

HOUSATONIC RIVER WATERSHED 2002 WATER QUALITY ASSESSMENT REPORT



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HOUSATONIC RIVER WATERSHED
2002 WATER QUALITY ASSESSMENT REPORT

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Department of Environmental Protection
Division of Watershed Management

Report Number:

21-AC-4

DWM Control Number:

CN141.5

Massachusetts Department of Environmental Protection
Division of Watershed Management
Worcester, Massachusetts

September 2007

ACKNOWLEDGEMENTS

We would like to thank Tom O'Brien (formerly of the Executive Office of Environmental Affairs, Massachusetts Watershed Initiative) and the Housatonic Valley Association for their efforts in facilitating the collaborative effort involved in the assessment process.

Data and information used in this report were provided in part by the following agencies and organizations:

Federal

- Environmental Protection Agency (EPA)
- United States Geological Survey (USGS)
 - Water Resources Division
- United States Army Corps of Engineers (ACOE)
- United States Fish and Wildlife Service (USFWS)
- National Oceanic and Atmospheric Administration (NOAA)

State

- Massachusetts Department of Environmental Protection (MassDEP):
 - Bureau of Strategic Policy and Technology, Wall Experiment Station (WES)
 - Bureau of Resource Protection (BRP)
 - Bureau of Waste Prevention (BWP)
 - Bureau of Waste Site Cleanup (BWSC)
- Massachusetts Department of Public Health (MA DPH)
- Department of Fish and Game (MA DFG)
 - Division of Fisheries and Wildlife
 - Riverways Program
 - Public Access Board
- Massachusetts Department of Conservation and Recreation, Division of State Parks and Recreation (MA DCR)

Regional

- Housatonic Valley Association (HVA)
- Lake Onota Preservation Association
- Berkshire Regional Planning Commission

Much appreciation is also extended to several MassDEP employees for their contributions: Richard Chase, Christine Duerring, Daniel Kurpaska, Matthew Poach, Richard McVoy, Peter Mitchell, Jane Ryder, and Arthur Screpetis.

It is impossible to thank everyone who contributed to the assessment report process: field, laboratory, data management, writing, editing, review and graphics, as well as meetings, phone calls, and many e-mails. All of these contributions are very much appreciated.

Cover photo: Housatonic River at Holmes Road, Pittsfield. Photo by: Jamie Carr

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LIST OF ACRONYMS

7Q10.....seven day, ten year low flow	MA DPH Massachusetts Department of Public Health
ACEC Area of Critical Environmental Concern	MS4..... Municipal Separate Stormwater System
ACOE Army Corps of Engineers (United States)	MassGIS Massachusetts Geographic Information System
BMP best management practice	NAS/NAE National Academy of Sciences and National Academy of Engineering
BPJ best professional judgment	ND non detectable
BRPC Berkshire Regional Planning Commission	NPDES..... National Pollutant Discharge Elimination System
CFU.....colony forming unit	NPS non-point source pollution
CMR Code of Massachusetts Regulations	ORW Outstanding Resource Water
CNOEC chronic no observed effect concentration	PCB polychlorinated biphenyl
CSO.....combined sewer overflow	PWS public water supply
CWA.....Clean Water Act	QA/QC..... quality assurance/ quality control
DFG..... Department of Fish and Game	QAPP quality assurance project plan
DMF Division of Marine Fisheries	RIFLS River Instream Flow Stewards
DO dissolved oxygen	S-EL severe effect level
DWM Division of Watershed Management	SOP standard operating procedure
DMR discharge monitoring report	SWAP..... Surface Water Assessment Program
EOEA Executive Office of Environmental Affairs	SWQS Surface Water Quality Standards
EPA United States Environmental Protection Agency	TMDL total maximum daily load
FERC Federal Energy Regulatory Commission	TOXTD MassDEP DWM Toxicity Testing Database
GIS.....geographic information system	TPCB.....total polychlorinated biphenyl
HVA.....Housatonic Valley Association	TSS total suspended solids
LC ₅₀ lethal concentration to 50% of the test organisms	USGS United States Geological Survey
L-EL..... low effect level	WBID waterbody identification code
MA DCR Massachusetts Department of Conservation and Recreation	WBS waterbody system database
MassDEP Massachusetts Department of Environmental Protection	WMA Water Management Act
MA DFG Massachusetts Department of Fish and Game	w/w wet weight
	WWTP..... wastewater treatment plant

LIST OF UNITS

cfs	cubic feet per second
cfu	colony forming unit
GPM(D)	gallons per minute (day)
MGD	million gallons per day
µg/kg	microgram per kilogram
M	meter
mL	milliliters
mg/L	milligram per liter
mg/m ³	milligrams per cubic meter
ng	nanograms
NTU	nephelometric turbidity units
ppb	parts per billion
ppm	parts per million
SU	standard units
TEQ/kg	toxic equivalents per kilogram
µeq/L	microequivalents per liter
µS/cm	micro seimens per centimeter

LIST OF FISH SPECIES

Common Name	Scientific Name
Banded killifish	<i>Fundulus diaphanus</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Blacknose dace	<i>Rhinichthys atratulus</i>
Bluegill	<i>Lepomis macrochirus</i>
Brook trout	<i>Salvelinus fontinalis</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Brown trout	<i>Salmo trutta</i>
Chain pickerel	<i>Esox niger</i>
Common carp	<i>Cyprinus carpio</i>
Common shiner	<i>Notropis cornutus</i>
Creek chub	<i>Semotilus atromaculatus</i>
Fallfish	<i>Semotilus corporalis</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Green sunfish	<i>Lepomis cyanellus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Northern pike	<i>Esox lucius</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Rock bass	<i>Ambloplites rupestris</i>
Slimy sculpin	<i>Cottus cognatus</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Spottail shiner	<i>Notropis hudsonius</i>
Tesselated darter	<i>Etheostoma olmstedii</i>
White sucker	<i>Catostomus commersoni</i>
Yellow perch	<i>Perca flavescens</i>

EXECUTIVE SUMMARY

HOUSATONIC WATERSHED 2002 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 are 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 Housatonic 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*, *Primary* and *Secondary Contact Recreation* and *Aesthetics*. Each use, within a given segment, is individually assessed as **support** or **impaired**. When too little current data/information exists or no reliable data are available 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”. It is important to note that not all waters are assessed. Many small and/or unnamed rivers and lakes have **never been assessed**; the status of their designated uses has never been 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 Waterbody System (WBS) or the new Assessment Database (ADB).

The term *Drinking Water Use* is used to indicate sources of public drinking water. While this use is not assessed in this report, the state provides general guidance on drinking water source protection of both surface water and groundwater sources (available at <http://www.mass.gov/dep/water/drinking.htm>). These waters are subject to stringent regulation in accordance with the Massachusetts Drinking Water Regulations. MassDEP’s Drinking Water Program has primacy for implementing the provisions of the federal Safe Drinking Water Act. The Drinking Water Program also continues to work on its Source Water Assessment Program, which requires that the Commonwealth delineate protection areas for all public ground and surface water sources, inventory land uses in these areas that may present potential threats to drinking water quality, determine the susceptibility of water supplies to contamination from these sources, and publicize the results.

Public water suppliers monitor their finished water (tap water) for major categories of both naturally occurring and man-made contaminants such as: microbiological, inorganic, organic, pesticides, herbicides, and radioactive contaminants. Specific information on community drinking water sources, including Source Water Assessment Program activities and drinking water quality information, are updated and distributed annually by the public water system to its customers in a “Consumer Confidence Report”. These reports are available from the public water system, the local boards of health, MA DPH and MassDEP.

The *Fish Consumption Use* (See Figure 2) is supported when there are no pollutants present that result in unacceptable concentrations in edible portions (as opposed to whole fish - see *Figure 1 Aquatic Life Use*) of fish, other aquatic life or wildlife for human consumption. The assessment of the *Fish Consumption Use* is made using the most recent list of Fish Consumption Advisories issued by the Massachusetts Executive Office of Health and Human Services, Department of Public Health (MDPH), Bureau of Environmental Health Assessment (MA DPH 2005b). The MDPH list identifies water bodies where elevated levels of a specified contaminant in edible portions of freshwater species pose a health risk for human consumption; hence, the *Fish Consumption Use* is assessed as impaired in these waters. In July 2001 MA DPH issued new statewide consumer advisories on fish consumption and mercury contamination (MA DPH 2001). Because of these statewide advisories no waters can be assessed as support for the *Fish Consumption Use*. These waters default to “not assessed”. The statewide advisories read as follows:

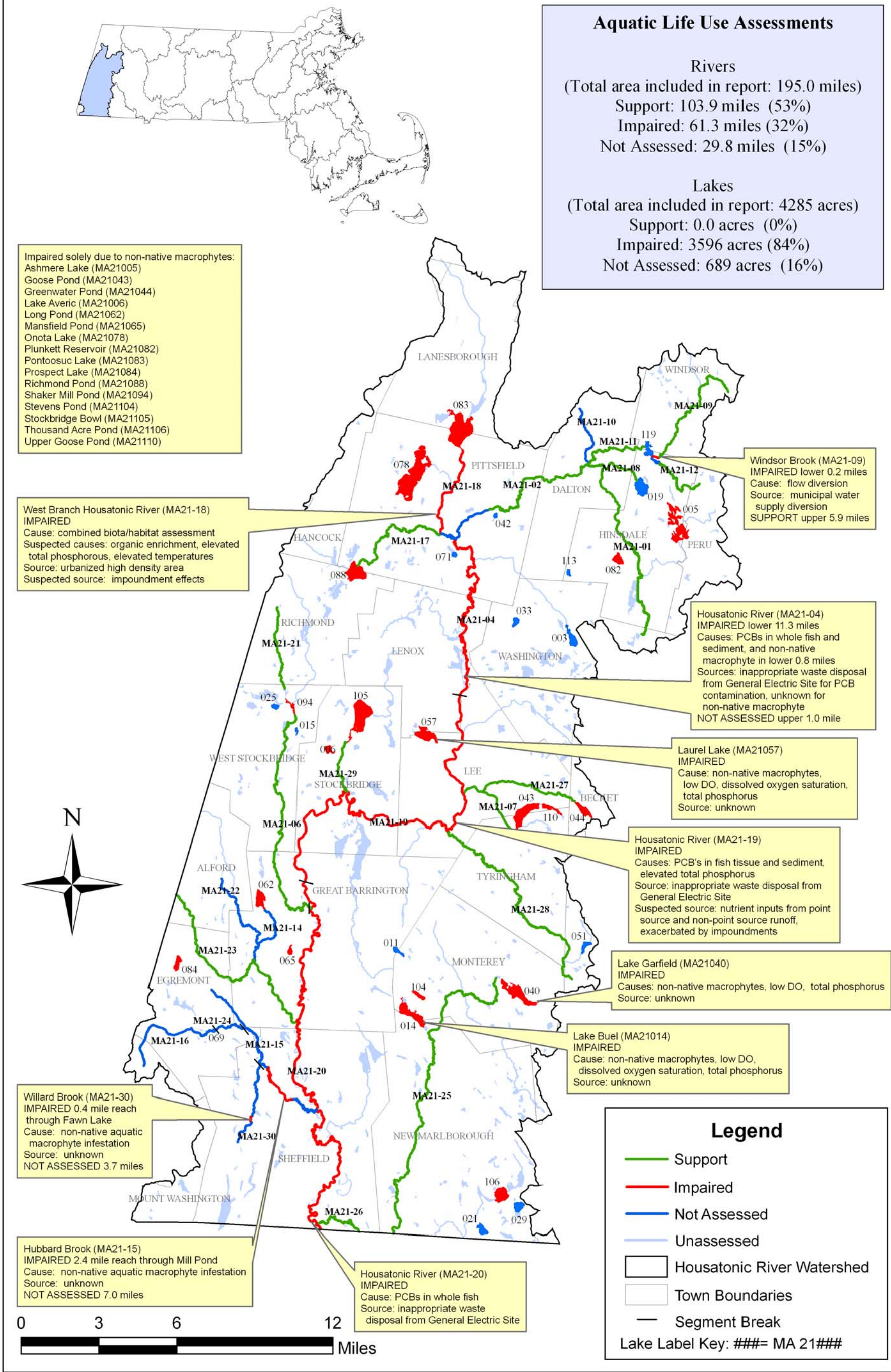
The MA DPH “is advising pregnant women, women of childbearing age who may become pregnant, nursing mothers and children under 12 years of age to refrain from eating the following marine fish; shark, swordfish, king mackerel, tuna steak and tilefish. In addition, MA DPH is expanding its previously issued statewide fish consumption advisory which cautioned pregnant women to avoid eating fish from all freshwater bodies due to concerns about mercury contamination, to now include women of childbearing age who may become pregnant, nursing mothers and children under 12 years of age.” Additionally, MA DPH “is recommending that pregnant women, women of childbearing age who may become pregnant, nursing mothers and children under 12 years of age limit their consumption of fish not covered by existing advisories to no more than 12 ounces (or about 2 meals) of cooked or uncooked fish per week. This recommendation includes canned tuna, the consumption of which should be limited to 2 cans per week. Very small children, including toddlers, should eat less. Consumers may wish to choose to eat light tuna rather than white or chunk white tuna, the latter of which may have higher levels of mercury.” MA DPH’s statewide advisory does not include fish stocked by the state Division of Fisheries and Wildlife or farm-raised fish sold commercially.

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Figure 1. 2002 Aquatic Life Use assessment summary for river and lake segments in the Housatonic Watershed

Note: The *Aquatic Life Use* is supported when suitable habitat (including water quality) is available for sustaining a native, naturally diverse, community of aquatic flora and fauna. Impairment of the *Aquatic Life Use* may result from anthropogenic stressors that include point and/or non-point source(s) of pollution and hydrologic modification. Causes and/or sources of impairments, when known, are noted in the callouts.

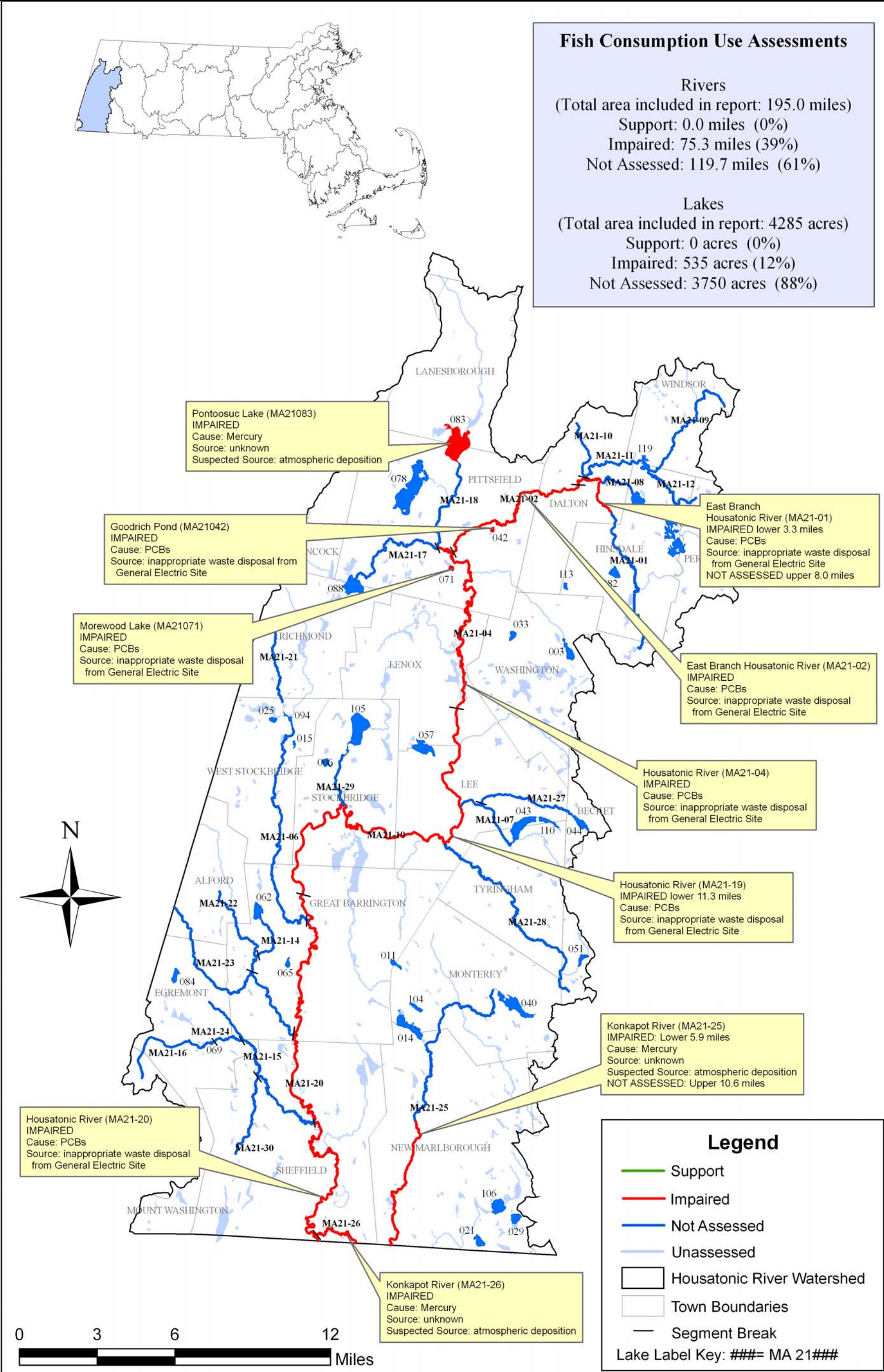


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Figure 2. 2002 Fish Consumption Use assessment summary for river and lake segments in the Housatonic Watershed.

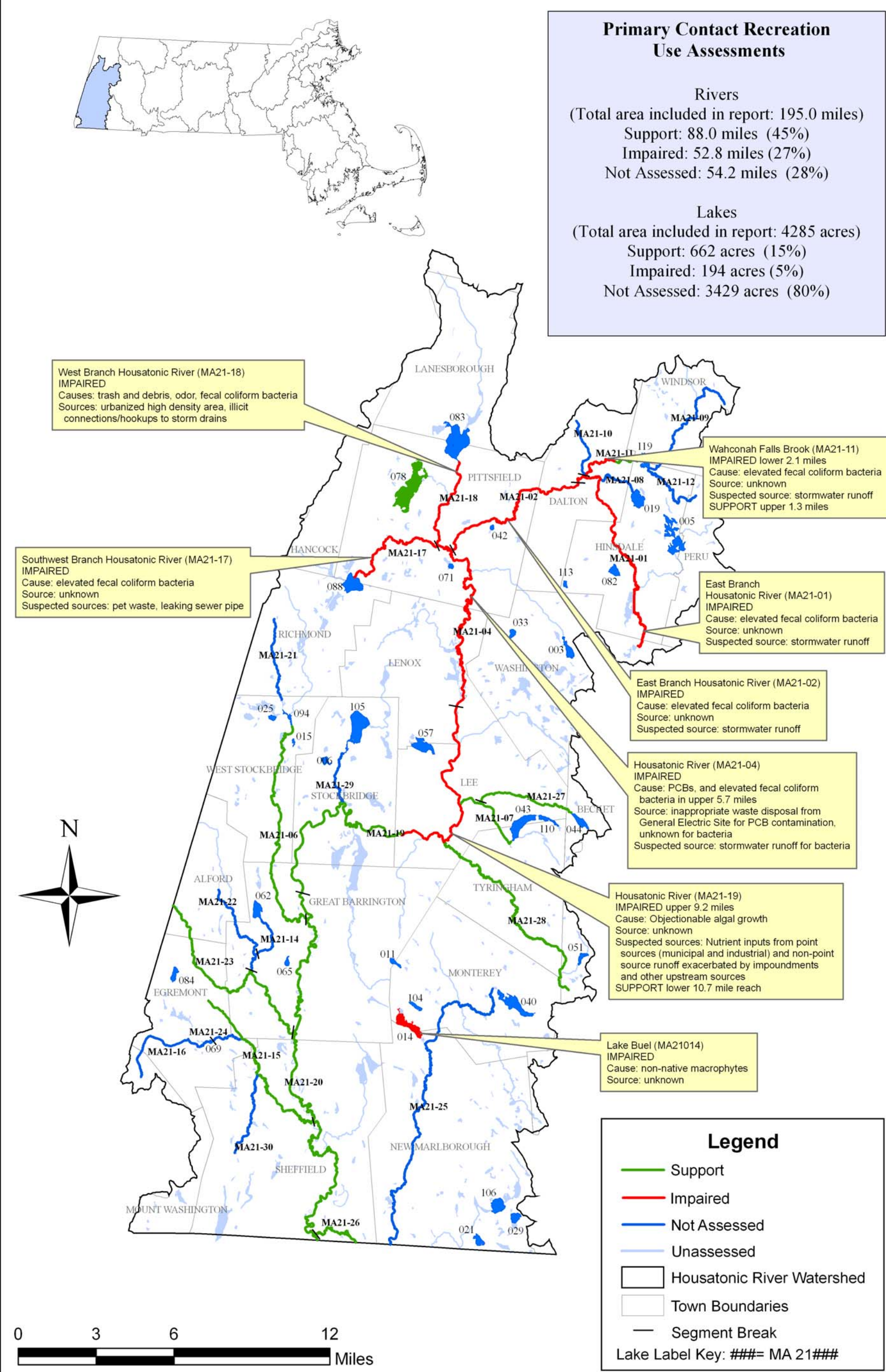
Note: The *Fish Consumption Use* is supported when there are no pollutants present that result in unacceptable concentrations in edible portions (as opposed to whole fish - see *Aquatic Life Use*) of fish, other aquatic life or wildlife for human consumption. The assessment of the *Fish Consumption Use* is made using the most recent list of Fish Consumption Advisories issued by the Massachusetts Executive Office of Health and Human Services, Department of Public Health (MA DPH), Bureau of Environmental Health Assessment (MA DPH 2005b). The MA DPH list identifies waterbodies where elevated levels of a specified contaminant in edible portions of freshwater species pose a health risk for human consumption; hence, the *Fish Consumption Use* is assessed as impaired in these waters. In July 2001 MA DPH issued new consumer advisories on fish consumption and mercury contamination (MA DPH 2001). Because of these statewide advisories no waters can be assessed as support for the *Fish Consumption Use*. These waters default to "not assessed". Causes and/or sources of impairments, when known, are noted in the callouts.



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Figure 3. 2002 Primary Contact Recreational Use assessment summary for river and lake segments in the Housatonic Watershed
Note: The *Primary Contact Recreational Use* is supported when conditions are suitable (fecal coliform bacteria densities, turbidity and aesthetics meet the SWQS and/or the MA DPH Bathing Beaches State Sanitary Code and/or guidance) for any recreational or other water related activity during which there is prolonged and intimate contact with the water and there exists a significant risk of ingestion. Activities include, but are not limited to, wading, swimming, diving, surfing and water skiing. Causes and/or sources of impairments, when known, are noted in the callouts.



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Figure 4. 2002 Secondary Contact Recreational Use assessment summary for river and lake segments in the Housatonic Watershed
Note: The *Secondary Contact Recreational Use* is supported when conditions are suitable for any recreational or other water use during which contact with the water is either incidental or accidental. These include, but are not limited to, fishing, boating and limited contact related to shoreline activities. For lakes, non-native aquatic macrophyte cover and/or transparency data (Secchi disk depth) are evaluated to assess the status of the recreational uses. Causes and/or sources of impairments, when known, are noted in the callouts.

**Secondary Contact Recreation
Use Assessments**

Rivers
(Total area included in report: 195.0 miles)
Support: 127.5 miles (65%)
Impaired: 13.3 miles (7%)
Not Assessed: 54.2 miles (28%)

Lakes
(Total area included in report: 4285 acres)
Support: 662 acres (15%)
Impaired: 194 acres (5%)
Not Assessed: 3429 acres (80%)

West Branch Housatonic River (MA21-18)
IMPAIRED
Causes: trash and debris, odor, fecal coliform bacteria
Sources: urbanized high density area, illicit connections/hookups to storm drains

Housatonic River (MA21-19)
IMPAIRED upper 9.2 mile reach
Cause: objectionable algal growth
Source: unknown
Suspected sources: Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources
SUPPORT lower 10.7 mile reach

Lake Buel (MA21014)
IMPAIRED
Cause: non-native macrophytes
Source: unknown

Legend

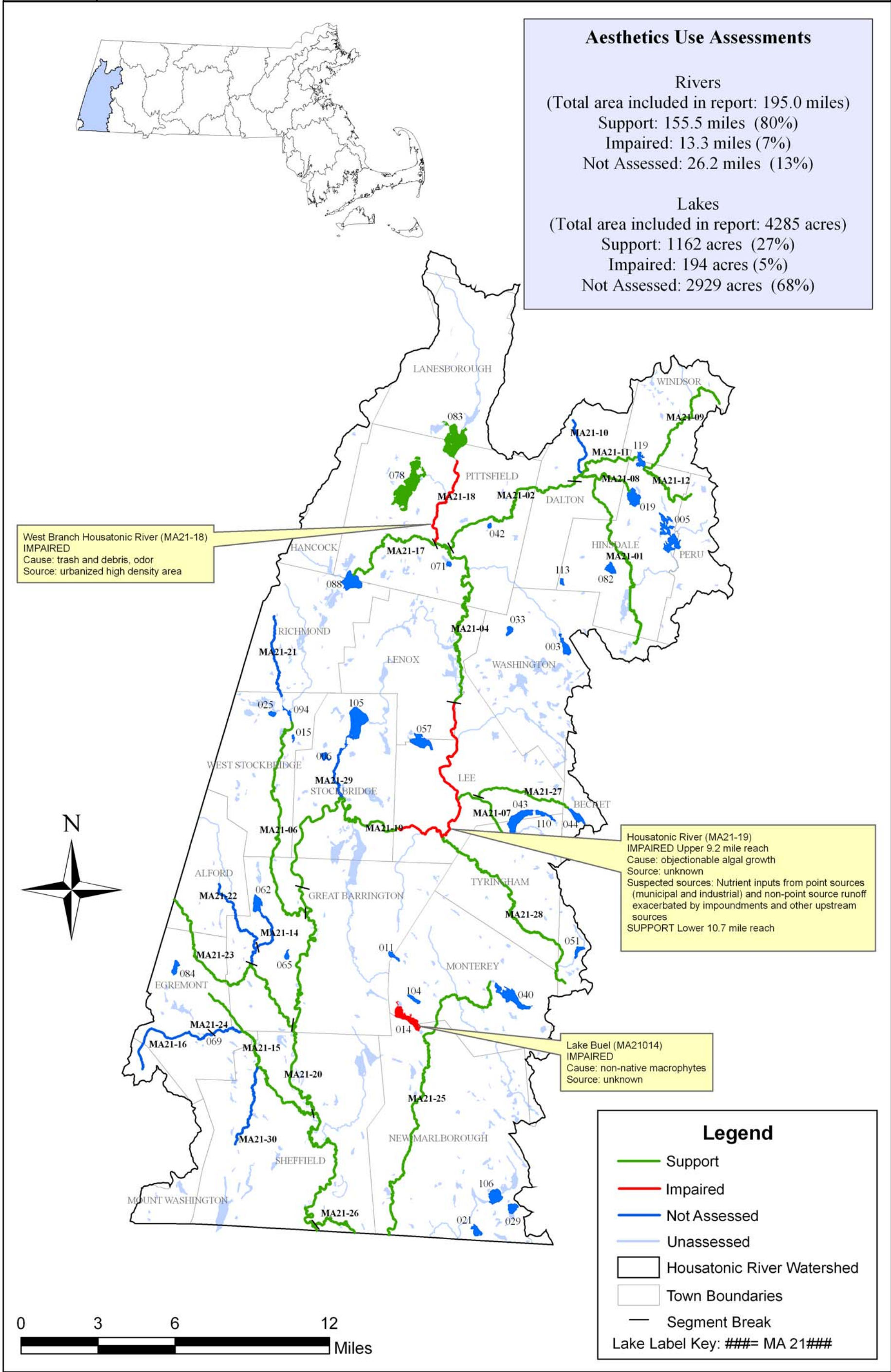
- Support
- Impaired
- Not Assessed
- Unassessed
- Housatonic River Watershed
- Town Boundaries
- Segment Break
- Lake Label Key: ####= MA 21###

0 3 6 12 Miles

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Figure 5. 2002 Aesthetics Use assessment summary for river and lake segments in the Housatonic Watershed
Note: The Aesthetics Use is supported when surface waters are free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life. Causes and/or sources of impairments, when known, are noted in the callouts.



