

APPENDIX C

DWM 2003 LAKE SURVEY DATA IN THE CHICOPEE RIVER WATERSHED

In the Chicopee River Watershed, baseline lake surveys were conducted in July, August, and September 2003 to coincide with maximum growth of aquatic vegetation, highest recreational use, and highest lake productivity. Lake Lorraine, Quaboag Pond, and Quacumquasit Pond were sampled.

In situ measurements using the Hydrolab® (measures dissolved oxygen, water temperature, pH, conductivity, and depth and calculates total dissolved solids and % oxygen saturation) were recorded. At deep hole stations measurements were recorded at various depths creating profiles. In-lake samples were also collected and analyzed for alkalinity, total phosphorus, apparent color, and chlorophyll *a* (an integrated sample). Macrophyte mapping was also conducted at select lakes during 2003. The aquatic plant cover (native and non-native) and species distribution was mapped and recorded.

Procedures used for water sampling and sample handling are described both in an Assurance Project Plan (MassDEP 2003) and Baseline Lake Survey Quality Assurance Project Plan (MassDEP 2003b), and Lakes Nutrient Criteria Quality Assurance Project Plan (Mass2003c). The QAPP written for DWM Monitoring included monitoring to develop Total Maximum Daily Loads (TMDLs) for specific waterbodies (MassDEP 2003). All methods and complete Standard Operating Procedures are included in the above QAPPs and are available from MassDEP. Information about data quality objectives (accuracy, precision, detection limits, holding times, representativeness and comparability) is available in the 2003 Data Validation Report (MassDEP 2005b). Methods used to determine data quality are detailed in *Data Validation and Usability* (MassDEP 2005). Data were excerpted from the *Baseline Lake Survey 2003 Technical Memo* and presented in tables C1 and C2 (MassDEP 2007). Quality assurance and quality control data are presented in table C3.

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Table C1 (continued): 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes physico-chemical data

Lake Lorraine (PALIS: 36084)

Unique_ID: W1083 Station: A

Description: [deep hole, southeastern lobe, Springfield]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	RelDepth	Depth	Chl-a	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr			m	mg/m3	mg/L	mg/L	mg/L	mg/L	PCU
07/10/03	5.1	12:50	11.0												
				LC-0094	--	12:45	VDOR	nb	9.5	--	--	--	--	##* m	--
				LC-0093	LC-0307	12:35	MNGR	--	--	--	--	--	--	##* m	<15*
				LC-0307	LC-0093	12:35	MNGR	--	--	--	--	--	--	##* m	<15*
				LC-0095	LC-0096	13:00	DINT	--	0 - 7.0	6.0*	--	--	--	--	--
				LC-0096	LC-0095	13:05	DINT	--	0 - 7.0	5.3*	--	--	--	--	--

Table C1 (continued): 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes physico-chemical data

Quaboag Pond (PALIS: 36130)

