

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010.

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S/cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S/cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 708-M01-01PT	413806070322311	280052.706	820987.246	41 38 05.84	70 32 23.14	0.5	-1.10	10/28/04	29.8	11.0
								7/21/05	258	.000
								11/10/05	104	.000
								8/8/06	249	.015
								7/17/07	197	.110
								7/30/08	151	.000
								7/23/09	239	.013
7/22/10	213	.007								
MA-FSW 708-M01-02GNT	413806070322312	280053.403	820986.946	41 38 05.83	70 32 23.11	0.5	1.8	10/28/04	69.7	10.2
								7/21/05	235	.000
								11/10/05	166	.000
								8/8/06	191	.000
								7/17/07	198	.150
								7/30/08	193	.000
								7/23/09	164	.303
7/22/10	221	.544								
MA-FSW 708-M01-03RT	413806070322313	280054.105	820986.337	41 38 05.81	70 32 23.08	0.5	4.7	10/28/04	--	--
								7/21/05	157	.000
								11/10/05	166	.000
								8/8/06	148	.000
								7/17/07	162	.135
								7/30/08	221	.608
								7/23/09	212	.493
7/22/10	254	.557								
MA-FSW 708-M01-04BUT	413806070322314	280054.806	820985.727	41 38 05.79	70 32 23.05	0.5	7.6	10/28/04	142	9.50
								7/21/05	122	1.70
								11/10/05	137	3.77
								8/8/06	119	3.54
								7/17/07	106	7.97
								7/30/08	272	.294
								7/23/09	247	.199
7/22/10	346	.376								
MA-FSW 708-M01-05BKT	413806070322315	280055.739	820985.121	41 38 05.77	70 32 23.01	0.5	10.5	10/28/04	119	4.58
								7/21/05	115	1.88
								11/10/05	143	3.68
								8/8/06	167	.160
								7/17/07	104	6.14
								7/30/08	199	.712
								7/23/09	241	.082
7/22/10	319	.554								
MA-FSW 708-M01-06WT	413806070322316	280056.440	820984.512	41 38 05.75	70 32 22.98	0.5	13.4	10/28/04	114	2.95
								7/21/05	113	2.22
								11/10/05	178	.795
								8/8/06	163	.190
								7/17/07	104	6.44
								7/30/08	168	1.04
								7/23/09	253	.083
7/22/10	255	.295								

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[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 708-M01-01PT	10/28/04	7.60	<.098	--	--	--	--
	7/21/05	6.93	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.80	<.098	--	--	--	--
	7/17/07	6.82	.228	--	--	--	--
	7/30/08	7.13	<.098	--	--	--	--
	7/23/09	7.27	<.244	^E .017	<.040	^E .007	0.138
	7/22/10	7.16	<.244	.035	--	--	--
MA-FSW 708-M01-02GNT	10/28/04	7.75	<.098	--	--	--	--
	7/21/05	6.94	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.06	<.098	--	--	--	--
	7/17/07	7.13	.228	--	--	--	--
	7/30/08	7.09	<.098	--	--	--	--
	7/23/09	7.28	<.244	.046	^E .026	.003	.323
	7/22/10	6.96	<.244	^E .013	--	--	--
MA-FSW 708-M01-03RT	10/28/04	--	--	--	--	--	--
	7/21/05	6.86	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.05	<.098	--	--	--	--
	7/17/07	7.05	.212	--	--	--	--
	7/30/08	7.12	.783	--	--	--	--
	7/23/09	7.10	.487	.025	<.040	^E .002	.762
	7/22/10	6.91	<.244	.023	--	--	--
MA-FSW 708-M01-04BUT	10/28/04	7.73	<.098	--	--	--	--
	7/21/05	7.08	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.73	<.098	--	--	--	--
	7/17/07	7.03	.147	--	--	--	--
	7/30/08	7.11	1.11	--	--	--	--
	7/23/09	7.05	.352	.039	<.040	^E .001	.848
	7/22/10	7.41	<.244	.031	<.244	<.244	<.244
MA-FSW 708-M01-05BKT	10/28/04	7.98	<.098	--	--	--	--
	7/21/05	7.31	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.75	<.098	--	--	--	--
	7/17/07	6.90	<.098	--	--	--	--
	7/30/08	7.28	.621	--	--	--	--
	7/23/09	6.94	.615	.058	<.040	<.002	.740
	7/22/10	7.41	<.244	.035	--	--	--
MA-FSW 708-M01-06WT	10/28/04	8.39	<.098	--	--	--	--
	7/21/05	8.18	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.09	<.098	--	--	--	--
	7/17/07	7.01	<.098	--	--	--	--
	7/30/08	7.41	1.32	--	--	--	--
	7/23/09	6.96	.456	.043	<.040	.003	.826
	7/22/10	7.56	<.244	.067	--	--	--

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USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 708-M01-07O	413806070322317	280057.141	820983.903	41 38 05.73	70 32 22.95	0.5	16.3	10/28/04	110	.050
								7/21/05	120	1.70
								11/10/05	209	.005
								8/8/06	177	.000
								7/17/07	120	.435
								7/30/08	204	.263
								7/23/09	236	.450
7/22/10	206	.433								
MA-FSW 708-M01-08GY	413806070322318	280057.843	820983.293	41 38 05.71	70 32 22.92	0.5	19.2	10/28/04	214	.040
								7/21/05	134	.000
								11/10/05	170	.015
								8/8/06	133	.060
								7/17/07	103	.050
								7/30/08	171	.410
								7/23/09	227	.239
7/22/10	118	6.030								
MA-FSW 708-M01-09Y	413806070322319	280058.544	820982.684	41 38 05.69	70 32 22.89	0.5	22.1	10/28/04	245	.010
								7/21/05	163	.000
								11/10/05	165	.000
								8/8/06	153	.015
								7/17/07	99	.070
								7/30/08	218	.020
								7/23/09	256	.019
7/22/10	208	.246								