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INTRODUCTION

HOUSATONIC WATERSHED 2002 WATER QUALITY ASSESSMENT REPORT

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 U.S. Environmental Protection Agency (EPA), the U.S. Congress, and the public. Together, these agencies are responsible for implementation of the CWA mandates. Under Section 305(b) of the Federal Clean Water Act, MassDEP must submit a statewide report every two years to the EPA, 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 surface 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. Quality assured 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 described in Appendix A (Assessment Methodology) of this report.

This report presents the current assessment of water quality conditions in the Housatonic Watershed. The assessment is based on information that has been researched and developed by the Massachusetts Department of Environmental Protection (MassDEP) through the first three years (information gathering, monitoring, and assessment) of the five-year cycle (Figure 6) in partial fulfillment of MassDEP's federal mandate to report on the status of the Commonwealth's waters under the CWA. In keeping with past document nomenclature, this report is titled in reference to the actual year (2002) in which the year two monitoring phase of the five year cycle last occurred for the Housatonic Watershed.

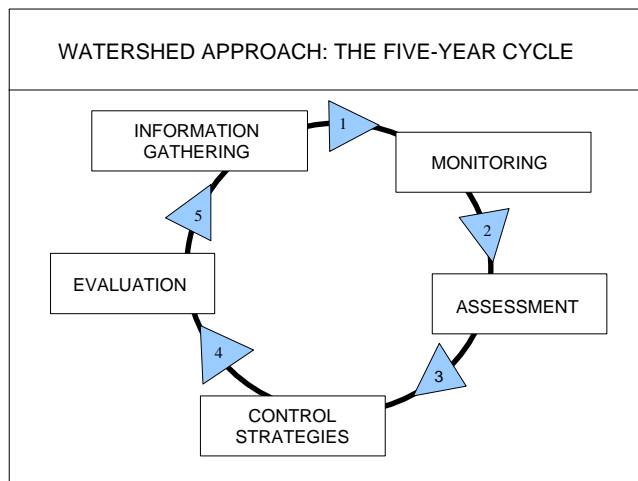


Figure 6. Five-year cycle of the Watershed Approach

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.

MassDEP submitted the Massachusetts Year 2004 Integrated List of Waters to the EPA in September 2005 (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 not assessed or “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 assessments for information pertaining to the 2004 Integrated List category and causes of impairment.

HOUSATONIC RIVER WATERSHED DESCRIPTION AND CLASSIFICATION

The Housatonic Basin (Figure 7) is located in southwestern Massachusetts. It is bordered by the Hudson River Basin to the north, the Westfield River Basin to the northeast and by the Farmington River Basin to the southeast. The south and west portions of the basin are bordered by the states of Connecticut and New York, respectively. The Housatonic River originates at the confluence of the West and Southwest Branches of the Housatonic River at Clapp Park in Pittsfield. The West Branch Housatonic River originates at the outlet of Pontoosuc Lake in Lanesborough and Pittsfield and the Southwest Branch originates from Richmond Pond in Richmond/Pittsfield. The East Branch Housatonic River, which originates from Muddy Pond in Washington/Hinsdale, joins the mainstem Housatonic River at Fred Garner Park in Pittsfield. From Pittsfield, the river flows south for 150 miles (approximately 54 river miles in Massachusetts) until it empties into Long Island Sound near Bridgeport, Connecticut. Other major tributaries to the Housatonic River in Massachusetts include the Williams, Green and Konkapot Rivers and Hubbard Brook.

The drainage basin of the Massachusetts portion of the Housatonic River encompasses 545 square miles and is located entirely in Berkshire County. The communities of Alford, Becket, Cheshire, Dalton, Egremont, Great Barrington, Hancock, Hinsdale, Lanesborough, Lee, Lenox, Monterey, Mount Washington, New Ashford, New Marlborough, Otis, Peru, Pittsfield, Richmond, Sandisfield, Sheffield, Stockbridge, Tyringham, Washington, West Stockbridge, and Windsor lie wholly or in part within the basin boundaries.

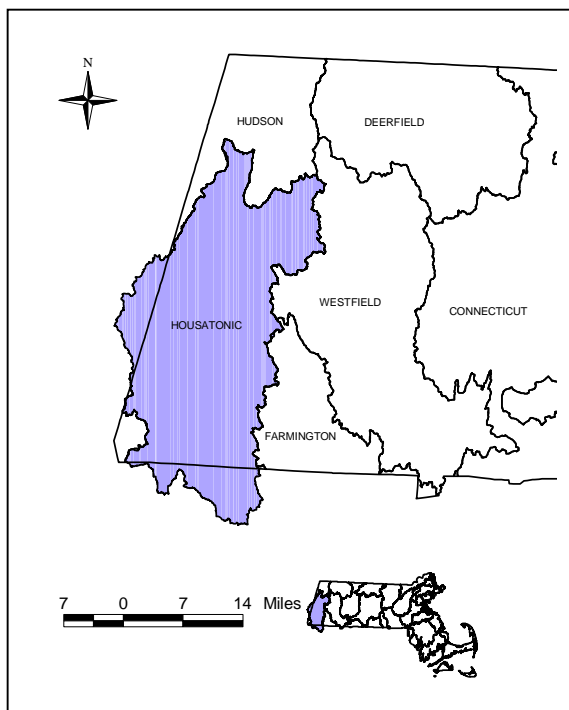


Figure 7. Location of the Housatonic River Watershed

OBJECTIVES

This report summarizes information generated in the Housatonic River Watershed since the 1997/98 Housatonic River Basin Water Quality Assessment Report published in June 2000 (Kennedy and Weinstein 2000). The methodology used to assess the status of water quality conditions of rivers, estuaries and lakes in accordance with EPA's and MassDEP's use assessment methods is provided in Appendix A. Data collected by DWM in 2002 are provided in Appendices B through I of this report. Appendix J provides a summary of Water Management Act (WMA) registration/permit holders and National Pollutant Discharge Elimination System (NPDES) permittees in the Housatonic River Watershed. Not all waters in the Housatonic River Watershed are included in the MassDEP/EPA databases (either the waterbody system database -- WBS, or the newer assessment database -- ADB) or this report.

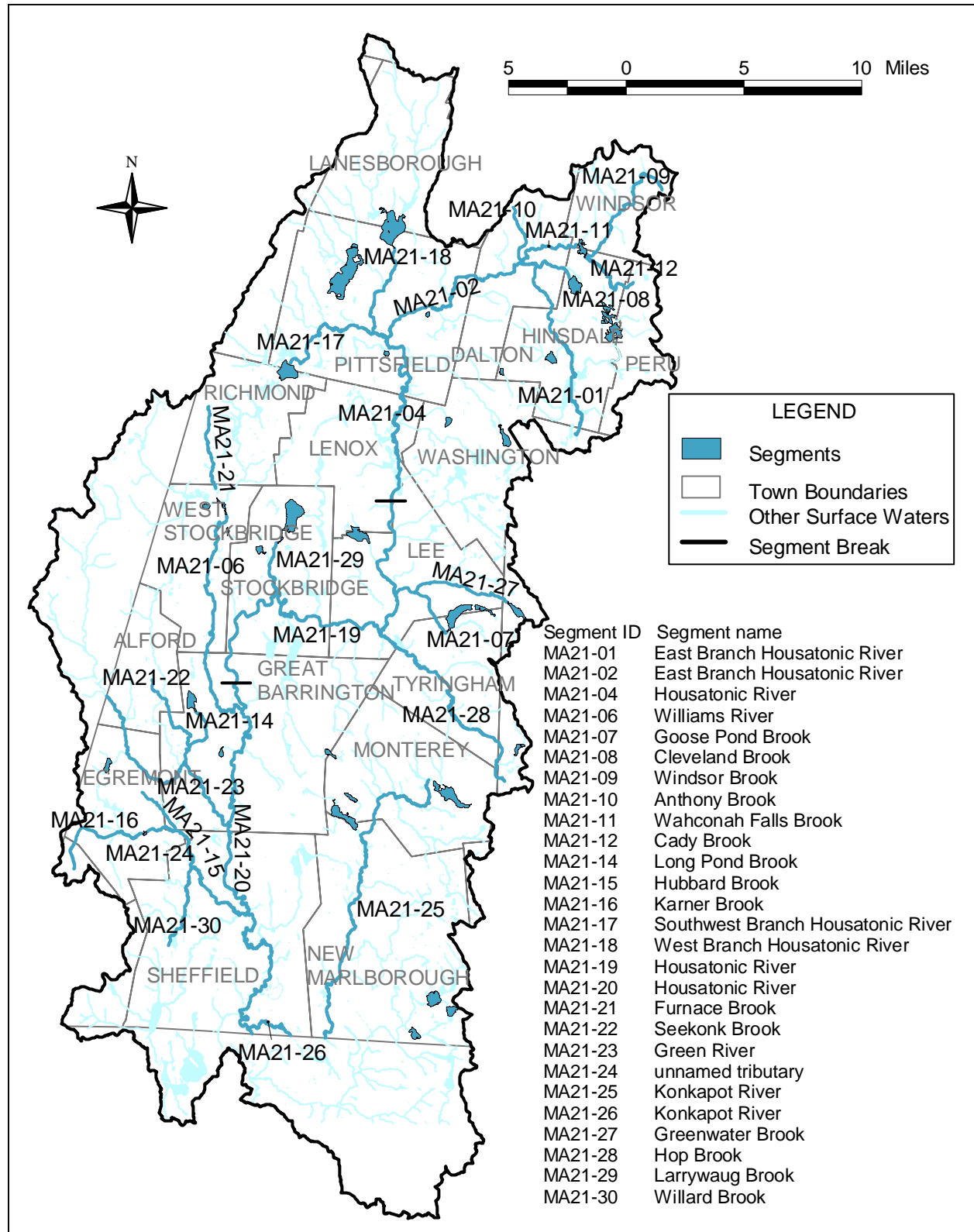
The objectives of this water quality assessment report are to:

1. evaluate whether or not surface waters in the Housatonic River Watershed, defined as segments in the MassDEP/EAP databases, currently support their designated uses (i.e., meet surface water quality standards);
2. identify water withdrawals (habitat quality/water quantity) and/or major point (wastewater discharges) and non-point (land-use practices, storm water discharges, etc.) sources of pollution that may impair water quality conditions;
3. identify the presence or absence of any non-native macrophytes in lakes;
4. identify waters (or segments) of concern that require additional data to fully assess water quality conditions;
5. recommend additional monitoring needs and/or remediation actions in order to better determine the level of impairment or to improve/restore water quality; and
6. provide information for the development of an action plan.

HOUSATONIC RIVER WATERSHED- RIVER SEGMENTS ASSESSED

Figure 8: Housatonic River Watershed – River Segments Assessed

The Housatonic River Basin segments included in this report are displayed below:



EAST BRANCH HOUSATONIC RIVER (SEGMENT MA21-01)

Location: Outlet of Muddy Pond, Washington, to the outlet of Center Pond, Dalton.

Segment Length: 11.3 miles.

Classification: Class B, Cold Water Fishery.

The upper portion of this segment is located within the Hinsdale Flats ACEC.

Center Pond (MA21016) will no longer be reported on as a lake segment since the retention time of this 12-acre waterbody was estimated at 1 day; it will be considered a run of the river impoundment (McVoy 2006). The retention time estimate was based on the annual historical mean discharge from two stream gages in the Housatonic River Basin (01197500 and 01197000) and the normal storage volume of the dam reported by MA DCR in their Massachusetts Dam Safety Program Database (Socolow *et al.* 2004 and MA DCR 2002).

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for priority organics (MassDEP 2005a).

East Branch Housatonic Watershed Assessment Grant Project (Project #02-05/604b) 2005 grant description: The Berkshire Regional Planning Commission (BRPC) and Housatonic Valley Association will conduct targeted water quality sampling of suspected problem areas and will pilot an effort to include volunteer water quality monitoring into a municipal stormwater management plan. This project will assess the extent of known and suspected nonpoint source pollution problems in the East Branch subwatershed of the Housatonic River. Additional efforts, if needed, will be directed towards waters on the 303d List. BRPC will assist the two communities in the subwatershed in meeting their stormwater management goals and will recommend remediation of identified erosion and sedimentation problems in two surface water supply watersheds.

WMA WATER WITHDRAWALS (APPENDIX J)

Hinsdale Water System (9P210213201)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

In 1999, Housatonic Valley Association (HVA) volunteers conducted a shoreline survey of the East Branch Housatonic River from Muddy Pond to Hubbard Ave. in Pittsfield, which includes this entire segment. Potential in-stream sedimentation from road runoff was a concern along most of the area covered (HVA 2004a).

DWM performed a habitat assessment on the East Branch Housatonic River near Jericho Road in Hinsdale (Station EB01B) in September 2002. The sampling reach received an overall score of 176 out of 200. Habitat was limited most by the low flow conditions and some deposition of fine sediment on the substrates (Appendix C). DWM biologists collected periphyton samples from Station EB01B in September of 2002 (Appendix G). Canopy cover at this site was reported as 70%, algal cover was <1%, and the dominant algal genera was *Cladophora* sp.

Center Pond was dewatered during 2005 and 2006 in order to carry out repair work at downstream dams (Noel 2005).

Biology

MA DFG conducted fish population sampling (Site 636) along the East Branch of the Housatonic River near Jericho Road, Hinsdale) on 11 July 2002 (Richards 2006). A total of 109 fish, representing 7 species, were collected including 41 blacknose dace, 41 longnose dace, 22 brown trout (56-197 mm), two white sucker, one pumpkinseed, one fallfish, and one brook trout (51mm). The fish assemblage is dominated by fluvial specialist species. Multiple age classes of brown trout and a young of the year brook trout represented pollution intolerant species.

DWM conducted benthic macroinvertebrate sampling on the East Branch Housatonic River at Station EB01B (B0502), near Jericho Road in Hinsdale in September 2002. This station was used as a reference station representative of a healthy community and least impacted conditions (Appendix C).

Toxicity

Ambient

General Electric Company dilution and control water is collected from the East Branch of the Housatonic River upstream at Old Dalton Road Bridge in Hinsdale for use as dilution water in the GE Pittsfield facility's whole effluent toxicity testing. Between July 2000 and September 2005 (n=18), survival of *Ceriodaphnia dubia* exposed (7-day) to the river water ranged from 90 to 100% (TOXTD database). Between January 2000 and March 2006 (n=73), survival of *Daphnia pulex* exposed (48-hour) ranged from 88 to 100%.

Chemistry-water

HVA conducted monthly water quality sampling at eight sites along this segment between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). The sites were labeled from upstream to downstream as: Bullard's Crossing, Home Club, Metal Bridge, Carmel House, Partridgefield, High School, Orchard St., and Center Pond Bridge. HVA also sampled many of these sites in 2001; data from 2001 is not summarized below, since their QAPP was not approved until 2002. Parameters measured included: dissolved oxygen, pH, temperature, alkalinity, total phosphorus, nitrate and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions. Low DO measurements were reported at sampling stations upstream from Hinsdale center. These conditions are considered to be naturally occurring as this section of the river flows through a large wetland and the stream gradient is low. Water temperatures were slightly elevated; seven of the eight stations had at least one temperature measurement of greater than 20°C (n= 90, 11 >20°C). Total phosphorous concentrations were also slightly elevated, ranging from <0.01 to 0.09 mg/L (n=98, 13 ≥ 0.05 mg/L). Though seven of the eight stations had at least one phosphorous measurement of 0.05 mg/L, the highest measurements were most frequently observed at the most upstream station. Total suspended solid measurements were typically low, but three measurements did exceed 25 mg/L (n=82).

The *Aquatic Life Use* is assessed as support. This assessment is based primarily on the biological data and the excellent survival of test organisms exposed to river water. The benthic community was deemed to be a suitable reference station indicative of excellent water quality conditions. The fish community was comprised of multiple age classes of brown trout, a pollution intolerant fluvial species. Habitat quality was excellent. Water temperatures did exceed 20°C, however thermal problems did not appear to be extended or severe. The slightly elevated total phosphorous levels could also be naturally influenced by the wetlands in the upper portion of this segment.

FISH CONSUMPTION

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*". Since it is the East Branch Housatonic River that flows through Dalton and past the GE plant in Pittsfield, the MA DPH advisory for the Housatonic River is assumed to cover this area of the East Branch of the Housatonic River. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory, the *Fish Consumption Use* is assessed as impaired for this segment from the Dalton/Hinsdale town line to the outlet of Center Pond (lower 3.3 miles) because of PCB contamination. The upper 8.0 miles are currently not assessed for the *Fish Consumption Use*.

PRIMARY AND SECONDARY CONTACT RECREATION AND AESTHETICS

HVA conducted bacteria monitoring at the eight water quality sites listed above (HVA 2002b, 2003c, and 2004b). Fecal coliform counts ranged from <10 to 3,900 cfu/100mL (n=114). The highest three-year






fecal coliform count at all but one of the eight sites came from one wet-weather sampling event in May of 2002. During another wet-weather sampling event in August 2003 five of the six stations had bacteria counts greater than 400 cfu/100mL. Excluding these two wet-weather sampling events, only 7 of 100 dry weather samples, or 7% were greater than 400 cfu/100mL. The geometric mean of the fecal coliform bacteria counts exceeded 200 cfu/100mL, and/or 10% exceeded 400 cfu/100mL at almost all stations sampled.

DWM biologists noted slight turbidity at Station EB01B in September 2002, however no other objectionable conditions were noted (e.g., oils, water odors, or other deposits).

In 1999 HVA volunteers conducted a shoreline survey of this segment of the East Branch Housatonic River. Trash was reported, but HVA volunteers conducted a cleanup at Bullard's Crossing Road in Hinsdale so it is no longer considered a problem. Overall this segment was described as generally aesthetically pleasing with a few areas specifically described as scenic and a potential location for a greenway (HVA 2004a).

The *Primary Contact Recreational Use* is assessed as impaired because of elevated fecal coliform bacteria counts, noted particularly during wet weather. However, the *Secondary Contact Recreation and Aesthetics* uses are assessed as support based upon bacteria counts that are acceptable for secondary contact and the lack of objectionable conditions.

EAST BRANCH HOUSATONIC RIVER (Segment MA21-01) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED upper 8.0 miles IMPAIRED lower 3.3 miles Cause: PCBs Source: inappropriate waste disposal from General Electric Site
Primary Contact		IMPAIRED Cause: elevated fecal coliform bacteria Source: unknown
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

RECOMMENDATIONS

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution in Dalton and Hinsdale to control activities and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

CLEVELAND BROOK (SEGMENT MA21-08)

Location: Headwaters, outlet of Cleveland Brook Reservoir, Hinsdale, to confluence with East Branch Housatonic River, Dalton.

Segment Length 1.9 miles.

Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aquatic Life* and *Aesthetics*) and was not assessed for others (MassDEP 2005a).

WMA WITHDRAWALS

Wahconah Country Club (10207001)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment of Cleveland Brook upstream from Old Windsor Road in Hinsdale on 20 August 2002 as part of the fish population survey. This sampling reach received a habitat score of 147 out of 200. Habitat was limited most by the low channel flow status and the limited riparian zone width adjacent to the road (Appendix F). Water from Cleveland Brook Reservoir is utilized for the municipal supply for the city of Pittsfield and the town of Dalton. It is unknown if minimum flows are required at the outlet of Cleveland Brook Reservoir for the protection of aquatic life.

Biology

DWM conducted fish population sampling in Cleveland Brook as described above. Seventy-five brook trout (multiple age classes), eight blacknose dace, three brown trout and one white sucker were collected (87 fish total) (Appendix F). The assemblage was dominated by pollution intolerant, fluvial dependent species indicative of excellent water quality.






The *Aquatic Life Use* is assessed as support based on the fish community data and best professional judgment. The presence of multiple year age classes of reproducing brook trout is indicative of high quality cold water.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM biologists noted no deposits, odors, turbidity or other objectionable conditions (Mitchell 2006).

The *Aesthetics Use* is assessed as support based on the lack of objectionable conditions. The *Primary* and *Secondary Contact Recreational* uses are not assessed due to the lack of recent quality-assured bacteria data.

CLEVELAND BROOK (Segment MA21-08) Use Summary

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

RECOMMENDATIONS:

Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan to protect in-stream biota in Cleveland Brook.

CADY BROOK (SEGMENT MA21-12)

Location: Source in Peru to the inlet of Windsor Reservoir, Hinsdale.

Segment Length: 3.5 miles.

Classification: Class A, Public Water Supply.

Much of the upper portion of this segment is located within the Hinsdale Flats ACEC.

Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aquatic Life* and *Aesthetics*) and was not assessed for others (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Pittsfield Water Department (10223601)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment of Cady Brook upstream from New Windsor Road in Hinsdale on 20 August 2002 as part of the fish population survey. This sampling reach received a habitat score of 169 out of 200. The habitat was limited most by the marginal bank stability -- likely the result of the flashy nature of this stream (Appendix F).

Cady Brook is diverted for the municipal supply of drinking water for the city of Pittsfield and the town of Dalton approximately 0.5 miles upstream from the inlet to Windsor Reservoir. The diverted water is sent to Cleveland Brook Reservoir. It is unknown what effects, if any, this practice has on the habitat quality of the lower 0.5 miles of this segment.

Biology

DWM and MA DFG conducted fish population sampling in Cady Brook as described above. Over one hundred eighty fish were collected represented by two species (blacknose dace and brook trout). Both species are fluvial specialist/dependants. The blacknose dace are classified as pollution tolerant, and the brook trout are classified as pollution intolerant. Multiple age classes of brook trout were present (52-180 mm in length) (Appendix F and Richards 2006).



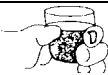



The *Aquatic Life Use* is assessed as support based on the fish community data and best professional judgment for the upper 3.0 mile reach of this segment. The presence of multiple year age classes of reproducing brook trout is indicative of high quality cold water and excellent habitat. This use is not assessed in the lower 0.5 mile reach because potential impacts associated with the water supply diversion.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

No objectionable deposits, odors, turbidity or other conditions were noted by DWM biologists in the stream reach sampled in Cady Brook (Mitchell 2006).

The *Aesthetics Use* is assessed as support based on the lack of objectionable conditions. The *Primary* and *Secondary Contact Recreational* uses are not assessed due to the lack of recent quality-assured bacteria data.

CADY BROOK (Segment MA21-12) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT upper 3.0 miles NOT ASSESSED lower 0.5 miles
Fish Consumption		NOT ASSESSED
Drinking Water**		NOT ASSESSED
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		SUPPORT

*The MassDEP Drinking Water Program maintains current drinking water supply data.

RECOMMENDATIONS:

Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan to protect in-stream biota in Cady Brook downstream from the aqueduct diversion.

WINDSOR BROOK (SEGMENT MA21-09)

Location: Source, southeast of Fobes Hill (west of Savoy Road/Route 8A), Windsor, to the Windsor Reservoir, Windsor.

Segment Length: 6.1 miles.

Classification: Class A, Public Water Supply.

Based on the last evaluation of water quality conditions, this segment is listed in Category 4c of the 2004 Integrated List of Waters. This segment was assessed as impaired due to flow alteration, which is not a pollutant requiring calculations of a TMDL (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Pittsfield Water Department (10223601)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment of Windsor Brook as part of the fish population survey conducted on 20 August 2002 upstream from Old Windsor Road, Hinsdale. The fish sampling reach received a habitat score of 166 out of 200.

On 10 September 2002 DWM performed a habitat assessment of Windsor Brook at Station WB01 as part of the benthic macroinvertebrate sampling (Appendix C). The sampling reach received a habitat score of 164 out of 200. Habitat was limited most by low channel flow status (associated with natural drought conditions) and a reduced riparian vegetated zone width.

Windsor Brook downstream from the aqueduct was observed to be dry during field reconnaissance in 2002 (Mitchell 2006).

Biology

MA DFG conducted fish population sampling at one site (Site 677) along Windsor Brook (~785 meters upstream from Windsor Reservoir) on 20 August 2002 (Richards 2006). Only two species (n=54) of fish were collected: 25 blacknose dace and 29 brook trout ranging in length from 67 to 203 mm.

DWM conducted fish population sampling upstream from the Old Windsor Road Bridge, Hinsdale, on 29 August 2002 (Appendix F). A total of 102 fish were collected, but only two species were present: 73 blacknose dace and 29 brook trout (multiple age classes). The dace are classified as pollution tolerant fluvial specialists, while the trout are pollution intolerant fluvial specialists.

DWM conducted benthic macroinvertebrate sampling in Windsor Brook at Station WB01 (B0291), approximately 150 meters upstream from the Cleveland Brook Reservoir Aqueduct at Old Windsor Road in Hinsdale. This station was a reference station representative of a healthy community and least impacted conditions (Appendix C).

DWM biologists collected periphyton samples from two habitat types at Station WB01 in September of 2002 (Appendix G). Canopy cover within rock/riffle habitat at this station was reported as 90%, algal cover was 60%, and the dominant algal genera was *Lyngbya* sp. Canopy cover within pool habitat at this station was reported as 90%, algal cover was 60%, and the dominant algal genera were *Spirogyra* sp. and *Melosira* sp.

Chemistry-water

DWM conducted monthly *in situ*, pre-dawn water quality sampling in Windsor Brook upstream from Windsor Road in Hinsdale (Station 09A) between May and September 2002 (Appendix B). All *in-situ* measurements met water quality standards.







