Massachusetts Department of ENVIRONMENTAL PROTECTION

APPENDIX B

CHICOPEE RIVER WATERSHED: 2003 WATER QUALITY TECHNICAL MEMOMORANDUM (TM36-3)

Prepared by Greg DeCesare

2006

DWM Control Number CN 106.2

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Robert W. Golledge Jr., Secretary
Massachusetts Department of Environmental Protection
Arleen O'Donnell Acting Commissioner
Bureau of Resource Protection
Glenn Haas, Acting Assistant Commissioner
Division of Watershed Management
Glenn Haas, Director

Table of Contents

List of Tables and Figures

INTRODUCTION AND PROJECT OBJECTIVES

The Division of Watershed Management (DWM) 2003 water quality monitoring plan for the Chicopee River Watershed was developed by DWM in consultation with the former Executive Office of Environmental Affairs (EOEA) Chicopee Watershed Team, a coalition of government and non-government groups. The monitoring strategy was guided primarily by suggestions of members of the EOEA Chicopee Watershed Team and DWM's review of previous surveys. Priority monitoring needs addressed by DWM included sampling for water chemistry, bacteria, macroinvertebrate biomonitoring, fish population studies, and fish toxics monitoring. This technical memorandum presents the DWM lotic water quality sampling component of the survey. Results of the other monitoring efforts mentioned above are described in separate DWM memoranda or reports.

The 1998 DWM Chicopee Assessment Report (MassDEP, 2001a) identified several segments that lacked sufficient water quality data for evaluation and also flagged several sites with potential water quality problems that needed more water chemistry data for adequate assessment. Several sites were also included in order to evaluate impacts from known or suspected sources of pollution to specific areas of the watershed. To address some of these water quality sampling needs, DWM conducted water quality sampling surveys from June through October 2003, which included *in-situ* water quality measurements and collection of water quality samples. Three water quality sampling surveys were pre-dawn surveys intended to capture dissolved oxygen minima. In order to address a Total Maximum Daily Load for Quaboag Pond and Quamcuasit Pond additional sampling also occurred during 2003. The following stations were part of that study: QAOBO, QA100, EB04, CRN01, SM02, SMG, EB04A, SM01, and two stations not located on segments. These two stations are QP011 (the connection between Quaboag and Quamcuasit Pond) and SPEFF (the Spencer wastewater treatment plant's final effluent channel). TMDL stations often had different sampling parameters and frequency. For a complete list of all sampling sites, parameters measured, and their frequency see Table 1.

QUALITY ASSURANCE AND QUALITY CONTROL

A Quality Assurance Project Plan (MassDEP 2003a;CN 127.0) was written for the DWM water quality sampling surveys in 2003. Procedures used were consistent with the prevailing DWM sampling protocols that are described in the *Sample Collection Techniques for DWM Surface Water Quality Monitoring, Standard Operating Procedure* (MassDEP 2003b; CN 1.2). For all water quality surveys, quality control samples (field blanks and sample duplicates) were taken at a minimum of one each per analyte per crew per survey. All water quality and bacteria samples were delivered to the Wall Experiment Station (WES), the department's analytical laboratory in Lawrence or Severn Trent Laboratory (STL) within holding time allowances for analysis.

DWM quality assurance and database management staff reviewed lab data reports and all multi-probe data. The data were validated and finalized per data validation procedures outlined in DWM SOP CN 56.2 (MassDEP, 2005a). In general, all water sample data were validated by reviewing Quality Control (QC) sample results, analytical holding time compliance, QC sample frequency and related ancillary data/documentation (at a minimum). A complete summary of censoring and qualification decisions for all 2003 DWM data is provided in the CN 211.0 – Draft DWM Data Validation Report for Year 2003 Project Data (MassDEP, 2005b).

Appendix 1 of this technical memorandum contains data censoring/qualification decisions for the 2003 Chicopee Watershed data. Definitions for the data qualifiers are also included in Appendix 1. This information was excerpted from the CN211. 0 – Draft DWM Data Validation Report for Year 2003 Project Data (MADEP, 2005b).

SURVEY METHODS

Information pertaining to station location, rationale, and objectives is available in the 2003 QAPP (CN 127.0, MADEP 2003a). As part of the core 2003 sampling effort, personnel from DWM and Mass DEP's CERO, Strategic Monitoring and Assessment for River basin Teams (SMART) performed daytime *in-situ*

water quality measurements and collected water quality samples at 35 stations in total for each of six surveys. *In- situ* parameters measured using a multiprobe included dissolved oxygen, percent saturation, pH, conductivity, temperature, and total dissolved solids. All stations were sampled by four different crews on each day of the survey. Surveys were conducted on the following dates in 2003: April 16, May 14, June 18, July 30, August 20, and October 15. In addition, pre-dawn *in-situ* water quality measurements were made at all stations on the following mornings in 2003: June 19, July 31, and August 21. A different sampling frequency was used at some stations included in this report (see Table 1 for complete details).

Water quality samples were analyzed at WES for turbidity and nutrients (nitrogen as NH3, and total phosphorus) with the exception of the October 15th survey when the nutrient samples were analyzed by STL. Samples collected for total suspended solids, fecal coliform bacteria, and *E. coli* were analyzed at STL. Each survey crew also took a minimum of one ambient field blank and one field duplicate sample per analyte during each survey for quality control purposes.

Prior to the collection of samples, riparian vegetation, observed uses, potential pollution sources, the presence/absence of objectionable deposits (trash and debris and scum), the percentage of periphyton/algae/aquatic plants covering the sampling reach, and sampling conditions were recorded on DWM field sheets.

Procedures used for water sampling and sample handling are described in the *Sample Collection Techniques for DWM Surface Water Quality Monitoring, Standard Operating Procedure* (MassDEP, 2003b) and *Hydrolab Series 3/Series 4 Multiprobe Standard Operating Procedure* (MassDEP 2001b). WES supplied all sample bottles and field preservatives, which were prepared according to the WES *Laboratory Quality Assurance Plan and Standard Operating Procedures* (MassDEP 2003c). Samples were transported on ice to WES and STL where they were analyzed by methods according to each laboratory's standard operating procedures. A summary of the analytical methods employed in 2003 can be found in Table 2.

Sampling Sites, Descriptions, Rationale, Parameters and Frequency for Chicopee River Watershed Monitoring

Waterbody (Segment)	Station ID# (Unique ID)	Site Description	Justification	Parameters	Frequency (# occasions)
Chicopee River (MA36-25)	CT03 (W0475)	Rt. 116 Bridge (alt sta. Rt. 33 bridge), Chicopee	Not assessed in 1998/downstream from Uniroyal Hazardous waste site, Eastern Etching, several other NPDES dischargers/12 CSOs,	1,2,3,4	Single grab samples (6) and Multiprobe (7 including 2 predawn).
Chicopee River (MA36-24)	CH06 (W1031)	West St. Bridge, Indian Orchard; Springfield	Not assessed in 1998/ 13 CSOs	1,2,3,4	Same as above
Chicopee River (MA36-23)	CH02B (W1032)	Miller Street bridge, Wilbraham	Not assessed in 1998/downstream from Red Bridge Impoundment/FERC hydromodification issues for Aquatic Life	1,2,3,4	Same as above
Chicopee River (MA36-22)	CH01 (W1033)	Near Intersection New Hampshire Ave and Springfield Street, Palmer	Not assessed in 1998/ CSOs present/downstream from Palmer WWTP discharge/upstream from Red Bridge FERC	1,2,3,4	Same as above
Abbey Brook (MA36-40)	AB01 (W1026)	Front Street bridge, Chicopee	Previously unassessed/PVPC identified as "likely contributing contaminants having a negative effect on water quality and habitat"	1,2,3,4	Same as above
Cooley Brook (MA36-38)	COOL01 (W1028)	Fuller Road bridge, Chicopee	Previously unassessed/PVPC also identified as "likely contributing contaminants…"/downstream of Westover AFB	1,2,3,4	Same as above
Poor Brook MA36-39)	POOR01 (W1027)	East Main Street bridge (141), Chicopee	Previously unassessed/PVPC also identified as "likely contributing contaminants…"/very urban-industrial disturbed watershed	1,2,3,4	Single grab samples (12) and Multiprobe (7 including 2 predawn).
Fuller Brook MA36-41)	FULL01 (W1029)	Shawinigan Dr., Chicopee	Previously unassessed/PVPC also identified as "likely contributing contaminants…"/Downstream from Chicopee Sanitary Landfill and the Mass Pike	1,2,3,4	Single grab samples (6) and Multiprobe (7 including 2 predawn).
Higher Brook (natural extension of fuller brook) (MA36-42)	FULL02 (W1030)	West St. @ Roy St., Ludlow	Previously unassessed/PVPC also identified as "likely contributing contaminants…"/upstream from Chicopee Sanitary Landfill and the Mass Pike	1,2,3,4	Same as above
[1]Quaboag River (MA36-17)	QA09A (W1015)	Palmer St. bridge, Palmer	Unassessed in 1998/CSOs	1,2,3,4	Single grab samples (6) and Multiprobe (9 including 3 predawn)
Quaboag River (MA36-16)	QRG (W0491)	Off Rt 67 @ USGS flow gage, SMART station, West Brimfield/ Palmer	Downstream from Warren WWTP, mostly non-support 1998, high bacteria during dry conditions, also dyes pass through the WWTP untreated turning the river red	1,2,3,4	Single grab sample (1) and Multiprobe (4 including 3 predawn)

1 = multiprobe day (DO, %DO, pH, specific conductance, temp), 2 = multiprobe predawn, 3 = nutrients/solids (Total Suspended Solids, Ammonia Nitrogen, Total Phosphorus, turbidity), 4 = bacteria (Fecal Coliform and *E. coli*), 5= Chloride, Alkalinity, Hardness, 6-Nitrogen (N03-NO2-N, TKN, TN)

Waterbody (Segment)	Station ID# (Unique ID)	Site Description	Justification	Parameters	Frequency (# occasions)
Quaboag River (MA36-15)	QA06A (W1011)	Gilbert Road bridge, West Warren	Upstream of Warren WWTP and downstream from Wm. E. Wright NPDES discharge, DWM bio in 1998, but no water quality in 1998	1,2,3,4	Single grab samples (6) and Multiprobe (9 including 3 predawn)
Quaboag River (MA36-14)	QAOBO (W1010)	Davis Road (Long Hill Road Bridge), West Brookfield	Not assessed in 1998, downstream from Brookfield Wire Co. NPDES discharge, SPENCER WWTP/TMDL station	1,2,3,4	Same as above
Quaboag River (MA36-14)	QA100 (W1041)	Rt. 148 bridge, Brookfield	Not assessed in 1998, upstream of Brookfield Wire Co. NPDES discharge, SPENCER WWTP/TMDL station	1,2,3,4	Single grab samples (14) and Multiprobe (8 including 3 predawn)
Forget-Me-Not Brook (MA36-18)	DB08 (W1040)	E. Brookfield Rd. bridge (north), N. Brookfield	Upstream of North Brookfield WWTP	1,2,3,4	Single grab samples (6) and Multiprobe (8 including 3 predawn)
Forget-Me-Not Brook (MA36-28)	DB07 (W1039)	E. Brookfield Rd. bridge (south), N. Brookfield	Downstream from North Brookfield WWTP	1,2,3,4	Single grab samples (6) and Multiprobe (8 including 3 predawn)
Dunn Brook (MA36-19)	DUN01 (W1042)	Quaboag St. bridge, Brookfield	Downstream from North Brookfield WWTP	1,2,3,4	Single grab samples (7) and Multiprobe (8 including 3 predawn)
Ware River (MA36-07)	WA12 (W1014)	Palmer St. bridge, Palmer	Most downstream station on the Ware before Three Rivers, downstream from 4 WWTPs and other NPDES discharges; only Aquatic Life assessed in 1998 (support)	1,2,3,4	Single grab samples (6) and Multiprobe (9 including 3 predawn)
Ware River (MA36-06)	WA09A (W0492)	Rt. 32 bridge – Gibbs Crossing, Ware	Below Ware WWTP (& others), SMART station, CSO #19 for Palmer plugged in 2003, downstream USGS gage	1,2,3,4	Single grab samples (2) and Multiprobe (4 including 3 predawn)
Ware River (MA36-05)	WA06A (W1009)	Upper Church St. bridge, Ware	Upstream of Ware WWTP, downstream from Gilbertville and Wheelwright WWTPs (& others)	1,2,3,4	Single grab samples (6) and Multiprobe (9 including 3 predawn)
Ware River (MA36-05)	WAX (W1008)	Creamery Road bridge, New Braintree	Upstream of Gilbertville WWTP, below Wheelwright WWTP	1,2,3,4	Same as above
Ware River (MA36-04)	WAIR (W1007)	Airport Road (alt. Hardwick Rd), Barre	Upstream of Wheelwright WWTP, downstream from Barre WWTP; mostly unassessed in 1998	1,2,3,4	Single grab samples (12) and Multiprobe (9 including 3 predawn)
Ware River (MA36-03)	CBG (W094)	Off Rt. 122 @ USGS flow gage, Barre	Just upstream Powder Mill Pond/Martone Landfill, downstream from MDC intake, SMART station	1,2,3,4	Single grab samples (1) and Multiprobe (4 including 3 predawn)
[2]Ware River (MA36-03)	WAWV (W1006)	New Braintree Rd. bridge, White Valley, S. Barre	Just downstream Powder Mill Pond/Martone Landfill	1,2,3,4,5,6	Single grab samples (6) and Multiprobe (9 including 3 predawn)

1 = multiprobe day (DO, %DO, pH, specific conductance, temp), 2=multiprobe night, 3 = nutrients/solids (Total Suspended Solids, Ammonia Nitrogen, Total Phosphorus , turbidity), 4 = bacteria (Fecal Coliform and E. coli), 5= Chloride, Alkalinity, Hardness, 6-Nitrogen (N03-NO2-N, TKN, TN)

Waterbody (Segment)	Station ID# (Unique ID)	Site Description	Justification	Parameters	Frequency (# occasions)
Swift River (MA36-10)	SR02 (W1013)	Rt 181/State St., Palmer	Downstream from Bondsville Dam, Old Bondsville Factory-hazardous waste site, CSO's, not assessed in 1998	1,2,3,4	Single grab samples (6) and Multiprobe (9 including 3 predawn)
Swift River (MA36-09)	SRG (W0493)	off River Road, at USGS flow gage, west of River Road, Ware/ Belchertown	SMART station, upstream from Old Bondsville Factory hazardous waste site and McLaughlin Fish Hatchery, downstream of Quabbin Reservoir	1,2,3,4	Single grab sample(1) and Multiprobe (4 including 3 predawn
Swift River (MA36-09)	SR03 (W1012)	Cold Spring Road, Belchertown/ Ware	Above Old Bondsville Factory Hazardous Waste Site, below McGlaughlin Hatchery	1,2,3,4,5,6	Single grab samples (6) and Multiprobe (9 including 3 predawn)
East Brookfield River (MA36-13)	EB04 (W1038)	Rt. 9 bridge, E. Brookfield	Outlet of Lake Lashaway, SPENCER WWTP/TMDL station, not assessed in 1998	1,2,3,4	10 grab samples, Multiprobe (8 including 3 predawn)
Cranberry Brook (MA36-20)	CRN01 (W1035)	So. Spencer Rd., Spencer	Above Spencer WWTP, SPENCER WWTP/TMDL station, not assessed in 1998	1,2,3,4	Same as above
Seven Mile River (MA36-12)	SM02 (W1037)	Rt. 49 bridge, Spencer	Below Spencer WWTP, SPENCER WWTP/TMDL station, not assessed in 1998	1,2,3,4	Same as above
Seven Mile River (MA36-11)	SMG (W0490)	Cooney Road bridge, Spencer	Above Spencer WWTP, SPENCER WWTP/TMDL station, not assessed in 1998, SMART station	1,2,3,4	2 grab samples, Multiprobe (4 including 3 predawn)
Quaboag/ Quacumquasit Ponds - flow gate (not a segment)	QP011 (W1267)	Lake Road, Brookfield/ E. Brookfield	Water flow & direction controlled	3,4	2 grab samples
East Brookfield River (MA36-13)	EB04A (W1016)	Shore Rd. bridge, E. Brookfield	Inlet to Quaboag Pond, SPENCER WWTP/TMDL station, not assessed in 1998	1,2,3,4	Grab samples (10) Multiprobe (8 including 3 predawn)
Seven Mile River (MA36-11)	SM01 (W1036)	Rt. 9 bridge, Spencer	Above Spencer WWTP, SPENCER WWTP/TMDL station, not assessed in 1998	1,2,3,4	Same as above
Spencer WWTP discharge	SPEFF (W1034) also called station MA0100919	Treatment Plant off Rt. 9, Spencer	SPENCER WWTP/TMDL station, sample the discharge before mixing	3,4	, Grab samples (10)

1 = multiprobe day (DO, %DO, pH, specific conductance, temp), 2=multiprobe night, 3 = nutrients/solids (Total Suspended Solids, Ammonia Nitrogen, Total Phosphorus , turbidity), 4 = bacteria (Fecal Coliform and E. coli), 5= Chloride, Alkalinity, Hardness, 6-Nitrogen (N03-NO2-N, TKN, TN)

Page Intentionally Left Blank

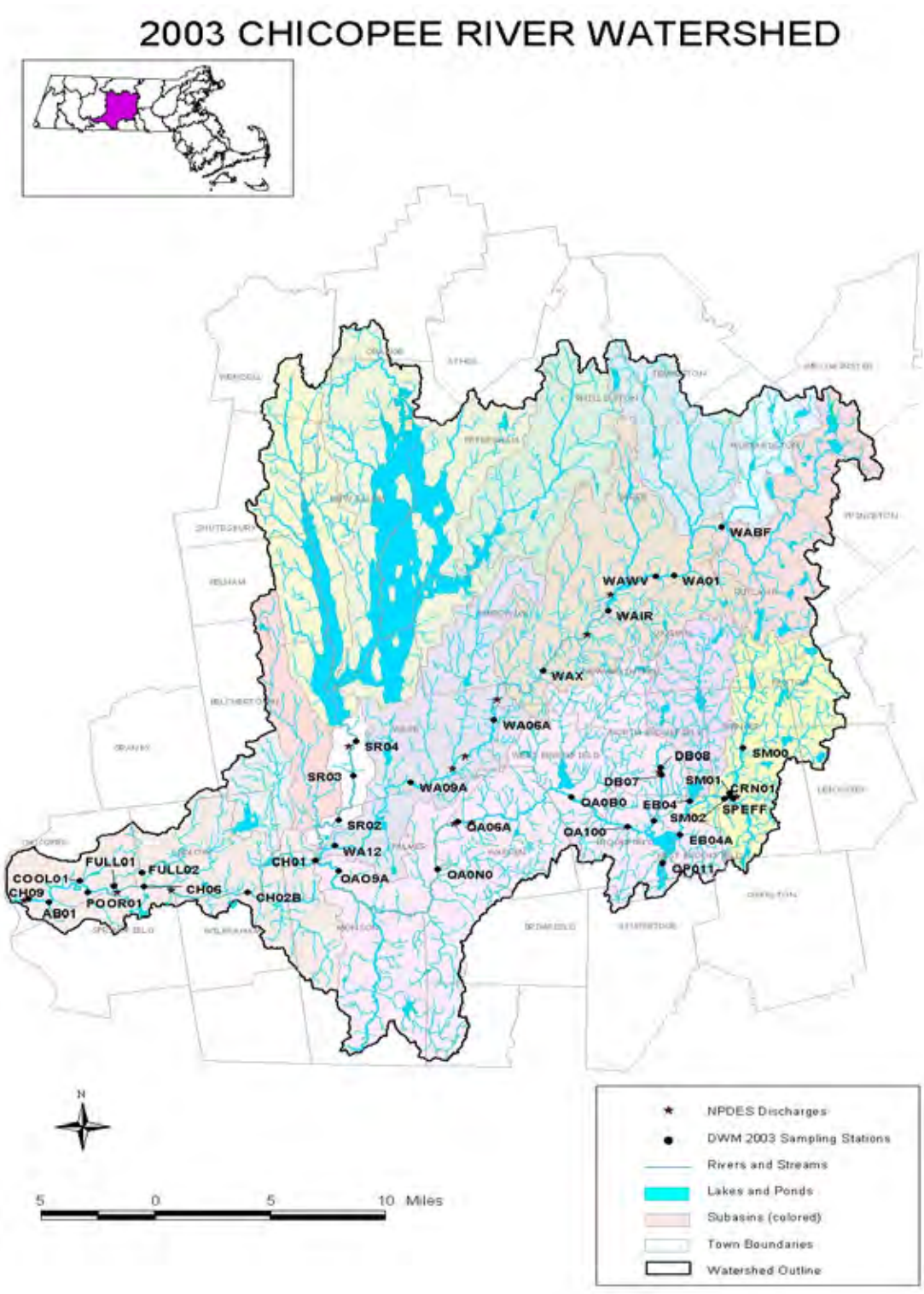


Figure 1: Location of 2003 DEP/DWM Water Quality Sampling Stations in the Chicopee Watersheds**.**

Table 2. WES/DWM Analytical Methods & MDLs for 2003 Water Quality Analytes

Water Quality Analyte	Method *	MDL **	RDL **
Hydrolab® Multiprobe Series 3 and (4)	DWM SOP (CN 4.2)	NA	NA
YSI 600 XLM	DWM SOP (CN 4.2)	NA	NA
Apparent Color (DWM)	SM 2120 B	15 PCU	15 PCU
Total Phosphorus	SM 4500-P-E	0.005 mg/l	0.015 mg/l
Dissolved Reactive P	SM 4500-P-A, B1, E	0.010 mg/l	0.020 mg/l
Alkalinity	SM 2320 B	2 mg/l	2 mg/l
Hardness	SM 2340 B; EPA 200.7	0.66 mg/l	2.0 mg/l
Chloride	SM 4500 Cl B	1 mg/l	1 mg/l
TSS	SM 2540 D	1.0 mg/l	1.0 mg/l
NH3-N	EPA 350.1	0.02 mg/l	0.06 mg/l
NO3-NO2-N	EPA 353.1	0.02 mg/l	0.06 mg/l
TKN	EPA 351.2	0.10 mg/l	0.30 mg/l
Total Nitrogen	USGS 1265003	0.040 mg/l	0.12 mg/l
Turbidity	SM 2130 B	0.10 NTU	0.36 NTU
Turbidity (DWM)	SM 2130 B	0.1 NTU	0.2 NTU
Chlorophyll a (DWM)	SM 10200 H	1 ug/l	1 ug/l
Fecal Coliform ***	SM 9222D	6 CFU/100mls	6 CFU/100mls
E. coli ***	EPA 1603 (also modified 1103.1)	6 CFU/100mls	6 CFU/100mls
Total Phosphorus	SM 4500-P-E	0.005 mg/l	0.02 mg/l
TSS (STL)	EPA 160.2	ND	2 mg/l
NH3-N (STL)	LAC 107061B	ND	0.10 mg/l
Turbidity (STL)	EPA 180.1	ND	0.10 NTU
Fecal Coliform (STL)	SM 9222D	0 CFU/100mls	0 CFU/100mls
E. coli (STL)	EPA 1103.1 modified	0 CFU/100mls	0 CFU/100mls
Total Phosphorus (STL)	SM 4500-P-E	0.002 mg/l	0.002 mg/l

***** = "Methods for Chemical Analysis of Water and Wastes", Environmental Protection Agency, Environmental Monitoring Systems Laboratory – Cincinnati (EMSL-CI), EPA-600/4-79-020, Revised March 1983 and 1979 where applicable.
****** = Standard Methods, Examination of Water and Wastewater, 20th edition
*** = Method used for samples analyzed on 10/24/01

STATION OBSERVATIONS
Station observations were recorded on field sheets for each survey by a DWM investigator. Station observations are described below for each DWM sampling event (see Table 1 for survey frequency).

CT03, Chicopee River, Rte. 116 Bridge, Chicopee, MA (MA36-25)

This site is downstream from the Uniroyal hazardous waste site, Eastern Etching's NPDES discharge and several other NPDES dischargers as well as 12 combined sewer overflows (CSOs) The surrounding land use is urban development and potential sources of pollution include storm drains under bridge, urban runoff, and upstream industries. The site was accessed on the north side of the bridge (the upstream side) by walking down the path next to the bridge. On the left bank of the river there is the Abbott mill building. The left bank had minimal vegetation and a mill wall with an approximate length of 400 meters. The right bank is steep and both banks had some hardwood trees and shrubs.

No objectionable deposits, scums or water odor were recorded by DWM field crews. The water clarity was described as clear or slightly turbid when noted. Minimal erosion was noted on two occasions. Although aquatic plant density was characterized as unobservable on the majority of sampling days, on August 20th aquatic plant density was noted to be moderate and composed of submerged plants, principally moss on rocks and milfoil (*Myriophyllum sp*.). Sparse periphyton coverage was noted on two occasions (April 16th and July 30th) while moderate coverage was noted on May 15th and August 20th. On the remaining sampling days periphyton coverage was unobservable or not recorded. On June 18th phytoplankton presence was described as sparse while the majority of occasions when observable or recorded no phytoplankton were noted. On April 16th the water level was noted to be extremely high and the storm drains under the bridge were observed to be flowing. On June 18th a storm drain near the bridge on the right bank was flowing.