MA-FSW 708-M01-10P	413806070322320	280059.245	820982.075	41 38 05.67	70 32 22.86	0.5	25.0	10/28/04	238	.010
								7/21/05	152	.000
								11/10/05	159	.020
								8/8/06	163	.000
								7/17/07	102	.065
								7/30/08	168	.000
								7/23/09	284	.024
7/22/10	200	.142								
MA-FSW 708-M01-11GN	413806070322321	280060.178	820981.469	41 38 05.65	70 32 22.82	0.5	27.9	10/28/04	231	.005
								7/21/05	156	.000
								11/10/05	176	.000
								8/8/06	172	.000
								7/17/07	104	.035
								7/30/08	156	.047
								7/23/09	266	.013
7/22/10	195	.006								
MA-FSW 708-M01-12R	413806070322322	280060.879	820980.859	41 38 05.63	70 32 22.79	0.5	30.8	10/28/04	186	.115
								7/21/05	117	.010
								11/10/05	178	.060
								8/8/06	127	.065
								7/17/07	97.4	.050
								7/30/08	144	.192
								7/23/09	221	.033
7/22/10	200	.004								

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USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 708-M01-07O	10/28/04	8.21	<.098	--	--	--	--
	7/21/05	7.72	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.41	<.098	--	--	--	--
	7/17/07	7.16	.343	--	--	--	--
	7/30/08	7.28	.783	--	--	--	--
	7/23/09	6.93	.547	.072	<.040	^E .002	.787
	7/22/10	7.60	<.244	.115	--	--	--
	MA-FSW 708-M01-08GY	10/28/04	7.60	<.098	--	--	--
7/21/05		7.99	<.098	--	--	--	--
11/10/05		--	<.098	--	--	--	--
8/8/06		7.60	<.098	--	--	--	--
7/17/07		7.57	.603	--	--	--	--
7/30/08		7.45	<.098	--	--	--	--
7/23/09		7.07	<.244	^E .017	<.040	^E .001	.651
7/22/10		7.05	<.244	^E .013	--	--	--
MA-FSW 708-M01-09Y	10/28/04	7.39	<.098	--	--	--	--
	7/21/05	8.34	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.70	.359	--	--	--	--
	7/17/07	7.60	<.098	--	--	--	--
	7/30/08	7.53	<.098	--	--	--	--
	7/23/09	7.40	<.244	.059	<.040	<.002	.318
	7/22/10	7.19	<.244	.033	--	--	--
MA-FSW 708-M01-10P	10/28/04	7.71	<.098	--	--	--	--
	7/21/05	8.31	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.63	.294	--	--	--	--
	7/17/07	7.49	.212	--	--	--	--
	7/30/08	7.65	.326	--	--	--	--
	7/23/09	7.41	<.244	.054	<.040	<.002	.123
	7/22/10	7.48	<.244	.052	--	--	--
MA-FSW 708-M01-11GN	10/28/04	7.41	<.098	--	--	--	--
	7/21/05	8.53	.277	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.58	.277	--	--	--	--
	7/17/07	7.40	<.098	--	--	--	--
	7/30/08	7.63	.359	--	--	--	--
	7/23/09	7.43	<.244	.036	<.040	.005	.033
	7/22/10	7.22	<.244	.026	--	--	--
MA-FSW 708-M01-12R	10/28/04	8.21	<.098	--	--	--	--
	7/21/05	8.75	.228	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.91	.277	--	--	--	--
	7/17/07	7.52	.212	--	--	--	--
	7/30/08	7.50	.245	--	--	--	--
	7/23/09	7.46	<.244	.042	<.040	^E .001	.027
	7/22/10	7.39	<.244	.041	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

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USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance (μS/cm)	Oxygen, dissolved (mg/L)
MA-FSW 708-M01-13BU	413806070322323	280061.581	820980.250	41 38 05.61	70 32 22.76	0.5	33.7	10/28/04	176	.065
								7/21/05	115	.015
								11/10/05	202	.005
								8/8/06	107	.000
								7/17/07	95.4	.000
								7/30/08	133	.072
								7/23/09	177	.022
								7/22/10	215	.008
MA-FSW 708-M01-14BK	413806070322324	280062.282	820979.641	41 38 05.59	70 32 22.73	0.5	36.6	10/28/04	168	.035
								7/21/05	132	.000
								11/10/05	192	.010
								8/8/06	103	.000
								7/17/07	108	.055
								7/30/08	142	.079
								7/23/09	175	.106
								7/22/10	218	.015
MA-FSW 708-M01-15W	413806070322325	280062.983	820979.032	41 38 05.57	70 32 22.70	0.5	39.5	10/28/04	171	2.59
								7/21/05	130	.560
								11/10/05	149	.235
								8/8/06	106	.225
								7/17/07	115	.215
								7/30/08	--	--
								7/23/09	189	.138
								7/22/10	184	1.43
MA-FSW 708-M02-01PT	413806070322326	280052.706	820987.246	41 38 05.84	70 32 23.14	3.0	- 1.1	10/28/04	110	.010
								7/21/05	181	.040
								11/10/05	64.1	8.43
								8/8/06	206	.200
								7/17/07	174	.070
								7/30/08	81.9	1.46
								7/23/09	220	.076
								7/22/10	183	.202
MA-FSW 708-M02-02GNT	413806070322327	280053.403	820986.946	41 38 05.83	70 32 23.11	3.0	1.8	10/28/04	98.8	.000
								7/21/05	192	.095
								11/10/05	133	4.52
								8/8/06	177	.135
								7/17/07	184	.215
								7/30/08	149	.863
								7/23/09	188	.204
								7/22/10	228	.078
MA-FSW 708-M02-03RT	413806070322328	280054.105	820986.337	41 38 05.81	70 32 23.08	3.0	4.7	10/28/04	63.1	.105
								7/21/05	172	.025
								11/10/05	171	.030
								8/8/06	189	.120
								7/17/07	188	.070
								7/30/08	192	.008
								7/23/09	225	.085
								7/22/10	248	.074

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USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 708-M01-13BU	10/28/04	7.65	<.098	--	--	--	--