With the exception of the lower 0.2 mile reach below the aqueduct, which is dewatered, the upper 5.9 miles of Windsor Brook are assessed as support for the *Aquatic Life Use*. This assessment is based primarily on the biological data. The benthic community was deemed to be a suitable reference station indicative of excellent water quality conditions. The fish community was comprised of multiple age

classes of brook trout, a pollution intolerant fluvial species. All water chemistry parameters met standards.

AESTHETICS

DWM field biologists made field observations at Station WB01 on 10 September 2002 and did not note any objectionable conditions. Water clarity was noted to be clear and no water odors, oils or objectionable deposits (trash etc.) were noted (MassDEP 2002b). DWM personnel also made field observations during the surveys conducted between May and September 2002. With the exception of one occasion when white foam was noted, no water odors, scums or objectionable deposits were noted (Station 09A) (MassDEP 2002a). The *Aesthetics Use* is assessed as support.

WINDSOR BROOK (Segment MA21-09) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT for upper 5.9 miles IMPAIRED for lower 0.2 miles Cause: flow diversion Source: municipal water supply diversion
Fish Consumption		NOT ASSESSED
Drinking Water*		NOT ASSESSED
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		SUPPORT

*The MassDEP Drinking Water Program maintains current drinking water supply data.

RECOMMENDATIONS:

Conduct water quality monitoring to evaluate designated uses. Develop and implement a flow management plan in order to protect in-stream biota in Windsor Brook downstream from the aqueduct diversion.

WAHCONAH FALLS BROOK (SEGMENT MA21-11)

Location: Headwaters, outlet of Windsor Reservoir, Windsor, to confluence with East Branch Housatonic River, Dalton.

Segment Length: 3.4 miles.

Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Dalton Fire District (10207003)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment of Wahconah Falls Brook as part of the benthic macroinvertebrate sampling at Station WF01A (B0501), upstream from Holiday Cottage Road in Dalton, on 10 September 2002. This sampling reach received a habitat score of 149 out of 200 (Appendix C). The habitat at this station, similar to others throughout the watershed, was affected by drought conditions (decreased channel flow status). Additionally, the riparian zone width scored in the poor category. There were no aquatic macrophytes within the reach, but green filamentous and thin film algae covered 80% of the rocks in the riffles. Canopy cover was estimated at 60% (Appendix C).

Biology

MA DFG conducted fish population sampling at stations 618 and 622 on Wahconah Falls Brook on 18 July 2002. At station 618, Cleveland Road Crossing, a total of 252 fish, representing 10 species, were collected including 132 blacknose dace, 32 brook trout (59-177 mm), 26 slimy sculpin, 20 creek chub, 17 longnose dace, 17 white sucker, four brown trout (65-193 mm), two common shiner, one largemouth bass, and one pumpkinseed (Richards 2006).

DWM sampled the benthic macroinvertebrate community at Station WF01A (upstream from Holiday Cottage Road in Dalton) in 2002. The RBP III analysis indicated this station was slightly impacted when compared to the reference station on Windsor Brook. DWM biologists collected periphyton samples from Station WF01A in September of 2002. Canopy cover at this station was reported as 60%, algal cover was 80%, and the dominant algal genera were *Synedra* sp. and *Fragilaria* sp. (Appendix G).

At Station 622, the most downstream station located upstream from the Route 9 crossing in Dalton, a total of 359 fish were collected. Eleven species were represented, including: 196 blacknose dace, 47 white sucker, 44 creek chub, 39 longnose dace, 17 common shiner, five brown trout (59-66 mm), four pumpkinseed, three brook trout (46- 62 mm), two slimy sculpin, one brown bullhead, and one rainbow trout (Richards 2006).

Chemistry-water

HVA conducted monthly water quality sampling at three sites along Wahconah Falls Brook between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). The three HVA stations were: State Park, Cleveland Road, and Route 9 crossing. HVA also sampled many of these sites in 2001; data from 2001 is not summarized below, as their QAPP was not approved until 2002. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions. All water quality measurements from these three stations during the years 2002-2004 met standards and were indicative of good water quality.

The *Aquatic Life Use* is assessed as support for Wahconah Falls Brook based on the RBP III analysis and the good water quality. However, there appears to be a slight shift in the fish community structure at the downstream sampling station, where reduced numbers of brook trout and slimy sculpin (both pollution intolerant cold water species) were noted. Agricultural land use activities in close proximity to the brook

may be contributing to this shift, so the *Aquatic Life Use* is identified as support with an Alert Status in the lower reach of this segment.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS






HVA conducted fecal coliform and *E. coli* bacteria sampling at the water quality stations described above (HVA 2002b, 2003c, and 2004b). Fecal coliform bacteria counts from all three stations across all three years ranged from <10 to a high of 920 cfu/100 mL (n=59). Six counts exceeded 400 cfu/100mL (10%). Four of these high counts (n=20, 20%) were recorded at the Route 9 sampling location, which is the most downstream station.

In 1999 HVA volunteers performed a shoreline survey of Wahconah Falls Brook. No aesthetic degradation was noted (i.e., no trash, odors, scums, nuisance vegetation). In fact, this stream flows through Wahconah Falls State Park, falling 312 feet over its course for a vertical drop of 92 feet/mile and creating Wahconah Falls. Of concern to the volunteers was stormwater runoff from unpaved roads resulting in siltation of the brook (HVA 2004a).

DWM field biologists made field observations at Station WF01A (B0501) on September 10, 2006. DWM biologists did not note any objectionable conditions. Water clarity was noted to be clear and no water odors, oils or objectionable deposits (trash, etc.) were noted (MassDEP 2002b).

The *Primary Contact Recreational Use* is assessed as support in the upper 1.3 mile reach from the outlet of Windsor Reservoir downstream to Cleveland Street. The Primary Contact Recreational Use is assessed as impaired for the lower 2.1 mile reach from Cleveland Street to the confluence with East Branch Housatonic because of elevated fecal coliform bacteria counts. The *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support for this segment due to the acceptable bacteria counts and lack of objectionable conditions.

WAHCONAH FALLS BROOK (Segment MA21-11) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT*
Fish Consumption		NOT ASSESSED
Primary Contact		SUPPORT upper 1.3 miles IMPAIRED lower 2.1 miles Cause: elevated fecal coliform bacteria Source: unknown Suspected sources: stormwater runoff
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

*Alert status issues identified, see details in use assessment

RECOMMENDATIONS

Habitat conditions would benefit from increased shading and adoption of agricultural BMPs. This may best be achieved by the planting of more trees within the riparian zone. Also, increased late-summer flows (in terms of both frequency and volume) from Windsor Reservoir would also improve the condition of this stream.

Continue to evaluate water quality conditions. Evaluate potential impacts associated with agricultural activities adjacent to the brook.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in the town of Dalton and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Reduce sediment contributions to the brook due to stormwater runoff from unpaved roads.

ANTHONY BROOK (SEGMENT MA21-10)

Location: Headwaters, outlet of Anthony Pond (locally known as Anthony Brook Reservoir), Dalton, to confluence with Wahconah Falls Brook, Dalton.

Segment Length: 2.6 miles.

Classification: Class B.






Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aquatic Life* and *Aesthetics*) and was not assessed for others (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Dalton Fire District (10207003)

USE ASSESSMENT

No recent quality-assured data are available for Anthony Brook.

ANTHONY BROOK (Segment MA21-10) Use Summary				
Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

Develop and implement a water use/withdrawal plan that will minimize low flow periods and negative impacts to in-stream biota.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Dalton and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

EAST BRANCH HOUSATONIC RIVER (SEGMENT MA21-02)

Location: Outlet of Center Pond, Dalton, to confluence with the Housatonic River, Pittsfield.

Segment Length: 8.0 miles.

Classification: Class B, Warm Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for unknown causes, unknown toxicity, priority organics, and pathogens (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Crane & Co., Inc (10207002)

Pittsfield Generating Company (Altresco Pittsfield L.P) (9P10223601)

Berkshire Hills Country Club (10223602)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Crane & Co., Inc. Byron Weston Mill (MAG250956)

Crane & Co., Inc. Pioneer Mill (MAG250955)

Crane & Co., Inc (MA0000671)

Pittsfield Development Authority (MA0040231) was General Electric Company (GE), Pittsfield (MA0003891) until June 2005

General Dynamics Defense Systems (MA0035718)

OTHER

General Electric Company, Pittsfield (<http://www.epa.gov/region01/ge/>).

It is important to note that the upper ½ mile and 1½ mile sections of the GE/EPA PCB Housatonic River cleanup project are located along the lower 2 miles of this segment. See EPA website above for more details. The upper ½ mile reach cleanup was completed in September 2002. Cleanup of the 1½ mile reach is ongoing.

USE ASSESSMENT AQUATIC LIFE USE

Habitat and Flow

Crane & Co. maintains five dams for their mill along this segment of the East Branch Housatonic River.

Crane & Co. made repairs to the Center Pond dam in October 2006. Center Pond has been dewatered in order to carry out repair work (Noel 2006). Byron Weston Dam #2 was temporarily by-passed while repair work was carried out, but it is now back to normal level. The Old Berkshire Mill Dam (formerly dam #3) breach was completed in November 2000. The process of removing the dam began in 1999 as a collaboration between Crane & Company and the Department of Fish and Game's Riverways Program. The dam, an historic timber-crib structure and concrete dam, had stood on the East Branch Housatonic River for 200 years (Riverways 2000). Crane & Co. also owns and operates three additional dams that are located along this segment downstream from the Old Berkshire Mill Dam. From upstream to downstream the dams are: Pioneer Mill Dam, Baystate Mill Dam, and Government Mill Dam. There are no fish passage facilities at these three dams.

DWM also performed a habitat assessment on the East Branch Housatonic River at Station EB02A (B0502) on 10 Sept. 2002 (Appendix C). The sampling reach, described below, received an overall score of 156 out of 200 due to a lack of in-stream fish cover, channel alteration, riparian vegetative zone width. Aquatic macrophytes (mosses) were present in 20% of the reach. Green filamentous and mat algae covered 50% of the rock substrates (Appendix G). The dominant algal genera were *Vaucheria* sp. and *Melosira* sp.

The United State Geological Survey (USGS) maintains one streamflow monitoring gage on this segment of the East Branch Housatonic River. USGS Gage #01197000 on the East Branch Housatonic River at Coltsville, MA, is located on the right bank 250 ft downstream from Hubbard Avenue Bridge in Pittsfield. Data are available from 1936 to the present (prior to 1945 data were published as the Housatonic River at Coltsville). The drainage area at the gage is 57.6 mi² and the average annual discharge over the period of record is 107 cfs. According to USGS flows are regulated by power plants upstream and, since 1949, for

the diversion of water upstream from Cleveland Brook Reservoir for the municipal supply of Pittsfield (Socolow *et al.* 2004). The estimated 7-day, 10-year low flow (7Q10) is 12.1 cfs (USGS 1998).

Biology

DWM also conducted benthic macroinvertebrate sampling on the East Branch Housatonic River at Station EB02A upstream from the Hubbard Avenue Bridge in Pittsfield, MA, on 10 Sept. 2002 (Appendix C). RBP III analysis of the benthos at Station EB02A indicated a non-impacted community when compared to the upstream reference station. However, DWM biologists point out that biotic index, EPT/Chironomidae Ratio, and Scraper/Filterer Ratio all indicated nutrient loading at this station.

DWM conducted fish population sampling upstream from the Hubbard Avenue Bridge in Pittsfield at Station 680 on 20 August 2002 (Appendix F). A total of 64 fish were collected including: 21 longnose dace, 20 rock bass, six fallfish, five creek chub, three white sucker, three brown trout (196-425mm), two pumpkinseed, two common shiner, and two blacknose dace. The assemblage in this reach was dominated by moderately pollution tolerant fluvial specialist/dependent species.

Toxicity

Ambient

The Crane and Company WWTF staff collected water from this segment of the East Branch Housatonic River approximately 1,350 feet upstream of the WWTF Outfall # 001 at the trestle next to the Bay State Mill where a pipeline enters the WWTF (Noel 2005). This collected river water is used as dilution water in the facility's whole effluent toxicity tests. Between May 1999 and January 2006 (n=25), survival of *C. dubia* exposed (7-day) to the river water ranged from 80 to 100% (TOXTD database).

Effluent

A total of 20 modified acute and chronic whole effluent toxicity tests were conducted on the Crane and Company effluent between May 1999 and January 2006 (n=27) using *C. dubia*. The effluent did not exhibit any acute toxicity (LC₅₀s were all >100% effluent). The C-NOEC results for the 26 valid tests ranged from 25 to 100% effluent with only two tests (May 1999 and July 2004) failing to meet the C-NOEC limit of 63% effluent (TOXTD database).

The effluent toxicity tests from GE Company in Pittsfield are conducted on composite samples (flow weighted) from various outfalls (Appendix J) that actually discharge into three different water bodies (Unkamet Brook, Silver Lake, and the East Branch Housatonic River). Since these tests represent combined outfalls they are not summarized here.

Chemistry-water

DWM sampled the water quality of the East Branch Housatonic River at two stations in 2002. Station 02A was located upstream from the Hubbard Ave. Bridge in Pittsfield and Station 02B was located ~600 feet downstream from Pomeroy Avenue in Pittsfield. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected from Station 02A only and analyzed for total suspended solids, nitrate-nitrogen, ammonia-nitrogen, and total phosphorus (low-level).

HVA conducted monthly water quality sampling downstream from Hubbard Avenue in Pittsfield between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). HVA also sampled this site in 2001, but data from 2001 are not summarized below, since their QAPP was not approved until 2002. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions.

USGS also collected discrete water samples at their gage on the East Branch Housatonic on 21 August 2003 near Hubbard Avenue (USGS 2006a).

All water quality data collected by DWM, HVA, and USGS in the river near Hubbard Avenue met criteria except for elevated levels of total phosphorous. The two total phosphorous measurements taken by DWM in 2002 were 0.1 and 0.2 mg/L. The 17 total phosphorus measurements recorded by HVA between 2002 and 2004 ranged from <0.01 to 0.574 and 3 measurements exceeded 0.05 mg/L. USGS reported

0.026 mg/L (USGS 2006a). All *in-situ* measurements taken by DWM in the river near Pomeroy Avenue met standards.

The *Aquatic Life Use* is assessed as support for the upper six mile reach of this segment of the East Branch Housatonic River based primarily on the non-impacted benthic community, the good survival of test organisms exposed to the river water, and the generally good water quality conditions. However, this use is identified with an Alert Status downstream from the Crane and Company WWTP discharge because of elevated phosphorous concentrations and some evidence of nutrient enrichment in the benthic community attributes. The *Aquatic Life Use* will not be assessed for the lower two mile reach (downstream from GE site) until water quality monitoring is conducted post remediation of the PCB contaminated sediments.

FISH CONSUMPTION

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: “*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*”. Since it is the East Branch Housatonic River that flows through Dalton and past the GE plant in Pittsfield, the MA DPH advisory for the Housatonic River is assumed to cover this area of the East Branch of the Housatonic River. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory issued in 1982 (see previous segment), the *Fish Consumption Use* is assessed as impaired due to PCBs.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

HVA collected monthly bacteria samples at their Hubbard Avenue water quality station in 2002, 2003, and 2004 (HVA 2002b, 2003c, and 2004b).

DWM collected fecal coliform bacteria and *E. coli* samples from the East Branch Housatonic River approximately 600 feet downstream from Pomeroy Avenue in Pittsfield (Station 02B) between May and September 2002 (Appendix B).

Fecal coliform counts from sampling conducted by DWM and HVA ranged from 20 to 1400 cfu/100mL (n=25). Bacteria counts collected at DWM Station 02B (the farthest downstream) had a geometric mean of 234 cfu/100mL. Elevated bacteria, particularly during wet-weather sampling events, were documented by HVA in 2002 and 2003.






In 1999 HVA volunteers conducted a shoreline survey of the East Branch Housatonic River between the Center Pond Dam and the Government Mill Dam in Pittsfield. Improper disposal of pet waste into the storm drains was reported near Depot Street in Dalton (HVA initiated a Storm Drain Awareness Program in 2001). Isolated areas of trash were noted. However, after the removal of the Berkshire Mill Dam in 2001, HVA conducted a river cleanup and removed the trash. Numerous pipes were noted and their locations have been mapped and entered into HVA's Geographic Information System for future action. It is important to note that HVA and Berkshire Regional Planning Commission are working on several projects to measure the impact of storm drains on the East Branch Housatonic River (HVA 2004a). Overall this segment was generally free from odor, oil and grease, color and turbidity, floating matter, and nuisance organisms.

DWM biologists noted the water at Station EB02A was “rust” colored and had a paper effluent odor (Mitchell 2005). DWM biologists also noted slight turbidity to the water but no oils or objectionable deposits (MassDEP 2002b). DWM personnel also made visual observations at this station during water quality surveys. At Station 02A trash was noted on two occasions (5/21/02 and 7/21/02) while on eight other occasions no objectionable deposits were noted (MassDEP 2002a). On 21 May 2002 no indication of the extent of deposits was noted, but on 21 July 2002 it was noted that the trash/garbage was “light, (a) few bottles”. With the exception of 24 September 2002 when white foam was noted, no scums were noted. A musky water odor and a “rotting vegetable” water odor were noted on two different occasions,

respectively. All other occasions no odor was noted. Water clarity was noted as clear on four occasions, slightly turbid on four other occasions and murky once. At Station 02B no objectionable deposits or scums were noted. A musky water odor was noted on one occasion, a septic water odor was noted twice, and sewage water odor was noted once. On the remaining six occasions no water odor was noted but of these occasions a sewer smell in the air was noted three times. Water clarity was generally noted as clear, and on only a few occasions it was rated as slightly turbid.

Similar to the upper East Branch Housatonic River segment, the *Primary Contact Recreational Use* is assessed as impaired because of elevated fecal coliform bacteria counts, noted particularly during wet weather. The *Secondary Contact* and *Aesthetics* uses are assessed as support based upon the acceptable bacteria counts and the generally acceptable aesthetic conditions noted by HVA volunteers and DWM personnel. However, these uses are identified with an Alert Status due to occasional septic/sewage odors and issues with turbidity.

EAST BRANCH HOUSATONIC RIVER (Segment MA21-02) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT* upper 6 miles NOT ASSESSED lower 2 miles
Fish Consumption		IMPAIRED Cause: PCBs Source: inappropriate waste disposal from General Electric Site
Primary Contact		IMPAIRED Cause: elevated fecal coliform bacteria Source: unknown Suspected sources: stormwater runoff
Secondary Contact		SUPPORT*
Aesthetics		SUPPORT*

*Alert status issues identified, see details in use assessment

RECOMMENDATIONS

Continued monitoring of the aquatic conditions (both chemical and biological) is recommended to monitor the status of the resident biotic communities.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Dalton and Pittsfield and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

It is currently being investigated by EPA as part of their Ecological Risk Assessment whether or not the biota in the East Branch Housatonic River upstream from the Crane & Co., Inc. dams (which pose a barrier to fish migration) are contaminated by PCBs. The MA DPH should review the results of this investigation and adjust the fish consumption advisory as needed.

WEST BRANCH HOUSATONIC RIVER (SEGMENT MA21-18)

Location: Headwaters, outlet of Pontoosuc Lake, Pittsfield, to confluence with Southwest Branch Housatonic River (forming the headwaters of the Housatonic River), Pittsfield.

Segment Length: 4.1 miles.

Classification: Class B, Cold Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for priority organics, siltation, and pathogens. Other habitat alterations also impair the segment, but they are a pollutant that does not require the calculation of a TMDL (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Lanesborough Village Water District (10214801)

UPCOMING PROJECTS

The Riverways Program, in partnership with the City of Pittsfield and Berkshire Regional Planning Commission, is currently evaluating the feasibility of removing the Tel-Electric (Mill Street) Dam on the West Branch Housatonic River to open up over one hundred miles of river continuity, extending to the mainstem Housatonic River. The feasibility study, being prepared by Kleinschmidt, will include a sediment management plan, conceptual dam removal alternatives analysis and hydraulic scour analysis. This project is being considered in concert with improved public access and flood control to protect historic Wahconah Park (MA DFG 2006c).

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

Water flows from Pontoosuc Lake via one of two ways--either over the dam into the main channel of the river or by diversion into a bypass channel, or "sluiceway", on the west end of the dam. This bypass channel runs parallel to the main riverbed for approximately 100 yards before joining with it. This 100-yard stretch of the main riverbed is often dry or very nearly dry since much more water leaves the lake via the bypass channel instead of flowing over the dam (HVA 2003c).

The Housatonic Valley Association (HVA), in cooperation with the Riverways Instream Flow Stewards (RIFLS) program, has documented issues with flows over the outlet of Pontoosuc Lake Dam (HVA 2002b). At times there has been no flow coming over the dam, resulting in recently stocked trout being stranded in isolated pools. Flows in this section of river do not correlate well with rainfall data or other flow data (e.g., flow is high when all others are low or vice versa). Downstream, near Wahconah Park, there are problems with the river flooding every time it rains.

In 2000 HVA conducted a shoreline survey of the West Branch Housatonic River from the outlet of Pontoosuc Lake to the confluence with the East Branch Housatonic River (HVA 2000). In the section from the outflow of Pontoosuc Lake to Wahconah Street, the river was channelized with "rocked-in or bricked-in walls or banks". In the section from Pecks Brook confluence to the Linden Street bridge, an active beaver dam impounds the river. Additionally, in-stream sedimentation is problematic in the vicinity of King Street.

DWM performed a habitat assessment at Station HW01 (B0021) on 10 September 2002, approximately 300 meters downstream from Route 20 in Pittsfield, MA (Appendix C). The habitat at station HW01 received the lowest habitat score of the 15 Housatonic Watershed stations examined in 2002 (94/200) due to poor in-stream fish cover, lack of deep pools or deep runs, sparse vegetation along the stream banks, and small industrial facilities, residences, roads, and parking areas impacting the riparian zone width. The sampled reach was channelized, with stone walls containing the flows for approximately half of the 100 meter reach. There were no aquatic macrophytes within the reach, and green filamentous algal coverage was estimated at less than 5%. Canopy cover was estimated at 65% (Appendix C).

Biology

MA DFG conducted fish population sampling at one station (Site 617, at Route 20, Pittsfield, near Clapp Park) on 11 July 2002. A total of 81 fish representing 13 species were collected, including: 29 white

sucker, 18 fallfish, nine bluegill, six pumpkinseed, six rock bass, three blunt nose minnows, three black crappie, two common shiner, one blacknose dace, one creek chub, one golden shiner, one largemouth bass, and one yellow perch (Richards 2006). The fish community was composed of pollution tolerant or moderately tolerant species, with a complete absence of pollution intolerant species. Few fluvial specialist species were present.

DWM sampled the benthic macroinvertebrate community in the river downstream from Route 20 (Station HW01) in September 2002 (Appendix C). RBP III analysis indicated this station was slightly impacted when compared to the regional reference station on the East Branch Housatonic River (Station EB01B). It should be noted that highly pollution tolerant worms dominated the community (37%); these organisms are indicative of organic enrichment. Additionally, this sampling reach exhibited the most degraded benthic community structure encountered during the 2002 Housatonic River watershed survey. Habitat quality was only 53% comparable to the reference station condition.

Chemistry-water

HVA conducted monthly water quality sampling at three sites along this segment between June and October 2002 and April and October 2003 (HVA 2002b and 2003c). In 2004 HVA sampled five sites on the West Branch (HVA 2004b). These stations were called: Pontoosuc Lake Dam, Taconic Park Drive, West Branch above Peck's, Jimmy's & Route 20, and Atwood Avenue. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions.

The majority of water quality data collected by HVA in the West Branch Housatonic River met criteria. Elevated levels of total phosphorous, temperatures exceeding 20°C, and two high concentrations of total suspended solids were recorded. Total phosphorous concentrations ranged from <0.01 to 0.13 mg/L (n=31). The highest measurements of total phosphorous and TSS were associated with wet-weather sampling. Water temperatures exceeding 20°C were frequently observed during the summer months.

The *Aquatic Life Use* is assessed as impaired based upon the examination of the collective data available for this segment. The RBP III analysis indicated that the benthic community was only slightly impacted. However, pollution tolerant worms dominated the sample, the biotic index was the highest (worst) and the EPT index was the lowest (worst) of any of the sites monitored. These community attributes were considered to be strong indicators of organic enrichment. Furthermore, the in-stream habitat quality was degraded and pollution intolerant cold-water fish species were absent. HVA water quality corroborates these findings, as they recorded elevated summer temperatures and elevated total phosphorous concentrations.

FISH CONSUMPTION

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Because there are no barriers to migration for fish between the West Branch Housatonic River and the GE site, the *Fish Consumption Use* is identified with an Alert Status.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

HVA collected monthly fecal coliform and *E. coli* bacteria samples from the five water quality stations described above (HVA 2002b, 2003c, and 2004b). Fecal coliform counts at these five stations ranged from 5 to >20,000 cfu/100mL (n=50). In 2002 a leaking sewer line was discovered due to these extremely high bacteria counts in the vicinity of the Jimmy's Restaurant & Rt. 20 site. The City of Pittsfield repaired the line that summer. Since that time the highest count was 3,960 cfu/100mL, recorded by HVA in 2003 at the Atwood Avenue station. Three of 19 samples collected at the Jimmy's and Atwood Ave stations in 2003 and 2004 exceeded 2000 cfu/100mL. Seven of these 19 exceeded 400 cfu/100mL.






In 2000 HVA conducted a shoreline survey of the West Branch Housatonic River (HVA 2000). Multiple crews noted trash throughout this reach, with one volunteer describing the river as "trashy, dangerous and aesthetically very unappealing". Volunteers noted a milky discharge from a storm drain in the West

Street to Atwood Avenue section. Sewage odors were documented at Wahconah Park and the Mill Street Dam.

DWM field biologists recorded field observations at Station HW01 (B0021) on 10 September 2002. They noted that the sediment smelled musty and there was an abundance of trash and debris in-stream (i.e., broken glass, bricks, etc). The water was also described as slightly turbid with a musty smell. No sedimentation or water oils were noted (MassDEP 2002b).

The *Primary* and *Secondary Contact Recreation* and *Aesthetics* uses are assessed as impaired for this segment due to the objectionable deposits of trash and odors throughout this segment noted by DWM biologists and shoreline survey observations made by HVA volunteers. In addition, the fecal coliform bacteria counts are sufficiently high to impair the *Primary Contact Use* downstream from the Peck's station and the *Secondary Contact Recreation Use* downstream from the Jimmy's station.

WEST BRANCH HOUSATONIC RIVER (Segment MA21-18) Use Summary

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: Combined biota/habitat assessment Suspected causes: Organic enrichment, elevated total phosphorous, elevated temperatures Source: urbanized high density area Suspected source: impoundment effects
Fish Consumption		NOT ASSESSED*
Primary Contact		IMPAIRED Cause: trash and debris, odor, fecal coliform bacteria Source: urbanized high density area, illicit connections/hookups to storm drains
Secondary Contact		IMPAIRED Cause: trash and debris, odor, fecal coliform bacteria Source: urbanized high density area, illicit connections/hookups to storm drains
Aesthetics		IMPAIRED Cause: trash and debris, odor Source: urbanized high density area

*Alert status issues identified, see details in use assessment

RECOMMENDATIONS

Monitor bacteria counts and conduct bacteria source tracking to identify and address point sources.

