

**Appendix 1: Estimated Average Monthly  
Streamflow and Nonstorm Streamflow and  
Model-Calculated Average Monthly Nonstorm  
Streamflow at Measurement Sites in the  
Assabet River Basin, Eastern Massachusetts**

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**Appendix 1.** Estimated average monthly streamflow, nonstorm streamflow, and model-calculated average monthly nonstorm streamflow at measurement sites in the Assabet River Basin, eastern Massachusetts.

[Site locations shown in figure 6. **Observed nonstorm streamflow:** Estimated for 1997–2001 from measurements made during 2001–2002, as described in text, except for average monthly streamflow at streamflow-gaging stations 01097000 and 01097300, which are averages of mean daily measured values; %, percent; ft<sup>3</sup>/s, cubic foot per second; --, not applicable]

Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01096630 Assabet River at School Street near Northborough							
January	36.20	28.23	46.43	28.63	22.43	36.89	29.39
February	41.14	32.08	52.75	32.54	25.49	41.93	38.36
March	54.52	42.52	69.92	42.82	33.55	55.17	59.59
April	47.80	37.28	61.30	40.56	31.77	52.25	64.44
May	30.71	23.95	39.38	25.91	20.29	33.38	33.74
June	29.12	22.70	37.34	19.90	15.59	25.64	21.27
July	15.19	11.84	19.48	11.12	8.71	14.33	14.23
August	9.77	7.62	12.54	7.52	5.89	9.68	11.68
September	9.35	7.29	11.99	6.14	4.81	7.92	10.38
October	13.19	10.29	16.92	10.39	8.14	13.39	13.78
November	17.88	13.94	22.92	14.38	11.27	18.53	17.18
December	20.18	15.74	25.88	17.00	13.32	21.90	19.74
01096710 Assabet River at Allen Street at Northborough							
January	58.99	42.06	82.73	49.37	35.20	69.23	43.67
February	65.11	46.42	91.31	55.33	39.45	77.60	58.86
March	95.45	68.06	133.86	79.03	56.36	110.84	93.50
April	90.59	64.59	127.04	78.87	56.23	110.60	102.56
May	54.37	38.77	76.26	48.58	34.64	68.14	53.95
June	51.45	36.69	72.16	38.43	27.40	53.89	31.21
July	24.01	17.12	33.67	19.97	14.24	28.01	18.51
August	15.25	10.88	21.39	13.05	9.31	18.30	13.66
September	14.80	10.55	20.76	9.97	7.11	13.98	11.34
October	19.30	13.76	27.06	16.13	11.50	22.62	16.52
November	27.16	19.37	38.09	22.71	16.19	31.85	23.45
December	32.81	23.40	46.02	28.18	20.10	39.53	28.11
01096730 Assabet River at Solomon Pond Mall near Marlborough							
January	69.82	47.58	102.46	59.29	40.41	87.01	52.70
February	81.05	55.23	118.94	68.85	46.92	101.03	70.47
March	111.03	75.66	162.93	94.60	64.47	138.82	113.81
April	105.30	71.75	154.52	93.09	63.43	136.60	124.93
May	68.68	46.80	100.78	61.80	42.12	90.69	66.57
June	65.63	44.72	96.31	51.24	34.92	75.20	40.11
July	34.50	23.51	50.63	29.10	19.83	42.70	25.39
August	23.84	16.24	34.98	20.61	14.04	30.24	19.82
September	23.45	15.98	34.41	17.64	12.02	25.89	17.27
October	29.91	20.38	43.90	25.51	17.38	37.43	22.86
November	37.18	25.33	54.55	31.49	21.46	46.22	30.56
December	42.16	28.73	61.87	36.55	24.91	53.64	35.79

**98 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA**

**Appendix 1.** Estimated average monthly streamflow, nonstorm streamflow, and model-calculated average monthly nonstorm streamflow at measurement sites in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 6. **Observed nonstorm streamflow:** Estimated for 1997–2001 from measurements made during 2001–2002, as described in text, except for average monthly streamflow at streamflow-gaging stations 01097000 and 01097300, which are averages of mean daily measured values; %, percent; ft<sup>3</sup>/s, cubic foot per second; --, not applicable]

Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01096840 Assabet River at Route 85 at Hudson							
January	111.77	92.05	135.71	94.80	78.08	115.11	91.71
February	125.70	103.52	152.62	107.05	88.16	129.98	121.33
March	179.17	147.56	217.55	149.26	122.93	181.23	193.04
April	171.76	141.46	208.55	149.21	122.89	181.17	208.33
May	106.42	87.65	129.22	95.46	78.62	115.91	104.31
June	104.78	86.30	127.23	77.78	64.06	94.45	62.19
July	50.13	41.29	60.87	43.11	35.51	52.35	40.51
August	34.45	28.37	41.83	29.68	24.45	36.04	32.28
September	33.96	27.97	41.24	24.46	20.14	29.70	28.56
October	40.13	33.05	48.72	34.70	28.58	42.13	39.58
November	55.76	45.93	67.71	47.38	39.02	57.53	53.44
December	65.59	54.02	79.64	56.97	46.92	69.17	61.16
01097000 Assabet River streamflow-gaging station at Maynard							
January	276.80	--	--	178.49	--	--	153.45
February	279.12	--	--	223.69	--	--	204.61
March	402.06	--	--	381.14	--	--	323.38
April	408.71	--	--	378.87	--	--	352.04
May	240.47	--	--	207.47	--	--	178.62
June	145.35	--	--	161.78	--	--	106.52
July	74.36	--	--	63.79	--	--	68.30
August	64.70	--	--	36.83	--	--	53.95
September	69.97	--	--	28.90	--	--	47.20
October	110.98	--	--	52.72	--	--	62.53
November	142.65	--	--	67.16	--	--	87.06
December	231.52	--	--	84.12	--	--	100.64
01097048 Assabet River at Pine Street at West Concord							
January	240.06	204.47	281.85	197.62	168.32	232.02	162.60
February	285.76	243.39	335.50	236.64	201.55	277.83	214.42
March	442.35	376.76	519.35	363.84	309.90	427.17	334.77
April	422.94	360.24	496.56	362.68	308.91	425.81	364.71
May	239.31	203.83	280.97	212.10	180.66	249.02	190.00
June	228.55	194.67	268.33	168.42	143.45	197.74	116.46
July	94.86	80.79	111.37	78.53	66.89	92.20	76.97
August	58.16	49.53	68.28	49.19	41.90	57.75	61.98
September	57.73	49.17	67.78	39.54	33.68	46.42	54.92
October	75.54	64.34	88.69	62.78	53.47	73.71	70.37
November	103.38	88.05	121.38	84.51	71.98	99.22	95.16
December	125.32	106.74	147.13	104.40	88.92	122.57	109.00

**Appendix 1.** Estimated average monthly streamflow, nonstorm streamflow, and model-calculated average monthly nonstorm streamflow at measurement sites in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 6. **Observed nonstorm streamflow:** Estimated for 1997–2001 from measurements made during 2001–2002, as described in text, except for average monthly streamflow at streamflow-gaging stations 01097000 and 01097300, which are averages of mean daily measured values; %, percent; ft<sup>3</sup>/s, cubic foot per second; --, not applicable]

Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01096615 Hop Brook at Indian Meadows near Northborough							
January	19.92	14.56	27.26	14.47	10.62	19.89	11.50
February	24.13	17.63	33.02	17.59	12.91	24.18	15.94
March	37.85	27.66	51.78	27.44	20.15	37.72	26.32
April	32.74	23.93	44.80	26.09	19.15	35.86	27.23
May	16.64	12.16	22.76	13.36	9.81	18.37	10.37
June	15.48	11.31	21.18	9.53	7.00	13.10	5.81
July	5.82	4.26	7.97	3.99	2.93	5.49	3.75
August	3.10	2.27	4.24	2.22	1.63	3.06	2.73
September	2.98	2.18	4.07	1.66	1.22	2.29	2.09
October	4.59	3.35	6.28	3.36	2.47	4.62	3.61
November	6.96	5.08	9.52	5.14	3.77	7.07	5.62
December	8.47	6.19	11.58	6.68	4.90	9.18	6.39
01096700 Howard Brook at Northborough							
January	7.36	4.12	13.13	5.12	2.88	9.18	5.70
February	12.96	7.26	23.12	8.87	4.99	15.90	9.02
March	10.96	6.14	19.57	8.38	4.72	15.02	9.75
April	4.77	2.67	8.51	3.69	2.08	6.62	4.45
May	4.40	2.47	7.85	2.44	1.37	4.38	2.08
June	1.28	.72	2.28	.82	.46	1.48	.86
July	.58	.33	1.04	.40	.22	.71	.39
August	.56	.31	1.00	.27	.15	.48	.20
September	.95	.53	1.69	.64	.36	1.15	.64
October	1.64	.92	2.92	1.14	.64	2.04	1.77
November	2.11	1.18	3.76	1.58	.89	2.83	2.37
01096705 Cold Harbor Brook at Northborough							
January	17.45	10.39	29.31	11.77	7.04	19.85	8.00
February	22.24	13.24	37.36	15.27	9.13	25.77	12.03
March	38.56	22.96	64.77	26.34	15.76	44.45	20.93
April	32.28	19.22	54.23	24.62	14.72	41.54	23.71
May	14.17	8.44	23.80	10.87	6.50	18.34	12.86
June	13.07	7.78	21.96	7.25	4.33	12.23	6.37
July	3.83	2.28	6.44	2.45	1.47	4.13	2.73
August	1.76	1.05	2.95	1.18	.71	2.00	1.14
September	1.69	1.01	2.85	.82	.49	1.38	.37
October	2.96	1.76	4.97	1.96	1.17	3.30	1.38
November	4.99	2.97	8.39	3.40	2.03	5.74	3.18
December	6.27	3.73	10.53	4.68	2.80	7.89	4.43

