

CRWA 2004 Monthly Monitoring Program

FINAL REPORT

Created by:

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Introduction

The Charles River Watershed Association (CRWA) is devoted to using sound science upon which to base its policy platforms. Monitoring the Charles River is extremely important because it helps us understand the complex hydrological, biological and chemical interactions in the watershed, identify and react to problem areas (hot spots) and track trends in water quality behavior over time. Water quality sampling is time and resource intensive leaving CRWA heavily reliant upon volunteers to conduct field collections and measurements. CRWA's Monthly Monitoring Program is essential to establishing baseline water quality information from which to understand the overall health of the river and identify and react to change. We greatly appreciate the time and effort you have put into making this type of work possible and hope that you will continue to feel closer to this beautiful and valuable natural resource you are helping protect.

The Monthly Monitoring program analyzes water from 37 sampling sites spanning the entire 80-mile stretch of the Charles River, including two tributaries (Figure 1). Bacteria levels are monitored on a monthly basis at all sites while chlorophyll *a* and different chemical forms of nitrogen and phosphorus are monitored on a quarterly basis at 12 sites. *In situ* temperature and depth readings are taken at all sites on a monthly basis.

Highlighted Results

Samples were not collected in January and February due to frozen conditions and in August due to a lapse in readily available resources. Below are highlights of the 2004 monitoring results.

E. Coli

In 2004, Massachusetts Water Resources Authority (MWRA) switched analyzed bacterium from fecal coliform to *E. coli* believing it to be a better indicator of health risk. Bacteria levels are compared to *E. coli* standards set by EPA ambient water quality criteria.

The strain of *E. coli* bacteria cultured for water quality analysis is not directly implicated in causing adverse health effects, but its presence indicates the likely presence of other harmful bacteria. In 2004, a total of 218 *E. coli* samples were collected, 66% of which were below the safe swimming standard (126 colonies/100mL of water) and 99% of which fell under safe boating requirements (630 colonies/100mL of water) (Table 1). Sixty-nine percent and 99% of samples taken during dry conditions (< 0.1 inch of rain fell within 72 hours before sampling; rain gage at Logan Airport) fell within safe swimming and boating standards, respectively, and 64% and 90% of samples taken in wet conditions fell within safe swimming and safe boating conditions, respectively. In the Charles River Basin (Watertown Dam, Site 012S to the Charles River Dam, Site 784S), 53% of all samples fell within EPA limits for safe swimming and 98% fell within

safe boating limits (Table 2). During five wet weather events, 57% and 100% of samples taken fell within EPA safe swimming and boating standards, respectively. During three dry weather events, 48% and 96% of samples taken fell within EPA limits for safe swimming and boating, respectively (Table 2).

Phosphorus

The primary sources for phosphorus in urban river systems are fertilizers applied to residential yards, parks and golf courses and detergent-rich wastewaters. In the Charles River watershed, phosphorus is the limiting nutrient implying that minor increases in phosphorus concentrations can cause major algal blooms. Many stretches of the Charles River are listed in the EPA 303(d) list of impaired waters for nutrients and CRWA is currently working on a project to assess current phosphorus concentrations in the upper watershed and determine the maximum load the river can receive and still attain it's designated use. Data collected from the Monthly Monitoring program is invaluable data in this assessment. The Monthly Monitoring Program includes analyses of total phosphorus and orthophosphate (phosphorus in a form readily available for plant uptake). In 2004, 33 total phosphorus samples were collected, of which nearly 88% of them exceeded the EPA recommended criteria of 0.024 mg/L (Table 3). Of the 30 orthophosphate tests, 50% did not meet 0.024 mg/L, EPA's recommended criteria (Table 4).