CH06, Chicopee River, West St. Bridge, Indian Orchard, Springfield, MA (MA36-24)

This site is downstream from 13 CSOs and located just upstream from the USGS gage at Indian Orchard. There is a dam and a mill upstream from this station. The river channel is large and wide. Samples were collected by the bridge drop method at this station.

No objectionable deposits, scums or water odor were recorded by DWM field crews. This station was a bridge drop so instream conditions were often unobservable. Water clarity was clear on all days when noted. When observable there was no phytoplankton noted and on the one occasion when periphyton was observable it was characterized as sparse. On three occasions (July 30th, July 31st and August 20th) dense submerged aquatic plants were noted (principally grasses) while on the rest of sampling days aquatic plants were unobservable.

CH02B, Chicopee River, Miller Street Bridge, Wilbraham (MA36-23)

This site is immediately downstream from the Red Bridge Impoundment (FERC hydroplant). This station was accessed by parking on left before bridge, walking down a closed sidewalk and dropping a basket into the Chicopee River at mid-channel. The surrounding land use is urban.

No objectionable deposits, odors or scums were noted by DWM field crews with the exception of one occasion when an oily sheen and rusty flow was noticed on the downstream left bank. Water clarity, although sometimes unobservable, was generally noted to be clear with one occasion of slight turbidity. Aquatic plant density, periphyton and plankton were generally noted as unobservable.

CH01, Chicopee River, Just west of 128 Springfield St (near intersection of New Hampshire Ave and Springfield St., Palmer, MA) (MA36-22)

This site is downstream of the Palmer WWTP discharge and upstream from the Red Bridge Impoundment (FERC plant). The surrounding land use is commercial, residential, and forest. The 100 meter riparian area on the left bank is characterized by low and medium residential development and forest downstream of the sampling station and high-density residential land use upstream of the sampling station. The right bank is largely forested downstream of the sampling station but is commercial and high density residential upstream of the sampling station towards the Three Rivers area in Palmer. The site was accessed by parking at a right of way dirt driveway and walking down a path to a cement slab and sampling upstream

of this cement slab. The right bank is steep and vegetated with shrubs and hardwoods. The left bank was noted to have a lot of sand and the river is wide and deep at this location.

No objectionable deposits, scums or water odor were recorded by DWM field crews. Water clarity was generally noted to be clear although on two occasions it was noted to be slightly turbid. Erosion was noted on one occasion only. Aquatic vegetation, periphyton and phytoplankton was unobservable or absent.

AB01, Abbey Brook, Front Street Bridge, Chicopee, MA

This station is located downstream from Bemis Pond and an unnamed pond. The surrounding land use for this station is the urban area of Chicopee. The immediate land use in the 100 meter area around this station is commercial, high-density residential, recreational, roads, industrial and some forest. The station was located upstream of Front Street bridge on the eastern bank and sampling was performed midstream and upstream of a storm drainpipe. Steep banks on both sides covered with leaf litter were found at this station. On the left bank residences abut the river with somewhat of a wetland habitat on left bank as well. The right bank is a steep drop from the road.

Objectionable deposits consisting of garbage and trash were noted on April 14th, July 30th and August 20th by DWM field crews. In addition to the trash noted on April 14th sand and silt were noted at this station. No scums were noted and with the exception of one occasion on which a musty water odor was recorded, no odors were noted. Water clarity was noted to be slightly turbid on five occasions and clear on three other occasions. Erosion especially on the right bank was noted on three occasions but was described as minimal. Riprap was found along the banks. No aquatic plants or phytoplankton were found or recorded. Periphyton was noted on five occasions and its presence was once described as dense on May 14th. In April thin film algae and filamentous algae was noted while in May filamentous periphyton was noted. On the rest of the observable occasions a brown periphyton was noted. The storm drain was running on April 16th, May 14th, June 18th, and October 15th while it was noted to be dry on July 30th and August 20th. On April 16th and May 14th the water in the storm drain was noted to be clear.

COOL01, Cooley Brook, Fuller Road Bridge, Chicopee, MA

This station is located downstream of Westover Air Force Base. This station is called Cooley Brook although it is actually a diversion of Cooley Brook. The immediate land use is cropland, woody vegetation, forest and low and medium density residential. The surrounding land use includes the aforementioned categories as well as commercial, industrial and other residential uses.

On April 16th heavy siltation was observed on the river bottom but otherwise no objectionable deposits were noted at this station. With the exception of April 16th when the water was noted to have both a septic and rotting vegetable odor, DWM field crews did not note water odors. No scums, aquatic plants or phytoplankton were noted during the sampling season at this location and the water was clear with the exception of April 16th when water clarity was slightly turbid. Undercutting of both banks was noted throughout the sampling season. Periphyton cover was described as moderate on April 16th, August 20th and October 15th and sparse on May 14th and July 30th. Periphyton was not observed on June 18th. The periphyton consisted of brown thin films attached on rocks and an orange floc on April 16th while green periphyton on rocks and green filamentous algae were found on May 14th. The rest of the season the periphyton was described as brown algae attached on rocks.

POOR01, Poor Brook, East Main Street Bridge, Chicopee, MA

This station is located in an urban area and the surrounding land use consists of residential, forest, commercial and open space recreational as well as having major highways located nearby. The immediate land use in the 100 meter area along this stream is forested, low-density residential, roadways, residential and urban open space. The brook begins in a wetland area near Berkshire Ave and the Conrail Line in Chicopee and drains into the Chicopee River. Riprap is present at this site. The site was accessed on the southern upstream side of the bridge.

On April 16th and July 30th objectionable deposits of silt and sand were found covering bottom substrate but no objectionable conditions were noted on other survey dates. No water odors were noted with the exception of a musty water smell on two occasions and no scums were found. Erosion principally on the

left bank was noted throughout the survey. Generally water clarity was clear at this site although on June 18th the water was highly turbid. Aquatic plants and phytoplankton were not noted at this site. Moderate and sparse green filamentous algae were noted on the first two survey dates respectively but periphyton cover, when observable, was not found on the remaining days.

FULL01, Fuller Brook, Shawinigan Drive, Chicopee, MA

The surrounding land use is roadways (Interstate 90), residential, forested, gravel pit and largely urban. The immediate land use at this station in the 100 meter riparian area is forest, roads, residential and gravel pit. This station is downstream of a large landfill and Interstate 90. The site was accessed at the Shawinigan Drive Bridge by walking down a sandy embankment and sampling at a concrete culvert.

On April 16th and August 20th trash and debris were noted at this station. Additionally, sedimentation likely due to adjacent roadwork was noticed on April 16th. Objectionable deposits were not noted on all other sampling dates. No scums or water odors were noted during the sampling season. Water clarity was generally described as slightly turbid at this station during the sampling season except the first two sampling dates when the water was clear. Minimal erosion was noted on two occasions and the presence of riprap was recorded. When observable no phytoplankton was found and only on June 18th was a sparse coverage of moss noted, otherwise no aquatic plants were found. Sparse coverage of green thin films was noted on April 16th while a sparse coverage of green filamentous algae was noted on June 18th while later on June 30th and August 20th a dense coverage of green and brown algae attached on the rocks was found.

FULL02, Higher Brook (natural extension of Fuller Brook), West Street at Roy Street, Ludlow, MA

This site is in an urban area and the surrounding land use at this station is residential, forest, roadways and commercial. The immediate land use in the 100 meter riparian buffer is residential, forest, and infrastructure (powerlines). This site was accessed on the upstream side of the West Ave Bridge at Roy Street by wading into the brook and sampling mid-stream.

With the exception of one day on which small amounts of trash were found, no objectionable deposits were noted at this site. No water odors or scums were found. Sparse coverage of moss was found in June while in August and October burreed (*Sparganium sp*.) was noted at this station. The presence of phytoplankton was not noted during the sampling season. Sparse coverage of green filamentous algae were found on the first two survey dates while in July and August respectively sparse and moderate algal coverage was found.

QA09A, Quaboag River, Palmer St bridge, Palmer, MA

The site is in a developed area and the surrounding land use is residential, forest, commercial, roadways (includes Interstate 90), industrial and cropland. The immediate land use in the 100 meter riparian area is residential, forest, roadways, cropland and industrial. This site was accessed by going over the railroad tracks and down the upstream right bank of Palmer St. bridge.

Garbage and trash were noted on the stream banks on two occasions and instream trash was noted on two occasions while on four occasions no objectionable deposits were noted. No water odor was found. On three occasions white foam was noted while on the majority of occasions no scums were found. Water clarity was generally clear or slightly turbid during the sampling season. A sparse coverage of Irises (*Iris sp.*) was found throughout the sampling season but no periphyton or phytoplankton was observed. Erosion was found on the right bank, which was undercut at this site.

QRG, Quaboag River off Rte 67 at USGS flow gage, West Brimfield, MA

This site is in an undeveloped area and the surrounding land use is forest, residential, roadways (includes Interstate 90), and cropland. The immediate land use in the 100 meter riparian area is forest, residential, roadway (Interstate 90) and cropland. This site is below the Warren WWTP. Hartwick Knitters and Wm. E. Wright both have industrial discharges that go to the Warren WWTP plant (Kimball, 2006). Both companies use dyes and attempt to pre-treat their discharge before the Warren WWTP (Kimball 2006). Non-point sources of pollution include a dirt road with heavy use and washout. This site was accessed by going to the USGS gage near the Route 67 bridge and sampling in the reach at the gaging station.

Both DWM and DEP CERO SMART crews found garbage and trash throughout 2003 survey season at this site (tires, old appliances, metals, floatables, assorted trash, etc) and on two occasions May 14th and October 22nd sand and silt deposits were noted. Water odor was not noted by DWM or CERO SMART crews during 2003. Scums were not noted with the exception of small isolated patches of foam found on three occasions by CERO SMART crews. MassDEP field crews noted some minor erosion. Water clarity was generally clear although slightly turbid on two occasions. Generally no aquatic plant coverage or phytoplankton were noted in the 2003 and on only one occasion (April 16th) was periphyton in the form of a sparse coverage of green filamentous algae found.

QA06A, Quaboag River, Gilbert Road (Long Hill Road Bridge), West Warren, MA

This site is in a largely undeveloped area downstream of Warren and upstream of the Warren waste water treatment plant (WWTP). This site is downstream from the Wm. E. Wright NPDES discharge (non-contact cooling and stormwater). A dam is also located near the Wm E. Wright facility. The surrounding land use is forest, residential, commercial, industrial and roadways. Land use in the 100 meter riparian buffer is mostly forested with residential, roadways, municipal (WWTP) and industrial uses. The site was accessed upstream of the bridge on the right bank.

With the exception of May 14th when garbage and trash were noted on the banks, no objectionable deposits were found. No water odor was found and a white foam was found approximately 50 percent of the time and likely the result of the upstream dam. No other scums were noted and the white foam is considered innocuous. Water clarity was generally clear or slightly turbid during the sampling season. DEP field crews did not find phytoplankton and on only once was a sparse coverage of aquatic plants found. In May a sparse coverage of green filamentous algae was found while in July a moderate coverage of brown thin films was noted. In August a sparse coverage of periphyton was found.

QAOBO, Quaboag River, Davis Road (Long Hill Road Bridge), West Brookfield, MA

This site is located south of downtown West Brookfield and the surrounding land use is residential, forested, non-forested wetland, industrial, commercial and cropland. The immediate land use in the 100 meter riparian buffer is forest, residential, non-forested wetland, and woody vegetation. This site was a bridge drop station.

Objectionable deposits in the form of siltation on the left bank from a stormdrain and sand deposits on the right bank coming from the road were noted on three occasions. Water odor was not noted by DWM field crews and no scums were found with the exception of two occasions when limited patches of scum were noted. Water clarity was clear on all sampling occasions and no erosion was noted. Sparse to moderate density of aquatic plants was found throughout the sampling season and included arrowhead, lily pads and grass and rush-like plants. A moderate amount of phytoplankton was found on August 20th although generally phytoplankton was not noted. No periphyton coverage was recorded early in the sampling season but by July a moderate coverage of green filamentous algae was found. A moderate coverage of green algae was also found in August but in October periphyton coverage was not found.

QA100, Quaboag River, Route 148 Bridge, Brookfield, MA

This site is located south of downtown Brookfield and was accessed on the upstream side of the Rte 148 bridge by wading in. This site is downstream of extensive wetlands and Quaboag Pond.

No objectionable deposits were found with the exception of one occasion when limited amounts of plastic bags were noted. DWM field crews noted no scums or water odors. Some limited erosion around a boat launch area was noted early in the sampling season but generally erosion was not noted. Phytoplankton was not found with the exception of May 14th when a moderate amount was found. Early in the field season sparse coverage of emergent aquatic plants was found. Between June and October a moderate density of aquatic plants (emergent, submerged, and floating) was found at this site. Many pond species were found at this site due to its wide shallow nature with extensive wetlands and location below Quaboag Pond. During the first three survey dates moderate coverage of green algae was found while during the remainder of the sampling season sparse to moderate coverage of brown thin films were noted.

DB08, Forget-Me-Not Brook, East Brookfield Road bridge (north), North Brookfield, MA

This site is located south of downtown North Brookfield and upstream of the North Brookfield WWTP. The surrounding land use is largely forested along with residential, industrial, cropland, commercial and non-forest wetland land use. The immediate land use in the 100 meter riparian buffer is forested, non-forested wetland, residential, industrial, commercial and cropland. Powerlines also cross the stream close to this station.

No objectionable deposits were found with the exception of one occasion when a heavy rusty brown bottom floc was noted. No scums were found and no water odors were found with exception of one date when a musty water smell was noted. Water clarity was generally slightly turbid at this location and no erosion was noted. Early in the season sparse amounts of moss and emergent grasses were noted but later in the sampling season no aquatic plants were noted. Sparse to moderate coverage of brown thin films was noted at this site during the sampling season while on May 14th a moderate coverage of green filamentous algae was found and on July 30th a moderate coverage of rusty-brown floc was found on the stream bottom at this site. Phytoplankton was not noted at this site with the exception of a sparse amount on June 18th.

DB07, Forget-Me-Not Brook, East Brookfield Road bridge (south), North Brookfield, MA

This site is located south of downtown North Brookfield and downstream from the North Brookfield WWTP. The surrounding land use is largely forested along with residential, industrial, cropland, commercial and non-forest wetland. The immediate land use in the 100 meter riparian buffer is forested, non-forested wetland, residential, industrial, commercial and cropland. The site was accessed by parking at a gate in the fence approximately 80 meters north of mailbox number 75.

No objectionable deposits or scums were noted although the water was often found to have either a septic or musty smell. The water clarity was clear, slightly turbid and highly turbid on two occasions each. No erosion was noted at this site. Moderate densities of green algae and sparse to moderate densities of brown thin film algae were found at this site during the sampling season. A brown floc on the stream bottom was also found on August 20th. Sparse and moderate amounts of phytoplankton were found on May 14th and June 18th respectively although none was found on other the survey dates. Sparse densities of grasses were found early in the sampling season but later no aquatic plants were noted.

DUN01, Dunn Brook, Quaboag St. bridge, Brookfield, MA

This site is located in a generally undeveloped area of Brookfield just off Route 9. The surrounding land use includes forest, non-forest wetland, residential, commercial and a solid waste handling facility. The immediate land use in the 100 meter riparian buffer is forest, residential, commercial, non-forested wetlands, and a solid waste handling facility. The wetlands upstream from this site are sizeable. A beaver dam is located just upstream of this site and the North Brookfield WWTP is also located upstream.

No objectionable deposits or scums were noted by DWM field crews at this location. No water odors were found with the exception of one occasion when the water had a musty odor. Water clarity was generally slightly turbid. Sparse to moderate amounts of aquatic plants were found throughout the sampling season and included mosses, duckweed and various emergents and pond plants. Dense green filamentous algae were found in April and July while green filamentous coverage was sparse in May. Moderate densities of a brown algae were found on the June, August and October survey dates. Sparse to moderate abundances of phytoplankton were noted throughout the sampling season.

WA12, Ware River, Palmer St. Bridge, Palmer, MA

This site is located on the Ware River upstream of the village of Three Rivers. The surrounding land use includes forest, non-forest wetland, residential and commercial. The immediate land use in the 100 meter riparian buffer is forest, cropland and residential. The site was accessed at the sewage pumping station by going down an asphalt swale to the right bank, upstream of the bridge.

No objectionable deposits or water odors were noted by DWM field crews at this site. A white foam was noted on the majority of occasions during the sampling season. Water clarity was generally either clear

or slightly turbid. DWM field crews noted that the banks are slightly undercut at this location. Moderate to dense amounts of an unidentified grass-like plants were found throughout the sampling season. No phytoplankton was noted at this site while sparse to moderate densities of green filamentous algae were found throughout the sampling season.

WA09A, Ware River, Route 32 Bridge-Gibbs Crossing, Ware, MA

This site is located near downtown Ware. This site is downstream from four wastewater treatment plants and other NPDES discharges. The surrounding land use includes forest, residential, cropland and commercial. The immediate land use in the 100m riparian buffer is forest, commercial, cropland and residential. The site was accessed by wading in from the eastern shore downstream of the Route 32 bridge.

Both DWM field crews and CERO SMART crews found objectionable deposits in the form of garbage and trash on the stream banks and in the stream (including tire, metals, bottles etc) throughout the sampling season. On April 16th the CERO Smart crew noticed heavy sand deposits near the bridge that were later also noticed by DWM field crews on May 16th. Beaudoin (2006) states the "bottom at this site shows ever-increasing embeddedness but not yet covered in sand". Water odors were not noted by either field crew. DWM field crews did not notice any scums although CERO Smart crews noticed small quarter size patches of foam in June, July, August and October. Water clarity was generally clear. Field crews also noted undercut banks. Generally no aquatic plants were noted but sparse amounts were noted in July and August. In April moderate amounts of filamentous algae and moss were found while in May moderate densities of brown thin films were noted. The field crews did not notice periphyton after May. DEP field crews did not note any phytoplankton during the sampling season.

WA06A, Ware River, Upper Church Street Bridge, Ware, MA

The surrounding land use includes forest, residential, cropland and an airplane landing strip. The immediate land use in the 100m riparian buffer is forest, cropland, residential and an airplane landing strip. The station was sampled upstream of the bridge on the left bank. The trees on the left bank included maples (*Acer sp*.) while on the right bank there is a farm field with no tree canopy. This site is below the Gilbertville WWTP.

DWM field crews noted no objectionable deposits during the sampling season. A white foam was generally noted at this site and water clarity was generally clear or slightly turbid. DWM field crews noted no water odor. Erosion was also not found at this site. No aquatic macrophytes or phytoplankton were noted at this site. Generally no periphyton was noted at this station although a sparse coverage of green filamentous algae was found on May 14th and a moderate coverage of thin films was noted on July 30th.

WAX, Ware River, Creamery Road bridge, New Braintree, MA

This site is in a rural area and the surrounding landuse includes forest, cropland and residential uses. The immediate land use in the 100m riparian buffer is cropland, residential and forest. This site was accessed at the Creamery Road Bridge, a bridge-drop sampling location.

DWM field crews did not note objectionable deposits at this station during the sampling season. A white foam was generally noted at this site and water clarity was generally clear or slightly turbid with the exception of one occasion when water clarity was highly turbid. No water odor was noted. DWM field crews noted that the left bank was undercut although the severity was not noted. Sparse coverage of emergent aquatic plants was found throughout the sampling season. Phytoplankton was not noted at this station. Periphyton was generally unobservable (as this was a bridge-drop location) or not noted.

WAIR, Ware River, Airport Road, Barre, MA

This site is in a rural area and the surrounding land use includes forest, cropland, residential use, an airport, wetlands, a sand and gravel pit and Department of Public Works (DPW) dump. The immediate land use in the 100 meter riparian buffer is forest, wetland, an airport, a sand and gravel pit and the DPW dump. The site was accessed by driving down a dirt road through the gravel pit and DPW dump to the river. Samples were collected by wading into the river.

DWM field crews did not find objectionable deposits at this site with the exception of one occasion when trash was noted. A pollen sheen was noted on three occasions and an oily sheen was noted once although generally no scums were noted. DWM field crews did not note any water odor. Slight undercut banks were noted on the left bank at this station. Water clarity was generally clear or slightly turbid. No aquatic plants were noted at this station during the sampling season. No periphyton was noted at this station with the exception of July 30th when a sparse coverage of green thin films was found. Phytoplankton was not noted at this site with the exception of one occasion when a sparse amount of phytoplankton was found.

CBG, Ware River, off Route 122 at USGS flow gage, Barre, MA

This site is in a rural area and the surrounding landuse includes forest, residential, wetland, cropland, recreational and a landfill and solid waste handling facility. The immediate land use in the 100m riparian buffer is forest, wetland and a landfill and sold waste handling facility. This site was accessed by wading in at the Route 122 rest stop at the USGS flow gaging station. This site was sampled by both DWM and CERO field crews.

DWM and CERO SMART field crews did not note objectionable deposits at this site. A white foam was generally noted at this site and water clarity was generally clear. DWM and CERO SMART field crews did not note any water odor at this site. No shoreline erosion was noted at this site. A sparse coverage of moss was noted on May 14th and a sparse coverage of wild celery (*Vallisneria Americana)* was found on June 18th. Generally no aquatic plants were found or their presence was not recorded. Although generally unobservable, periphyton cover was noted on two occasions. On April 16th a dense coverage of moss was noted and on June 18th a moderate amount of thin films were noted. Phytoplankton was not noted at this site.

WAWV, Ware River, New Braintree Road bridge, White Valley, South Barre, MA

This site is in a rural area and immediately downstream of Powder Mill Pond and Martone Landfill. The surrounding land use includes forest, cropland, residential, commercial, and a landfill. The immediate land use in the 100m riparian buffer is forest, landfill and residential uses. This site was accessed by walking down a footpath on the south side of the road to the river and sampling half way between the bridge and the dam.

Minor trash deposits were noted on two occasions but generally DWM field crews noted no objectionable deposits at this site. Patches of white foam were found at this site throughout the sampling season and it is believed to be natural. DWM field crews did not note any water odors at this site. Minor erosion in the form of undercut banks was noted at this site. Water clarity was generally clear. Sparse coverage of submerged and emergent aquatic plants was found at this site throughout the sampling season. A dense brown film of periphyton was found on one occasion but generally either periphyton was not found or its coverage was not recorded. Phytoplankton was not noted at this site.

SR02, Swift River, Route 181/State Street, Palmer, MA

This station is in a developed area of Bondsville in Palmer. The surrounding land use includes residential, forest, cropland, industrial, commercial, mining and non-forested wetlands. The immediate land use in the 100m riparian buffer is residential, commercial, industrial, and forest. This site was accessed by parking in a dirt access area on the right after crossing the Rte 181 bridge and crossing the street to walk down an embankment to the river. Samples were collected by wading to the center of the river. This site is downstream of a dam and there is a stone wall on the left bank and large boulders on the right bank.

DWM field crews found trash on four occasions (mainly cans and bait worm containers) although the extent of the trash was not extensive. White foam was noted on three occasions but generally no scums were noted. No water odor was noted with the exception of one occasion when the water had a rotting vegetable smell. No shoreline erosion was found at this station as the banks were armored. Sparse to moderate amounts of moss were found at this station throughout the sampling season. In April and May, respectively, moderate and dense coverage of green filamentous algae was found. From June to August no periphyton was noted and in October sparse amount of green filamentous algae was found. Phytoplankton was not noted at this site.

SRG, Swift River, off River Road at USGS flow gage, Ware/Belchertown, MA

This site is in the Swift River Wildlife Management Area. The surrounding land use is mainly forest with some residential, commercial, cropland, and non-forested wetland land uses. The immediate land use in the 100m riparian buffer is forest, cropland and residential. A beaver dam was located approximately 200 meters upstream from this station. This site was accessed at a fisherman's access road and samples were collected from the center of the stream at the USGS flow gaging station.

Both DWM and CERO SMART field crews did not note any objectionable deposits at this site during the sampling season. No scums or water odors were noted. On July 31st the air had a septic smell. Water clarity was clear at this station throughout the sampling season. Minor erosion in the form of undercut banks was found at this station. Sparse to moderate abundances of submerged aquatic plants (moss and other submerged plants) were found at this site throughout the sampling season. Periphyton was generally unobservable at this site but on May 14th a sparse coverage of brown thin films were found. Phytoplankton was not noted at this site.

SR03, Swift River, Cold Spring Road, Belchertown/Ware, MA

This site is in the Swift River Wildlife Management Area. The surrounding land use is mainly forest with cropland, pasture, residential and non-forested wetland land uses. The immediate land use in the 100m riparian buffer is forest, residential, and pasture. There is also a fish hatchery upstream of this site. The site was accessed on the upstream side of the Cold Spring Road bridge.