Monitor summer water temperatures with deployed probes. Investigate flow alterations or other actions that could improve the cold water habitat of this designated cold water fishery.

Control pollutant loading from storm drains by implementing Phase II stormwater permit requirements in the city of Pittsfield. Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Pittsfield and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Due to the no flow occurrence documented by HVA volunteers, local regulatory authorities are encouraged to establish a flow management strategy to protect in-stream biota in the West Branch Housatonic River downstream from Lake Pontoosuc.

SOUTHWEST BRANCH HOUSATONIC RIVER (SEGMENT MA21-17)

Location: Headwaters, outlet Richmond Pond, Pittsfield, to confluence with West Branch Housatonic River, Pittsfield.

Segment Length: 5.8 miles.

Classification: Class B, Cold Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for unknown causes and siltation. An additional pollutant not requiring the calculation of a TMDL is other habitat alteration (MassDEP 2005a).

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment at Station HW02S (B0022) in September 2002, downstream from Barker Road in Pittsfield, MA. The total habitat score for Station HW02S was 146/200 due to sediment deposition (up to 50% of the stream bed affected by new sediment deposits) and the lack of deep-water habitat. Although the substrate embeddedness was limited in riffle areas, it was a negative impact on benthic habitat within the remainder of the sampling reach. All substrates had a "silty cover" overlaying them and the water appeared to be slightly turbid. DWM biologists collected periphyton samples from Station HW02S in September of 2002 (Appendix G). Canopy cover at this station was reported as 70%. There were no aquatic macrophytes within the reach, nor was there any algal coverage.

Biology

MA DFG conducted fish population sampling on the Southwest Branch of the Housatonic River (Site 620, Barker Road, Pittsfield) on 11 July 2002 (Richards 2006). A total of 134 fish were collected, representing 12 species, including: 52 blacknose dace, 26 white sucker, 22 longnose dace, 11 brown trout (70-260mm), nine fallfish, seven common shiner, two yellow perch, one creek chub, one bluegill, one largemouth bass, one pumpkinseed, and one rock bass. Fluvial specialists dominated the fish community at this site. Multiple age classes of brown trout, a pollution intolerant species, were also present.

DWM sampled the benthic macroinvertebrate community in the river downstream from Barker Road (Station HW02S) in September 2002 (Appendix C). RBP III analysis indicated this station was non-impacted when compared to the regional reference station on the East Branch Housatonic River (Station EB01B). The structure of the 2002 benthic community was much improved over conditions observed in 1997, when RBP III analysis indicated slight/moderate impairment.

Chemistry-water

HVA conducted monthly water quality sampling at two sites along this segment between June and October 2002 and April and October 2003 (HVA 2002b and 2003c). In 2004 HVA sampled three sites on the Southwest Branch Housatonic River (HVA 2004b). The four stations where sampling was conducted between 2002 and 2004 were called Richmond Pond Dam, Lebanon Ave., West Hungerford, and Barker Ave. Parameters measured included: dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions. These data are summarized below. It is important to note that 2002 was a drought year and HVA reports that flows out of Richmond Pond were minimal (HVA 2002b).

The majority of water quality data collected by HVA in the Southwest Branch Housatonic River met standards. Total phosphorous concentrations ranged from <0.01 to 0.147 mg/L (n=24). Only two measurements exceeded 0.05 mg/L, and these measurements were associated with wet-weather sampling. One elevated measurement of TSS (63 mg/L) was also recorded during wet-weather sampling. Water temperatures exceeding 20°C were often observed during the summer months, particularly at the outlet of Richmond Pond. Also worthy of note are occasional low DO measurements (3) recorded in the river below the Richmond Pond Dam and Lebanon Avenue (n=37).

The *Aquatic Life Use* is assessed as support based upon the non-impacted benthic community and the fish assemblage. This use is identified with an Alert Status because of extensive sediment deposition and the embeddedness of substrates.

FISH CONSUMPTION

In 1982, the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Because there are no barriers to migration for fish between the Southwest Branch Housatonic River and the GE site, the *Fish Consumption Use* is identified with an Alert Status.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

HVA collected monthly fecal coliform and *E. coli* bacteria samples from the four water quality stations named above between June and October 2002 and between April and October during 2003 and 2004 (HVA 2002b, HVA 2003c, and HVA 2004b).






Fecal coliform bacteria counts ranged from <10 to 1000 cfu/100 mL (n=37) at the four HVA stations. Eight fecal coliform bacteria counts were greater than 400 cfu/100mL. The geometric mean of samples collected at Lebanon Ave in 2004 and Barker Road in 2002, 2003, and 2004 were all greater than 200 cfu/100mL.

In 2006 a MassDEP bacteria source tracking reconnaissance team discovered a leaking sewer line near Route 20 at the East end of Hungerford Road. The sewer line has been fixed and subsequent sampling did not find any elevated bacteria levels (Kurpaska 2006). A pet walking area adjacent to Walker Brook was also identified as a possible source of bacteria, especially during rain events.

DWM biologists noted that the water was slightly turbid but no odors or oils were present in the Southwest Branch Housatonic River near Barker Road in Pittsfield (Station HW02S) on 10 September 2002 (MassDEP 2002b).

The *Primary Contact Recreational Use* is assessed as impaired because of elevated fecal coliform bacteria counts. The *Secondary Recreation* and *Aesthetics* uses are assessed as support based on the bacteria counts being acceptable for secondary contact and the lack of any objectionable conditions, odors, or deposits.

SOUTHWEST BRANCH HOUSATONIC RIVER (SEGMENT MA21-17) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT*
Fish Consumption		NOT ASSESSED*
Primary Contact		IMPAIRED Cause: elevated fecal coliform bacteria Source: unknown Suspected sources: pet waste, leaking sewer pipe
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

*Alert status issues identified, see details in use assessment

RECOMMENDATIONS

Field reconnaissance and implementation of Phase II stormwater permit requirements should be conducted to help to identify and address potential areas contributing to sediment deposition. Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Pittsfield and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

Conduct long term temperature monitoring during the summer months to determine if the water quality standards for cold water fisheries are being exceeded.

HOUSATONIC RIVER (SEGMENT MA21-04)

Location: Confluence of Southwest Branch Housatonic River and West Branch Housatonic River, Pittsfield, to outlet of Woods Pond, Lee/Lenox.

Segment Length: 12.3 miles.

Classification: Class B, Warm Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for priority organics, pathogens, and turbidity (MassDEP 2005a).

Woods Pond (MA21120) will no longer be reported on as a lake segment since the retention time of this 114 acre waterbody was estimated at less than 1 day; it will be considered a run of the river impoundment (McVoy 2006). The retention time estimate was based on the annual historical mean discharge from two stream gages in the Housatonic River Basin (01197500 and 01197000) and the normal storage volume of the dam reported by MA DCR in their Massachusetts Dam Safety Program Database (Socolow *et al.* 2004 and MA DCR 2002).

WMA WATER WITHDRAWALS (APPENDIX J)

Pittsfield Water Department (10223601)

Pittsfield Country Club (10223603)

Bosquet Ski Area (9P210223602)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Pittsfield Wastewater Treatment Plant (MA0101681)

USE ASSESSMENT

AQUATIC LIFE USE

Biology

DWM biologists collected chlorophyll *a* samples from Stations 04B, 04C, and 19AU on July 31st and September 25th 2002. Chlorophyll *a* levels measured on these dates at stations 04B and 04C were between 1.8 and 3.3 mg/m³, respectively (Appendix G). These are low levels of chlorophyll *a*. Chlorophyll *a* levels were measured at station 19AU above Woods Pond dam (14.6 mg/m³ on September 25th and 23.6 mg/m³ (mean of two samples) on July 31st). These elevated measurements are indicative of nutrient enriched conditions.

Woods Pond is infested with the non-native aquatic macrophyte *Trapa natans* (MA DFG 2005). The length of river through Woods Pond is approximately 0.8 miles.

Toxicity

Ambient

The Pittsfield WWTP staff collected water from the Housatonic River approximately 2.2 miles upstream from Outfall # 003 at the Pomeroy Avenue Bridge for accessibility reasons (Landry 2005). The water is collected for use as dilution water in the facility's whole effluent toxicity tests. Between April 2000 and March 2006 (n=25), survivals of *C. dubia* exposed (7-day) to the river water were all 100% (TOXTD database).

Effluent

Between December 2000 and June 2005, 19 whole effluent toxicity tests were conducted on the City of Pittsfield WWTP effluent using the test organism *C. dubia*. No acute or chronic toxicity was detected (LC₅₀ ≥ 100% effluent, C-NOECs ranged from 75 to 100% effluent). The permitted limits for this facility are LC₅₀ > 100% effluent and C-NOEC ≥ 50% effluent.

Chemistry-water

DWM conducted water quality sampling at three stations on this segment of the Housatonic River between May and September 2002 (Appendix B). Station 04X was located upstream from South St., Pittsfield. Station 04B was located upstream from Holmes Road, Pittsfield. Station 04C was located upstream from New Lenox Road, Lenox. *In-situ* sampling was conducted to measure dissolved oxygen,

temperature, pH, and conductivity during pre-dawn hours. All *in-situ* measurements met water quality criteria.

Chemistry-sediment

Blasland, Bouck & Lee, Inc. and Quantitative Environmental Analysis, LLC prepared a 2003 report for the General Electric Company detailing the extent of PCB contamination in Housatonic River sediments (BBL 2003). This report was based upon sediment cores collected by the EPA between 1998 and 2002. Four of the study reaches presented within this report are located within segment MA 21-04. The study reaches are defined as follows: 5A is the river section from the confluence to just above the Pittsfield WWTP; 5B is the river section from the Pittsfield WWTP to Roaring Brook; 5C is the river section from Roaring Brook to the headwaters of Woods Pond; and 6 is Woods Pond from its headwaters to the dam.

Concentrations of PCBs and total organic carbon (TOC) measured in the top 6 inches of sediment within reaches of this segment of the Housatonic River are below (BBL 2003 as summarized by Poach and Kurpaska 2006). The numbers (n) of cores analyzed to produce the results appear in parentheses after the reach designation.

Reach (n)	Sediment PCB Concentration in 0 - 6 inch layer (mg/kg)			
	Min	Max	Mean	Median
5A (369)	ND	290	20	11
5B (179)	ND	165	6.5	3.3
5C (224)	ND	294	22	6.1
6 (113)	ND	210	32	17

Reach (n)	Sediment TOC Concentration in 0 - 6 inch layer (%)			
	Min	Max	Mean	Median
5A (351)	ND	21	1.4	0.77
5B (177)	ND	13	1.4	1
5C (236)	ND	25	3.2	2.3
6 (121)	0.058	36	7.8	6.2

Since minimum TOC levels were listed as non-detectable, the median TOC concentrations were used to calculate the S-EL to make this a conservative estimate of the level of PCB toxicity. The mean PCB sediment concentrations within these reaches were found to approach or exceed the total PCB S-EL (by a factor of 0.97 to 5). Maximum PCB sediment concentrations all exceeded the total PCB S-EL based upon the maximum TOC level of 10% (Persaud et al 1993).

Chemistry-tissue

Weston Solutions, Inc. prepared a 2004 report for the Army Corps of Engineers and the U.S. Environmental Protection Agency detailing the extent of PCB contamination in fish tissue from fish caught in the Housatonic River (Weston 2004). This report is based upon fish collected by EPA between 1998 and 2002. Reaches 5A, 5BC (reached 5B and 5C combined) and 6 are located within Segment MA 21-04.

Concentrations of PCB in fish collected from reaches within Housatonic River segment 21-04 appear below (Weston 2004 as summarized by Poach and Kurpaska 2006). The numbers of fish analyzed to produce the results appear in parentheses after the fish name.

Whole body concentrations of PCB in fish

Reach	Whole Body tPCB (µg/kg w/w)		Fish Sampled
	Min	Max	
5A	3,030	220,000	largemouth bass (5), smallmouth bass (2), white sucker (16)
5BC	10,700	412,000	largemouth bass(10), brown bullhead(2), common carp(8), goldfish(19), white sucker(26)
6	8,260	447,000	largemouth bass (11), goldfish (23), white sucker (15)

Composite concentrations of PCB in fish

Reach	Composite tPCB (µg/kg w/w)		Fish Sampled
	Min	Max	
5A	24,100	54,300	largemouth bass (2), fallfish (5), yellow perch (5)
5BC	2,590	39,800	largemouth bass (5), pumpkinseed (4), golden shiner (5), yellow perch (5)
6	8,800	120,000	largemouth bass(5), common carp(3), pumpkinseed(5), golden shiner(5), yellow perch(5)

Composite concentrations of PCB in young of the year fish in 2002

Reach	Young of Year tPCB (µg/kg w/w)		Fish Sampled
	Min	Max	
5B	10,000	27,000	largemouth bass (7), bluegill (6), pumpkinseed (1), yellow perch (4)
6	12,000	19,000	largemouth bass (7), bluegill (7), yellow perch (2)

All of the whole fish samples analyzed for total PCB exceeded (by between 5 and 894 times) the NAS/NAE guideline for the protection of fish eating wildlife (500µg/kg wet weight).

The *Aquatic Life Use* is not assessed for the upper one mile of this segment (upstream from the confluence with the East Branch Housatonic River) due to too limited data. Downstream from the confluence with the East Branch Housatonic River, the *Aquatic Life Use* is assessed as impaired for the lower 11.3 miles based upon high levels of PCB contamination. Whole fish PCB levels greatly exceeded the National Academy of Sciences and National Academy of Engineering (NAS/NAE) guideline for the protection of fish eating wildlife. Surficial sediments are also contaminated with PCBs in this reach. The invasive aquatic macrophyte *Trapas natans* was also observed in the 0.8 mile Woods Pond section of the river. Water quality was generally acceptable, except for elevated chlorophyll a levels (See Appendix G) indicative of enrichment measured in Woods Pond.

FISH CONSUMPTION

Weston Solutions, Inc. prepared a 2005 report for the Army Corps of Engineers and the U.S. Environmental Protection Agency detailing the extent of PCB contamination in fish fillets from fish caught in the Housatonic River. The mean total PCB concentrations in fish fillets collected in reaches 5 and 6 (confluence downstream to the Woods Pond dam) were reported as follows: bass 16.7, bullhead 13.2, perch 7.4, and sunfish 6.5 mg/kg wet weight (Weston 2005).

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*". The upper one mile portion of this segment of the Housatonic River is upstream of its confluence with the East Branch Housatonic River. Therefore, it is assumed that the MA DPH advisory for the Housatonic River does not cover this one mile reach. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory, the *Fish Consumption Use* is assessed as impaired for this segment because of PCB contamination.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria samples from this segment of the Housatonic River at water quality stations 04B and 04C (Appendix B). Fecal coliform counts ranged from 110 to 1300 cfu/100mL (n=10). The geometric mean of five samples collected at the upstream station, 04B near Holmes Road in






Pittsfield, was 451 cfu/100mL. Further downstream at Station 04C near New Lenox Road in Lenox, the geometric mean of five samples was 152 cfu/100mL.

DWM personnel did not note objectionable conditions at stations 04X, 04B and 04C (MassDEP 2002a). Water clarity was found to be clear or slightly turbid and no objectionable deposits, scums or water odor were recorded at any of the stations.

Weston Solutions, Inc. prepared a 2005 report entitled "Human Health Risk Assessment GE/Housatonic River Site, Rest of River" for the U.S. EPA and U.S. Army Corps of Engineers (Weston 2005). In this study, total hazard index values calculated for reasonable maximum exposure to sediment within Housatonic River reaches 5 and 6, located within segment MA21-04, were shown to slightly exceed the EPA non-cancer hazard level of 1.0. Total hazard index values calculated for the central tendency exposure to sediment within this segment were all less than the EPA non-cancer hazard level of 1.0.

The *Primary Contact Recreational Use* is assessed as impaired in the upper 5.7 mile reach from the headwaters to the Pittsfield WWTP due to elevated fecal coliform bacteria counts. The Primary Contact Recreation Use is assessed as impaired for this segment based upon the results of the human health risk assessment for exposure to PCB contaminated sediment within this segment. The *Secondary Contact Recreation and Aesthetics* uses are assessed as support, based on fecal coliform bacteria counts that are acceptable for secondary contact and the lack of any objectionable conditions.

HOUSATONIC RIVER (Segment MA21-04) Use Summary

Designated Uses		Status
Aquatic Life		NOT ASSESSED upper 1.0 mile IMPAIRED lower 11.3 miles Cause: PCBs in whole fish and sediment, and non-native macrophyte in lower 0.8 miles Source: inappropriate waste disposal from General Electric Site for PCB contamination, unknown for non-native macrophyte
Fish Consumption		IMPAIRED Cause: PCBs Source: inappropriate waste disposal from General Electric Site
Primary Contact		IMPAIRED Cause: PCBs, and elevated fecal coliform bacteria in upper 5.7 miles Source: inappropriate waste disposal from General Electric Site for PCB contamination, unknown for bacteria Suspected source: stormwater runoff for bacteria
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

RECOMMENDATIONS

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Pittsfield and to assess the status of the Primary and Secondary Contact Recreational uses. Conduct bacteria source tracking as needed to identify undocumented sources.

HOUSATONIC RIVER (SEGMENT MA21-19)

Location: Outlet of Woods Pond, Lee/Lenox, to the Risingdale impoundment dam, Great Barrington.

Segment Length: 19.9 miles.

Classification: Class B, Warm Water Fishery

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for unknown toxicity, priority organics, thermal modifications, pathogens, and turbidity (MassDEP 2005a).

Risingdale Impoundment (MA21121) will no longer be reported on as a lake segment since the retention time of this 41 acre waterbody was estimated at less than 1 day; it will be considered a run of the river impoundment (McVoy 2006). The retention time estimate was based on the annual historical mean discharge from two stream gages in the Housatonic River Basin (01197500 and 01197000) and the normal storage volume of the dam reported by MA DCR in their Massachusetts Dam Safety Program Database (Socolow *et al.* 2004 and MA DCR 2002).

Through the River Instream Flow Stewards (RIFLS) program, HVA has monitored the water level in Beartown Brook, a tributary to this segment, in Lee (RIFLS 2006). Trout and crayfish were documented in the brook. HVA also deployed a temperature logger in the brook.

WMA WATER WITHDRAWALS (APPENDIX J)

Schweitzer-Mauduit International, Inc (10215002/9P210215002)

Mead Westvaco formerly Mead Corporation – Specialty Paper Division (10215001/9P10215001) Two sources listed, Housatonic River and Beartown Brook

Cranwell Conference Center (V10215202)

Lane Construction Company (9P210215004)

Lee Water Department (10215003/9P210215003)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Lenox Wastewater Treatment Plant (MA0100935)

Schweitzer-Mauduit International, Inc (MA0005371)

Oldcastle Architectural Products Group (MAR05A083)

Lee WWTP (MA0100153)

MW Custom Papers, Inc.– Laurel Mill (MA0001716)

MW Custom Papers, Inc.– Willow Mill (MA0001848)

Stockbridge Wastewater Treatment Plant (MA0101087)

FERC

Willow Mill Hydroelectric Project FERC No. 2985

The Willow Mill Hydroelectric Project is owned and operated by MeadWestvaco Corporation and has an existing FERC license, which was issued on May 1, 1981 and has an expiration date of April 30, 2011. MeadWestvaco Corporation intends to submit an Application for a New License by April 30, 2009. In order to expedite the licensing process, the MeadWestvaco Corporation submitted a Pre-Application Document and Notice of Intent for a new FERC license in April 2006. Comments by resource agencies and stakeholders on the Pre-Application Document and Notice of Intent will result in data gathered from fieldwork and those study results will be incorporated into the license application.

Glendale Hydroelectric Project (P-2801).

The Glendale Project is owned and operated by Littleville Power Company, Inc. (LPC), a subsidiary of Enel North America, Inc. (Enel). LPC is preparing an application to the FERC for a new federal license. The existing license, which was issued on November 23, 1979, has an expiration date of October 31, 2009. LPC must file its application with FERC on or before October 31, 2007. The following information is excerpted from the Initial Consultation Document (ICD) for the Glendale Hydroelectric Project (LPC 2005).

A FERC preliminary permit was issued to Fox River Paper Co. to operate the Risingdale Dam (Project Number 12528). The facility is authorized to generate 1100 kW. The permit was issued in December 2004 and expires in November 2007. Multiple preliminary permits have been granted for this site dating

back to 1985. A preliminary permit is issued to allow a project proponent time to study the feasibility of a project and determine if it is economically viable. It is anticipated that this permittee will apply for a license in the winter of 2008 and the project should be online by 2010. The operator plans to continue the project in run-of-river mode. Environmental and engineering studies are projected to be finished in 2006. The HVA has submitted comments requesting minimum flow requirements and that recreational access for the public is allowed. MassDEP and the US Department of the Interior also submitted comments to FERC concerning this project including its impact on the cleanup of PCBs associated with the General Electric site and impacts to fish and wildlife (FERC 2006).

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed habitat assessments at three stations on this segment of the Housatonic River (Appendix C) in September 2002.

Station HT19A was adjacent to Crescent Mills – Crystal Street in Lenox, MA, downstream from the Woods Pond dam and the Lenox WWTP discharge. The total habitat score for Station HT19A was 162 out of 200. Habitat was limited by a narrow riparian zone. Filamentous green algal coverage within the reach was extensive (95%). Canopy coverage was estimated to be 0% (Appendix G). The dominant algal genera were *Rhizoclonium* sp., *Tabellaria* sp., and *Cocconeis* sp.

Station HT19C was downstream from power lines that cross Tyringham Road and 185 meters downstream from the Lee WWTP outfall in Lee. The total habitat score was 172 out of 200. Aquatic macrophytes were present in 25% of the reach, and were comprised almost entirely of the rooted submerged plants milfoil (*Myriophyllum* sp.) and Coontail (*Ceratophyllum* sp.). Also present, though sparse, was free floating Duckweed (*Lemna* sp.). Canopy cover was reported as 0%, while green filamentous algae covered 50% of the reach (Appendix G). The dominant algal genera were *Rhizoclonium* sp. and *Cocconeis* sp. Also notable were patches of sewage fungus near and downstream of the Lee WWTP outfall.

Station HT19E was located 145 meters downstream from the Springfield Terminal Railroad Bridge, and 1,940 meters downstream of the Glendale Dam in Stockbridge. The total habitat score for station HT19E was 185 out of 200. There was no canopy cover at this station. Aquatic macrophytes (*Myriophyllum* sp.) were sparse. Algal coverage was dense and dominated by thin-film green algae (100% within reach coverage) (Appendix G).

According to FERC records available online (FERC 2006), the Glendale Project has operated as run-of-river and met the minimum flow requirement of 10 cfs at the dam in 2002, 2003, and 2004. No fish passage facilities are currently required at this project. When requested the licensee is required to install fish passage facilities. It should also be noted that a flow study in the bypass reach of the Glendale Hydroelectric Project was conducted in the summer/fall 2006 (Smith 2006). The study results in the form of habitat versus flow relationships for each evaluation species (an In-stream Flow Incremental Methodology – IFIM evaluation that included brown trout, fallfish, and longnose dace) should provide a basis for making future recommendations on in-stream flow in the bypass reach, as well as serve as a decision making tool that will allow the FERC to balance in-stream flow and energy generation needs at the Project (Smith 2006).

Biology

DWM biologists collected chlorophyll *a* samples from Stations 19C and 19E on July 31st and September 25th 2002 (Appendix G). Chlorophyll *a* levels measured on these dates at stations 19C and 19E were between 1.5 and 3.7 mg/m³. These are low chlorophyll *a* levels.

MA DFG conducted fish population sampling by barge, boat or backpack electroshocking within this segment of the Housatonic River at 18 sites between 2002 and 2004 (Richards 2006). Thirteen of these sites were located in Lee and five were located in Stockbridge. Sampling consisted of nine sites sampled in 2002, seven in 2003, and two in 2004. A total of 3,623 fish representing 24 species were observed at these 18 sites collectively, including: 1,662 rock bass, 419 smallmouth bass, 310 longnose dace, 303 white sucker, 262 bluntnose minnow, 210 brown trout (53-530mm), 84 bluegill, 59 common shiner, 57 blacknose dace, 43 common carp, 32 black crappie, 31 largemouth bass, 30 creek chub, 22 brook trout

(66-200mm), 21 fallfish, 21 pumpkinseed, 18 banded killifish, 16 brown bullhead, 12 golden shiner, 4 yellow perch, 3 northern pike, 2 tessellated darter, 1 chain pickerel, and 1 spottail shiner. Brown trout were observed at 13 of the 18 sites, while the 22 brook trout observed were all captured at one site. Although the fish assemblage was dominated by macrohabitat generalist species, the presence of 9 fluvial specialist/dependent species (though often represented by few individuals) is indicative of adequate water and habitat quality and a stable flow regime. The fish community was dominated by species tolerant to pollution, however two pollution intolerant species were present (brown and brook trout).

DWM sampled the benthic macroinvertebrate community at three sites along this segment of the Housatonic River (stations HT19A, HT19C, and HT19E) (Appendix C). The RBP III analysis of the benthic community in the river downstream from the Woods Pond dam and the Lenox WWTP discharge ((Station HT19A) indicated this station was slightly impacted when compared to the reference station on the mainstem river in Stockbridge (Station HT19E).

The RBP III analysis of the benthic community in the river downstream from the Lee WWTP outfall (Station HT19C) was found to be slightly impacted when compared to the mainstem reference (Station HT19E).

A reference station on the mainstem Housatonic River in Stockbridge (Station HT19E) was chosen that represented least impacted conditions and a healthy community (Appendix C). When compared to the reference station on the East Branch Housatonic River (Station EB01B) the benthic community at this site indicated the benthos were non-impacted.

Toxicity

Ambient

The Lenox WWTP staff collected water from the Housatonic River at the Foot Bridge at Woods Pond upstream from Outfall #001 for use as dilution water in the whole effluent toxicity tests. Between March 2002 and March 2006 (n=17), survival of *C. dubia* exposed (48 hours) to the river water ranged from 90 to 100% and survival of *P. promelas* exposed (48 hours) to the river water ranged from 95 to 100% (TOXTD database).

The Schweitzer-Mauduit staff collected water from the Housatonic River, approximately 100 yards upstream of the Columbia Mill Dam behind the Columbia WWTF (Columbia Street, Lee), for use as dilution water in the facility's whole effluent toxicity tests (Ryan 2005). River water is collected further upstream (approximately 1300 feet upstream of the Columbia Mill Dam at the Golden Hill Bridge) when snow and ice conditions are present. Between September 2000 and March 2006 (n=25), survival of *C. dubia* exposed (7-day) to the river water ranged from 80 to 100% (TOXTD database).