Nitrogen

CRWA tests waters for total nitrogen, ammonia, and nitrate-nitrite. Total nitrogen testing analyzes for both organic and inorganic nitrogen forms. Ammonia is commonly found in untreated sewage and its oxidation yields nitrite, which is quickly converted to nitrate, the nutrient form directly available to algae and other aquatic plants. Of 29 ammonia samples taken, only one sample exceeded EPA recommended criteria (0.3 mg/L) for suggested ambient waters (Table 5). Of 28 nitrate-nitrite samples, 78% exceeded EPA recommended criteria of 0.57 mg/L (Table 6). Of 30 total nitrogen samples, 90% exceeded EPA action standards of 0.57mg/L (Table 7).

Chlorophyll a

Chlorophyll *a* measures are an indicator of algae concentrations in the water column. Increased algal content can lead to anoxic (no available oxygen) conditions detrimental to fish and other aquatic fauna as bacteria use oxygen to break algae down. Of the 31 chlorophyll analyses, 64% failed to meet EPA action limits of 0.00375 mg/L.

Conclusions

Each chemical and biological parameter is an indicator of overall stream health. With each month's data, we can identify new problems and refocus our efforts to tackle the most urgent water quality issues. As shown by the accumulated data over the past 10

years, Charles River water quality is improving. By continuously sampling over a long period of time, we find that overall trends are leading towards water quality improvement as CRWA, its staff and you work towards protecting our valuable rivers.

