

MERRIMACK RIVER WATERSHED 2004 WATER QUALITY ASSESSMENT REPORT

**COMMONWEALTH OF MASSACHUSETTS
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2004-2009 WATER QUALITY ASSESSMENT REPORT

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**ATTACHED DATA CD – COMPENDIUM OF MASSDEP DWM MERRIMACK RIVER TECHNICAL
MEMORANDUMS AND REPORTS**

Merrimack River Watershed 2004 Water Quality Assessment Report
Technical Memorandum TM-84-5 Merrimack River Watershed 2004 Water Quality
Technical Memorandum TM-84-6 Merrimack River Watershed 2004 Benthic Macroinvertebrate
Assessment
Technical Memorandum 84-7 2004 Merrimack River Watershed Fish Population Assessment
Technical Memorandum 84-7 2004 Merrimack and French & Quinebaug Periphyton Study - Stream
Velocity and Canopy Cover Considerations
Technical Memorandum TM S-16 Baseline Lake Survey 2003 Technical Memorandum (Excerpt)

***Segments not included in the report due to insufficient data to assess any of the uses.**

Beaver Brook (MA84B-05)
Beaver Brook (MA84B-02)
Stony Brook (MA84B-03)
Powwow River (MA84A-28)
Bailey Pond (MA84003)
Mill Pond (MA84038)
Mill Pond (MA84081)
Mill Pond (MA84039)
Uptons Pond (MA84075)
Ward Pond (MA84096)

List of Acronyms and Abbreviations

surface water quality standards	SWQS	Safe Drinking Water Act	SDWA
Waterbody System	WBS	New England Interstate Water Pollution Control Commission	NEIWPCC
Assessment Database	ADB	Massachusetts Department of Public Health	MA DPH
National Hydrography Dataset	NHD	rapid bioassessment protocol	RBP
Clean Water Act	CWA	Massachusetts Department of Fish and Game	MA DFG
U.S. Environmental Protection Agency	EPA	milligrams per liter	mg/L
Massachusetts Department of Environmental Protection	MassDEP	micrograms per liter	ug/L
total maximum daily load	TMDL	milliliter	ml
Division of Watershed Management	DWM	Massachusetts Division of Marine Fisheries	MA DMF
combined sewer overflows	CSO	sanitary sewer overflow	SSO
dissolved oxygen	DO	National Pollutant Discharge Elimination System	NPDES
colony forming units	CFU	water pollution control facility	WPCF
MassDEP Drinking Water Program	DWP	Merrimack River Watershed Assoc.	MRWA

EXECUTIVE SUMMARY

MERRIMACK RIVER WATERSHED 2003 WATER QUALITY ASSESSMENT REPORT

The Massachusetts Surface Water Quality Standards (SWQS) designate the most sensitive uses for which surface waters in the state shall be protected. The assessment of current water quality conditions is a key step in the successful implementation of the Watershed Approach. This critical phase provides an assessment of whether or not the designated uses are supported or impaired, or not assessed, as well as basic information needed to focus resource protection and remediation activities later in the watershed management planning process.

This report presents a summary of current water quality data/information in the Merrimack River watershed used to assess the status of the designated uses as defined in the SWQS. The designated uses, where applicable, include: *Aquatic Life, Fish Consumption, Drinking Water, Primary and Secondary Contact Recreation and Aesthetics*. Each use, within a given assessment segment, is individually assessed as **support** or **impaired**. When too little current data/information exists or no reliable data are available for an assessment segment the use is **not assessed**. However, if there is some indication of water quality impairment, which is not “naturally-occurring”, the use is identified with an “Alert Status”. Some rivers and lakes do not have an assigned assessment segment identification number and the status of their designated uses has never been assessed, investigated, and/or reported to the EPA in the Commonwealth’s Summary of Water Quality Report (305(b) Report) nor is information on these waters maintained in the Assessment Database (ADB). In the interest of reporting on all river miles and lake acres in the Merrimack River watershed, any waters not currently assigned an assessment segment identification number are classified as **not assessed other waters**.

The summary of the assessments for the *Aquatic Life, Fish Consumption, Shellfishing, Primary and Secondary Contact Recreation and Aesthetics* uses in the Merrimack River watershed segments are illustrated in Figures 1 through 6, respectively. The percentage of total river miles, lake acreage and estuarine area classified as impaired, support, and not assessed for each designated use are provided in Table 1.

Table 1. Percentage of total river miles (391 miles), lake acreage (5734 acres) and estuarine area (6.7 square miles) in the Merrimack River basin assessed as support, impaired, or not assessed for each use. (National Hydrography Dataset (NHD) 1:24,000 is the source for the total river miles and lake acreage calculations)

Use	River			Lakes			Estuaries		
	Support	Impaired	Not Assessed ¹	Support	Impaired	Not Assessed ¹	Support	Impaired	Not Assessed
Aquatic Life	15.5%	3.3%	81.2%	0.0%	21.1%	78.9%	94.0%	0.0%	6.0%
Fish Consumption	0.0%	6.6%	93.4%	0.0%	53.9%	46.1%	0.0%	0.0%	100%
Shellfishing	Not Applicable						0.0%	72.0%	28.0%
Drinking Water	Not Assessed in this Report ²						Not Applicable		
Primary Contact	6.3%	20.8%	72.9%	0.0%	0.0%	100%	0.0%	95.5%	4.5%
Secondary Contact	17.1%	10.0%	72.9%	0.0%	0.0%	100%	68.6%	26.9%	4.5%
Aesthetics	19.3%	2.5%	78.4%	0.0%	0.0%	100%	0.04%	0.0%	99.96%

1 - Not Assessed includes river or lakes not assigned assessment segments or not assessed other waters.

2 - While this use is not assessed in this report, information on drinking water source protection and finish water quality is available at <http://www.mass.gov/dep/water/drinking.htm> and from local public water suppliers.

Aesthetics	Support	
<p>In 2004, MassDEP DWM recorded field observations regarding aesthetics at one site (W1203). There were no field observations indicating prolonged or frequent occurrences of objectionable deposits, odors, turbidity or color, floating scum, or overabundant growths of aquatic plants or algae. The <i>Aesthetics Use</i> is assessed as support.</p> <p style="text-align: right;"><i>Data Sources: 9, 17</i></p>		
Monitoring Recommendations		
Conduct additional bacteria monitoring to characterize the impairment and identify unknown sources.		

MERRIMACK RIVER (SEGMENT MA84A-05)

Segment Description: Confluence Little River, Haverhill to confluence Indian River, West Newbury/Amesbury.

Segment Length: 1.8 Square Miles

Segment Classification: SB, CSO, Shellfishing

2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Priority organics, Pathogens).

NPDES Permits: City of Haverhill Wastewater Division (MA0101621), Haverhill Paperboard Corp. (MAG250961), Town of Merrimac (MA0101150)

Designated Use	Use Assessment	Alert
Aquatic Life	Support	Yes
<p>In 2003, CDM collected eight total phosphorus and six chlorophyll-a (phytoplankton) samples at two sites (M024, M025) (See Special Note 2). The total phosphorus concentrations ranged from 0.062 to 0.095 mg/L and the chlorophyll-a concentrations ranged from 2.2 to 28.6 µg/L. Water from the Merrimack River was collected from the Route 125 bridge (Basiliere Bridge) in Haverhill for use as dilution water in the Haverhill WPAF whole effluent toxicity tests. Between June 2001 and April 2009 survival of <i>P. promelas</i> exposed (48 hours) to the river was > 95% (n=31 test events). Water from the Merrimack River just upstream from its confluence with Cobbler Brook in Merrimac was also collected for use as dilution water in the Merrimac WWTP's whole effluent toxicity tests. Between November 2001 and July 2008 survival of <i>M. bahia</i> and <i>M. beryllina</i> exposed (48-hours) to the river water was > 93% (n= 14 and 12 test events, respectively). The <i>Aquatic Life Use</i> is assessed as support based primarily on the good survival of test organisms exposed to river water samples in this segment of the river. An Alert Status is identified for this use due to occasionally elevated chlorophyll-a concentrations.</p> <p style="text-align: right;"><i>Data Sources: 3, 7</i></p>		
Fish Consumption	Not Assessed	
<p>This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by MA DPH due to mercury contamination apply to this waterbody (See Special Note 4).</p>		
Shellfishing	Not Assessed	
<p>DMF does not classify any shellfishing areas in this segment so the Shellfishing Use is not assessed.</p>		

Primary Contact	Impaired	
<p>In 2008, MRWA collected E.coli samples at three sites (19.1, 17.8, 16.8) and Enterococcus at two sites (14.1, 10.6). The geometric means of the samples collected at each site during the primary contact season ranged from 107.2 CFU/100ml to 124.3 CFU/100ml for the E. coli sites and 31.8CFU/100ml to 39.2 CFU/100ml for the Enterococcus sites. In 2003, CDM collected Enterococcus samples at two sites (M024, M025) (See Special Note 1). Neither site had the minimum number of samples (5) required to determine compliance with the Enterococcus geometric mean criterion, however five out of eight counts at the two sites exceeded 104 colonies/100ml. Based on the CDM and MRWA results violating the Enterococcus geometric mean criterion (35 CFU/100ml), the <i>Primary Contact Recreational Use</i> is assessed as impaired. Bacteria was elevated during both dry and wet weather conditions and the highest counts represented wet weather sampling. NOTE: Between June 2000 and July 2006 \$20.1 Million has been invested to increase capacity at the Haverhill WWTP to capture over 97% of all combined flows including modifications at the WWTP and design and construction of miscellaneous improvements at CSO structures.</p> <p>Cause(s) of Impairment: Enterococcus Source(s) of Impairment: Wet Weather Discharges (Point Source and Combination of Stormwater, SSO or CSO), Source Unknown</p> <p style="text-align: right;"><i>Data Sources: 3, 25</i></p>		
Secondary Contact	Impaired	
<p>In 2008, MRWA collected E.coli samples at three sites (19.1, 17.8, 16.8) and Enterococcus at two sites (14.1, 10.6). The geometric means of the samples collected at each site ranged from 107.2 CFU/100ml to 124.3 CFU/100ml for the E. coli sites and 31.8CFU/100ml to 39.2 CFU/100ml for the Enterococcus sites. In 2003, CDM collected Enterococcus samples at two sites (M024, M025) (See Special Note 1). Neither CDM site had the minimum number of samples (5) required to determine compliance with the Enterococcus geometric mean criterion 175 colonies/100ml), however four out of eight counts at the two sites exceeded 350 colonies/100ml so the <i>Secondary Contact Recreational Use</i> is assessed as impaired. Bacteria was elevated during both dry and wet weather conditions and the highest counts represented wet weather sampling and were more frequently detected at the upstream sampling location. NOTE: Between June 2000 and July 2006 \$20.1 Million has been invested to increase capacity at the Haverhill WWTP to capture over 97% of all combined flows including modifications at the WWTP and design and construction of miscellaneous improvements at CSO structures.</p> <p>Cause(s) of Impairment: Enterococcus Source(s) of Impairment: Wet Weather Discharges (Point Source and Combination of Stormwater, SSO or CSO), Source Unknown</p> <p style="text-align: right;"><i>Data Sources: 3, 25</i></p>		
Aesthetics	Not Assessed	
<p>Insufficient data were available to assess the <i>Aesthetics Use</i>.</p>		
Monitoring Recommendations		
<p>Conduct bacteria monitoring to evaluate if recent upgrades to the Haverhill WWTP and CSO structures have improved water quality.</p>		