**100 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA**

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Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01096805 North Brook near Berlin							
January	24.71	16.54	36.92	17.83	11.93	26.63	26.84
February	30.01	20.09	44.83	22.25	14.90	33.25	35.69
March	50.31	33.68	75.17	36.51	24.44	54.55	58.39
April	43.51	29.13	65.00	34.65	23.19	51.76	59.17
May	20.64	13.81	30.83	16.64	11.14	24.85	20.28
June	19.39	12.98	28.96	11.50	7.70	17.18	10.31
July	6.12	4.10	9.14	4.20	2.81	6.27	6.70
August	2.95	1.97	4.40	2.13	1.42	3.18	5.28
September	2.86	1.91	4.27	1.48	.99	2.21	4.54
October	4.66	3.12	6.96	3.28	2.20	4.90	9.47
November	7.81	5.23	11.66	5.66	3.79	8.45	14.30
December	9.90	5.23	11.66	7.66	3.79	8.45	15.82
01096838 Hog Brook below Tripp Pond at Hudson							
January	5.23	3.94	6.93	3.94	2.97	5.23	1.30
February	6.07	4.57	8.05	4.73	3.56	6.27	2.32
March	11.02	8.31	14.62	8.25	6.22	10.94	4.32
April	10.27	7.74	13.62	8.27	6.24	10.98	5.27
May	4.62	3.48	6.13	3.89	2.93	5.16	2.64
June	4.32	3.26	5.73	2.76	2.08	3.67	1.13
July	1.29	.97	1.71	1.00	.75	1.33	.24
August	.65	.49	.86	.51	.39	.68	.09
September	.63	.48	.84	.33	.25	.44	.07
October	.92	.70	1.22	.69	.52	.92	.05
November	1.61	1.21	2.13	1.20	.91	1.60	.06
December	2.14	1.61	2.84	1.70	1.28	2.25	.33
01096853 Danforth Brook at Route 85 at Hudson							
January	10.77	6.92	16.76	7.12	4.57	11.07	7.34
February	14.26	9.16	22.19	9.54	6.13	14.84	10.25
March	26.25	16.87	40.85	17.38	11.17	27.04	16.83
April	21.73	13.97	33.82	16.13	10.36	25.09	17.26
May	8.49	5.45	13.21	6.42	4.13	9.99	5.66
June	7.84	5.04	12.20	4.08	2.62	6.34	2.37
July	2.03	1.30	3.15	1.27	.81	1.97	.80
August	.85	.55	1.33	.56	.36	.87	.38
September	.80	.52	1.25	.39	.25	.60	.32
October	1.41	.91	2.20	.95	.61	1.48	1.08
November	2.49	1.60	3.88	1.69	1.09	2.63	2.98
December	3.27	2.10	5.09	2.42	1.56	3.77	3.67

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Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01096880 Fort Meadow Brook near Hudson							
January	9.50	3.98	22.69	7.67	3.21	18.32	3.92
February	10.70	4.48	25.55	8.92	3.74	21.31	5.37
March	16.01	6.70	38.23	12.78	5.35	30.52	8.38
April	13.95	5.84	33.32	12.01	5.03	28.68	9.87
May	8.07	3.38	19.27	6.95	2.91	16.60	6.33
June	7.43	3.11	17.74	4.84	2.02	11.55	3.98
July	2.99	1.25	7.15	2.10	.88	5.02	2.52
August	1.52	.64	3.64	1.20	.50	2.87	1.78
September	1.42	.60	3.40	.85	.36	2.04	1.36
October	2.38	1.00	5.68	1.83	.76	4.36	1.53
November	3.66	1.53	8.74	2.96	1.24	7.07	2.17
December	4.61	1.93	11.02	3.75	1.57	8.96	2.58
01096898 Great Brook at Route 117 near Bolton							
January	10.10	6.43	15.87	6.82	4.34	10.72	7.39
February	12.95	8.25	20.35	9.06	5.77	14.23	10.36
March	24.04	15.30	37.77	16.38	10.43	25.74	16.95
April	20.08	12.78	31.54	15.26	9.71	23.97	17.41
May	8.17	5.20	12.84	6.30	4.01	9.90	5.95
June	7.66	4.88	12.04	4.02	2.56	6.32	2.90
July	1.87	1.19	2.95	1.19	.76	1.87	1.65
August	.77	.49	1.21	.52	.33	.82	1.12
September	.74	.47	1.17	.34	.22	.54	.88
October	1.35	.86	2.11	.88	.56	1.38	1.69
November	2.52	1.60	3.95	1.71	1.09	2.68	3.40
December	3.34	2.12	5.24	2.44	1.56	3.84	4.01
01096945 Elizabeth Brook off White Pond Road near Stow							
January	34.97	24.90	49.12	25.82	18.39	36.27	28.78
February	43.14	30.72	60.58	32.41	23.08	45.52	38.70
March	71.94	51.22	101.03	53.30	37.95	74.85	60.89
April	63.91	45.51	89.76	51.23	36.48	71.95	64.78
May	30.56	21.76	42.92	25.07	17.85	35.21	29.24
June	29.02	20.67	40.76	17.93	12.76	25.18	17.59
July	9.52	6.78	13.37	6.88	4.90	9.66	11.49
August	4.85	3.45	6.81	3.62	2.58	5.08	8.85
September	4.73	3.37	6.64	2.65	1.89	3.72	7.52
October	7.13	5.08	10.02	5.27	3.75	7.40	9.77
November	11.37	8.09	15.96	8.45	6.01	11.86	15.41
December	14.30	10.18	20.08	11.26	8.02	15.82	18.04

## 102 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA

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Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01097095 Unnamed Tributary Fort Pond Brook, Sargent Road near West Acton							
January	7.27	4.13	12.80	3.87	2.20	6.82	4.91
February	11.10	6.30	19.54	5.99	3.40	10.55	6.35
March	24.91	14.14	43.88	13.59	7.71	23.93	10.51
April	18.29	10.38	32.21	11.90	6.76	20.97	9.53
May	5.13	2.91	9.04	3.34	1.90	5.89	.99
June	4.58	2.60	8.06	1.78	1.01	3.13	.01
July	.71	.41	1.26	.34	.19	.60	.00
August	.21	.12	.37	.11	.06	.19	.00
September	.20	.11	.35	.07	.04	.12	.00
October	.48	.27	.84	.25	.14	.45	1.62
November	1.02	.58	1.80	.56	.32	.99	2.53
December	1.41	.80	2.48	.90	.51	1.58	2.54
01097270 Fort Pond Brook at River Road near South Acton							
January	54.77	33.06	90.73	35.77	21.59	59.26	26.34
February	73.06	44.10	121.04	52.37	31.61	86.76	36.22
March	159.36	96.19	264.02	108.40	65.43	179.59	59.05
April	135.14	81.57	223.89	100.84	60.87	167.07	62.13
May	43.59	26.31	72.21	33.81	20.41	56.02	23.37
June	43.60	26.32	72.24	21.12	12.75	34.99	9.69
July	6.83	4.12	11.31	4.36	2.63	7.22	3.47
August	2.05	1.24	3.40	1.36	.82	2.26	1.50
September	2.11	1.27	3.49	.81	.49	1.34	1.00
October	3.91	2.36	6.48	2.43	1.47	4.03	5.78
November	8.91	5.38	14.76	5.80	3.50	9.60	11.97
December	13.56	8.19	22.47	9.53	5.75	15.79	14.51
01097300 Nashoba Brook gaging station near Acton							
January	27.14	--	--	15.20	--	--	15.09
February	26.60	--	--	20.90	--	--	20.69
March	42.66	--	--	34.10	--	--	31.06
April	37.83	--	--	31.93	--	--	37.84
May	21.55	--	--	16.87	--	--	25.07
June	13.67	--	--	12.84	--	--	13.62
July	3.98	--	--	4.17	--	--	7.00
August	5.19	--	--	2.05	--	--	4.56
September	5.85	--	--	1.47	--	--	3.78
October	12.33	--	--	3.01	--	--	4.75
November	16.04	--	--	6.12	--	--	8.00
December	23.37	--	--	7.87	--	--	10.40



**Appendix 1.** Estimated average monthly streamflow, nonstorm streamflow, and model-calculated average monthly nonstorm streamflow at measurement sites in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 6. **Observed nonstorm streamflow:** Estimated for 1997–2001 from measurements made during 2001–2002, as described in text, except for average monthly streamflow at streamflow-gaging stations 01097000 and 01097300, which are averages of mean daily measured values; %, percent; ft<sup>3</sup>/s, cubic foot per second; --, not applicable]