Figure 1: Charles River Watershed Sampling Locations

Charles River Monthly Sampling Locations

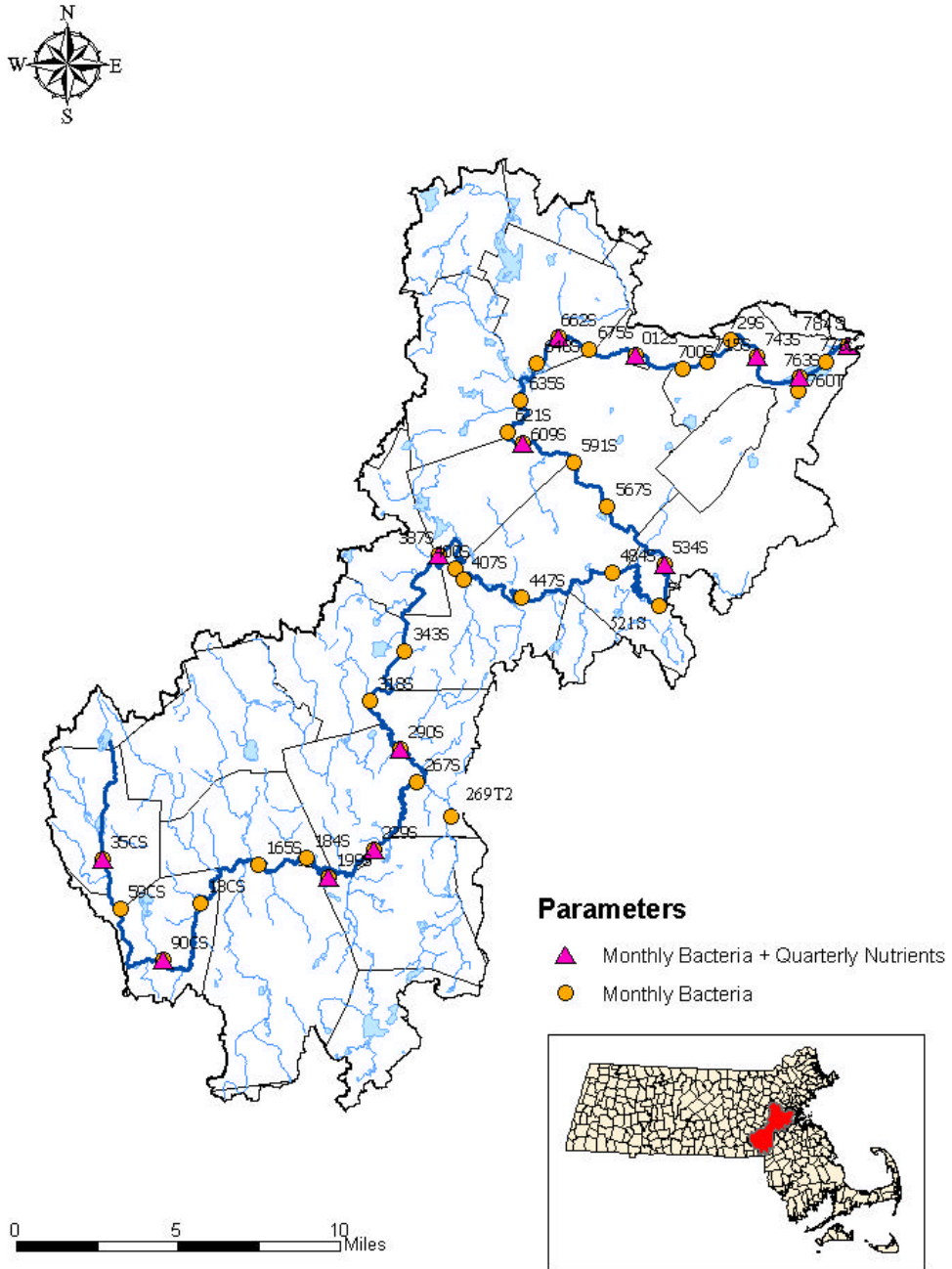


Table 1: E. coli Bacteria Results

Site #	Description	Town	River mile	3/23/2004	4/13/2004	5/18/2004	6/15/2004	7/20/2004	10/19/2004	11/16/2004	12/21/2004 (b)	Mean	Median	Stnd Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	10	800	120					100	310	120	428	10	800
35CD	Discharge Pipe @ Central St	Milford	3.5	510	460	670						547	510	110	460	670
35C2	2nd Discharge Pipe @ Central St	Milford	3.5									NoData	NoData	NoData	NoData	NoData
59CS	Mellen St. Bridge	Bellingham	5.9	10	230	180					1100	140	180	115	10	230
90CS	Rt. 126, N. Main St.	Bellingham	9.0	<10	20	170		220	160	50	70	124	160	85	20	220
13CS	Maple St. Bridge	Bellingham	12.9	40	10		40	30	100	40	40	43	40	30	10	100
165S	Shaw St. Bridge	Franklin	16.5	<10		250	310	200	80		30	210	225	98	80	310
199S	Populatic Pond Boat Launch	Norfolk	19.9		<10	60	30					45	45	21	30	60
229S	Rt. 115, Baltimore St.	Norfolk/Millis	22.9	10	90	90	50	50	50	160	4960	75	70	51	10	160
267S	Dwight St. Bridge	Millis	26.7	7.5	30	70	170	40	70	70	1880	65	55	57	8	170
269T	Causeway St. Stop River	Medfield	26.9			20	90	140	80	50	10	76	80	45	20	140
290S	Old Bridge St.	Medfield	29.0		<10	60	40	80	20		1840	50	50	26	20	80
318S	Rt. 27 Bridge	Medfield	31.8	<10	<10	20	70	90	40	20	740	48	40	31	20	90
343S	Farm Rd./Bridge St.	Sherborn/Dover	34.3	<10	<10	5	40	40	20		420	26	30	17	5	40
387S	Cheney Bridge	Wellesley	38.7		19			190	140	70		105	105	75	19	190
400S	Charles River Road Bridge	Dover	40.0	<10	10	30	160		40	40	300	56	40	59	10	160
447S	Dover Gage	Dover	44.7		<10	40	40	50	50	<10		45	45	6	40	50
484S	Dedham Medical Center	Dedham	48.4	10	70	30	50	150	30	60	240	57	50	46	10	150
521S	Ames St. Bridge	Dedham	52.1	10	20	40	70	75	30	20	170	38	30	25	10	75
534S	Rt. 109 Bridge	Dedham	53.4	<10	250	30	80		170	20	140	110	80	98	20	250
567S	Nahanton Park	Newton	56.7	<10	10	10	<10	50	100	15	160	37	15	39	10	100
591S	Rt. 9 Gaging Station	Newton	59.1		1450	50	110	120		40	200	354	110	614	40	1450
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	10	540	40	160	260				202	160	214	10	540
621S	Leo J. Martin Golf Course/Park Rd.	Weston	62.1	30	790	100	120	180	150	50		203	120	284	30	790
635S	2391 Commonwealth Ave.	Newton	63.5	10	2200		90	200	660	40		533	145	851	10	2200
648S	Lakes Region	Waltham	64.8			10	110	10				43	10	58	10	110