	7/21/05	8.14	.326	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.59	.277	--	--	--	--
	7/17/07	7.36	.228	--	--	--	--
	7/30/08	7.37	.457	--	--	--	--
	7/23/09	7.13	<.244	^E .010	<.040	.004	.040
	7/22/10	7.20	<.244	.029	--	--	--
MA-FSW 708-M01-14BK	10/28/04	7.68	<.098	--	--	--	--
	7/21/05	7.97	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.27	<.098	--	--	--	--
	7/17/07	7.20	<.098	--	--	--	--
	7/30/08	7.09	<.098	--	--	--	--
	7/23/09	7.09	<.244	^E .012	.072	.005	.033
	7/22/10	7.11	<.244	.046	--	--	--
MA-FSW 708-M01-15W	10/28/04	7.23	<.098	--	--	--	--
	7/21/05	7.55	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.16	<.098	--	--	--	--
	7/17/07	7.20	<.098	--	--	--	--
	7/30/08	--	--	--	--	--	--
	7/23/09	6.84	.542	^E .010	.080	^E .001	.113
	7/22/10	6.36	<.244	^E .014	--	--	--
MA-FSW 708-M02-01PT	10/28/04	6.19	<.098	--	--	--	--
	7/21/05	6.08	1.03	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	5.98	1.50	--	--	--	--
	7/17/07	6.12	1.16	--	--	--	--
	7/30/08	5.98	.962	--	--	--	--
	7/23/09	5.99	.989	1.23	2.538	.096	<.020
	7/22/10	6.34	1.30	1.43	--	--	--
MA-FSW 708-M02-02GNT	10/28/04	5.23	<.098	--	--	--	--
	7/21/05	6.32	.864	--	--	--	--
	11/10/05	--	.701	--	--	--	--
	8/8/06	6.03	1.44	--	--	--	--
	7/17/07	6.24	1.48	--	--	--	--
	7/30/08	5.95	1.42	--	--	--	--
	7/23/09	6.29	1.10	1.32	<.040	<.002	.358
	7/22/10	6.30	1.24	1.32	--	--	--
MA-FSW 708-M02-03RT	10/28/04	5.34	<.098	--	--	--	--
	7/21/05	6.32	1.40	--	--	--	--
	11/10/05	--	.962	--	--	--	--
	8/8/06	5.98	1.34	--	--	--	--
	7/17/07	6.34	1.68	--	--	--	--
	7/30/08	6.01	1.42	--	--	--	--
	7/23/09	6.18	1.28	1.45	<.040	<.002	.830
	7/22/10	6.29	1.20	1.17	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 708-M02-04BUT	413806070322329	280054.806	820985.727	41 38 05.79	70 32 23.05	3.0	7.6	10/28/04	99.9	.115
								7/21/05	164	.045
								11/10/05	185	.070
								8/8/06	216	.055
								7/17/07	188	.070
								7/30/08	215	.061
								7/23/09	236	.183
7/22/10	298	.068								
MA-FSW 708-M02-05BKT	413806070322330	280055.739	820985.121	41 38 05.77	70 32 23.01	3.0	10.5	10/28/04	131	.710
								7/21/05	159	.055
								11/10/05	250	.010
								8/8/06	252	.085
								7/17/07	157	.020
								7/30/08	200	.161
								7/23/09	250	.230
7/22/10	301	.102								
MA-FSW 708-M02-06WT	413806070322331	280056.440	820984.512	41 38 05.75	70 32 22.98	3.0	13.4	10/28/04	104	.255
								7/21/05	164	.010
								11/10/05	247	.000
								8/8/06	272	.015
								7/17/07	160	.020
								7/30/08	174	.000
								7/23/09	251	.127
7/22/10	300	.101								
MA-FSW 708-M02-07O	413806070322332	280057.141	820983.903	41 38 05.73	70 32 22.95	3.0	16.3	10/28/04	86.1	.685
								7/21/05	171	.040
								11/10/05	260	.015
								8/8/06	220	.010
								7/17/07	160	.075
								7/30/08	203	.000
								7/23/09	238	.059
7/22/10	253	.860								
MA-FSW 708-M02-08GY	413806070322333	280057.843	820983.293	41 38 05.71	70 32 22.92	3.0	19.2	10/28/04	165	.015
								7/21/05	189	.000
								11/10/05	247	.035
								8/8/06	181	.070
								7/17/07	121	.100
								7/30/08	242	.000
								7/23/09	242	.075
7/22/10	254	.051								
MA-FSW 708-M02-09Y	413806070322334	280058.544	820982.684	41 38 05.69	70 32 22.89	3.0	22.1	10/28/04	234	.015
								7/21/05	211	.000
								11/10/05	174	.020
								8/8/06	164	.050
								7/17/07	114	.055
								7/30/08	251	.000
								7/23/09	247	.083
7/22/10	235	.183								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —*continued*

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 708-M02-04BUT	10/28/04	5.81	<.098	--	--	--	--
	7/21/05	6.51	1.11	--	--	--	--
	11/10/05	--	1.04	--	--	--	--
	8/8/06	6.00	1.17	--	--	--	--
	7/17/07	6.41	1.65	--	--	--	--
	7/30/08	6.09	1.24	--	--	--	--
	7/23/09	6.15	1.13	1.48	<.040	<.002	.883
	7/22/10	6.16	1.00	.958	--	--	--
MA-FSW 708-M02-05BKT	10/28/04	6.91	<.098	--	--	--	--
	7/21/05	6.83	1.13	--	--	--	--
	11/10/05	--	.310	--	--	--	--
	8/8/06	6.14	1.16	--	--	--	--
	7/17/07	6.56	1.76	--	--	--	--
	7/30/08	6.28	.718	--	--	--	--
	7/23/09	6.14	1.09	1.34	<.040	<.002	.808
	7/22/10	5.89	.845	.910	--	--	--
MA-FSW 708-M02-06WT	10/28/04	6.68	<.098	--	--	--	--
	7/21/05	7.05	.734	--	--	--	--
	11/10/05	--	.228	--	--	--	--
	8/8/06	6.52	.913	--	--	--	--
	7/17/07	6.65	1.52	--	--	--	--
	7/30/08	6.48	1.47	--	--	--	--
	7/23/09	6.20	.932	1.15	<.040	<.002	.835
	7/22/10	5.89	.692	.792	--	--	--
MA-FSW 708-M02-07O	10/28/04	6.91	<.098	--	--	--	--
	7/21/05	7.11	1.14	--	--	--	--
	11/10/05	--	.636	--	--	--	--
	8/8/06	6.86	.913	--	--	--	--
	7/17/07	6.85	1.21	--	--	--	--
	7/30/08	6.66	1.63	--	--	--	--
	7/23/09	6.33	1.16	1.24	<.040	<.002	.787
	7/22/10	5.99	.845	.922	--	--	--