Unique_ID: W1004 Station: A, Mile Point: -9

Description: [deep hole, East Brookfield]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	RelDepth	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr			m	mg/m3	mg/L	mg/L	mg/L	mg/L	mg/L	PCU
12/11/02	1.8	11:45	4.6													
				LB-2465	--	11:45	MNGR	--	--	--	--	--	--	--	0.019 h	--
01/30/03	**	**	**													
				LB-2467	LB-2468	12:05	MNGR	--	--	--	--	--	--	--	0.019	--
				LB-2468	LB-2467	12:05	MNGR	--	--	--	--	--	--	--	0.017	--
03/04/03	**	**	**													
				LB-2470	--	10:55j	MNGR	--	--	--	--	--	--	--	0.019	--
04/15/03	2.9	10:40	3.0													
				LB-2476	--	10:46	MNGR	--	--	--	<0.02	--	--	--	0.014	--
05/13/03	2.0	10:45	4.2													
				LB-2492	LB-2493	10:41	MNGR	--	--	--	--	--	--	--	0.028 h	--
				LB-2493	LB-2492	10:42	MNGR	--	--	--	--	--	--	--	0.029 h	--
06/17/03	1.8	11:00	4.4													
				LB-2605	--	11:15	VDOR	nb	4.0	--	--	--	--	--	0.056	--
				LB-2496	LB-2497	11:00	MNGR	--	--	--	--	--	--	--	0.029	50*
				LB-2497	LB-2496	11:00	MNGR	--	--	--	--	--	--	--	0.025	60*
				LB-2601	LB-2602	11:05	DINT	--	0 - 4.0	10.2* m	--	--	--	--	--	--
				LB-2602	LB-2601	11:05	DINT	--	0 - 4.0	9.7* m	--	--	--	--	--	--
07/30/03	1.8	11:40	4.0													
				LB-2502	--	11:35	VDOR	nb	3.5	--	--	--	--	--	##* fm	--
				LB-2500	LB-2501	11:30	MNGR	--	--	--	--	--	--	--	##* fm	65*
				LB-2501	LB-2500	11:30	MNGR	--	--	--	--	--	--	--	##* fm	60*

Table C1 (continued): 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes physico-chemical data

Quaboag Pond (PALIS: 36130) (continued)
 Unique_ID: W1004 Station: A, Mile Point: -9
 Description: [deep hole, East Brookfield]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	RelDepth	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
				LB-2503	LB-2504	11:45	DINT	--	0 - 3.5	24.9*	--	--	--	--	--	--
				LB-2504	LB-2503	11:45	DINT	--	0 - 3.5	27.3*	--	--	--	--	--	--
08/20/03	1.4	12:40	4.2													
				LB-2520	--	12:40	VDOR	nb	3.8	--	--	--	--	--	##* m	--
				LB-2518	LB-2519	12:25	MNGR	--	--	--	--	<0.02	0.55	--	##* m	75*
				LB-2519	LB-2518	12:25	MNGR	--	--	--	--	<0.02	0.52	--	0.041	65*
				LB-2522	--	12:30	DINT	--	0 - 3.8	35.1*	--	--	--	--	--	--
09/24/03	0.8	12:30	4.3													
				LB-2536	--	12:35	VDOR	nb	3.8	--	--	<0.06 h	--	0.75 bh	0.056 bh	--
				LB-2534	LB-2535	12:30	MNGR	--	--	--	--	<0.06 h	--	0.97 bh	0.060 bh	70* h
				LB-2535	LB-2534	12:31	MNGR	--	--	--	--	<0.06 h	--	1.0 bh	0.062 bh	70* h
				LB-2538	--	12:41	DINT	--	0 - 2.4	32.8*	--	--	--	--	--	--
10/22/03	1.6	12:30	4.0													
				LB-2555	--	12:10	VDOR	nb	3.5	--	--	--	--	--	0.035 fh	--
				LB-2553	LB-2554	12:00	MNGR	--	--	--	--	--	--	--	0.040 h	** *
				LB-2554	LB-2553	12:00	MNGR	--	--	--	--	--	--	--	0.037 h	** *
				LB-2556	LB-2557	12:15	DINT	--	0 - 3.5	** *	--	--	--	--	--	--
				LB-2557	LB-2556	12:15	DINT	--	0 - 3.5	** *	--	--	--	--	--	--
11/25/03	1.2	12:20	4.4													
				LB-2620	LB-2670	10:21	MNGR	--	--	--	--	--	--	--	0.048 h	55*
				LB-2670	LB-2620	10:22	MNGR	--	--	--	--	--	--	--	0.049 h	60*

Table C1 (continued): 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes physico-chemical data