662S	Moody St. Bridge	Waltham	66.2	<10	610	30	30	60	205	45	1010	163	53	229	30	610
675S	North St.	Waltham	67.6	50	540	40	130	120	230		670	185	125	187	40	540
012S	Watertown Dam Footbridge	Watertown	69.3	20	530						390	275	275	361	20	530
700S	N. Beacon St.	Newton	70.9	80	300	110	250	320	410	660		304	300	195	80	660
715S	Arsenal St.	Brighton	71.5	40	170	140	210	160		230		158	165	67	40	230
729S	Eliot Bridge	Cambridge	72.9		270	90	130			300		198	200	103	90	300
743S	Western Ave	Cambridge	74.3	40	190	40	10	10	170	120		83	40	76	10	190
760S	Muddy River at Comm. Ave.	Boston	76.0	60		80	270	520		170		220	170	187	60	520
763S	Mass. Ave. at Harvard Bridge	Boston	76.3		120	80	300	10		60	490	114	80	111	10	300
773S	Longfellow Bridge	Cambridge	77.3	20	5.3	20	70	90	240	50	380	71	50	81	5	240
784S	New Charles River Dam	Boston	78.4	50	<10	15	30	<10.0	160	30		57	30	59	15	160
QA/QC Samples																
	Equipment Blank			<1	<1	<1				<1						
	Site No.			567S	773S	784S				130S						
	Equipment Blank				28	<1										
	Site No.				387S	343S										
Rainfall At Logan International Airport (inches)																
	3 Days Prior to Sampling			0.17	0.00	0.01	0.00	0.00	0.57	0.00	0.00					
	2 Days Prior to Sampling			0.30	0.00	0.10	0.00	trace	0.00	0.00	0.00					
	1 Day Prior to Sampling			0.00	trace	0.00	trace	0.04	trace	0.00	0.11					
	Day of Sampling			0.00	1.97	0.22	0.00	0.00	0.49	0.00	0.00					

Samples were run at MWRA Central Laboratory
 Results reported in number of Escherichia coli (E . coli) Bacteria colonies per 100mL of sample water
 (a) Average of duplicates
 (b) Maximum sample holding time from sample to analysis (6hrs) exceeded by 30 minutes
 * January and February sampling were cancelled due to harsh, frozen temperatures, frozen river, inaccessible sampling sites

Table 2: Charles River Basin Bacteria Trends



**Percent of Time
CHARLES RIVER BASIN
Meets State Water Quality Standards**

	Overall		Dry Weather		Wet Weather		River Grade
	Swimming	Boating	Swimming	Boating	Swimming	Boating	
1995	19	39					D
1996	21	57	40	94	15	45	C-
1997	34	70	56	87	22	61	C
1998	51	83	85	98	31	74	C+
1999	55	90	69	100	47	84	B-
2000	52	91	88	88	49	91	B
2001	69	87	87	96	36	71	B
2002 (a)	33	88	78	100	27	86	B
2003 (b)	50	89	48	90	56	89	B-
2004 (c)	53	98	48	96	57	100	

(a) Only one dry weather event (rainfall less than 0.1 inches in previous 72 hours) occurred in 2002. Rainfall data collected at Logan Airport in Boston.