The Town of Lee has contracted the services of a private laboratory to conduct toxicity sampling and analysis of the WWTP effluent. The contracted laboratory personnel collected river water approximately 75 to 100 feet upstream of Outfall# 001 for use as dilution water in the whole effluent toxicity tests (Zerbato 2005). Between February 2000 and March 2006 (n=23), survival of *C. dubia* exposed (48 hours) to the river water ranged from 90 to 100% (TOXTD database).

The MW Custom Papers staff collected river water approximately 150 feet upstream of the Laurel Mill outfall at a point near the process water intake for use as dilution water in the facility's whole effluent toxicity tests (Grant 2005). Between October 2000 and April 2006 (n=23), survival of *C. dubia* exposed (7-day) to the river water ranged from 90 to 100% (TOXTD database). Between October 2000 and June 2005 survival of *P. promelas* exposed (7-day) to the river water ranged from 18 to 98% and survival was less than 75% in 17 of the 19 test events (TOXTD database). It should be noted that as of June 2005 the facility is no longer required to perform tests using *P. promelas*.

The MW Custom Papers staff collected river water approximately 3000 feet upstream of the Willow Mill outfall at the Meadow Street Bridge for use as dilution water for the Willow Mill WWTF's whole effluent toxicity tests. Between October 2000 and January 2006 (n=22), survival of *C. dubia* exposed (7-day) to the river water ranged from 80 to 100% (TOXTD database). During the same time period, survival of *P.*

promelas exposed (7-day) to the river water ranged from 8 to 98% and survival was less than 75% in 16 of the 22 test events (TOXTD database).

The Town of Stockbridge has contracted the services of a private laboratory to conduct toxicity sampling and analysis. The contracted laboratory personnel collected water from the Housatonic River approximately 30 feet upstream of Outfall # 001 for use as dilution water in the whole effluent toxicity tests (Campetti 2005). Between October 2004 and October 2005, survival of *C. dubia* exposed (48-hour) to the river water was between 90 and 100% (n=3), and survival of *P. promelas* was 100% (n=3) (TOXTD database).

Effluent

Between March 2002 and March 2006, acute whole effluent toxicity tests were conducted on the Lenox WWTP effluent using *C. dubia* and *P. promelas*. The LC₅₀s were all >100% (n=17) for each species, with the exception of one invalid *C. dubia* test (TOXTD database).

Between September 2000 and March 2006, twenty-five whole effluent toxicity tests were conducted on the Schweitzer-Mauduit WWTP effluent using the test organism *C. dubia*. The LC₅₀s ranged from 35 to 100% effluent with three test events (December 2001, 71%; June 2002, 37%; and March 2004, 35%) failing to meet the permit limit of LC₅₀ ≥ 100% effluent. C-NOEC's ranged from 6.25 to 100% effluent with only one event (March 2005, 6.25% effluent) failing to meet the permit limit of ≥ 14% effluent (TOXTD database). However, in the 7-day chronic renewal, test organisms are sequentially exposed to three separate composite effluent samples collected over the course of the test. Thus, it is possible to observe acute effluent toxicity soon after effluent renewals during the chronic test. In 20 of the 25 toxicity tests there was evidence of some chronic toxicity. Of these 20 tests, acute toxicity was manifested in 8 tests, 6 of which were conducted during the month of March (2001-2006).

Between February 2000 and March 2006 twenty-three whole effluent toxicity tests were conducted on the Lee WWTF effluent using *C. dubia* as a test species. The LC₅₀ 's were all ≥100% (TOXTD database). This facility is in the process of being upgraded.

Between October 2000 and April 2006 twenty-three whole effluent toxicity tests using *C. dubia* were conducted on the effluent from the MW Custom Papers WWTF at Laurel Mill. The LC₅₀ results were all ≥100%. When *P. promelas* were used as test organisms (November 2000 through April 2005 n=19 test events) the LC₅₀ results were all ≥100% (TOXTD database). For the 21 valid chronic tests using *C. dubia*, the C-NOEC results ranged from 6.25 to 100% effluent. C-NOEC results using *P. promelas* ranged from 25 to 100% effluent (n=17 valid tests using lab water as diluent). These data indicate that whole effluent acute and chronic toxicity in this discharge has been vastly reduced compared to data reported between July 1995 and September 2000.

Between October 2000 and January 2006 whole effluent toxicity tests were conducted on the effluent (Outfall #001) from the MW Custom Papers WWTF at Willow Mill using *C. dubia* (n=22) and *P. promelas* (n=22). The LC₅₀ results from the *C. dubia* tests were all ≥100%, except for one test event (January 2002, 71% effluent). The LC₅₀ results using *P. promelas* were all ≥100% (TOXTD database). C-NOEC results using *C. dubia* ranged from 12.5 to 100% effluent. C-NOEC results using *P. promelas* ranged from <6.25 to 100% effluent (n=21 valid tests using lab water as diluent). The C-NOEC was <6.25% effluent for three of these tests (January 2002, January 2003, and April 2003). It should be noted that whole effluent acute and chronic toxicity in this discharge has been vastly reduced since the upgrades to the treatment plant were completed in 1998.

Whole effluent toxicity tests were conducted on the Stockbridge WWTP effluent between October 2004 and October 2005 using *C. dubia* and *P. promelas* as test organisms. The LC₅₀s for both test organisms were ≥ 100% effluent (n=3) (TOXTD database).

Chemistry-water

DWM sampled the water quality of this segment of the Housatonic River at three stations in 2002. Station 19A was located ~360 feet upstream from Valley St. and downstream from the Lenox WWTP discharge. Station 19C was located ~300 feet downstream from Lee WWTP in Lee. Station 19E was located

upstream from railroad bridge, east of Rte. 183 in Stockbridge. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours.

Water quality conditions at Station 19A generally met criteria. High phosphorous concentrations were recorded on 3 of 4 visits (concentrations ranging from 0.04 to 0.19 mg/L).

Water quality conditions at Station 19C were generally poor (low DO/saturation, extremely high concentrations of both total phosphorous and ammonia-nitrogen). Two of the five ammonia-nitrogen measurements were above toxic levels (4.48 and 5.72 mg/L). Total phosphorous levels at Station 19C were 2 to 5 times higher than levels measured upstream at 19A. However, water quality data collected downstream from the Lee treatment plant at Station 19C were collected on the same bank as the effluent discharge. Despite being 300 feet below the outfall, it is likely that these samples are not representative of a fully mixed effluent at this point in the river. [Note: The concentration of ammonia in the Lee WWTP effluent reported by the facility in their monthly discharge monitoring reports (DMRs) between May and September 2002 ranged from 7.7 to 22 mg/L. The monthly average concentration of total phosphorous ranged from 0.52 to 1.7 mg/L, and the maximum total phosphorous concentration measured was 6.3 mg/L. The total phosphorus concentrations in the Schweitzer-Mauduit WWTP effluent reported by the facility in their monthly DMRs between May and September 2002 ranged from 0.02 to 1.0 mg/L, although the discharge from this facility is approximately four times greater than the Lee WWTP effluent.]

Continuous *in-situ* temperature monitoring was conducted from the 25th of July through the 28th of August, 2002, behind HVA offices on Route 102 in Lee (Appendix H). In-stream temperatures ranged from 19.2-27.0 °C. The mean temperature over this 35-day period was 22.3 °C.

USGS also collected discrete water samples from the Housatonic River near Glendale on 18 September 2003 (USGS 2006b). Water quality collected by USGS at this station was similar to conditions observed by DWM at Station 19E in 2002. Phosphorous was recorded as 0.05 mg/L.

Water quality conditions at Station 19E generally met criteria, with the exception of high phosphorous levels collected on 3 of 4 visits.

Chemistry- sediment

Blasland, Bouck & Lee, Inc. and Quantitative Environmental Analysis, LLC. prepared a 2003 report for the General Electric Company detailing the extent of PCB contamination in Housatonic River sediments (BBL 2003). This report was based upon sediment cores collected by the EPA and BBL/GE between 1997 and 2002. Study reaches 7 and 8 as described in this report are located within Segment MA21-19. Study Reach 7 is defined as the river section from downstream of Woods Pond Dam to the upstream extent of Rising Pond. Study Reach 8 is defined as Rising Pond from its upstream extent to the Risingdale impoundment dam.

Concentrations of PCBs and total organic carbon (TOC) measured in the top 6 inches of sediment within reaches of this segment of the Housatonic River are summarized below (BBL 2003 as summarized by Poach and Kurpaska 2006). The numbers (n) of cores analyzed to produce the results appear in parentheses after the reach designation.

Reach (n)	Sediment PCB Concentration in 0 - 6 inch layer (mg/kg)			
	Min	Max	Mean	Median
7 (198)	ND	38	1.8	0.28
8 (25)	ND	11	2.7	2.2

Reach (n)	Sediment TOC Concentration in 0 - 6 inch layer (%)			
	Min	Max	Mean	Median
7 (173)	ND	19	2.1	1.8
8 (27)	ND	5.3	2.4	2.4

Since minimum TOC levels were listed as non-detectable, the median TOC concentrations were used to calculate the S-EL and make this a conservative estimate of the level of PCB toxicity. The mean PCB sediment concentrations within these reaches did not exceed the PCB S-EL. Maximum PCB sediment concentrations did not exceed the total PCB S-EL based upon the maximum TOC levels (Persaud et al 1993).

Chemistry- fish tissue

Weston Solutions, Inc. prepared a 2004 report for the Army Corps of Engineers and the U.S. Environmental Protection Agency detailing the extent of PCB contamination in fish tissue from fish caught in the Housatonic River (Weston 2004). This report is based upon fish collected by the EPA between 1998 and 2002. Reaches 7 and 8 are located within Segment MA 21-19.

Concentrations of PCB in fish collected from reaches within Housatonic River Segment 21-19 appear below (Weston 2004 as summarized by Poach and Kurpaska 2006). The numbers of fish analyzed to produce the results appear in parentheses after the fish name.

Composite concentrations of PCB in young of the year fish in 2002

Young of Year tPCB (µg/kg w/w)			
Reach	Min	Max	Fish Sampled
7	2,000	4,200	largemouth bass (7), bluegill (3), pumpkinseed (4)

Whole body concentrations of PCB in fish

Whole Body tPCB (µg/kg w/w)			
Segment Reach	Min	Max	Fish Sampled
8	12,800	41,500	largemouth bass (14)

Composite concentrations of PCB in fish

Composite tPCB (µg/kg w/w)			
Segment Reach	Min	Max	Fish Sampled
8	8,080	11,200	largemouth bass (5), pumpkinseed (5), yellow perch (5)

All of the whole fish samples analyzed for total PCB exceeded (by between 4 and 83 times) the NAS/NAE guideline for the protection of fish eating wildlife (500µg/kg wet weight).

The *Aquatic Life Use* is assessed as impaired for this reach based upon high levels of PCB contamination in whole fish exceeding the NAS/NAE guideline for the protection of fish eating wildlife. PCB contamination of surficial sediments was greatly reduced within this reach when compared to sediments upstream. Water quality data indicate nutrient enrichment affects in the upper half of this reach (the upper 9.2 miles). Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources all likely contribute to this condition. Although the RBP III analyses of benthic communities at three stations in this reach show either slight or no impacts and fish communities appear normal for a warm water fish community, the frequent poor survival of *P. promelas* exposed to river water upstream from the MW Custom Papers WWTF Laurel Mill and Willow Mill is of concern. Acute and/or chronic whole effluent toxicity has been greatly reduced in the MW Custom Papers WWTF Laurel and Willow Mill effluents, although it is still occasionally present. Whole effluent toxicity in the Schweitzer-Mauduit WWTP effluent is also of concern.

FISH CONSUMPTION

Weston Solutions, Inc. prepared a 2005 report for the Army Corps of Engineers and the U.S. Environmental Protection Agency detailing the extent of PCB contamination in fish fillets from fish caught in the Housatonic River. The mean total PCB concentrations in fish fillets collected in Rising Pond were reported as follows: bass 3.8, bullhead 4.5, perch 8.2, and sunfish 2.9 mg/kg wet weight (Weston 2005).

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA

DPH advisory recommends: “*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*”.

Due to the MA DPH site-specific fish consumption advisory the *Fish Consumption Use* is assessed as impaired for the entire 19.9 miles of this segment because of PCB levels in edible fish tissue.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria samples from this segment of the Housatonic River at water quality stations 19A, 19C, and 19E (Appendix B). The geometric mean of five samples collected at the upstream station, 19A, was 77 cfu/100mL. One bacteria sample did exceed 400 cfu/mL (1300 cfu/mL). Further downstream at Station 19C (300 feet below the Lee WWTP), the geometric mean of five samples was 979 cfu/100mL. Three samples collected at this station exceeded 400 cfu/mL. None of the five samples collected at the most downstream station, 19E, exceeded 70 cfu/mL.

HVA volunteers conducted a shoreline survey within this segment of the Housatonic River from the dam at Woods Pond in Lenox to the Willow Mill Dam in South Lee in May of 2001. At the impoundment created by the Schweitzer-Mauduit dam, the river was described as weedy with occasional patches of milfoil. Multiple stormwater pipes were noted. The majority of this segment was described as beautiful with few signs of human disturbance (HVA 2001).

DWM biologists noted moderate to dense filamentous green and brown algae covered the rock substrates at Station 19A (~360 feet upstream from Valley St. and downstream from the Lenox WWTP discharge) (MassDEP 2002b). DWM personnel also made field observations during the surveys conducted between May and September 2002. At Station 19A water clarity was generally clear and no scum was noted. Generally, no water odor was noted, but on two occasion an odor was recorded (septic and chlorine, respectively). With the exception of one occasion where trash was noted, objectionable deposits were not noted (MassDEP 2002a).

There was a “septic” odor coming from the water at Station 19C (~300 feet downstream from Lee WWTP in Lee), and dense algal growth on both the submerged plants and rocks (MassDEP 2002b). No objectionable deposits or scum were noted, but a septic water odor was noted on all occasions. Water clarity was generally clear (MassDEP 2002a).

HVA volunteers also conducted a shoreline survey of the Housatonic River from the Willow Mill Dam in South Lee to the Risingdale dam in Great Barrington in May of 2002 (HVA 2002a). Volunteers noted that immediately downstream from the Willow Mill Dam riffles and pools contain heavy algae growth. A grey slippery clay-like material was observed in weeds below two pipes in the same areas. Red and blue stains were seen below the mill on the river bottom soil. Garbage was noted in isolated areas throughout the segment.

Above the Glendale Dam there was an influx of duckweed. An “alluvial fan of sand” was deposited at a stormwater pipe outfall from Route 183. Algae and an oily sheen were noted in the cove just downstream from the discharge. Numerous other pipes were also reported. Overall, however, this section was described as attractive and appeared to be healthy (HVA 2002a).






The river moves swiftly at Station 19E (upstream from the Railroad bridge, east of Rte. 183 in Stockbridge). The water had a slightly musty odor and moderate amounts of filamentous green algae covered many of the rocks (MassDEP 2002b). Water clarity was generally clear and no scums were noted. Generally, no objectionable deposits were noted, but on two occasions slight deposits of trash were observed. Out of ten visits, on three occasions a musty odor was recorded and on one occasion a pulp mill smell was recorded (MassDEP 2002a).

Weston Solutions, Inc. prepared a 2005 report entitled “Human Health Risk Assessment GE/Housatonic River Site, Rest of River” for the U.S. EPA and U.S. Army Corps of Engineers (Weston 2005). In this study, total hazard index values calculated for reasonable maximum exposure to sediment within Housatonic River reach 7, located within segment MA21-19, were shown to fall below the EPA non-

cancer hazard level of 1.0. Total hazard index values calculated for the central tendency exposure to sediment within this segment were all less than the EPA non-cancer hazard level of 1.0.

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as impaired for the upper 9.2 mile reach of this segment, based primarily upon the excess algal growth observed in the river. It is BPJ that the high bacteria counts measured at Station 19C, though concerning, are not representative of the entire river in that section and most likely reflect the Lee WWTP effluent quality. The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support downstream from the Willow Mill dam (the lower 10.7 miles of this segment). This is based upon the water quality, lack of elevated bacteria counts, acceptable cancer risk assessment values, and field observations of DWM personnel and HVA volunteers.

HOUSATONIC RIVER (Segment MA21-19) Use Summary

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: PCBs in whole fish and sediment, elevated total phosphorus in upper 9.2 miles of segment Source: inappropriate waste disposal from General Electric Site for PCB contamination Suspected source: Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources
Fish Consumption		IMPAIRED Cause: PCBs Source: inappropriate waste disposal from General Electric Site
Primary Contact		IMPAIRED Upper 9.2 mile reach Cause: Objectionable algal growth Source: Unknown Suspected source: Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources SUPPORT lower 10.7 mile reach
Secondary Contact		IMPAIRED Upper 9.2 mile reach Cause: Objectionable algal growth Source: Unknown Suspected source: Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources SUPPORT lower 10.7 mile reach
Aesthetics		IMPAIRED Upper 9.2 mile reach Cause: Objectionable algal growth Source: Unknown Suspected source: Nutrient inputs from point sources (municipal and industrial) and non-point source runoff exacerbated by impoundments and other upstream sources SUPPORT lower 10.7 mile reach

RECOMMENDATIONS

Stressors resulting in the "slightly impacted" conditions observed at Station 19A in 2002 likely can be traced to the effects from Woods Pond and, potentially, the Lenox WWTP. While the extensive wetlands in Woods Pond may be a natural condition, upstream / downstream water quality monitoring should be performed to determine if any effect is occurring as a result of the operation of the Lenox WWTP.

More benthic community study is needed, with more locations (particularly bracketing the NPDES discharges and potential nonpoint sources), to determine if the benthic community is indeed slightly or

non-impacted as the three 2002 stations indicate. Consider bracketing more of the point source discharges with water quality stations to define nutrient inputs into the system (total phosphorous loads especially).

More bacteria sampling stations (both banks, and farther down) are required downstream from Lee to better evaluate uses within that stretch of the river.

The Lee WWTP effluent does not appear to be readily mixing with the river water as evidenced by the poor water quality observed at Station 19C. Investigate mixing zone of discharge under various flow conditions and how far downstream this condition may persist.

Investigate the correlation between the discharge from the Lee WWTP and/or run-off from the town of Lee and the impairment of the benthic community at Station 19C.

Evaluate the results of the flow study in the bypass reach of the Glendale Hydroelectric Project and make appropriate recommendations to protect aquatic life in the bypass reach of the project.

Because of the frequency of the reduced survival of *P. promelas* in the Housatonic River downstream from the Lee WWTP discharge, additional in-stream studies (ambient chronic toxicity testing) should be conducted. If significant chronic toxicity is detected, determine cause(s) and source(s) of in-stream toxicity.

Investigate the sources/causes of the chronic and acute toxicities observed in the Schweitzer-Mauduit WWTP effluent, particularly during the month of March.

GREENWATER BROOK (SEGMENT MA21-27)

Location: Headwaters, outlet of Greenwater Pond, Becket, to the confluence with Goose Pond Brook, Lee.

Segment Length: 4.4 miles.

Classification: Class B.

This is a new segment, and therefore it does not appear on the 2004 Integrated List.

USE ASSESSMENT

AQUATIC LIFE USE

Biology

MA DFG conducted fish population at one site (Site 676) on Greenwater Brook, just downstream from the confluence with Basin Pond Brook, on 19 August 2002 using backpack electroshocking equipment (Richards 2006). A total of 170 fish were collected including 144 brown trout (49-335 mm in length), 24 slimy sculpin, and two brook trout (230 and 235 mm long).

Chemistry-water

DWM sampled the water quality of Greenwater Brook Station (Station GWPB) between May and September 2002. Station GWPB was located downstream from Forest St., Lee (Appendix B). *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). All *in-situ* and water quality measurements/data met water quality standards.

The *Aquatic Life Use* is assessed as support based on the fish community and the limited water quality data. The fish community was comprised of multiple age classes of brown trout, a pollution intolerant fluvial dependent species. All water chemistry parameters met standards.






PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria and *E. coli* samples from Greenwater Brook at Station GWPB, Forest Street in Lee, between May and September 2002 (Appendix B). None of the fecal coliform bacteria counts exceeded 160 cfu/100mL. DWM collected optical brightener samples from Greenwater Brook at Station GWPB, Forest Street in Lee, over two-day periods on July 29th and September 23rd, 2002 (Appendix I). One of the two results was positive for optical brightening agents. It should be noted that the positive optical brightener result was obtained on 9/25, which corresponded to the highest observed fecal coliform measurement of 160 cfu/100 mL. At this time more bacterial and optical brightener data would need to be collected to prove or disprove the presence of a human source.

DWM personnel made field observations at Station GWPB during the surveys conducted between May and September 2002. No objectionable deposits, scums or water odors were noted (MassDEP 2002a).

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support, based on the low fecal coliform bacteria counts and the lack of any objectionable conditions.

GREENWATER BROOK (Segment MA21-27) Use Summary

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

RECOMMENDATIONS

Fish community data collected in 2002 indicate that Greenwater Brook merits consideration to be designated as a cold water fishery. Its receiving water, Goose Pond Brook, has already been designated as a cold water fishery. The appropriate fish community and temperature data should be collected to validate the designation of Greenwater Brook as a cold water fishery.

GOOSE POND BROOK (SEGMENT MA21-07)

Location: Outlet of Goose Pond, Tyringham, to confluence with Housatonic River, Lee.

Segment Length: 3.3 miles.

Classification: Class B, Cold Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for pathogens (MassDEP 2005a).

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment at Station GPB07A (B0506), approximately 100 meters downstream from Forest Street in Lee, MA. The total habitat score for Station GPB07A was 174 out of 200 (Appendix C). There were no aquatic macrophytes within the reach, but algal coverage was estimated at 60%. Algae types included green filamentous and thin film algae attached to rocks in the riffle zones. Canopy cover was estimated to be 30%. The dominant algal genera was *Cladophora* sp. (Appendix G).

Biology

DWM sampled the benthic macroinvertebrate community at Station GPB07A (see above) in 2002 (Appendix B). RBP III analysis indicated this station was slightly impacted when compared to the regional reference station on Windsor Brook (WB01).

MA DFG conducted fish population sampling on Goose Pond Brook on 19 August 2002 at Site 627, Tyringham Road, in Lee (Richards 2006). A total of 214 fish were collected, including: 81 longnose dace, 65 brown trout (69-218 mm length), 39 blacknose dace, 23 bluntnose minnow, four creek chub, one brook trout, and one rainbow trout.

Chemistry-water

DWM sampled the water quality of Goose Pond Brook at Station 07A between May and September 2002. Station 07A was located ~30 feet upstream from the Greenwater Brook confluence, Lee. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). All *in-situ* and water quality measurements/data met water quality criteria.

The *Aquatic Life Use* is assessed as support based on the RBP III analysis, fish community and water quality data. The fish community was comprised of multiple age classes of brown trout, a pollution intolerant fluvial dependent species. All water chemistry parameters met standards.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS






DWM collected fecal coliform bacteria and *E. coli* samples from Goose Pond Brook at Station 07A between May and September 2002 (Appendix B). None of the fecal coliform counts exceeded 30 cfu/100mL. Goose Pond Brook was also sampled at Station 07B, Tyringham Road, Lee on 5 and 25 September 2002. Fecal coliform bacteria counts were 90 and 70 cfu/100mL respectively.

DWM biologists noted on September 11, 2002 at Station GPB07A (B0506) that water was clear with no odors or surface oils (MassDEP 2002b). DWM personnel also made field observations during the surveys conducted between May and September 2002. No objectionable deposits, scums or water odors were recorded. It was noted that there was a storm drain producing sedimentation in this reach. Water clarity recorded as clear on all occasions (MassDEP 2002a).

DWM collected optical brightener samples from Goose Pond Brook at two stations in Lee; Station 07A at Forest Street and Station 07B at Tyringham Road. Samples were collected at Station 07A over two day periods on July 29th and September 23rd, 2002. One sample was collected at Station 07B on September 23rd, 2002 (Appendix I). Optical brightener results for all three of these samples were negative.

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support, based on the low fecal coliform bacteria counts and the lack of any objectionable conditions.

GOOSE POND BROOK (Segment MA21-07) Use Summary

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

HOP BROOK (SEGMENT MA21-28)

Location: Headwaters, outlet of Curtin Pond, Otis, to the confluence with the Housatonic River, Lee.

Segment Length: 11.9 miles.

Classification: Class B.

This is a new segment, and therefore it does not appear on the 2004 Integrated List.

USE ASSESSMENT

AQUATIC LIFE USE

Biology

DWM/MA DFG conducted fish population sampling on Hop Brook on 20 August 2002 at Site 682 upstream from Merry Brook and Jerusalem Road in Tyringham (Richards 2006). A total of 703 fish, representing 10 species, were collected including 433 blacknose dace, 135 longnose dace, 89 common shiner, 18 tessellated darter, 11 creek chub, six white sucker, five brown trout (75-260mm), four rock bass, one brook trout (80 mm), and one pumpkinseed. This fish community was dominated by fluvial specialist species.

Chemistry-water

DWM sampled the water quality of Hop Brook Station at Station HB, Meadow Street in Lee, between May and September 2002 (Appendix B). *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). Although one pre-dawn dissolved oxygen saturation measurement (out of 5) was below 60%, given the low stream gradient and potential influence of wetlands, these conditions are considered to be naturally occurring. All other measurements were indicative of good water quality conditions and met water quality criteria.

Continuous *in-situ* temperature monitoring was conducted from the 25th of July through the 28th of August, 2002 at Station HB (Appendix H). In-stream temperatures ranged from 17.2-28.5 °C. The mean temperature over this 35-day period was 22.8 °C.

DWM biologists collected a chlorophyll *a* sample from Station HB on July 31st, 2002. The chlorophyll *a* level measured on this date was <1 mg/m³ (Appendix G).

The *Aquatic Life Use* is assessed as support for Hop Brook, based upon the limited water quality data and the relatively diverse fish community dominated by fluvial specialist species.






PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria and *E. coli* samples from Hop Brook at Station HB between May and September 2002 (Appendix B). The maximum fecal coliform measurement was 160 cfu/100mL.

DWM personnel made field observations during the surveys conducted between May and September 2002. Water clarity was generally noted as slightly turbid, except on one occasion when it was highly cloudy. No scum or water odor was noted and no objectionable deposits were noted with the exception of one occasion where trash was observed (MassDEP 2002a).

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support, based on the low fecal coliform bacteria counts and the general lack of any objectionable conditions.

HOP BROOK (SEGMENT MA21-28) Use Summary

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

LARRYWAUG BROOK (SEGMENT MA21-29)

Location: Headwaters, outlet Stockbridge Bowl, Stockbridge, to confluence with Housatonic River, Stockbridge.

Segment Length: 2.9 miles.

Classification: Class B.

This is a new segment, and therefore it does not appear on the 2004 Integrated List.