Quacumquasit Pond (PALIS: 36131)
 Unique_ID: W1005 Station: A, Mile Point: -9
 Description: [deep hole, East Brookfield]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	RelDepth	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
	m	24hr	m			24hr			m	mg/m3	mg/L	mg/L	mg/L	mg/L	mg/L	PCU
01/30/03	**	**	**													
				LB-2466	--	12:45	MNGR	--	--	--	--	--	--	--	0.013	--
03/04/03	**	**	**													
				LB-2474	LB-2471	11:10j	MNGR	--	--	--	--	--	--	--	0.007	--
				LB-2471	LB-2474	11:40	MNGR	--	--	--	--	--	--	--	0.010	--
04/15/03	3.1	12:00	22.9													
				LB-2477	LB-2478	12:05	MNGR	--	--	--	<0.02	--	--	--	0.015	--
				LB-2478	LB-2477	12:05	MNGR	--	--	--	<0.02	--	--	--	0.013	--
05/13/03	3.8	11:15	22.2													
				LB-2494	--	11:15	MNGR	--	--	--	--	--	--	--	0.011 h	--
06/17/03	3.3	11:45	21.9													
				LB-2604	--	12:00	VDOR	nb	20.6	--	--	--	--	--	0.059	--
				LB-2498	--	11:45	MNGR	--	--	--	--	--	--	--	0.018	19*
				LB-2603	--	12:01	DINT	--	0 - 8.0	7.0* m	--	--	--	--	--	--
07/30/03	4.5	12:50	22.0													
				LB-2508	--	12:45	VDOR	nb	21.0	--	--	--	--	--	##* fm	--
				LB-2507	--	12:40	MNGR	--	--	--	--	--	--	--	##* fm	<15*
				LB-2606	LB-2607	13:00	DINT	--	0 - 8.0	10.6* d	--	--	--	--	--	--
				LB-2607	LB-2606	13:01	DINT	--	0 - 8.0	6.8* d	--	--	--	--	--	--
08/20/03	4.8	13:50	22.0													
				LB-2526	--	14:25	VDOR	nb	21.0	--	--	--	--	--	##* m	--
				LB-2524	LB-2525	13:55	MNGR	--	--	--	--	--	--	--	0.007	--

Table C1 (continued): 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes physico-chemical data

Quacumquasit Pond (PALIS: 36131) (continued)

Unique_ID: W1005 Station: A, Mile Point: -9

Description: [deep hole, East Brookfield]

Date	Secchi	Secchi Time	Station Depth	OWMID	QAQC	Time	SmpTyp	RelDepth	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
				LB-2525	LB-2524	13:55	MNGR	--	--	--	--	<0.02	0.23	--	##* m	<15*
				LB-2609	LB-2610	14:05	DINT	--	0 - 7.0	5.1*	--	--	--	--	--	--
				LB-2610	LB-2609	14:05	DINT	--	0 - 7.0	5.4*	--	--	--	--	--	--
09/24/03	4.2	13:30	21.5													
				LB-2542	--	13:25	VDOR	nb	21.0	--	--	<0.02 h	--	1.1 bh	0.055 bh	--
				LB-2541	--	13:15	MNGR	--	--	--	--	<0.02 h	--	0.23 bh	0.011 bh	19* h
				LB-2612	LB-2613	13:35	DINT	--	0 - 12.6	7.8*	--	--	--	--	--	--
				LB-2613	LB-2612	13:40	DINT	--	0 - 12.6	6.8*	--	--	--	--	--	--
10/22/03	5.0	13:00	20.0													
				LB-2615	--	13:20	VDOR	nb	19.0	--	--	--	--	--	0.071 fh	--
				LB-2559	--	13:10	MNGR	--	--	--	--	--	--	--	0.014 h	** *
				LB-2616	LB-2617	13:30	DINT	--	0 - 14.0	** *	--	--	--	--	--	--
				LB-2617	LB-2616	13:30	DINT	--	0 - 14.0	** *	--	--	--	--	--	--
11/25/03	1.4	13:15	22.6													
				LB-2625	--	13:15	MNGR	--	--	--	--	--	--	--	0.020 h	25*

