PARKER RIVER WATERSHED
AND COASTAL DRAINAGE AREA
2004-2008 WATER QUALITY ASSESSMENT REPORT

Parker RIver Estuary/Plum Island Sound - 2005 Color Orthophotos MassGIS

COMMONWEALTH OF MASSACHUSETTS
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PARKER RIVER WATERSHED AND COASTAL DRAINAGE AREA

2004-2008 WATER QUALITY ASSESSMENT REPORT

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Massachusetts Department of Environmental Protection
Division of Watershed Management

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

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State
Department of Environmental Protection (MassDEP):
- Bureau of Resource Protection (BRP)
  - Division of Watershed Management (DWM)
- Bureau of Strategic Policy and Technology Wall Experiment Station (WES)

Department of Conservation and Recreation (MA DCR)
Department of Fish and Game (MA DFG)
- Division of Fisheries and Wildlife (MDFW)

Department of Public Health (MA DPH)

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United States Environmental Protection Agency (EPA)
United States Geological Survey (USGS)
- Water Resources Division (WRS)

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Parker River Watershed Association (PRWA)

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LIST OF ACRONYMS AND ABBREVIATIONS

7Q10	seven day, ten year low flow
BPJ	best professional judgment
CFU	colony forming unit
CMR	Code of Massachusetts Regulations
CSO	combined sewer overflow
CWA	Clean Water Act
DMF	Division of Marine Fisheries
DO	dissolved oxygen
DPW	Department of Public Works
DWM	Division of Watershed Management
DWP	Drinking Water Program
EPA	United States Environmental Protection Agency
MA DCR	Massachusetts Department of Conservation and Recreation
MA DFG	Massachusetts Department of Fish and Game
MA DPH	Massachusetts Department of Public Health
MassDEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information System
ug/kg	microgram per kilogram
mg/L	milligram per liter
MGD	million gallons per day
ml	Milliliters
PRCWA	Parker River Clean Water Association
NAWQA	National Water-Quality Assessment Program
ng	nanograms
NPDES	National Pollutant Discharge Elimination System
ppb	parts per billion
ppm	parts per million
PWS	public water supply
QA/QC	quality assurance/ quality control
QAPP	quality assurance project plan
RBP	Rapid Bioassessment Protocol
SSO	sanitary sewer overflow
SWQS	Surface Water Quality Standards
TMDL	total maximum daily load
TP	Total Phosphorus
TSS	Total Suspended Solids
USGS	United States Geological Survey
WBS	Waterbody System database
WMA	Water Management Act
WWTP	wastewater treatment plant

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EXECUTIVE SUMMARY
PARKER RIVER WATERSHED AND COASTAL DRAINAGE AREA
2004-2008 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, impaired, or not assessed, as well as basic information needed to focus resource protection and remediation activities later in the watershed management planning process.

This report presents a summary of current water quality data/information in the Parker River Watershed and Coastal Drainage Area used to assess the status of the designated uses as defined in the SWQS. The designated uses, where applicable, include: *Aquatic Life, Fish Consumption, Drinking Water, Shellfish Harvesting, 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 for an assessment segment the use is ***not assessed***. However, if there is some indication of water quality impairment, which is not "naturally-occurring", the use is identified with an "Alert Status." It is important to note that not all waters are assessed. Many small and/or unnamed rivers, lake and estuarine areas have not been assigned an assessment segment identification number and the status of their designated uses has never been assessed, investigated, and/or reported to the EPA in the Commonwealth's Summary of Water Quality Report (305(b) Report) nor is information on these waters maintained in the Waterbody System (WBS) or the new Assessment Database (ADB). In the interest of reporting on all river miles, lake acres, and estuarine areas in the Parker River Watershed, any waters not currently assigned an assessment segment identification number are considered ***not assessed other waters***.

This assessment report summarizes information generated in the Parker River Watershed and Coastal Drainage Area since the last water quality assessment report that was published in August 2001 (Weinstein and Connors 2001). The new assessments are based on the most currently available validated water quality data/information developed by the Massachusetts Department of Environmental Protection (MassDEP) as well as more recent data collected by external data sources in the watershed in partial fulfillment of MassDEP's federal mandate to report on the status of the Commonwealth's waters under the Clean Water Act (CWA). An overview of the estimated sizes of rivers, lakes and estuaries in the Parker River Watershed and those defined as segments in this report are as follows.

Waterbody Type	***Estimated Total Size in Watershed***	***Segment Size (% of total size in Watershed)***
Rivers	74.0 river miles (perennial)*	28.0 miles (~38% of total miles)
Lakes	559 acres*	290 acres (~52% of total acres)
Estuaries	7.0 square miles**	6.3 square miles (90% of total area)

* Estimates based on calculations using the 2002-2005 high resolution National Hydrography Dataset (1:24,000) excluding waters within 50m of salt wetlands.
** Estimates based on calculations using the Designated Shellfish Growing Areas datalayer from MassGIS updated in September 2009 in the Parker River Watershed upstream from the outermost boundary of the Plum Island Sound segment.

The summary of the assessments for the *Aquatic Life, Fish Consumption, Primary and Secondary Contact Recreation, Aesthetics, and Shellfish Harvesting* uses in the Parker River Watershed and Coastal Drainage Area segments are illustrated in Figures 1 through 6, respectively. Where sufficient data/current information were not available, the uses were not assessed.

The status of the *Drinking Water Use* is not assessed in this report since the most current information on drinking water source protection and finished water quality is available at http://www.mass.gov/dep/water/drinking.htm and from local public water supplies.