WMA WATER WITHDRAWALS (APPENDIX J)

Stockbridge Water Department (10228301)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

HVA volunteers have been monitoring the height of the water flowing over the spillway structure at the outlet of Stockbridge Bowl since January 2004 as part of the Massachusetts Riverways Program pilot River Instream Flow Stewards (RIFLS) project (MA DFG 2006b). In addition to the passive spillway dam, there is also a gate valve at the outlet that can be set manually. Stage height and some limited streamflow data have also been collected by the volunteers for Larrywaug Brook at the most upstream crossing of Route 183 in Stockbridge (MA DFG 2006b). HVA has expressed concern about alteration of the natural flow pattern in Larrywaug Brook due to manual manipulation of the outlet, leaves clogging the outlet structure, and beavers attempting to build a dam at the outlet.

Biology

DWM/MA DFG conducted fish population sampling at two stations on Larrywaug Brook on 19 July 2002. Site 621 was located upstream from Averic Road in Stockbridge (Richards 2006). A total of 115 fish, representing 5 species, were collected including 84 longnose dace, 17 blacknose dace, six bluntnose minnow, five rock bass, and three largemouth bass. Site 616 was located at the Route 183 crossing South of the Mass Pike in Stockbridge (Richards 2006). A total of 117 fish, representing 10 species, were collected including 41 blacknose dace, 25 longnose dace, 22 fallfish, 17 common shiner, two bluegill, three smallmouth bass, three white sucker, two rock bass, one largemouth bass, and one bluntnose minnow.

At both stations, fluvial species and individuals that are tolerant to moderately tolerant of pollution dominated the fish community. Longnose dace were the only cold water fish species present.






The *Aquatic Life Use* is assessed as support based upon the fish community (dominated by fluvial species) and BPJ.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

E. coli bacteria testing was conducted at Averic Road Park Beach on Larrywaug Brook in Stockbridge. Eleven tests were conducted in both 2004 and 2005 (MA DPH 2005a, 2006). Only one of these samples, with a count of 250 cfu/100mL, collected in 2005, exceeded the bathing beach single sample criteria of 235 cfu/100mL. There were no postings at this beach. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no *Primary Contact Recreational Use* assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are not assessed due to a lack of data.

LARRYWAUG BROOK (Segment MA21-29) Use Summary

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

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

Due to the manipulated flows observed by HVA volunteers at the outlet of Stockbridge Bowl, local regulatory authorities are encouraged to establish a flow management strategy to protect in-stream biota in Larrywaug Brook.

HOUSATONIC RIVER (SEGMENT MA21-20)

Location: Outlet of Risingdale Impoundment, Great Barrington, to the state line in Sheffield, MA/Canaan, CT.

Segment Length: 23.0 miles.

Classification: Class B, Warm Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for priority organics, pathogens, and taste, odor, and color (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Butternut Basin Ski Area (10211304/ 9P210211302)

Fox River Paper Co.-Rising Paper Division (10211303)

Great Barrington Fire District (10211301)

Sheffield Water Company (10226701)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Fox River Paper Company, Rising Paper Division (MAG250281)

Great Barrington WWTP (MA0101524)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

The United State Geological Survey (USGS) maintains one streamflow monitoring gage on this segment of the Housatonic River. USGS Gage #01197500, Housatonic River near Great Barrington, MA, is located on the left bank at upstream side of the highway bridge at Van Deusenville and 0.5 mi upstream from Williams River, Great Barrington. Data are available from 1913 to the present. The drainage area at the gage is 282 mi² and the average annual discharge over the period of record is 527 cfs. According to USGS, flows are regulated by power plants upstream during low flows and since 1973 high flows are slightly affected by a retarding reservoir (Socolow *et al.* 2004). The estimated 7Q10 at the gage is 69 cfs (Wandle and Lippert 1984).

USGS measured instantaneous discharge from the Housatonic River near Ashley Falls, MA (Station #01198125) between October 1991 and September 2004. Discharge measurements from January, March, May, June, July, August, September, and November 2002 through 2004 (n=23) ranged between 106 cfs and 1790 cfs (USGS 2006c).

Biology

The few large rocks and boulders that were part of the substrate at Station 20D (described below) were covered with long, green, filamentous algae (Appendix B).

MA DFG conducted fish population sampling by barge within this segment of the Housatonic River at four sites between 2002 and 2004 (Richards 2006). Fish community data collected between 2002 and 2004 varied between stations based upon differences in habitat and the influence of tributaries. At two stations, the fish assemblage was dominated by macrohabitat generalist species. The other two stations were dominated by fluvial dependent/specialist species. The fish community was dominated by species tolerant and moderately tolerant to pollution. Pollution intolerant fish species were represented only by two brown trout, which may or may not have been stocked fish. Species observed at these four sites are presented below in Table 1.

Table 1: Fish species observed at four stations located within the Housatonic River (Segment MA21-20)

	Site 623 Upstream of Division St., Great Barrington July 17 2002 (n=254)	Site 645 Upstream of Cottage St., Great Barrington Sept. 19 2002 (n=136)	Site 1094 ~350m upstream of Kellogg St., Sheffield August 6 2004 (n=154)	Site 624 Upstream side of Kellogg St., Sheffield July 16 2002 (n=208)	Total
Smallmouth bass	35	85	6	11	137
White sucker	9	13	78	11	111
Bluntnose Minnow	46		32	18	96
Common shiner	85				85
Rock bass	27	17	3	28	75
Green sunfish			3	47	50
Pumpkinseed	1	3	2	41	47
Fallfish	2	17	14	3	36
Tessellated darter	2		10	15	27
Longnose dace	22		3		25
Yellow perch				22	22
Bluegill	10		1	9	20
Common carp	10				10
Largemouth bass	2			1	3
Brown trout	1 (183mm)	1 (245mm)			2
Northern pike	1			1	2
Blacknose dace			1		1
Banded killifish				1	1
Spottail shiner			1		1
Brown bullhead	1				1

Toxicity

Ambient

The Great Barrington WWTP staff collected water from the Housatonic River approximately 500 feet upstream from Outfall # 001 at the Bridge Street Bridge for use as dilution water in their whole effluent toxicity tests. Between June 2000 and March 2006 (n=24) survival of *C. dubia* exposed (7-day) to the river water ranged from 90 to 100% (TOXTD database). Between June 1999 and June 2000 (n=7) survival of *P. promelas* exposed (7 day) to the river water ranged from 30 to 98%. Survival was less than 75% in 5 of 7 test events (TOXTD database).

Effluent

Between June 2000 and March 2006, twenty-four whole effluent toxicity tests were conducted on the Great Barrington WWTP effluent using the test organism *C. dubia*. The LC₅₀s ranged from 8.8 to 100% effluent with four of the 21 test events not meeting the permit limit of LC₅₀ ≥ 100% effluent. The C-NOEC results ranged from < 6.25 to 100% effluent (TOXTD database). The facility is only required to report the C-NOEC results. It should be noted, however, that acute toxicity was present in three of the five chronic tests conducted between March 2005 and March 2006 in the second or third renewal samples.

Chemistry-water

DWM conducted water quality at two stations on this segment of the Housatonic River between May and September 2002. Station 20A was located upstream from Division Street (USGS gage 01197500) in Great Barrington and Station 20D was located upstream from Kellogg Road in Sheffield. *In-situ* sampling was conducted on five occasions at each station to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (Appendix B).

Continuous *in-situ* temperature monitoring was conducted from the 25th of July through the 24th of August, 2002 at Station 20A, Division St. (Appendix H). In-stream temperatures ranged from 19.6-31.0 °C. The mean temperature over this 35-day period was 24.1 °C.

USGS collected discrete water samples from the Housatonic River near Ashley Falls, MA (Station #01198125) between October 1991 and September 2004. Data were collected from January, March, May, June, July, August, September, and November 2002 through 2004 (n=23) (USGS 2006d).

USGS water quality data corroborated those collected by DWM. With the exception of slightly elevated total phosphorous concentrations, all other water quality measures collected by both groups at a total of three stations met criteria and were indicative of good water quality.

DWM biologists collected chlorophyll *a* samples from Stations 20A and 20D on July 31st and September 25th 2002. Chlorophyll *a* levels measured on these dates were between 1.2 and 3.4 mg/m³, respectively (Appendix G). These are low chlorophyll *a* levels.

Chemistry- fish tissue

Weston Solutions, Inc. prepared a 2004 report for the Army Corps of Engineers and the U.S. Environmental Protection Agency detailing the extent of PCB contamination in fish tissue from fish caught in the Housatonic River (Weston 2004). This report is based upon fish collected by the EPA between 1998 and 2002. Reach 9 is located within Segment MA21-20.

Concentrations of PCB in fish collected from reaches within Housatonic River Segment MA21-20 appear below (Weston 2004 as summarized by Poach and Kurpaska 2006). The numbers of fish analyzed to produce the results appear in parentheses after the fish name.

Composite concentrations of PCB in young of the year fish in 2002

Reach	Young of Year tPCB (µg/kg w/w)		Fish Sampled
	Min	Max	
9	1,600	2,700	largemouth bass (7), bluegill (5), pumpkinseed (2), yellow perch (4)

All of the young of the year whole fish samples analyzed for total PCB exceeded (by between 3 and 5 times) the NAS/NAE guideline for the protection of fish eating wildlife (500 µg/kg wet weight).

The *Aquatic Life Use* is assessed as impaired for this reach because of PCB contamination in young of the year whole fish exceeding the NAS/NAE guideline for the protection of fish eating wildlife.

FISH CONSUMPTION

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*".

Based on the MA DPH site-specific fish consumption advisory, the *Fish Consumption Use* is assessed as impaired for this entire segment (23.0 miles) for elevated concentrations of PCBs in edible fish tissue.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria samples from this segment of the Housatonic River at the stations described above between May and September 2002 (Appendix B). Bacteria counts at this station ranged between <10 and 160 cfu/100mL, with no counts exceeding 400 cfu/100mL.

USGS also collected bacteria samples at their site near Ashley Falls (#01198125) between 1991 and 2004 (USGS 2006d). During the collection period between 2002 and 2004 (n=23) fecal coliform bacteria counts ranged from 35 to 2700 cfu/100mL, with only 2 counts (less than 10%) exceeding 400 cfu/100mL. The geometric mean of these 23 samples was 103 cfu/100mL.






DWM personnel made field observations at both water quality stations during each survey conducted between May and September 2002. Water clarity was generally described as clear and no objectionable deposits were noted. On the majority of occasions no water odor was noted although on three occasions a musty water odor was recorded (MassDEP 2002a).

In April of 2003, HVA volunteers conducted a shoreline survey of the Housatonic River from the Rising Pond Dam in Housatonic to Rob's Landing near the Sheffield border. Consistent with the upper portions of the Housatonic, HVA volunteers noted that this section was generally pleasant with occasional isolated areas of trash and debris and numerous storm water pipes (HVA 2003b).

HVA volunteers also conducted a shoreline survey from Rob's Landing at the Great Barrington/Sheffield town line to the Massachusetts/Connecticut state line in November 2003. In this section HVA volunteers noted numerous areas of erosion and a plethora of drainage pipes, but otherwise this section was a "pristine section of the Housatonic River" (HVA 2003a). Volunteers in the section near the Route 7A bridge in Ashley Falls noted "dairy cows grazing to the water's edge with evidence of them entering the river."

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support based on the low bacteria counts and the lack of objectionable conditions.

HOUSATONIC RIVER (Segment MA21-20) Use Summary

Designated Uses		Status
Aquatic Life		IMPAIRED Cause: PCBs in whole fish Source: inappropriate waste disposal from General Electric Site
Fish Consumption		IMPAIRED Cause: Elevated concentration of total PCB Source: inappropriate waste disposal from General Electric Site
Primary Contact		SUPPORT
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

RECOMMENDATIONS

Issues with *P. promelas* survival warrant a toxicity identification/reduction evaluation at the Great Barrington WWTF to reduce acute whole effluent toxicity.

Conduct future monitoring to evaluate the extent of elevated temperatures observed in this segment. Temperatures measured in the river at Great Barrington reached 31°C, and exceeded 28°C on 11 consecutive days in August 2002.

Monitor phosphorous levels given the presence of the Great Barrington WWTP and the possible expansion of the Fox River Paper Co.

Fish population assemblages should be monitored, as two of the four fish stations were dominated by macrohabitat generalist species. Also of note was the relative absence of pollution intolerant fish species.

FURNACE BROOK (SEGMENT MA21-21)

Location: Headwaters south of Route 295 (Canaan Road), Richmond, to inlet of Mud Ponds, West Stockbridge.

Segment Length: 3.6 miles.

Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aquatic Life* and *Aesthetics*) and was not assessed for others (MassDEP 2005a).

USE ASSESSMENT

AQUATIC LIFE USE






Biology

MA DFG conducted fish population sampling in Furnace Brook at Site 640, Furnace Road crossing in Richmond, on 5 September 2002 using backpack electroshocking equipment (Richards 2006). A total of 101 fish representing nine species were collected including: 24 creek chub, 20 blacknose dace, 17 brown trout (61-190 mm length), 11 rock bass, eight white sucker, eight pumpkinseed, seven largemouth bass, five chain pickerel, and one brook trout. Multiple age classes of brown trout, a pollution intolerant fluvial specialist species, were present.

The *Aquatic Life Use* is assessed as support based on the fish community data and the presence of intolerant fluvial species.

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are not assessed due to a lack of data.

FURNACE BROOK (Segment MA21-21) Use Summary

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

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

WILLIAMS RIVER (SEGMENT MA21-06)

Location: Source, outlet of Shaker Mill Pond, West Stockbridge, to confluence with Housatonic River, Great Barrington.

Segment Length: 11.0 miles.

Classification: Class B, Cold Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aquatic Life* and *Aesthetics*) and was not assessed for others (MassDEP 2005a).

Although this segment is classified as a cold water fishery, there are no records of young of year brook trout or brown trout, or slimy sculpin occurring in this river (Richards 2006, MA DFG 1971).

WMA WATER WITHDRAWALS (APPENDIX J)

Lenox Water Department (10215201)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

West Stockbridge WWTP (MA0103110)

Town of Lenox Root Reservoir WTF (MAG640015) located on Lenox Mountain Brook

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

Stage height and some limited streamflow data have also been collected for the Williams River at Division Street in Great Barrington between July 2003 and September 2006 by HVA volunteers partnering with the Massachusetts Riverways Programs pilot River Instream Flow Stewards (RIFLS) project (MA DFG 2006b).

DWM performed a habitat assessment at Station WR01 (B0017), downstream from Division Street, Great Barrington, MA (Appendix B). The total habitat score for Station WR01 was 142 out of 200 because of the moderate sediment deposition and poor bank stability. Low flow conditions and the limited width of the riparian vegetative zone also contributed to a lower habitat score. DWM biologists collected periphyton samples from two habitat types at Station WR01 in September of 2002 (Appendix G). Canopy cover within cobble/riffle habitat at this station was reported as 50%, algal cover was 30%, and the dominant algal genera was *Cladophora glomerata*. Canopy cover within cobble/pool habitat at this station was reported as 50%, algal cover was 30%, and the dominant algal genera were *Ulothrix zonata* and *Oscillatoria* sp.

Biology

Fish population sampling was conducted by either MA DFG (Richards 2006) or DWM (Appendix F) at a total of three stations on the Williams River in August of 2002 (See Table 2). The assemblage was dominated by fluvial dependent/specialists and most species were moderately tolerant to tolerant of pollution. It should be noted that the Williams River is on the MA Trout Stocked Waters 2006 list (MA DFG 2006a).

Table 2: Fish species observed at three stations located within the Williams River (Segment MA21-06)

	Site 629 ~3100 m downstream from MassPike, West Stockbridge 1 August 2002 (n=148)	Site 630 At Division Street, Great Barrington 13 August 2002 (n=253)	Site 683 ~170 m downstream from Division Street, Great Barrington 19 August 2002 (n=107)
Blacknose dace	--	41	6
Bluegill	11	--	--
Bluntnose minnow	--	50	--
Brown bullhead	6	--	--
Brown trout	--	3 (183-264 mm)	1 (448 mm)
Chain pickerel	6	--	--
Common shiner	41	23	21
Creek chub	--	2	--
Fallfish	29	2	--
Golden shiner	--	1	--
Largemouth Bass	1	--	--
Longnose dace	--	56	60
Pumpkinseed	27	1	--
Rock bass	24	6	--
Smallmouth bass	1	35	13
Tessellated darter	--	6	2
White sucker	2	27	4

DWM sampled the benthic macroinvertebrate community at Station WR01 (see above) in 2002. RBP III analysis indicated this station was non-impacted when compared to the regional reference station EB01B on the East Branch Housatonic River (Appendix C).

Toxicity

Ambient

The Town of West Stockbridge contracted the services of a private laboratory to collect samples and perform laboratory analysis for their toxicity testing requirements. Water is collected from the Williams River approximately 30 feet upstream from outfall # 001 at the Old Train Bridge for use as dilution water in the whole effluent toxicity tests. Between April 1999 and April 2006, survival of *C. dubia* exposed (48 hours) to the river water ranged from 90 to 100% (n=22). Survival of *P. promelas* exposed (48 hours) to the river water between April 1999 and November 2004 (n=16) was 100% (TOXTD database).

Effluent

Whole effluent toxicity tests were conducted on the West Stockbridge WWTF effluent between April 1999 and April 2006 using *C. dubia* (n=22) and *P. promelas* (n=16) as test species. LC₅₀s were all $\geq 100\%$ effluent, with the exception of one test event in March 2001 (LC₅₀= 70.7% and 61.6 % for *C. dubia* and *P. promelas* respectively) (TOXTD database). It should be noted that the ammonia concentration in the effluent during the March 2001 test event was 25.1 mg/L (TOXTD Database).

Chemistry-water

DWM sampled the water quality of the Williams River upstream from Division Street in Great Barrington (Station 06A) between May and September 2002. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). Two of the five temperature measurements taken were greater than 20 °C. With the exception of the temperature measurements, all other *in-situ* measurements/data met water quality criteria.

The *Aquatic Life Use* for the Williams River is assessed as support based on the following: the RBP III analysis indicated the benthic community was non-impacted, the fish community was dominated by fluvial specialist/dependant species, there was excellent survival of organisms exposed to the river water, and most of the limited water quality data met criteria. In-stream temperatures did exceed criteria (20°C) on

two of five occasions. This use is identified with an Alert Status because of the apparent absence of reproducing cold water fish species. Although three brown trout were captured, there were no young of the year captured and these fish appear likely to have been stocked.






PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria and *E. coli* samples from the Williams River at Station 06A (described above) between May and September 2002 (Appendix B). The highest fecal coliform measurement recorded was 50 cfu/100mL.

DWM biologists noted at Station WR01 that the water was clear with no odors or surface oils. Silt deposits were noted in shallow areas (MassDEP 2002b). DWM personnel also made field observations at Station 06A during the surveys conducted between May and September 2002. No objectionable deposits, scums or water odors were recorded and water clarity was generally noted as clear (MassDEP 2002a).

Based upon the lack of objectionable conditions and the low fecal coliform measurements, this segment is assessed as support for the *Primary* and *Secondary Contact Recreation* and *Aesthetics* uses.

WILLIAMS RIVER (Segment MA21-06) Use Summary

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

* Alert Status issues identified, see details in use assessment

RECOMMENDATIONS

Conduct continuous temperature monitoring at several places to investigate the extent of thermal issues along this 11 mile stretch of river.

Conduct additional fish population and habitat monitoring to better evaluate the current status of the fish community in the Williams River.

LONG POND BROOK (SEGMENT MA21-14)

Location: Outlet of Long Pond, Great Barrington, to the confluence with Seekonk Brook, Great Barrington.

Segment Length: 2.0 miles.






Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 4c of the 2004 Integrated List of Waters. This segment was assessed as impaired or threatened due to flow alteration which is not a pollutant requiring calculations of a TMDL (MassDEP 2005a).

USE ASSESSMENT

No recent quality assured data are available, thus all uses are not assessed. Housatonic Water Works Company (WMA registration 10211306) withdraws from Long Pond.

LONG POND BROOK (Segment MA21-14) Use Summary

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

SEEKONK BROOK (SEGMENT MA21-22)

Location: Outlet of small impoundment east of West Road, Alford, to confluence with the Green River, Great Barrington






Segment Length: 4.8 miles.

Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).

USE ASSESSMENT

No recent quality assured data are available, thus all uses are not assessed.

SEEKONK BROOK (Segment MA21-22) Use Summary				
Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

GREEN RIVER (SEGMENT MA21-23)

Location: Alford, Massachusetts/ Hillsdale, New York border southwest of Route 71 to confluence with the Housatonic River, Great Barrington.

Segment Length: 10.1 miles.

Classification: Class B, Cold Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (*Aesthetics*) and was not assessed for others (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Great Barrington Fire District (10211301)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

Stage height and some limited streamflow data have been collected for the Green River at Hurlburt Street in Great Barrington between March and August 2006 by HVA volunteers partnering with the Massachusetts Riverways Programs pilot River Instream Flow Stewards (RIFLS) project (MA DFG 2006b).

DWM performed a habitat assessment at Station GR23A (B0497), downstream from Route 23/41 in Great Barrington, MA. The total habitat score for Station WR01 was 130 out of 200 because of "poor quality of in-stream features, not riparian features" (Appendix C). Habitat such as in-stream cover for fish was poor, and there was a large amount of sediment deposition. DWM biologists collected periphyton samples at Station GR23A in September of 2002 (Appendix G). Canopy cover at this station was reported as 10%, algal cover was 90%, and the dominant algal genera were *Zygnema* sp., *Mougeetia* sp., and *Cocconeis* sp.

Biology

DWM sampled the benthic macroinvertebrate community at Station GR23A (see above) in 2002. RBP III analysis indicated this station was non-impacted when compared to the regional reference station on the East Branch Housatonic River (Station EB01B).

MA DFG sampled two sites on the Green River. Site 649 was located downstream from Cross Road near West Plain Road in Great Barrington. One hundred twenty-two fish were collected, representing seven species, including: 69 brown trout (62-370 mm long), 30 slimy sculpin, nine brook trout (70-175 mm long), seven bluegill, three green sunfish, three pumpkinseed, and one blacknose dace. Site 669 was located between the Boston and Maine Railroad and Route 7 in Great Barrington (Richards 2006). A total of 162 fish were collected, representing 13 species, including: 89 white sucker, 26 brown trout (51-475 mm in length), 14 blacknose dace, nine slimy sculpin, eight tessellated darter, five bluntnose minnow, three green sunfish, two bluegill, two common shiner, one creek chub, one fallfish, one largemouth bass, and one rock bass. The fish community at station 649 was dominated by pollution intolerant fluvial specialist species. Station 669 displayed a diverse fish community, with 13 species present, and included multiple age classes of brown trout, a pollution intolerant species.

Chemistry-water

DWM sampled the water quality of the Green River at Station 23A, downstream from Rte. 23/41 in Great Barrington between May and September 2002 (Appendix B). *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). All *in-situ* measurements met water quality criteria.

The Aquatic Life use is assessed as support based upon the RBP III analysis of the macroinvertebrate community as non-impacted, the cold water fish communities, and the good water quality. Sedimentation issues are a concern (Appendix C).

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS






DWM collected fecal coliform bacteria and *E. coli* samples from the Green River at Station 23A between May and September 2002 (Appendix B). None of the fecal coliform counts exceeded 180 cfu/100mL.

The Town of Great Barrington conducted weekly *E. coli* bacteria testing at a bathing beach on the Green River in 2003 and 2004. Despite nine of the 23 counts exceeded the bathing beach single sample criteria of 235 cfu/100mL, there were no postings at this beach in 2003 or 2004 (MA DPH 2004, 2005a). Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no *Primary Contact Recreational Use* assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.

DWM biologists made field observations at Station GR23A on September 9, 2002. No sediment odors, deposits or oils were noted and the water was noted to be clear with no odors or oils (MassDEP 2002b). DWM personnel also made field observations at Station 23A during the surveys conducted between May and September 2002. No objectionable deposits, scums or water odors were noted and water clarity was generally noted as clear (MassDEP 2002a).

The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support, based on the low fecal coliform bacteria counts and the lack of any objectionable conditions.

GREEN RIVER (Segment MA21-23) Use Summary

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

RECOMMENDATIONS

Investigate the sediment contributions from the upstream agricultural activities. Monitoring of the biota has not yet shown an impact but the sediment contributions are significant enough to warrant concern for negative impacts in the future.

Continue to monitor elevated bacteria levels around the beach area, and, if possible, use bacteria source tracking methods to identify sources.

KARNER BROOK (SEGMENT MA21-16)

Location: Headwaters, east of East Street, Mount Washington, to the inlet of Mill Pond, Egremont.

Segment Length: 4.7 miles.

Classification: Class A, Public Water Supply.

This lower portion of this segment is located within the Karner Brook ACEC.

Based on the last evaluation of water quality conditions, this segment is listed in Category 4c of the 2004 Integrated List of Waters. This segment was assessed as impaired or threatened due to flow alteration which is not a pollutant requiring calculations of a TMDL (MassDEP 2005a).



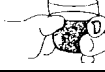



WMA WATER WITHDRAWALS (APPENDIX J)

Catamount Ski Area (10109001)

South Egremont water Company (PWS # 10900000-01S)

USE ASSESSMENT

No recent quality assured data are available, thus all uses are not assessed.

KARNER BROOK (Segment MA21-16) Use Summary					
Aquatic Life	Fish Consumption	Drinking Water*	Primary Contact	Secondary Contact	Aesthetics
					
NOT ASSESSED					

*The MassDEP Drinking Water Program maintains current drinking water supply data.

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

UNNAMED TRIBUTARY (SEGMENT MA21-24)

Location: Headwaters, outlet of Mill Pond, Egremont, to confluence with Hubbard Brook, Egremont.

Segment Length: 1.5 miles.






Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).

USE ASSESSMENT

No recent quality assured data are available, thus all uses are not assessed.

UNNAMED TRIBUTARY (Segment MA21-24) Use Summary

Aquatic Life	Fish Consumption	Primary Contact	Secondary Contact	Aesthetics
				
NOT ASSESSED				

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

WILLARD BROOK (SEGMENT MA21-30)

Location: Headwaters, north of Salisbury Road, Sheffield, to confluence with Hubbard Brook, Sheffield.

Segment Length: 4.1 miles.

Classification: Class B.

This is a new segment, so it does not appear on the 2004 Integrated List of Waters.

The upper portion of this segment is located within the Schenob Brook ACEC.

This segment goes through two impoundments: Fawn Lake and Combes Pond. The estimated retention time of Fawn Lake is approximately two days so it will be considered a run of the river impoundment (McVoy 2006). The retention time estimate was based on the annual historical mean discharge from two stream gages in the Housatonic River Basin (01197500 and 01197000) and the normal storage volume of the dam reported by MA DCR in their Massachusetts Dam Safety Program Database (Socolow *et al.* 2004 and MA DCR 2002).

USE ASSESSMENT






AQUATIC LIFE USE

Biology

Myriophyllum spicatum is present in Fawn Lake (MassDEP 2005b).