(b) In 2003, monthly water quality monitoring was conducted seven out of twelve months; of which, only two monthly monitoring events occurred during wet weather, which may have skewed the percentages of the time the river met the swimming and boating standards.

(c) Statistics from 1995 to 2003 based on CRWA monthly fecal coliform testing at in Charles River Basin. In 2004, samples were analyzed for e.coli bacteria instead of fecal coliform bacteria and these results were compared to US EPA recommended recreational standards.

Contact CRWA at (781) 788-0007 or visit the website at www.charlesriver.org for more information.

Table 3: Total Phosphorus Results

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004		Mean	Median	Stnd Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	0.021					0.021	0.021	N/A	0.021	0.021
90CS	Rt. 126. N. Main St.	Bellingham	9.0		0.051	0.108	0.054		0.071	0.054	0.032	0.051	0.108
199S	Populatic Pond Boat Launch	Norfolk	19.9		0.069	0.069			0.069	0.069	0.000	0.069	0.069
229S	Rt. 115. Baltimore St.	Norfolk/Millis	22.9						NoData	NoData	NoData	NoData	NoData
290S	Old Bridge St.	Medfield	29.0		0.080	0.066	0.071		0.073	0.071	0.007	0.066	0.080
387S	S. Natick Dam	Natick	37.8			0.072			0.072	0.072	N/A	0.072	0.072
534S	Rt. 109 Bridge	Dedham	53.4	0.036	0.091	(a) 0.086	0.063		0.069	0.075	0.025	0.036	0.091
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	0.038	0.077	0.114			0.077	0.077	0.038	0.038	0.114
662S	Moody St. Bridge	Waltham	66.2	0.039	0.073	0.103	0.058		0.068	0.065	0.027	0.039	0.103
012S	Watertown Dam Footbridge	Watertown	69.3	0.038	0.000		0.061		0.033	0.038	0.031	0.000	0.061
743S	Western Ave	Cambridge	74.3	0.036	0.087	0.161			0.095	0.087	0.063	0.036	0.161
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			0.124	0.071		0.097	0.097	0.038	0.071	0.124
784S	New Charles River Dam	Boston	78.4	0.046		0.091			0.068	0.068	0.032	0.046	0.091
Total # Samples		33											
# Samples Exceeding Action Limit (b)		29											
% Samples Exceeding Action Limit		88											
QA/QC Samples													
	Equipment Blank												
	Site No.												
Rainfall At Logan International Airport (inches)													
	3 Days Prior to Sampling			0.17	0.00	2.87	0.00						
	2 Days Prior to Sampling			0.30	0.00	0.00	0.00						
	1 Day Prior to Sampling			0.00	trace	0.00	0.11						
	Day of Sampling			trace	0.00	0.00	0.00						
				Wet	Dry	Wet	Wet						
* Total phosphorus results reported in milligrams per liter (mg/L).													
Samples analyzed at Massachusetts Water Resources Authority's Central Laboratory.													
(a) Average of duplicate samples.													
(b) Action limit of 0.024 mg/L based on US EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV													