DWM field crews did not note any objectionable deposits at this site during the sampling season. Pollen blankets were noted on the water on three occasions although generally no scums were noted. The water generally had no odor except on two occasions when the water smelled like manure. Sparse coverage of submerged aquatic plants was noted beginning in May and by October the station had a moderate coverage of submerged aquatic plants. On April 16th dense amounts of green thin films and filamentous algae were found while on May 14th moderate amounts of brown thin films were noted at this station. DWM field crews did not note periphyton coverage at this location for the rest of the field sampling season. With the exception of May 14th, when a sparse amount of phytoplankton was noted, phytoplankton was not noted at this site by DWM field crews.

EB04, East Brookfield River, Route 9 bridge, East Brookfield, MA

This site is located in downtown East Brookfield and at the outlet of Lake Lashaway. The surrounding land use is mainly residential along with commercial, cropland, non-forested wetland, industrial and landfill land uses. The immediate land use in the 100m riparian buffer is residential, commercial, forest and downstream of the station the immediate land use includes non-forested wetlands, forest, cropland and the East Brookfield landfill.

On four occasions DWM field crews noted objectionable deposits. Limited trash was found on one occasion, sunken concrete debris on another occasion and two flocculent masses on two occasions (one rust colored). On the majority of occasions though no objectionable deposits were noted by DWM field crews. Generally no water odor was noted with the exception of a musty smell on one occasion and a fishy smell on two occasions. White foam was generally noted at this station. Water clarity was often slightly turbid, otherwise it was clear. The west bank was observed to be eroding according to DWM field crews. DWM field crews noted sparse emergent and submerged aquatic plants throughout the sampling season. In April, May and November sparse amounts of green algae were noted at this station. Thin film algae were sparse in June, moderate in July and dense in August and by October thin film algae were moderate again. The thin film algae were generally brown but in July included both green and brown thin films. Generally no phytoplankton was noted with the exception of two occasions when sparse amounts were found.

CRN01, Cranberry Brook, South Spencer Road, Spencer, MA

This station is southwest of downtown Spencer and upstream of the Spencer WWTP discharge. The surrounding land use is residential, forest, non-forested wetland, industrial, commercial, cropland, landfill, and municipal wastewater treatment. The immediate land use in the 100m riparian buffer is non-forested

wetlands, forest, residential, landfill, and municipal waste treatment. The site was accessed on the upstream side of the bridge over Cranberry Brook on South Spencer Road. A beaver dam was noted in May near this station and by November it was breached with the installation of a culvert.

DWM field crews did not find any objectionable deposits with the exception of trash on one occasion and sand from the road on two occasions. No water odors or scums were noted by DWM field crews. Slight shoreline erosion was noted at this site. Generally a sparse coverage of emergent aquatic plants was found at this site, although on some occasions both emergent and submerged plants were found. In August moderate coverage of aquatic plants including emergent, submerged and floating plants was found. A sparse coverage of algae was found at this site throughout the sampling season. The periphyton types included green filamentous algae and green and brown thin film algae. On November 25th the algal coverage was moderate. With the exception of October 15th when a sparse amount of phytoplankton was noted, DWM field crews did not note phytoplankton at this site.

SM02, Seven Mile River, Route 49 Bridge, Spencer, MA

This site is located southwest of downtown Spencer and is downstream of the Spencer wastewater treatment plant. The surrounding land use is residential, forest, non-forested wetland, industrial, commercial, cropland, landfill, and municipal wastewater treatment. The immediate land use in the 100m riparian buffer is residential, forest, commercial, non-forested wetland and municipal wastewater treatment. The site was accessed off the Route 49 bridge by parking on bridge and walking down the bank to the upstream side. Samples were collected by wading into the stream.

DWM field crews did not find any objectionable deposits with the exception of two occasions where sand deposits coming from Route 49 were found. Slight erosion was noted at this site in addition to sand deposits. On April 16th the sand deposits were characterized as "forming large delta from route 49" and it was noted that the road lacks a catch basin. No water odors or scums were noted except on one occasion when a chlorine smell was noted and an oil sheen was found. Water clarity was generally slightly turbid. Sparse to moderate coverage of aquatic plants was found throughout the sampling season and included both submerged and emergent plants. In April a sparse coverage of brown algae was found while in May and June a moderate coverage of green filamentous algae was found. In July and August moderate coverage of brown algae was noted. The remainder of the season periphyton cover was unobservable or not found. Sparse amounts of phytoplankton were noted in May, June and July.

SMG, Seven Mile River, Cooney Road Bridge, Spencer, MA

This site is located north of downtown Spencer and is above the Spencer wastewater treatment plant. The surrounding land use is residential, forest, cropland, non-forested wetland, and mining/quarry. The immediate land use in the 100m riparian buffer is residential, forest, cropland, non-forested wetland and mining/quarry. The site was accessed by going down the upstream side of the Cooney Road Bridge and wading to center stream to collect samples.

CERO SMART crews noted that sunken granite blocks from a partially dismantled dam were present at this site. Neither DWM field crews nor CERO SMART crews noted any objectionable deposits. No water odors were noted but a white foam was commonly observed at this site. This site appears to be a depositional area for sand/gravel, possibly from extraction activities upstream. A large gravel bar has formed on the western bank and has blocked flow through the western culvert except on extreme high flows. Water clarity was generally clear, only once it was found to be slightly turbid. Both field crews generally found sparse coverages of aquatic plants (often mosses and grasses) throughout the growing season. In April and June sparse coverage of filamentous algae was found while in May, July and August moderate coverage of filamentous algae was found. In August the moderate coverage of algae also included thin films while in October the coverage of thin films was sparse. Phytoplankton was not noted at this site.

QP011, Connection between Quaboag and Quacumquasit Pond, Lake Road, Brookfield/E. Brookfield, MA

This site is the culvert/connection between Quaboag Pond and Quacumquasit Pond and was sampled as part of a TMDL development project for both lakes. DWM field crews did not note any objectionable

deposits, scums or water odors. On September 24th it was noted that there was backflooding from Quaboag due to the previous day's heavy rain.

EB04A, East Brookfield River, Shore Road Bridge, East Brookfield, MA

This site is located near the mouth of the East Brookfield River before it flows into Quaboag Pond. The surrounding land use is forest, residential, non-forested wetlands, cropland, commercial, and a sand pit. The immediate land use in the 100m riparian buffer is non-forested wetland, forest and residential. There are extensive wetlands upstream of this site. The site was accessed by wading in to the river at the Shore Road bridge.

DWM field crews did not find any objectionable deposits at this site during the sampling season. No water odors or scums were noted. No shoreline erosion was found and water clarity was generally slightly turbid. Field crews found sparse to dense amounts of many different types of aquatic plants (submerged, emergent and floating) during the sampling season. In July and August the invasive species fanwort (*Cabomba carolinia)* was found. The close proximity to Quaboag Pond also explains the presence of many pond plant species found here. From May to July periphyton coverage was either sparse or moderate and included thin film and filamentous algae. For the remainder of the sampling season periphyton coverage was either not recorded or unobservable. Sparse green algae was often found floating in the water column from May to October.

SM01, Seven Mile River, Route 9 Bridge, Spencer, MA

This site is located on the western edge of Spencer and is in a developed commercial area. The surrounding land use is residential, forest, non-forested wetland, industrial, commercial, cropland, and municipal wastewater treatment. The immediate land use in the 100m riparian buffer is commercial, forest, non-forested wetland, municipal wastewater treatment, and residential. This site was accessed by walking down the west side of the bridge on the upstream side and wading in mid-stream.

DWM field crews did not find any objectionable deposits with the exception of minimal trash on one occasion. No scums were noted at this station and no water odor was noted with the exception of one occasion when a musty smell was noted. Slight bank erosion and undercut banks were noted at this station. Water clarity was generally clear or slightly turbid. Sparse to moderate densities of aquatic plants were found throughout the sampling season and included both emergent and submerged plants, principally moss and burreed (*Sparganium* sp.). In April and May respectively sparse and moderate coverage of green algae was found while between June and August moderate coverage of brown thin films was found. In October the coverage of brown thin films was sparse. No phytoplankton was noted at this site.

SPEFF, Spencer Wastewater Treatment Plant discharge, Spencer, MA

This station is at the Spencer Wastewater Treatment plant. The plant's discharge (final effluent channel) was sampled as part of TMDL development for Quaboag Pond and Quacumquasit Pond.

SURVEY CONDITIONS

To fulfill the assessment guidance, information on precipitation and stream discharge (Socolow *et al.* 2004 and 2005) were analyzed to estimate hydrological conditions during water quality sampling events. Rainfall data from the NOAA/National Weather Service precipitation station in Springfield was reviewed for the five days prior to and on the sampling dates (Table 3) (NOAA, 2006). Rainfall records were used to determine whether the fecal coliform bacteria data were representative of "wet" or "dry weather" sampling conditions. The USGS streamflow data were used to estimate the streamflow condition in relation to the 7-day, 10-year (7Q10) low flow.

There were nine stream gages active during 2003 in the Chicopee River Watershed (Figure 2). Streamflow data from all these gages (Table 4) were used principally to estimate hydrological conditions for the water quality sampling events and were also used to determine "wet or dry" sampling status. The major stream discharges in the Chicopee River Watershed are routinely regulated for municipal supplies; therefore, gage data throughout the basin should be interpreted with caution. Three stream gages located on the Ware River near Barre, MA (01172500), at the Ware River at Intake Works, Barre, MA (01173000), and on the Ware River downstream of the Barre Falls Reservoir at Gibbs Crossing, MA (01173500) are all affected by municipal withdrawals. The Ware Intake Works, which diverts water to the Quabbin Reservoir for use by the MWRA, is located upstream of the gage on Ware River at Gibbs Crossing (01173500) further affecting flow recorded at this gage. The USGS gage on the Swift River at West Ware (01175500) is affected by diversions of water from Quabbin Reservoir to the Wachusett Reservoir, the Chicopee Valley Aqueduct, and the City of Worcester. This gage show little variation in flows and was not used to determine "wet" or "dry weather" sampling conditions (Table 4). Upstream ponds occasionally regulate flow at the USGS gage on the Sevenmile River near Spencer, MA (01175670). The USGS gage on the Quaboag River (01176000) is slightly affected during high flows by reservoirs. The USGS gage on the Chicopee River at Indian Orchard, MA (01177000) is the most downstream gage in the basin and consequently the most regulated. It is affected especially by withdrawals in the Swift River, Ware River, and Quaboag River subbasins; thus, data from the Chicopee River gage while included in Table 4, are not used as the sole determinant of wet or dry conditions during sampling. A synthesis of the various gages in the watershed was used secondarily to rainfall information. Two gages do not have estimated 7Q10 values (Table 4).

Streamflow conditions for the Chicopee watershed between April 2003 and October 2003 were characterized as either normal or above normal by USGS (Socolow et al. 2004 and 2005). These data should be relatively indicative of conditions for the watershed. Conditions prior to each survey were characterized by analyzing precipitation and streamflow data.

Survey conditions are described below for each DWM sampling event:

April 16, 2003: This survey represents relatively average flow conditions and dry weather. Although a significant rain event of 0.61 inches was recorded in Springfield five days prior to the survey (Table 3), the flows as recorded at the USGS Gage on the Chicopee River in Indian Orchard was approximately equal to pre-rain levels (Table 3). Streamflow diminished from 2,630 cfs four days before the survey down to 1,700 cfs on the survey day (Table 4). This should be considered consistent with the 2003 Mean monthly flow of 1,733 cfs as well as the Period of Record (POR) Monthly Mean for April of 1,830. The remaining gages in the Chicopee Watershed also indicated dry weather conditions. Flow at the Chicopee River gage at Indian Orchard was well above the 7-day, 10-year low-flow (7Q10) value of 126 cfs during this survey. Flow at all other gages was above their respective 7Q10 values.

May 14, 2003: This survey represents relatively average flow conditions but appears to be a wet-weather sampling event. A significant rain event of 0.64 inches was recorded in Springfield on May 11, three days prior to the survey (Table 3). This rain resulted in an increase of flow on the Chicopee River at Indian Orchard from 808 cfs on May 11 to 1,150 cfs on May 12 (Table 4). However, for the next two days the flows decreased to 981 cfs on the survey day (Fig. 3). The stream gages in the Ware River Subbasin also show a pattern of increased streamflow 2 days prior to sampling while the gages in the Quaboag show no pattern of increased flow (Table 4). The East Branch Swift River and the West Branch Swift River both show elevated streamflow due to the previous precipitation (Fig. 4). Given the altered

hydrology in the watershed it is difficult to interpret the streamflow pattern but it is believed that wet-weather conditions were present during sampling. Flow during the survey was above 7Q10 at all gages.

June 18 & 19, 2003: The two-day water quality survey was conducted during and immediately after a significant rainfall. On June 18, the day that the water quality samples were taken, 0.42 inches of rain was recorded in Springfield (Table 3). Field crews reported overcast, drizzle and rainy conditions while sampling on the 18th and the 19th. Although the stream flow recorded for the Chicopee River at Indian Orchard reflected a receding flow pattern during the four-day period before the survey, it should be recognized that the flows at this station, and for the Chicopee watersheds in general, are highly varied due to anthropogenic manipulations such as power generators, dams, withdrawals and diversions. The Chicopee River at this point also has a very large amount of contributing watershed area and may take days for the flow to respond to input from precipitation. Therefore the recorded discharge rate at the gage may be misleading for this survey date. This survey should be considered representative of "first flush" conditions for wet weather. Flow during the survey was above the 7-day, 10-year low-flow (7Q10) value at all gages.

July 30 & 31, 2003: Dry weather conditions prevailed during this survey as sampling was performed after a long antecedent dry period. No significant rain had fallen for the five days prior to the survey as recorded in Springfield (Table 3). This survey was conducted at a flow (256 cfs) below both the July 2003 monthly average (624.2 cfs) and the July POR flow (481 cfs) for the Chicopee River gage at Indian Orchard (Table 4). Survey flow conditions were above the 7Q10 values of 126 cfs in the Chicopee River at Indian Orchard (01177000). All other gages were also above 7Q10 (Table 4).

August 20 & 21, 2003: This survey was conducted during relatively dry weather conditions. Very little rainfall was reported at the Springfield rain gage prior to this survey. A small event resulted in 0.31 inches of rainfall on August 16, four days prior to the survey and no additional rain was reported until after the survey (Table 3). A dry weather pattern is obviously demonstrated by the hydrograph at the Chicopee River gage at Indian Orchard (01177000). Flow decreased from 904 cfs on August 15 to 380 cfs on August 21. (Table 4). Decreasing stream flows were also found leading up to this survey at all other gages in the Chicopee Watershed with the exception of Swift River at West Ware, MA (011775500) (Table 4). The water quality sampling survey on August 20th was conducted at a flow of 456 cfs, which is below the August 2003 monthly average of 570.5 cfs and just slightly above the August POR flow of 446 cfs for the Chicopee River gage at Indian Orchard (01177000) (Table 4). Survey flow conditions were above the 7Q10 value of 126 cfs in the Chicopee River at Indian Orchard. All other gages were also above 7Q10 (Table 4).

October 15, 2003: No significant rain was reported at Springfield during the five-day period preceding the survey. However, the flow recorded at the Chicopee River Gage rose from 257 cfs on October 14th to 576 cfs on October 15th, the day of the survey (Table 4). Although not in the Chicopee Watersheds, a review of rainfall data in towns just outside of the watershed boundaries to the north and east (Worcester, Orange, Fitchburg) demonstrate rainfall of about 1.5 inches on October 15th suggesting that there was a significant amount of rainfall in the northern and eastern portions of the Chicopee watersheds that flow south and west contributing flow to downstream portions of the watersheds. The three gages in the Ware River subbasin all showed a marked increase in streamflow on the survey date (Table 4). The gaged rivers in the Quaboag River subbasin and the East Branch Swift River and West Branch Swift River also showed a marked increase in streamflow during the survey day (Table 4). Conditions during this survey are considered to represent wet-weather conditions. All the gages were above 7Q10 conditions (Table 4).

Table 3. Estimated Chicopee Watersheds 2003 Precipitation Data Summary Based on NOAA rain gauge in Springfield, MA. (NOAA, 2006)

Chicopee Watershed Survey							
Precipitation Data Summary (reported in inches of rain)							
Survey Dates	5 Days Prior	4 Days Prior	3 Days Prior	2 Days Prior	1 Day Prior	Survey Date	Monthly Total
April 16	0.61	0.03	0	0	0	0	2.91
May 14	0.01	0	0.64	0.03	0.01	0.04	4.69
June 18	0.74	0	0	0	0	0.42	5.0
June 19	0	0	0	0	0.42	0	5.0
July 30	T	0	0	0	0	0	1.13
July 31	0	T	0	0	0	0	1.13
August 20	0	0.31	0	0	0	0	2.64
August 21	0.31	0	0	0	0	0	2.64
October 15	0	0	0.03	0	0	T	2.14

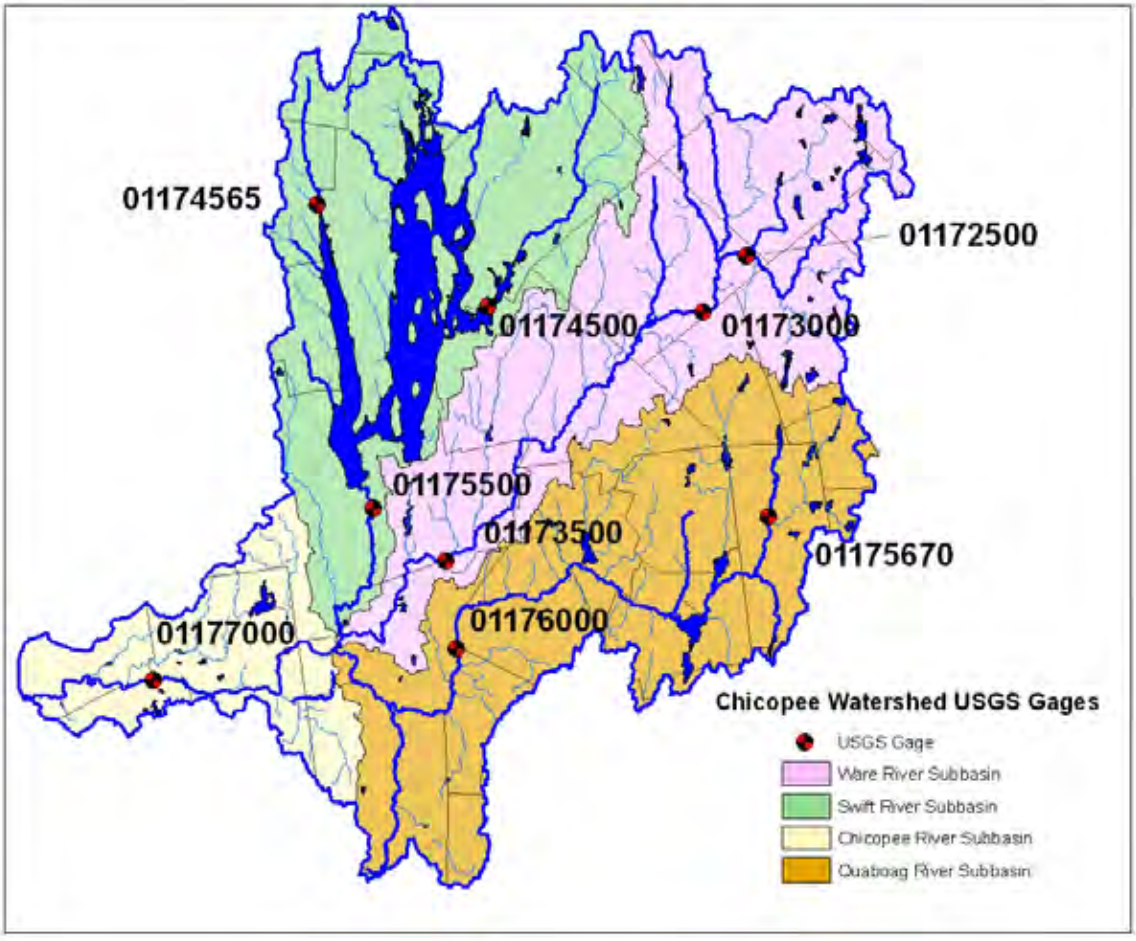


Figure 2: Location of USGS Stream Gages in Chicopee River Basin

Table 4. USGS gage data summaries in Chicopee Watershed for 2003 MassDEP DWM surveys (Socolow et al. 2004, Socolow et al. 2005)

Chicopee River Watershed Survey
USGS Flow Data Summary (reported in cubic feet per second)

Survey Date	5 Days Prior	4 Days Prior	3 Days Prior	2 Days Prior	1 Day Prior	Survey Date	Monthly Mean 2003	POR* Monthly Mean
Ware River Subbasin								
01172500 Ware River Near Barre, MA (Provisional 7Q10 = 1.235 cfs, USGS 1998) **								
4/16/03	199	338	390	305	245	211	252.3	231
5/14/03	106	100	93	110	120	112	130.9	121
6/18/03	124	137	131	132	115	101	143.9	77.2
6/19/03	137	131	132	115	101	98	143.9	77.2
7/30/03	15	13	12	11	11	17	30.1	32.5
7/31/03	13	12	11	11	17	23	30.1	32.5
8/20/03	152	140	78	54	47	39	49.4	28.9
8/21/03	140	78	54	47	39	32	49.4	28.9
10/15/03	32	27	25	29	28	46	81.7	52.1
01173000 Ware River At Intake Works Near Barre, MA (Provisional 7Q10 = 6.500 cfs, USGS 1998)								
4/16/03	451	863	751	573	449	392	440.7	405
5/14/03	194	155	173	225	222	223	203.4	217
6/18/03	252	276	234	194	162	151	265.2	141
6/19/03	276	234	194	162	151	152	265.2	141
7/30/03	35	31	26	25	29	37	59.2	67.7
7/31/03	31	26	25	29	37	53	59.2	67.7
8/20/03	282	255	123	104	98	86	101	53.8
8/21/03	255	123	104	98	86	64	101	53.8
10/15/03	44	39	39	44	44	89	123.9	86.6
01173500 Ware River At Gibbs Crossing, MA (Provisional 7Q10 = 22.373 cfs, USGS 1998)								
4/16/03	537	1210	870	634	518	440	516.8	596
5/14/03	349	314	318	387	364	335	344.2	373
6/18/03	639	704	628	500	387	350	579	259
6/19/03	704	628	500	387	350	358	579	259
7/30/03	110	108	66	69	54	68	136.5	140
7/31/03	108	66	69	54	68	81	136.5	140
8/20/03	403	358	308	184	174	154	185.8	122
8/21/03	358	308	184	174	154	128	185.8	122
10/15/03	68	120	73	95	82	166	251.5	166

* Period of Record

** USGS notes that records above 200 cfs are poor at this gage (Socolow *et al.*, 2004)

Table 4. Continued. USGS gage data summaries in Chicopee Watershed for 2003 MassDEP DWM surveys (Socolow et al. 2004, Socolow et al. 2005)

Chicopee River Watershed Survey
USGS Flow Data Summary (reported in cubic feet per second)

