.03 81.40 0.87 176 0.08 0.63 1/21/2011 13:25 13 36 61.03 1 0.71 50 1.12 2.56 <															
7/27/2011 15:30															
8/5/2011 15:15 15 57 36.3 49.77 1 0.40 75 1.18 1.76 52.05 0.43 17 0.01 0.28 8/24/2011 13:20 222 68 43.2 57.24 1 0.48 66.4 1.34 1.83 58.57 0.44 19 0.13 0.81 8/29/2011 16:10 270 4,550 43.3 78.67 1 0.53 62.1 24.3 3.66 81.0 0.02 -1.01 9/30/2011 14:30 181 1,060 63.6 78.13 0 0.57 59.2 2.26 3.03 81.40 0.87 716 0.08 0.63 1/25/2011 14:10 112 467 54.3 72.01 0 1.05 34.3 2.05 2.67 73.36 0.75 122 0.03 0.02 3/13/2012 14:10 12 40 77.95 0 0.89 40.7 1.91 2.85 74.99 0.79 53 0.29															
8/24/2011 13:20 22 68 43.2 57.24 1 0.48 66.4 1.34 1.83 58.57 0.44 19 0.13 0.81 8/29/2011 10:45 270 4.55 64.3 78.67 1 0.58 58.6 1.19 2.25 58.27 0.58 29 0.20 1.01 1.90 0.21 1.19 6.53 3.6 2.1 2.24 3.06 81.30 0.58 0.61 1.12 2.6 2.08 2.9 0.20 1.01 9.30 2.11 3.06 460 61.03 1 0.71 59.2 2.26 3.03 81.40 0.87 176 0.08 0.63 3/13/2012 11:10 112 467 78.3 72.9 73.52 1 1.03 3.5 1.94 2.85 74.99 0.79 53 0.29 1.27 3/13/2012 16:10 82 96 61.4 77.95 0 8.99 40.7 1.91 3.00 8.08															
8/29/2011 10:45 270 4,550 64.3 78.67 1 0,53 62.1 2,43 3.66 81.30 0.58 120 0.42 1,90 9/21/2011 15:00 15 177 41.9 56.53 1 0.58 58.6 1.19 2.25 58.27 0.58 29 -0.20 -1.01 9/30/2011 13:25 13 366 46.0 61.03 1 0.71 50 1.12 2.56 62.33 0.58 39 -0.41 -2.29 3/13/2012 11:10 112 467 54.3 72.01 0 1.05 34.3 2.05 2.67 73.36 0.75 122 0.03 0.32 3/15/2012 16:10 82 996 61.4 77.95 0 0.89 40.7 1.91 3.00 80.08 0.88 171 -0.25 -1.38 3/15/2012 16:15 29 344 50.8 8.8 1 1.02 35.5 1.46 2.54 69.33															
9/21/2011 15:00 15 177 41.9 56.53 1 0.58 58.6 1.19 2.25 58.27 0.58 29 -0.20 -1.01 9/30/2011 14:30 181 1,060 63.6 61.03 1 0.57 59.2 2.26 3.03 81.40 0.87 176 0.08 0.63 10/25/2011 13:25 13 366 46.0 61.03 1 0.71 50 1.12 2.56 62.33 0.58 39 0.41 -2.29 3/13/2012 14:10 87 708 55.9 73.52 1 1.03 35 1.94 2.85 74.99 0.79 53 0.29 1.27 3/27/2012 16:15 29 344 50.8 68.88 1 1.02 35.5 1.46 2.54 69.33 0.63 38 -0.05 -0.18 4/10/2012 16:00 67 437 56.3 73.03 0 0.91 40 1.83 2.64 69.49															
9/30/2011 14:30 181 1,060 63.6 78.13 0 0.57 59.2 2.26 3.03 81.40 0.87 176 0.08 0.63 10/25/2011 13:25 13 366 46.0 61.03 1 0.71 50 1.12 2.56 62.33 0.58 39 -0.41 -2.29 3/13/2012 11:10 112 467 54.3 72.01 0 1.05 34.3 2.05 2.67 73.36 0.75 122 0.03 0.32 3/15/2012 14:40 87 708 55.9 73.52 1 1.03 35 1.94 2.85 74.99 0.79 53 0.29 1.27 3/27/2012 16:10 82 996 61.4 77.95 0 0.89 40.7 1.91 3.00 0.68 81.71 0.25 -1.18 4/10/2012 16:00 67 437 56.3 73.03 0 0.91 40 1.83 2.64 69.33 0.62 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>															
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$															
3/13/2012 11:10			,												
3/15/2012 14:40 87 708 55.9 73.52 1 1.03 35 1.94 2.85 74.99 0.79 53 0.29 1.27 3/20/2012 16:10 82 996 61.4 77.95 0 0.89 40.7 1.91 3.00 80.08 0.88 171 -0.25 -1.38 3/27/2012 16:15 29 344 50.8 68.58 1 1.02 35.5 1.46 2.54 69.33 0.63 38 -0.05 -0.18 4/10/2012 16:00 67 437 56.3 73.03 0 0.91 40 1.83 2.64 69.49 0.42 43 -0.01 -0.87 4/15/2012 10:45 34 435 53.4 69.40 1 0.81 44.5 1.53 2.64 69.49 0.42 43 -0.03 0.05 5/11/2012 13:30 15 150 61.8 75.3 1 0.50 64.5 1.86 2.96 77.31 0															
3/20/2012 16:10 82 996 61.4 77.95 0 0.89 40.7 1.91 3.00 80.08 0.88 171 -0.25 -1.38 3/27/2012 16:15 29 344 50.8 68.58 1 1.02 35.5 1.46 2.54 69.33 0.63 38 -0.05 -0.18 4/10/2012 16:00 67 437 56.3 73.03 0 0.91 40 1.83 2.64 73.33 0.52 119 -0.18 -0.87 4/25/2012 10:45 34 435 53.4 69.40 1 0.81 44.5 1.53 2.64 69.49 0.42 43 -0.03 0.05 5/17/2012 13:15 73 920 62.0 75.75 1 0.50 64.5 1.86 2.96 77.31 0.57 59 0.16 0.94 6/11/2012 15:30 15 150 61.8 75.34 1 0.47 67.3 1.18 2.18 75.98 <															
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$															
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$															