Month	Estimated average monthly flow (ft <sup>3</sup> /s)						Model-calculated nonstorm streamflow (ft <sup>3</sup> /s)
	Streamflow			Nonstorm streamflow			
	Flow	90% confidence limits		Flow	90% confidence limits		
		Lower	Upper		Lower	Upper	
01097380 Nashoba Brook at Commonwealth Avenue at West Concord							
January	98.58	62.48	155.56	68.72	43.55	108.44	57.25
February	131.75	83.49	207.89	94.27	59.74	148.76	77.81
March	209.93	133.04	331.27	152.64	96.73	240.85	122.16
April	175.41	111.17	276.79	138.96	88.06	219.27	135.65
May	84.59	53.61	133.48	66.76	42.31	105.34	66.89
June	81.07	51.38	127.93	47.31	29.98	74.65	34.22
July	25.89	16.41	40.85	17.06	10.81	26.92	17.79
August	12.20	7.73	19.25	8.44	5.35	13.32	11.76
September	12.15	7.70	19.17	6.53	4.14	10.30	9.56
October	20.90	13.25	32.98	14.11	8.94	22.26	17.11
November	31.92	20.23	50.36	22.37	14.18	35.30	29.15
December	38.17	24.19	60.23	29.06	18.42	45.86	35.60
01097412 Spencer Brook at Barretts Mill Road near Concord							
January	12.63	7.46	21.40	8.58	5.06	14.53	8.36
February	16.23	9.58	27.49	11.18	6.60	18.94	11.29
March	27.62	16.31	46.78	18.87	11.14	31.96	17.37
April	22.81	13.46	38.63	17.43	10.29	29.52	18.85
May	10.15	5.99	17.19	7.79	4.60	13.19	8.98
June	9.50	5.61	16.10	5.13	3.03	8.70	4.74
July	2.79	1.65	4.73	1.76	1.04	2.98	2.44
August	1.28	.75	2.16	.85	.50	1.44	1.72
September	1.23	.72	2.08	.61	.36	1.03	1.41
October	2.13	1.26	3.60	1.43	.84	2.42	1.89
November	3.62	2.13	6.13	2.49	1.47	4.22	3.73
December	4.52	2.67	7.66	3.39	2.00	5.74	5.00



**Appendix 2: Model-Calculated Average Annual,  
March, and September Hydrologic Budgets for  
Subbasins in the Assabet River Basin, Eastern  
Massachusetts**

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**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Assabet Main Stem Headwaters Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.11	6.72	0	2.11	6.72	0	2.11	6.72	0
Recharge to uplands	4.88	15.58	0	4.88	15.58	0	4.88	15.58	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	0	3.98	--	0	3.80	--	0	4.01
Stream leakage to aquifer	1.45	1.44	1.22	1.24	1.28	1.13	1.45	1.44	1.21
Other subbasins	.31	.57	.24	.33	.56	.26	.30	.56	.23
Bedrock layer	.12	.34	.03	.12	.34	.03	.12	.34	.03
Septic-system return flow	.02	.02	.02	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	8.89	24.67	5.49	8.68	24.48	5.22	8.86	24.64	5.48
Outflow									
Storage	--	10.71	0.01	--	10.68	0.01	--	10.71	0.01
GW discharge to streams	4.73	10.67	1.56	5.34	11.32	2.14	4.69	10.61	1.61
ET from wetlands and ponds	1.54	.79	1.85	1.54	.79	1.85	1.54	.79	1.85
ET from nonwetland areas	.76	.54	.60	.78	0	.63	.76	.54	.60
Other subbasins	.86	1.31	.55	.88	1.29	.56	.85	1.29	.53
Bedrock layer	.13	.36	.03	.13	.36	.03	.12	.36	.03
Water-supply withdrawal	.68	.54	.77	0	0	0	.68	.54	.77
CU in privately supplied areas	.02	0	.03	0	0	0	.02	0	.03
CU by unpermitted agriculture	0	0	0	0	0	0	0	0	0
Infiltration to sewers	.17	.27	.11	0	0	0	.20	.32	.13
Total outflow	8.89	25.19	5.51	8.67	24.44	5.22	8.86	25.16	5.56
Budget error	0.00	-0.52	-0.02	0.01	0.04	0.00	0.00	-0.52	-0.08
Surface-water-flow system									
Inflow									
Streamflow from upstream	0	0	0	0	0	0	0	0	0
Net GW discharge <sup>1</sup>	3.27	9.26	.34	4.12	10.07	1.02	3.26	9.20	.40
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	3.27	9.26	0.34	4.12	10.07	1.02	3.26	9.20	0.40

**108 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA**

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Assabet Main Stem Upper Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	5.42	17.31	0	5.42	17.31	0	5.42	17.31	0
Recharge to uplands	5.16	16.49	0	5.16	16.49	0	5.16	16.49	0
Recharge to kettle ponds	.01	.14	.01	.01	.14	.01	.01	.14	.01
Storage	--	.51	7.21	--	0	5.86	--	.69	7.53
Stream leakage to aquifer	2.13	3.52	.90	.64	.63	1.12	2.38	3.74	1.23
Other subbasins	2.91	3.98	2.43	2.92	4.12	2.40	3.13	4.11	2.72
Bedrock layer	.12	.33	.03	.12	.34	.03	.11	.33	.03
Septic-system return flow	.19	.19	.19	0	0	0	.10	.10	.10
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	15.94	42.47	10.77	14.27	39.03	9.42	16.31	42.91	11.62
Outflow									
Storage	--	17.61	0.07	--	16.61	0.08	--	17.68	0.06
GW discharge to streams	7.74	16.83	3.05	8.59	17.84	3.93	7.42	16.33	2.87
ET from wetlands and ponds	1.87	.48	2.52	1.87	.48	2.52	1.87	.48	2.52
ET from nonwetland areas	1.19	0	1.14	1.25	0	1.25	1.12	0	1.05
Other subbasins	2.38	3.46	1.55	2.43	3.32	1.64	2.40	3.42	1.62
Bedrock layer	.12	.32	.04	.12	.33	.04	.12	.32	.04
Water-supply withdrawal	2.25	3.02	2.20	0	0	0	3.07	3.81	3.21
CU in privately supplied areas	0	0	0	0	0	0	0	0	0
CU by unpermitted agriculture	0	0	0	0	0	0	0	0	0
Infiltration to sewers	.40	.64	.26	0	0	0	.43	.70	.28
Total outflow	15.95	42.36	10.83	14.26	38.58	9.46	16.43	42.74	11.65
Budget error	-0.01	0.11	-0.06	0.01	0.45	-0.04	-0.12	0.17	-0.03
Surface-water-flow system									
Inflow									
Streamflow from upstream	19.29	49.37	2.75	21.37	51.90	4.28	18.26	47.90	2.27
Net GW discharge <sup>1</sup>	5.61	13.31	2.15	7.95	17.21	2.81	5.04	12.59	1.64
Wastewater discharge	7.34	9.89	5.98	0	0	0	10.57	14.24	8.61
Outflow									
Water-supply withdrawals	.06	0	.12	0	0	0	.08	0	.15
Total nonstorm streamflow	32.39	73.03	10.92	29.42	69.53	7.13	33.97	75.15	12.57

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Assabet Main Stem Middle Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	12.15	38.81	0	12.15	38.81	0	12.15	38.81	0
Recharge to uplands	8.81	28.15	0	8.81	28.15	0	8.81	28.15	0
Recharge to kettle ponds	.01	.14	.01	.01	.14	.01	.01	.14	.01
Storage	--	0	15.14	--	0	14.64	--	0	15.30
Stream leakage to aquifer	1.36	1.40	1.25	1.23	1.19	.80	1.47	1.60	1.40
Other subbasins	3.11	4.58	2.48	3.08	4.63	2.43	3.17	4.61	2.59
Bedrock layer	.18	.43	.08	.18	.43	.08	.17	.41	.07
Septic-system return flow	.25	.25	.25	0	0	0	.08	.08	.08
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	25.87	73.76	19.21	25.46	73.35	17.96	25.86	73.80	19.45
Outflow									
Storage	--	39.44	0.08	--	39.37	0.07	--	39.64	0.08
GW discharge to streams	16.15	26.99	9.19	17.16	28.05	9.46	15.45	26.07	8.82
ET from wetlands and ponds	4.68	1.59	6.07	4.68	1.59	6.07	4.68	1.59	6.07
ET from nonwetland areas	1.42	0	1.00	1.49	0	1.04	1.35	0	.90
Other subbasins	2.23	3.87	1.58	2.00	3.84	1.32	2.25	3.83	1.62
Bedrock layer	.17	.43	.06	.16	.43	.06	.49	.75	.40
Water-supply withdrawal	.65	.45	.73	0	0	0	1.08	.86	1.16
CU in privately supplied areas	.09	0	.15	0	0	0	.09	0	.15
CU by unpermitted agriculture	.02	0	0	0	0	0	.02	0	0
Infiltration to sewers	.46	.74	.30	0	0	0	.50	.80	.32
Total outflow	25.87	73.51	19.16	25.49	73.28	18.02	25.91	73.54	19.52
Budget error	0.00	0.25	0.05	-0.03	0.07	-0.06	-0.05	0.26	-0.07
Surface-water-flow system									
Inflow									
Streamflow from upstream	55.95	135.8	14.72	54.61	133.9	12.46	56.99	137.2	15.98
Net GW discharge <sup>1</sup>	14.79	25.59	7.94	15.93	26.86	8.66	13.98	24.47	7.42
Wastewater discharge	2.30	3.04	1.86	0	0	0	2.65	3.51	2.15
Outflow									
Water-supply withdrawals	.05	0	.12	0	0	0	.05	0	.12
Total nonstorm streamflow	73.04	164.4	25.54	70.55	160.7	21.13	73.63	165.2	25.57