MA-FSW 708-M02-08GY	10/28/04	6.89	<.098	--	--	--	--
	7/21/05	7.25	1.27	--	--	--	--
	11/10/05	--	.946	--	--	--	--
	8/8/06	7.14	1.32	--	--	--	--
	7/17/07	7.22	1.32	--	--	--	--
	7/30/08	6.88	1.60	--	--	--	--
	7/23/09	6.64	.643	1.30	<.040	E.002	.727
	7/22/10	6.47	.904	.791	--	--	--
MA-FSW 708-M02-09Y	10/28/04	6.95	.359	--	--	--	--
	7/21/05	7.53	.718	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.61	.457	--	--	--	--
	7/17/07	7.41	.620	--	--	--	--
	7/30/08	7.38	.489	--	--	--	--
	7/23/09	7.24	.415	.341	<.040	.002	.520
	7/22/10	6.80	.506	.465	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 708-M02-10P	413806070322335	280059.245	820982.075	41 38 05.67	70 32 22.86	3.0	25.0	10/28/04	238	.005
								7/21/05	200	.000
								11/10/05	159	.020
								8/8/06	169	.065
								7/17/07	106	.050
								7/30/08	215	.000
								7/23/09	281	.044
7/22/10	229	.009								
MA-FSW 708-M02-11GN	413806070322336	280060.178	820981.469	41 38 05.65	70 32 22.82	3.0	27.9	10/28/04	230	.025
								7/21/05	186	.000
								11/10/05	176	.015
								8/8/06	179	.000
								7/17/07	112	.035
								7/30/08	170	.048
								7/23/09	274	.042
7/22/10	224	.021								
MA-FSW 708-M02-12R	413806070322337	280060.879	820980.859	41 38 05.63	70 32 22.79	3.0	30.8	10/28/04	225	.005
								7/21/05	154	.000
								11/10/05	182	.020
								8/8/06	149	.000
								7/17/07	115	.020
								7/30/08	158	.000
								7/23/09	200	.056
7/22/10	212	.005								
MA-FSW 708-M02-13BU	413806070322338	280061.581	820980.250	41 38 05.61	70 32 22.76	3.0	33.7	10/28/04	196	.020
								7/21/05	136	.000
								11/10/05	211	.005
								8/8/06	117	.010
								7/17/07	106	.060
								7/30/08	142	.000
								7/23/09	188	.063
7/22/10	211	.682								
MA-FSW 708-M02-14BK	413806070322339	280062.282	820979.641	41 38 05.59	70 32 22.73	3.0	36.6	10/28/04	171	.015
								7/21/05	133	.000
								11/10/05	194	.025
								8/8/06	96.1	.230
								7/17/07	79.	2.81
								7/30/08	121	.018
								7/23/09	111	4.89
7/22/10	187	5.48								
MA-FSW 708-M02-15W	413806070322340	280062.983	820979.032	41 38 05.57	70 32 22.70	3.0	39.5	10/28/04	155	.070
								7/21/05	129	.005
								11/10/05	165	.045
								8/8/06	85.1	.740
								7/17/07	88.	2.09
								7/30/08	118	1.26
								7/23/09	110	4.89
7/22/10	172	5.350								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 708-M02-10P	10/28/04	7.12	.881	--	--	--	--
	7/21/05	7.62	.391	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.55	.326	--	--	--	--
	7/17/07	7.37	.245	--	--	--	--
	7/30/08	7.48	.245	--	--	--	--
	7/23/09	7.26	.277	.209	^E .030	.002	.275
	7/22/10	7.05	.252	.194	--	--	--
MA-FSW 708-M02-11GN	10/28/04	7.17	.359	--	--	--	--
	7/21/05	7.88	.245	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.48	.212	--	--	--	--
	7/17/07	7.25	<.098	--	--	--	--
	7/30/08	7.53	.310	--	--	--	--
	7/23/09	7.28	<.244	.134	^E .029	.004	.034
	7/22/10	7.20	<.244	.095	--	--	--
MA-FSW 708-M02-12R	10/28/04	7.34	.473	--	--	--	--
	7/21/05	8.00	.245	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.35	<.098	--	--	--	--
	7/17/07	7.13	.245	--	--	--	--
	7/30/08	7.44	.212	--	--	--	--
	7/23/09	7.12	<.244	.068	.078	.008	.039
	7/22/10	6.92	.263	.139	--	--	--
MA-FSW 708-M02-13BU	10/28/04	7.31	.294	--	--	--	--
	7/21/05	7.67	.245	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.16	.228	--	--	--	--
	7/17/07	7.17	<.098	--	--	--	--
	7/30/08	7.01	<.098	--	--	--	--
	7/23/09	7.31	<.244	.094	.095	.008	.034
	7/22/10	6.92	<.244	.079	--	--	--
MA-FSW 708-M02-14BK	10/28/04	6.97	.963	--	--	--	--
	7/21/05	6.92	.375	--	--	--	--
	11/10/05	--	.538	--	--	--	--
	8/8/06	6.58	<.098	--	--	--	--
	7/17/07	6.55	.603	--	--	--	--
	7/30/08	5.92	<.098	--	--	--	--
	7/23/09	5.61	.325	.483	.709	<.002	<.020
	7/22/10	5.94	.328	.271	--	--	--
MA-FSW 708-M02-15W	10/28/04	6.55	1.04	--	--	--	--
	7/21/05	6.16	.701	--	--	--	--
	11/10/05	--	.669	--	--	--	--
	8/8/06	5.85	.391	--	--	--	--
	7/17/07	6.12	.603	--	--	--	--
	7/30/08	5.74	.245	--	--	--	--
	7/23/09	5.59	.275	.288	.746	<.002	<.020
	7/22/10	5.82	.324	.284	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S/cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S/cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 709-M01-01PT	413807070322216	280072.563	821012.153	41 38 06.64	70 32 22.27	0.5	- 1.1	10/28/04	168	.010
								7/21/05	170	.000
								11/10/05	518	.020
								8/8/06	202	.020
								7/17/07	203	.015
								7/30/08	230	.000
								7/23/09	198	.016
7/22/10	236	.064								
MA-FSW 709-M01-02GNT	413807070322217	280073.493	821011.855	41 38 06.63	70 32 22.23	0.5	1.8	10/28/04	140	.130
								7/21/05	173	.000
								11/10/05	283	.010
								8/8/06	159	.040
								7/17/07	191	.000