4/25/2012 10:45 34 435 53.4 69.40 1 0.81 44.5 1.53 2.64 69.49 0.42 43 -0.03 0.05 5/17/2012 12:20 32 394 58.8 73.32 1 0.62 55.8 1.51 2.60 73.29 0.33 41 -0.04 -0.05 5/31/2012 13:15 73 920 62.0 75.75 1 0.50 64.5 1.86 2.96 77.31 0.57 59 0.16 0.94 6/11/2012 15:30 15 150 61.8 75.34 1 0.47 67.3 1.18 2.18 75.98 0.41 27 -0.18 -0.81 4/11/2013 10:25 60 621 - 1 - 1.78 2.79 50 0.15 0.87 4/15/2013 10:35 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76															
5/17/2012 12:20 32 394 58.8 73.32 1 0.62 55.8 1.51 2.60 73.29 0.33 41 -0.04 -0.05 5/31/2012 13:15 73 920 62.0 75.75 1 0.50 64.5 1.86 2.96 77.31 0.57 59 0.16 0.94 6/11/2012 15:30 15 150 61.8 75.34 1 0.47 67.3 1.18 2.18 75.98 0.41 27 -0.18 -0.81 4/11/2013 10:15 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76 142 -0.21 -1.09 4/17/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.93 80.51 1.00 159 0.10 0.69 4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83															
5/31/2012 13:15 73 920 62.0 75.75 1 0.50 64.5 1.86 2.96 77.31 0.57 59 0.16 0.94 6/11/2012 15:30 15 150 61.8 75.34 1 0.47 67.3 1.18 2.18 75.98 0.41 27 -0.18 -0.81 4/11/2013 10:25 60 621 1 1.78 2.79 50 0.15 0.87 4/15/2013 10:15 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76 142 -0.21 -1.09 4/15/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.91 74.83 0.64 56 0.42 1.67 4/18/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51															
6/11/2012 15:30 15 150 61.8 75.34 1 0.47 67.3 1.18 2.18 75.98 0.41 27 -0.18 -0.81 4/11/2013 10:25 60 621 1 1.78 2.79 50 0.15 0.87 4/15/2013 10:15 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76 142 -0.21 -1.09 4/17/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.93 80.51 1.00 159 0.10 0.69 4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83 0.64 56 0.42 1.67 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37															
4/11/2013 10:25 60 621 1 1.78 2.79 50 0.15 0.87 4/15/2013 10:15 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76 142 -0.21 -1.09 4/17/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.93 80.51 1.00 159 0.10 0.69 4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83 0.64 56 0.42 1.67 4/22/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51 56 0.06 0.58 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37															
4/15/2013 10:15 75 652 56.2 73.33 0 0.97 37.6 1.87 2.81 74.87 0.76 142 -0.21 -1.09 4/17/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.93 80.51 1.00 159 0.10 0.69 4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83 0.64 56 0.42 1.67 4/22/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51 56 0.06 0.58 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37 43 0.03 0.37 5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21															
4/17/2013 13:40 170 844 60.8 77.68 0 0.93 39.1 2.23 2.93 80.51 1.00 159 0.10 0.69 4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83 0.64 56 0.42 1.67 4/22/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51 56 0.06 0.58 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37 43 0.03 0.37 5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21 0.40 31 0.87 2.29 5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30															
4/18/2013 12:30 125 807 57.3 74.29 1 0.95 38.4 2.10 2.91 74.83 0.64 56 0.42 1.67 4/22/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51 56 0.06 0.58 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37 43 0.03 0.37 5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21 0.40 31 0.87 2.29 5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30 22 -0.19 -0.94 5/21/2013 15:10 13 13 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34<															
4/22/2013 17:15 55 813 56.8 73.00 1 0.84 42.9 1.74 2.91 73.14 0.51 56 0.06 0.58 4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37 43 0.03 0.37 5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21 0.40 31 0.87 2.29 5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30 22 -0.19 -0.94 5/21/2013 15:10 13 133 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34 26 -0.22 -1.27 5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.															