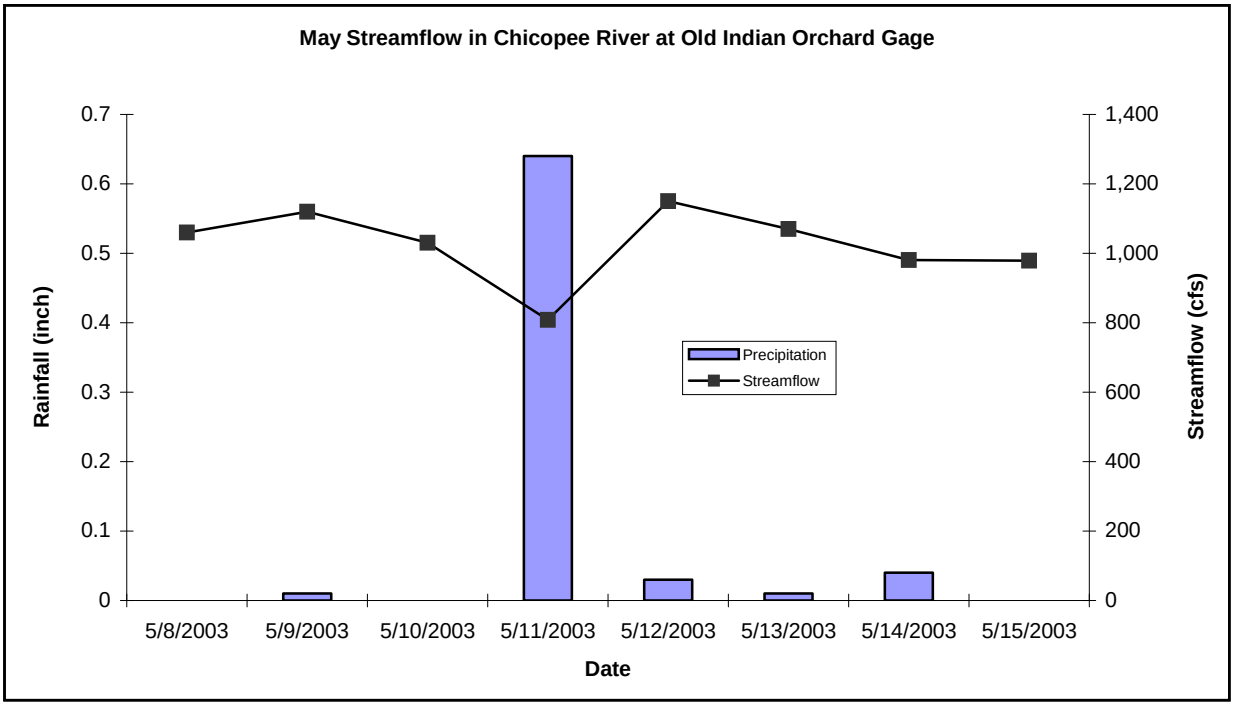
Survey Date	5 Days Prior	4 Days Prior	3 Days Prior	2 Days Prior	1 Day Prior	Survey Date	Monthly Mean 2003	POR* Monthly Mean
Quaboag River Subbasin								
01175670 Sevenmile River Near Spencer, MA (Provisional 7Q10 = 0.227 cfs, USGS 1998)								
4/16/03	38	52	45	37	31	28	32.8	31.9
5/14/03	15	15	13	14	16	14	16	18
6/18/03	33	35	28	32	18	14	24.9	12.4
6/19/03	35	28	32	18	14	15	24.9	12.4
7/30/03	9.7	8.8	6.8	4.8	3.5	2.9	8.89	5.05
7/31/03	8.8	6.8	4.8	3.5	2.9	2.5	8.89	5.05
8/20/03	9.9	8	7.1	6.4	6	4.9	6.08	4.05
8/21/03	8	7.1	6.4	6	4.9	4.5	6.08	4.05
10/15/03	3.7	3.6	4.1	4.2	3.8	15	13	7.69
01176000 Quaboag River At West Brimfield, MA (Provisional 7Q10 = 15.847 cfs, USGS 1998)								
4/16/03	744	808	785	761	720	670	658.2	548
5/14/03	334	303	284	281	265	252	282.5	315
6/18/03	572	539	484	440	402	390	444.3	193
6/19/03	539	484	440	402	390	383	444.3	193
7/30/03	111	106	101	94	84	79	151.7	103
7/31/03	106	101	94	84	79	74	151.7	103
8/20/03	138	135	129	121	114	104	112.6	103
8/21/03	135	129	121	114	104	95	112.6	103
10/15/03	109	103	96	91	93	179	199.5	127
Swift River Subbasin								
01174500 East Branch Swift River Near Hardwick, MA								
4/16/03	181	400	397	286	221	188	194.5	161
5/14/03	104	97	93	133	165	152	120.9	91.6
6/18/03	200	233	190	134	107	97	167.5	61.1
6/19/03	233	190	134	107	97	104	167.5	61.1
7/30/03	27	23	20	19	17	15	36	28.7
7/31/03	23	20	19	17	15	14	36	28.7
8/20/03	72	50	40	34	31	26	43.1	23
8/21/03	50	40	34	31	26	22	43.1	23
10/15/03	25	23	21	22	23	48	73.1	38.3
01174565 West Branch Swift River Near Shutesbury, MA								
4/16/03	58	120	95	69	60	55	50.5	42.3
5/14/03	24	22	23	34	30	24	25.1	29.1
6/18/03	52	42	28	21	19	19	30	24.7
6/19/03	42	28	21	19	19	19	30	24.7
7/30/03	7.1	6	5	4.3	3.8	3.6	6.94	9.23
7/31/03	6	5	4.3	3.8	3.6	3.3	6.94	9.23
8/20/03	18	15	15	19	13	10	15.8	6.85
8/21/03	15	15	19	13	10	8.3	15.8	6.85
10/15/03	12	12	11	10	9.6	62	29.3	12.8

Table 4. Continued. USGS gage data summaries in Chicopee Watershed for 2003 MassDEP DWM surveys (Socolow et al. 2004, Socolow et al. 2005)

Chicopee River Watershed Survey
USGS Flow Data Summary (reported in cubic feet per second)

Survey Date	5 Days Prior	4 Days Prior	3 Days Prior	2 Days Prior	1 Day Prior	Survey Date	Monthly Mean 2003	POR* Monthly Mean
01175500 Swift River At West Ware, MA (Provisional 7Q10 = 27.824 cfs, USGS 1998)								
4/16/03	41	41	39	37	37	36	37.1	166
5/14/03	35	34	35	36	35	35	35.1	159
6/18/03	42	37	35	35	34	34	36.7	124
6/19/03	37	35	35	34	34	31	36.7	124
7/30/03	41	36	33	34	34	82	94.8	76.5
7/31/03	36	33	34	34	82	114	94.8	76.5
8/20/03	35	35	35	35	35	35	46.9	78.9
8/21/03	35	35	35	35	35	35	46.9	78.9
10/15/03	38	38	38	38	38	42	39.8	71.3
Chicopee River Subbasin								
01177000 Chicopee River At Indian Orchard, MA (Provisional 7Q10 = 125.963 cfs, USGS 1998)								
4/16/03	1790	2630	2560	2070	1860	1700	1733	1810
5/14/03	1120	1030	808	1150	1070	981	1034	1180
6/18/03	1700	2010	1800	1410	1240	1150	1534	824
6/19/03	2010	1800	1410	1240	1150	1230	1534	824
7/30/03	469	432	484	403	341	256	624.2	481
7/31/03	432	484	403	341	256	250	624.2	481
8/20/03	904	809	733	587	481	456	570.5	446
8/21/03	809	733	587	481	456	380	570.5	446
10/15/03	368	273	331	325	257	576	673.4	523

Figure 3: May Precipitation and Streamflow in Chicopee River at Indian Orchard



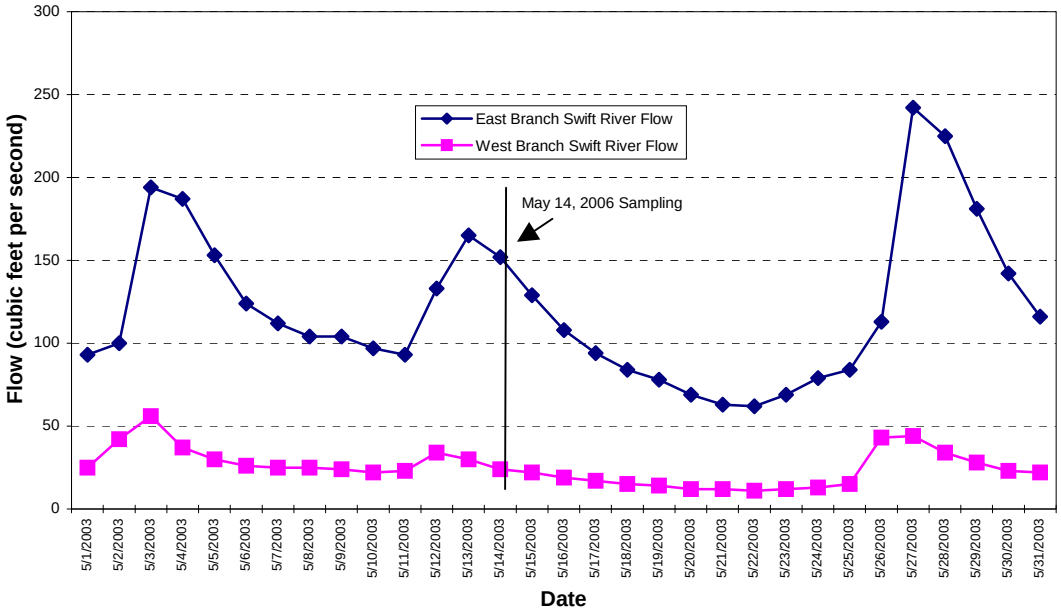


Figure 4: May 2003 Flow in East Branch Swift River and West Branch Swift River

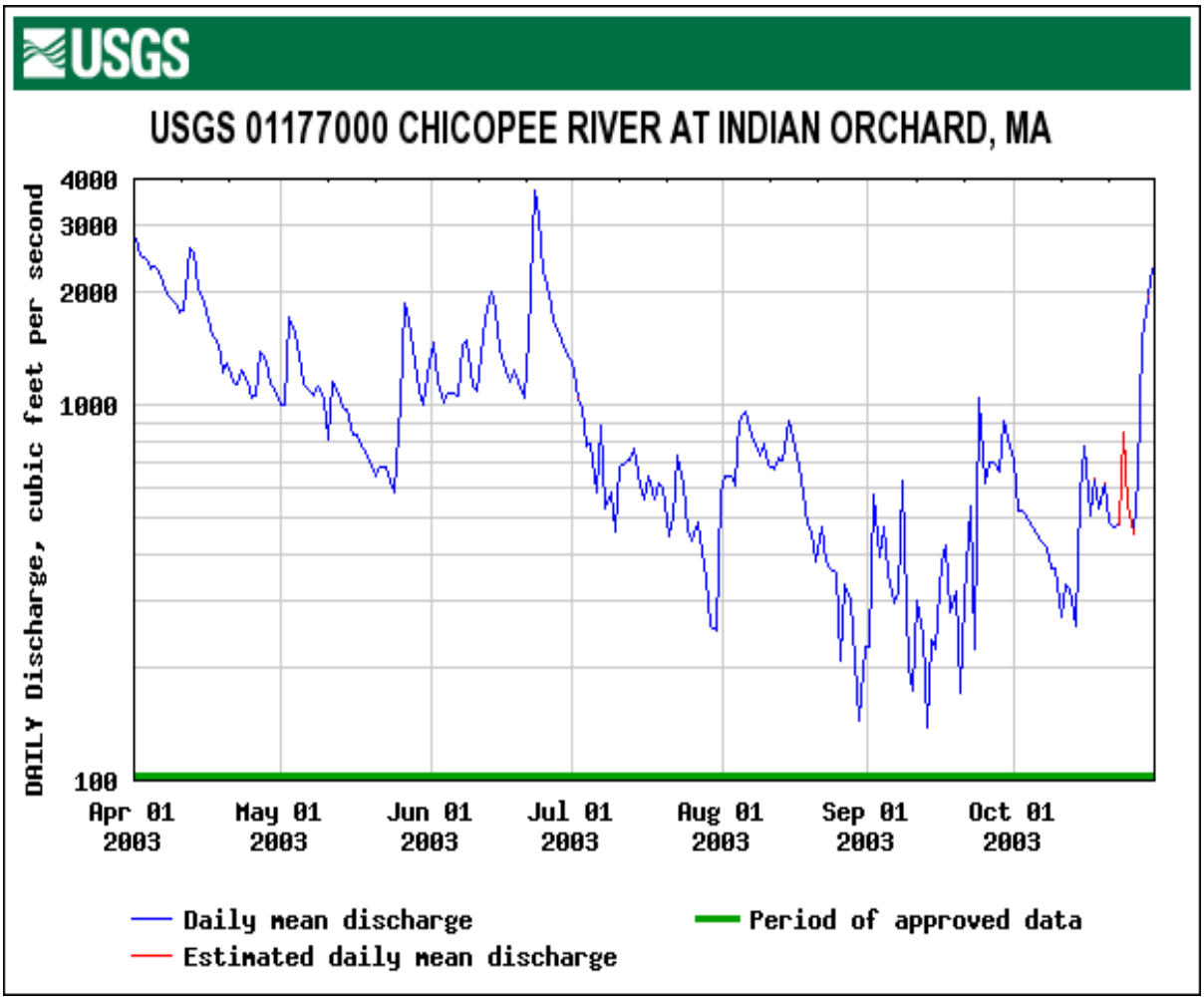


Figure 5. Hydrograph of Daily Mean Discharge at USGS Gage 01177000 during the 2003 Chicopee Survey Season.

WATER QUALITY DATA

Raw data files, field sheets, lab reports and chain of custody (COC) records are stored in open files at the Division of Watershed Management (DWM) in Worcester. All DEP DWM water quality data are managed and maintained in the *Water Quality Data Access Database*.

Table 5. 2003 MassDEP Chicopee Watersheds *in-situ* Hydrolab® Data.
Temperature, pH, Conductivity, Total Dissolved Solids (TDS), Salinity, Dissolved Oxygen (DO), Dissolved Oxygen Percent Saturation (Data qualifiers listed at end of table and in Appendix 1)

Chicopee, (2003) (QC Status: 4)

Unnamed Tributary
Unique_ID: W1027 Station: POOR01, Mile Point: 0.356
Description: [unnamed tributary to the Chicopee River (locally known as Poor Brook), Route 141 (East Main Street) bridge, Chicopee]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0199	09:59	## i	13.0	7.4 cu	606	388	9.7 u	94 u
05/14/03	36-0263	09:45	## i	12.4	7.3 c	556	356	9.5	91
07/30/03	36-0444	10:05	0.2	16.7	7.9 c	643	411	8.4 u	87 u
07/31/03	36-0478	02:13	## i	20.4	7.5 c	377 u	241 u	7.5	84
08/20/03	36-0572	10:11	0.1 i	17.1	7.4 c	602	385	8.2	86
08/21/03	36-0599	02:05	## i	17.3	7.3 c	600	384	8.1	86
10/15/03	36-0675	10:50	## i	14.7	7.0 c	143	91.5	8.9	91

Unnamed Tributary
Unique_ID: W1026 Station: AB01, Mile Point: 0.111
Description: [unnamed tributary to the Chicopee River (locally considered part of Abbey Brook) upstream of storm drain discharge, Front Street, Chicopee]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0198	09:41	## i	13.4	7.4 c	624	399	10.2	101
05/14/03	36-0262	09:17	## i	13.7	7.2 c	467	299	9.5	95
07/30/03	36-0443	09:45	0.1 i	24.7	7.5 c	502	321	6.9	84
07/31/03	36-0477	01:53	## i	24.9	7.5 c	509	326	6.9	84
08/20/03	36-0571	09:50	0.1 i	24.1	7.4 c	467	299	7.0 u	84 u
08/21/03	36-0598	01:43	0.1 i	24.8	7.4 c	468	300	6.8	83
10/15/03	36-0674	10:25	0.2 i	14.3	7.1 c	354	227	9.2	94

Unnamed Tributary
Unique_ID: W1028 Station: COOL01, Mile Point: 0.061
Description: [unnamed tributary to the Chicopee River (an apparent diversion of Cooley Brook) at Fuller Road, approximately 1100 feet northwest of Haynes Circle, Chicopee]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0200	10:30	## i	12.4	6.6	220	141	7.2 u	69 u
05/14/03	36-0730	10:10	## i	14.2	6.9 c	129	82.5	8.8	88
07/30/03	36-0445	10:23	## i	19.3	7.0 c	136	87.0	7.5 u	83 u
07/31/03	36-0479	02:33	## i	19.1	6.9 u	133 u	85.0 u	6.9	76
08/20/03	36-0573	10:35	0.1 i	19.8	6.8	132	84.4	7.3	81
08/21/03	36-0600	02:26	## i	19.4	6.8	133	85.0	7.1 u	78 u
10/15/03	36-0676	11:07	## i	13.2	6.5	158	101	7.6	76

Unnamed Tributary
Unique_ID: W1267 Station: QP011, Mile Point: 0.011
Description: [Lake Road/South Pond Road (culvert between Quaboag Pond and Quacumquasit Pond when flowing north to Quaboag Pond), Brookfield/East Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
12/11/02	Ice Out	12:15j	--	--	--	--	--	--	--

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1033 Station: CH01, Mile Point: 17.725
Description: [near the intersection of New Hampshire Avenue and Springfield Street, Palmer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0205	12:42	0.5 i	12.9	6.7 u	118	75.2	10.3 u	100 u
05/14/03	36-0268	12:18	1.1 i	14.0	6.7 u	132	84.3	9.9 u	99 u
07/30/03	36-0450	12:16	0.5	22.7	7.6 c	171 u	109 u	8.4 u	99 u
07/31/03	36-0484	04:25	0.4 i	22.2	6.9 c	164 u	105 u	7.9	92
08/20/03	36-0578	12:27	0.4	22.8	7.2 c	170	109	8.1 u	96 u
08/21/03	36-0605	04:14	0.4 i	23.2	7.1 c	171	109	7.6	90
10/15/03	36-0681	12:54	0.4 i	13.8	6.9 cu	154	98.0	9.0 u	91 u

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1032 Station: CH02B, Mile Point: 12.802
Description: [Miller Street/Cottage Avenue bridge, Ludlow/Wilbraham]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0204	12:15	## i	12.0	6.7	115	73.8	10.5	100
05/14/03	36-0267	11:47	0.2 i	14.6	6.6	123	78.7	9.3	94
07/30/03	36-0449	11:50	0.3	24.3	7.1 cu	142	90.6	7.9	96
07/31/03	36-0483	04:01	0.6 i	24.4	6.8	142	91.1	8.2	100
08/20/03	36-0577	11:58	0.7	23.6	7.0 cu	129	82.2	7.7 u	92 u
08/21/03	36-0604	03:41	1.0 i	24.0	6.8	133	85.1	7.4	89
10/15/03	36-0680	12:30	1.4 i	13.7	6.8	141	89.9	9.5 u	95 u

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1031 Station: CH06, Mile Point: 7.494
Description: [River Street/West Street bridge, Springfield/Ludlow]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0203	11:39	## i	10.3	6.9 c	117	74.8	11.0 u	101 u
05/14/03	36-0266	11:10	0.1 i	14.5	6.6	128	82.2	9.3	94
07/30/03	36-0448	11:22	0.2	24.9	7.2 c	151	96.0	8.6	105
07/31/03	36-0482	03:35	0.4 i	24.4	6.8	155	99.0	7.6	92
08/20/03	36-0576	11:28	0.6	25.1	6.9 uc	133	84.9	7.6	94
08/21/03	36-0603	03:15	0.2 i	24.8	6.8	133	85.4	7.1	87
10/15/03	36-0679	11:56	0.5 i	13.6	6.9 c	151	97.0	9.5	95

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W0475 Station: CT03, Mile Point: 0.839
Description: [Route 116 bridge, Chicopee.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0197	09:20	0.3 i	10.8	7.7 cu	126	80.7	11.1	103
05/14/03	36-0261	08:53	0.8 i	14.6	7.2 uc	140	89.6	10.0	101
07/30/03	36-0442	09:28	0.3	25.0	7.4 c	169	108	8.1	99
07/31/03	36-0476	01:34	0.2 i	24.6	7.2 c	179	114	7.4	90
08/20/03	36-0570	09:28	0.1 i	24.4 u	7.1 cu	150	96.0	8.1 u	98 u
08/21/03	36-0597	01:25	0.1 i	25.2	7.0 c	149	95.5	7.3 u	90 u
10/15/03	36-0673	10:04	0.5 i	14.4	7.1 uc	186	119	9.7	99

FULLER BROOK (SARIS: 3625075)
Unique_ID: W1029 Station: FULL01, Mile Point: 0.227
Description: [between Route 90 and Shawinigan Drive, Chicopee]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0201	10:48	1.1 i	13.2	6.9 c	205	131	9.8	96
05/14/03	36-0264	10:27	0.2 i	13.2	7.0 c	219	140	9.5 u	93 u
07/30/03	36-0446	10:41	0.1 i	20.7	7.3 c	354	227	7.6 u	86 u
07/31/03	36-0480	02:55	## i	21.8	7.1 c	359	230	7.5	87
08/20/03	36-0574	10:50	0.1 i	20.6	7.2 c	298	191	7.7	87
08/21/03	36-0601	02:43	0.1 i	22.1	7.2 c	308	197	7.3	85
10/15/03	36-0677	11:25	## i	13.6	7.0 c	252	161	8.4 u	84 u

HIGHER BROOK (SARIS: 3625100)
Unique_ID: W1030 Station: FULL02, Mile Point: 0.562
Description: [West Street bridge, south of Roy Street, Ludlow (stream name change at Ludlow/Chicopee corporate boundry, natural extension of Fuller Brook with station 2.5 miles up "Fuller route")]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0202	11:07	## i	14.7	6.9 c	185	118	10.2	104
05/14/03	36-0265	10:44	## i	14.0	6.9	193	123	9.0 u	90 u
07/30/03	36-0447	11:04	0.1 i	21.0	7.2 c	263	168	6.6	75
07/31/03	36-0481	03:21	## i	21.0	6.9 c	268	172	6.1	69
08/20/03	36-0575	11:08	0.1 i	20.7	7.0 c	255	163	6.6	75
08/21/03	36-0602	03:00	## i	21.0	7.0 c	258	165	6.0	68
10/15/03	36-0678	11:40	## i	13.9	6.8	178	114	7.3	74

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1041 Station: QA100, Mile Point: 23.956
Description: [Route 148 (Fiskdale Road), Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0283	11:24	0.3	15.0	6.7	125	79.9	8.8	90
06/18/03	36-0353	11:55	0.9	20.5	6.6	123	80.0	7.1	79
06/19/03	36-0383	02:34	0.4	20.2	6.1	119	75.8	6.9	78
07/30/03	36-0466	11:28	0.8	25.6	6.7	131	85.0	6.0	73
07/31/03	36-0500	03:39	1.2	25.3	6.7	129	84.0	5.4	66
08/20/03	36-0594	11:30	0.4	25.3	6.5	130	85.0	4.9 u	60 u
08/21/03	36-0621	03:47	0.8	25.5	6.1	130	83.3	4.4	54
10/15/03	36-0696	11:59	0.5	14.2	6.7	117	76.0	8.4 u	82 u

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1010 Station: QAOBO, Mile Point: 20.627
Description: [Long Hill Road bridge, West Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0192	10:44	1.7	12.1	6.2	107	68.8	9.6	91
05/14/03	36-0272	10:27	0.8	14.8	6.7	128	83.0	9.2	91
06/18/03	36-0342	10:44	1.1	20.3	6.3	119	77.0	5.2	58
06/19/03	36-0372	02:05	0.5	20.1	6.3	118	76.0	5.1	57
07/30/03	36-0454	10:55	1.3	25.2	6.7	130	85.0	7.4	90
07/31/03	36-0488	02:10	0.6	25.4	6.5	131	85.0	3.8	47
08/20/03	36-0582	10:28	0.5	24.4	6.3	130	84.0	2.5	30
08/21/03	36-0609	02:29	1.0	24.5	6.3	130	84.0	1.9	22
10/15/03	36-0685	11:39	0.9	14.4	6.7 u	125	81.0	8.3	81

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1011 Station: QA06A, Mile Point: 13.687
Description: [Gilbert Road bridge, Warren]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0193	11:22	0.5	12.4	6.6 u	104	66.2	10.4	100
05/14/03	36-0273	11:04	0.2	14.6	7.1 uc	120	78.0	10.7	106
06/18/03	36-0343	11:11	0.2	19.3	6.9 c	114	74.0	9.3	101
06/19/03	36-0373	02:29	0.2	19.5	6.9 c	109	71.0	9.2	100
07/30/03	36-0455	11:29	0.2	25.0	7.4 c	129	84.0	8.4 u	102 u
07/31/03	36-0489	02:34	0.3	24.3	7.4 c	129	84.0	8.1	97
08/20/03	36-0583	10:56	0.4	24.3	7.3 c	134	87.0	8.5	102
08/21/03	36-0610	02:55	0.3	24.3	7.3 c	130	84.0	8.2	98
10/15/03	36-0686	12:09	0.6	14.1	7.1 c	114	74.0	10.1	98

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W0491 Station: QRG, Mile Point: 10.931
Description: [east of Route 67, (near USGS flow gauging station #01176000), Palmer/Brimfield.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0292	12:00	0.7	15.3	7.4 c	133	86.0	10.7	107
06/19/03	36-0387	04:36	0.8	19.2	7.0 c	117	76.0	9.2	99
07/31/03	36-0504	03:20	0.2	23.4	7.2 uc	173	110	7.4 u	89 u
08/21/03	36-0625	03:03	0.2 i	23.5	7.2 c	167	109	7.9	93

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1015 Station: QA09A, Mile Point: 1.469
Description: [Palmer Street bridge, Palmer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0196	12:51	0.9	13.0	6.7	119	76.0	10.5 u	102 u
05/14/03	36-0276	12:12	0.3	14.0	7.0 uc	169	110	11.1	107
06/18/03	36-0346	12:16	0.3 i	18.2	6.9 c	134	87.0	9.4	99
06/19/03	36-0376	03:27	0.6	18.1	6.9 c	129	84.0	9.4	99
07/30/03	36-0458	12:50	0.2	22.6	7.2 c	185	120	9.0	104
07/31/03	36-0492	03:36	0.6	22.9	7.1 c	187	121	7.3	85
08/20/03	36-0586	11:58	0.7	22.1	7.1 c	184	120	8.6	99
08/21/03	36-0613	04:00	0.6 u	23.3	7.0 c	184	120	7.4	87
10/15/03	36-0689	13:29	0.7	13.7	6.9 c	157	102	9.4	91

DUNN BROOK (SARIS: 3626175)
Unique_ID: W1042 Station: DUN01, Mile Point: 0.681
Description: [Quaboag Street, Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0284	11:49	0.5	14.3	6.5	217	139	7.5	75
06/18/03	36-0354	11:38	0.8	17.5	6.4	133	87.0	5.3	55
06/19/03	36-0384	02:18	0.7	17.2	6.0	132	84.5	4.1 u	43 u
07/30/03	36-0467	10:51	0.9	23.2	6.7	230	149	2.6 u	31 u
07/31/03	36-0501	02:47	0.8	24.5	6.8	232	151	4.4	52
08/20/03	36-0595	10:57	0.1 i	22.7	6.7	237	154	5.0	59
08/21/03	36-0622	04:01	0.6	23.7	6.6	238	152	4.4	53
10/15/03	36-0697	11:17	0.6	12.8	6.4	197	128	5.8 u	55 u

FORGET-ME-NOT BROOK (SARIS: 3626200)
Unique_ID: W1040 Station: DB08, Mile Point: 1.522
Description: [East Brookfield Road/Donovan Road intersection (approximately 1100 feet upstream of the North Brookfield WWTP (MA0101061) discharge), North Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0282	12:27	0.1 i	13.8	6.6 u	188	120	8.9 u	88 u
06/18/03	36-0352	11:19	0.4	14.2	6.6	202	131	8.9	86
06/19/03	36-0382	03:12	## i	14.5	6.3	170	109	7.7	77
07/30/03	36-0465	10:31	0.2	22.4	6.7	231	150	5.7	65
07/31/03	36-0499	02:24	0.2	20.6	6.7	230	149	5.4	60
08/20/03	36-0593	10:37	0.1 i	22.3	6.7	261	170	6.9 u	79 u
08/21/03	36-0620	03:27	## i	21.2	6.5	266	170	5.6 u	63 u
10/15/03	36-0695	11:00	0.3	13.5	6.5	111 u	72.0 u	8.7 u	83 u

FORGET-ME-NOT BROOK (SARIS: 3626200)
Unique_ID: W1039 Station: DB07, Mile Point: 1.072
Description: [west of East Brookfield Road approximately 1300 feet downstream of North Brookfield WWTP (MA0101061) discharge, North Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0281	12:13	0.2	13.4	7.0 c	285	183	10.2	101
06/18/03	36-0351	11:08	0.4	14.4	6.9 c	244 u	158 u	10.1	99
06/19/03	36-0381	02:55	0.1 i	14.7	6.6	216	138	8.8	88
07/30/03	36-0464	10:17	0.3	20.8	7.3 c	458	298	8.3	92
07/31/03	36-0498	02:07	0.3	19.8	7.2 uc	406	264	8.2	90
08/20/03	36-0592	10:25	0.3	21.0	7.0 c	429	279	8.4	95
08/21/03	36-0619	03:15	0.2	20.6	6.9 c	413	264	7.7	87
10/15/03	36-0694	10:50	0.3	14.0	6.7	178	116	9.4 u	91 u

EAST BROOKFIELD RIVER (SARIS: 3626225)
Unique_ID: W1038 Station: EB04, Mile Point: 2.416
Description: [below all Lake Lashaway outlet structures, approximatley 100 feet downstream of Route 9 bridge, East Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0280	10:22	0.2	15.4	6.8	68.6	43.9	9.5 u	97 u
06/18/03	36-0350	10:51	0.6	20.1	7.1 c	72.0	47.0	9.4	103
06/19/03	36-0380	01:44	0.1 i	20.0	6.6 u	70.2	44.9	8.8	98
07/30/03	36-0463	10:00	1.3	25.1	7.2 c	77.0	50.0	8.0	96
07/31/03	36-0497	01:48	1.2	24.4	7.1 c	78.0	51.0	7.8	94
08/20/03	36-0591	10:05	0.2	25.7	7.2 c	79.0	52.0	8.2	100
08/21/03	36-0618	03:00	0.1 i	26.1	7.4 c	76.1	48.7	7.9	99
10/15/03	36-0693	10:33	0.6	14.6	7.0 c	77.0	50.0	9.6	94

EAST BROOKFIELD RIVER (SARIS: 3626225)
Unique_ID: W1016 Station: EB04A, Mile Point: 0.004
Description: [Shore Road, East Brookfield]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0285	10:46	1.6	13.7	6.4	127	81.0	8.2	81
06/18/03	36-0355	10:31	0.9 u	18.5	6.3	119	77.0	5.2	55
06/19/03	36-0385	02:04	0.3	18.6	6.0 u	122	78.3	5.6	61
07/30/03	36-0468	11:07	1.8	23.0	6.3	145	94.0	1.7	20
07/31/03	36-0502	03:07	1.9	23.6	6.3	148	96.0	1.7	20
08/20/03	36-0596	11:11	0.3 u	23.0	6.3 u	144	94.0	2.3 u	26 u
08/21/03	36-0623	04:15	1.3	23.4	6.0 u	148	94.7	1.5	18
10/15/03	36-0698	11:34	0.9	13.5	6.6	144	93.0	8.0	77

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W0490 Station: SMG, Mile Point: 5.866
Description: [Cooney Road at USGS flow gauging station #01175670, Spencer.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0286	08:29	0.2 i	12.7	6.7	87.0	57.0	10.2	97
06/19/03	36-0386	05:16	0.2	17.5	6.6	86.0	56.0	8.6	90
07/31/03	36-0503	04:04	## i	21.4	6.7	102	65.5	7.3 u	83 u
08/21/03	36-0624	03:46	## i	22.3	6.8	98.0	64.0	7.6	87

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W1036 Station: SM01, Mile Point: 2.857
Description: [approximately 200 feet upstream of Route 9 (West Main Street) bridge, Spencer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0278	09:34	## i	12.7	6.1 u	150	95.7	6.7 u	65 u
06/18/03	36-0348	09:49	0.3	17.5	6.3	139	90.0	5.0	53
06/19/03	36-0378	01:08	0.1 i	17.8	6.0	135	86.5	4.3	45
07/30/03	36-0461	09:25	0.5	20.9	6.4	162	106	3.4	38
07/31/03	36-0495	01:11	1.5	22.8	6.4	170	111	4.4	51
08/20/03	36-0589	09:24	0.1 ui	20.3	6.3	153	99.0	3.1 u	35 u
08/21/03	36-0616	02:27	0.2	22.7	6.1	153	98.0	3.0	35
10/15/03	36-0691	10:04	0.5	12.8	6.3	134	87.0	5.3 u	50 u

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W1037 Station: SM02, Mile Point: 2.301
Description: [Route 49 (Podunk Pike) bridge, Spencer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0279	09:58	0.3	12.9	6.3	153	98.0	7.9	77
06/18/03	36-0349	10:07	0.7	17.3	6.4	144	94.0	6.2	65
06/19/03	36-0379	01:24	0.7	17.8	6.0	140	89.6	5.3	56
07/30/03	36-0462	09:40	0.5	20.8	6.6	179	116	5.9	66
07/31/03	36-0496	01:26	0.7	22.0	6.6	190	123	5.6	64
08/20/03	36-0590	09:42	0.1 i	20.4	6.5	168	109	5.5	61
08/21/03	36-0617	02:42	0.5	22.4	6.3	176	112	4.8	57
10/15/03	36-0692	10:17	0.4 u	12.8	6.4	149	97.0	6.7 u	64 u

CRANBERRY RIVER (SARIS: 3626300)
Unique_ID: W1035 Station: CRN01, Mile Point: 0.252
Description: [South Spencer Road, Spencer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0277	08:56	0.1 i	13.2	6.3 u	103	66.0	7.8	76
06/18/03	36-0347	09:31	0.5	17.6	6.4	95.0	62.0	5.9	62
06/19/03	36-0377	00:49	0.3	18.5	6.2	95.3	61.0	4.9	53
07/30/03	36-0460	09:08	0.4	21.8	6.6	118	77.0	5.6	63
07/31/03	36-0494	00:55	0.4	23.1	6.5	118	77.0	5.0	58
08/20/03	36-0588	09:08	0.2 u	21.2	6.5 u	124	80.0	5.5	62
08/21/03	36-0615	02:14	0.3	23.0	6.3	115	73.6	4.7	56
10/15/03	36-0690	09:50	0.5	13.5	6.4 u	98.0	64.0	7.6	72

WARE RIVER (SARIS: 3626500)
Unique_ID: W0494 Station: CBG, Mile Point: 30.472
Description: [south of Route 122 at weir downstream of Shaft #8 water supply intake, Barre.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0287	09:11	0.7	12.5	6.2	92.0	60.0	10.1	95
06/19/03	36-0390	00:41	0.3	17.7	6.2	94.0	61.0	8.6	90
07/31/03	36-0507	00:57	0.3	22.6	6.3	105	67.3	7.2	85
08/21/03	36-0628	00:59	0.5 i	23.4	6.2 u	118	76.0	8.2	96

WARE RIVER (SARIS: 3626500)
Unique_ID: W1006 Station: WAWV, Mile Point: 29.645
Description: [approximately 150 feet upstream of Vernon Avenue, Barre]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0207	10:55	0.7	11.3	5.6	89.8	57.5	9.8	92
05/14/03	36-0288	09:31	0.8	12.9	6.2	93.0	61.0	10.1	96
06/18/03	36-0328	10:39	0.6	18.6	5.8	92.9	59.5	8.1	88
06/19/03	36-0391	00:55	0.8	18.2	6.2	95.0	61.0	8.6	91
07/30/03	SM-0798	10:45	0.8	23.5	6.7	113	72.1	8.1	96
07/31/03	36-0508	01:18	0.1 i	23.3	6.7	120	76.8	7.9	94
08/20/03	SM-0814	09:42	0.6	22.8	6.1	114	73.0	7.6 u	89 u
08/21/03	36-0629	01:13	0.3 i	23.9	6.6	116	76.0	8.2	97
10/22/03	SM-0857	10:42	0.9	8.4	6.4	92.0	60.0	12.5	106

WARE RIVER (SARIS: 3626500)
Unique_ID: W1007 Station: WAIR, Mile Point: 24.523
Description: [between the confluence of Pine Hill Brook and Broadmeadow Brook, Hardwick]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0189	08:58	0.7	10.3	5.9	107	68.3	9.7	89
05/14/03	36-0269	08:41	0.3	12.6	6.2	108	71.0	9.4	88
06/18/03	36-0339	09:03	0.3 u	17.9	6.2	102	66.0	7.9	83
06/19/03	36-0369	00:53	0.3	17.9	6.3	107	69.0	8.3	87
07/30/03	36-0451	09:04	0.2 u	23.7	6.6	154	100	6.9	82
07/31/03	36-0485	01:00	0.4 u	25.0	6.9 c	154	100	8.5	103
08/20/03	36-0579	09:06	0.7	22.4	6.2	122	79.0	6.5	75
08/21/03	36-0606	01:00	0.2 u	23.8	6.3	123	80.0	6.6	78
10/15/03	36-0682	10:00	0.3 u	12.0	6.1	115	75.0	8.9	83

WARE RIVER (SARIS: 3626500)
Unique_ID: W1008 Station: WAX, Mile Point: 20.194
Description: [Creamery Road/Unitas Road, Hardwick/New Braintree]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0190	09:35	1.9	11.1	6.1	104	66.5	10.3	96
05/14/03	36-0270	09:24	1.2	13.1	6.4	107	69.0	10.5	100
06/18/03	36-0340	09:50	0.4 u	17.9	6.4	104	68.0	8.8	93
06/19/03	36-0370	01:16	0.4	17.7	6.4	101	66.0	8.7	91
07/30/03	36-0452	09:52	0.6	21.2	6.7	145	94.0	7.9	89
07/31/03	36-0486	01:23	0.4	22.8	6.8	147	95.0	7.2	84
08/20/03	36-0580	09:31	1.4	22.0	6.4	118	76.0	7.7	88
08/21/03	36-0607	01:30	0.9	22.1	6.4	120	78.0	7.5	86
10/15/03	36-0683	10:37	0.8	12.7	6.4	109	71.0	9.4	89

WARE RIVER (SARIS: 3626500)
Unique_ID: W1009 Station: WA06A, Mile Point: 14.951
Description: [Upper Church Street, Ware]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0191	10:09	0.7	11.7	6.4	107	68.3	10.4	98
05/14/03	36-0271	09:56	0.2	13.0	6.8	109	71.0	11.1	106
06/18/03	36-0341	10:16	0.2 u	17.5	6.7 u	104	68.0	9.4	98
06/19/03	36-0371	01:40	0.2	17.4	6.7	103	67.0	9.3	97
07/30/03	36-0453	10:22	0.2 u	21.8	7.3 uc	143	93.0	9.2 u	104 u
07/31/03	36-0487	01:44	0.5	22.8	7.1 c	149	97.0	7.8	91
08/20/03	36-0581	09:58	0.7	21.3	6.8	99.0	64.0	8.8	100
08/21/03	36-0608	01:57	0.6	23.2	6.8	121	79.0	7.9	92
10/15/03	36-0684	11:05	0.5	12.9	6.9 u	120	78.0	10.2	97

WARE RIVER (SARIS: 3626500)
Unique_ID: W0492 Station: WA09A, Mile Point: 8.559
Description: [Route 32 at Gibbs Crossing, Ware.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0291	11:16	0.4	14.1	6.8	104	68.0	10.5	102
06/19/03	36-0388	04:10	0.5	17.7	6.6 u	107	69.0	9.0 u	94 u
07/31/03	36-0505	02:48	0.2	23.8	6.8 u	144	92.4	6.9 u	83 u
08/21/03	36-0626	02:37	## i	22.5	6.7	126	82.0	7.4	85

WARE RIVER (SARIS: 3626500)
Unique_ID: W1014 Station: WA12, Mile Point: 1.321
Description: [Route 181, Palmer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0195	12:24	0.5	12.8	6.6	107	68.3	10.1 u	97 u
05/14/03	36-0275	11:52	0.2	14.1	6.8	108	70.0	10.5	102
06/18/03	36-0345	11:56	0.2 u	18.4	6.7	106	69.0	9.1	97
06/19/03	36-0375	03:09	0.2	18.3	6.7	106	69.0	9.4	100
07/30/03	36-0457	12:23	0.2	25.0	7.3 c	139	90.0	8.4	101
07/31/03	36-0491	03:19	0.4	23.4	7.2 c	141	92.0	7.7	90
08/20/03	36-0585	11:40	0.6	24.2	6.8	119	78.0	8.1	97
08/21/03	36-0612	03:44	0.5	23.2	6.9 c	123	80.0	8.0	94
10/15/03	36-0688	13:02	0.3	13.8	7.0 uc	121	79.0	10.4	100

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W0493 Station: SRG, Mile Point: 8.191
Description: [at USGS flow gauging station #01175500 west of River Road, Ware/Belchertown.]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
05/14/03	36-0289	10:30	0.5	8.3	6.6	56.0	36.0	12.5	106
06/19/03	36-0389	01:43	0.5	10.5	6.5	67.0	44.0	11.3 u	101 u
07/31/03	36-0506	02:03	0.3	11.1	6.5	41.9	26.8	10.8 u	99 u
08/21/03	36-0627	02:00	0.1 i	11.4	6.5 u	49.0	32.0	10.9	100

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W1012 Station: SR03, Mile Point: 6.057
Description: [Cold Spring Road/Old Belchertown Road, Belchertown/Ware (bridge under repair in 2003)]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0206	12:42	0.9	8.9	6.2	62.1	39.9	9.5	84
05/14/03	36-0290	10:52	0.8	9.7	6.4	63.0	41.0	10.3 u	91 u
06/18/03	36-0329	12:03	1.7	12.0	5.9	58.8	37.6	8.7	82
06/19/03	36-0392	02:01	1.7	11.2	6.5 u	61.0	40.0	11.1	101
07/30/03	SM-0800	12:09	0.6	13.3 u	6.3	50.7	32.4	9.2	89
07/31/03	36-0509	02:24	0.4	12.2 u	6.4	43.5	27.9	9.7 u	91 u
08/20/03	SM-0816	11:03	0.4	14.6	6.1	53.2	34.1	8.2	82
08/21/03	36-0630	02:16	## i	14.5	6.6	53.0	34.0	11.1	108
10/22/03	SM-0859	12:07	1.0	11.0	6.3	57.0	37.0	9.2	83

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W1013 Station: SR02, Mile Point: 3.191
Description: [Route 181, Belchertown/Palmer]

Date	OWMID	Time	Depth	Temp	pH	Cond@ 25°C	TDS	DO	SAT
		(24hr)	(m)	(°C)	(SU)	(uS/cm)	(mg/L)	(mg/L)	(%)
04/16/03	36-0194	11:57	0.4	11.9	6.7 u	64.1	41.1	10.7	101
05/14/03	36-0274	11:33	0.2	13.2	6.9 c	63.0	41.0	11.1	105
06/18/03	36-0344	11:37	0.3	16.2	6.9 c	66.0	43.0	10.0	102
06/19/03	36-0374	02:54	0.2	15.6	6.8	66.0	43.0	10.1	101
07/30/03	36-0456	12:03	0.2	19.5	7.0 c	57.0	37.0	9.4	103
07/31/03	36-0490	03:02	0.5	17.9	6.9 uc	56.0	36.0	9.7	102
08/20/03	36-0584	11:23	0.3	18.9	6.9 c	58.0	37.0	9.5	102
08/21/03	36-0611	03:24	0.5	19.3	6.9 c	59.0	38.0	9.2	99
10/15/03	36-0687	12:40	0.3 u	13.9	6.8 u	58.0	38.0	10.2	98

" ## " = Censored data (i.e., data that have been discarded for some reason).
" c " = Greater than calibration standard used for pre-calibration, or outside the acceptable range about the calibration standard. See Section Appendix 2 for acceptance criteria
" i " = Inaccurate readings from multiprobe likely
" m " = Method SOP not followed. (only partially implemented or not implemented at all) due to complications with sample matrix (e.g. sediment in sample, floc formation), lab error (e.g. cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, missing data or deviations from field sampling SOPs.
" u " = Unstable readings, due to lack of sufficient equilibration time prior to final readings, non-representative location, highly-variable water quality conditions, etc

Table 6. 2003 MassDEP Chicopee Watersheds Instream Bacteria and Physico/Chemical Data.
Fecal coliform, E. coli, Turbidity, Ammonia Nitrogen (NH3-N), Total Phosphorus (TP), and Total Suspended Solids (TSS) (Data qualifiers listed at the end the Table and in Appendix 1)

Unnamed Tributary
Unique_ID: W1027 Station: POOR01, Mile Point: 0.356
Description: [unnamed tributary to the Chicopee River (locally known as Poor Brook), Route 141 (East Main Street) bridge, Chicopee]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0137	36-0138	09:55	6* e	30* e	3.3*	2.2	--	0.030	5.0*
04/16/03	36-0138	36-0137	09:55	16*	12*	3.2*	2.1	--	0.029	5.5*
05/14/03	36-0212	36-0213	09:40	54*	49*	3.6*	1.3	--	0.047 j	5*
05/14/03	36-0213	36-0212	09:40	39*	38*	3.7*	1.3	--	0.042 j	5*
06/18/03	36-0297	36-0298	10:25	6100*	4200*	17*	1.4	--	0.21	38*
06/18/03	36-0298	36-0297	10:25	4400*	3100*	18*	1.4	--	0.21	41*
07/30/03	36-0402	36-0403	10:03	190*	160*	2.6*	0.48	--	0.017	2*
07/30/03	36-0403	36-0402	10:03	200*	180*	2.7*	0.57	--	0.015	3*
08/20/03	36-0522	36-0523	10:05	600* d	120*	3.1*	0.33	--	0.020	3*
08/20/03	36-0523	36-0522	10:05	300* d	200*	3.0*	0.33	--	0.019	2*
10/15/03	36-0642	36-0643	10:48	3100*	1880*	--	--	0.70*	##* b	18*
10/15/03	36-0643	36-0642	10:48	3600*	2330*	--	--	0.83*	##* b	18*

Unnamed Tributary
Unique_ID: W1026 Station: AB01, Mile Point: 0.111
Description: [unnamed tributary to the Chicopee River (locally considered part of Abbey Brook) upstream of storm drain discharge, Front Street, Chicopee]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0136	--	09:37	<2*	2*	6.2*	0.14	--	0.035	6.0*
05/14/03	36-0211	--	09:20	76*	72*	4.8*	0.20	--	0.045	6*
06/18/03	36-0296	--	09:50	140*	112*	5.3*	0.16	--	0.046	5*
07/30/03	36-0401	--	09:46	200*	30*	3.1*	0.14	--	0.079	5*
08/20/03	36-0521	--	09:45	400*	110*	3.5*	0.07	--	0.063	8*
10/15/03	36-0641	--	10:20	13500*	10000*	--	--	<0.10*	##* b	12*

Unnamed Tributary
Unique_ID: W1028 Station: COOL01, Mile Point: 0.061
Description: [unnamed tributary to the Chicopee River (an apparent diversion of Cooley Brook) at Fuller Road, approximately 1100 feet northwest of Haynes Circle, Chicopee]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0140	--	10:25	<2* e	10* e	6.9*	<0.06	--	0.030	7.5*
05/14/03	36-0215	--	10:08	17*	9*	1.6*	<0.02	--	0.042 j	4*
06/18/03	36-0300	--	10:50	270*	190*	2.6*	0.06	--	0.060	8*
07/30/03	36-0405	--	10:24	50*	10*	2.1*	0.10	--	0.037	3*
08/20/03	36-0525	--	10:30	500*	300*	1.8*	0.12	--	0.23	2*
10/15/03	36-0645	--	11:10	4700*	1100*	--	--	0.29*	##* b	<2*

Unnamed Tributary
Unique_ID: W1043 Station: QP011, Mile Point: 0.022
Description: [Lake Road/South Pond Road (culvert between Quaboag Pond and Quacumquasit Pond when flowing south to Quacumquasit Pond), Brookfield/East Brookfield]

Date	OWMID	QAQC	Time	NO3-NO2-N	TKN	TN	TP
			(24hr)	mg/L	mg/L	mg/L	mg/L
12/23/02	36-0102	--	13:45	--	--	--	0.030 h
09/24/03	LB-2539	--	13:00	<0.06 h	--	0.61 h	0.043 h

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1033 Station: CH01, Mile Point: 17.725
Description: [near the intersection of New Hampshire Avenue and Springfield Street, Palmer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0145	--	12:35	20* e	30* e	0.70*	<0.02	--	0.031	4.5*
05/14/03	36-0220	--	12:20	77*	64*	1.1*	<0.02	--	0.033	6*
06/18/03	36-0305	--	12:39	1330*	290*	1.8*	<0.02	--	0.064	9*
07/30/03	36-0410	--	12:10	310*	160*	1.7*	<0.06	--	0.051	2*
8/20/03	36-0530	--	12:24	700*	400*	1.6*	<0.02	--	0.049	2*
10/15/03	36-0650	--	12:53	1800*	1520*	--	--	<0.10*	##* b	13*

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1032 Station: CH02B, Mile Point: 12.802
Description: [Miller Street/Cottage Avenue bridge, Ludlow/Wilbraham]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0144	--	12:10	<2*	<2*	0.62*	<0.02	--	0.021	<2.0*
05/14/03	36-0219	--	11:53	26*	20*	1.0*	<0.02	--	0.032	2*
06/18/03	36-0304	--	12:17	80*	32*	1.2*	<0.02	--	0.055	4*
07/30/03	36-0409	--	11:46	100*	40*	1.9*	<0.02	--	0.040	<2*
08/20/03	36-0529	--	11:58	<10*	<10*	1.5*	<0.02	--	0.049	2*
10/15/03	36-0649	--	12:30	120* e	160* e	--	--	<0.10*	##* b	2*

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W1031 Station: CH06, Mile Point: 7.494
Description: [River Street/West Street bridge, Springfield/Ludlow]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0143	--	11:37	2* e	4* e	0.66*	<0.02	--	0.021	<2.0*
05/14/03	36-0218	--	11:05	20*	18*	0.96*	<0.02	--	0.033	3*
06/18/03	36-0303	--	11:47	248*	90*	1.2*	<0.02	--	0.056	5*
07/30/03	36-0408	--	11:22	30*	30*	1.3*	<0.02	--	0.035	2*
08/20/03	36-0528	--	11:26	100*	80*	1.4*	<0.02	--	0.045	<2*
10/15/03	36-0648	--	11:56	126*	126*	--	--	<0.10*	##* b	<2*

CHICOPEE RIVER (SARIS: 3625000)
Unique_ID: W0475 Station: CT03, Mile Point: 0.839
Description: [Route 116 bridge, Chicopee.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0135	--	09:18	8*	4*	0.75*	<0.02	--	0.024	3.0*
05/14/03	36-0210	--	08:55	26*	20*	0.98*	0.21	--	0.039	3*
06/18/03	36-0295	--	09:20	310*	190*	1.4*	<0.02	--	0.057	5*
07/30/03	36-0400	--	09:25	120*	100*	1.5*	<0.02	--	0.034	<2*
08/20/03	36-0520	--	09:25	200*	130*	1.4*	<0.02	--	0.044	<2*
10/15/03	36-0640	--	10:03	7700*	2980*	--	--	0.15*	##* b	7*

FULLER BROOK (SARIS: 3625075)
Unique_ID: W1029 Station: FULL01, Mile Point: 0.227
Description: [between Route 90 and Shawinigan Drive, Chicopee]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0141	--	10:44	20*	14*	1.3*	0.10	--	0.022	3.2*
05/14/03	36-0216	--	10:27	62*	55*	1.9*	0.20	--	0.045	4*
06/18/03	36-0301	--	11:12	2200*	450*	6.9*	0.15	--	0.088	6*
07/30/03	36-0406	--	10:40	400*	160*	6.1*	0.13	--	0.046	4*
08/20/03	36-0526	--	10:46	400*	200*	4.1*	0.14	--	0.039	2*
10/15/03	36-0646	--	11:22	5500*	1120*	--	--	<0.10*	##* b	93*

HIGHER BROOK (SARIS: 3625100)
Unique_ID: W1030 Station: FULL02, Mile Point: 0.562
Description: [West Street bridge, south of Roy Street, Ludlow (stream name change at Ludlow/Chicopee corporate boundry), natural extension of Fuller Brook.

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0142	--	11:05	10*	4*	0.66*	<0.02	--	0.020	2.0*
05/14/03	36-0217	--	10:44	71*	64*	1.3*	<0.02	--	0.037	4*
06/18/03	36-0302	--	11:36	450*	370*	2.8*	<0.02	--	0.077	6*
07/30/03	36-0407	--	11:01	400*	110*	1.8*	<0.06	--	0.037	3*
08/20/03	36-0527	--	11:08	100*	40*	1.3*	<0.02	--	0.030	<2*
10/15/03	36-0647	--	11:40	1800*	800*	--	--	<0.10*	##* b	6*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1041 Station: QA100, Mile Point: 23.956
Description: [Route 148 (Fiskdale Road), Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0098	36-0099	12:20	--	--	--	--	--	0.023 h	--
12/11/02	36-0099	36-0098	12:20	--	--	--	--	--	0.021 h	--
04/16/03	36-0163	36-0164	11:55	<2*	<2*	0.74*	<0.02	--	0.020	** *
04/16/03	36-0164	36-0163	11:55	<2*	<2*	0.75*	<0.02	--	0.016	** *
05/14/03	36-0238	36-0239	11:24	5*	1*	1.5*	## d	--	0.035 h	5*
05/14/03	36-0239	36-0238	11:24	4*	<0.9*	1.3*	## d	--	0.035 h	5*
06/18/03	36-0323	36-0324	11:55	20*	8*	1.3*	<0.02	--	0.046	4* h
06/18/03	36-0324	36-0323	11:55	20*	8*	1.4*	<0.02	--	0.048	4* h
07/30/03	36-0428	36-0429	11:30	<10*	<10*	1.8*	<0.02	--	0.046	2*
07/30/03	36-0429	36-0428	11:30	10*	<10*	1.7*	<0.02	--	0.044	2*
08/20/03	36-0556	36-0557	11:35	<10*	<10*	1.1*	<0.02	--	0.050	2*
08/20/03	36-0557	36-0556	11:35	<10*	<10*	1.3*	<0.02	--	0.047	2*
10/15/03	36-0668	36-0669	12:00	800* d	460*	--	--	<0.10*	##* bd	<2*
10/15/03	36-0669	36-0668	12:00	400* de	430* e	--	--	<0.10*	##* bd	<2*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1010 Station: QAOBO, Mile Point: 20.627
Description: [Long Hill Road bridge, West Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0151	--	10:37	<2*	<2*	0.62*	<0.02	--	0.017	3.5*
05/14/03	36-0226	--	10:30	9*	3*	1.4*	0.11	--	0.042	6*
06/18/03	36-0311	--	10:49	50*	40*	1.4*	<0.02	--	0.052	5* h
07/30/03	36-0416	--	10:53	200*	20*	1.9*	<0.02	--	0.045	3*
08/20/03	36-0536	--	10:23	410*	100*	1.5*	<0.02	--	0.048	2*
10/15/03	36-0656	--	11:31	300*	120*	--	--	<0.10*	##* b	<2*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1011 Station: QA06A, Mile Point: 13.687
Description: [Gilbert Road bridge, Warren]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0152	--	11:15	<2*	<2*	0.64*	<0.02	--	0.019	4.5*
05/14/03	36-0227	--	11:05	43*	41*	1.4*	<0.02	--	0.043	6*
06/18/03	36-0312	--	11:11	284*	182*	2.1*	<0.02	--	0.058	7* h
07/30/03	36-0417	--	11:30	200*	90*	2.3*	<0.02	--	0.045	2*
08/20/03	36-0537	--	10:52	500*	12*	1.7*	<0.02	--	0.040	<2*
10/15/03	36-0657	--	12:05	800*	690*	--	--	<0.10*	##* b	4*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W0491 Station: QRG, Mile Point: 10.931
Description: [east of Route 67, (near USGS flow gauging station #01176000), Palmer/Brimfield.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
05/14/03	36-0250	--	11:50	83*	43*	1.3*	<0.02	0.049	5*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1015 Station: QA09A, Mile Point: 1.469
Description: [Palmer Street bridge, Palmer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0155	--	12:38	10*	<2*	0.71*	<0.02	--	0.028	5.0*
05/14/03	36-0230	--	12:07	55*	50*	1.1*	<0.02	--	0.045	8*
06/18/03	36-0315	--	12:14	736*	400*	1.8*	<0.02	--	0.078	9* h
07/30/03	36-0420	--	12:46	700*	400*	1.9*	<0.02	--	0.043	2*
08/20/03	36-0540	--	11:51	700*	430*	1.6*	<0.02	--	0.049	3*
10/15/03	36-0660	--	13:25	2300*	2160*	--	--	0.10*	##* b	12*

DUNN BROOK (SARIS: 3626175)
Unique_ID: W1042 Station: DUN01, Mile Point: 0.681
Description: [Quaboag Street, Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0097	--	12:35	--	--	--	--	--	0.053 h	--
04/16/03	36-0166	--	12:10	<2* e	4* e	1.0*	<0.02	--	0.038	** *
05/14/03	36-0241	--	11:50	28*	23*	2.4*	<0.02 d	--	0.093 h	4*
06/18/03	36-0326	--	11:40	210*	160*	3.2*	<0.02	--	0.17	5* h
07/30/03	36-0431	--	10:45	70*	20*	4.7*	<0.02	--	0.17	4*
08/20/03	36-0559	--	10:55	10*	10*	6.4*	<0.02	--	0.23	7*
10/15/03	36-0671	--	11:20	1400*	960*	--	--	0.15*	##* b	8*

FORGET-ME-NOT BROOK (SARIS: 3626200)
Unique_ID: W1040 Station: DB08, Mile Point: 1.522
Description: [East Brookfield Road/Donovan Road intersection (approximately 1100 feet upstream of the North Brookfield WWTP (MA0101061) discharge), North Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0162	--	12:30	<2*	<2*	0.76*	0.10	--	0.023	** *
05/14/03	36-0237	--	12:25	81*	40*	1.5*	0.14 d	--	0.036 h	6*
06/18/03	36-0322	--	11:20	1220*	1050*	2.4*	<0.06	--	0.062	12* h
07/30/03	36-0427	--	10:30	400*	100*	11*	0.15	--	0.085	17*
08/20/03	36-0555	--	10:35	80*	30*	11*	0.16	--	0.060	10*
10/15/03	36-0667	--	11:00	6000*	4100*	--	--	0.17*	##* b	20*

FORGET-ME-NOT BROOK (SARIS: 3626200)
Unique_ID: W1039 Station: DB07, Mile Point: 1.072
Description: [west of East Brookfield Road approximately 1300 feet downstream of North Brookfield WWTP (MA0101061) discharge, North Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0161	--	12:25	96*	60*	0.60*	0.60	--	0.14	** *
05/14/03	36-0236	--	12:10	17*	16*	0.98*	<0.06 d	--	0.20 h	3*
06/18/03	36-0321	--	11:05	770*	560*	2.3*	<0.02	--	0.23	50* h
07/30/03	36-0426	--	10:13	200*	200*	2.1*	<0.02	--	0.13	3*
08/20/03	36-0554	--	10:24	100*	100*	1.5*	<0.06	--	0.16	<2*
10/15/03	36-0666	--	10:50	5200*	5100*	--	--	0.32*	##* b	17*

EAST BROOKFIELD RIVER (SARIS: 3626225)
Unique_ID: W1038 Station: EB04, Mile Point: 2.416
Description: [below all Lake Lashaway outlet structures, approximatley 100 feet downstream of Route 9 bridge, East Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0096	--	11:00	--	--	--	--	--	0.023 h	--
01/30/03	36-0107	--	11:45	--	--	--	--	--	0.013 f	--
03/04/03	36-0111	--	10:30	--	--	--	--	--	0.015 f	--
04/16/03	36-0160	--	10:22	<2*	<2*	0.87*	<0.02	--	0.018	** *
05/14/03	36-0235	--	10:20	<0.9*	<0.9*	1.1*	<0.02 d	--	0.014 h	2*
06/18/03	36-0320	--	10:50	<2*	<2*	1.3*	<0.02	--	0.025	6* h
07/30/03	36-0425	--	09:55	100*	70*	3.4*	<0.02	--	0.022	4*
08/20/03	36-0553	--	10:03	90*	30*	4.7*	<0.02	--	0.018	5*
10/15/03	36-0665	--	10:35	100*	90*	--	--	0.38*	##* b	6*
11/25/03	36-0704	--	11:20	--	--	--	--	--	0.031 fh	--

EAST BROOKFIELD RIVER (SARIS: 3626225)
Unique_ID: W1016 Station: EB04A, Mile Point: 0.004
Description: [Shore Road, East Brookfield]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0101	--	11:20	--	--	--	--	--	0.021 h	--
01/30/03	36-0108	--	13:00	--	--	--	--	--	0.017 f	--
03/04/03	36-0109	--	10:45	--	--	--	--	--	0.016 f	--
04/16/03	36-0167	--	11:10	<2*	<2*	0.56*	<0.02	--	0.014	** *
05/14/03	36-0242	--	10:48	19*	18*	1.3*	<0.02 d	--	0.024 h	3*
06/18/03	36-0327	--	10:30	30*	8*	1.9*	<0.02	--	0.036	4* h
07/30/03	36-0432	--	11:05	10*	<10*	2.9*	<0.02	--	0.042	3*
08/20/03	36-0560	--	11:10	100*	10*	3.4*	<0.02	--	0.039	<2*
10/15/03	36-0672	--	11:35	152*	100*	--	--	<0.10*	##* b	17*
11/25/03	36-0705	--	11:40	--	--	--	--	--	0.021 fh	--

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W0490 Station: SMG, Mile Point: 5.866
Description: [Cooney Road at USGS flow gauging station #01175670, Spencer.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
12/11/02	36-0090	--	09:20	--	--	--	--	0.009 h	--
05/14/03	36-0243	--	08:30	11*	10*	0.77*	<0.02	0.017	2*

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W1036 Station: SM01, Mile Point: 2.857
Description: [approximately 200 feet upstream of Route 9 (West Main Street) bridge, Spencer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0091	--	09:40	--	--	--	--	--	0.013 h	--
01/30/03	36-0103	--	11:00	--	--	--	--	--	0.011 f	--
03/04/03	36-0113	--	10:00	--	--	--	--	--	0.014 f	--
04/16/03	36-0158	--	09:25	<2*	<2*	0.52*	<0.02	--	0.011	** *
05/14/03	36-0233	--	09:36	17*	12*	1.2*	<0.06 d	--	0.019 h	2*
06/18/03	36-0318	--	09:50	170*	148*	2.3*	<0.02	--	0.039	3* h
07/30/03	36-0423	--	09:15	100*	60*	5.7*	<0.06	--	0.038	6*
08/20/03	36-0551	--	09:22	200*	90*	6.8*	<0.02	--	0.037	6*
10/15/03	36-0663	--	10:00	1000*	1000*	--	--	0.25*	##* b	9*
11/25/03	36-0702	--	10:55	--	--	--	--	--	0.025 fh	--

SEVENMILE RIVER (SARIS: 3626275)
Unique_ID: W1037 Station: SM02, Mile Point: 2.301
Description: [Route 49 (Podunk Pike) bridge, Spencer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0092	--	10:25	--	--	--	--	--	0.019 h	--
01/30/03	36-0106	--	11:15	--	--	--	--	--	0.015 f	--
03/04/03	36-0110	--	10:15	--	--	--	--	--	0.019 f	--
04/16/03	36-0159	--	09:46	<2*	<2*	0.44*	<0.02	--	0.017	** *
05/14/03	36-0234	--	10:00	33*	21*	1.2*	<0.02 d	--	0.022 h	3*
06/18/03	36-0319	--	10:05	1100*	74*	2.9*	<0.02	--	0.047	5* h
07/30/03	36-0424	--	09:40	100*	80*	4.1*	<0.02	--	0.037	4*
08/20/03	36-0552	--	09:41	100*	50*	5.1*	<0.02	--	0.039	6*
10/15/03	36-0664	--	10:15	700*	440*	--	--	0.13*	##* b	14*
11/25/03	36-0703	--	11:07	--	--	--	--	--	0.025 fh	--

CRANBERRY RIVER (SARIS: 3626300)
Unique_ID: W1035 Station: CRN01, Mile Point: 0.252
Description: [South Spencer Road, Spencer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0094	--	10:15	--	--	--	--	--	0.019 h	--
01/30/03	36-0105	--	10:30	--	--	--	--	--	0.011 f	--
03/04/03	36-0112	--	09:50	--	--	--	--	--	0.013 f	--
04/16/03	36-0157	--	08:35	<2*	<2*	0.76*	<0.02	--	0.021	** *
05/14/03	36-0232	--	08:56	86*	66*	1.2*	0.10 d	--	0.026	4*
06/18/03	36-0317	--	09:30	56*	30*	1.5*	<0.02	--	0.030	3* h
07/30/03	36-0422	--	09:04	100*	100*	2.8*	<0.02	--	0.035	4*
08/20/03	36-0550	--	09:08	300*	120*	2.3*	<0.02	--	0.030	4*
10/15/03	36-0662	--	09:50	500*	480*	--	--	<0.10*	##* b	4*
11/25/03	36-0701	--	09:55	--	--	--	--	--	0.014 fh	--

Pipe/Discharge to CRANBERRY RIVER (SARIS: 3626300)
Unique_ID: W1034 Station: MA0100919, Mile Point: 0.125
Description: [Spencer WWTP final effluent channel, Spencer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0093	--	10:00	--	--	--	--	--	0.016 h	--
01/30/03	36-0104	--	10:45	--	--	--	--	--	0.15 f	--
03/04/03	36-0114	--	09:45	--	--	--	--	--	0.12 f	--
04/16/03	36-0156	--	09:00	40*	22*	0.24*	0.12	--	0.18 h	<2.0*
05/14/03	36-0231	--	09:16	171*	108*	0.42*	0.18 d	--	0.32	<2*
06/18/03	36-0316	--	09:15	<2*	<2*	0.28*	0.10	--	0.21	<2* h
07/30/03	36-0421	--	09:00	<10*	<10*	0.47*	0.09	--	0.24	<2*
08/20/03	36-0549	--	09:00	<10*	<10*	0.24*	0.07	--	0.23	<2*
10/15/03	36-0661	--	09:45	<2*	<2*	--	--	<0.10*	##* b	<2*
11/25/03	36-0700	--	10:20	--	--	--	--	--	0.20 fh	--

WARE RIVER (SARIS: 3626500)
Unique_ID: W0494 Station: CBG, Mile Point: 30.472
Description: [south of Route 122 at weir downstream of Shaft #8 water supply intake, Barre.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
05/14/03	36-0244	--	09:15	15*	13*	0.85*	<0.02	0.020	2*

Page Intentionally Left Blank

WARE RIVER (SARIS: 3626500)
Unique_ID: W1006 Station: WAWV, Mile Point: 29.645
Description: [approximately 150 feet upstream of Vernon Avenue, Barre]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	Turb	Chloride	Alk	Hard	NH3-N	NH3-N	NO3-NO2-N	TKN	TN	TP	TSS	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0169	--	11:00	<2*	<2*	0.51*	--	--	--	--	<0.02	--	--	--	--	0.012	--	** *
05/14/03	36-0245	--	09:30	14*	10*	0.91*	--	--	--	--	0.12	--	--	--	--	0.024	--	3*
06/18/03	36-0328	--	10:35	40*	20*	1.4*	--	--	--	--	<0.02	--	--	--	--	0.031	--	3* h
07/30/03	SM-0798	--	10:35	20*	10*	--	5.5	22	5	14	<0.02	--	<0.06	0.57	--	0.053	3.2	--
08/20/03	SM-0814	--	09:40	100*	70*	--	3.7	23	5	14	<0.02	--	<0.06	0.69	--	0.042	9.3	--
10/22/03	SM-0857	--	10:35	--	--	--	2.4*	--	--	--	--	<0.01 h	<0.02 h	--	0.21 h	0.022 h	--	--

WARE RIVER (SARIS: 3626500)
Unique_ID: W1007 Station: WAIR, Mile Point: 24.523
Description: [between the confluence of Pine Hill Brook and Broadmeadow Brook, Hardwick]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0146	36-0147	08:45	<2*	2*	0.60*	<0.02	--	0.018	2.0*
04/16/03	36-0147	36-0146	08:45	2* e	8* e	0.58*	<0.02	--	0.015	<2.0*
05/14/03	36-0221	36-0222	08:33	64*	64*	1.1*	<0.02	--	0.033	6*
05/14/03	36-0222	36-0221	08:33	84*	73*	1.1*	<0.02	--	0.036	4*
06/18/03	36-0306	36-0307	09:13	40*	32*	1.7*	<0.06	--	0.044	7* h
06/18/03	36-0307	36-0306	09:13	46*	20*	1.6*	<0.02	--	0.049	5* h
07/30/03	36-0411	36-0412	09:17	300* d	100*	4.2*	0.12	--	0.10	9*
07/30/03	36-0412	36-0411	09:17	110* d	100*	4.2*	0.12	--	0.095	10*
08/20/03	36-0531	36-0532	09:00	400*	200*	2.1*	<0.06	--	0.051	6*
08/20/03	36-0532	36-0531	09:00	300*	100*	2.0*	<0.06	--	0.051	4*
10/15/03	36-0651	36-0652	10:00	156*	140*	--	--	<0.10*	##* bd	2*
10/15/03	36-0652	36-0651	10:00	200*	102*	--	--	<0.10*	##* bd	2*

Page Intentionally Left Blank

WARE RIVER (SARIS: 3626500)
Unique_ID: W1008 Station: WAX, Mile Point: 20.194
Description: [Creamery Road/Unitas Road, Hardwick/New Braintree]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0149	--	09:31	8*	2*	0.55*	<0.02	--	0.020	2.5*
05/14/03	36-0224	--	09:35	75*	68*	1.0*	<0.02	--	0.035	4*
06/18/03	36-0309	--	09:50	150*	90*	1.4*	<0.02	--	0.053	4* h
07/30/03	36-0414	--	09:54	600*	230*	3.7*	<0.02	--	0.050	3*
08/20/03	36-0534	--	09:29	130* e	200* e	2.1*	<0.02	--	0.045	4*
10/15/03	36-0654	--	10:29	1200*	880*	--	--	<0.10*	##* b	6*

WARE RIVER (SARIS: 3626500)
Unique_ID: W1009 Station: WA06A, Mile Point: 14.951
Description: [Upper Church Street, Ware]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0150	--	10:00	4*	2*	0.62*	<0.02	--	0.028	3.5*
05/14/03	36-0225	--	09:59	134*	101*	1.1*	<0.02	--	0.037	4*
06/18/03	36-0310	--	10:14	300*	152*	1.5*	<0.02	--	0.053	6* h
07/30/03	36-0415	--	10:23	400*	310*	3.0*	<0.02	--	0.049	2*
08/20/03	36-0535	--	09:52	1300*	1100*	2.1*	<0.02	--	0.057	3*
10/15/03	36-0655	--	11:00	3700*	830*	--	--	<0.10*	##* b	6*

WARE RIVER (SARIS: 3626500)
Unique_ID: W0492 Station: WA09A, Mile Point: 8.559
Description: [Route 32 at Gibbs Crossing, Ware.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
05/14/03	36-0248	36-0249	11:15	54*	42*	1.1*	0.06	0.033	4*
05/14/03	36-0249	36-0248	11:15	98*	72*	1.1*	<0.06	0.031	4*

WARE RIVER (SARIS: 3626500)
Unique_ID: W1014 Station: WA12, Mile Point: 1.321
Description: [Route 181, Palmer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0154	--	12:16	2*	2*	0.60*	<0.02	--	0.018	2.5*
05/14/03	36-0229	--	11:50	93*	74*	1.1*	<0.06	--	0.044	4*
06/18/03	36-0314	--	11:57	80*	66*	1.4*	0.06	--	0.055	5* h
07/30/03	36-0419	--	12:25	480*	180*	2.4*	<0.02	--	0.050	5*
08/20/03	36-0539	--	11:37	510*	100*	1.6*	<0.02	--	0.043	2*
10/15/03	36-0659	--	12:56	300*	90*	--	--	<0.10*	##* b	<2*

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W0493 Station: SRG, Mile Point: 8.191
Description: [at USGS flow gauging station #01175500 west of River Road, Ware/Belchertown.]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
05/14/03	36-0246	--	10:30	<0.9*	<0.9*	0.28*	<0.02	0.008	<2*

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W1013 Station: SR02, Mile Point: 3.191
Description: [Route 181, Belchertown/Palmer]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0153	--	11:46	<2*	2*	0.37*	<0.02	--	0.023	<2.0*
05/14/03	36-0228	--	11:30	65*	46*	0.62*	<0.02	--	0.032	<2*
06/18/03	36-0313	--	11:35	64*	56*	0.65*	<0.02	--	0.033	<2* h
07/30/03	36-0418	--	12:00	140*	120*	0.63*	<0.02	--	0.025	<2*
08/20/03	36-0538	--	11:18	40*	30*	0.41*	<0.02	--	0.022	<2*
10/15/03	36-0658	--	12:32	94*	90*	--	--	<0.10*	##* b	<2*

Page Intentionally Left Blank

SWIFT RIVER (SARIS: 3626525)
Unique_ID: W1012 Station: SR03, Mile Point: 6.057
Description: [Cold Spring Road/Old Belchertown Road, Belchertown/Ware (bridge under repair in 2003)]

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	Turb	Chloride	Alk	Hard	NH3-N	NH3-N	NO3-NO2-N	TKN	TN	TP	TSS	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0168	--	12:35	<2*	2*	0.29*	--	--	--	--	<0.02	--	--	--	--	0.034	--	** *
05/14/03	36-0247	--	10:50	2*	1*	0.38*	--	--	--	--	<0.06	--	--	--	--	0.26	--	<2*
06/18/03	36-0329	--	12:05	80*	80*	0.52*	--	--	--	--	0.07	--	--	--	--	0.026	--	<2* h
07/30/03	SM-0800	--	12:05	100*	30*	--	0.89	6	3	10	0.15	--	<0.06	0.27	--	0.032	<1.0	--
08/20/03	SM-0816	--	11:00	<10*	<10*	--	0.68	6	5	11	0.07	--	<0.06	0.31	--	0.021	<1.0	--
10/22/03	SM-0859	--	12:05	--	--	--	0.5*	--	--	--	--	0.04 h	0.08 h	--	0.18 h	0.013 h	--	--

" ## " = Censored data (i.e., data that has been discarded for some reason)
" * " = Analysis performed by Laboratory other than DEP's Wall Experiment Station (WES)
" -- " = No data (i.e., data not taken/not required)
" 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
" 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 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
" j " = 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. Denotes an 'estimated' value' when used as a qualifier only (i.e., not censored). When solely used for censored data, it denotes censure at the lab
" h " = Holding time violation (usually indicating possible bias low)
" m " = Method SOP not followed (only partially implemented or not implemented at all) due to complications with sample matrix (e.g. sediment in sample, floc formation), lab error (e.g. cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, missing data or deviations from field sampling SOPs
" r " = Samples collected may not be representative of actual field conditions, based on documented or suspected field sampling error, or inexplicable or improbable ("outliers") values

Page Intentionally Left Blank

Table 7. 2003 MassDEP Chicopee Watersheds Quality Control Data - Duplicates
(Data qualifiers listed in Appendix 1)

Unnamed Tributary
Unique_ID: W1027 Station: POOR01, Mile Point: 0.356
Description: [unnamed tributary to the Chicopee River (locally known as Poor Brook), Route 141 (East Main Street) bridge, Chicopee]