The *Aquatic Life Use* is assessed as impaired for the 0.4 mile reach of Willard Brook that flows through Fawn Lake based upon the presence of the non-native aquatic macrophyte *M. spicatum*. The remaining 3.7 miles of Willard Brook are not assessed for the *Aquatic Life Use* but are identified with an Alert Status due to the possible presence of non-native aquatic macrophytes.

WILLARD BROOK (Segment MA21-30) Use Summary

Designated Uses		Status
Aquatic Life		IMPAIRED 0.4 mile reach through Fawn Lake Cause: Non-native aquatic macrophyte infestation Source: Introduction of non-native plant NOT ASSESSED 3.7 miles*
Fish Consumption		NOT ASSESSED
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		NOT ASSESSED

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS

Conduct water quality monitoring to evaluate designated uses.

Determine if *M. spicatum* is present throughout this segment of Willard Brook. Continue to monitor for the presence of invasive non-native aquatic vegetation and determine the extent of the infestation. Prevent spreading of invasive aquatic plants. Once the extent of the problem is determined and control practices are exercised, vigilant monitoring needs to be practiced to guard against infestations in unaffected areas, including downstream from the site, and to ensure that managed areas stay in check. A key portion of the prevention program should be posting of boat access points with signs to educate and alert lake-users to the problem and their responsibility to prevent spreading these species. The Final GEIR for

Eutrophication and Aquatic Plant Management in Massachusetts (Mattson *et al.* 2004) should also be consulted prior to the development of any lake management plan to control non-native aquatic plant species. Plant control options can be selected from several techniques (e.g., bottom barriers, drawdown, herbicides, etc.) each of which has advantages and disadvantages that need to be addressed for the specific site. However, methods that result in fragmentation (such as cutting or raking) should not be used for many species because of the propensity for these invasive species to reproduce and spread vegetatively (from cuttings).

HUBBARD BROOK (SEGMENT MA21-15)

Location: Source, northwest of Townhouse Hill Road, Egremont, to confluence with Housatonic River, Sheffield (thru Mill Pond, which was formerly reported as Segment MA21068).

Segment Length: 9.4 miles.

Classification: Class B, Cold Water Fishery.

This segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment requires a TMDL for pathogens (MassDEP 2005a).

Mill Pond (MA21068) will no longer be reported as a lake segment since the retention time of this 97-acre waterbody was estimated at 8 days. It will be considered a run of the river impoundment (McVoy 2006). The retention time estimate was based on the annual historical mean discharge from two stream gages in the Housatonic River Basin (01197500 and 01197000) and the normal storage volume of the dam reported by MA DCR in their Massachusetts Dam Safety Program Database (Socolow *et al.* 2004 and MA DCR 2002).

Although this segment is classified as a cold water fishery, there are no records of young of year brook trout, brown trout, or slimy sculpin occurring in this river (Richards 2006, MA DFG 1971). One long nosed sucker, a cold water fish species, was observed in Hubbard Brook during a 1984 survey (Richards 2006).

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Sheffield Plastics, Inc. (MAR05B410 and MAR05B411)

USE ASSESSMENT

AQUATIC LIFE USE

Biology

Mill Pond is infested with two non-native aquatic macrophytes: *Myriophyllum spicatum* and *Trapa natans* (MassDEP 2003b, MassDEP 2004, and MassDEP 2005b). The Mill Pond impoundment encompasses a 2.4 mile reach of Hubbard Brook.

Chemistry-water

DWM sampled the water quality of Hubbard Brook at Station 15A, upstream from Route 7, Sheffield, between May and September 2002 (Appendix B). *In situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level).

One pre-dawn dissolved oxygen saturation measurement (out of 5) was below 75%. Temperatures were found to be elevated (24.0°C) during June and July, exceeding cold water standards of 20 °C. All other *in-situ* measurements/data met water quality criteria.

Continuous *in-situ* temperature monitoring was conducted from the 25th of July through the 28th of August, 2002 at Station 15A (Appendix H). In-stream temperatures ranged from 17.9-26.8 °C. The mean temperature over this 35-day period was 22.6 °C, and 31 of out of the 35 days had a mean daily temperature greater than the cold water criteria of 20°C.






The *Aquatic Life Use* is assessed as impaired for the 2.4 mile reach through the Mill Pond impoundment due to the presence of non-native aquatic macrophytes. The potential for infestation in the remaining 7.0 miles downstream is also of concern. Although elevated temperatures were documented and are of concern, the remainder of the reach is not assessed due the limited data available for this segment. Because of these issues the *Aquatic Life Use* is not assessed but is identified with an Alert Status in the remaining 7.0 miles.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform bacteria and *E. coli* samples from Hubbard Brook at Station 15A between May and September 2002 (Appendix B). Fecal coliform bacteria counts ranged from <10 to 290 cfu/100mL and the geometric mean was 90 cfu/100mL.

DWM personnel made field observations at Station 15A during the surveys conducted between May and September 2002. No objectionable deposits, scums or water odors were noted. Water clarity was generally slightly turbid, but on two occasions it was highly cloudy (MassDEP 2002a). The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* Uses are assessed as support based upon the low fecal coliform counts and the lack of objectionable conditions.

HUBBARD BROOK (Segment MA21-15) Use Summary

Designated Uses		Status
Aquatic Life		IMPAIRED 2.4 mile reach through Mill Pond Cause: non-native aquatic macrophyte infestation Source: Introduction of non-native plant NOT ASSESSED 7.0 miles*
Fish Consumption		NOT ASSESSED
Primary Contact		SUPPORT
Secondary Contact		SUPPORT
Aesthetics		SUPPORT

*Alert Status issues identified, see details in use assessment

RECOMMENDATIONS

Additional water quality monitoring is recommended, with better spatial coverage, to distinguish between Schenob Brook water quality and that of Hubbard Brook.

Determine if *M. spicatum* is present throughout this segment of Hubbard Brook. Continue to monitor for the presence of invasive non-native aquatic vegetation and determine the extent of the infestation. Prevent spreading of invasive aquatic plants. Once the extent of the problem is determined and control practices are exercised, vigilant monitoring needs to be practiced to guard against infestations in unaffected areas, including downstream from the site, and to ensure that managed areas stay in check. A key portion of the prevention program should be posting of boat access points with signs to educate and alert lake-users to the problem and their responsibility to prevent spreading these species. The Final GEIR for Eutrophication and Aquatic Plant Management in Massachusetts (Mattson *et al.* 2004) should also be consulted prior to the development of any lake management plan to control non-native aquatic plant species. Plant control options can be selected from several techniques (e.g., bottom barriers, drawdown, herbicides, etc.) each of which has advantages and disadvantages that need to be addressed for the specific site. However, methods that result in fragmentation (such as cutting or raking) should not be used for many species because of the propensity for these invasive species to reproduce and spread vegetatively (from cuttings).

Conduct bio-monitoring to better evaluate whether the upper and lower portions of Hubbard Brook are supporting cold water fish communities.

KONKAPOT RIVER (SEGMENT MA21-25)

Location: Outlet of Brewer Lake, Monterey, to the state line in New Marlborough, MA/Canaan, CT.

Segment Length: 16.5 miles.

Classification: Class B.

This segment is included on the 2004 303(d) List of Impaired Waters due to mercury contamination (<http://mass.gov/dep/water/resources/tmdls.htm>).

WMA WATER WITHDRAWALS (APPENDIX J)

Berkshire National Fish Hatchery (10211302)

Lowland Farm (10219301)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Berkshire National Fish Hatchery (MA0005401)

Gould Farm (MA0022705)

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM performed a habitat assessment of this segment of the Konkapot River as part of the benthic macroinvertebrate sampling at Station KR11 (B0015), downstream from Bidwell Park falls in Monterey, on 11 September 2002. This sampling reach received a score of 170 out of 200 (Appendix C). The habitat at this station, similar to others throughout the watershed, was affected by drought conditions (decreased channel flow status). DWM biologists collected periphyton samples at Station KR11 in September of 2002 (Appendix G). Canopy cover at Station KR11 was reported as 75%, algal cover was <1%, and the dominant algal genera were *Cladophora* sp., *Melosira* sp., and *Cocconeis* sp.

DWM also performed a habitat assessment at Station KR07 (B0012), east of Clayton Mill River Road, in the village of Mill River, New Marlborough. This sampling reach received a score of 172 out of 200 (Appendix C). Aquatic vegetation covered less than 1% of the in-stream habitat, and consisted entirely of mosses. DWM biologists collected periphyton samples at Station KR07 in September of 2002 (Appendix G). Canopy cover at Station KR07 was reported as 60%, algal cover was 80%, and the dominant algal genera were *Cladophora* sp. and an unidentified green coccoid.

Biology

MA DFG and DWM (Richards 2006, Appendix F) conducted fish population sampling at five stations along this segment of the Konkapot River. Data are summarized in the table below (from upstream to downstream).

Table 3: Fish species observed at three stations located within the Konkapot River (Segment MA21-25)

	Site 910 7/28/2003 n=62	Site 679 Great Barrington Rd, New Marlborough 8/19/2002 n=97	Site 670 Clayton Mill Rd, New Marlborough 7/31/2002 n=111	Site 909 Konkapot Road, New Marlborough 7/28/2003 n=69	Site 911 East of Canaan Southfield Road, New Marlborough 7/28/2003 n=30
Blacknose dace	41	50	31	9	5
Bluegill	--	--	1	2	--
Brook Trout		3 (77-80 mm)			
Brown bullhead	--	--	--	1	--
Brown trout	1 (373 mm)	12 (75-384 mm)	21 (67-440 mm)	5 (63-211 mm)	2 (76-78 mm)
Common shiner	4	1	2	4	3
Creek chub	2	--	--	--	--
Longnose dace	11	29	30	22	8
Pumpkinseed	1	--	1	19	--
Rock bass	2	1	1	2	3
Slimy sculpin	--	--	20	5	--
White sucker	--	1	4	--	9

Fluvial specialist fishes dominate the Konkapot River fish community. Although each station was dominated by pollution tolerant or moderately tolerant species such as blacknose or longnose dace, the presence of several pollution intolerant species and evidence of reproducing trout is indicative of good water quality throughout the segment.

DWM sampled the benthic macroinvertebrate community at two stations in this segment of the Konkapot River in September 2002. The most upstream sampling reach (Station KR11) was used as a reference station and typifies least impacted conditions and a healthy benthic community (Appendix C). The RBP III analysis of the benthic macroinvertebrate community in the Konkapot River at Station KR07 was non-impacted when compared to the KR11 reference station.

The *Aquatic Life Use* is assessed as support for this segment of the Konkapot River based upon the benthic macroinvertebrate community data, the high quality in-stream habitat, and the fish community data.

FISH CONSUMPTION

Because of elevated concentrations of mercury in fish collected from the Konkapot River downstream from the dam at Mill River, MA DPH issued a site specific fish consumption advisory (MA DPH 2005b). The advisory warns that children under 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body. In addition, the general public should limit consumption of all fish from this water body to two meals per month.






The lower 5.9 mile reach of this segment is assessed as Impaired for the *Fish Consumption Use* due to the MA DPH fish consumption advisory for elevated concentrations of mercury in fish tissue. The upper 10.6 miles of segment are not assessed for this use.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM field biologists made field observations at Stations KR11 and KR07 (B0015) during September 2002. No objectionable odors, deposits or oils were noted at either station and the water was described as being clear with no odors or oils (MassDEP 2002b).

The *Aesthetics Use* is assessed as support based upon the lack of objectionable conditions. No recent quality assured bacteria data are available, so the *Primary* and *Secondary Contact Recreation* uses are not assessed.

KONKAPOT RIVER (Segment MA21-25) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		NOT ASSESSED: Upper 10.6 miles IMPAIRED: Lower 5.9 miles CAUSE: Mercury SOURCE: Unknown SUSPECTED SOURCE: Atmospheric deposition
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		SUPPORT

RECOMMENDATIONS

Conduct water quality monitoring to assess the *Primary* and *Secondary Contact Recreation* uses and determine if Mill River village is having a negative impact on the water quality of the Konkapot River.

KONKAPOT RIVER (SEGMENT MA21-26)

Location: From the state line in Sheffield, MA/Canaan, CT, to the confluence with the Housatonic River, Sheffield.

Segment Length: 2.9 miles.

Classification: Class B.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for metals, organic enrichment/low DO, and pathogens (MassDEP 2005a).

USE ASSESSMENT

AQUATIC LIFE USE

Habitat and Flow

DWM biologists performed a habitat assessment of this segment of the Konkapot River as part of the benthic macroinvertebrate sampling at Station KR02 (B0500), approximately 100 meters downstream from Route 124, North Canaan, CT, on 9 September 2002. This sampling reach received a score of 139 out of 200 due to decreased channel flow status (drought conditions), lack of habitat variety (velocity-depth combinations), elevated sediment deposition, decrease in the in-stream cover, and highly abbreviated riparian zone width (Appendix C). DWM biologists collected periphyton samples at Station KR02 in September of 2002 (Appendix G). Canopy cover at this station was reported as 0%, algal cover was 25%, and the dominant algal genera were *Cladophora* sp. and *Tabellaria* sp.

Biology

DWM sampled the benthic macroinvertebrate community at Station KR02 in 2002 (Appendix C). The RBP III analysis indicated this station was non-impacted when compared to the upstream Konkapot River reference station (KR11).

Chemistry-water

DWM sampled the water quality of the Konkapot River upstream from the railroad bridge, ~160 feet upstream from Rte. 7A, in Sheffield (Station 26A), between May and September 2002. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected and analyzed for total suspended solids, ammonia-nitrogen, and total phosphorus (low-level). All in-situ measurements met water quality criteria.

The *Aquatic Life Use* is assessed as support for this segment of the Konkapot River based upon the benthic macroinvertebrate community data and the *in-situ* water quality data.

FISH CONSUMPTION

Because of elevated concentrations of mercury in fish collected from the Konkapot River downstream from the dam at Mill River, MA DPH issued a site-specific fish consumption advisory (MA DPH 2005b). The advisory warns that children under 12 years of age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body. In addition, the general public should limit consumption of all fish from this water body to two meals per month.

This segment is assessed as Impaired for the *Fish Consumption Use* due to the MA DPH fish consumption advisory for elevated concentrations of mercury in fish tissue.






PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

DWM collected fecal coliform and *E. coli* bacteria samples from the Konkapot River at Station 26A between May and September 2002 (Appendix B). Fecal coliform bacteria counts ranged from <70 to 250 cfu/100mL, and the geometric mean was 146 cfu/100mL.

Neither DWM biologists or water quality field sampling crews noted any deposits, odors, oils or other objectionable conditions in the Konkapot River near the Route 7A bridge in Ashley Falls, Sheffield. The water column was described as either clear or slightly turbid on all sampling occasions (MassDEP 2002a and MassDEP 2002b).

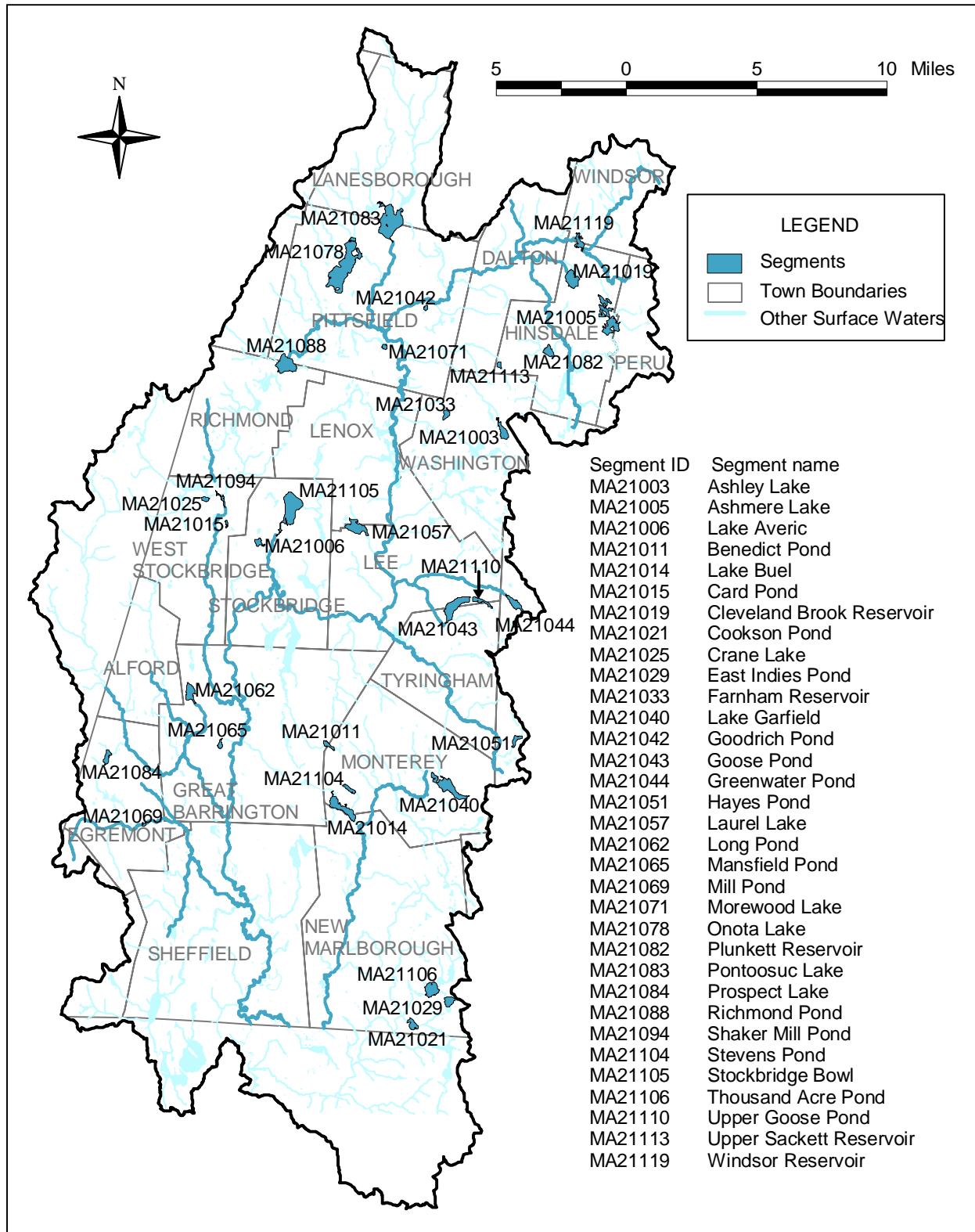
The *Primary Contact Recreation*, *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support based upon the low fecal coliform counts and the lack of objectionable conditions.






KONKAPOT RIVER (Segment MA21-26) Use Summary






Designated Uses		Status
Aquatic Life		SUPPORT
Fish Consumption		IMPAIRED Cause: Mercury Source: Unknown Suspected Source: Atmospheric deposition
Primary Contact		SUPPORT
Secondary Contact		SUPPORT
Aesthetics		SUPPORT






HOUSATONIC RIVER WATERSHED- LAKES SEGMENTS ASSESSED






Figure 9: Housatonic River Watershed – Lake Segments Assessed













Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Ashley Lake, Washington	MA21003	94	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Ashley Lake is a Class A, Public Water Supply. Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>WMA Water Withdrawals (Appendix J) Pittsfield Water Department (10223601). The system is described in more detail in Kennedy and Weinstein (2000). Other: The City of Pittsfield owns and operates a FERC exempt hydro project on Ashley Lake (Project Number 9983, issued February 1987). The capacity of this project is 225 kW (http://www.ferc.gov/industries/hydropower/gen-info/licensing/exemptions.xls).</p> <p>No recent quality-assured data are available for Ashley Lake. All designated uses are not assessed. It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.</p>							
Ashmere Lake, Hinsdale/Peru	MA21005	294	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Ashmere Lake is located within the Hinsdale Flats ACEC. Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophyte <i>Myriophyllum spicatum</i> was documented in Ashmere Lake during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). The non-native aquatic macrophyte <i>Potamogeton crispus</i> has also been reported in this waterbody (MassDEP 2003b, MassDEP 2004, and MassDEP 2005b). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of non-native aquatic macrophytes.</p> <p>Bacteria samples (<i>E. coli</i>) were collected weekly from the Camp Taconic beach on Lake Ashmere in Hinsdale 2002, 2003, and 2004 (n=38). <i>E. coli</i> samples were also collected weekly from the Camp Ashmere beach in Hinsdale in 2002, 2003, and 2004 (n=40). Camp Danbee also collected weekly <i>E. coli</i> bacteria samples at their beach on Lake Ashmere in Peru in 2002, 2003, and 2004 (n=36) (MA DPH 2003, 2004, 2005a). The beaches were never formally posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p> <p>Though no water quality monitoring data was generated, one project (<i>Implementing a Stormwater Remediation Strategy at Ashmere Lake -- Project 01-15/319</i>) sought to implement a comprehensive stormwater remediation strategy recommended by studies to prevent sedimentation from gravel roads and prevent the spread of non-native aquatic species. It should also be noted that the outlet flow from Lake Ashmere into Bennett Brook has been documented to be zero on occasion and there have been periods where flow in the brook has been static for days on end (RIFLS 2006). To the extent possible a natural flow regime should be maintained in Bennett Brook.</p>							
Lake Averic, Stockbridge	MA21006	42	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Lake Averic is a Class A, Public Water Supply. Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The Stockbridge Water Department has a water withdrawal registration (WMA # 10228301) allowing for the withdrawal of 0.29 MGD from Lake Averic.</p> <p>The non-native aquatic macrophyte <i>Myriophyllum spicatum</i> was documented in Lake Averic during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000).</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of non-native aquatic macrophytes. The other uses are not assessed. It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Benedict Pond, Great Barrington/Monterey	MA21011	37	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>The water at the Benedict Pond Beach in Monterey was tested weekly for <i>Enterococci</i> bacteria in 2001, 2002, 2003, and 2004 (n=70) (MA DPH 2002, 2003, 2004, 2005a). There were six exceedances of the bathing beach criteria- one in 2001, one in 2002, and four in 2003; however, the beach was not posted. In 2004, the beach was posted on two occasions. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody. No other data are available so all uses are not assessed.</p>							
Lake Buel, Monterey/New Marlborough	MA21014	194	IMPAIRED (non-native macrophytes, low DO, dissolved oxygen saturation, total phosphorus)	NOT ASSESSED	IMPAIRED (non-native macrophytes)	IMPAIRED (non-native macrophytes)	IMPAIRED (non-native macrophytes)
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for nutrients. The presence of exotic species also impairs the segment, but is a pollutant that does not require the calculation of a TMDL (MassDEP 2005a).</p> <p>Two non-native aquatic macrophytes, <i>Myriophyllum spicatum</i> and <i>Najas minor</i>, were documented in Lake Buel during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). One additional non-native aquatic macrophyte, <i>Potamogeton crispus</i>, was also observed by DWM in 2002 (MassDEP 2002a).</p> <p>An <i>in-situ</i> profile was taken by DWM at the deep hole of the lake on 22 August 2002. Dissolved oxygen concentrations ranged from 14.1 to <0.2 mg/L; percent saturations ranged from 152 to <2% (Appendix D). Anoxic conditions (≤ 2.1 mg/L and 19% saturation) were measured in the bottom water at depths of 6.9 meters or greater. Grab samples were collected in June, July, and August and analyzed for total phosphorus (n=8) apparent color (n=6) and chlorophyll a (n=4). Total phosphorus concentrations suggest that phosphorus may be released from the sediments with concentrations in the bottom water measured at 0.059 and 0.24 mg/L. Chlorophyll a concentrations ranged from 4.6 to 12.6 mg/m³.</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired for Lake Buel since approximately 33% of the lake area had low DO in the epilimnion. Supersaturation and evidence of phosphorus release from the sediments were also problematic. Although the lake is being actively harvested, invasive non-native macrophytes also impair the <i>Aquatic Life Use</i>.</p> <p>DWM conducted fish toxics monitoring in Lake Buel on 9 July 2002 (Appendix E). MA DPH did not issue a site-specific advisory for Lake Buel, so the <i>Fish Consumption Use</i> is currently not assessed.</p> <p>The water at the Seven Stones Beach on Lake Buel in Monterey was tested weekly for <i>E. coli</i> bacteria in 2003 and 2004 (n=33) (MA DPH 2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody. However, because of the area of the lake occupied by the non-native aquatic macrophytes, the <i>Primary</i> and <i>Secondary Contact Recreational</i> and <i>Aesthetics</i> uses are assessed as impaired.</p> <p>One project (<i>Lake Buel Implementation and Demonstration Project</i> 01-13/319) was completed in June 2005. A stormwater BMP was designed and installed at the public boat ramp. Annual weed harvesting and a plant replacement trial were also conducted.</p>							

Lake, Location	WBID	Size (Acres)	<div>Aquatic Life</div> <div></div> <div>(Impairment Cause)</div>	<div>Fish Consumption</div> <div></div> <div>(Impairment Cause)</div>	<div>Primary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Secondary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Aesthetics</div> <div></div> <div>(Impairment Cause)</div>
Card Pond, West Stockbridge	MA21015	11	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).							
The water at Card Pond Beach was tested weekly for <i>E. coli</i> in 2003 and 2004 (n=32) (MA DPH 2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.							
No recent quality-assured data are available for Card Pond. All designated uses are not assessed.							
Center Pond, Dalton	MA21016	12	THIS WATERBODY IS NO LONGER BEING ASSESSED AS A LAKE SEGMENT. It is a run-of-river impoundment (river segment MA21-01).				
Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for priority organics (MassDEP 2005a).							
Cleveland Brook Reservoir, Hinsdale	MA21019	156	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
Cleveland Brook Reservoir is a Class A, Public Water Supply. Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).							
WMA Water Withdrawals (Appendix J) Pittsfield Water Department (10223601)							
One project, <i>Pittsfield Water Supply: Stormwater Remediation Project 03-06/319</i> , is underway. Cleveland Brook Reservoir is threatened by stormwater runoff from adjacent roadways.							
The MassDEP Drinking Water Program maintains current drinking water supply data for this source.							
No recent quality-assured data are available for Cleveland Brook Reservoir. All designated uses are not assessed.							
Cookson Pond, New Marlborough	MA21021	67	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).							
No recent quality-assured data are available for Cookson Pond. All designated uses are not assessed.							
Crane Lake, West Stockbridge	MA21025	27	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).							
The water at the Camp Crane Lake beach was sampled weekly for <i>E. coli</i> bacteria in 2003 and 2004 (n=20) (2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.							
No recent quality-assured data are available for Crane Lake. All designated uses are not assessed.							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
East Indies Pond, New Marlborough	MA21029	72	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).</p> <p>No recent quality-assured data are available for East Indies Pond. All designated uses are not assessed.</p>							
Farnham Reservoir, Washington	MA21033	41	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Farnham Reservoir is a Class A, Public Water Supply. Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>WMA Water Withdrawals (Appendix J) Pittsfield Water Department (10223601)</p> <p>No recent quality-assured data are available for Farnham Reservoir. All designated uses are not assessed.</p> <p>It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.</p>							
Lake Garfield, Monterey	MA21040	256	IMPAIRED (non-native macrophytes, low DO, total phosphorus)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>Two non-native macrophytes, <i>Myriophyllum spicatum</i> and <i>Potamogeton crispus</i>, were found in the lake in 2004 (MA DCR 2004).</p> <p>In 2003 DWM collected water quality data from the deep-hole station of Lake Garfield (Appendix D, Table D2). Low DO was found at 6m and below (approximately 50% of the lake area). There was also evidence of total phosphorus release from the sediment and moderate levels of chlorophyll <i>a</i>. Because of these conditions and the presence of non-native aquatic macrophytes, the <i>Aquatic Life Use</i> is assessed as impaired.</p> <p>Friends of Lake Garfield conducted water quality monitoring at three stations on Lake Garfield (Edelstein 2006). Despite the fact that these data do not meet minimum QA/QC requirements because they are not found in a citable report, they appear to corroborate the findings of MassDEP.</p> <p>Fish from Lake Garfield were sampled for toxins in fish tissue in 1993 by DWM. Samples were analyzed for metals and PCBs (Maietta undated). No site-specific fish consumption advisory was issued for this waterbody, so the <i>Fish Consumption</i> use is not assessed.</p> <p>The water at the Monterey town beach on Lake Garfield was tested weekly for <i>E. coli</i> bacteria in 2002, 2003, and 2004 (n=48) (MA DPH 2003, 2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Goodrich Pond, Pittsfield	MA21042	15	NOT ASSESSED	IMPAIRED PCBs	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).</p> <p>MA DPH issued the Goodrich Pond advisory in February 2001. The US Fish and Wildlife Service sampled in October 1998 and the analysis was done by Environmental Data Services, Inc. and Texas A&M University, Geochemical & Environmental Research Group (GERG), College of Geosciences and Maritime Studies (Beattie 2006).</p> <p>MA DPH issued a site-specific fish consumption advisory for Goodrich Pond. The advisory states: <i>The general public should not consume any fish from this waterbody due to elevated concentrations of PCBs in fish tissue</i> (MDPH 2005). The source of PCB is the General Electric site (16).</p>							
Goose Pond, Lee/Tyringham	MA21043	237	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>Two non-native aquatic macrophytes, <i>Myriophyllum spicatum</i> and <i>Potamogeton crispus</i>, were documented in Goose Pond in 1995 (Kennedy and Weinstein 2000). <i>Myriophyllum spicatum</i> was also identified in a recent application submitted to the Department to apply herbicides to the pond (MassDEP 2004).</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>Fish were collected from Goose Pond by DWM in 1993. Fish tissue samples were analyzed for As, Hg, PB, and Zn (Maietta undated). No site-specific fish consumption advisory was issued so the <i>Fish Consumption Use</i> is not assessed.</p> <p>Leisure Lee Beach on Goose Pond in Lee was sampled weekly for <i>E. coli</i> bacteria in 2001, 2002, 2003, and 2004 (n=45) (MA DPH 2002, 2003, 2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							
Greenwater Pond, Becket	MA21044	89	IMPAIRED (non-native macrophyte)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophyte <i>Myriophyllum spicatum</i> was documented in Greenwater Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000).</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophyte. No other recent data are available so the other uses are not assessed.</p>							
Hayes Pond, Otis	MA21051	46	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>No recent data are available so the uses are not assessed.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Laurel Lake, Lee/Lenox	MA21057	173	IMPAIRED (non-native macrophytes, low DO, dissolved oxygen saturation, total phosphorus)	NOT ASSESSED	NOT ASSESSED* Alert Status	NOT ASSESSED	NOT ASSESSED

Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species which, is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).