## 110 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA

### Appendix 2. Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Assabet Main Stem Lower Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	8.29	26.48	0	8.29	26.48	0	8.29	26.48	0
Recharge to uplands	1.82	5.82	0	1.82	5.82	0	1.82	5.82	0
Recharge to kettle ponds	.002	.04	.002	.002	.04	.002	.002	.04	.002
Storage	--	0	8.19	--	0	7.96	--	0	8.25
Stream leakage to aquifer	.85	.86	.88	.83	.78	.90	.85	.87	.85
Other subbasins	3.90	4.47	3.48	3.93	4.18	3.50	3.81	4.38	3.39
Bedrock layer	.04	.07	.03	.04	.07	.03	.04	.07	.03
Septic-system return flow	.39	.39	.39	0	0	0	.35	.35	.35
GW discharge of wastewater	0	0	0	0	0	0	.25	.25	.25
Total inflow	15.29	38.13	12.97	14.91	37.37	12.39	15.41	38.26	13.12
Outflow									
Storage	--	20.78	0.01	--	20.90	0.01	--	20.74	0.01
GW discharge to streams	9.78	12.71	7.32	10.91	13.75	8.24	9.87	12.82	7.43
ET from wetlands and ponds	1.84	.78	2.30	1.84	.78	2.30	1.84	.78	2.30
ET from nonwetland areas	.61	0	.59	.69	0	.67	.61	0	.58
Other subbasins	1.42	2.03	1.22	1.44	2.42	1.19	1.39	2.02	1.20
Bedrock layer	.04	.07	.02	.04	.07	.02	.04	.07	.02
Water-supply withdrawal	1.39	1.22	1.42	0	0	0	1.44	1.27	1.48
CU in privately supplied areas	.001	0	.002	0	0	0	.001	0	.002
CU by unpermitted agriculture	.001	0	0	0	0	0	.001	0	0
Infiltration to sewers	.22	.36	.15	0	0	0	.24	.38	.15
Total outflow	15.30	37.95	13.03	14.92	37.92	12.43	15.43	38.03	13.17
Budget error	-0.01	0.18	-0.06	-0.01	-0.55	-0.04	-0.02	0.18	-0.05
Surface-water-flow system									
Inflow									
Streamflow from upstream	129.4	298.0	36.97	127.5	294.8	33.87	129.6	298.4	37.73
Net GW discharge <sup>1</sup>	8.93	11.85	6.44	10.08	12.97	7.34	9.02	11.95	6.58
Wastewater discharge	1.34	1.67	1.12	0	0	0	1.70	2.14	1.41
Outflow									
Water-supply withdrawals	.14	.08	.16	0	0	0	.14	.08	.17
Total nonstorm streamflow	139.7	311.6	44.56	137.6	307.8	41.24	140.4	312.6	45.75



**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Hop Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.37	7.57	0	2.37	7.57	0	2.37	7.57	0
Recharge to uplands	5.90	18.85	0	5.90	18.85	0	5.90	18.85	0
Recharge to kettle ponds	0	.01	0	0	.01	0	0	.01	0
Storage	--	0	2.88	--	0	2.95	--	0	3.28
Stream leakage to aquifer	.56	.30	.76	.53	.26	.71	.62	.37	.90
Other subbasins	.50	.78	.62	.49	.76	.51	.54	.76	.71
Bedrock layer	.10	.28	.03	.11	.29	.03	.10	.28	.03
Septic-system return flow	.17	.17	.17	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	9.60	27.96	4.46	9.40	27.74	4.20	9.35	27.84	4.92
Outflow									
Storage	--	7.49	0.01	--	7.42	0.003	--	7.82	0.01
GW discharge to streams	7.20	17.58	2.15	7.53	18.17	2.42	6.60	16.66	1.97
ET from wetlands and ponds	.65	.10	.92	.65	.10	.92	.65	.10	.92
ET from nonwetland areas	.15	0	.13	.15	0	.13	.13	0	.11
Other subbasins	.90	1.71	.73	.93	1.86	.73	1.14	1.87	1.05
Bedrock layer	.12	.32	.03	.12	.32	.03	.12	.31	.03
Water-supply withdrawal	.12	0	.22	0	0	0	.39	.22	.52
CU in privately supplied areas	.003	0	.01	0	0	0	.003	0	.01
CU by unpermitted agriculture	.001	0	0	0	0	0	.001	0	0
Infiltration to sewers	.45	.73	.29	0	0	0	.50	.80	.32
Total outflow	9.59	27.93	4.49	9.38	27.87	4.23	9.53	27.78	4.95
Budget error	0.01	0.03	-0.03	0.02	-0.13	-0.03	0.00	0.06	-0.03
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	6.64	17.28	1.39	7.01	17.91	1.71	5.97	16.29	1.07
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	.02	0	.04	0	0	0	.03	0	.05
Total nonstorm streamflow	6.64	17.28	1.39	7.01	17.91	1.71	5.97	16.29	1.07

## 112 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA

### Appendix 2. Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Cold Harbor and Howard Brooks Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.88	9.18	0	2.88	9.18	0	2.88	9.18	0
Recharge to uplands	6.86	21.92	0	6.86	21.92	0	6.86	21.92	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	0	3.46	--	0	3.32	--	0	3.40
Stream leakage to aquifer	.34	.32	1.25	.19	.27	.94	.36	.32	1.33
Other subbasins	.83	2.11	.35	.89	2.10	.37	.83	2.10	.34
Bedrock layer	.17	.47	.04	.18	.47	.04	.17	.47	.04
Septic-system return flow	.13	.13	.13	0	0	0	.002	.002	.002
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	11.21	34.13	5.23	11.00	33.94	4.67	11.10	33.99	5.11
Outflow									
Storage	--	11.56	0.01	--	11.49	0.01	--	11.53	0.01
GW discharge to streams	7.88	19.70	1.58	8.37	20.45	1.77	7.71	19.47	1.50
ET from wetlands and ponds	1.23	.20	1.72	1.23	.20	1.72	1.23	.20	1.72
ET from nonwetland areas	.47	0	.27	.47	0	.27	.45	0	.26
Other subbasins	.77	1.36	.99	.76	1.35	.86	.77	1.36	.99
Bedrock layer	.16	.43	.06	.16	.44	.05	.16	.43	.06
Water-supply withdrawal	.45	.51	.42	0	0	0	.45	.51	.42
CU in privately supplied areas	.04	0	.08	0	0	0	.04	0	.08
CU by unpermitted agriculture	.01	0	.01	0	0	0	.01	0	.01
Infiltration to sewers	.20	.32	.13	0	0	0	.25	.40	.16
Total outflow	11.20	34.09	5.26	10.99	33.93	4.69	11.06	33.91	5.20
Budget error	0.01	0.04	-0.03	0.01	0.01	-0.02	0.04	0.08	-0.09
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	7.53	19.37	0.32	8.17	20.17	0.82	7.33	19.13	0.16
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	7.53	19.37	0.32	8.17	20.17	0.82	7.33	19.13	0.16

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Stirrup Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.51	8.00	0	2.51	8.00	0	2.51	8.00	0
Recharge to uplands	1.33	4.25	0	1.33	4.25	0	1.33	4.25	0
Recharge to kettle ponds	.03	.52	.03	.03	.52	.03	.03	.52	.03
Storage	--	0	3.31	--	0	3.07	--	0	3.36
Stream leakage to aquifer	.60	.68	.57	.53	.56	.55	.65	.74	.56
Other subbasins	.66	1.08	.43	.67	.98	.48	.64	1.06	.42
Bedrock layer	.03	.08	.01	.03	.08	.01	.03	.08	.01
Septic-system return flow	.14	.14	.14	0	0	0	.03	.03	.03
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	5.30	14.75	4.49	5.10	14.39	4.14	5.22	14.68	4.41
Outflow									
Storage	--	8.93	0.03	--	8.86	0.01	--	8.93	0.01
GW discharge to streams	2.47	4.15	1.30	2.61	4.32	1.31	2.36	4.03	1.22
ET from wetlands and ponds	1.25	.21	1.75	1.25	.21	1.75	1.25	.21	1.75
ET from nonwetland areas	.39	0	.32	.40	0	.33	.39	0	.31
Other subbasins	.81	1.02	.76	.80	1.01	.74	.80	1.00	.75
Bedrock layer	.03	.08	.01	.03	.08	.01	.03	.08	.01
Water-supply withdrawal	.28	.20	.29	0	0	0	.28	.20	.29
CU in privately supplied areas	0	0	0	0	0	0	0	0	0
CU by unpermitted agriculture	0	0	0	0	0	0	0	0	0
Infiltration to sewers	.06	.10	.04	0	0	0	.09	.14	.06
Total outflow	5.29	14.69	4.50	5.09	14.48	4.15	5.20	14.59	4.40
Budget error	0.01	0.06	-0.01	0.01	-0.09	-0.01	0.02	0.09	0.01
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	1.85	3.47	0.71	2.07	3.76	0.73	1.70	3.28	0.64
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	1.85	3.47	0.71	2.07	3.76	0.73	1.70	3.28	0.64

## 114 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA

### Appendix 2. Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>North Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	4.78	15.28	0	4.78	15.28	0	4.78	15.28	0
Recharge to uplands	13.10	41.85	0	13.10	41.85	0	13.10	41.85	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	0	5.48	--	0	5.52	--	0	5.53
Stream leakage to aquifer	.87	.50	.68	.87	.49	.67	.88	.51	.69
Other subbasins	.77	1.80	.61	.77	1.79	.60	.76	1.79	.61
Bedrock layer	.26	.71	.06	.27	.71	.06	.26	.71	.06
Septic-system return flow	.14	.14	.14	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	19.92	60.28	6.97	19.79	60.12	6.85	19.78	60.14	6.89
Outflow									
Storage	--	15.58	0.01	--	15.58	0.003	--	15.64	0.01
GW discharge to streams	16.47	41.06	3.93	16.55	41.00	4.04	16.28	40.77	3.83
ET from wetlands and ponds	1.07	.20	1.49	1.07	.20	1.49	1.07	.20	1.49
ET from nonwetland areas	.73	0	.63	.72	0	.63	.72	0	.61
Other subbasins	1.20	2.59	.67	1.19	2.64	.67	1.22	2.60	.68
Bedrock layer	.27	.73	.05	.27	.73	.05	.26	.73	.05
Water-supply withdrawal	0	0	0	0	0	0	0	0	0
CU in privately supplied areas	.10	0	.17	0	0	0	.10	0	.17
CU by unpermitted agriculture	.04	0	.01	0	0	0	.04	0	.01
Infiltration to sewers	.05	.08	.03	0	0	0	.08	.13	.05
Total outflow	19.93	60.24	6.99	19.80	60.15	6.88	19.77	60.07	6.90
Budget error	-0.01	0.04	-0.02	-0.01	-0.03	-0.03	0.01	0.07	-0.01
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	15.47	40.20	3.24	15.57	40.19	3.35	15.30	39.95	3.12
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	15.47	40.20	3.24	15.57	40.19	3.35	15.30	39.95	3.12

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Danforth Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	1.75	5.59	0	1.75	5.59	0	1.75	5.59	0
Recharge to uplands	5.10	16.29	0	5.10	16.29	0	5.10	16.29	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	0	2.13	--	0	2.05	--	0	2.20
Stream leakage to aquifer	.26	.06	.61	.22	.05	.54	.27	.06	.60
Other subbasins	.73	1.87	.47	.76	1.87	.47	.73	1.87	.47
Bedrock layer	.08	.24	.01	.08	.24	.01	.08	.24	.01
Septic-system return flow	0	0	0	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	7.92	24.05	3.22	7.91	24.04	3.07	7.93	24.05	3.28
Outflow									
Storage	--	5.95	0.06	--	5.96	0.03	--	5.98	0.10
GW discharge to streams	5.18	14.98	.90	5.35	15.19	.93	5.17	14.95	.89
ET from wetlands and ponds	.86	.10	1.23	.86	.10	1.23	.86	.10	1.23
ET from nonwetland areas	.25	0	.05	.26	0	.06	.24	0	.05
Other subbasins	1.35	2.54	.90	1.35	2.54	.89	1.35	2.54	.90
Bedrock layer	.10	.25	.02	.10	.25	.02	.10	.25	.02
Water-supply withdrawal	.01	0	.01	0	0	0	.04	0	.05
CU in privately supplied areas	.03	0	.06	0	0	0	.03	0	.06
CU by unpermitted agriculture	.02	0	0	0	0	0	.02	0	0
Infiltration to sewers	.12	.20	.08	0	0	0	.12	.20	.08
Total outflow	7.92	24.02	3.31	7.92	24.04	3.16	7.93	24.02	3.38
Budget error	0.00	0.03	-0.09	-0.01	0.00	-0.09	0.00	0.03	-0.10
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	5.03	5.16	0.29	5.23	15.38	0.38	5.01	15.13	0.29
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	5.03	5.16	0.29	5.23	15.38	0.38	5.01	15.13	0.29

**116 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA**

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Fort Meadow Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.19	6.99	0	2.19	6.99	0	2.19	6.99	0
Recharge to uplands	4.11	13.12	0	4.11	13.12	0	4.11	13.12	0
Recharge to kettle ponds	.001	.01	.001	.001	.01	.001	.001	.01	.001
Storage	--	0	4.32	--	0	4.32	--	0	4.41
Stream leakage to aquifer	.47	.31	1.15	.14	.15	.39	.61	.37	1.34
Other subbasins	1.07	2.06	.51	.78	2.02	.23	1.07	2.03	.56
Bedrock layer	.08	.26	.02	.09	.26	.02	.08	.25	.02
Septic-system return flow	.11	.11	.11	0	0	0	.01	.01	.01
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	8.03	22.86	6.11	7.31	22.55	4.96	8.07	22.78	6.34
Outflow									
Storage	--	11.20	0.01	--	11.28	0.01	--	11.23	0.01
GW discharge to streams	3.52	7.70	1.43	4.53	8.96	1.98	3.32	7.36	1.35
ET from wetlands and ponds	1.49	.71	1.82	1.49	.71	1.82	1.49	.71	1.82
ET from nonwetland areas	.51	0	.48	.57	0	.56	.50	0	.47
Other subbasins	.64	1.03	.65	.64	1.02	.61	.67	1.02	.74
Bedrock layer	.08	.23	.03	.08	.23	.03	.08	.23	.04
Water-supply withdrawal	1.45	1.37	1.52	0	0	0	1.67	1.58	1.75
CU in privately supplied areas	0	0	0	0	0	0	0	0	0
CU by unpermitted agriculture	0	0	0	0	0	0	0	0	0
Infiltration to sewers	.33	.53	.21	0	0	0	.35	.56	.23
Total outflow	8.02	22.77	6.15	7.31	22.20	5.01	8.08	22.69	6.41
Budget error	0.01	0.09	-0.04	0.00	0.35	-0.05	-0.01	0.09	-0.07
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	3.06	7.39	0.28	4.39	8.80	1.59	2.71	7.00	0.01
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	3.06	7.39	0.28	4.39	8.80	1.59	2.71	7.00	0.01

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Elizabeth Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	7.85	25.07	0	7.85	25.07	0	7.85	25.07	0
Recharge to uplands	12.83	40.97	0	12.83	40.97	0	12.83	40.97	0
Recharge to kettle ponds	.001	.01	.001	.001	.01	.001	.001	.01	.001
Storage	--	0	9.23	--	0	9.11	--	0	9.23
Stream leakage to aquifer	1.08	.89	1.12	1.07	.89	1.14	1.08	.89	1.12
Other subbasins	1.61	2.81	1.02	1.64	2.81	1.06	1.61	2.81	1.02
Bedrock layer	.25	.70	.04	.26	.70	.04	.25	.70	.04
Septic-system return flow	0	0	0	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	23.62	70.45	11.41	23.65	70.45	11.35	23.62	70.45	11.41
Outflow									
Storage	--	25.63	0.01	--	25.46	0.01	--	25.63	0.01
GW discharge to streams	18.34	41.26	6.18	18.63	41.46	6.52	18.34	41.26	6.18
ET from wetlands and ponds	2.68	.53	3.70	2.68	.53	3.70	2.68	.53	3.70
ET from nonwetland areas	1.14	0	.66	1.16	0	.70	1.14	0	.66
Other subbasins	.93	2.17	.43	.94	2.17	.43	.93	2.17	.43
Bedrock layer	.24	.68	.04	.24	.68	.04	.24	.68	.04
Water-supply withdrawal	.04	0	.08	0	0	0	.04	0	.08
CU in privately supplied areas	.19	0	.33	0	0	0	.19	0	.33
CU by unpermitted agriculture	.06	0	.03	0	0	0	.06	0	.03
Infiltration to sewers	0	0	0	0	0	0	0	0	0
Total outflow	23.62	70.27	11.46	23.65	70.30	11.40	23.62	70.27	11.46
Budget error	0.00	0.18	-0.05	0.00	0.15	-0.05	0.00	0.18	-0.05
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	17.13	39.97	5.06	17.43	40.17	5.38	17.13	39.97	5.06
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	.04	0	.08	0	0	0	.04	0	.08
Total nonstorm streamflow	17.13	39.97	5.06	17.43	40.17	5.38	17.13	39.97	5.06

**118 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA**

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Taylor Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	3.25	10.37	0	3.25	10.37	0	3.25	10.37	0
Recharge to uplands	1.11	3.54	0	1.11	3.54	0	1.11	3.54	0
Recharge to kettle ponds	.01	.10	.01	.01	.10	.01	.01	.10	.01
Storage	--	0	3.17	--	0	3.01	--	0	3.19
Stream leakage to aquifer	.02	.01	.21	.02	.01	.15	.02	.01	.23
Other subbasins	.22	.34	.18	.21	.35	.16	.23	.35	.18
Bedrock layer	.01	.04	.01	.01	.04	.01	.01	.04	.01
Septic-system return flow	0	0	0	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	4.62	14.40	3.58	4.61	14.41	3.34	4.63	14.41	3.62
Outflow									
Storage	--	9.22	0.09	--	9.29	0.03	--	9.21	0.09
GW discharge to streams	1.62	3.11	.43	1.98	3.52	.61	1.57	3.07	.42
ET from wetlands and ponds	.98	.08	1.42	.98	.08	1.42	.98	.08	1.42
ET from nonwetland areas	.39	0	.24	.47	0	.28	.38	0	.23
Other subbasins	1.14	1.40	1.00	1.15	1.39	1.00	1.14	1.40	1.00
Bedrock layer	.02	.04	.01	.02	.04	.01	.02	.04	.01
Water-supply withdrawal	.50	.49	.45	0	0	0	.57	.55	.51
CU in privately supplied areas	0	0	0	0	0	0	0	0	0
CU by unpermitted agriculture	.002	0	0	0	0	0	.002	0	0
Infiltration to sewers	.08	.12	.05	0	0	0	.08	.12	.05
Total outflow	4.73	14.46	3.69	4.60	14.32	3.35	4.74	14.47	3.73
Budget error	-0.11	-0.06	-0.11	0.01	0.09	-0.01	-0.11	-0.06	-0.11
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	1.60	3.10	0.22	1.96	3.51	0.46	1.56	3.06	0.19
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	1.60	3.10	0.22	1.96	3.51	0.46	1.56	3.06	0.19



**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Fort Pond Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	8.59	27.44	0	8.59	27.44	0	8.59	27.44	0
Recharge to uplands	15.90	50.79	0	15.90	50.79	0	15.90	50.79	0
Recharge to kettle ponds	.003	.06	.003	.003	.06	.003	.003	.06	.003
Storage	--	0	10.70	--	0	10.19	--	0	10.72
Stream leakage to aquifer	.47	.34	1.44	.29	.17	1.47	.52	.36	1.48
Other subbasins	1.40	2.73	.96	1.40	3.11	.93	1.36	2.67	.95
Bedrock layer	.26	.78	.05	.26	.79	.04	.26	.04	.04
Septic-system return flow	1.04	1.04	1.04	0	0	0	.72	.72	.72
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	27.66	83.18	14.19	26.44	82.36	12.63	27.35	82.08	13.91
Outflow									
Storage	--	31.49	0.07	--	30.77	0.06	--	31.52	0.08
GW discharge to streams	17.03	44.23	3.11	17.16	44.76	3.04	16.75	43.86	2.92
ET from wetlands and ponds	4.59	.84	6.38	4.59	.84	6.38	4.59	.84	6.38
ET from nonwetland areas	1.39	.54	.81	1.42	0	.86	1.40	0	.8
Other subbasins	3.02	4.59	2.40	3.00	4.28	2.42	2.90	4.47	2.31
Bedrock layer	.73	1.18	.47	.27	.81	.05	.79	1.22	.53
Water-supply withdrawal	.70	.54	.82	0	0	0	.70	.54	.74
CU in privately supplied areas	.13	0	.22	0	0	0	.13	0	.22
CU by unpermitted agriculture	.02	0	0	0	0	0	.02	0	0
Infiltration to sewers	.06	.10	.04	0	0	0	.11	.18	.07
Total outflow	27.67	83.51	14.32	26.44	81.46	12.81	27.39	82.63	14.05
Budget error	-0.01	-0.33	-0.13	0.00	0.90	-0.18	-0.04	-0.55	-0.14
Surface-water-flow system									
Inflow									
Streamflow from upstream	16.31	35.11	4.50	15.96	34.31	4.40	16.27	35.08	4.46
Net GW discharge <sup>1</sup>	16.56	43.89	1.67	16.87	44.59	1.57	16.23	43.5	1.44
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	.01	0	0	0	0	0	.01	0	0
Total nonstorm streamflow	32.91	79.07	6.18	32.88	78.99	5.97	32.54	78.65	5.91

## 120 Simulation of Ground-Water Flow and Evaluation of Water-Management Alternatives in the Assabet River Basin, Eastern MA

### Appendix 2. Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Nashoba Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	10.96	35.02	0	10.96	35.02	0	10.96	35.02	0
Recharge to uplands	11.48	36.67	0	11.48	36.67	0	11.48	36.67	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	0	11.76	--	0	11.66	--	0	11.79
Stream leakage to aquifer	.40	.91	1.08	.58	.92	.89	.45	.91	1.08
Other subbasins	.89	2.05	.42	.84	2.01	.40	.87	2.03	.42
Bedrock layer	.21	.56	.07	.20	.55	.05	.21	.56	.07
Septic-system return flow	1.53	1.53	1.53	0	0	0	1.52	1.52	1.52
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
<b>Total inflow</b>	<b>25.47</b>	<b>76.74</b>	<b>14.86</b>	<b>24.06</b>	<b>75.17</b>	<b>13.00</b>	<b>25.49</b>	<b>76.71</b>	<b>14.88</b>
Outflow									
Storage	--	36.49	0.05	--	35.35	0.04	--	36.48	0.05
GW discharge to streams	16.67	35.82	5.59	16.50	35.03	5.29	16.68	35.79	5.55
ET from wetlands and ponds	3.53	.93	4.74	3.53	.93	4.74	3.53	.93	4.74
ET from nonwetland areas	3.09	0	2.56	2.87	0	2.32	3.08	0	2.54
Other subbasins	1.10	2.18	.65	1.06	2.18	.63	1.10	2.17	.66
Bedrock layer	.21	.56	.07	.19	.54	.05	.21	.56	.07
Water-supply withdrawal	.93	.57	1.15	0	0	0	.97	.58	1.21
CU in privately supplied areas	.07	0	.12	0	0	0	.07	0	.12
CU by unpermitted agriculture	.03	0	0	0	0	0	.03	0	0
Infiltration to sewers	0	0	0	0	0	0	.002	.003	.001
<b>Total outflow</b>	<b>25.63</b>	<b>76.55</b>	<b>14.93</b>	<b>25.15</b>	<b>74.03</b>	<b>13.07</b>	<b>25.67</b>	<b>76.51</b>	<b>14.94</b>
<b>Budget error</b>	<b>-0.16</b>	<b>0.19</b>	<b>-0.07</b>	<b>-0.09</b>	<b>1.14</b>	<b>-0.07</b>	<b>-0.18</b>	<b>0.20</b>	<b>-0.06</b>
Surface-water-flow system									
Inflow									
Streamflow from upstream	0	0	0	0	0	0	0	0	0
Net GW discharge <sup>1</sup>	16.31	35.11	4.50	15.96	34.31	4.40	16.27	35.08	4.46
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
<b>Total nonstorm streamflow</b>	<b>16.31</b>	<b>35.11</b>	<b>4.50</b>	<b>15.96</b>	<b>34.31</b>	<b>4.40</b>	<b>16.27</b>	<b>35.08</b>	<b>4.46</b>

**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Spencer Brook Subbasin Surficial Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	2.37	7.56	0	2.37	7.56	0	2.37	7.56	0
Recharge to uplands	4.05	12.94	0	4.05	12.94	0	4.05	12.94	0
Recharge to kettle ponds	.007	.07	.003	.004	.07	.003	.004	.07	.003
Storage	--	0	2.81	--	0	2.84	--	0	2.81
Stream leakage to aquifer	.07	.01	.30	.07	.01	.30	.07	.01	.30
Other subbasins	.72	1.19	.57	.71	1.19	.57	.72	1.19	.57
Bedrock layer	.07	.20	.02	.07	.20	.02	.07	.20	.02
Septic-system return flow	.12	.12	.12	0	0	0	.12	.12	.12
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
Total inflow	7.41	22.09	3.82	7.27	21.97	3.73	7.40	22.09	3.82
Outflow									
Storage	--	8.86	0.04	--	8.81	0.03	--	8.86	0.04
GW discharge to streams	4.86	11.75	1.28	4.80	11.68	1.26	4.86	11.75	1.28
ET from wetlands and ponds	1.04	.09	1.50	1.04	.09	1.50	1.04	.09	1.50
ET from nonwetland areas	.50	0	.22	.49	0	.23	.50	0	.22
Other subbasins	.87	1.17	.71	.87	1.16	.70	.87	1.17	.71
Bedrock layer	.07	.20	.02	.07	.19	.02	.07	.20	.02
Water-supply withdrawal	0	0	0	0	0	0	0	0	0
CU in privately supplied areas	.04	0	.07	0	0	0	.04	0	.07
CU by unpermitted agriculture	.01	0	0	0	0	0	.01	0	0
Infiltration to sewers	0	0	0	0	0	0	0	0	0
Total outflow	7.39	22.07	3.84	7.27	21.93	3.74	7.39	22.07	3.84
Budget error	0.02	0.02	-0.02	0.00	0.04	-0.01	0.01	0.02	-0.02
Surface-water-flow system									
Inflow									
Net GW discharge <sup>1</sup>	4.71	11.45	0.95	4.65	11.39	0.94	4.71	11.46	0.96
Wastewater discharge	.02	.03	.02	0	0	0	.05	.07	.05
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
Total nonstorm streamflow	4.73	11.48	0.97	4.65	11.39	0.94	4.76	11.53	1.01



**Appendix 2.** Model-calculated average annual, March, and September hydrologic budgets for subbasins in the Assabet River Basin, eastern Massachusetts.—Continued

[All flows in million gallons per day. CU, consumptive use; ET, evapotranspiration; GW, ground water; S1, Scenario 1; S2, Scenario 2; SG, stratified glacial deposits; Budget error, inflow minus outflow; --, not applicable]