								7/30/08	176	.000
								7/23/09	156	1.90
7/22/10	187	2.45								
MA-FSW 709-M01-03RT	413807070322218	280074.194	821011.246	41 38 06.61	70 32 22.20	0.5	4.7	10/28/04	191	.250
								7/21/05	181	.025
								11/10/05	167	.010
								8/8/06	185	.005
								7/17/07	172	.015
								7/30/08	313	.000
								7/23/09	198	.012
7/22/10	298	.094								
MA-FSW 709-M01-04BUT	413807070322219	280075.123	821010.948	41 38 06.60	70 32 22.16	0.5	7.6	10/28/04	198	.020
								7/21/05	207	.000
								11/10/05	198	.005
								8/8/06	199	.000
								7/17/07	175	.015
								7/30/08	361	.000
								7/23/09	229	.011
7/22/10	315	.075								
MA-FSW 709-M01-05BKT	413807070322220	280076.052	821010.650	41 38 06.59	70 32 22.12	0.5	10.5	10/28/04	162	.000
								7/21/05	200	.010
								11/10/05	216	.000
								8/8/06	219	.050
								7/17/07	167	.000
								7/30/08	390	.000
								7/23/09	239	.006
7/22/10	277	.082								
MA-FSW 709-M01-06WT	413807070322221	280076.754	821010.041	41 38 06.57	70 32 22.09	0.5	13.4	10/28/04	170	.060
								7/21/05	164	.000
								11/10/05	221	.000
								8/8/06	177	.000
								7/17/07	184	.000
								7/30/08	314	.000
								7/23/09	203	.024
7/22/10	277	.029								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S/cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 709-M01-01PT	10/28/04	7.24	<.098	--	--	--	--
	7/21/05	7.53	.571	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.75	.375	--	--	--	--
	7/17/07	6.59	.652	--	--	--	--
	7/30/08	6.61	1.66	--	--	--	--
	7/23/09	6.37	1.55	1.81	<0.040	^E .001	0.609
	7/22/10	6.60	1.52	1.43	--	--	--
MA-FSW 709-M01-02GNT	10/28/04	7.17	<.098	--	--	--	--
	7/21/05	7.00	.245	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.92	<.098	--	--	--	--
	7/17/07	6.96	.701	--	--	--	--
	7/30/08	6.39	1.79	--	--	--	--
	7/23/09	6.29	.737	.896	<.040	^E .001	.297
	7/22/10	6.44	.580	.591	--	--	--
MA-FSW 709-M01-03RT	10/28/04	7.61	<.098	--	--	--	--
	7/21/05	7.00	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.21	<.098	--	--	--	--
	7/17/07	7.24	.245	--	--	--	--
	7/30/08	7.22	<.098	--	--	--	--
	7/23/09	7.00	<.244	.045	<.040	^E .002	.339
	7/22/10	6.61	<.244	.099	--	--	--
MA-FSW 709-M01-04BUT	10/28/04	7.55	<.098	--	--	--	--
	7/21/05	7.00	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.21	<.098	--	--	--	--
	7/17/07	7.29	.245	--	--	--	--
	7/30/08	7.25	<.098	--	--	--	--
	7/23/09	7.26	<.244	.052	<.040	<.002	.329
	7/22/10	7.03	<.244	.100	--	--	--
MA-FSW 709-M01-05BKT	10/28/04	7.71	<.098	--	--	--	--
	7/21/05	7.05	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.24	<.098	--	--	--	--
	7/17/07	7.24	.261	--	--	--	--
	7/30/08	7.33	<.098	--	--	--	--
	7/23/09	7.13	<.244	.064	<.040	^E .001	.176
	7/22/10	7.16	<.244	.094	--	--	--
MA-FSW 709-M01-06WT	10/28/04	7.76	<.098	--	--	--	--
	7/21/05	6.61	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.07	<.098	--	--	--	--
	7/17/07	7.06	.294	--	--	--	--
	7/30/08	7.26	<.098	--	--	--	--
	7/23/09	6.99	<.244	.098	^E .020	^E .002	.025
	7/22/10	7.10	<.244	.180	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 709-M01-07O	413807070322222	280077.683	821009.743	41 38 06.56	70 32 22.05	0.5	16.3	10/28/04	149	.010
								7/21/05	156	.000
								11/10/05	226	.000
								8/8/06	128	.000
								7/17/07	164	.025
								7/30/08	275	.000
								7/23/09	191	.007
7/22/10	243	.000								
MA-FSW 709-M01-08GY	413807070322223	280078.381	821009.442	41 38 06.55	70 32 22.02	0.5	19.2	10/28/04	183	.000
								7/21/05	186	.000
								11/10/05	226	.010
								8/8/06	144	.000
								7/17/07	159	.000
								7/30/08	251	.000
								7/23/09	252	.021
7/22/10	240	.138								
MA-FSW 709-M01-09Y	413807070322224	280079.313	821008.836	41 38 06.53	70 32 21.98	0.5	22.1	10/28/04	212	.000
								7/21/05	172	.000
								11/10/05	189	.015
								8/8/06	124	.000
								7/17/07	149	.065
								7/30/08	220	.000
								7/23/09	216	.011
7/22/10	214	.036								
MA-FSW 709-M01-10P	413807070322225	280080.243	821008.537	41 38 06.52	70 32 21.94	0.5	25.0	10/28/04	211	.020
								7/21/05	153	.000
								11/10/05	200	.010
								8/8/06	145	.000
								7/17/07	139	.020
								7/30/08	218	.000
								7/23/09	257	.018
7/22/10	206	.221								
MA-FSW 709-M01-11GN	413807070322226	280080.940	821008.237	41 38 06.51	70 32 21.91	0.5	27.9	10/28/04	188	.140
								7/21/05	146	.000
								11/10/05	196	.010
								8/8/06	128	.005
								7/17/07	102	.000
								7/30/08	189	.000
								7/23/09	249	.009
7/22/10	205	.005								
MA-FSW 709-M01-12R	413807070322227	280081.873	821007.630	41 38 06.49	70 32 21.87	0.5	30.8	10/28/04	113	1.53
								7/21/05	169	.000
								11/10/05	242	.355
								8/8/06	225	1.50