Table 4: Orthophosphate Results

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004	Mean	Median	Std Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	0.014				0.014	0.014	N/A	0.014	0.014
90CS	Rt. 126, N. Main St.	Bellingham	9.0		0.021	0.071	0.016	0.036	0.021	0.031	0.016	0.071
199S	Populatic Pond Boat Launch	Norfolk	19.9		0.030	0.030		0.030	0.030	0.000	0.030	0.030
229S	Rt. 115, Baltimore St.	Norfolk/Millis	22.9					Nodata	Nodata	Nodata	Nodata	Nodata
290S	Old Bridge St.	Medfield	29.0		0.042	0.031	0.035	0.036	0.035	0.006	0.031	0.042
387S	S. Natick Dam	Natick	37.8			0.086		0.086	0.086	N/A	0.086	0.086
534S	Rt. 109 Bridge	Dedham	53.4	0.019	0.023	(a) 0.020	0.026	0.022	0.022	0.003	0.019	0.026
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	0.025	0.017	0.021		0.021	0.021	0.004	0.017	0.025
662S	Moody St. Bridge	Waltham	66.2	0.021	0.013	0.045	0.023	0.026	0.022	0.013	0.013	0.045
012S	Watertown Dam Footbridge	Watertown	69.3	0.022			0.025	0.024	0.024	0.002	0.022	0.025
743S	Western Ave.	Cambridge	74.3	0.023	0.024	0.099		0.049	0.024	0.044	0.023	0.099
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			0.020	0.035	0.028	0.028	0.011	0.020	0.035
784S	New Charles River Dam	Boston	78.4	0.027		0.025		0.026	0.026	0.001	0.025	0.027
Total # Samples		30										
Total # Samples Exceeding Action Limit (b)		15										
% Samples Exceeding Action Limit		50										
QA/QC Samples												
	Equipment Blank											
	Site No.											
Rainfall At Logan International Airport (inches)												
	3 Days Prior to Sampling			0.17	0.00	2.87	0.00					
	2 Days Prior to Sampling			0.30	0.00	0.00	0.00					
	1 Day Prior to Sampling			0.00	trace	0.00	0.11					
	Day of Sampling			trace	0.00	0.00	0.00					
				Wet	Dry	Wet	Wet					
* Orthophosphate results reported in milligrams per liter (mg/L).												
(a) Average of duplicate samples												
(b) Action limit of 0.024 mg/L based on US EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV												

Table 5: Ammonia Results

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004	Mean	Median	Std Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	0.088				0.088	0.088	N/A	0.088	0.088
90CS	Rt. 126, N. Main St.	Bellingham	9.0		0.109	0.017	0.221	0.116	0.109	0.102	0.017	0.221
199S	Populatic Pond Boat Launch	Norfolk	19.9		0.037			0.037	0.037	N/A	0.037	0.037
229S	Rt. 115, Baltimore St.	Norfolk/Millis	22.9					NoData	NoData	NoData	NoData	NoData
290S	Old Bridge St.	Medfield	29.0		0.050	0.015	0.469	0.178	0.050	0.253	0.015	0.469
387S	S. Natick Dam	Natick	37.8			0.005		0.005	0.005	N/A	0.005	0.005
534S	Rt. 109 Bridge	Dedham	53.4	0.016	0.032	0.003	0.201	0.063	0.024	0.093	0.003	0.201
609S	Washington St. Hunnewell Bridge	Welleslev	60.9	0.049	0.056	0.006		0.037	0.049	0.027	0.006	0.056
662S	Moody St. Bridge	Waltham	66.2	0.054	0.023	0.004	0.160	0.060	0.039	0.070	0.004	0.160
012S	Watertown Dam Footbridge	Watertown	69.3	0.055			0.150	0.103	0.103	0.067	0.055	0.150
743S	Western Ave.	Cambridge	74.3	0.046	0.057	0.011		0.038	0.046	0.024	0.011	0.057
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			0.040	0.134	0.087	0.087	0.067	0.040	0.134
784S	New Charles River Dam	Boston	78.4	0.073		0.096		0.084	0.084	0.016	0.073	0.096
Total # Samples		29										
Total # Samples Exceeding Action Limit (b)		1										
% Samples Exceeding Action Limit		3										
QA/QC Samples												
	Equipment Blank											
	Site No.											
Rainfall At Logan International Airport (inches)												
	3 Days Prior to Sampling			0.17	0.00	2.87	0.00					
	2 Days Prior to Sampling			0.30	0.00	0.00	0.00					
	1 Day Prior to Sampling			0.00	trace	0.00	0.11					
	Day of Sampling			trace	0.00	0.00	0.00					
				Wet	Dry	Wet	Wet					
Ammonia results reported in milligrams per liter (mg/L).												
Analysis performed at Massachusetts Water Resources Authority's Central Lab												
(a) Average of duplicate samples.												
(b) Action limit of 0.3 mg/L based on US EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV												