Hydrologic budget component	1997–2001			S1			S2		
	Annual	March	September	Annual	March	September	Annual	March	September
<b>Assabet Main Stem Subbasins Bedrock Layer</b>									
Ground-water-flow system									
Inflow									
Recharge to SG	0	0	0	0	0	0	0	0	0
Recharge to uplands	0	0	0	0	0	0	0	0	0
Recharge to kettle ponds	0	0	0	0	0	0	0	0	0
Storage	--	.00	.00	--	.00	.00	--	.00	.00
Stream leakage to aquifer	0	0	0	0	0	0	0	0	0
Other subbasins	.07	.13	.06	.07	.14	.06	.07	.13	.06
Surficial layer	.44	1.18	.15	.45	1.19	.15	.77	1.50	.49
Septic-system return flow	0	0	0	0	0	0	0	0	0
GW discharge of wastewater	0	0	0	0	0	0	0	0	0
<b>Total inflow</b>	<b>0.51</b>	<b>1.31</b>	<b>0.21</b>	<b>0.52</b>	<b>1.33</b>	<b>0.21</b>	<b>0.84</b>	<b>1.56</b>	<b>0.55</b>
Outflow									
Storage	--	0.00	0.00	--	0.00	0.00	--	0.00	0.00
GW discharge to streams	0	0	0	0	0	0	0	0	0
ET from wetlands and ponds	0	0	0	0	0	0	0	0	0
ET from nonwetland areas	0	0	0	0	0	0	0	0	0
Other subbasins	.06	.14	.03	.06	.03	.13	.06	.13	.03
Surficial layer	.45	1.16	.17	.45	1.18	.17	.44	1.14	.17
Water-supply withdrawal	.01	0	0	0	0	0	.35	.35	.35
CU in privately supplied areas	0	0	0	0	0	0	0	0	0
CU by unpermitted agriculture	0	0	0	0	0	0	0	0	0
Infiltration to sewers	0	0	0	0	0	0	0	0	0
<b>Total outflow</b>	<b>0.52</b>	<b>1.30</b>	<b>0.20</b>	<b>0.51</b>	<b>1.21</b>	<b>0.30</b>	<b>0.85</b>	<b>1.62</b>	<b>0.55</b>
<b>Budget error</b>	<b>-0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.12</b>	<b>-0.09</b>	<b>-0.01</b>	<b>-0.08</b>	<b>0.00</b>
Surface-water-flow system									
Inflow									
Streamflow from upstream	0	0	0	0	0	0	0	0	0
Net GW discharge <sup>1</sup>	0	0	0	0	0	0	0	0	0
Wastewater discharge	0	0	0	0	0	0	0	0	0
Outflow									
Water-supply withdrawals	0	0	0	0	0	0	0	0	0
<b>Total nonstorm streamflow</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<sup>1</sup>Includes withdrawals from ground water and surface water.



**Appendix 3: Average Monthly Withdrawals and Discharges at Permitted Municipal and Nonmunicipal Water-Supply Sources and Wastewater-Treatment Facilities used in the Calibrated Transient Model to Simulate Average 1997–2001 Conditions and in a Scenario of Increased Withdrawals and Discharges in the Assabet River Basin, Eastern Massachusetts**

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**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
<b>Acton Water-Supply System</b>													
Calibrated Transient Model													
AN-01G	0.11	0.14	0.15	0.16	0.18	0.11	0.13	0.09	0.11	0.06	0.06	0.09	0.12
AN-02G	.16	.09	.06	.09	.18	.18	.22	.20	.16	.14	.16	.10	.14
AN-03G	.13	.11	.13	.18	.20	.16	.19	.18	.17	.15	.17	.13	.16
AN-04G	.17	.16	.15	.18	.19	.22	.21	.22	.20	.18	.19	.17	.19
AN-05G	.31	.31	.32	.26	.32	.32	.32	.31	.30	.25	.31	.30	.30
AN-06G	.33	.31	.31	.25	.41	.39	.42	.41	.39	.38	.39	.37	.36
AN-07G	.05	.02	.01	.03	.04	.18	.14	.08	.11	.08	.07	.07	.07
AN-08G	.09	.09	.09	.12	.12	.13	.10	.10	.10	.07	.09	.06	.10
AN-09G	.03	.03	.03	.02	.09	.04	.05	.02	.00	.00	.00	.02	.03
AN-10G	.37	.42	.44	.44	.33	.41	.34	.35	.36	.31	.35	.37	.37
AN-11G	.06	.05	.05	.11	.11	.11	.09	.08	.10	.10	.10	.10	.09
Total	1.79	1.72	1.73	1.84	2.18	2.25	2.22	2.04	1.99	1.89	1.71	1.79	1.93
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
AN-01G	0.11	0.15	0.15	0.16	0.19	0.11	0.13	0.10	0.12	0.06	0.06	0.09	0.12
AN-02G	.16	.09	.06	.10	.19	.19	.23	.20	.16	.14	.16	.10	.15
AN-03G	.13	.11	.13	.15	.15	.15	.15	.15	.15	.15	.15	.13	.14
AN-04G	.17	.16	.15	.18	.20	.22	.22	.22	.21	.18	.19	.17	.19
AN-05G	.31	.31	.32	.27	.33	.32	.32	.32	.30	.25	.31	.31	.31
AN-06G	.33	.32	.31	.25	.42	.39	.43	.42	.39	.38	.40	.37	.37
AN-07G	.05	.02	.01	.03	.04	.18	.15	.08	.11	.08	.07	.07	.07
AN-08G	.09	.09	.09	.12	.13	.13	.11	.10	.10	.08	.10	.06	.10
AN-09G	.03	.03	.03	.02	.10	.04	.06	.02	.00	.00	.01	.02	.03
AN-10G	.37	.42	.44	.44	.33	.42	.35	.35	.36	.31	.35	.37	.38
AN-11G	.06	.05	.05	.11	.12	.11	.09	.09	.10	.10	.10	.10	.09
Total	1.80	1.73	1.74	1.85	2.19	2.26	2.23	2.05	2.00	1.90	1.72	1.80	1.94

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
<b>Concord Water-Supply System</b>													
Calibrated Transient Model													
CN-01G	0.57	0.64	0.52	0.69	0.60	0.56	0.57	0.49	0.57	0.61	0.54	0.63	0.58
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
CN-01G	.62	.69	.56	.74	.65	.61	.61	.52	.62	.65	.58	.68	.63
<b>Hudson Water-Supply System</b>													
Calibrated Transient Model													
HD-02G	0.08	0.08	0.08	0.06	0.17	0.21	0.25	0.23	0.25	0.20	0.15	0.13	0.16
HD-03G	.60	.63	.63	.62	.69	.69	.67	.64	.61	.56	.52	.47	.61
HD-04G	.70	.69	.66	.67	.74	.73	.72	.68	.66	.66	.66	.66	.69
HD-05G	.40	.36	.36	.49	.50	.46	.43	.43	.41	.43	.44	.44	.43
HD-01S	.07	.07	.09	.07	.14	.28	.34	.28	.18	.13	.12	.11	.16
Total	1.85	1.84	1.82	1.92	2.25	2.37	2.41	2.27	2.11	1.97	1.89	1.82	2.04
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
HD-02G	.09	.09	.09	.07	.20	.25	.29	.26	.29	.23	.17	.15	.18
HD-03G	.69	.73	.72	.71	.75	.75	.75	.74	.70	.64	.60	.55	.69
HD-04G	.81	.79	.76	.77	.86	.85	.83	.78	.76	.75	.76	.76	.79
HD-05G	.46	.42	.42	.57	.59	.54	.50	.49	.47	.49	.51	.51	.50
HD-01S	.08	.08	.10	.08	.17	.33	.40	.33	.21	.15	.14	.12	.18
Total	2.13	2.11	2.10	2.21	2.57	2.71	2.76	2.61	2.43	2.26	2.17	2.09	2.35
<b>Marlborough Water-Supply System</b>													
Calibrated Transient Model													
ML-01S	1.33	1.71	2.50	2.87	2.69	1.80	1.19	1.04	1.32	0.87	0.51	0.75	1.55
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
ML-01S	1.52	1.95	2.86	3.28	3.07	2.06	1.36	1.19	1.50	1.00	.59	.85	1.77