Table C2: 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes *in-situ* data

Lake Lorraine (PALIS: 36084)

Unique_ID: W1083 Station: A

Description: [deep hole, southeastern lobe, Springfield]

Date	OWMID	Time (24hr)	Depth (m)	Temp (°C)	pH (SU)	Cond@ 25C (uS/cm)	TDS (mg/L)	DO (mg/L)	SAT (%)
07/10/03									
	LC-0097	11:11	0.5	26.8 u	7.0 c	165	106	8.2	104
	LC-0097	11:18	1.5	26.6	6.9 c	165	105	8.0	101
	LC-0097	11:24	2.5	26.5	6.9 c	165	105	7.8	99
	LC-0097	11:30	3.3	24.8 u	7.0 c	164	105	8.5	104
	LC-0097	11:36	4.0	22.4 u	6.8 u	167	107	7.8 u	91 u
	LC-0097	11:42	5.0	17.7 u	7.5 c	172	110	10.9	116
	LC-0097	11:50	5.9	13.0 u	7.5 cu	173	111	11.9	115
	LC-0097	11:59	7.4	9.1 u	7.1 uc	171	110	11.1	98
	LC-0097	12:05	8.4	7.7	6.7 u	172	110	10.0	85
	LC-0097	12:11	10.0	7.1	6.2 u	177 u	113 u	1.5 u	12 u

Quaboag Pond (PALIS: 36130)

Unique_ID: W1004 Station: A

Description: [deep hole, East Brookfield]

Date	OWMID	Time (24hr)	Depth (m)	Temp (°C)	pH (SU)	Cond@ 25C (uS/cm)	TDS (mg/L)	DO (mg/L)	SAT (%)
08/20/03									
	LB-2523	12:17	0.5	27.1	7.5 c	127	81.2	8.5	108
	LB-2523	12:26	1.5	26.7	7.5 cu	127	81.2	8.2 u	103 u
	LB-2523	12:34	2.0	24.9	6.4	122 u	77.8 u	2.3 u	28 u
	LB-2523	12:38	2.5	23.9 u	6.3	148 u	94.7 u	## u	## u
	LB-2523	12:43	3.6	20.7 u	7.2 c	214 u	137 u	<0.2	<2

Quacumquasit Pond (PALIS: 36131)

Unique_ID: W1005 Station: A

Description: [deep hole, East Brookfield]

Date	OWMID	Time (24hr)	Depth (m)	Temp (°C)	pH (SU)	Cond@ 25C (uS/cm)	TDS (mg/L)	DO (mg/L)	SAT (%)
08/20/03									
	LB-2611	13:41	0.5	26.9	7.4 c	89.8	57.5	8.2	104
	LB-2611	13:45	2.5	26.3	7.4 c	89.8	57.5	8.2	103
	LB-2611	13:53	4.0	25.2	7.0 c	89.2	57.1	8.6	106
	LB-2611	13:59	5.0	20.2 u	6.9 c	87.3	55.9	9.5 u	106 u
	LB-2611	14:06	9.0	8.4 u	6.2	84.2	53.9	5.0 u	43 u
	LB-2611	14:12	14.0	6.2	6.1	85.1	54.5	2.3	18
	LB-2611	14:21	18.0	5.8	6.2	89.3	57.1	<0.2	<2
	LB-2611	14:27	21.0	5.7	7.2 c	158 u	101 u	<0.2	<2

Table C3: 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes Quality Assurance/Quality control data

Lake Lorraine (PALIS: 36084)

Unique_ID: W1083 Station: A

Description: [deep hole, southeastern lobe, Springfield]