Table 6: Nitrate/Nitrite Results

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004	Mean	Median	Std Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	0.307				0.307	0.307	N/A	0.307	0.307
90CS	Rt. 126. N. Main St.	Bellingham	9.0		3.812	1.671	3.652	3.045	3.652	1.193	1.671	3.812
199S	Populatic Pond Boat Launch	Norfolk	19.9		0.912			0.912	0.912	N/A	0.912	0.912
290S	Old Bridge St.	Medfield	29.0		1.261	1.981	1.111	1.451	1.261	0.465	1.111	1.981
387S	S. Natick Dam	Natick	37.8			0.414		0.414	0.414	N/A	0.414	0.414
534S	Rt. 109 Bridge	Dedham	53.4	1.061	0.660	0.588	0.756	0.766	0.708	0.208	0.588	1.061
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	1.031	0.579	0.006		0.539	0.579	0.513	0.006	1.031
662S	Moody St. Bridge	Waltham	66.2	0.977	0.491	0.000	0.699	0.542	0.595	0.413	0.000	0.977
012S	Watertown Dam Footbridge	Watertown	69.3				0.736	0.736	0.736	N/A	0.736	0.736
743S	Western Ave.	Cambridge	74.3	0.957	0.586	0.003		0.516	0.586	0.481	0.003	0.957
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			0.086	0.716	0.401	0.401	0.446	0.086	0.716
784S	New Charles River Dam	Boston	78.4	0.980		0.082		0.531	0.531	0.636	0.082	0.980
Total # Samples		28										
Total # Samples Exceeding Action Limit (b)		20										
% Samples Exceeding Action Limit		71										
QA/QC Samples												
	Equipment Blank											
	Site No.											
Rainfall At Logan International Airport (inches)												
	3 Days Prior to Sampling			0.17	0.00	2.87	0.00					
	2 Days Prior to Sampling			0.30	0.00	0.00	0.00					
	1 Day Prior to Sampling			0.00	trace	0.00	0.11					
	Day of Sampling				0.00	0.00	0.00					
				Wet	Dry	Wet	Wet					
* Nitrate-nitrite results reported in milligrams per liter (mg/L).												
* Analyzed at Massachusetts Water Resource Authority's Central Lab												
** Action limit of 0.57 mg/L based on EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV												

Table 7: Total Nitrogen Results

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004		Mean	Median	Stnd Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	0.62					0.624	0.624	N/A	0.624	0.624
90CS	Rt. 126, N. Main St.	Bellingham	9.0		4.51	2.64	4.26		3.805	4.262	1.016	2.641	4.512
199S	Populatic Pond Boat Launch	Norfolk	19.9		1.46	1.46			1.461	1.461	0.000	1.461	1.461
290S	Old Bridge St.	Medfield	29.0		1.71	1.35	1.93		1.664	1.711	0.293	1.351	1.931
387S	S. Natick Dam	Natick	37.8						NoData	NoData	NoData	NoData	NoData
534S	Rt. 109 Bridge	Dedham	53.4	1.34	1.23	1.78	4.03		2.095	1.561	1.313	1.226	4.032
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	1.38	1.11	1.34			1.277	1.341	0.146	1.111	1.381
662S	Moody St. Bridge	Waltham	66.2	1.32	1.01	1.03	1.34		1.176	1.176	0.179	1.011	1.341
012S	Watertown Dam Footbridge	Watertown	69.3	1.37	0.00		1.29		0.887	1.291	0.769	0.000	1.371
743S	Western Ave.	Cambridge	74.3	1.31	1.17	1.44			1.307	1.311	0.135	1.171	1.441
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			1.02	1.27		1.146	1.146	0.177	1.021	1.271
784S	New Charles River Dam	Boston	78.4	1.43		0.33			0.881	0.881	0.777	0.332	1.431
Total # Samples		30											
Total # Samples Exceeding Action Limit (b)		27											
% Samples Exceeding Action Limit		1											
QA/QC Samples													
	Equipment Blank												
	Site No.												
Rainfall At Logan International Airport (inches)													
	3 Days Prior to Sampling			0.17	0.00	2.87	0.00						
	2 Days Prior to Sampling			0.30	0.00	0.00	0.00						
	1 Day Prior to Sampling			0.00	trace	0.00	0.11						
	Day of Sampling			trace	0.00	0.00	0.00						
				Wet	Dry	Wet	Wet						
* Total nitrogen results reported in milligrams per liter (mg/L).													
* Samples analyzed at Massachusetts Water Resources Authority's Central Lab.													
(a) Average of duplicates													
(b) Action limit of 0.57 mg/L based on US EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV													