								7/17/07	109	1.53
								7/30/08	134	.000
								7/23/09	233	.041
7/22/10	199	.013								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 709-M01-07O	10/28/04	7.82	<.098	--	--	--	--
	7/21/05	6.74	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.14	<.098	--	--	--	--
	7/17/07	7.14	<.098	--	--	--	--
	7/30/08	7.42	<.098	--	--	--	--
	7/23/09	7.29	<.244	.064	<.040	<.002	.022
	7/22/10	7.30	<.244	.050	--	--	--
MA-FSW 709-M01-08GY	10/28/04	7.87	<.098	--	--	--	--
	7/21/05	6.32	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.83	<.098	--	--	--	--
	7/17/07	6.91	.261	--	--	--	--
	7/30/08	7.23	<.098	--	--	--	--
	7/23/09	6.61	<.244	.109	.058	^E .001	^E .014
	7/22/10	7.02	.401	.403	--	--	--
MA-FSW 709-M01-09Y	10/28/04	8.23	<.098	--	--	--	--
	7/21/05	7.18	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.11	<.098	--	--	--	--
	7/17/07	7.06	.261	--	--	--	--
	7/30/08	7.53	<.098	--	--	--	--
	7/23/09	7.34	<.244	.049	<.040	^E .002	<.020
	7/22/10	7.23	<.244	.072	--	--	--
MA-FSW 709-M01-10P	10/28/04	8.20	<.098	--	--	--	--
	7/21/05	6.75	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.89	<.098	--	--	--	--
	7/17/07	6.92	.261	--	--	--	--
	7/30/08	7.30	.245	--	--	--	--
	7/23/09	7.05	<.244	.044	<.040	^E .004	.027
	7/22/10	7.17	<.244	.112	--	--	--
MA-FSW 709-M01-11GN	10/28/04	7.86	<.098	--	--	--	--
	7/21/05	6.88	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.91	<.098	--	--	--	--
	7/17/07	7.00	.228	--	--	--	--
	7/30/08	7.31	<.098	--	--	--	--
	7/23/09	7.26	<.244	.036	<.040	.006	^E .015
	7/22/10	7.29	<.244	.030	--	--	--
MA-FSW 709-M01-12R	10/28/04	7.47	<.098	--	--	--	--
	7/21/05	6.27	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.23	1.04	--	--	--	--
	7/17/07	6.54	.799	--	--	--	--
	7/30/08	6.75	.359	--	--	--	--
	7/23/09	6.77	<.244	.072	<.040	<.002	^E .012
	7/22/10	7.05	.256	.354	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 709-M01-13BU	413807070322228	280082.802	821007.332	41 38 06.48	70 32 21.83	0.5	33.7	10/28/04	110	.715
								7/21/05	84.8	.000
								11/10/05	131	.060
								8/8/06	102	.035
								7/17/07	98.	.000
								7/30/08	129	.000
								7/23/09	209	.008
7/22/10	203	.003								
MA-FSW 709-M01-14BK	413807070322229	280083.504	821006.723	41 38 06.46	70 32 21.80	0.5	36.6	10/28/04	123	.350
								7/21/05	94.5	.480
								11/10/05	175	.730
								8/8/06	137	2.20
								7/17/07	104	3.12
								7/30/08	113	2.37
								7/23/09	191	.002
7/22/10	194	.164								
MA-FSW 709-M01-15W	413807070322230	280084.433	821006.425	41 38 06.45	70 32 21.76	0.5	39.5	10/28/04	113	.370
								7/21/05	88.5	1.11
								11/10/05	104	1.92
								8/8/06	101	2.55
								7/17/07	86.	3.70
								7/30/08	137	4.03
								7/23/09	99.5	4.40
7/22/10	172	5.20								
MA-FSW 709-M02-01PT	413807070322231	280072.563	821012.153	41 38 06.64	70 32 22.27	3.0	- 1.1	10/28/04	108	.020
								7/21/05	161	.060
								11/10/05	560	.070
								8/8/06	192	.045
								7/17/07	181	.045
								7/30/08	184	.126
								7/23/09	190	.053
7/22/10	234	.129								
MA-FSW 709-M02-02GNT	413807070322232	280073.493	821011.855	41 38 06.63	70 32 22.23	3.0	1.8	10/28/04	131	.000
								7/21/05	202	.020
								11/10/05	403	.010
								8/8/06	206	.035
								7/17/07	197	.085
								7/30/08	219	.131
								7/23/09	187	.035
7/22/10	275	.207								
MA-FSW 709-M02-03RT	413807070322233	280074.194	821011.246	41 38 06.61	70 32 22.20	3.0	4.7	10/28/04	253	.005
								7/21/05	227	.005
								11/10/05	180	.010
								8/8/06	218	.000
								7/17/07	199	.030
								7/30/08	320	.000
								7/23/09	213	.014
7/22/10	312	.162								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 709-M01-13BU	10/28/04	7.39	<.098	--	--	--	--
	7/21/05	7.05	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.81	<.098	--	--	--	--
	7/17/07	6.72	<.098	--	--	--	--
	7/30/08	7.33	<.098	--	--	--	--
	7/23/09	7.18	<.244	<.020	<.040	.008	.038
	7/22/10	7.13	.327	.067	--	--	--
MA-FSW 709-M01-14BK	10/28/04	6.97	<.098	--	--	--	--
	7/21/05	6.49	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.45	<.098	--	--	--	--
	7/17/07	6.21	.326	--	--	--	--
	7/30/08	6.85	<.098	--	--	--	--
	7/23/09	6.68	<.244	.053	.057	.003	.025
	7/22/10	6.87	.630	.521	--	--	--
MA-FSW 709-M01-15W	10/28/04	6.54	<.098	--	--	--	--
	7/21/05	6.24	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.03	<.098	--	--	--	--
	7/17/07	5.99	<.098	--	--	--	--
	7/30/08	5.71	<.098	--	--	--	--
	7/23/09	5.64	<.244	.220	.612	<.002	<.020
	7/22/10	5.86	<.244	.207	--	--	--
MA-FSW 709-M02-01PT	10/28/04	6.29	<.098	--	--	--	--
	7/21/05	6.76	1.68	--	--	--	--
	11/10/05	--	.408	--	--	--	--
	8/8/06	6.52	1.71	--	--	--	--
	7/17/07	6.58	1.21	--	--	--	--
	7/30/08	6.07	1.03	--	--	--	--
	7/23/09	6.21	.949	1.12	<.040	<.002	.581
	7/22/10	6.20	.752	.782	--	--	--
MA-FSW 709-M02-02GNT	10/28/04	6.69	<.098	--	--	--	--
	7/21/05	7.44	1.04	--	--	--	--
	11/10/05	--	.408	--	--	--	--
	8/8/06	6.89	.799	--	--	--	--
	7/17/07	6.91	1.52	--	--	--	--
	7/30/08	6.23	1.09	--	--	--	--
	7/23/09	6.24	1.08	1.33	<.040	<.002	.495
	7/22/10	6.28	.851	.880	--	--	--
MA-FSW 709-M02-03RT	10/28/04	7.10	<.098	--	--	--	--
	7/21/05	7.75	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.25	.897	--	--	--	--
	7/17/07	6.94	.228	--	--	--	--
	7/30/08	6.80	1.32	--	--	--	--
	7/23/09	6.54	1.10	1.56	<.040	E.001	.433
	7/22/10	6.43	1.39	1.27	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 709-M02-04BUT	413807070322234	280075.123	821010.948	41 38 06.60	70 32 22.16	3.0	7.6	10/28/04	226	.035
								7/21/05	234	.015
								11/10/05	212	.035
								8/8/06	248	.000
								7/17/07	187	.000
								7/30/08	249	.000
								7/23/09	230	.013
								7/22/10	296	.054
MA-FSW 709-M02-05BKT	413807070322235	280076.052	821010.650	41 38 06.59	70 32 22.12	3.0	10.5	10/28/04	192	.000
								7/21/05	206	.040
								11/10/05	240	.085
								8/8/06	241	.000
								7/17/07	175	.005
								7/30/08	260	.060
								7/23/09	228	.035
								7/22/10	290	.071
MA-FSW 709-M02-06WT	413807070322236	280076.754	821010.041	41 38 06.57	70 32 22.09	3.0	13.4	10/28/04	172	.035
								7/21/05	172	.020
								11/10/05	245	.000
								8/8/06	192	.155
								7/17/07	196	.040
								7/30/08	290	.000
								7/23/09	214	.030
								7/22/10	314	.097
MA-FSW 709-M02-07O	413807070322237	280077.683	821009.743	41 38 06.56	70 32 22.05	3.0	16.3	10/28/04	166	.100
								7/21/05	168	.000
								11/10/05	243	.015
								8/8/06	157	.020
								7/17/07	192	.010
								7/30/08	258	.000
								7/23/09	200	.004
								7/22/10	245	.110
MA-FSW 709-M02-08GY	413807070322238	280078.381	821009.442	41 38 06.55	70 32 22.02	3.0	19.2	10/28/04	208	.015
								7/21/05	198	.000
								11/10/05	222	.015
								8/8/06	158	.035
								7/17/07	172	.015
								7/30/08	260	.000
								7/23/09	216	.017
								7/22/10	235	2.14
MA-FSW 709-M02-09Y	413807070322239	280079.313	821008.836	41 38 06.53	70 32 21.98	3.0	22.1	10/28/04	222	.095
								7/21/05	181	.860
								11/10/05	189	.225
								8/8/06	120	3.24
								7/17/07	124	.000
								7/30/08	193	.000
								7/23/09	202	4.60
								7/22/10	189	4.86

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μ S/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 709-M02-04BUT	10/28/04	7.03	<.098	--	--	--	--
	7/21/05	7.16	.212	--	--	--	--
	11/10/05	--	.228	--	--	--	--
	8/8/06	7.03	1.06	--	--	--	--
	7/17/07	6.88	1.04	--	--	--	--
	7/30/08	6.32	1.89	--	--	--	--
	7/23/09	6.16	.778	1.05	.049	.015	.247
	7/22/10	6.36	.864	.873	--	--	--
MA-FSW 709-M02-05BKT	10/28/04	7.20	<.098	--	--	--	--
	7/21/05	7.62	.571	--	--	--	--
	11/10/05	--	.473	--	--	--	--
	8/8/06	6.95	.832	--	--	--	--
	7/17/07	6.85	1.32	--	--	--	--
	7/30/08	6.27	1.65	--	--	--	--
	7/23/09	6.14	.743	.954	<.040	<.002	.080
	7/22/10	6.24	.754	.740	--	--	--
MA-FSW 709-M02-06WT	10/28/04	7.38	<.098	--	--	--	--
	7/21/05	7.48	<.098	--	--	--	--
	11/10/05	--	.212	--	--	--	--
	8/8/06	7.19	.375	--	--	--	--
	7/17/07	6.94	.832	--	--	--	--
	7/30/08	6.42	2.77	--	--	--	--
	7/23/09	6.28	1.31	1.61	<.040	<.002	^E .015
	7/22/10	6.30	1.21	1.15	--	--	--
MA-FSW 709-M02-07O	10/28/04	7.54	.294	--	--	--	--
	7/21/05	7.12	.212	--	--	--	--
	11/10/05	--	.310	--	--	--	--
	8/8/06	7.14	<.098	--	--	--	--
	7/17/07	6.97	.701	--	--	--	--
	7/30/08	6.91	.669	--	--	--	--
	7/23/09	6.19	.464	.516	.090	.008	^E .013
	7/22/10	6.16	.470	.510	--	--	--
MA-FSW 709-M02-08GY	10/28/04	7.48	<.098	--	--	--	--
	7/21/05	6.98	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.13	<.098	--	--	--	--
	7/17/07	7.07	<.098	--	--	--	--
	7/30/08	6.96	.603	--	--	--	--
	7/23/09	6.36	.359	.433	.211	.005	<.020
	7/22/10	6.02	.300	.317	--	--	--
MA-FSW 709-M02-09Y	10/28/04	7.23	1.22	--	--	--	--
	7/21/05	6.64	.277	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.51	.359	--	--	--	--
	7/17/07	6.52	.277	--	--	--	--
	7/30/08	6.17	.848	--	--	--	--
	7/23/09	5.74	.353	.465	.592	<.002	^E .017
	7/22/10	5.92	.333	.425	--	--	--

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010—continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	USGS site ID	Easting (m)	Northing (m)	Latitude (° ′ ″)	Longitude (° ′ ″)	Depth below pond bottom (ft)	Distance from mean shoreline position (ft)	Date sampled	Measured in field, unfiltered	
									Specific conductance ($\mu\text{S}/\text{cm}$)	Oxygen, dissolved (mg/L)
MA-FSW 709-M02-10P	413807070322240	280080.243	821008.537	41 38 06.52	70 32 21.94	3.0	25.0	10/28/04	206	.045