Date	OWMID	QAQC	Time (24hr)	Depth (m)	Chl-a mg/m3	NO3-NO2-N mg/L	TKN mg/L	TN mg/L	TP mg/L	AppColor PCU
7/10/2003	LC-0093	LC-0307	12:35	--	--	--	--	--	##* m	<15*
7/10/2003	LC-0095	LC-0096	13:00	0 - 7.0	6.0*	--	--	--	--	--
7/10/2003	LC-0096	LC-0095	13:05	0 - 7.0	5.3*	--	--	--	--	--
7/10/2003	LC-0307	LC-0093	12:35	--	--	--	--	--	##* m	<15*
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			12.4%	--	--	--	--	0.0%

Table C3: 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes Quality

Assurance/Quality control data

Quaboag Pond (PALIS: 36130)

Unique_ID: W1004 Station: A

Description: [deep hole, East Brookfield]

Date	OWMID	QAQC	Time	Depth	Chl-a	NH3-N	NO3-NO2-N	TKN	TN	TP	AppColor
	--	--	(24hr)	(m)	mg/m3	mg/L	mg/L	mg/L	mg/L	mg/L	PCU
1/30/2003	LB-2467	LB-2468	12:05	--	--	--	--	--	--	0.019	--
1/30/2003	LB-2468	LB-2467	12:05	--	--	--	--	--	--	0.017	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	11.1%	--
5/13/2003	LB-2492	LB-2493	10:41	--	--	--	--	--	--	0.028 h	--
5/13/2003	LB-2493	LB-2492	10:42	--	--	--	--	--	--	0.029 h	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	3.5%	--
6/17/2003	LB-2496	LB-2497	11:00	--	--	--	--	--	--	0.029	50*
6/17/2003	LB-2497	LB-2496	11:00	--	--	--	--	--	--	0.025	60*
6/17/2003	LB-2601	LB-2602	11:05	0 - 4.0	10.2* m	--	--	--	--	--	--
6/17/2003	LB-2602	LB-2601	11:05	0 - 4.0	9.7* m	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			5.0%	--	--	--	--	14.8%	18.2%
7/30/2003	LB-2500	LB-2501	11:30	--	--	--	--	--	--	##* fm	65*
7/30/2003	LB-2501	LB-2500	11:30	--	--	--	--	--	--	##* fm	60*
7/30/2003	LB-2503	LB-2504	11:45	0 - 3.5	24.9*	--	--	--	--	--	--
7/30/2003	LB-2504	LB-2503	11:45	0 - 3.5	27.3*	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			9.2%	--	--	--	--	--	8.0%
8/20/2003	LB-2518	LB-2519	12:25	--	--	--	<0.02	0.55	--	##* m	75*
8/20/2003	LB-2519	LB-2518	12:25	--	--	--	<0.02	0.52	--	0.041	65*
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	0.0%	5.6%	--	--	14.3%
9/24/2003	LB-2534	LB-2535	12:30	--	--	--	<0.06 h	--	0.97 bh	0.060 bh	70* h
9/24/2003	LB-2535	LB-2534	12:31	--	--	--	<0.06 h	--	1.0 bh	0.062 bh	70* h
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	0.0%	--	3.0%	3.3%	0.0%
10/22/2003	LB-2553	LB-2554	12:00	--	--	--	--	--	--	0.040 h	** *
10/22/2003	LB-2554	LB-2553	12:00	--	--	--	--	--	--	0.037 h	** *
10/22/2003	LB-2556	LB-2557	12:15	0 - 3.5	** *	--	--	--	--	--	--
10/22/2003	LB-2557	LB-2556	12:15	0 - 3.5	** *	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	7.8%	--
11/25/2003	LB-2620	LB-2670	10:21	--	--	--	--	--	--	0.048 h	55*
11/25/2003	LB-2670	LB-2620	10:22	--	--	--	--	--	--	0.049 h	60*
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	2.1%	8.7%

Table C3: 2003 MassDEP DWM Chicopee River Watershed Baseline Lakes Quality Assurance/Quality control data

Quacumquasit Pond (PALIS: 36131)

Unique_ID: W1005 Station: A

Description: [deep hole, East Brookfield]

Date	OWMID	QAQC	Time (24hr)	Depth (m)	Chl-a mg/m3	NH3-N mg/L	NO3-NO2-N mg/L	TKN mg/L	TN mg/L	TP mg/L	AppColor PCU
	--	--									
3/4/2003	LB-2471	LB-2474	11:40	--	--	--	--	--	--	0.010	--
3/4/2003	LB-2474	LB-2471	11:10j	--	--	--	--	--	--	0.007	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	35.3%	--
4/15/2003	LB-2477	LB-2478	12:05	--	--	<0.02	--	--	--	0.015	--
4/15/2003	LB-2478	LB-2477	12:05	--	--	<0.02	--	--	--	0.013	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	0.0%	--	--	--	14.3%	--
7/30/2003	LB-2606	LB-2607	13:00	0 - 8.0	10.6* d	--	--	--	--	--	--
7/30/2003	LB-2607	LB-2606	13:01	0 - 8.0	6.8* d	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			43.7%	--	--	--	--	--	--
8/20/2003	LB-2524	LB-2525	13:55	--	--	--	--	--	--	0.007	--
8/20/2003	LB-2525	LB-2524	13:55	--	--	--	<0.02	0.23	--	##* m	<15*
8/20/2003	LB-2609	LB-2610	14:05	0 - 7.0	5.1*	--	--	--	--	--	--
8/20/2003	LB-2610	LB-2609	14:05	0 - 7.0	5.4*	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			5.7%	--	--	--	--	--	--
9/24/2003	LB-2612	LB-2613	13:35	0 - 12.6	7.8*	--	--	--	--	--	--
9/24/2003	LB-2613	LB-2612	13:40	0 - 12.6	6.8*	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			13.7%	--	--	--	--	--	--
10/22/2003	LB-2616	LB-2617	13:30	0 - 14.0	** *	--	--	--	--	--	--
10/22/2003	LB-2617	LB-2616	13:30	0 - 14.0	** *	--	--	--	--	--	--
<i>Relative</i>	<i>Percent</i>	<i>Difference</i>			--	--	--	--	--	--	--

Data Qualifiers

The following data qualifiers or symbols are used in the MassDEP/DWM Water Quality Database (WQD) for qualified and censored water quality and multi-probe data. Decisions regarding censoring vs. qualification for specific, problematic data are made based on a thorough review of all pertinent information related to the data.

General Symbols (applicable to all types):

“ ## ” = Censored data (i.e., data that has been discarded for some reason). NOTE: Prior to 2001 data,

“***” denoted either censored or missing data.

“ ** ” = Missing data (i.e., data that should have been reported). See NOTE above.

“ -- ” = No data (i.e., data not taken/not required)

* = Analysis performed by Laboratory OTHER than DEP’s Wall Experiment Station (WES)

[] = A result reported inside brackets has been “censored”, but is shown for informational purposes (e.g., high blank results).

Multi-probe-specific Qualifiers:

“ i ” = inaccurate readings from Multi-probe likely; may be due to significant pre-survey calibration problems, post-survey calibration readings outside typical acceptance range for the low ionic check and for the deionized blank water check, lack of calibration of the depth sensor prior to use, or to checks against laboratory analyses.

“i” = General Depth Criteria: Apply to each OWMID#
- Clearly erroneous readings due to faulty depth sensor: **Censor (i)**
- **Negative and zero depth readings: Censor (i); (likely in error)**
- **0.1 m depth readings: Qualify (i); (potentially in error)**
- **0.2 and greater depth readings: Accept without qualification; (likely accurate)**

Specific Depth Criteria: Apply to entirety of depth data for survey date

- If zero and/or negative depth readings occur more than once per survey date, censor all negative/zero depth data, and qualify all other depth data for that survey (indicates that erroneous depth readings were not recognized in the field and that corrective action (field calibration of the depth sensor) was not taken, ie. that all positive readings may be in error.)