Table 8: Chlorophyll a Result

Site #	Description	Town	River mile	3/23/2004	6/15/2004	9/21/2004	12/21/2004						
				Chlorophyll a	Chlorophyll a	Chlorophyll a	Chlorophyll a		Mean	Median	Std Dev	Min	Max
35CS	Central Street Bridge	Milford	3.5	1.65					1.650	1.650	N/A	1.650	1.650
90CS	Rt. 126 N. Main St.	Bellingham	9.0		3.82	20.5	1.31		8.543	3.820	10.431	1.310	20.500
199S	Populatic Pond Boat Launch	Norfolk	19.9		9.67				9.670	9.670	N/A	9.670	9.670
290S	Old Bridge St.	Medfield	29.0		7.22	5.1	1.19		4.503	5.100	3.059	1.190	7.220
387S	S. Natick Dam	Natick	37.8			19.3			19.300	19.300	N/A	19.300	19.300
534S	Rt. 109 Bridge	Dedham	53.4	3.00	16.6 (a)	69.5	1.19		22.573	9.800	32.032	1.190	69.500
609S	Washington St. Hunnewell Bridge	Wellesley	60.9	3.67	26.1	83.6			37.790	26.100	41.227	3.670	83.600
662S	Moody St. Bridge	Waltham	66.2	3.81	36.4	67	1.01		27.055	20.105	31.100	1.010	67.000
012S	Watertown Dam Footbridge	Watertown	69.3	4.07			1.19		2.630	2.630	2.036	1.190	4.070
743S	Western Ave	Cambridge	74.3	4.07	37.2	68.3			36.523	37.200	32.120	4.070	68.300
763S	Mass. Ave. at Harvard Bridge	Boston	76.3			42.3	2.09		22.195	22.195	28.433	2.090	42.300
784S	New Charles River Dam	Boston	78.4	6.93		51.7			29.315	29.315	31.657	6.930	51.700
Total # Samples		31											
Total # Samples Exceeding Action Limit (b)		20											
% Samples Exceeding Action Limit		64.5											
QA/QC Samples													
	Equipment Blank			<0.05									
	Site No.			534S									
Rainfall At Logan International Airport (inches)													
	3 Days Prior to Sampling			0.17	0.00	2.87	0						
	2 Days Prior to Sampling			0.30	0.00	0.00	0						
	1 Day Prior to Sampling			0.00	trace	0.00	0.11						
	Day of Sampling			trace	0.00	0.00	0						
				Wet	Dry	Wet	Wet						
* Chlorophyll a reported in micrograms per milliliter (ug/mL).													
Samples analyzed at Massachusetts Water Resources Authority's Central Lab.													
(a) Average of duplicates													
(b) Action Limit of 3.75ug/L based on US EPA Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV													