

TEN MILE RIVER WATERSHED

2002 WATER QUALITY ASSESSMENT REPORT



COMMONWEALTH OF MASSACHUSETTS
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2002 WATER QUALITY ASSESSMENT REPORT

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Federal

- United States Environmental Protection Agency (EPA)
- United States Geological Survey (USGS)
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Photo cover credit: The Bungay River taken by Stella Tamul, MassDEP, DWM.

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LIST OF ACRONYMS AND ABBREVIATIONS

BRPBureau of Resource Protection	MDFWMassachusetts Division of Fisheries and Wildlife
C-NOECChronic No Observed Effect Concentration	MDL.....Method Detection Limit
CWA..... Clean Water Act	MDPH.....Massachusetts Department of Public Health
DWMDivision of Watershed Management	NPDES.....National Pollutant Discharge Elimination System
EPAUnited States Environmental Protection Agency	PALISPond and Lake Information System
LC ₅₀Lethal concentration to 50% of the test organisms	PCBPolychlorinated Biphenyls
MA DCR.....Massachusetts Department of Conservation and Recreation (formerly the Department of Environmental Management)	RBPRapid Bioassessment Protocol
MassDEPMassachusetts Department of Environmental Protection	SWQSSurface Water Quality Standards
MA DFGDepartment of Fish and Game (formerly the Department of Fisheries, Wildlife and Environmental Law Enforcement)	TMDLTotal Maximum Daily Load
MassGISMassachusetts Geographic Information System	TOXTDMassDEP DWM Toxicity Testing Database
	WAL.....Water Access Laboratory (Bridgewater State College)
	WBSWaterbody System Database
	WPCF.....Water Pollution Control Facility
	WWTFWastewater treatment facility
	WWTP.....Wastewater treatment plant

LIST OF UNITS

cfu.....colony forming unit
kmkilometer
MGD.....million gallons per day
mg/kgmilligram per kilogram
mmeter
mg/Lmilligram per liter
mLmilliliter
SUstandard units

TABLE OF FISH SCIENTIFIC NAMES

Common name	Scientific name	Common name	Scientific name
American eel	<i>Anguilla rostrata</i>	Golden shiner	<i>Notemigonus crysoleucas</i>
Black crappie	<i>Pomoxis nigromaculatus</i>	Largemouth bass	<i>Micropterus salmoides</i>
Bluegill	<i>Lepomis macrochirus</i>	Pumpkinseed	<i>Lepomis gibbosus</i>
Brown bullhead	<i>Ameiurus nebulosus</i>	Redfin pickerel	<i>Esox americanus</i>
Brown trout	<i>Salmo trutta</i>	Tessellated darter	<i>Etheostoma olmstedii</i>
Chain pickerel	<i>Esox niger</i>	White sucker	<i>Catostomus commersonii</i>
Common carp	<i>Cyprinus carpio</i>	Yellow bullhead	<i>Ameiurus natalis</i>

INTRODUCTION

The goal of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (Environmental Law Reporter 1988). To meet this objective the CWA requires states to develop information on the quality of the Nation's water resources and report this information to the United States Environmental Protection Agency (EPA), the United States Congress, and the public.

Together, these agencies are responsible for implementation of the CWA mandates. Under Section 305(b) of the CWA, every two years MassDEP must submit to the EPA a statewide report, which describes the status of water quality in the Commonwealth. Until 2002 this was accomplished as a statewide summary of water quality (the 305(b) Report). States are also required to submit, under Section 303(d) of the CWA, a list of impaired waters requiring a total maximum daily load (TMDL) calculation. In 2002, however, EPA required the states to combine elements of the statewide 305(b) Report and the Section 303(d) List of Impaired Waters into one "Integrated List of Waters" (Integrated List). This statewide list is based on the compilation of information for the Commonwealth's 27 watersheds. Massachusetts has opted to write individual watershed water quality assessment reports and use them as the supporting documentation for the Integrated List. The assessment reports utilize data compiled from a variety of sources and provide an evaluation of water quality, progress made towards maintaining and restoring water quality, and the extent to which problems remain at the watershed level. In-stream biological, habitat, physical/chemical, toxicity data and other information are evaluated to assess the status of water quality conditions. This analysis follows a standardized process provided in Appendix A of this report. Once the use assessments have been completed, the segments are categorized for the Integrated List.

This report presents the current assessment of water quality conditions in the Ten Mile River Watershed. The water quality assessments are based on information that has been researched and developed by the Massachusetts Department of Environmental Protection (MassDEP) Division of Watershed Management (DWM) through the first three years (information gathering, monitoring, and assessment) of the five-year cycle (Figure 1) in partial fulfillment of MassDEP's federal mandate to report on the status of the Commonwealth's waters under the Federal Water Pollution Control Act (commonly known as the Clean Water Act).

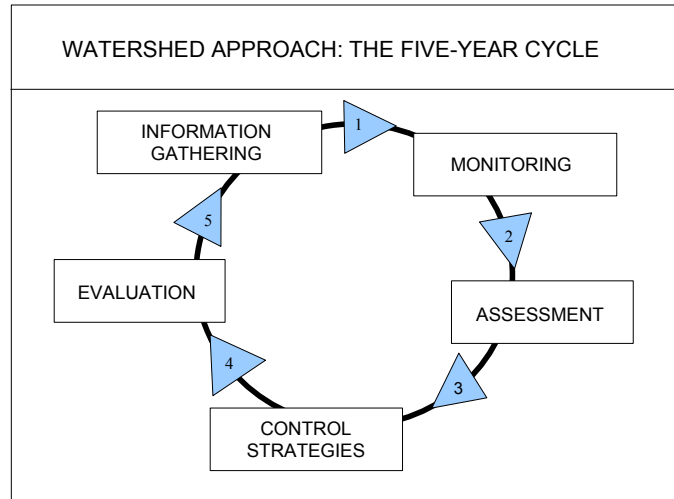


Figure 1. Five-year cycle of the Watershed Approach

MASSACHUSETTS INTEGRATED LIST OF WATERS

Section 305(b) of the CWA defines the process whereby states monitor and assess the quality of their surface and groundwater and report on the status of those waters every two years. Section 303(d) of the CWA requires states to periodically identify and list those waterbodies for which existing controls on point and nonpoint sources of pollutants are not stringent enough to attain or maintain compliance with applicable surface water quality standards. Through the year 2000 the MassDEP fulfilled the 305(b) and 303(d) reporting requirements in two completely separate documents. In 2001 the EPA released guidance that provided states with the option of preparing a single Integrated List of Waters to be submitted. That would meet the reporting requirements of both sections 305(b) and 303(d) of the CWA.

The *Massachusetts Year 2004 Integrated List of Waters* was submitted to the EPA by the MassDEP in September 2005 – approval pending (MassDEP 2005a). In that report each waterbody segment was placed in one of five major categories. Category 1 included those waters that were meeting all designated uses. No Massachusetts waters were listed in Category 1 because a statewide health advisory pertaining to the consumption of fish precludes any waters from being in full support of the fish consumption use. Waters listed in Category 2 were found to support some of the uses for which they were assessed but other uses were unassessed. Category 3 contained those waters for which insufficient or no information was available to assess any uses.

Waters exhibiting impairment for one or more uses were placed in either Category 4 (impaired but not requiring a TMDL report) or Category 5 (impaired and requiring one or more TMDLs) according to the EPA guidance. Category 4 was further divided into three sub-categories – 4A, 4B and 4C – depending upon the reason that TMDLs were not needed. Category 4A included waters for which the required TMDL(s) had already been completed and approved by the EPA. However, since segments could only appear in one category waters that had an approved TMDL for some pollutants, but not others, remained in Category 5. Category 4B was to include waters for which other pollution control requirements were reasonably expected to result in the attainment of the designated use before the next listing cycle (i.e., 2006). Because of the uncertainty related to making predictions about conditions in the future the MassDEP made a decision not to utilize Category 4B in the 2004 Integrated List. Finally, waters impaired by factors, such as flow modification or habitat alteration, that are not subjected to TMDL calculations because the impairment is not related to one or more pollutants were included in Category 4C.

See individual segment assessment for information pertaining to the 2004 Integrated List category and causes of impairment.

TEN MILE RIVER WATERSHED DESCRIPTION

DESCRIPTION

The Ten Mile River Watershed (figures 2 and 3) is bordered by the Blackstone River, Charles River, Taunton River, and Narragansett Bay watersheds. A small piece (5.4 square miles) of the southern portion of the watershed is located in Rhode Island. The watershed covers most of following municipalities: Plainville, North Attleborough, Seekonk, Attleboro, and smaller portions of Mansfield, Rehoboth, Wrentham, and Foxborough.

The Ten Mile River Watershed, with a total drainage area of about 50 square miles, is the smallest of the 27 major Massachusetts watersheds. The Ten Mile River's headwaters begin in Plainville and the river flows south through many impoundments before flowing into the Seekonk and Providence Rivers and ultimately Narragansett Bay.

The Ten Mile River has two major tributaries, the Sevenmile River and the Bungay River.

The Sevenmile River begins in North Attleborough, flows south through Attleboro and joins the Ten Mile River in Seekonk. Unnamed tributaries to the Bungay River originate in the Town of Foxborough and flow south into Greenwood Lake located in Mansfield and North Attleborough. The Bungay River originates at the outlet of Greenwood Lake and flows south to join the Ten Mile River in Attleboro. In addition to three minor tributaries (Fourmile Brook, Coles Brook, and Scott's Brook), there are also 45 lakes and ponds located in the Ten Mile River Watershed.

There are seven named rivers, streams, or brooks (the term "rivers" will hereafter be used to include all) represented by ten river segments that are presented in this report. These include the Ten Mile River, Scotts Brook, Bungay River, Speedway Brook, Sevenmile River, Fourmile Brook, and Coles Brook. This report also includes information on twelve pond and/or impoundments (the term "lakes" will hereafter include all). These include: Cargill Pond, Whittings Pond, Falls Pond, Plain Street Pond, Greenwood Lake, Hoppin Hill Reservoir, Manchester Pond Reservoir, Orrs Pond, Lake Como, Central Pond, and James V. Turner Reservoir. (See Table 1 for a summary of the use assessments for each segment.)

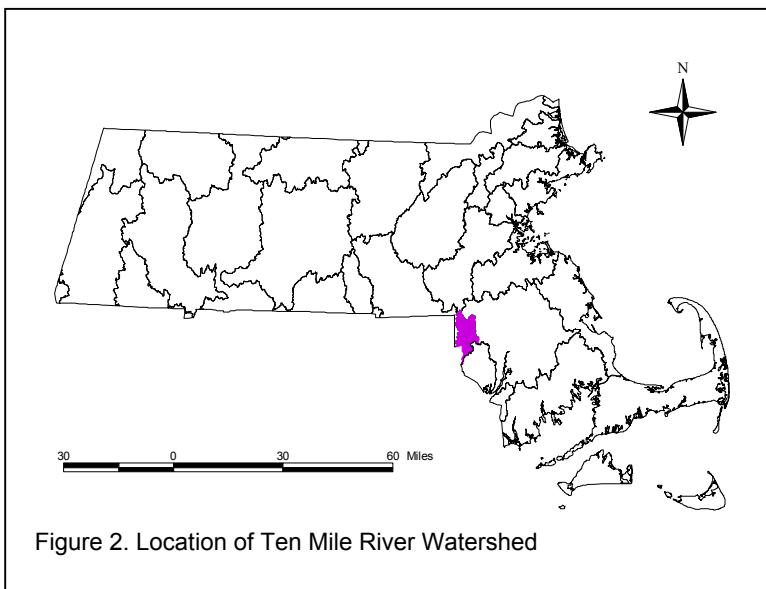


Figure 2. Location of Ten Mile River Watershed

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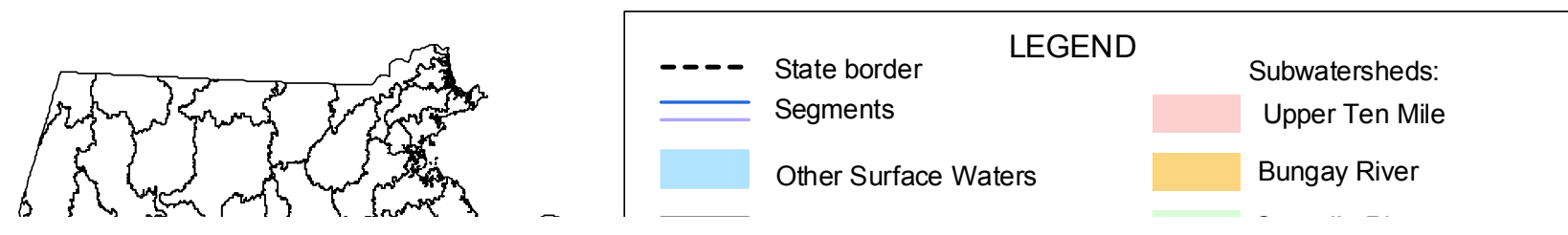
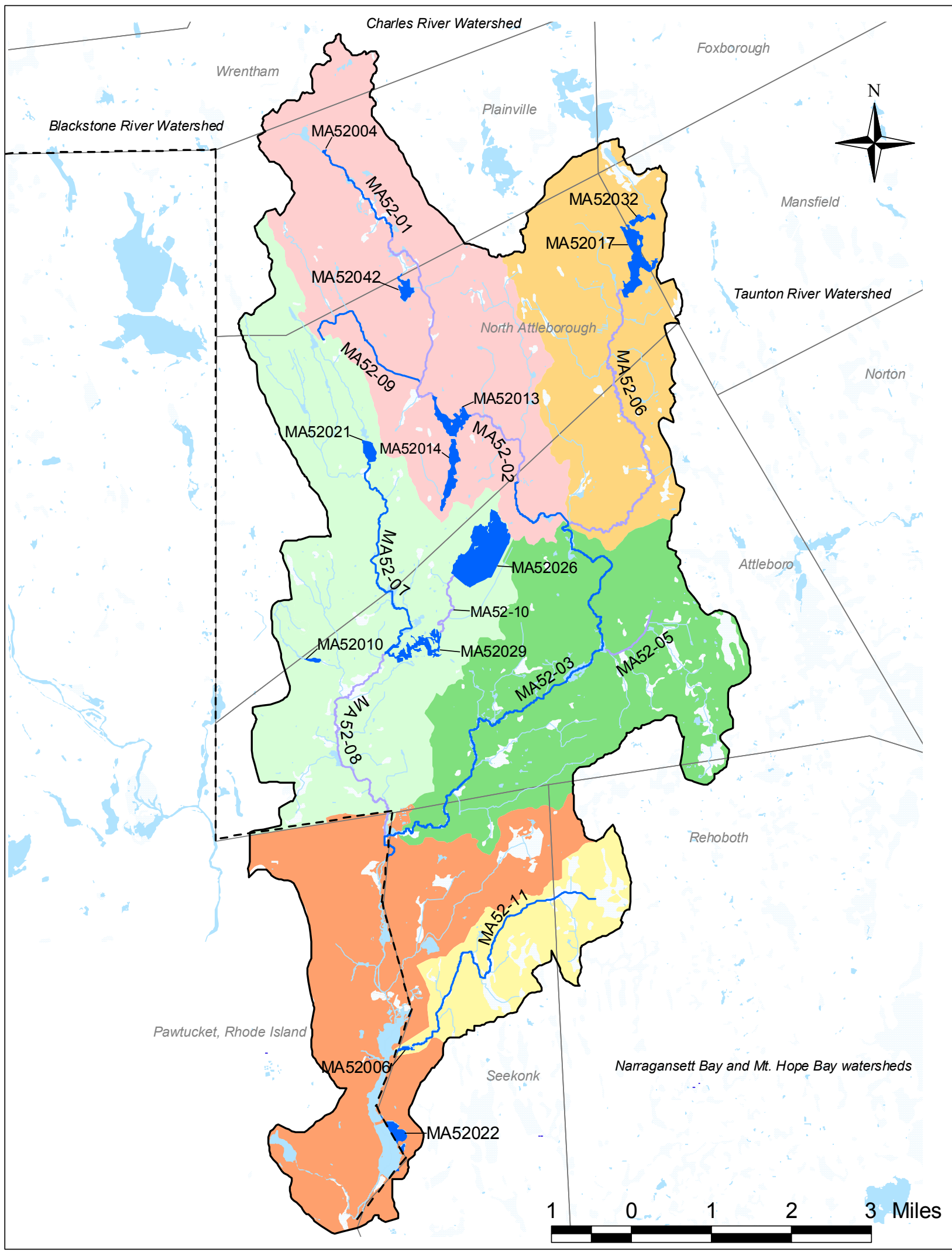







Figure 3. Ten Mile River Watershed

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Table 1. Ten Mile River Watershed Use Assessment Summary

Ten Mile River Watershed Use Assessment Summary																
		Aquatic Life			Fish Consumption			Primary Contact			Secondary Contact			Aesthetics		
River Segments	Total length (miles)	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed
Ten Mile River (MA52-01)	1.5	1.5					1.5	1.5			1.5			1.5		
Ten Mile River (MA52-02)	5.0	5.0					5.0		5.0		5.0			5.0		
Scotts Brook (MA52-09)	2.1			2.1			2.1			2.1			2.1			2.1
Ten Mile River (MA52-03)	9.1		9.1			0.5	8.6		9.1			9.1		7.5	1.6	
Bungay River (MA52-06)	5.1	5.1					5.1		0.4	4.7		0.4	4.7	5.1		
Speedway Brook (MA52-05)	0.9		0.9				0.9		0.9		0.9			0.9		
Sevenmile River (MA52-07)	3.2	3.2					3.2	3.2			3.2			3.2		
Fourmile Brook (MA52-10)	1.0		1.0				1.0	1.0			1.0			1.0		
Sevenmile River (MA52-08)	3.4	3.4					3.4		3.4		3.4			3.4		
Coles Brook (MA52-11)	4.2	4.2					4.2	4.2			4.2			4.2		
Total River Miles	35.5	22.4	11.0	2.1	0.0	0.5	35.0	9.9	18.8	6.8	26.7	2.0	6.8	31.8	1.6	2.1
Lake Segments	Total area (acres)	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed	Support	Impaired	Not Assessed
Cargill Pond (MA52004)	1.6			1.6			1.6			1.6			1.6			1.6
Whiting Pond (MA52042)	23.6			23.6		23.6				23.6			23.6			23.6
Falls Pond (MA52013)	54.1		54.1				54.1			54.1	54.1			54.1		
Falls Pond (MA52014)	49.4		49.4				49.4			49.4			49.4			49.4
Plain Street Pond (MA52032)	12.2		12.2				12.2			12.2			12.2			12.2
Greenwood Lake (MA52017)	96.6			96.6			96.6			96.6			96.6			96.6
Hoppin Hill Reservoir (MA52021)	22.4			22.4			22.4			22.4			22.4			22.4
Manchester Pond Reservoir (MA52026)	237.3			237.3			237.3			237.3			237.3			237.3
Orrs Pond (MA52029)	57.9		57.9				57.9			57.9			57.9			57.9
Lake Como (MA52010)	4.8		4.8				4.8			4.8			4.8			4.8
Central Pond (MA52006)	5.8		5.8				5.8		5.8			5.8			5.8	
James V. Turner Reservoir (MA52022)	28.4		28.4				28.4		28.4			28.4			28.4	
Total Lake Acres	594.1	0.0	212.6	381.5	0.0	23.6	570.5	0.0	34.2	559.9	54.1	34.2	505.8	54.1	34.2	505.8

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CARGILL POND (SEGMENT MA52004)

Location: Plainville






Segment Area: 1.6 acres

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” (pollutants needing TMDL: noxious aquatic plants, turbidity) (MassDEP 2005a).

No current data are available to assess this segment.

Cargill Pond (MA52004) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS – CARGILL POND (MA52004)

Cargill Pond should be sampled during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

TEN MILE RIVER (SEGMENT MA52-01)

Location: Headwaters, outlet of Cargill Pond to West Bacon Street, Plainville.

Segment Length: 1.5 miles

Classification: Class B, Warm Water Fishery

From the outlet of Cargill Pond in Plainville, the Ten Mile River flows in a southeasterly direction through Fuller Pond (MA52016 – see note below) and a small impoundment (locally known as Plainville Pond). The land use within this segment's subwatershed is primarily forest and residential. However, there is an active gravel and mining operation in the headwaters of this segment.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL" (pollutant needing TMDL: metals) (MassDEP 2005a).

Note: Fuller Pond (MA52016) will not be assessed as a lake segment in this report since the estimated retention time of this 5.6 acre waterbody is only 3.4 days; it will be considered a run-of-the river impoundment (McVoy 2006).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a Rapid Bioassessment Protocol (RBP) III benthic macroinvertebrate survey at one station (TM01) in this segment of the Ten Mile River downstream from Fuller Street, Plainville, MA. The stream width was about half a meter, with depth in the riffle areas and shallow pools. The extremely shallow conditions resulted in virtually no in-stream cover for fish, and less than optimal epifaunal habitat for benthos, though macroinvertebrates were afforded an abundance of rocky substrates in the form of cobble and pebble. In-stream aquatic vegetation covered less than five percent of the reach bottom, while algal coverage was considerably extensive (Appendix B).

During the 2002 survey season, DWM field crews noted silt and sedimentation on the stream bottom during all water quality surveys (Appendix D).

Biology

The MassDEP DWM 2002 RBP III analysis indicated that Station TM01 was characterized by a macroinvertebrate assemblage indicating a healthy aquatic community (Appendix B).

Toxicity

Ambient

The North Attleborough Waste Water Treatment Facility (WWTF) staff collected water from this segment of the Ten Mile River at Fuller Pond Dam in Plainville (approximately 5.2 miles upstream from their outfall) for use as dilution water in the whole effluent toxicity tests (Horton 2005). Between December 1999 and August 2005, survival of *Ceriodaphnia dubia* (*C. dubia*) exposed (7-day) to the river ranged from 80 to 100% (n=24)(MassDEP 2005b; Appendix C).

The Attleboro Water Pollution Control Facility (WPCF) staff collected water from this segment of the Ten Mile River at Fuller Pond Dam in Plainville (approximately 12.7 miles upstream from their outfall) for use as dilution water in their whole effluent toxicity tests (Kennedy 2005). Between April 1999 and August 2005, survival of *C. dubia* exposed (7-day) to the river water ranged from 80 to 100% except for two test events (March 2005, 70%, and April 2005, 70%; n=28)(Appendix C).

Water Chemistry

MassDEP DWM conducted water quality monitoring at Station TM01 (described above) in this segment of the Ten Mile River during the 2002 monitoring season. Station TM01 was sampled during five surveys (May, June, July, August, and October - 2002) for total phosphorus, ammonia-nitrogen, and total suspended solids. None of the parameters violated Surface Water Quality Standards (SWQS) and/or recommended guidance (Massachusetts currently has no criteria for nutrients, conductivity, and total dissolved solids). *In-situ* measurements were taken at this station for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. In total, ten *in-situ*

measurements were taken at this site during both pre and post dawn. Three of the ten measurements taken violated SWQS for dissolved oxygen and percent dissolved oxygen saturation (one of these measurements was taken during pre-dawn hours) (Appendix D).

The *Aquatic Life Use* is assessed as support for this segment of the Ten Mile River based on biological monitoring analysis that indicated a healthy aquatic community, good survival of test organisms, and generally good water quality data.

Primary and Secondary Contact Recreation Uses

MassDEP DWM collected bacteria [fecal coliform, *Escherichia coli* (*E. coli*), and *Enterococcus* sp.] from this segment of the Ten Mile River at Station TM01 during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Fecal coliform	60 cfu/100mL	13 to 1,400 cfu/100mL (n= 5)






The *Primary and Secondary Contact Recreation* uses are assessed as support for this segment of the Ten Mile River based on the low geometric mean.

Aesthetics Use

MassDEP DWM recorded field observations during the 2002 survey season at Station TM01. During all surveys the water column was described as having no odors and clear with the exception of the June survey where slight turbidity was noted in the water column (Appendix D).

The *Aesthetics Use* is assessed as support for this segment of the Ten Mile River based on the absence of objectionable conditions.

Ten Mile River (MA52-01) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED
Primary Contact		SUPPORT
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

RECOMMENDATIONS – TEN MILE RIVER (MA52-01)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

TEN MILE RIVER (SEGMENT MA52-02)

Location: West Bacon Street, Plainville, to the North Attleborough Waste Water Treatment Plant (WWTP) discharge, Attleboro.

Segment Length: 5.0 miles

Classification: Class B, Warm Water Fishery

This segment of the Ten Mile River flows in a southeasterly direction through two ponds: Wetherells Pond (MA52041 – see note below) and Falls Pond (MA52013) and picks up flow from Scotts Brook (MA52-09). The land use within this segment's subwatershed is primarily residential and commercial.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL" - pollutants needing TMDL: metals, nutrients, siltation, other habitat alterations, pathogens, noxious aquatic plants, turbidity (MassDEP 2005a).

Note: Wetherells Pond (MA52041) will not be assessed as a lake segment in this report since the estimated retention time of this 9.8 acre waterbody is only 3.1 days; it will be considered a run-of-the river impoundment (McVoy 2006).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a RBP III benthic macroinvertebrate survey at two stations (TM02 and TM06) in this segment of the Ten Mile River. Station TM02 was located downstream from West Bacon Street, Plainville, MA. Water levels were observed to be low during the July biological surveys. There was marginal habitat for macroinvertebrates and fish. Aquatic vegetation was observed in about 25% of the reach and both stream banks were stable and well vegetated. It should be noted that in-stream sedimentation, which compromised benthic habitat quality during the 1997 biomonitoring survey at this site, was negligible during the 2002 sampling effort (Appendix B).

Station TM06 was located downstream from Cedar Street and a short distance upstream from the North Attleborough WWTP discharge outfall in North Attleborough, MA. The river was wide and shallow in this forested and mostly shaded portion of the river with cobble/gravel substrates and swift current velocity providing optimal habitat for macroinvertebrates. The lack of large hard substrates resulted in minimal cover and marginal habitat for fish. It should be noted that effects from sedimentation were considerable at this site in 1997 and resulted in the listing of this segment as an impaired, Category 5 Water due to "siltation", were minimal during the 2002 biosurvey (Appendix B).

Biology

The MassDEP DWM 2002 RBP III analyses indicated that both stations TM02 and TM06 represented "non-impacted" biological communities (Appendix B).

In July 2002 MassDEP DWM conducted fish population sampling at two locations within this segment of the Ten Mile River. Fish were collected from stations TM02 (described above) and TM06 (located just downstream from Cedar Street) using a backpack electrofisher. The fish community at TM02 was comprised of 17 redbfin pickerel and one pumpkinseed. The fish community at TM06 was comprised of five redbfin pickerel, five largemouth bass, four yellow bullhead, one bluegill, and one chain pickerel (MassDEP 2002a). All fish collected are classified as tolerant macrohabitat generalists (Halliwell et al. 1999 and Bain and Meixler 2000).

It should also be noted that these two stations (or similarly located stations) were sampled in 1997 by MassDEP DWM biologists. Sampling conducted at TM02 in 1997 resulted the collection of multiple age classes of brook trout and individual brown trout (both fluvial dependants). It appeared that the brown trout and brook trout may have been stocked fish. However, the presence of brook trout suggested a reproducing population at that time. It is unclear whether this population has been extirpated, fish avoided capture, or had moved upstream. Although fish habitat was rated as excellent at TM06 in 1997, only four fish (macrohabitat generalists) were collected at that time. This is consistent with finding in 2002 (Maietta 2006).

The absence of fluvial fish from this segment is most likely due to the large number of impoundments located both upstream, within, and downstream from this segment.

Water Chemistry

MassDEP DWM conducted water quality monitoring at three stations (TM02 – described above, TM04 – located at Route 1, North Attleborough, MA, and TM06 located upstream from Cedar Street, North Attleborough, MA) in this segment of the Ten Mile River during the 2002 monitoring season. All three stations were sampled during five surveys (May, June, July, August, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. MassDEP DWM collected additional nutrient analytes at Station TM06 during two of these surveys as part of a phosphorus loading study. Elevated (>0.05 mg/L) total phosphorus levels were documented at all three stations (July through October). All other parameters met SWQS. *In-situ* measurements were taken at these stations for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. Measurements taken at stations TM02 and TM06 did not exhibit problems (TM02 had one low dissolved oxygen during the July pre-dawn survey). However, four of the nine measurements taken at Station TM04 violated SWQS for dissolved oxygen and five violated for percent dissolved oxygen saturation (two of the four measurements were taken during pre-dawn hours) (Appendix D).

The *Aquatic Life Use* for this segment is assessed as support based on the RBP III analysis (“non-impacted” biological communities) and the water quality data. The use is identified with an Alert Status, however, because of elevated total phosphorus levels and occasional low dissolved oxygen measurements.

Primary and Secondary Contact Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from four stations (TM02 – described above, TM02A located at Fisher Street, North Attleborough, MA, TM04 – described above, and TM06 – described above) along this segment of the Ten Mile River during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station TM02 Fecal coliform	123 cfu/100mL	13 to 880 cfu/100mL (n= 5)
Station TM02A Fecal coliform	399 cfu/100mL	97 to 1,700 cfu/100mL (n= 5)
Station TM04 Fecal coliform	389cfu/100mL	150 to 740 cfu/100mL (n= 5)
Station TM06 Fecal coliform	198 cfu/100mL	52 to 330 cfu/100mL (n= 7)

The geometric mean for all 22 fecal coliform samples collected within this segment of the Ten Mile River exceeded 200 cfu/100 mL (seven samples had counts > 400 cfu/100mL, 32%). Additionally, two of the four stations sampled along this segment had individual geometric means that exceeded 200 cfu/100 mL.

The *Primary Contact Recreation Use* is assessed as impaired for this segment of the Ten Mile River based on elevated fecal coliform counts. However, the *Secondary Contact Recreation Use* is assessed as support although the use is identified with an Alert Status because of occasional turbidity in the water column and isolated areas of trash and debris (see **Aesthetics Use** below).

Aesthetics Use

MassDEP DWM recorded field observations during the 2002 survey season at four stations (TM02, TM02A, TM04, and TM06 – all described above) along this segment of the Ten Mile River (Appendix D). Station observations are summarized below.

TM02

The water column was described as having no odors and clear, except for the July and August surveys, where turbidity in the water column was noted.

TM02A

The water column was described as having no odors and clear, except for the June and July surveys, where turbidity in the water column was noted. Garbage (sunken trash and debris) was observed in the river during all survey events.

TM04






The water column was described as having no odors and turbid during all surveys. Trash and debris were observed in the river during the July and August survey.

TM06

The water column was described as having no odors and clear.

The *Aesthetics Use* is assessed as support for this segment of the Ten Mile River based on infrequent objectionable conditions. However, the use is identified with an Alert Status because of occasional turbidity in the water column and isolated areas of trash and debris.

Ten Mile River (MA52-02) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT*
Fish Consumption		NOT ASSESSED
Primary Contact		IMPAIRED Cause: Fecal coliform bacteria Source: Unknown (Suspected Source: Municipal (urbanized high density area))
Secondary Contact		SUPPORT*
Aesthetics		SUPPORT*

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – TEN MILE RIVER (MA52-02)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Conduct bacteria source tracking in this segment to identify potential sources of bacteria.

WHITING POND (SEGMENT MA52042)

Location: North Attleborough/Plainville

Segment Area: 23.6 acres

Classification: Class B

The land use within this pond segment's subwatershed is a mix of forest, medium density residential and industrial. The immediate shoreline is approximately 90 percent developed with residences and a large industrial building.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 4b, "Waters Expected to Attain all Designated uses through Pollution Control measures other than TMDLs" - pollutants addressed by other pollution controls are metals (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Primary and Secondary Contact Recreation Uses

There is one beach along the shoreline of Whiting Pond. Currently there is uncertainty associated with accurate reporting of freshwater beach closure information to the Massachusetts DPH required as part of the Beaches Bill. Therefore no *Primary Contact Recreational Use* assessments (either support or impairment) decisions will be made using Beaches Bill data for fresh waterbodies.

Fish Consumption Use

In June 2002 MassDEP DWM conducted fish toxics monitoring in Wetherells Ponds. Fish were collected using a boat electroshocker. Three fillet composites of largemouth bass, bluegill, pumpkinseed, black crappie, and brown bullhead were analyzed for heavy metals, PCB, organochlorine pesticides, and percent lipids. Mercury concentrations exceeded the Massachusetts Department of Public Health (MDPH) trigger level of 0.5 mg/kg in two of the five samples analyzed. The largemouth bass and bluegill samples were found to contain 0.83 and 0.54 mg/kg of mercury respectively (Appendix G). The presence of elevated concentrations of mercury in largemouth bass and bluegill resulted in the issuance of a MDPH advisory recommending (MDPH 2004b):






Children under 12, pregnant women, nursing mothers, and women of childbearing age who may become pregnant should refrain from consuming bluegill and largemouth bass from Whittings Pond to prevent exposure of developing fetuses, nursing infants and young children to mercury [and]

The general public should limit consumption of bluegill and largemouth bass caught from Whittings Pond to two meals per month".

All remaining metals were either below MDLs or at concentrations that do not appear to be of concern. PCB and organochlorine pesticides were below MDLs in all but one sample analyzed. Trace amounts of PCB and DDE were detected in brown bullhead. It is unclear where PCB congeners or DDE may have originated, however, historic use and discharge from industry or homes (in the case of DDE) are certainly potential sources. Concentrations are not indicative of an ongoing source of these contaminants (Maietta *et al* 2004).

The *Fish Consumption Use* is assessed as impaired for this segment because of elevated levels of mercury which resulted in a fish consumption advisory.

Whiting Pond (MA52042) Use Summary Table

Designated Uses		Status
Aquatic Life		NOT ASSESSED
Fish Consumption		IMPAIRED Cause: Mercury in fish tissue Source: Unknown (Suspected Source: Atmospheric deposition)
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		NOT ASSESSED

RECOMMENDATIONS – WHITING POND (MA52042)

Whiting Pond should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

SCOTTS BROOK (SEGMENT MA52-09)

Location: Headwaters north of High Street, to confluence with Ten Mile River, North Attleborough.

Segment Length: 2.1 miles

Classification: Class B

Scotts Brook originates in a golf course in Plainville. It flows south through a few small ponds, a forested/agricultural area, and then a high density residential area before joining the Ten Mile River in North Attleborough.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutant needing TMDL: flow alteration (MassDEP 2005a). (Note: This segment will be moved to Category 4c - “Impairment not Caused by a pollutant” - during the next revision of the Integrated List of Waters)

No current data are available to assess this segment.

Scotts Brook (MA52-09) Use Summary Table

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS – SCOTTS BROOK (MA52-09)

Scotts Brook should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

FALLS POND (SEGMENT MA52013)

Location: North Attleborough
Segment Area: 54.1 acres
Classification: Class B

The land use within this pond's subwatershed is a predominately medium density residential. The immediate shoreline is developed with residences and a small amount of forested land.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL" - pollutants needing TMDL: nutrients, noxious aquatic plants, turbidity (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Biology

In August 2002 MassDEP DWM conducted a synoptic survey of Falls Pond (north basin). Field notes indicated that bushy pondweed (*Najas* sp.) was the most dominant macrophyte observed (MassDEP 2002b).

Water Chemistry

In June, July, and August 2002 MassDEP DWM collected grab samples for total phosphorus, chloride, chlorophyll *a*, and apparent color from Falls Pond for the purpose of TMDL development. An *in-situ* profile (surface, mid-water, bottom) for dissolved oxygen, temperature, conductivity, and pH was conducted during the July survey. In-lake total phosphorus concentrations were fairly low with evidence of phosphorus release from presumably anoxic sediments. Chlorophyll *a* concentrations were moderately elevated (>10 mg/m³). Dissolved oxygen measurements dropped below 5 mg/L and 60% saturation between the depths of 3.5 m to 7.5 m. Secchi disk depth measurements did not violate the bathing beach guidance of four feet (Appendix E).

The *Aquatic Life Use* is assessed as impaired due to low dissolved oxygen/saturation encompassing approximately 50% of the lake area.

Primary and Secondary Contact Recreation Uses

There is one beach along the shoreline of Falls Pond. Currently there is uncertainty associated with accurate reporting of freshwater beach closure information to the Massachusetts DPH required as part of the Beaches Bill. Therefore no *Primary Contact Recreational Use* assessments (either support or impairment) decisions will be made using Beaches Bill data for fresh waterbodies.






The *Primary Contact Recreational Use* is identified with an Alert Status because of the phytoplankton bloom observed during the DWM August 2002 survey. The *Secondary Contact Recreational Use* is assessed as support based on the Secchi disk depth measurements. However, the use is identified with an Alert Status because of the phytoplankton bloom observed during the DWM August 2002 survey.

Aesthetics Use

Secchi disk depth measurements did not violate the bathing beach guidance of four feet. Field notes recorded from the August macrophyte mapping survey described a prevalent phytoplankton bloom and the Secchi disk measurement was 1.8 m (Appendix E) (MassDEP 2002b).

The *Aesthetics Use* is assessed as support based on the Secchi disk depth measurements. However, the use is identified with an Alert Status because of the phytoplankton bloom observed during the August 2002 survey.

Falls Pond (MA52013) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Dissolved oxygen saturation, low dissolved oxygen Source: Unknown (Suspected Sources: Municipal point source, internal nutrient recycling)
Fish Consumption		NOT ASSESSED
Primary Contact		NOT ASSESSED*
Secondary Contact		SUPPORT*
Aesthetics		

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – FALLS POND (MA52013)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality since the 2002 survey.

FALLS POND (SEGMENT MA52014)

Location: North Attleborough

Segment Area: 49.4 acres

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 4c, “Impairment not Caused by a pollutant”. The impairment cause is presence of a non-native species (MassDEP 2005a).

Aquatic Life Use

Biology

In August 2002 MassDEP DWM conducted a synoptic survey of Falls Pond (south basin). Field notes indicated that milfoil (*Myriophyllum* sp.) was the most dominant macrophyte observed (MassDEP 2002b).






A non-native species (*Myriophyllum heterophyllum*) was observed during the 1997 synoptic surveys (MassDEP 2000).

The *Aquatic Life Use* for this segment is assessed as impaired based on the presence of a non-native species.

Primary and Secondary Contact Recreation and Aesthetics Uses

The *Recreational* and *Aesthetic* uses are not assessed. However, they are identified with an Alert Status because of the density (approximately 25% of the lake area) of the non-native macrophytes (MassDEP 2002b).

Falls Pond (MA52014) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Non-native aquatic plant species Source: Introduction of non-native organisms (accidental or intentional)
Fish Consumption		NOT ASSESSED*
Primary Contact		
Secondary Contact		
Aesthetics		

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – FALLS POND (MA52014)

Falls Pond should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

TEN MILE RIVER (SEGMENT MA52-03)

Location: North Attleborough WWTP discharge, Attleboro, to the MA/RI border near Central Avenue, Seekonk, MA/Pawtucket, RI.

Segment Length: 9.1 miles

Classification: Class B, Warm Water Fishery

This segment of the Ten Mile River flows in a south to southwesterly direction through a several ponds (see note below) - Farmers Pond, Mechanics Pond, Dodgeville Pond, and Hebronville Pond - and picks up flow from the Bungay River (MA52-06), Speedway Brook (MA52-05), and the Sevenmile River (MA52-07 and MA52-08). The land use within this segment's subwatershed is primarily medium to high density residential, commercial, and industrial.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutants needing TMDL: unknown toxicity, metals, nutrients, organic enrichment/low dissolved oxygen, pathogens, noxious aquatic plants (MassDEP 2005a).

Note: The following waterbodies will not be assessed as lake segments in this report based on the estimated retention time (<14 days). They will be considered run-of-the river impoundments (McVoy 2006).

Farmers Pond (6.3 acres) has an estimated retention time of 0.8 days.

Mechanics Pond (15.2 acres) has an estimated retention time of 0.7 days.

Dodgeville Pond (37.4 acres) has an estimated retention time of 1.55 days.

Hebronville Pond (16.4 acres) has an estimated retention time of 2.0 days.

NPDES DISCHARGE SUMMARY

There are three National Pollutant Discharge Elimination System (NPDES) dischargers that are permitted in this segment's subwatershed (Appendix C).

Town of North Attleborough (MA0101036)

Mantrose-Haeuser Company, Inc. (MAG250958)

City of Attleboro (MA0100595)

In August 2002 the EPA conducted a NPDES Compliance Sampling Inspection of the North Attleborough WWTP and Attleboro WPCF. An ISCO automatic sampler was installed to collect a 24-hour composite sample of the final effluent. Data are summarized in Appendix F.

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a RBP III benthic macroinvertebrate survey at three stations (TM06A, TM11, and TM14) in this segment of the Ten Mile River. Station TM06A was located approximately 460 m downstream from Cedar Street in Attleboro, MA (downstream from the North Attleborough WWTP discharge). In-stream sediment deposition (gravel bars) was noted, as was slight turbidity in the water column. Poor fish cover and riparian disruption along the right bank limited the habitat quality (Appendix B).

Station TM11 was located approximately 120 m downstream from Tiffany Street in Attleboro, MA. The reach was essentially a single long, deep riffle of uniform depth (0.40 m) with mainly cobble and large pebble substrates subjected to swift current velocity, optimal epifaunal habitat for macroinvertebrates but less than ideal as fish habitat. The habitat quality was limited by riparian disruption (i.e., reduced vegetative zone) and erosion along the left bank (Appendix B).

Station TM14 was located approximately 200 m downstream from Central Avenue in Pawtucket, Rhode Island near the Rhode Island-Massachusetts border and about 1 km downstream from the Attleboro WPCF discharge. There was an abundance of large rocky substrates, snags, and other woody debris; both fish and macroinvertebrates were provided with excellent habitat throughout the sampling reach (Appendix B).

Toxicity

Ambient

The Mantrose-Haeuser staff, in conjunction with staff from a private laboratory, collected water from the Ten Mile River adjacent to their property 30 to 50 feet upstream from their discharge for use as dilution water in the whole effluent toxicity tests (Young 2005). In May 2001 survival of *C. dubia* exposed (7-day) to the river water was 100% (n=1) (MassDEP 2005b) (Appendix C).

Effluent

Whole effluent toxicity (WET) tests were conducted on the North Attleborough WWTF effluent using *C. dubia* between December 1999 and February 2006. The LC₅₀s were all >100% except for one test event 19.8% (August 2000)(n=26). The C-NOEC results ranged from 12.5 to 100% effluent. Out of the 26 tests that were conducted, only 13 were valid. Three test results did not meet the C-NOEC limit of 94% (August 2000, February 2003, and August 2004); (MassDEP 2005b; Appendix C).

WET tests were conducted on the Attleboro WPCF effluent using *C. dubia* between April 1999 and March 2006. The LC₅₀s were $\geq 100\%$ in all of the tests (n=28). The C-NOEC results ranged from <6.25 to 100% effluent (n=30). Seven of the 26 valid chronic tests did not meet the C-NOEC limit of 71% effluent (MassDEP 2005b) (Appendix C).

One time WET test using *C. dubia* was required for the Mantrose-Haeuser effluent in May 2001. No acute or chronic toxicity were detected (LC₅₀ $\geq 100\%$ and C-NOEC = 100% effluent) (MassDEP 2005b; Appendix C).

Biology

The MassDEP DWM RBP III analysis for Station TM06A indicated a "moderately impacted" biological community. The analysis for Station TM11 indicated a "non-impacted" biological community and the analysis for Station TM14 indicated a "slightly impacted" biological community (Appendix B).

In June and July 2002, MassDEP DWM conducted surveys of three impoundments along this segment. Field notes on Farmers Pond in Attleboro, MA, indicated that greater than 90% of the surface was covered with duckweed. Also, a very dense subsurface cover of *Elodea sp.* was observed. Filamentous green algae were abundant along with purple loosestrife (*Lythrum salicaria*) and water willow (*Decadon verticillatus*). Field notes on Mechanics Pond in Attleboro, MA, indicated that green filamentous algae was dense in the majority of the pond. *Elodea sp.* and milfoil (*Myriophyllum sp.*) were the most dominant species. Field notes on Dodgeville Pond in Attleboro, MA, indicated that the pond was 90% covered with duckweed (*Lemna sp.*) and a green filamentous algae (Appendix E) (MassDEP 2002b).

In July 2002 MassDEP DWM conducted fish population sampling at two locations in this segment of the Ten Mile River. Fish were collected from Station TM06A (downstream from the North Attleborough Wastewater Treatment Plant) and Station TM14 (described above) using a backpack shocker. The fish community at TM06A was comprised of four tolerant, macrohabitat generalist species, which included five redbfin pickerel, five largemouth bass, four yellow bullhead, and one bluegill. It should be noted that TM06A was also sampled in 1997 and at that time no fish were collected or observed at this location. Although all species observed in 2002 were macrohabitat generalists, the presence of 14 fish at this location is an improvement over 1997 (Maietta 2006). The fish community at TM14 was also comprised of four species. However, total numbers of fish were much higher and included two fluvial dependant species (white sucker and tessellated darter). The sample was comprised of 23 white sucker, 23 tessellated darter, four yellow perch, and one largemouth bass (MassDEP 2002a).

In addition to surveys conducted by MassDEP DWM, Massachusetts Division of Fisheries and Wildlife (MDFW) also conducted fish population sampling at one location along this segment, near Central Avenue in Pawtucket, RI (Station 706), using a backpack shocker in July 2002. A total of 51 fish, representing four species were collected. The sample was dominated by white sucker and tessellated darter while four yellow bullhead and one largemouth bass were collected (Richards 2003a). Although the fish present can be classified as tolerant or moderately tolerant to pollution, they are considered fluvial species and are indicative of a stable flow regime.

Water Chemistry

MassDEP DWM conducted water quality monitoring at five stations TM06A (described above), TM08A (located at Olive Street in Attleboro, MA), TM11 (described above), TM13 (located at Pond Street, Seekonk, MA), and TM14 (described above) in this segment of the Ten Mile River during the 2002 monitoring season. All five stations were sampled during five surveys (May, June, July, August, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. During all survey dates, elevated (>0.05 mg/L) total phosphorus levels were documented at all five stations where all other parameters did not violate SWQS. *In-situ* measurements were taken at these stations for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. Including all sampling stations, 49 *in-situ* measurements were taken in this segment of the Ten Mile River during dawn and pre-dawn hours. There were six violations of the SWQS for dissolved oxygen and 10 for percent dissolved oxygen saturation during the monitoring season. Station TM08A, located downstream from Mechanics Pond, exhibited the most problems with dissolved oxygen and percent dissolved oxygen saturation (four violations for both parameters - two of these measurements for both parameters were taken during pre-dawn hours)(Appendix D). Water quality data collected at the three impoundments (Farmers, Mechanics, and Dodgeville ponds) along this segment can be found in Appendix E. Elevated total phosphorus (>0.05 mg/l) and chlorophyll *a* concentrations (>10 mg/m³) and low dissolved/saturation and supersaturation were also documented (Appendix E).

The *Aquatic Life Use* for this segment is assessed as impaired based on the benthic community structure in response to enrichment, elevated total phosphorus concentrations, which is contributing to high productivity (algal and macrophyte growth in the impounded reaches of this segment), and low dissolved oxygen and supersaturation condition.

Fish Consumption Use

In June 2002 MassDEP DWM conducted fish toxics monitoring in Mechanics Pond using a boat electroshocker. Three fillet composites each of largemouth bass, white perch, pumpkinseed, bluegill, and black crappie were analyzed for heavy metals, PCB, organochlorine pesticides, and percent lipids. Mercury was below the MDPH trigger level of 0.5 mg/kg in all samples analyzed. Arsenic, lead, and cadmium were either below MDLs or at concentrations that do not appear to be of concern. Selenium seemed to be slightly elevated in Mechanics Pond fishes. Concentrations ranged from 0.97 mg/kg in largemouth bass to 2.2 mg/kg in white perch. Although these concentrations are as much as 10 times higher than what is normally encountered, no advisory has been issued (Appendix G).

Trace concentrations of PCB and DDT were detected in fish from Mechanics Pond. The presence of chlordane in white perch resulted in the issuance of MDPH advisories recommending as follows (MDPH 2004b);

Children under 12, pregnant women, nursing mothers, and women of childbearing age who may become pregnant should refrain from consuming white perch from Mechanics Pond to prevent exposure of developing fetuses, nursing infants and young children to chlordane [and]

The general public should limit the consumption of white perch caught from Mechanics Pond to two meals per month.

The *Fish Consumption Use* is assessed as impaired for 0.5 river mile reach of this segment through Mechanics Pond based elevated concentrations of chlordane, which resulted in a site-specific fish consumption advisory.

Primary and Secondary Contact Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from five stations (TM06A, TM08A, TM11, TM13, and TM14 – all described above) along this segment of the Ten Mile River during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station TM06A Fecal coliform	85 cfu/100mL	39 to 350 cfu/100mL (n= 5)
Station TM08A Fecal coliform	155 cfu/100mL	90 to 580 cfu/100mL (n= 5)
Station TM11 Fecal coliform	144cfu/100mL	42 to 510 cfu/100mL (n= 5)
Station TM13 Fecal coliform	471 cfu/100mL	220 to 1,700 cfu/100mL (n= 5)
Station TM14 Fecal coliform	284 cfu/100mL	120 to 800 cfu/100mL (n= 5)

The geometric mean for all 25 fecal coliform samples collected within this segment of the Ten Mile River was 191 cfu/100 mL. Stations TM13 and TM14 (two of the five stations sampled in this segment) had geometric means that exceeded 200 cfu/100 mL.

The *Primary and Secondary Contact Recreation* uses are assessed as impaired for this segment based on elevated fecal coliform counts, occasional observations of in-stream turbidity and objectionable deposits (see **Aesthetics Use** below), and excess algal growth and elevated total phosphorus levels (in the 1.6 impounded river miles).

Aesthetics Use

MassDEP DWM recorded field observations during the 2002 survey season at five stations (TM06A, TM08A, TM11, TM13, and TM14 – all described above) along this segment of the Ten Mile River during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

TM06A

The water column was described as having no odors and turbid during all surveys. Yard waste was noted during all surveys along the right bank.

TM08A

The water column was described as having no odors and clear, except for the July survey, where turbidity in the water column was noted.

TM11

The water column was described as having no odors and clear with a yellow color, except for the July survey, where turbidity in the water column was noted.

TM13

The water column was described as having no odors. The water was colored yellow and moderate amounts of water lilies and duckweed were noted.






TM14

The water column was described as having no odors and clear, except for the August survey where slight turbidity and an effluent smell were noted. Trash and debris were noted in-stream during the July biomonitoring survey.

During the 2002 synoptic lake surveys conducted by MassDEP DWM, the impounded reaches of the river (totaling 1.6 miles) had dense duckweed and filamentous green algae cover.

The *Aesthetics Use is assessed* as support for 7.5 miles of this segment based on the field observations; although this use is identified with an Alert Status based on occasional observations of in-stream turbidity and isolated areas of trash and debris. The *Aesthetics Use* is assessed as impaired for the 1.6 impounded river miles due to excess algal growth.

Ten Mile River (MA52-03) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Elevated total phosphorus, organic enrichment, nutrient enrichment, low dissolved oxygen, dissolved oxygen saturation, aquatic plants/macrophytes, excessive algal growth Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4))
Fish Consumption		IMPAIRED impounded 0.5 mile Cause: Chlordane Source: Unknown NOT ASSESSED 8.6 miles
Primary Contact		IMPAIRED Cause: Fecal coliform bacteria, excess algal growth, aquatic plants/macrophytes, elevated total phosphorus Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4))
Secondary Contact		
Aesthetics		IMPAIRED impounded 1.6 miles Cause: Excess algal growth, aquatic plants/macrophytes, elevated total phosphorus Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4)) SUPPORT* 7.5 miles of river

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – TEN MILE RIVER (MA52-03)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Conduct bacteria source tracking in this segment to identify potential sources of bacteria.

PLAIN STREET POND (SEGMENT MA52032)

Location: Mansfield

Segment Area: 12.2 acres

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutant needing TMDL: noxious aquatic plants (MassDEP 2005a).

DESIGNATED USE ASSESSMENT






Aquatic Life Use

Biology

A non-native species (*Cabomba caroliniana*) was observed during the 1997 synoptic surveys (MassDEP 2000).

The *Aquatic Life Use* for this segment is assessed as impaired based on the presence of a non-native species.

Plain Street Pond (MA52032) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Non-native aquatic plant species Source: Introduction of non-native organisms (accidental or intentional)
Fish Consumption		NOT ASSESSED
Primary Contact		
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – PLAIN STREET POND (MA52032)

Plain Street Pond should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

GREENWOOD LAKE (SEGMENT MA52017)

Location: Mansfield/North Attleborough

Segment Area: 96.6 acres

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 2, “Attaining Some Uses; others Uses Not Assessed”. The uses attained are *Secondary Contact* and *Aesthetics* (MassDEP 2005a).

DESIGNATED USE ASSESSMENT






Aquatic Life Use

Biology

A non-native species (*Cabomba caroliniana*) was observed in an upstream lake (Plain Street Pond) during the 1997 synoptic surveys (MassDEP 2000).

The *Aquatic Life Use* for this segment is not assessed, but the use is identified with an Alert Status based on the presence of a non-native species directly upstream from this segment.

Greenwood Lake (MA52017) Use Summary Table

Aquatic Life*	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – GREENWOOD LAKE (MA52017)

Greenwood Lake should be sampled during the next round of DWM monitoring in 2007 to document water quality conditions, to confirm the presence of non-native species, and to provide data to assess the designated uses.

BUNGAY RIVER (SEGMENT MA52-06)

Location: Headwaters, outlet of Greenwood Lake, North Attleborough, to confluence with Ten Mile River, Attleboro.

Segment Length: 5.1 miles

Classification: Class B, Warm Water Fishery

The Bungay River originates at the outlet of Greenwood Lake and flows south through an extensive forested area to its confluence with the Ten Mile River. The land use within this segment's subwatershed is primarily forest.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 3, “No Uses Assessed” (MassDEP 2005a).

NPDES DISCHARGE SUMMARY

The United States Fish and Wildlife Service is permitted (MA0005398) to discharge treated culture water to this segment. Fortifiber Corporation of Attleboro is permitted (MAG250033) to discharge to an unnamed pond that empties to the Bungay River (Appendix C).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In November 2002 MassDEP DWM retrieved the Hester-Dendy multiplate samplers that were used for the RBP III analysis at two station locations (BR03 and BR02) in this segment. Station BR03 was located 300 m downstream from Bungay Road (upstream from the federal fish hatchery) North Attleborough, MA. Substrates were comprised of an even mix of sand and silt. Much of the stream bottom was affected by sediment deposition in the form of bars of fine inorganic materials. Limited pool variability and poor channel sinuosity contributed to the monotonous fish habitat and epifaunal habitat was also considered marginal. The most severe limitations to habitat were related to in-stream features and channel morphology (Appendix B).

Station BR02 was located near the end of Mary-Kennedy Road, downstream from the United States Fish and Wildlife Service fish hatchery, North Attleborough, MA. In-stream substrates were dominated by sand and silt, although some coarser materials (gravel, cobble, and pebble) were present. Channel sinuosity, channel flow status (water reaches base of both banks), and pool variability were slightly better than at BR03. The sediment deposition observed at BR03 appeared to persist in this portion of the river as well (Appendix B).

Biology

The MassDEP DWM 2002 RBP III analysis indicated that stations BR03 and BR02 represented “non-impacted” biological communities (Appendix B).

On separate dates both the MassDEP DWM and MDFW conducted fish population sampling in August 2002 (Station BG02A at Bungay Road in Mansfield, MA – MassDEP DWM) (Station 718 – MDFW) in this segment. Fish from Station BG02A and Station 718 were collected using a backpack shocker. The fish community surveyed by MassDEP DWM was comprised of five species; nine tessellated darter, five redbfin pickerel, and one each of American eel, pumpkinseed, and bluegill (MassDEP 2002a). A total of 17 fish, representing five species were collected by MDFW. The sample was dominated by tessellated darter and redbfin pickerel while one individual each of American eel, pumpkinseed, and bluegill were collected (Richards 2003). Although most species present were macrohabitat generalists, the dominance by a moderately tolerant fluvial specialist (tessellated darter) is indicative of a stable flow regime and acceptable water quality. It should be noted that the Bungay River passes through an extensive wetland and is primarily comprised of deep, slow-moving habitat types (Maietta 2006).

Water Chemistry

MassDEP DWM conducted water quality monitoring at two stations (BG02 located at Holden Street in Attleboro, MA and BG02A located at the outlet of Blackinton Pond in Attleboro, MA) in this segment during the 2002 monitoring season. Water quality samples were not collected at Station BG02. Station

BG02A was sampled during five surveys (May, June, July, August, and September) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements (temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation) were taken at Station BG02 during three surveys (July, August, and October) and Station BG02A during five surveys. Including both sampling stations, 16 *in-situ* measurements were taken in this segment during dawn and pre-dawn hours. There was one violation (Station BG02A during pre-dawn hours) of the SWQS for percent dissolved oxygen saturation (Appendix D).

The *Aquatic Life Use* for this segment is assessed as support based on the RBP III analysis and the water quality data.

Primary and Secondary Contact Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from one station (BG02A - described above) along this segment during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station BG02A		
Fecal coliform	1,067 cfu/100mL	370 to 5,200 cfu/100mL (n= 8)

During all survey events a large number of waterfowl were observed in the pond directly upstream from the sample location (Station BG02A). Based on best professional judgment, the source of bacteria is likely from the waterfowl specific to this area.

The *Primary and Secondary Contact Recreation* uses are not assessed for the upper 4.7 mile reach (upstream from Blackinton Pond) of the Bungay River due to lack of bacteria data. The *Primary and Secondary Contact Recreation* uses are impaired for the lower 0.4 mile reach of the Bungay River due to elevated fecal coliform counts (seven samples, including duplicates, had counts > 400 cfu/100mL).

Aesthetics Use

MassDEP DWM recorded field observations during the 2002 survey season at two stations (BG02 and BG02A - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

BG02 (observations made during three surveys only – July, August, and October)






The water column was described as clear and odorless, except for the August survey where some turbidity was observed.

BG02A

The water column was described as a slight yellow/tan color and was observed to be turbid during the May survey. A septic odor was noted when the water levels had dropped during the June and July surveys. Small amounts of trash and debris were observed along the river banks during all surveys.

The *Aesthetics Use* is assessed as support for the Bungay River. However, the use is identified with an Alert Status based on occasional observations of in-stream turbidity and objectionable deposits (yard waste, trash, and debris) along the river banks at Station BG02A.

Bungay River (MA52-06) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED
Primary Contact		NOT ASSESSED upper 4.7 miles
Secondary Contact		IMPAIRED lower 0.4 mile Cause: Fecal coliform bacteria Source: Waterfowl
Aesthetics		SUPPORT*

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – BUNGAY RIVER (MA52-06)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Conduct bacteria source tracking in this segment to identify potential sources of bacteria.

SPEEDWAY BROOK (SEGMENT MA52-05)

Location: Headwaters to confluence with Ten Mile River, Attleboro.

Segment Length: 0.9 mile

Classification: Class B, Warm Water Fishery

Speedway Brook (locally known as Thatcher Brook) originates from underground at Maple Street in Attleboro and flows southwest to its confluence with the Ten Mile River in Attleboro. The immediate land use within this segment's subwatershed is multi-family and high density residential.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL" - pollutants needing TMDLs: metals, nutrients, siltation, organic enrichment/low dissolved oxygen, other habitat alterations, pathogens, turbidity (MassDEP 2005a).

NPDES DISCHARGE SUMMARY

Bristol Nursing Home (MA0023426) closed in October 2001. Texas Instruments, Inc. is permitted (MA0001791) to discharge from their facility in Attleboro to Speedway Brook (Appendix C).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Biology

MDFW conducted fish population sampling in September 2002 at one location along this segment, near Dexter Street in Attleboro, MA (Station 728), using a backpack shocker. A total of 69 fish, representing 10 species were collected. The sample was dominated by redbfin pickerel and brown bullhead, while nine yellow bullhead, seven golden shiner, four common carp, three largemouth bass, two pumpkinseed, and one each of tessellated darter, white sucker, and bluegill were collected (Richards 2003).

The fish sample was almost entirely composed of tolerant/moderately tolerant macrohabitat generalists. With the exception of one tessellated darter and one white sucker, the relative absence of fluvial specialists/dependants suggests flow issues within this segment (Maietta 2006).

Water Chemistry

MassDEP DWM conducted water quality monitoring at one station (SW01 located at Route 152 in Attleboro, MA) in this segment during the 2002 monitoring season. Station SW01 was sampled during five surveys (May, June, July, August, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements were taken at this Station for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation, including both dawn and pre-dawn hours (n= 10). There were three violations of the SWQS for dissolved oxygen (one measurement was taken during pre-dawn hours) and six violations for percent dissolved oxygen saturation (three measurements were taken during pre-dawn hours – 30% of measurements) (Appendix D).

The *Aquatic Life Use* for this segment is assessed as impaired based on violations of the SWQS for dissolved oxygen and percent dissolved oxygen saturation.

Primary and Secondary Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from one station (SW01 - described above) along this segment during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station SW01		
Fecal coliform	596 cfu/100mL	290 to 3,000 cfu/100mL (n= 5)

The *Primary Contact Recreation Use* is assessed as impaired for Speedway Brook due to elevated fecal coliform counts (two samples had counts > 400cfu/100mL). The *Secondary Contact Recreation Use* is assessed as support. However, the use is identified with an Alert Status due to one bacteria sample >2,000cfu/mL.

Aesthetics Use






MassDEP DWM recorded field observations during the 2002 survey season at one station (SW01 - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

SW01

The water column was described as having no odors and clear with a yellow color, except for the July survey, where turbidity in the water column was noted.

The *Aesthetics Use* is assessed as support for Speedway Brook based the lack of objectionable odors, oils, and/or deposits.

Speedway Brook (MA52-05) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Low dissolved oxygen saturation, dissolved oxygen saturation Source: Unknown
Fish Consumption		NOT ASSESSED
Primary Contact		IMPAIRED Cause: Fecal coliform bacteria Source: Unknown (Suspected Source: Municipal (urbanized high density area))
Secondary Contact		SUPPORT*
Aesthetics		SUPPORT

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – SPEEDWAY BROOK (MA52-05)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Conduct bacteria source tracking in this segment to identify potential sources of bacteria.

HOPPIN HILL RESERVOIR (SEGMENT MA52021)

Location: North Attleborough







Segment Area: 22.4 acres

Classification: Class A Public Water Supply, Outstanding Resource Water

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 2, “Attaining Some Uses; others Uses Not Assessed”. The uses attained are *Secondary Contact* and *Aesthetics* (MassDEP 2005a).

No current data are available to assess this segment.

Hoppin Hill Reservoir (MA52021) Use Summary Table

Designated Uses		Status
Aquatic Life		NOT ASSESSED
Fish Consumption		NOT ASSESSED
Drinking Water		The MassDEP Drinking Water Program maintains current drinking water supply data.
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		NOT ASSESSED

RECOMMENDATIONS – HOPPIN HILL RESERVOIR (MA52021)

Hoppin Hill Reservoir should be sampled during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

SEVENMILE RIVER (SEGMENT MA52-07)

Location: Headwaters, outlet of Hoppin Hill Reservoir, North Attleborough, to inlet of Orrs Pond, Attleboro.
Segment Length: 3.2 miles
Classification: Class A Public Water Supply, Outstanding Resource Water, Warm Water Fishery

This segment of the Sevenmile River originates at the outlet of Hoppin Hill Reservoir (MA52021) and flows south through Luther Reservoir (see note below) before entering Orrs Pond (MA52029). The land use within this segment's subwatershed is a mix of forest, residential, and commercial.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL"- pollutants needing TMDL: organic enrichment/low dissolved oxygen, flow alteration, pathogens (MassDEP 2005a).

Note: Luther Reservoir (MA52025) will not be assessed as a lake segment in this report since the estimated retention time of this 15.8 acre waterbody is only 10.1 days; it will be considered a run-of-the-river impoundment (McVoy 2006).

NPDES DISCHARGE SUMMARY

Simon Property Group/Mayflower Emerald Square is permitted (MA0030244) to discharge from their facility in Attleboro to this segment of the Sevenmile River (Appendix C).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a RBP III benthic macroinvertebrate survey at one station (SM00) in this segment of the Sevenmile River. Station SM00 was located upstream from Draper Avenue, North Attleborough, MA. Flow regimes were dominated by swift current velocity that, along with an abundance of cobble substrates, providing macroinvertebrates with excellent epifaunal habitat. Fish cover was also exceptional, due to the optimal channel flow status and a good mix of snags, submerged logs, boulder, and overhanging vegetation (Appendix B).

Biology

The MassDEP DWM 2002 RBP III analysis indicated that Station SM00 represented a "non-impacted" biological community (Appendix B).

In July 2002 MassDEP DWM conducted fish population sampling at one station (SM00 - upstream from Draper Avenue in North Attleborough, MA) using a backpack shocker. The fish community was comprised of one species; 11 redbfin pickerel (MassDEP 2002a). It should be noted that fish population monitoring conducted in 1997 yielded similar results. The sample was dominated by redbfin pickerel but also included bluegill (n=12 young of the year) and three largemouth bass (two of which were young of the year). Young of the year fish were thought to have originated upstream in Hoppin Hill Reservoir. It remains unclear why this segment (which has excellent fish habitat) is populated by only redbfin pickerel (Maietta 2006).

Water Chemistry

MassDEP DWM conducted water quality monitoring at one station (SM00 located upstream from Draper Avenue in Attleboro, MA) in this segment during the 2002 monitoring season. Station SM00 was sampled during five surveys (May, June, July, August, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements were taken at this station for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. Including both dawn and pre-dawn hours, ten *in-situ* measurements were taken in this segment. All measurements met SWQS (Appendix D).

The *Aquatic Life Use* for this segment is assessed as support based on the RBP III analysis and the water quality data.

Primary and Secondary Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from one station (SM00 - described above) along this segment during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station SM00		
Fecal coliform	189 cfu/100mL	130 to 390 cfu/100mL (n= 5)

The *Primary and Secondary Contact Recreation* uses are assessed as support for this segment of the Sevenmile River based on low fecal coliform counts.

Aesthetics Use







MassDEP DWM recorded field observations during the 2002 survey season at one station (SM00 - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

SM00

The water column was described as having no odors and slightly turbid during the May survey and clear for the remainder of the survey season. Siltation and sedimentation were noted on the river substrates during all the surveys.

The *Aesthetics Use* is assessed as support for this segment of the Sevenmile River based on 2002 field observations (lack of objectionable conditions, e.g. odors, oils, and/or deposits).

Sevenmile River (MA52-07) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED
Drinking Water		The MassDEP Drinking Water Program maintains current drinking water supply data.
Primary Contact		SUPPORT
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – SEVENMILE RIVER (MA52-07)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

MANCHESTER POND RESERVOIR (SEGMENT MA52026)

Location: Attleboro







Segment Area: 237.3 acres

Classification: Class A Public Water Supply, Outstanding Resource Water

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 2, “Attaining Some Uses; others Uses Not Assessed”. The uses attained are *Secondary Contact* and *Aesthetics* (MassDEP 2005a).

No current data are available to assess this segment.

Manchester Pond Reservoir (MA52026) Use Summary Table

Designated Uses		Status
Aquatic Life		NOT ASSESSED
Fish Consumption		NOT ASSESSED
Drinking Water		The MassDEP Drinking Water Program maintains current drinking water supply data.
Primary Contact		NOT ASSESSED
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – MANCHESTER POND RESERVOIR (MA52026)

Manchester Pond Reservoir should be sampled during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

FOURMILE BROOK (SEGMENT MA52-10)

Location: Outlet of Manchester Pond Reservoir to inlet of Orrs Pond, Attleboro.

Segment Length: 1.0 mile

Classification: Class A Public Water Supply, Outstanding Resource Water

Fourmile Brook flows south from the outlet of Manchester Pond Reservoir (MA52026) to Orrs Pond (MA52029) in Attleboro, MA. The land use within this segment's subwatershed is a mix of forest and medium density residential. Additionally, a small portion of the brook flows through a wetland area and cropland.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 2, “Attaining Some Uses; others Uses Not Assessed”. The use attained is *Aesthetics* (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a RBP III benthic macroinvertebrate survey at one station (FM01) in this segment. Station FM01 was located downstream from West Street in Attleboro, MA. Only about half the reach contained substrates suitable for kick sampling, small cobble and pebble subjected to shallow riffles provided suboptimal epifaunal habitat. The shallow nature of the stream, coupled with small-sized substrates and a total lack of stable cover, led to very poor fish habitat. Heavy deposits of fine sediments throughout the reach compromised all types of aquatic habitat. Similar types of habitat degradation were observed here during the 1997 biomonitoring survey when only a qualitative sampling effort was made (Appendix B).

Biology

The MassDEP DWM 2002 RBP III analysis indicated that Station FM01 represented a “moderately impacted” biological community (Appendix B).

Water Chemistry

MassDEP DWM conducted water quality monitoring at one station (FM01 – described above) in this segment during the 2002 monitoring season. Station FM01 was sampled during five surveys (May, June, July, August, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements were taken at this station for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. Including both dawn and pre-dawn hours, ten *in-situ* measurements were taken in this segment. All measurements met SWQS (Appendix D).

The *Aquatic Life Use* for this segment is assessed as impaired based on the RBP III analysis, which indicated moderate habitat degradation.

Primary and Secondary Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from one station (FM01 - described above) along this segment during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station FM01		
Fecal coliform	55 cfu/100mL	32 to 97 cfu/100mL (n= 5)

The *Primary and Secondary Contact Recreation* uses are assessed as support for this segment of the Fourmile Brook based on low fecal coliform counts.

Aesthetics Use







MassDEP DWM recorded field observations during the 2002 survey season at one station (FM01 - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

FM01

The water column was described as having no odors and clear during all surveys.

The *Aesthetics Use* is assessed as support for this segment based on 2002 field observations (lack of objectionable conditions, e.g. odors, oils, and/or deposits).

Fourmile Brook (MA52-10) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Sedimentation/siltation Source: Physical substrate alteration
Fish Consumption		NOT ASSESSED
Drinking Water		The MassDEP Drinking Water Program maintains current drinking water supply data.
Primary Contact		SUPPORT
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – FOURMILE BROOK (MA52-10)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

ORRS POND (SEGMENT MA52029)

Location: Attleboro

Segment Area: 57.9 acres

Classification: Class A Public Water Supply, Outstanding Resource Water

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 4c, “Impairment not Caused by a pollutant”. The impairment cause is presence of a non-native species (MassDEP 2005a).







Aquatic Life Use

Biology

A non-native species (*Myriophyllum spicatum*) was observed during the 1997 synoptic surveys (MassDEP 2000).

The *Aquatic Life Use* for this segment is assessed as impaired based on the presence of a non-native species.

Orrs Pond (MA52029) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Non-native aquatic plant species Source: Introduction of non-native organisms (accidental or intentional)
Fish Consumption		NOT ASSESSED
Drinking Water		The MassDEP Drinking Water Program maintains current drinking water supply data.
Primary Contact		NOT ASSESSED
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – ORRS POND (MA52029)

Orrs Pond should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

SEVENMILE RIVER (SEGMENT MA52-08)

Location: Outlet of Orrs Pond, Attleboro, to confluence with the Ten Mile River, Pawtucket, RI.

Segment Length: 3.4 miles

Classification: Class B, Warm Water Fishery

This Sevenmile River segment flows south from the outlet of Orrs Pond (MA52029) in Attleboro through areas of wooded wetlands and residential development to the MA/RI border in Attleboro/Pawtucket, RI.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutant needing TMDL: pathogens (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Biology

In July 2002 MassDEP DWM conducted fish population sampling at one station (SM01 - downstream from Pitas Avenue in Attleboro, MA) using a backpack shocker. The fish community was comprised of three species; 35 redbfin pickerel, 27 white sucker, and seven tessellated darter (MassDEP 2002a). The presence of two fluvial dependant/specialists is indicative of a stable flow regime (Maietta 2006).

Water Chemistry

MassDEP DWM conducted water quality monitoring at two stations (SM01A located at Pitas Avenue in Attleboro, MA and SM01 located upstream from County Street in Attleboro, MA) in this segment during the 2002 monitoring season. Both stations were sampled during five surveys (May, June, July, August, and September) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements (temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation) were also taken at both stations during the 2002 survey season. Including both sampling stations, 20 *in-situ* measurements were taken in this segment during dawn and pre-dawn hours. All parameters met SWQS (Appendix D).

The *Aquatic Life Use* for this segment is assessed as support based on the water quality data.

Primary and Secondary Contact Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from two stations (SM01A and SM01 - described above) along this segment during five surveys (May, June, July, August, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>Geometric Mean</u>	<u>Range</u>
Station SM01A		
Fecal coliform	526 cfu/100mL	160 to 530 cfu/100mL (n= 9)
Station SM01		
Fecal coliform	317 cfu/100mL	130 to 460 cfu/100mL (n= 5)

The *Primary Contact Recreation* use is assessed as impaired for this segment of the Sevenmile River due to elevated fecal coliform counts. The *Secondary Contact Recreation* use is assessed as support.

Aesthetics Use






MassDEP DWM recorded field observations during the 2002 survey season at two stations (SM01A and SM01 - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

SM01A and SM01

The water column was described as having no odors and clear, except for the August survey where slight turbidity was noted.

The *Aesthetics Use* is assessed as support for this segment of the Sevenmile River based on field observations.

Sevenmile River (MA52-08) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED
Primary Contact		IMPAIRED Cause: Fecal coliform bacteria Source: Unknown (Suspected Source: Municipal (urbanized high density area))
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

RECOMMENDATIONS – SEVENMILE RIVER (MA52-08)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Conduct bacteria source tracking in this segment to identify potential sources of bacteria.

LAKE COMO (SEGMENT MA52010)

Location: Attleboro/North Attleborough

Segment Area: 4.8 acres

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutants needing TMDL: noxious aquatic plants, turbidity (MassDEP 2005a).






Aquatic Life Use

Biology

A non-native species (*Cabomba caroliniana*) was observed during the 1997 synoptic surveys (MassDEP 2000).

The *Aquatic Life Use* for this segment is assessed as impaired based on the presence of a non-native species.

Lake Como (MA52010) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Non-native aquatic plant species Source: Introduction of non-native organisms (accidental or intentional)
Fish Consumption		
Primary Contact		
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – LAKE COMO (MA52010)

Lake Como should be sampled (water quality and biological sampling) during the next round of DWM monitoring in 2007 to document water quality conditions and to provide data to assess the designated uses.

COLES BROOK (SEGMENT MA52-11)

Location: Headwaters, Grassie Swamp west of Allens Lane, Rehoboth, to inlet of Central Pond, Seekonk.
Segment Length: 4.2 miles
Classification: Class B.

Coles Brook flows in a southwesterly direction to the inlet of Central Pond (MA52006) in Seekonk, MA. The land use within this segment's subwatershed is low to medium density residential and forest. Additionally, Coles Brook flows through a country club property where the brook is impounded for a short distance in Seekonk, MA.

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, "Waters requiring a TMDL" - pollutants needing TMDL: flow alterations, pathogens (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Habitat and Flow

In July 2002 MassDEP DWM conducted a RBP III benthic macroinvertebrate survey at one station (CB01A) in this segment. Station CB01A was located downstream from Talbots Way, Seekonk, MA. There was little water in the stream channel, resulting in extremely shallow riffles that provided epifaunal habitat for macroinvertebrates that was marginal. In addition, the lack of stable cover due to substrate exposure and shallow pools resulted in virtually no productive fish habitat. In-stream deposition of fine sediments, both organic and inorganic, affected about a third of the stream bottom in the CB01A sampling reach (Appendix B).

Field observations recorded adverse conditions at the water quality Station CB01 located downstream from Route 152 in Seekonk, MA during the 2002 survey season. According to the field observations, the brook was partially dammed by a property owner directly upstream from the sampling location to create a pond on their property. This manipulation noticeably restricted flow downstream from the property during the survey season. Samples were not collected during July and August due to lack of water. By October the water level in the brook had increased.

Biology

Despite considerable in-stream habitat limitations related to low baseflow, the CB01A benthic community was highly comparable (90%) to both reference stations (TM01 and SM00). The MassDEP DWM 2002 RBP III analysis indicated that Station CB01A represented a "non-impacted" biological community (Appendix B).

Water Chemistry

MassDEP DWM conducted water quality monitoring at one station (CB01 – described above) in this segment during the 2002 monitoring season. Station CB01 was sampled during three surveys (May, June, and October) for total phosphorus, ammonia-nitrogen, and total suspended solids. All parameters met SWQS. *In-situ* measurements were taken at this Station for temperature, conductivity, total dissolved solids, dissolved oxygen, and percent dissolved oxygen saturation. Including both dawn and pre-dawn hours, six *in-situ* measurements were taken in this segment. There was one violation of the SWQS for percent dissolved oxygen saturation (this measurement was taken during the day (Appendix D).

The *Aquatic Life Use* for this segment is assessed as support based on the RBP III analysis and water quality data. The use is identified with an Alert Status, however, because of low flow/no flow conditions caused by lack of water from flow manipulation by a property owner.

Primary and Secondary Recreation Uses

MassDEP DWM collected bacteria (fecal coliform, *E. coli*, and *Enterococcus* sp.) from one station (CB01- described above) along this segment during three surveys (May, June, and October – 2002; Appendix D). A brief summary of the data is presented below.

<u>Parameter</u>	<u>May</u>	<u>June</u>	<u>October</u>
Station CB01			
Fecal coliform	350 cfu/100mL	300 cfu/100mL	100 cfu/100mL (n= 3)

The *Primary and Secondary Contact Recreation* uses are assessed as support for Coles Brook based on low fecal coliform counts.

Aesthetics Use






MassDEP DWM recorded field observations during the 2002 survey season at one station (CB01 - described above) along this segment during five surveys (May, June, July, August, and October) (Appendix D). Station observations are summarized below.

CB01

The water column was described as having no odors and clear, except for the July and August surveys when there was no water.

The *Aesthetics Use* is assessed as support for this segment based on 2002 field observations (lack of objectionable conditions, e.g. odors, oils, and/or deposits).

Coles Brook (MA52-11) Use Summary Table

Designated Uses		Status
Aquatic Life		SUPPORT*
Fish Consumption		NOT ASSESSED
Primary Contact		SUPPORT
Secondary Contact		
Aesthetics		

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS – COLES BROOK (MA52-11)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

Confirm the source of low flow conditions in this segment (e.g., withdrawals, drought year, flow manipulation by land owners).

CENTRAL POND (SEGMENT MA52006)

Location: Seekonk/Pawtucket, RI/Providence, RI
 Segment Area: 5.8 acres (Massachusetts portion)
 Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutants needing TMDLs: noxious aquatic plants, nutrients (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Biology

In July 2002 MassDEP DWM conducted a survey of Central Pond. Field notes indicated that greater than 90% of the surface was covered with duckweed. Also, a very dense subsurface cover of *Elodea sp.* and a filamentous algae mat were observed (MassDEP 2002b).

Water Chemistry






In June, July, and August 2002 MassDEP DWM collected grab samples for total phosphorus, chloride, chlorophyll *a*, and apparent color from Central Pond for the purpose of TMDL development. An *in-situ* profile (surface, mid-water, bottom) for dissolved oxygen, temperature, conductivity, and pH was conducted during the July survey. Water quality data collected from Central Pond can be found in Appendix E. Elevated total phosphorus (>0.05 mg/l) and chlorophyll *a* concentrations (>10 mg/m³) and low dissolved oxygen/saturation and supersaturation were documented (Appendix E).

The *Aquatic Life Use* for this segment is assessed as impaired based on elevated total phosphorus concentrations, which are contributing to high productivity (algal and macrophyte growth in the impounded reaches of this segment), and low dissolved oxygen and supersaturation conditions.

Primary and Secondary Contact Recreation and Aesthetics Uses

The *Recreational and Aesthetics uses* are impaired because of the dense macrophyte cover and excess algal growth observed during the July 2002 survey.

Central Pond (MA52006) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Elevated total phosphorus, organic enrichment, nutrient enrichment, low dissolved oxygen, dissolved oxygen saturation, aquatic plants/macrophytes, excessive algal growth Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4), municipal (urbanized high density area))
Fish Consumption		NOT ASSESSED
Primary Contact		IMPAIRED Cause: Excess algal growth, aquatic plants/macrophytes, elevated total phosphorus Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4), municipal (urbanized high density area))
Secondary Contact		
Aesthetics		

RECOMMENDATIONS – CENTRAL POND (MA52006)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

JAMES V. TURNER RESERVOIR (SEGMENT MA52022)

Location: Seekonk/East Providence, RI

Segment Area: 28.4 acres (Massachusetts portion)

Classification: Class B

This segment is on the proposed Massachusetts Year 2004 Integrated List of Waters – Category 5, “Waters requiring a TMDL” - pollutants needing TMDLs: nutrients, noxious aquatic plants (MassDEP 2005a).

DESIGNATED USE ASSESSMENT

Aquatic Life Use

Biology

In July 2002 MassDEP DWM conducted a synoptic survey of James V. Turner Reservoir. Field notes from the survey indicated moderate to dense macrophyte cover. Additionally, field notes from the August 2002 survey indicated that a very dense filamentous green algal mat was observed on the bottom of the reservoir – the northern portion of the reservoir was 50% covered with this mat and the southern portion had a sparser coverage of the algae on the bottom. Duckweed was observed to be dense in the cove areas of the reservoir and sparse elsewhere (MassDEP 2002b).

Water Chemistry

In June, July, and August 2002 MassDEP DWM collected grab samples for total phosphorus, chloride, chlorophyll *a*, and apparent color from James V. Turner Reservoir for the purpose of TMDL development. An *in-situ* profile (surface, mid-water, bottom) for dissolved oxygen, temperature, conductivity, and pH was conducted during the July survey. Water quality data collected from this segment can be found in Appendix E. Elevated total phosphorus (>0.05 mg/l) and low dissolved oxygen/saturation and supersaturation were documented (Appendix E).






The *Aquatic Life Use* for this segment is assessed as impaired based on elevated total phosphorus concentrations, which are contributing to high productivity (algal and macrophyte growth in the impounded reaches of this segment), and low dissolved oxygen and supersaturation conditions.

Primary and Secondary Contact Recreation and Aesthetics Uses

Of the three Secchi disk depth measurements taken during the 2002 survey season, there was one violation (1.1 m measured from the August survey). Additionally, field notes recorded from the August survey described a prevalent phytoplankton bloom in the water column (MassDEP 2002b).

The *Recreational* and *Aesthetics uses* are impaired based on the phytoplankton bloom observed during the August 2002 survey.

James V. Turner Reservoir (MA52022) Use Summary Table

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Elevated total phosphorus, organic enrichment, nutrient enrichment, low dissolved oxygen, dissolved oxygen saturation, aquatic plants/macrophytes, excessive algal growth Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4), municipal (urbanized high density area))
Fish Consumption		NOT ASSESSED
Primary Contact		IMPAIRED Cause: Excess algal growth, aquatic plants/macrophytes, elevated total phosphorus
Secondary Contact		Source: Municipal point source discharges (Suspected sources: Discharges from municipal separate storm sewer systems (MS4), municipal (urbanized high density area))
Aesthetics		

RECOMMENDATIONS – JAMES V. TURNER RESERVOIR (MA52022)

Continue to sample this segment during the next round of DWM monitoring in 2007 to document any changes to the water quality and the biological communities since the 2002 survey.

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