4/26/2013 10:45 40 450 52.7 69.05 1 0.86 42.1 1.60 2.65 68.54 0.37 43 0.03 0.37 5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21 0.40 31 0.87 2.29 5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30 22 -0.19 -0.94 5/21/2013 15:10 13 133 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34 26 -0.22 -1.27 5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.07 142 0.34 1.51 5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 58 2.31 3.42 83.12															
5/2/2013 11:05 197 209 49.7 64.50 1 0.64 54 2.29 2.32 65.21 0.40 31 0.87 2.29 5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30 22 -0.19 -0.94 5/21/2013 15:10 13 133 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34 26 -0.22 -1.27 5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.07 142 0.34 1.51 5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 57.9 2.47 3.02 83.98 0.93 175 0.29 1.38 5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12															
5/17/2013 16:45 12 96 49.8 64.17 1 0.60 57.2 1.09 2.00 64.30 0.30 22 -0.19 -0.94 5/21/2013 15:10 13 133 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34 26 -0.22 -1.27 5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.07 142 0.34 1.51 5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 57.9 2.47 3.02 83.98 0.93 175 0.29 1.38 5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12 1.07 263 -0.04 -0.09 5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01	5/2/2013 11:05	197	209	49.7	64.50	1	0.64		2.29	2.32	65.21	0.40	31	0.87	2.29
5/21/2013 15:10 13 133 49.6 64.02 1 0.60 56.9 1.12 2.14 64.43 0.34 26 -0.22 -1.27 5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.07 142 0.34 1.51 5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 57.9 2.47 3.02 83.98 0.93 175 0.29 1.38 5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12 1.07 263 -0.04 -0.09 5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01 0.93 97 0.19 1.18 5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95															
5/22/2013 13:12 268 643 64.8 79.45 0 0.63 54.6 2.43 2.82 84.15 1.07 142 0.34 1.51 5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 57.9 2.47 3.02 83.98 0.93 175 0.29 1.38 5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12 1.07 263 -0.04 -0.09 5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01 0.93 97 0.19 1.18 5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95 0.88 104 -0.06 -0.28															
5/23/2013 11:40 292 1,030 65.8 80.16 0 0.59 57.9 2.47 3.02 83.98 0.93 175 0.29 1.38 5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12 1.07 263 -0.04 -0.09 5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01 0.93 97 0.19 1.18 5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95 0.88 104 -0.06 -0.28															
5/24/2013 10:30 206 2,519 63.7 78.07 0 0.59 58 2.31 3.42 83.12 1.07 263 -0.04 -0.09 5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01 0.93 97 0.19 1.18 5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95 0.88 104 -0.06 -0.28															
5/24/2013 15:45 129 2,792 63.9 78.39 1 0.60 56.8 2.11 3.45 83.01 0.93 97 0.19 1.18 5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95 0.88 104 -0.06 -0.28															
5/26/2013 10:40 77 3,198 62.6 78.30 1 0.77 46.5 1.88 3.52 81.95 0.88 104 -0.06 -0.28															
5/28/2013 8:55 46 1,477 63.9 78.92 1 0.68 51.9 1.66 3.07 81.21 0.80 66 -0.09 -0.52															
5/31/2013 10:50 42 715 57.2 71.52 1 0.58 58.3 1.63 2.86 71.73 0.34 53 -0.03 0.00															