“ m ” = method not followed; one or more protocols contained in the DWM Multi-probe SOP not followed, ie. operator error (eg. less than 3 readings per station (rivers) or per depth (lakes), or instrument failure not allowing method to be implemented.

“ s ” = field sheet recorded data were used to accept data, not data electronically recorded in the Multi-probe surveyor unit, due to operator error or equipment failure.

“ u ” = unstable readings, due to lack of sufficient equilibration time prior to final readings, non-representative location, highly-variable water quality conditions, etc. See Section 4.1 for acceptance criteria.

“ c ” = greater than calibration standard used for pre-calibration, or outside the acceptable range about the calibration standard. Typically used for conductivity (>718, 1,413, 2,760, 6,668 or 12,900 uS/cm) or turbidity (>10, 20 or 40 NTU). It can also be used for TDS and Salinity calculations based on qualified (“c”) conductivity data, or that the calculation was not possible due to censored conductivity data (TDS and Salinity are calculated values and entirely based on conductivity reading). See Section 4.1 for acceptance criteria.

“ r ” = data not representative of actual field conditions.

“ ? ” = Light interference on Turbidity sensor (Multiprobe error message). Data is typically censored.

Sample-Specific Qualifiers:

“ a ” = accuracy as estimated at WES Lab via matrix spikes, PT sample recoveries, internal check standards and lab-fortified blanks did not meet project data quality objectives identified for program or in QAPP.

“ b ” = blank Contamination in lab reagent blanks and/or field blank samples (indicating possible bias high and false positives).

“ d ” = precision of field duplicates (as RPD) did not meet project data quality objectives identified for program or in QAPP. Batched samples may also be affected.

“ e ” = not theoretically possible. Specifically, used for bacteria data where colonies per unit volume for e-coli bacteria > fecal coliform bacteria, for lake Secchi and station depth data where a specific Secchi depth is greater than the reported station depth, and for other incongruous or conflicting results.

“ f ” = frequency of quality control duplicates did not meet data quality objectives identified for program or in QAPP.

“ h ” = holding time violation (usually indicating possible bias low)

“ j ” = ‘estimated’ value; used for lab-related issues where certain lab QC criteria are not met and re-testing is not possible (as identified by the WES lab only). Also used to report sample data where the sample concentration is less than the ‘reporting’ limit or RDL and greater than the method detection limit or MDL (mdl < x < rdl). Also used to note where values have been reported at levels less than the mdl.

“ m ” = method SOP not followed, only partially implemented or not implemented at all, due to complications with sample matrix (eg. sediment in sample, floc formation), lab error (eg. cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, and missing data.

“ p ” = samples not preserved per SOP or analytical method requirements.

“ r ” = samples collected may not be representative of actual field conditions, including the possibility of “outlier” data and flow-limited conditions (e.g., pooled).

Sample codes for sampling:

OWMID: Office of Watershed Management Identification Code for the bottle.

QAQC: the OWMID codes (e.g. LB-1903) refer to the field duplicate sample (usually immediately above or below in the table) to be compared with the current sample.

Time: Local time.

SymTyp: Sample Type- VDOR= Van Dorn; DINT= Depth integrated by vertical hose; MNGR= Manual Grab; NR= not recorded.

RelDepth: Relative Depth- s= Near Surface; m= middle depth; nb= near bottom.

References

MassDEP. 2003a. CN 127.0 *DWM Monitoring Quality Assurance Project Plan*. Massachusetts Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

MassDEP. 2003b. CN 128.0 *Baseline Lake Survey Quality Assurance Project Plan*. Massachusetts Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

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MassDEP. 2005b. *CN 211.0 Data Validation Report for Year 2003 Project Data*. MassDEP, Division of Watershed Management, Worcester, MA. Nov. 2005.

MassDEP. 2007. *Baseline Lake Survey 2003, CN 205.0*. TM-S-16. Massachusetts Department of Environmental Protection, Division of Watershed Management, Worcester, MA.