Date	OWMID	QAQC	Time	Log10(Fecal)	Log10(E.coli)	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0137	36-0138	09:55	0.778* e	1.477* e	3.3*	2.2	--	0.030	5.0*
04/16/03	36-0138	36-0137	09:55	1.204*	1.079*	3.2*	2.1	--	0.029	5.5*
Relative	*Percent*	*Difference*		*43.0%*	*31.1%*	*3.1%*	*4.7%*	--	*3.4%*	*9.5%*
05/14/03	36-0212	36-0213	09:40	1.732*	1.690*	3.6*	1.3	--	0.047 j	5*
05/14/03	36-0213	36-0212	09:40	1.591*	1.580*	3.7*	1.3	--	0.042 j	5*
Relative	*Percent*	*Difference*		*8.5%*	*6.8%*	*2.7%*	*0.0%*	--	*11.2%*	*0.0%*
06/18/03	36-0297	36-0298	10:25	3.785*	3.623*	17*	1.4	--	0.21	38*
06/18/03	36-0298	36-0297	10:25	3.643*	3.491*	18*	1.4	--	0.21	41*
Relative	*Percent*	*Difference*		*3.8%*	*3.7%*	*5.7%*	*0.0%*	--	*0.0%*	*7.6%*
07/30/03	36-0402	36-0403	10:03	2.279*	2.204*	2.6*	0.48	--	0.017	2*
07/30/03	36-0403	36-0402	10:03	2.301*	2.255*	2.7*	0.57	--	0.015	3*
Relative	*Percent*	*Difference*		*1.0%*	*2.3%*	*3.8%*	*17.1%*	--	*12.5%*	*40.0%*
08/20/03	36-0522	36-0523	10:05	2.778* d	2.079*	3.1*	0.33	--	0.020	3*
08/20/03	36-0523	36-0522	10:05	2.477* d	2.301*	3.0*	0.33	--	0.019	2*
Relative	*Percent*	*Difference*		*11.5%*	*10.1%*	*3.3%*	*0.0%*	--	*5.1%*	*40.0%*
10/15/03	36-0642	36-0643	10:48	3.491*	3.274*	--	--	0.70*	##* b	18*
10/15/03	36-0643	36-0642	10:48	3.556*	3.367*	--	--	0.83*	##* b	18*
Relative	*Percent*	*Difference*		*1.8%*	*2.8%*	--	--	*17.0%*	--	*0.0%*

QUABOAG RIVER (SARIS: 3625450)
Unique_ID: W1041 Station: QA100, Mile Point: 23.956
Description: [Route 148 (Fiskdale Road), Brookfield]

Date	OWMID	QAQC	Time	Log10(Fecal)	Log10(E.coli)	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0098	36-0099	12:20	--	--	--	--	--	0.023 h	--
12/11/02	36-0099	36-0098	12:20	--	--	--	--	--	0.021 h	--
Relative	*Percent*	*Difference*			--	--	--	--	*9.1%*	--
04/16/03	36-0163	36-0164	11:55	0.301*	0.301*	0.74*	<0.02	--	0.020	** *
04/16/03	36-0164	36-0163	11:55	0.301*	0.301*	0.75*	<0.02	--	0.016	** *
Relative	*Percent*	*Difference*		*0.0%*	*0.0%*	*1.3%*	*0.0%*	--	*22.2%*	--
05/14/03	36-0238	36-0239	11:24	0.699*	0.000*	1.5*	## d	--	0.035 h	5*
05/14/03	36-0239	36-0238	11:24	0.602*	-0.046*	1.3*	## d	--	0.035 h	5*
Relative	*Percent*	*Difference*		*14.9%*	*-200.0%*	*14.3%*	--	--	*0.0%*	*0.0%*
06/18/03	36-0323	36-0324	11:55	1.301*	0.903*	1.3*	<0.02	--	0.046	4* h
06/18/03	36-0324	36-0323	11:55	1.301*	0.903*	1.4*	<0.02	--	0.048	4* h
Relative	*Percent*	*Difference*		*0.0%*	*0.0%*	*7.4%*	*0.0%*	--	*4.3%*	*0.0%*
07/30/03	36-0428	36-0429	11:30	1.000*	1.000*	1.8*	<0.02	--	0.046	2*
07/30/03	36-0429	36-0428	11:30	1.000*	1.000*	1.7*	<0.02	--	0.044	2*
Relative	*Percent*	*Difference*		*0.0%*	*0.0%*	*5.7%*	*0.0%*	--	*4.4%*	*0.0%*
08/20/03	36-0556	36-0557	11:35	1.000*	1.000*	1.1*	<0.02	--	0.050	2*
08/20/03	36-0557	36-0556	11:35	1.000*	1.000*	1.3*	<0.02	--	0.047	2*
Relative	*Percent*	*Difference*		*0.0%*	*0.0%*	*16.7%*	*0.0%*	--	*6.2%*	*0.0%*
10/15/03	36-0668	36-0669	12:00	2.903* d	2.663*	--	--	<0.10*	##* bd	<2*
10/15/03	36-0669	36-0668	12:00	2.602* de	2.633* e	--	--	<0.10*	##* bd	<2*
Relative	*Percent*	*Difference*		*10.9%*	*1.1%*	--	--	*0.0%*	--	*0.0%*

WARE RIVER (SARIS: 3626500)
Unique_ID: W1007 Station: WAIR, Mile Point: 24.523
Description: [between the confluence of Pine Hill Brook and Broadmeadow Brook, Hardwick]

Date	OWMID	QAQC	Time	Log10(Fecal)	Log10(E.coli)	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
04/16/03	36-0146	36-0147	08:45	0.301*	0.301*	0.60*	<0.02	--	0.018	2.0*
04/16/03	36-0147	36-0146	08:45	0.301* e	0.903* e	0.58*	<0.02	--	0.015	<2.0*
Relative	*Percent*	*Difference*		*0.0%*	*100.0%*	*3.4%*	*0.0%*	--	*18.2%*	*0.0%*
05/14/03	36-0221	36-0222	08:33	1.806*	1.806*	1.1*	<0.02	--	0.033	6*
05/14/03	36-0222	36-0221	08:33	1.924*	1.863*	1.1*	<0.02	--	0.036	4*
Relative	*Percent*	*Difference*		*6.3%*	*3.1%*	*0.0%*	*0.0%*	--	*8.7%*	*40.0%*
06/18/03	36-0306	36-0307	09:13	1.602*	1.505*	1.7*	<0.06	--	0.044	7* h
06/18/03	36-0307	36-0306	09:13	1.663*	1.301*	1.6*	<0.02	--	0.049	5* h
Relative	*Percent*	*Difference*		*3.7%*	*14.5%*	*6.1%*	*100.0%*	--	*10.8%*	*33.3%*
07/30/03	36-0411	36-0412	09:17	2.477* d	2.000*	4.2*	0.12	--	0.10	9*
07/30/03	36-0412	36-0411	09:17	2.041* d	2.000*	4.2*	0.12	--	0.095	10*
Relative	*Percent*	*Difference*		*19.3%*	*0.0%*	*0.0%*	*0.0%*	--	*5.1%*	*10.5%*
08/20/03	36-0531	36-0532	09:00	2.602*	2.301*	2.1*	<0.06	--	0.051	6*
08/20/03	36-0532	36-0531	09:00	2.477*	2.000*	2.0*	<0.06	--	0.051	4*
Relative	*Percent*	*Difference*		*4.9%*	*14.0%*	*4.9%*	*0.0%*	--	*0.0%*	*40.0%*
10/15/03	36-0651	36-0652	10:00	2.193*	2.146*	--	--	<0.10*	##* bd	2*
10/15/03	36-0652	36-0651	10:00	2.301*	2.009*	--	--	<0.10*	##* bd	2*
Relative	*Percent*	*Difference*		*4.8%*	*6.6%*	--	--	*0.0%*	--	*0.0%*

WARE RIVER (SARIS: 3626500)
Unique_ID: W0492 Station: WA09A, Mile Point: 8.559
Description: [Route 32 at Gibbs Crossing, Ware.]

Date	OWMID	QAQC	Time	Log10(Fecal)	Log10(E.coli)	Turb	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L
05/14/03	36-0248	36-0249	11:15	1.732*	1.623*	1.1*	0.06	0.033	4*
05/14/03	36-0249	36-0248	11:15	1.991*	1.857*	1.1*	<0.06	0.031	4*
Relative	*Percent*	*Difference*		*13.9%*	*13.5%*	*0.0%*	*0.0%*	*6.3%*	*0.0%*

Table 8. 2003 MassDEP Chicopee Watersheds Quality Control Data – Blanks (Data qualifiers listed in Appendix 1)

Date	OWMID	QAQC	Time	Fecal	E.coli	Turb	NH3-N	NH3-N	TP	TSS
			(24hr)	CFU/100mL	CFU/100mL	NTU	mg/L	mg/L	mg/L	mg/L
12/11/02	36-0100	Blank	12:05j	--	--	--	--	--	<0.005 h	--
04/16/03	36-0139	Blank	09:50j	<2*	<2*	<0.10*	<0.02	--	<0.005	<2.0*
04/16/03	36-0148	Blank	08:40j	<2*	<2*	<0.10*	<0.02	--	<0.005	<2.0*
04/16/03	36-0165	Blank	15:04j	<2*	<2*	<0.10*	<0.06	--	<0.005	<2.0*
05/14/03	36-0214	Blank	09:42j	<0.9*	<0.9*	<0.10*	<0.02	--	<0.005 j	<2*
05/14/03	36-0223	Blank	08:25j	<0.9*	<0.9*	<0.10*	<0.02	--	<0.005	<2*
05/14/03	36-0240	Blank	11:24j	<0.9*	<0.9*	<0.10*	<0.02 d	--	<0.005 h	<2*
05/14/03	36-0251	Blank	11:45j	<0.9*	<0.9*	<0.10*	<0.02	--	<0.005	<2*
06/18/03	36-0299	Blank	10:25j	<2*	<2*	<0.10*	<0.02	--	<0.005	<2*
06/18/03	36-0308	Blank	08:59j	<2*	<2*	<0.10*	<0.02	--	<0.005	<2* h
06/18/03	36-0325	Blank	11:55j	<2*	<2*	<0.10*	<0.02	--	<0.005	<2* h
07/30/03	36-0404	Blank	10:00j	<10* m	<10* m	<0.10*	<0.02	--	<0.005	<2*
07/30/03	36-0413	Blank	09:06j	<10*	<10*	<0.10*	<0.02	--	<0.005	<2*
07/30/03	36-0430	Blank	11:25j	<10*	<10*	<0.10*	<0.06	--	<0.005	<2*
08/20/03	36-0524	Blank	10:07j	<10*	<10*	<0.10*	<0.02	--	<0.005	<2*
08/20/03	36-0533	Blank	09:00j	<10*	<10*	<0.10*	<0.02	--	<0.005	<2*
08/20/03	36-0558	Blank	11:35j	<10*	<10*	<0.10*	<0.02	--	<0.005	<2*
10/15/03	36-0644	Blank	10:45j	<2*	<2*	--	--	<0.10*	[0.93*] b	<2*
10/15/03	36-0670	Blank	12:00j	<2*	<2*	--	--	<0.10*	[0.93*] b	<2*
10/15/03	36-0653	Blank	09:50	<2*	<2*	--	--	<0.10*	[1.0*] b	<2*

REFERENCES

Beaudoin, Therese. 2006. Personal Communication. Chicopee 2003 Water Quality Tech Memo edits. Massachusetts Department of Environmental Protection, Central Environmental Regional Office. Worcester, MA

Kimball, Warren. 2006. Personal Communication. Wm. E. Wright discharge and Hartwick Knitters operations. Massachusetts Department of Environmental Protection, Central Environmental Regional Office. Worcester, MA

MassDEP. 2001a. *Chicopee River Basin 1998 Water Quality Assessment Report.* Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester, MA

MassDEP. 2001b. CN 4.1 - Hydrolab Series 3/Series 4 Multiprobe Standard Operating Procedure (May 15, 2001). Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester, MA.

MassDEP. 2003a. CN 127.0 - Quality Assurance Project Plan 2003 MADEP-DWM Monitoring in the Blackstone, Chicopee, Connecticut and Nashua watersheds. March 10, 2003. Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester, MA

MassDEP. 2003b. CN 1.2 Sample Collection Techniques for DWM Surface Water Quality Monitoring, Standard Operating Procedure. March, 2003. Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester, MA.

MassDEP. 2003c. Laboratory Quality Assurance Plan and Standard Operating Procedures. Massachusetts Department of Environmental Protection, Division of Environmental Analysis, Senator William X. Wall Experiment Station. Lawrence, MA.

MassDEP. 2005a. CN 56.2 - DWM Data Validation Standard Operating Procedure. January 2005. Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester,

MassDEP. 2005b. CN 211.0 - 2003 Data Validation Report. 15 February 2005. Massachusetts Department of Environmental Protection, Division of Watershed Management. Worcester, MA.

NOAA. 2006. [Online]. *National Weather Service, Eastern Region Headquarters*. http://www.erh.noaa.gov accessed 16 April 2006.

Socolow, R.S., J.L. Zanca, T.R. Driskell, and L.R. Ramsbey. 2004. *Water Resources Data for Massachusetts and Rhode Island, 2003, Water-Data Report MA-RI-03-1* U.S. Geological Survey, Water Resources Division, Northborough, MA

Socolow, R.S., L.Y. Comeau and D. Murino Jr. 2005. *Water Resources Data for Massachusetts and Rhode Island, 2004, Water-Data Report MA-RI-04-1* U.S. Geological Survey, Water Resources Division, Northborough, MA

USGS. 1998. Unpublished Data. *Provisional low flow frequency statistics for gaging (3.5" floppy disc).* United States Geological Survey, Water Resources Division, Marlborough, MA.

USGS. 2006. [Online] *USGS Water Data for the Nation.* http://waterdata.usgs.gov/nwis accessed 16 April 2006.

Appendix 1

Selected Excerpts from:

DRAFT

DATA VALIDATION REPORT
for Year 2003 Project Data

CN 211.0

November, 2005

Department of Environmental Protection
Division of Watershed Management
627 Main Street, Second Floor
Worcester, MA

Data Validation For The
Chicopee Watersheds 2003 Water Quality Survey

1.0 Introduction

The purpose of this report is to document the review and validation of environmental data gathered by MADEP/DWM in 2003, including decisions to censor and qualify data.

The report includes review of field-recorded information, internal DWM laboratory data, and lab-validated data from DEP's analytical laboratory, Wall Experiment Station (WES) and 2003 contract lab (Severn Trent Laboratory, Westfield, MA). See Section 3 for 2003 projects.

2.0 Validation Process for 2003 Data

The procedures used to accept, accept with qualification or censor data are based on the DWM SOP for data validation (CN 56.2), and are in addition to separate quality assurance activities and laboratory validation performed by WES and the STL Lab.

The **specific validation criteria** applied to the 2003 data include, but are not limited to:

- Conformance to DWM-project and DWM-programmatic Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs)

- Precision (review of overall precision, including field precision and lab precision, for duplicate samples)

- Accuracy (review of lab quality control data regarding analysis of single-blind and/or double-blind performance evaluation samples, internal check standards, blanks and matrix spike samples)

- Representativeness (review of field data sheets and field SOPs used to collect the data for the evidence of the potential for non-representative conditions at the time of sampling)

- Holding Times and Preservation (review for conformance to method holding times and preservation requirements for samples)

- Frequency of Field QC samples (review for conformance to standard DWM requirements for the number of field blank and split/duplicate samples taken per total number of samples taken by survey crews)

- Contamination of Field Blanks (review of lab and ambient field blank results for detectable analyte concentrations)

- Documentation (review of Chain-of-Custody, fieldsheets, notebooks, etc. for sample mishandling, improper procedures, inaccurate or missing information)

Data falling outside established QA/QC acceptance criteria were investigated and may have been subject to censoring or qualification. Specific symbols and qualifiers used to censor and qualify 2003 data are provided in Appendix A.

Completion of 2003 data validation results in the generation of usable environmental data and long-term data management within DWM's monitoring databases.

3.0 2003 Projects, QAPPS, SOPS AND SERVICES

2003 Lab Services were provided by:

Lab	Services	Contact
Wall Experiment Station, Lawrence, MA (MADEP)	Sample analysis for monitoring in the Blackstone and Nashua watersheds	Oscar Pancorbo
Severn Trent Laboratories, Westfield, MA.	Sample analysis for monitoring in the Chicopee, Connecticut and Blackstone watersheds	Steve Hartman

4.0 2003 In-Situ *Multiprobe Data*

4.1 QA/QC OBJECTIVES AND CRITERIA FOR 2003* IN-SITU *MULTI-PROBE DATA

Trained DWM staff members (and their designees) conducted *in-situ* measurements using Hydrolab® Series 3/4 and YSI 6000 Series multi-probe instruments. These simultaneously measure dissolved oxygen, temperature, pH, conductivity, and depth, and provide calculated estimates for total dissolved solids and % oxygen saturation.

NOTE: no unattended multi-probe sonde deployments were conducted in 2003.

To ensure the quality of the data, the following QA/QC steps were taken before, during and after use:

- Pre-Survey Calibration and Check: Standard pre-survey calibration of each unit was conducted in accordance with the DWM SOP (CN 4.2). After the instrument was calibrated and before the instrument was released to field staff, an instrument check using both a low ionic standard and filtered de-ionized water was performed. The purpose of this check is to make sure that the instrument is providing stable readings as the waters in Massachusetts are typically of low ionic strength. If the instrument failed acceptance criteria, it was not released to field staff until the source of error was identified and corrected.

- Post-Survey Check: A standard post survey check of each unit was performed in accordance with the DWM SOP. Upon return to the lab, a visual inspection was performed to identify any physical damage that may have occurred in the field. The calibration of the unit was then checked against both a low ionic standard and filtered de-ionized water. The results of the post survey calibration check were compared to the pre-calibration results. If visual damage was observed and/or post calibration acceptance criteria were not achieved, the source of error was investigated and data collected in the field may have been subject to qualification or censoring.

- Data Reduction: The Multi-probe Coordinator, QC Analyst and Database Manager reviewed the multi-probe data for instability, instrument malfunction, operator error and aberrant trends. If any of these conditions were detected, the data was investigated and may have been recommended for censoring. The Database Manager electronically tagged all data recommended for censoring in the database. Measured data were also evaluated for the following:

• **Consistency with the SOP** (specifically, the requirement for three (minimum)-five (preferred) sequential readings one-minute-apart at appropriate depths, proper field use, etc.).

• **Accuracy and precision** of readings, as assessed through review of pre-survey calibration/check and post-survey check data, field notes for any information on faulty operation and/or unusual field conditions, and accuracy checks.

• **Representativeness** of data (review of fieldsheets and notes for any information that might indicate non-representativeness; eg. not taken at the deep hole).

• Check for **"outliers" or unreasonable data**, based on best professional judgement. Outliers are identified and flagged for scrutiny. For lake depth profiles, more leeway is given to apparently unstable multi-probe data, given that thermal stratification can cause rapid, natural changes in parameters within the thermocline.

• Multi-probe record **acceptance criteria**: Within each set of records for individual OWMID #s, automatically accept the final line of data for each depth where the change in depth from the previous accepted-record-depth is greater than 0.2 meters, subject to review and change by the multiprobe review team.

• The criterion used in 2003 to accept, qualify or censor **Conductivity (and the dependent, calculated estimates for TDS and Salinity)** readings was based on exceedance of the calibration standard concentration. For exceedances greater than two times the standard, the conductivity reading was typically censored. Readings above the calibration standard were qualified whenever the reading was less than two times the calibration standard. NOTE: In cases where readings fell far below the calibration standard concentration (e.g.,

measured value of 100 uS/cm using 6668 calibration standard), no censoring or qualification was imposed.

• For **D.O.** values less than 0.2 mg/l, 2003 data were accepted without qualification and reported as "<0.2". Similarly for % saturation, values less than 2% were accepted without qualification and reported as "<2%".

• For all parameters taken at the same location and whose range for 3-5 successive readings fluctuated beyond the range (+/-) of probe accuracy, the data was typically qualified or censored (depending on the degree of fluctuation) with "u" (**unstable**). Data exhibiting significant, continuous movement in one direction and that did not appear to reach equilibrium was also qualified or censored.

• For instances **where temperature has been censored, data for Conductivity, pH and D.O. are typically qualified.** (readings for Conductivity, pH and dissolved oxygen are internally-corrected for temperature; conductivity is temperature-compensated to 25 deg. C, D.O. readings are adjusted about 5% per degree C to account for changes in oxygen solubility and membrane permeability, and pH is compensated for electrode effects due to variable sample temperatures.) In cases where temperature has only been qualified, no qualification of data for conductivity, pH and D.O. is imposed.

• Depth criteria:

General Depth Criteria: Apply to each OWMID# for lakes and rivers

- 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.)

4.2 2003 Censored/Qualified Multi-probe Data

See Appendix B (CN 211.1) for a complete presentation of all censoring and qualification decisions for multiprobe data.

4.3 2003 Corrective Actions Involving Multi-probe Use

Numerous sample ID#s for multiprobe data were duplicated in error in 2003. These were identified and corrected during the data entry QC process. Steps were taken in 2004/2005 to attempt to correct systematic and/or typical mistakes involving multi-probe ID allocation.

5.0 2003 Discrete Water Sample Data

5.1 QA/QC Objectives and Criteria for 2003 Discrete Water Sample Data

The collection and analysis of discrete water samples in 2003 followed the DWM Standard Operating Procedures and lab analyte-specific SOPs. The majority of river samples were taken via the manual grab and basket sampler techniques (where ambient water enters the sample bottle directly).

For river sampling, field quality control samples consisted of approx. 10% ambient blanks and 10% field duplicates (i.e., separate, co-located (side-by-side), simultaneous field duplicates).

Using the following criteria, as well as other considerations and input from data reviewers, individual datum were either:

1) Accepted
2) Accepted with qualification, or
3) Censored

In cases where poor quality control (e.g., blank/cross contamination, lab accuracy) affected batched analyses or entire surveys, censoring/qualification decisions were applied to groups of samples (e.g., a specific crew's samples, a specific survey's samples or all samples from a specific batch analysis).

Criteria for acceptance of discrete water quality sample data were as follows:

- For simplicity, samples that were **"lost", "missing", "spilled" and "not analyzed"** were denoted using the 'm' (method not followed) qualifier and ** symbol.

- **Sampling/Analysis Holding Time**: Each analyte has a standard holding time that has been established to ensure sample/analysis integrity. Refer to DWM Standard Operating Procedure CN# 1.2 for a complete listing. If the standard holding time was exceeded, this criterion is violated and the data may be censored, depending on the extent of exceedance. For minor exceedances (e.g., < than 20% of the holding time), the data is typically qualified ("h" for minor holding time violation).

- **Quality Control Sample Frequency**: At a minimum, one field blank and one replicate must be collected for every ten samples by any given sampling crew on any given date. If less than 10% blanks and replicates were collected, the data are typically qualified with "f". If blanks were omitted and duplicates taken, typically no data are qualified, as long as there are no documented historical problems for the survey-specific samplers or station locations with regard to field contamination. If blanks were taken but duplicates were not, the data may be qualified with "f". Typically, no censoring of data takes place for insufficient QC sample frequencies only.

- **Field Blanks:** Field blanks were prepared at the DWM Worcester Laboratory. Reagent grade water was transported into the field in a sample container where it was transferred into a different

sample container directly or via a sampling device (equipment blank) using the same methods as for its corresponding field sample (e.g., blank samples were preserved in the same way). All blanks were submitted to the WES laboratory "blind". If the field blank results were greater than the MDL (indicating potential sampling error, airborne contaminants, dirty equipment, etc.), the data may be censored or qualified, depending on extent and other factors.

- **Field Replicates:** In 2003, field duplicate samples for rivers were taken as co-located, simultaneous duplicates. As a result, these duplicate results include any spatial, natural variability present between side-by-side samples (which should be minimal in most cases where site selection has accounted for uniform mixing). Duplicate lake samples were sequential and therefore also include any temporal variability. Samples were submitted to WES laboratory "blind". Results were compared to specific criteria contained in a 2003 QAPP document. If the criteria are not met, the sample/duplicate data may be censored or qualified, depending on extent of exceedance and other factors. Arguably, very poor precision of field duplicate samples reflects poor reproducibility for entire surveys and/or analytical batch runs, and should result in censoring or qualification of the entire survey/batch data. Decisions related to poor precision for entire surveys/batchs were made on a case-by-case basis.

- Results of **Field and/or Lab Audits** and Miscellaneous Survey Information: If, based on the results of field evaluation of implementation of field sampling SOPs, samples are deemed to have been taken incorrectly or to not represent station conditions at the time of sampling, then individual or survey-based sample results may be qualified or censored. Likewise, the results of QC audits of lab(s) analytical accuracy (and precision) for specific parameters are evaluated. If results indicate poor accuracy or repeatability, batch run data may be qualified or censored. In addition, information from survey personnel regarding sample integrity and representativeness may lead to decisions to qualify or censor data.

- **Laboratory assessment of analytical precision and accuracy:** The WES Laboratory is solely responsible for the administration of its Quality Assurance Program and Standard Operating Procedures. WES staff release discrete water sample data when their established QA/QC criteria have been met. When the following criteria cannot be met, data are qualified using appropriate qualifiers:

• Low Calibration Standards – Checks the stability of the instrument's calibration curve; analyzes the *accuracy* of an instrument's calibration within a 5% range.