Schweitzer-Mauduit International, Inc (10215002/9P210215002) is authorized to withdraw water from Laurel Lake (WMA 10215002/9P210215002).

The non-native aquatic macrophytes *Myriophyllum spicatum*, *Potamogeton crispus*, and *Najas minor* were documented in Laurel Lake during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000, MassDEP 1997).

An *in-situ* profile was taken by DWM at the deep hole of the lake on 26 August 2003. Dissolved oxygen concentrations ranged from 0.3 to 16.8 mg/L; percent saturations ranged from 3 to 173% (Appendix D, Table D3). Severe oxygen depletion (<5 mg/L and 50% saturation) was measured at depths of 8.5 meters or greater (approximately 44% of the lake area). There was also evidence of a metalimnetic bloom (DO supersaturation at depths of 6 and 7m). Grab samples were collected in August and analyzed for total phosphorus, apparent color, and chlorophyll *a*. Total phosphorus concentrations suggest that phosphorus may be released from the sediments with concentrations in the bottom water measured at 0.41 mg/L. The chlorophyll *a* concentration was low/moderate (6.7 mg/m³).

The *Aquatic Life Use* is assessed as impaired for Laurel Lake since approximately 44% of the lake area had low DO in the epilimnion. Supersaturation and evidence of phosphorus release from the sediments were also problematic.

The presence of the non-native aquatic macrophytes also impairs the *Aquatic Life Use*.

There are three public bathing beaches on Laurel Lake. In Lee, the town beach and Sandy Beach were sampled weekly for *E. coli* in 2001, 2002, 2003, and 2004 (n=73). There were never any postings. In Lenox the town beach was also sampled weekly for *E. coli* in 2001, 2002, 2003, and 2004 (n=49) (MA DPH 2002, 2003, 2004, 2005a). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no *Primary Contact Recreational Use* assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.






It should be noted that *Myriophyllum spicatum* was the dominant aquatic macrophyte between the 6 and 14 foot depth contours (essentially, the entire shoreline area of the lake). Because this species may interfere with swimming, the *Primary Contact Use* is identified with an Alert Status. No other recent quality assured data are available so the other uses are not assessed.






Long Pond, Great Barrington	MA21062	114	IMPAIRED (non-native macrophyte)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
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Long Pond is a Class A, Public Water Supply (source Housatonic Water Works Company, WMA registration 10211306). Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculations of a TMDL (MassDEP 2005a).

The non-native aquatic macrophyte *Myriophyllum spicatum* was documented in Long Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). The *Aquatic Life Use* is assessed as impaired because of the presence of the non-native aquatic macrophyte. No other recent data are available so the other uses are not assessed.

It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.

Lake, Location	WBID	Size (Acres)	<div>Aquatic Life</div> <div></div> <div>(Impairment Cause)</div>	<div>Fish Consumption</div> <div></div> <div>(Impairment Cause)</div>	<div>Primary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Secondary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Aesthetics</div> <div></div> <div>(Impairment Cause)</div>
Mansfield Pond, Great Barrington	MA21065	28	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophytes <i>Myriophyllum spicatum</i> and <i>Potamogeton crispus</i> were documented in Mansfield Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). There was a project to reduce the <i>Myriophyllum spicatum</i> infestation using biological control (weevils) with a DEM 2000 lake and pond grant, however no post implementation data are available on the effectiveness.</p> <p>An <i>in situ</i> profile was taken by DWM at the deep hole of the lake on 26 August 2003. Dissolved oxygen concentrations ranged from 0.8 to 7.9 mg/L; percent saturations ranged from 10 to 98% (Appendix D, Table D4). Severe oxygen depletion (<5 mg/L and 50% saturation) was only measured at depths greater than 4m, which does not constitute a significant portion of the lake area. Grab samples were collected in August and analyzed for total phosphorus, apparent color, and chlorophyll a. Total phosphorus concentrations suggest that phosphorus may be released from the sediments with concentrations in the bottom water measured at 0.08 mg/L. The chlorophyll a concentration was low (4.0 mg/m³).</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes. Phosphorus release from sediments is also of concern.</p> <p>The Town of Great Barrington maintains a public bathing beach on Mansfield Pond. The beach area was tested weekly during the bathing season for <i>E. coli</i> bacteria in 2001, 2003, and 2004 (n=36) (MA DPH 2002, 2004, 2005a). The beach was never formally posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p> <p>No other recent data are available so the other uses are not assessed.</p>							
Mill Pond, Egremont	MA21069	10	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a). This segment is entirely within the Karner Brook ACEC.</p> <p>No recent data are available so the uses are not assessed.</p>							
Mill Pond, Sheffield	MA21068	97	THIS WATERBODY IS NO LONGER BEING ASSESSED AS A LAKE SEGMENT. It is a run-of-river impoundment (see Hubbard Brook - segment MA21-15)				
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a). This waterbody is infested with two non-native aquatic macrophytes, <i>Myriophyllum spicatum</i> and <i>Trapas natans</i> (MassDEP 2003b, MassDEP 2004, and MassDEP 2005b).</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Morewood Lake, Pittsfield	MA21071	20	NOT ASSESSED	IMPAIRED PCBs	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>This segment is new, so it does not appear in the 2004 Integrated List of Waters.</p> <p>Pittsfield Country Club maintains a registered WMA to withdraw 0.12 MGD from Morewood Lake (WMA 10223603).</p> <p>At the request of MassDEP, BBL acting as consultant to GE sampled fish from Morewood Lake in September 2004 (Messur 2004). Concentrations of total PCB in individual largemouth bass (n=10) ranged from 0.37 to 28.1 ppm with an average PCB concentration of 9.3 ppm. Concentrations in individual bluegill (n=10) ranged from <MDL to 3.8 ppm (average concentration of 0.75 ppm).</p> <p>MA DPH issued a site-specific fish consumption advisory for Morewood Lake. The advisory states: <i>The general public should not consume any fish from this waterbody due to elevated levels of PCBs.</i> The source of PCBs is attributed to the GE Company Pittsfield Plant. Because of the site-specific fish consumption advisory due to PCB contamination, the <i>Fish Consumption Use</i> is assessed as impaired. The source of PCB is the General Electric site (16).</p> <p>There is a public bathing beach on Morewood Lake. The beach area was tested during the 2005 bathing season for <i>E. coli</i> bacteria (n=10) (MA DPH 2006). The beach was never formally posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Onota Lake, Pittsfield	MA21078	662	IMPAIRED (non-native macrophytes)	NOT ASSESSED	SUPPORT	SUPPORT	SUPPORT

Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).

Three non-native aquatic macrophytes *Myriophyllum spicatum*, *Najas minor*, and *Potamogeton crispus* were documented in Onota Lake during the 1997-1998 DWM synoptic survey (Kennedy and Weinstein 2000). Two of these species (*Myriophyllum spicatum* and/or *Potamogeton crispus*, were also identified in a recent applications submitted to the Department to apply herbicides to the lake (MassDEP 2003b and MassDEP 2005b). A fourth non-native aquatic macrophyte, *Trapas natans*, was also recently reported to be in this waterbody (MA DFG 2005).

Lake Onota Preservation Association (LOPA) volunteers have conducted water quality monitoring at several Lake Onota stations during 2001-2004. Low dissolved oxygen concentrations were measured in all years at the two deep hole stations (D2 northern deep hole and D6 southern deep hole)(LOPA Annual Report 2001, 2002, 2003, 2004). The low DO conditions affect approximately 25% of the lake area. Despite not being covered under an approved QAPP, these DO data corroborate a 1987 diagnostic study for Onota Lake (ITC 1987), which demonstrated low DO conditions in a significant portion of the lake during the summer months.

The *Aquatic Life Use* is assessed as impaired because of the presence of the non-native aquatic macrophytes and the low dissolved oxygen levels. In the fall of 2006, zebra mussels (an invasive non-native organism) were found in boats brought to Onota Lake (NALMS 2006).






LOPA volunteers also measured Secchi disk depth at the deep hole stations at regular intervals during 2001-2004. The Secchi disk measurements are included within a MassDEP approved QAPP. Secchi disk depth ranged from 2.1 to 5.6 m at Station D2 and 2.6 to 7.5 m at Station D6 (D2 northern deep hole and D6 southern deep hole)(LOPA Annual Report 2001, 2002, 2003, 2004).






The *Primary* and *Secondary Contact Recreation* and *Aesthetics* uses are assessed as support based upon the acceptable water clarity as measured by the Secchi disk depths.

Fish from Onota Lake were sampled for toxics in fish tissue as part of an Office of Research and Standards managed research project in 2002 and 2004. Samples were analyzed for mercury and selenium (Maietta undated). Since no site-specific fish consumption advisory was issued for this waterbody, the *Fish Consumption Use* is not assessed.

Camp Witawentin tested the water at their bathing beach on Onota Lake weekly during 2002 for *E. coli* bacteria (n=10) (MA DPH 2003). The beach was never posted. The City of Pittsfield also tested the water at their bathing beach on Onota Lake weekly during 2002 for *E. coli*. The City beach was also never posted. Camp Winadu also maintains a beach on Onota Lake, no data were reported. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no *Primary Contact Recreational Use* assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.

There were two grant projects which received funding as listed below:
 00-01/319: Implementing the Diagnostic/ Feasibility Study Recommendation for Onota Lake. The overall goal of abating the accelerated eutrophication of Onota Lake will be accomplished through the continued implementation of in-lake restoration and watershed management measures to reduce nutrient and sediment loading. Implementation of these measures will improve water quality, improve fish habitat, and improve recreational use of the lake.
 03-15/MWI *Onota Lake Watershed Assessment* This project will perform an assessment of current and past aquatic vegetation and nutrient control practices at Onota Lake and develop a lake and watershed management plan targeted at controlling nuisance aquatic vegetation. Tasks include: conducting two qualitative and quantitative aquatic macrophyte surveys; training volunteers from the Lake Onota Preservation Association in macrophyte identification and mapping; conducting a lake watershed assessment.

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Plunkett Reservoir, Hinsdale	MA21082	72	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a). This segment is located within the Hinsdale Flats ACEC.</p> <p>The non-native aquatic macrophytes <i>Myriophyllum spicatum</i> and <i>Najas minor</i> were documented in Plunkett Reservoir during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). <i>Myriophyllum spicatum</i> was also identified in a recent applications submitted to the Department to apply herbicides to the lake (MassDEP 2004 and MassDEP 2005b). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>There is a public bathing beach on Plunkett Reservoir. The water at the beach was sampled weekly during the bathing season for <i>E. coli</i> in 2001, 2002, 2003, and 2004 (MA DPH 2002, 2003, 2004, 2005a). The beach was never formerly posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Pontoosuc Lake, Pittsfield/Lanesborough	MA21083	500	IMPAIRED (non-native macrophytes)	IMPAIRED Mercury	NOT ASSESSED	NOT ASSESSED	SUPPORT

Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a). Pontoosuc Lake was also assessed as impaired due to metals (mercury) (see MassDEP 2005a). Lanesborough Village Water District is registered (10214801) to withdraw from two groundwater sources along Town Brook, a tributary to Pontoosuc Lake (Appendix J, Table J1).

Four non-native aquatic macrophytes (*Myriophyllum spicatum*, *Najas minor*, *Potamogeton crispus*, and *Trapas natans*) were documented in Pontoosuc Lake (Kennedy and Weinstein 2000 and Robinson 2006b). The *Aquatic Life Use* is assessed as impaired because of the presence of the non-native aquatic macrophytes.






In 1994 EPA funded an agricultural waste management project to reduce nonpoint source inputs to Pontoosuc Lake from five farms in the watershed. A diagnostic assessment of conditions in Pontoosuc Lake was conducted in 1997 as a follow-up to evaluate the effectiveness the project. No methods or quality assurance data are provided in this report, so the information was not used to make *Aquatic Life Use* assessments. According to ENSR, "summer anoxia was observed in the small hypolimnion and appeared to promote internal recycling of phosphorus during the growing season, algal blooms in the lake were reported to be common but not severe, and rooted plant growths were dominated by non-native species with high nuisance potential but appeared to be adequately managed with drawdown and harvesting" (ENSR 2000). It was determined that pollutant inputs of nutrients from storm drain systems were problematic because of their proximity and rapid discharge to the lake. As part of projects 99-03/319 and 01-14/319 priority storm drain problems were corrected by the installation of innovative stormwater infiltration technologies at three locations. These systems were designed to capture the "first flush" of storm runoff and infiltrate it into the ground. It should be noted that a newly funded project, 04-10/319, is underway. Water quality monitoring under an approved quality assurance project plan will be conducted as part of this project.






In 1993 DWM conducted fish toxics monitoring in Pontoosuc Lake that resulted in MA DPH issuing a site-specific fish consumption advisory for the lake due to elevated concentrations of mercury in fish tissue. On 20 June 2002 DWM resampled the fish in Pontoosuc Lake (Appendix E, Table E1). Although the data generated in 2002 indicate that mercury is below the MA DPH "trigger level" in all samples (including one composite sample of three largemouth bass), MA DPH took the data point for largemouth bass in 2002 and combined it with the 1993 largemouth bass data and calculated an average concentration. As a result MA DPH decided to re-issue the previous advisory (Maietta *et al.* 2004, MA DPH 2005b). The current MA DPH fish consumption advisory recommends that due to elevated concentrations of mercury "Children younger than 12 years of age, pregnant women, women of childbearing age who may become pregnant and nursing mothers should not eat any largemouth bass from this waterbody and the general public should limit consumption of largemouth bass to two meals per month". Because of this site-specific advisory, the *Fish Consumption Use* is assessed as impaired due to mercury contamination. Although the source of mercury is unknown, atmospheric deposition is suspected.






Pontoosuc Lake was sampled weekly for *E. coli* bacteria at the Lanesborough town beach off Sunrise Street in 2002, 2003, and 2004 (n=34) (MA DPH 2003, 2004, 2005a). The lake was also sampled from the beach at Memorial Park in 2002 (n=8). The beaches were never posted. In 2002 the City of Pittsfield tested the water at their bathing beach on Pontoosuc Lake for *E. coli* bacteria on a weekly basis (n=11). The beach was never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no *Primary Contact Recreational Use* assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.






Algal blooms in the lake were reported to be common but not severe, and rooted plant growths were dominated by non-native species with high nuisance potential but appeared to be adequately managed with drawdown and harvesting" (ENSR 2000).

The *Aesthetics Use* is assessed as support based on the documentation provided by ENSR that algal blooms are not severe and the non-native aquatic macrophyte populations appear to be adequately managed.

Lake, Location	WBID	Size (Acres)	<div>Aquatic Life</div> <div></div> <div>(Impairment Cause)</div>	<div>Fish Consumption</div> <div></div> <div>(Impairment Cause)</div>	<div>Primary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Secondary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Aesthetics</div> <div></div> <div>(Impairment Cause)</div>
Prospect Lake, Egremont	MA21084	59	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 3 of the 2004 Integrated List of Waters. This segment was not assessed for any of the designated uses (MassDEP 2005a).</p> <p>An <i>in-situ</i> profile was taken by DWM at the deep hole of the lake on 26 August 2003. Dissolved oxygen concentrations ranged from 7.3 to 9.4 mg/L; percent saturations ranged from 84 to 113% (Appendix D, Table D5). Grab samples were collected in August and analyzed for total phosphorus, apparent color, and chlorophyll <i>a</i>. Total phosphorus concentrations were low. The chlorophyll <i>a</i> concentration was low/moderate (6.8 and 9.0 mg/m³). Two non-native macrophytes, <i>Potamogeton crispus</i> and <i>Marsilea quadrifolia</i>, were also documented (MassDEP 2002a).</p> <p>The <i>Aquatic Life Use</i> is assessed as impaired because of the infestation of non-native aquatic macrophytes.</p> <p>The Egremont Town Beach and Prospect Lake Park Beach were sampled weekly in 2001, 2002, 2003, and 2004 (n=72) (MA DPH 2002, 2003, 2004, 2005a). The beaches were never formally posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							
Richmond Pond, Richmond/Pittsfield	MA21088	227	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophytes <i>Myriophyllum spicatum</i> and <i>Najas minor</i> were documented in Richmond Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). <i>Myriophyllum spicatum</i> and <i>Potamogeton crispus</i> were also identified in a recent application submitted to MassDEP to apply herbicides to the pond (MassDEP 2005b). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>The water in Richmond Pond was sampled weekly at three bathing beaches for <i>E. coli</i> in 2001, 2002, 2003, and 2004 (Camp Russell n=34, Richmond Shores =52, and the Town beach=43) (MA DPH 2002, 2003, 2004, 2005a). The beaches were never posted. Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p> <p>Grant Project 02-04/319: Implementing Nonpoint Source BMPs at Richmond Pond. Project goals include implementation of watershed and in-lake BMPs to mitigate NPS, restoration and protection of recreational uses and habitat value, and implementation of recommendations for the elimination and control of invasive aquatics.</p>							
Risingdale Impoundment, Great Barrington	MA21121	41	THIS WATERBODY NO LONGER ASSESSED AS LAKE SEGMENT. This waterbody Is considered a run-of-river impoundment (see Housatonic River – Segment MA21-19).				
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for priority organics (MassDEP 2005a).</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Shaker Mill Pond, West Stockbridge	MA21094	27	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>This segment is new and therefore does not appear in the 2004 Integrated List of Waters.</p> <p>Shaker Mill Pond is infested with three non-native aquatic macrophytes <i>Myriophyllum spicatum</i>, <i>Potamogeton crispus</i> and <i>Trapa natans</i> (MA DFG 2005 and Robinson 2006a). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>NPDES Permits (Appendix J) Town of Lenox Root Reservoir (MAG640015)</p> <p>No other data are available so the other uses are not assessed.</p>							
Stevens Pond, Monterey	MA21104	39	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>In recent applications submitted to MassDEP to apply herbicides to the pond, Stevens Pond was reported to be infested with <i>Myriophyllum spicatum</i> and <i>Potamogeton crispus</i> (MassDEP 2004 and MassDEP 2005b). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>No other data are available so the other uses are not assessed.</p>							

Lake, Location	WBID	Size (Acres)	Aquatic Life  (Impairment Cause)	Fish Consumption  (Impairment Cause)	Primary Contact  (Impairment Cause)	Secondary Contact  (Impairment Cause)	Aesthetics  (Impairment Cause)
Stockbridge Bowl, Stockbridge	MA21105	383	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophytes <i>Myriophyllum spicatum</i> was documented in Stockbridge Bowl during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophyte.</p> <p>The Town of Stockbridge has been trying to draw down water levels in the Bowl for five years for management of aquatic plant species. In one year, leaves clogged the outlet allowing on a tiny trickle to Larrywaug Brook. In October 2005, heavy rains resulted in high water levels, so the lake could not be drawn down.</p> <p>Fish from Stockbridge Bowl were collected by DWM in 1983 and fish tissue samples were analyzed for dioxins (Maietta undated). No site-specific fish consumption advisory was issued for this water body, so the <i>Fish Consumption Use</i> is not assessed.</p> <p>There are nine bathing beaches on the shores of Stockbridge Bowl. The water at the beaches was tested weekly for <i>E. coli</i> bacteria in 2001, 2002, 2003, and 2004 (MA DPH 2002, 2003, 2004, 2005a).</p> <ul style="list-style-type: none"> Beachwood Association (n=53) no postings Berkshire Country Day School (n=76) no postings Camp Mahkeenac (n=82) no postings Kripalu (n=48) three exceedances, no postings Sports Day camp (n=35) two exceedances, no postings Tanglewood (n=42) no postings Town Beach (n=48) one exceedance, no postings White Pines (n=38) no postings Mah-Kee-Nac Shores (n=35) no postings <p>Currently, there is uncertainty associated with the accurate reporting of freshwater beach closure information to the Massachusetts DPH, which is required as part of the Beaches Bill. Therefore, no <i>Primary Contact Recreational Use</i> assessments (either support or impairment) decisions are being made using Beaches Bill data for this waterbody.</p>							
Thousand Acre Pond, New Marlborough	MA21106	145	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophyte <i>Myriophyllum spicatum</i> was documented in Thousand Acre Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophyte.</p> <p>No other quality assured data are available so the other uses are not assessed.</p>							

Lake, Location	WBID	Size (Acres)	<div>Aquatic Life</div> <div></div> <div>(Impairment Cause)</div>	<div>Fish Consumption</div> <div></div> <div>(Impairment Cause)</div>	<div>Primary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Secondary Contact</div> <div></div> <div>(Impairment Cause)</div>	<div>Aesthetics</div> <div></div> <div>(Impairment Cause)</div>
Upper Goose Pond, Lee/Tyringham	MA21110	55	IMPAIRED (non-native macrophytes)	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Based on the last evaluation of water quality conditions, this segment is listed on the 2004 Integrated List of Waters in Category 4c. This segment was assessed as impaired due to exotic species, which is not a pollutant requiring calculation of a TMDL (MassDEP 2005a).</p> <p>The non-native aquatic macrophyte <i>Myriophyllum spicatum</i> was documented in Upper Goose Pond during the 1997 DWM synoptic survey (Kennedy and Weinstein 2000). <i>Myriophyllum spicatum</i> was also identified in a recent application submitted to MassDEP to apply herbicides to the pond (MassDEP 2004). The <i>Aquatic Life Use</i> is assessed as impaired because of the presence of the non-native aquatic macrophytes.</p> <p>No other quality assured data are available so the other uses are not assessed.</p>							
Upper Sackett Reservoir, Hinsdale	MA21113	19	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Upper Sackett Reservoir is a Class A, Public Water Supply (source Housatonic Water Works Company - WMA registration 10223601). Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>One project, <i>Pittsfield Water Supply: Stormwater Remediation Project 03-06/319</i>, is underway. Upper Sackett Reservoir is threatened by stormwater runoff from adjacent roadways.</p> <p>No recent water quality data are available so all uses are not assessed. It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.</p>							
Windsor Reservoir, Hinsdale/Windsor	MA21119	74	NOT ASSESSED*	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED	NOT ASSESSED
<p>Windsor Reservoir is a Class A, Public Water Supply (emergency source Dalton Fire District (WMA registration 10207003). Based on the last evaluation of water quality conditions, this segment is listed in Category 2 of the 2004 Integrated List of Waters. This segment supported some designated uses (<i>Secondary Contact</i> and <i>Aesthetics</i>) and was not assessed for others (MassDEP 2005a).</p> <p>Grant Project 05-03/319: Windsor Reservoir Restoration Project. Although no water quality data will be collected, the goal of this project is to repair and stabilize the roadways, install flood protection and stormwater BMPs, and remove accumulated sediment from the inlet tributary. This work is recommended in a SWAP report for the water supply. Pollutants of concern are sediment, turbidity, and phosphorus.</p> <p>The <i>Aquatic Life Use</i> is not assessed but sedimentation and erosion issues from the road/runoff are of concern so this use is identified with an Alert Status. No other recent water quality data are available so the other uses are not assessed.</p> <p>It should be noted that the MassDEP Drinking Water Program maintains current drinking water supply data for this source.</p>							
Woods Pond, Lee/Lenox	MA21120	114	THIS WATERBODY NO LONGER ASSESSED AS LAKE SEGMENT. It is considered a run of river impoundment see Housatonic River - Segment MA21-04.				
<p>Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires a TMDL for priority organics, noxious aquatic plants, and turbidity (MassDEP 2005a). This waterbody is infested with the non-native aquatic macrophyte <i>Trapas natans</i> (MA DFG 2005).</p>							

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