								7/21/05	155	.100
								11/10/05	210	.245
								8/8/06	123	1.55
								7/17/07	120	.070
								7/30/08	203	1.27
								7/23/09	248	3.73
7/22/10	186	5.04								
MA-FSW 709-M02-11GN	413807070322241	280080.940	821008.237	41 38 06.51	70 32 21.91	3.0	27.9	10/28/04	179	.050
								7/21/05	132	.020
								11/10/05	197	.050
								8/8/06	129	.140
								7/17/07	107	.015
								7/30/08	202	.000
								7/23/09	262	.016
7/22/10	229	.027								
MA-FSW 709-M02-12R	413807070322242	280081.873	821007.630	41 38 06.49	70 32 21.87	3.0	30.8	10/28/04	121	.075
								7/21/05	94.1	.005
								11/10/05	179	.025
								8/8/06	126	.105
								7/17/07	98.1	.005
								7/30/08	181	.000
								7/23/09	249	.005
7/22/10	234	.009								
MA-FSW 709-M02-13BU	413807070322243	280082.802	821007.332	41 38 06.48	70 32 21.83	3.0	33.7	10/28/04	114	.030
								7/21/05	86.8	.000
								11/10/05	150	.045
								8/8/06	103	.145
								7/17/07	94.6	.285
								7/30/08	149	.000
								7/23/09	219	.574
7/22/10	202	2.60								
MA-FSW 709-M02-14BK	413807070322244	280083.504	821006.723	41 38 06.46	70 32 21.80	3.0	36.6	10/28/04	129	.025
								7/21/05	91.6	.015
								11/10/05	146	.035
								8/8/06	118	.135
								7/17/07	102	.050
								7/30/08	147	.000
								7/23/09	148	.038
7/22/10	190	2.45								
MA-FSW 709-M02-15W	413807070322245	280084.433	821006.425	41 38 06.45	70 32 21.76	3.0	39.5	10/28/04	103	2.16
								7/21/05	103	4.38
								11/10/05	145	.890
								8/8/06	180	3.50
								7/17/07	100	4.42
								7/30/08	125	2.55
								7/23/09	127	4.62
7/22/10	176	5.13								

Table 9. Physical properties of sampling locations and chemical analyses of groundwater samples collected from horizontal multiport samplers at a pond-bottom permeable reactive barrier, Ashumet Pond, Massachusetts, October 2004–July 2010 —continued

[Easting and Northing: State plane coordinates are for North American Datum of 1983 (NAD83). Latitude and longitude in degrees (°), minutes (′), and seconds (″). Altitude refers to distance above or below the National Geodetic Vertical Datum of 1929. Negative values for distance from mean shoreline position indicate distance in the shoreward direction. Source of laboratory data: USGS National Water Quality Laboratory, Lakewood, Colorado. USGS, U.S. Geological Survey; ft, foot; m, meter; μS/cm, microsiemens per centimeter at 25 degrees Celsius; <, actual value less than value shown; --, no data; E, estimated value for constituent detected in the sample below the laboratory reporting level. Mean shoreline position is the estimated shoreline position at a pond altitude of 45.50 ft. Pond stage during each sampling period is listed in table 1. Locations of sites shown in figure 8]

USGS station name	Date sampled	Measured in field, unfiltered		Measured in laboratory, filtered			
		pH (standard units)	Orthophosphate (mg/L as P)	Phosphorus (mg/L as P)	Nitrite plus nitrate (mg/L as N)	Nitrite (mg/L as N)	Ammonia (mg/L as N)
MA-FSW 709-M02-10P	10/28/04	7.27	<.098	--	--	--	--
	7/21/05	7.03	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.18	<.098	--	--	--	--
	7/17/07	6.33	<.098	--	--	--	--
	7/30/08	6.38	<.098	--	--	--	--
	7/23/09	5.76	<.244	.262	.471	<.002	<.020
	7/22/10	5.92	.267	.367	--	--	--
MA-FSW 709-M02-11GN	10/28/04	7.56	<.098	--	--	--	--
	7/21/05	7.56	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.70	<.098	--	--	--	--
	7/17/07	6.68	<.098	--	--	--	--
	7/30/08	7.40	<.098	--	--	--	--
	7/23/09	7.03	<.244	.061	^E .035	.006	.035
	7/22/10	6.71	<.244	.039	--	--	--
MA-FSW 709-M02-12R	10/28/04	7.19	.212	--	--	--	--
	7/21/05	7.40	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	7.01	<.098	--	--	--	--
	7/17/07	7.01	<.098	--	--	--	--
	7/30/08	7.34	.571	--	--	--	--
	7/23/09	7.03	<.244	.020	<.040	^E .004	.029
	7/22/10	6.92	<.244	.029	--	--	--
MA-FSW 709-M02-13BU	10/28/04	7.06	<.098	--	--	--	--
	7/21/05	7.11	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.93	<.098	--	--	--	--
	7/17/07	7.02	.277	--	--	--	--
	7/30/08	6.98	<.098	--	--	--	--
	7/23/09	6.61	<.244	.036	.173	^E .002	<.020
	7/22/10	6.65	<.244	.081	--	--	--
MA-FSW 709-M02-14BK	10/28/04	6.54	<.098	--	--	--	--
	7/21/05	7.02	<.098	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.85	<.098	--	--	--	--
	7/17/07	7.00	<.098	--	--	--	--
	7/30/08	7.01	<.098	--	--	--	--
	7/23/09	6.71	<.244	^E .013	.136	.005	.023
	7/22/10	6.07	<.244	<.020	--	--	--
MA-FSW 709-M02-15W	10/28/04	5.91	<.098	--	--	--	--
	7/21/05	6.05	.294	--	--	--	--
	11/10/05	--	<.098	--	--	--	--
	8/8/06	6.15	.245	--	--	--	--
	7/17/07	6.34	.506	--	--	--	--
	7/30/08	5.58	.228	--	--	--	--
	7/23/09	5.74	.292	.371	.843	.076	<.020
	7/22/10	5.95	.329	.376	--	--	--