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
<b>Maynard Water-Supply System</b>													
Calibrated Transient Model													
MIN-01G	0.28	0.24	0.22	0.26	0.27	0.34	0.24	0.31	0.30	0.25	0.25	0.23	0.27
MIN-02G	.12	.17	.20	.18	.19	.21	.07	.08	.07	.07	.09	.07	.13
MIN-03G	.09	.07	.07	.09	.13	.15	.17	.20	.08	.06	.09	.07	.11
MIN-04G	.38	.43	.38	.58	.47	.53	.67	.31	.42	.32	.60	.44	.46
Total	0.87	0.91	0.87	1.11	1.05	1.23	1.14	0.91	0.87	0.70	1.03	0.82	0.96
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
MIN-01G	0.32	0.28	0.25	0.30	0.30	0.39	0.27	0.35	0.34	0.29	0.29	0.26	0.30
MIN-02G	.14	.19	.22	.21	.21	.23	.08	.09	.08	.08	.10	.08	.14
MIN-03G	.10	.08	.08	.11	.15	.17	.19	.23	.10	.07	.10	.08	.12
MIN-04G	.43	.49	.43	.66	.53	.61	.76	.36	.47	.36	.68	.50	.52
Total	0.98	1.04	0.98	1.26	1.20	1.40	1.30	1.03	0.99	0.80	1.17	0.93	1.09
<b>Northborough Water-Supply System</b>													
Calibrated Transient Model													
NB-01G	0.33	0.35	0.34	0.27	0.35	0.37	0.34	0.34	0.36	0.37	0.39	0.34	0.34
NB-02G	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
NB-03G	.29	.35	.38	.32	.28	.34	.32	.23	.33	.33	.32	.31	.32
NB-04G	.15	.14	.13	.13	.15	.16	.16	.11	.08	.11	.11	.13	.13
Total	0.77	0.85	0.85	0.72	0.78	0.86	0.83	0.68	0.77	0.81	0.82	0.79	0.79
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
NB-01G	0.33	0.35	0.34	0.27	0.35	0.37	0.34	0.34	0.36	0.37	0.39	0.34	0.34
NB-02G	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
NB-03G	.29	.35	.38	.32	.28	.34	.32	.23	.33	.33	.32	.31	.32
NB-04G	.15	.14	.13	.13	.15	.16	.16	.11	.08	.11	.11	.13	.13
Total	0.77	0.85	0.85	0.72	0.78	0.86	0.83	0.68	0.77	0.81	0.82	0.79	0.79

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												Average
	January	February	March	April	May	June	July	August	September	October	November	December	
<b>Shrewsbury Water-Supply System</b>													
Calibrated Transient Model													
SW-01G	0	0	0	0	0	0	0	0	0	0	0	0	0
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
SW-01G	.23	.22	.22	.23	.29	.32	.32	.31	.29	.25	.23	.21	.26
<b>Westborough Water-Supply System</b>													
Calibrated Transient Model													
WB-01G	0.18	0.24	0.25	0.25	0.34	0.34	0.34	0.32	0.31	0.30	0.28	0.26	0.28
WB-02G	.21	.23	.22	.16	.25	.22	.28	.32	.32	.35	.34	.33	.27
WB-03G	.30	.21	.17	.17	.28	.25	.34	.36	.39	.38	.31	.31	.29
WB-04G	.12	.13	.07	.06	.10	.09	.12	.10	.13	.16	.16	.16	.12
WB-05	.00	.00	.01	.01	.02	.00	.00	.01	.02	.01	.05	.03	.01
WB-06G	.28	.24	.19	.07	.22	.29	.27	.27	.27	.33	.37	.35	.26
WB-07G	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Total	1.10	1.07	0.92	0.71	1.22	1.20	1.35	1.39	1.44	1.53	1.52	1.44	1.24
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
WB-01G	0.18	0.24	0.25	0.25	0.34	0.34	0.34	0.32	0.31	0.31	0.29	0.26	0.29
WB-02G	.21	.23	.22	.16	.25	.22	.28	.32	.32	.35	.35	.33	.27
WB-03G	.30	.21	.17	.17	.28	.25	.34	.36	.39	.39	.31	.31	.29
WB-04G	.12	.13	.07	.06	.10	.09	.12	.10	.13	.17	.17	.16	.12
WB-05	.00	.00	.01	.01	.02	.00	.00	.01	.02	.02	.06	.03	.01
WB-06G	.28	.24	.19	.07	.22	.29	.27	.27	.27	.34	.37	.35	.27
WB-07G	.52	.51	.44	.34	.58	.57	.64	.66	.69	.69	.69	.68	.59
Total	1.62	1.58	1.35	1.05	1.80	1.77	1.99	2.06	2.13	2.27	2.24	2.12	1.83
<b>Assabet Sand and Gravel</b>													
Calibrated Transient Model													
ASG-01S	0.00	0.00	0.08	0.19	0.22	0.22	0.19	0.20	0.16	0.18	0.16	0.07	0.14
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
ASG-01S	.00	.00	.08	.19	.22	.22	.20	.20	.17	.18	.17	.07	.14

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												Average
	January	February	March	April	May	June	July	August	September	October	November	December	
<b>Berberian Farms</b>													
Calibrated Transient Model													
BER-01S	0.00	0.00	0.00	0.00	0.02	0.06	0.09	0.06	0.04	0.00	0.00	0.00	0.02
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
BER-01S	.00	.00	.00	.00	.02	.08	.12	.09	.05	.00	.00	.00	.03
<b>Bigelow Nurseries</b>													
Calibrated Transient Model													
BIG-01S	0.00	0.00	0.00	0.03	0.09	0.18	0.34	0.26	0.18	0.08	0.01	0.00	0.10
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
BIG-01S	.00	.00	.00	.03	.09	.18	.34	.26	.18	.08	.01	.00	.10
<b>Concrete Services</b>													
Calibrated Transient Model													
CNS-01S	0	0	0	0	0	0	0	0	0	0	0	0	0
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
CNS-01S	.34	.34	.34	.34	.34	.34	.34	.34	.34	.34	.34	.34	.34
<b>Great Oak Farms</b>													
Calibrated Transient Model													
GRK-01G	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.01
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
GRK-01G	.00	.00	.00	.03	.05	.09	.09	.08	.05	.03	.00	.00	.04
<b>Idylwilde Farms</b>													
Calibrated Transient Model													
IDY-01S	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.01
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
IDY-01S	.00	.00	.00	.00	.00	.03	.03	.03	.00	.00	.00	.00	.01

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												Average
	January	February	March	April	May	June	July	August	September	October	November	December	
<b>Intel Hudson Plant</b>													
Calibrated Transient Model													
INT-01G	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01
INT-02G	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
INT-01G	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18
INT-02G	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18
<b>Juniper Farms Country Club</b>													
Calibrated Transient Model													
AN-10G	0.00	0.00	0.00	0.01	0.09	0.13	0.17	0.17	0.12	0.04	0.00	0.00	0.06
AN-10G	.00	.00	.00	.01	.11	.16	.21	.20	.15	.05	.00	.00	.08
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
<b>Stow Acres Country Club</b>													
Calibrated Transient Model													
SCC-01S	0.00	0.00	0.00	0.00	0.03	0.05	0.16	0.15	0.12	0.06	0.01	0.00	0.05
SCC-02S	.00	.00	.00	.01	.03	.08	.12	.14	.08	.04	.01	.00	.04
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
SCC-01S	.00	.00	.00	.00	.03	.05	.16	.15	.12	.06	.01	.00	.05
SCC-02S	.00	.00	.00	.01	.03	.08	.12	.14	.08	.04	.01	.00	.04
<b>Acton Adams Street Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
AN-WWTF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AN-WWTF	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
<b>Hudson Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
HD-WWTF	2.39	2.50	3.04	3.05	2.53	2.38	1.99	1.86	1.86	1.92	1.97	2.05	2.30
HD-WWTF	2.76	2.89	3.51	3.52	2.92	2.74	2.30	2.15	2.15	2.22	2.28	2.36	2.65
Scenario of Increased Withdrawals and Discharges (Scenario 2)													

**Appendix 3.** Average monthly withdrawals and discharges at permitted municipal and nonmunicipal water-supply sources and wastewater-treatment facilities used in the calibrated transient model to simulate average 1997-2001 conditions and in a scenario of increased withdrawals and discharges in the Assabet River Basin, eastern Massachusetts.—Continued

[Site locations shown in figure 14. Additional information on sources provided in table 8. Mgal/d, million gallons per day]

Well identifier	Withdrawal or discharge rate (Mgal/d)												
	January	February	March	April	May	June	July	August	September	October	November	December	Average
<b>MCI Concord Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
MCI-WWTF	0.30	0.25	0.26	0.24	0.23	0.25	0.26	0.27	0.26	0.23	0.24	0.24	0.25
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
MCI-WWTF	.30	.25	.26	.24	.23	.25	.26	.27	.26	.23	.24	.24	.25
<b>Marlborough Westerly Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
MLW-WWTF	1.96	2.17	2.82	2.88	2.36	2.20	1.88	1.76	1.71	1.75	1.67	1.70	2.07
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
MLW-WWTF	2.74	3.02	3.93	4.01	3.30	3.07	2.63	2.46	2.38	2.44	2.33	2.37	2.89
<b>Maynard Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
MN-WWTF	1.14	1.21	1.41	1.44	1.17	1.15	0.97	0.89	0.86	0.93	0.91	0.93	1.09
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
MN-WWTF	1.53	1.62	1.88	1.92	1.57	1.54	1.29	1.20	1.16	1.24	1.22	1.24	1.45
<b>Middlesex School Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
MID-WWTF	0.02	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
MID-WWTF	.06	.07	.07	.07	.05	.05	.03	.03	.05	.05	.04	.05	.05
<b>Westborough Wastewater-Treatment Facility</b>													
Calibrated Transient Model													
WB-WWTF	5.52	5.81	7.07	6.80	5.43	5.25	4.38	4.27	4.27	4.91	4.67	4.83	5.27
Scenario of Increased Withdrawals and Discharges (Scenario 2)													
WB-WWTF	8.04	8.47	1.31	9.92	7.92	7.66	6.38	6.22	6.23	7.16	6.81	7.05	7.68