• Reference Standards – Generally, a second source standard (a standard different from the calibration stock standard) that analyzes the method *accuracy.*

• Laboratory Reagent Blank/Method Blank (LRB) – Reagent grade water (de-ionized) extracted with every sample set used to ensure that the system is free of target analytes (< MDL) and to assess potential blank contamination.

• Duplicate Sample – Measures the *precision* (as Relative Percent Difference or RPD) of the analytical process. The acceptable laboratory %RPD range is typically $\leq$ 25%. For bacteria, duplicate data are evaluated based the range of logged values.

• Spike Sample (Laboratory Fortified Blank - LFB, Laboratory Fortified Matrix - LFM)– Measures the *accuracy* (% Recovery) of an analytical method. The acceptable laboratory % recovery range is typically between 80 – 120% for LFB samples and 70 –130% for LFM discrete water samples.

5.2 Field and Lab Audit Results

Field Audits – In 2003, no field audits were completed for any Chicopee Watershed surveys.

Lab Audits – To provide external evaluation of lab performance with regard to sample analyses for specific analytes, the following lab audit was performed in 2003:

Proficiency Test for fecal coliform by membrane filtration (single-blind, semi-quantitative, via DWM contract with Microcheck, Inc., 4/15/03). Both WES and STL labs were provided with whole volume fecal coliform samples (blank, 0-1920 CFUs/100 mls.). Both labs reported "0" for the blanks. For the two 0-1920 range samples provided to each lab, WES reported 698 and 704, and STL reported 1400 and 2200. WES results indicate acceptable accuracy and precision. STL results indicate relatively **poor accuracy and precision** for the samples containing coliform, but results were within test acceptance limits.

5.3 QA/QC Issues and Considerations for 2003 Data

The following are particularly noteworthy regarding 2003 DWM/CERO surveys. The validation decisions contained in the tables below reflect these considerations.

1) **Duplicate and Misappropriated OWMIDs.** a) Coordination with WES was needed to make sure that all samples from the Lakes Baseline, Lakes Nutrient Criteria and Chicopee projects had the correct ID #s, because these numbers were often misallocated.

2) **WES "<RDL" and "ND" Results**: Since May, 2002, WES has reported data near detection limits in the following 3 ways: a) "ND" = <MDL ; b) result w/ qualifier "M" = result between MDL and RDL; and c) "<RDL" = result between MDL and RDL, but insufficient certainty to report a value (applicable for certain analyses). Users of 2003 data are cautioned that DWM reports "<RDL" WES lab results as less than the WES-specified RDL value, and that this should not be misconstrued to mean any value down to 0, but rather as defined, i.e., between MDL and RDL.. (see 9/29/04 email from Jim Sullivan to R. Chase)

3) **CERO/SMART Bucket Use**: The CERO/SMART monitoring program continued to use plastic bucket samplers off elevated sampling locations at several locations in 2003. Buckets use is inconsistent with DWM SOP for grab sampling. Therefore, these samples are **qualified with "m".**

4) **Continuous Temperature Monitoring Data**. Continuous (15 minute interval) temperature data from two projects (Nashua and Blackstone) were finalized and stored in a read-only electronic network folder (non-database as of 2005). Supporting documents justifying these data include the 2003 DWM QAPP, project-specific technical memoranda and this report. In general, most of these data met DQOs and were usable (after clipping the beginnings and ends of the data sets).

5) **STL-Westfield Lab bacteria bottles.** Sometime in July, 2003, the STL Lab changed its standard bacteria bottle (separate 120 ml. bottles for fecal coliform and *E. coli*) from a flip-top, locking tab type to a screw cap type. A few DWM staff persons using these new bottles noted that the threads did not always engage right away, which could lead to unsecured caps (if the threads were not engaged properly). (These bottles also made it more difficult to take co-located, simultaneous duplicates.) **The thread issue alone did not provide adequate justification to censor any of the STL Lab bacteria results.** There was no mention of partially-threaded caps on any of the STL lab reports.

6) **Rinse vs. No Rinse of WES Sample Bottles.** Based on small amounts of visible particles in some of the new, pre-cleaned sample bottles (for delivery to the WES lab), **a precautionary recommendation was made in mid-June, 2003 to begin field rinsing sample bottles with representative site water prior to sample collection.** A new procedure for doing this was forwarded to and implemented by field crews, and effectively avoided this problem if and when it occured. The particle problem was not evident in bottles from the STL lab.

   Based on staff input, the majority of WES samples in 2003 were taken after pre-rinsing with site water. Samples taken during nine surveys from April to mid June were not based on pre-rinsing.

   It is assumed that consistent application of this new approach improved data quality by removing the potential risk of sample contamination from visable-to-the-eye and/or less obvious particulates in the bottles. Due to uncertainty regarding the extent of this problem and lack of any comparison data to evaluate its effects on specific analytes, **it was decided NOT to qualify or censor data based on this issue.**

7) **Station Representativeness**. For this data validation effort, all station locations were assumed to have been located to be representative of river/stream and lake/pond conditions at the sampling time. This assumption is applied to both historic station locations, as well as new sampling stations.

8) **Sample Representativeness**. As detailed above, some specific sample data have been censored or qualified ("r") due to known or suspected non-representativeness of the sample. For example, some CERO/SMART samples taken from elevated crossings, such as at bridges, trestles and roads, were taken with plastic buckets attached to ropes, and have been qualified with "m". The use of plastic buckets as collection devices may potentially contaminate all samples, regardless of analytes, through station-station cross-contamination of the bucket and rope (even with rinsing), sampling location disturbance (in shallow conditions), and weather effects (precipitation entering bucket upon retrieval). Sample integrity may be especially compromised when sampling for bacteria and solids. Data users should use all CERO/SMART bucket-drop data with caution. Because most ambient river samples taken by DWM and CERO/SMART were via wade–in technique as described in CN 1.2, the majority of river samples taken in 2003 were assumed to be representative of in-situ water quality.

9) **Frequency and Type of Field QC Samples** (ambient field blanks and field duplicates/splits). DWM field sheet data were reviewed with respect to meeting the minimum frequency of survey QC samples (ambient field blanks and field duplicates/splits). Unless otherwise indicated in Sections 5, 6 and 7, all reported data from WES (and DWM for color and chl a) met the required minimum frequency of approx. 10% of the total sample number (and a minimum of one blank/analyte/survey and one duplicate/split per analyte per survey. In 2003, field duplicates were typically taken as co-located, simultaneous replicates.

10) **High NH3-N in ambient field blanks.** On more than one occasion, elevated levels of NH3-N were detected in ambient field blanks. The cause(s) for this could not be traced to the quality of DWM deionized water, WES/STL lab contamination, field effects (e.g., precipitation), or crew effects (high blanks observed for multiple crews). **While the cause remains unknown, all survey data related to high NH3-N in ambient field blanks have been qualified.**

11) **CERO-SMART Turbidity Data.** These data, based on use of DWM's lab turbidimeter, have not been entered into the WQD database and remain ancillary to project data.

12) **WES Lab TSS Data.** Lack of adherence to the WES lab SOP for TSS analysis resulted in WES' **qualification of TSS data from 5 batches.** These decisions have been carried through to the final DWM data.

13) **STL Lab TP results for 10/15/03 survey.** All STL lab results for **TP for samples from a 10/15/03 survey have been censored** due to extremely high P in blanks (and samples). Neither the survey coordinator nor the lab has been able to explain these results, where P in blanks were all approx. 1000 ug/l. Fortunately, these were the only survey samples analyzed by STL for TP.

5.4 2003 Censored/Qualified Discrete Water Sample Data

All Year 2003 data for discrete water samples that have been censored or qualified are listed below, except for missing data.

Exported from WQD2003 on 10/14/05, 3:45pm by T. Dallaire		QC4					
PROJNAME	**Analyte**	**DATE**	**OWMID**	**LabSNum**	**Result**	**DWMQual**	**Units**
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0137	206457-006	6*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0140	206457-012	<2*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0143	206457-018	2*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0145	206457-022	20*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0147	206457-026	2*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	4/16/2003	36-0166	206457-064	<2*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	7/30/2003	36-0404	208809-010	<10*	m	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	7/30/2003	36-0411	208809-024	300*	d	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	7/30/2003	36-0412	208809-026	110*	d	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	8/20/2003	36-0522	209322-006	600*	d	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	8/20/2003	36-0523	209322-008	300*	d	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	8/20/2003	36-0534	209322-030	130*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	10/15/2003	36-0649	210693-020	120*	e	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	10/15/2003	36-0668	210693-056	800*	d	CFU/100mL
Chicopee, (2003)	Fecal Coliforms	10/15/2003	36-0669	210693-058	400*	de	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0137	206457-006	30*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0140	206457-012	10*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0143	206457-018	4*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0145	206457-022	30*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0147	206457-026	8*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	4/16/2003	36-0166	206457-064	4*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	7/30/2003	36-0404	208809-010	<10*	m	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	8/20/2003	36-0534	209322-030	200*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	10/15/2003	36-0649	210693-020	160*	e	CFU/100mL
Chicopee, (2003)	E. Coli - Modified m-Tec	10/15/2003	36-0669	210693-058	430*	e	CFU/100mL
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0231	2003061-001	0.18	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0232	2003061-002	0.10	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0233	2003061-003	<0.06	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0234	2003061-004	<0.02	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0235	2003061-005	<0.02	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0236	2003061-006	<0.06	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0237	2003061-007	0.14	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0238	2003061-008	##	d	mg/L

Chicopee, (2003)	Ammonia-N	5/14/2003	36-0239	2003061-009	##	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0240	2003061-010	<0.02	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0241	2003061-011	<0.02	d	mg/L
Chicopee, (2003)	Ammonia-N	5/14/2003	36-0242	2003061-012	<0.02	d	mg/L
Chicopee, (2003)	Ammonia-N	10/22/2003	SM-0857	2004045-003	<0.01	h	mg/L
Chicopee, (2003)	Ammonia-N	10/22/2003	SM-0859	2004045-005	0.04	h	mg/L
Chicopee, (2003)	Nitrate/Nitrite-N	9/24/2003	LB-2539	2003189-007	<0.06	h	mg/L
Chicopee, (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0857	2004045-003	<0.02	h	mg/L
Chicopee, (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0859	2004045-005	0.08	h	mg/L
Chicopee, (2003)	Total Nitrogen	9/24/2003	LB-2539	2003189-007	0.61	h	mg/L
Chicopee, (2003)	Total Nitrogen	10/22/2003	SM-0857	2004045-003	0.21	h	mg/L
Chicopee, (2003)	Total Nitrogen	10/22/2003	SM-0859	2004045-005	0.18	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0090	2003003-002	0.009	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0091	2003003-003	0.013	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0092	2003003-004	0.019	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0093	2003003-005	0.016	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0094	2003003-006	0.019	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0096	2003003-007	0.023	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0097	2003003-008	0.053	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0098	2003003-009	0.023	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0099	2003003-010	0.021	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0100	2003003-011	<0.005	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/11/2002	36-0101	2003003-012	0.021	h	mg/L
Chicopee, (2003)	Total Phosphorus	12/23/2002	36-0102	2003003-013	0.030	h	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0103	2003015-001	0.011	f	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0104	2003015-002	0.15	f	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0105	2003015-003	0.011	f	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0106	2003015-004	0.015	f	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0107	2003015-005	0.013	f	mg/L
Chicopee, (2003)	Total Phosphorus	1/30/2003	36-0108	2003015-006	0.017	f	mg/L
Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0109	2003023-001	0.016	f	mg/L
Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0110	2003023-002	0.019	f	mg/L
Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0111	2003023-003	0.015	f	mg/L
Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0112	2003023-004	0.013	f	mg/L
Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0113	2003023-005	0.014	f	mg/L

Chicopee, (2003)	Total Phosphorus	3/4/2003	36-0114	2003023-006	0.12	f	mg/L
Chicopee, (2003)	Total Phosphorus	4/16/2003	36-0156	2003041-001	0.18	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0212	2003060-003	0.047	j	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0213	2003060-004	0.042	j	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0214	2003060-005	<0.005	j	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0215	2003060-006	0.042	j	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0233	2003061-003	0.019	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0234	2003061-004	0.022	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0235	2003061-005	0.014	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0236	2003061-006	0.20	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0237	2003061-007	0.036	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0238	2003061-008	0.035	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0239	2003061-009	0.035	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0240	2003061-010	<0.005	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0241	2003061-011	0.093	h	mg/L
Chicopee, (2003)	Total Phosphorus	5/14/2003	36-0242	2003061-012	0.024	h	mg/L
Chicopee, (2003)	Total Phosphorus	9/24/2003	LB-2539	2003189-007	0.043	h	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0640	210693-067	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0641	210693-068	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0642	210693-069	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0643	210693-070	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0644	210693-071	[0.93*]	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0645	210693-072	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0646	210693-073	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0647	210693-074	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0648	210693-075	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0649	210693-076	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0650	210693-077	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0651	210693-078	##*	bd	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0652	210693-079	##*	bd	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0653	210693-080	[1.0*]	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0654	210693-081	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0655	210693-082	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0656	210693-083	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0657	210693-084	##*	b	mg/L

Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0658	210693-085	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0659	210693-086	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0660	210693-087	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0661	210693-088	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0662	210693-089	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0663	210693-090	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0664	210693-091	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0665	210693-092	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0666	210693-093	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0667	210693-094	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0668	210693-095	##*	bd	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0669	210693-096	##*	bd	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0670	210693-097	[0.93*]	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0671	210693-098	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/15/2003	36-0672	210693-099	##*	b	mg/L
Chicopee, (2003)	Total Phosphorus	10/22/2003	SM-0857	2004045-003	0.022	h	mg/L
Chicopee, (2003)	Total Phosphorus	10/22/2003	SM-0859	2004045-005	0.013	h	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0700	2004281-001	0.20	fh	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0701	2004281-002	0.014	fh	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0702	2004281-003	0.025	fh	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0703	2004281-004	0.025	fh	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0704	2004281-005	0.031	fh	mg/L
Chicopee, (2003)	Total Phosphorus	11/25/2003	36-0705	2004281-006	0.021	fh	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0306	207836-023	7*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0307	207836-025	5*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0308	207836-027	<2*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0309	207836-029	4*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0310	207836-031	6*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0311	207836-033	5*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0312	207836-035	7*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0313	207836-037	<2*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0314	207836-039	5*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0315	207836-041	9*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0316	207836-043	<2*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0317	207836-045	3*	h	mg/L

Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0318	207836-047	3*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0319	207836-049	5*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0320	207836-051	6*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0321	207836-053	50*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0322	207836-055	12*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0323	207836-057	4*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0324	207836-059	4*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0325	207836-061	<2*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0326	207836-063	5*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0327	207836-065	4*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0328	207836-067	3*	h	mg/L
Chicopee, (2003)	Total Suspended Solids	6/18/2003	36-0329	207836-069	<2*	h	mg/L
SMART: Chicopee (2003)	Fecal Coliforms	4/16/2003	SM-0725	206457-075	<2*	e	CFU/100mL
SMART: Chicopee (2003)	Fecal Coliforms	8/20/2003	SM-0817	209322-072	100*	d	CFU/100mL
SMART: Chicopee (2003)	Fecal Coliforms	8/20/2003	SM-0818	209322-073	500*	d	CFU/100mL
SMART: Chicopee (2003)	E. Coli - Modified m-Tec	4/16/2003	SM-0725	206457-075	6*	e	CFU/100mL
SMART: Chicopee (2003)	E. Coli - Modified m-Tec	8/20/2003	SM-0817	209322-072	40*	d	CFU/100mL
SMART: Chicopee (2003)	E. Coli - Modified m-Tec	8/20/2003	SM-0818	209322-073	300*	d	CFU/100mL
SMART: Chicopee (2003)	Turbidity	7/30/2003	SM-0804	2003136-027	0.15	b	NTU
SMART: Chicopee (2003)	Turbidity	8/20/2003	SM-0820	2003160-027	0.15	b	NTU
SMART: Chicopee (2003)	Alkalinity	7/30/2003	SM-0801	2003136-024	11	d	mg/L
SMART: Chicopee (2003)	Alkalinity	7/30/2003	SM-0802	2003136-025	18	d	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0855	2004045-001	<0.01	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0856	2004045-002	<0.01	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0858	2004045-004	<0.01	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0860	2004045-006	<0.03	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0861	2004045-007	<0.01	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0862	2004045-008	<0.03	h	mg/L
SMART: Chicopee (2003)	Ammonia-N	10/22/2003	SM-0863	2004045-009	<0.01	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0855	2004045-001	<0.02	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0856	2004045-002	<0.02	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0858	2004045-004	<0.02	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0860	2004045-006	0.15	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0861	2004045-007	0.12	h	mg/L
SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0862	2004045-008	<0.02	h	mg/L

SMART: Chicopee (2003)	Nitrate/Nitrite-N	10/22/2003	SM-0863	2004045-009	<0.02	h	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	2/12/2003	SM-0686	2003020-012	0.14	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	4/16/2003	SM-0727	2003039-007	0.11	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0762	2003084-001	0.34	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0763	2003084-002	0.43	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0764	2003084-003	0.20	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0765	2003084-004	0.52	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0766	2003084-005	0.49	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	6/18/2003	SM-0767	2003084-006	0.55	b	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0796	2003136-001	0.43	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0797	2003136-002	0.49	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0799	2003136-004	0.16	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0801	2003136-006	##	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0802	2003136-007	##	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0803	2003136-008	0.51	d	mg/L
SMART: Chicopee (2003)	Kjeldahl-N	7/30/2003	SM-0804	2003136-009	<0.10	d	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0855	2004045-001	0.16	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0856	2004045-002	0.24	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0858	2004045-004	<0.040	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0860	2004045-006	0.38	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0861	2004045-007	0.33	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0862	2004045-008	0.28	h	mg/L
SMART: Chicopee (2003)	Total Nitrogen	10/22/2003	SM-0863	2004045-009	<0.040	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0855	2004045-001	0.010	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0856	2004045-002	0.020	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0858	2004045-004	0.006	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0860	2004045-006	0.027	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0861	2004045-007	0.026	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0862	2004045-008	0.026	h	mg/L
SMART: Chicopee (2003)	Total Phosphorus	10/22/2003	SM-0863	2004045-009	<0.005	h	mg/L

6.0 2003 FLOW SURVEY DATA

All DWM flow crew staff took part in flow measurement training prior to surveys. All work followed DWM's SOP for flow measurement (CN 68.0). Instrument maintenance, inspection and calibration were performed prior to each survey. Standard USGS-type flow fieldsheets were used to record field data. A standard spreadsheet calculator was used to perform all calculations and statistics. Velocity meter accuracy checks were performed using Sontek, Swoffer and Price AA meters in February, 2003.

Raw fieldsheet (and other) information was evaluated and spreadsheet data output was checked in order to validate the flow data.for all results. "Stage" readings relied on accurate, consistent measurement of distance from a fixed point to the water surface. Graphs of rating curves were checked for accuracy. NOTE: The number of data points needed to generate accurate, location-specific rating curves is greater than that collected at any location by DWM in 2003. Ratings containing more than five points, however, can be used to approximate flow from a stage recording.

The following streamflow surveys were conducted in 2003.

Project	Waterbody	No. of Surveys	Evaluation of Results *	Comments
Chicopee	Seven Mile River @ Rt. 49	3	All results valid	3 point rating curve
Chicopee	Inlet to Quaboag Pond	3	All results valid	3 point rating curve
Chicopee	Cranberry Brook	3	All results valid	3 point rating curve
Chicopee	Lake Lashaway Outlet	3	All results valid	3 point rating curve
Chicopee	Seven Mile River @ Rt. 9	3	All results valid	3 point rating curve

* Results for individual survey flow estimates only. Most ratings have too few points to be usable for anything other than "ballpark" estimates

9.0 OVERVIEW OF INFORMATION SOURCES FOR 2003 DATA VALIDATION

9.1 2003 Field Sheet Data

All 2003 DWM field sheet data and metadata were reviewed with respect to potential effects on data quality and to the need for data qualification or censoring. Effects on the validity of project data may be due to survey-level, station-level or sample-level fieldsheet information. (Approx. 50% of the information on DWM fieldsheets is entered directly into the WQD database.)

9.2 2003 DWM Lab Sheets (apparent color, Chl a)

DWM laboratory records (lab notebooks, lab bench sheets) for apparent color and chl a analysis were reviewed for potential effects on data quality and to the need for data qualification or censoring.

9.3 2003 Multi-probe Calibration Records

Calibration sheets for all multi-probe uses in 2003 were reviewed for potential effects on data quality and to assist decision-making related to data qualification or censoring.

9.4 WES and STL-Westfield Laboratory QC Data (lab duplicates, QC unknowns, matrix spikes, etc.)

The quality control results contained in the WES laboratory 2003 data reports were reviewed for potential implications to data quality and to determine if any data was or should have been qualified by WES (based on lab accuracy and precision data). Unless otherwise indicated in Section 5, all reported data from WES met analyte-specific acceptance limits of WES as well as the Data Quality Objectives (DQOs) of DWM.

9.5 WES and STL-Westfield Chain-of-Custody Forms

All 2003 COC forms for sample handling and delivery to the WES and STL-Westfield Labs were reviewed for potential implications to data quality.

9.6 Field Notebooks

Review of 2003 field notebook information was limited to that for the CERO-SMART surveys. DWM uses standard fieldsheet forms as the primary field data recording tool. Any individual DWM staff notebooks were not reviewed.

9.7 External Lab Performance Evaluations (QC Sample Results)

See Section 5.2.

9.8 Project Technical Memoranda

As available, project-specific and/or lab-specific technical memoranda were reviewed used for potential implications to data quality.

9.9 Misc. Information

Additional information, such as via personal communications, electronic mail and notes to file, was also used as available to evaluate 2003 data quality.

10.0 Analytical Methods and Detection Limits

The analytical methods, associated detection limits and project data quality objectives for water sample and fish tissue analyses at WES, DWM and STL were as follows in 2003.

Water Quality Analyte	Method *	MDL **	RDL **
Hydrolab® Multiprobe Series 3 and (4)	DWM SOP (CN 4.2)	NA	NA
YSI 600 XLM	DWM SOP (CN 4.2)	NA	NA
Apparent Color (DWM)	SM 2120 B	15 PCU	15 PCU
Total Phosphorus	SM 4500-P-E	0.005 mg/l	0.015 mg/l
Dissolved Reactive P	SM 4500-P-A, B1, E	0.010 mg/l	0.020 mg/l
Alkalinity	SM 2320 B	2 mg/l	2 mg/l
Hardness	SM 2340 B; EPA 200.7	0.66 mg/l	2.0 mg/l
Chloride	SM 4500 Cl B	1 mg/l	1 mg/l

Water Quality Analyte	Method *	MDL **	RDL **
TSS	SM 2540 D	1.0 mg/l	1.0 mg/l
NH3-N	EPA 350.1	0.02 mg/l	0.06 mg/l
NO3-NO2-N	EPA 353.1	0.02 mg/l	0.06 mg/l
TKN	EPA 351.2	0.10 mg/l	0.30 mg/l
Total Nitrogen	USGS 1265003	0.040 mg/l	0.12 mg/l
Turbidity	SM 2130 B	0.10 NTU	0.36 NTU
Turbidity (DWM)	SM 2130 B	0.1 NTU	0.2 NTU
Chlorophyll a (DWM)	SM 10200 H	1 ug/l	1 ug/l
Fecal Coliform ***	SM 9222D	6 CFU/100mls	6 CFU/100mls
E. coli ***	EPA 1603 (also modified 1103.1)	6 CFU/100mls	6 CFU/100mls
Total Phosphorus	SM 4500-P-E	0.005 mg/l	0.02 mg/l
TSS (STL)	EPA 160.2	ND	2 mg/l
NH3-N (STL)	LAC 107061B	ND	0.10 mg/l
Turbidity (STL)	EPA 180.1	ND	0.10 NTU
Fecal Coliform (STL)	SM 9222D	0 CFU/100mls	0 CFU/100mls
E. coli (STL)	EPA 1103.1 modified	0 CFU/100mls	0 CFU/100mls
Total Phosphorus (STL)	SM 4500-P-E	0.002 mg/l	0.002 mg/l

***** = "Methods for Chemical Analysis of Water and Wastes", Environmental Protection Agency, Environmental Monitoring Systems Laboratory – Cincinnati (EMSL-CI), EPA-600/4-79-020, Revised March 1983 and 1979 where applicable; Standard Methods, Examination of Water and Wastewater, 20th edition

** = WES typically reports results down to the MDL with a qualifier.

*** = MDL and RDL not listed for fecal and E. coli results; 6 CFUs/100 mls. was the practical RDL for WES, as no results were reported below 6 (these were reported as "<6")

NA = Not Applicable

ND = No Data

The following data qualifiers or symbols are used in the MADEP/DWM WQD database 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 checks outside typical acceptance ranges for the low ionic and deionized water checks, lack of calibration of the depth sensor prior to use, or to checks against laboratory analyses. Where documentation on unit pre-calibration is lacking, but SOPs at the time of sampling dictated pre-calibration prior to use, then data are considered potentially inaccurate.

Qualification Criteria for Depth (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 (Hydrolab 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 reagant 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).

Page Intentionally Left Blank