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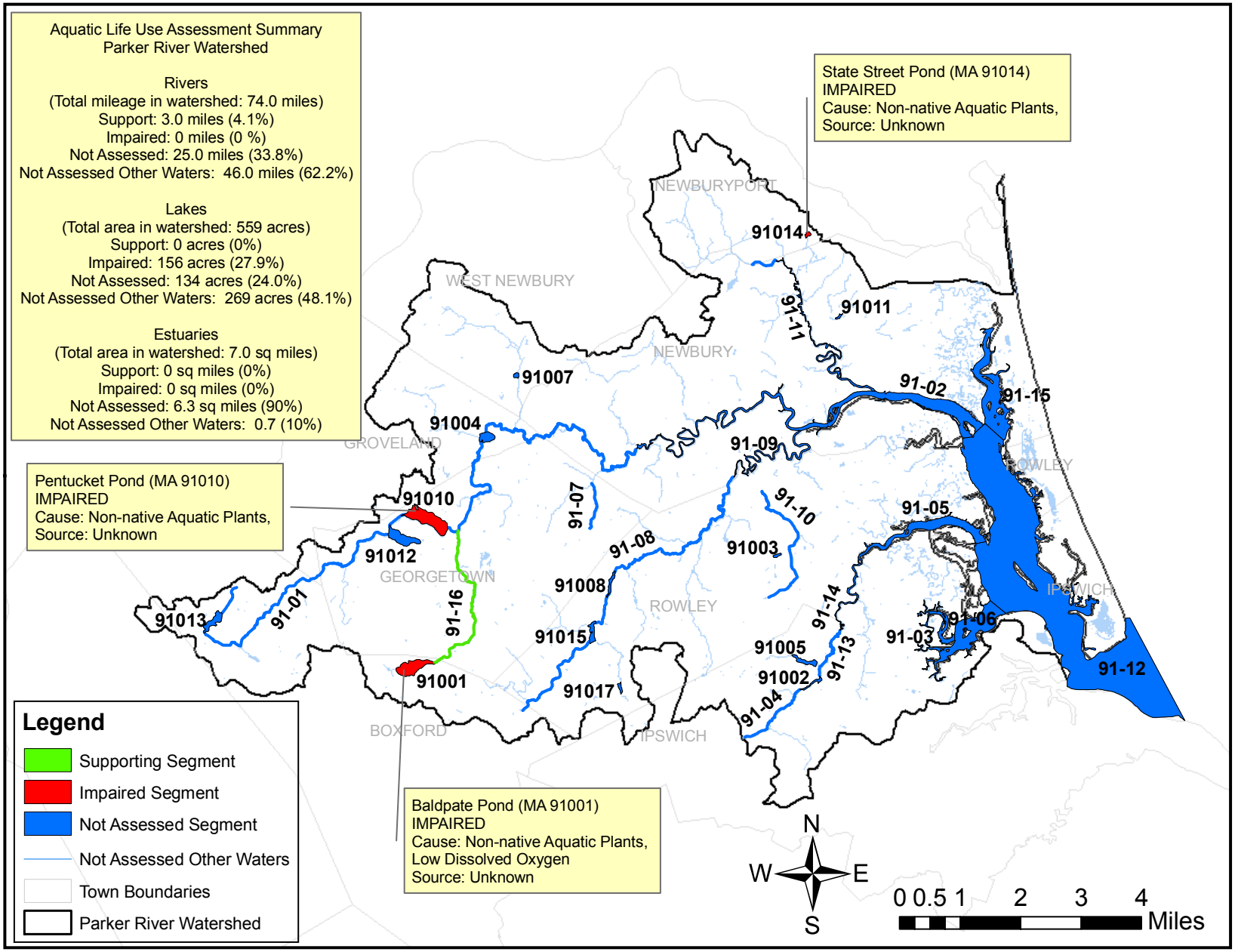

Figure 1. *Aquatic Life Use* assessment summary for rivers, estuarine, and lake segments in the Parker River Watershed and Coastal Drainage Area. Note: The *Aquatic Life Use* is supported when suitable habitat (including water quality) is available for sustaining a native, naturally diverse, community of aquatic flora and fauna. Impairment of the *Aquatic Life Use* may result from anthropogenic stressors that include point and/or non-point sources of pollution and hydrologic modification. Causes and/or sources of impairments, when known, are noted in the callouts.

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MA DPH June 2009 news release: Fish Consumption Advisory for Marine and Fresh Water Bodies (MA DPH 2009b)

Fish is good for you and your family. It is a good source of protein and it is low in fat. It may also protect you against heart disease.
If you may become pregnant or are pregnant or nursing, you and your children under 12 years old may safely eat 12 ounces (about 2 meals) per week of fish or shellfish not covered in this advisory. 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. Otherwise, it is important to follow the Safe Eating Guidelines included in this advisory.

Safe eating guidelines for pregnant women, women who may become pregnant, nursing mothers and children under 12 years old: (contaminants of concern in parenthetical as noted by MA DPH and MassDEP)
Do Not Eat: Freshwater fish caught in streams, rivers, lakes, and ponds in Massachusetts* (Hg)
Safe To Eat: Fish that are stocked in streams, rivers, lakes, and ponds in Massachusetts
Safe To Eat: Cod, haddock, flounder and pollock in larger amounts
Do Not Eat: Lobster from New Bedford Harbor (PCB)
Do Not Eat: Swordfish, shark, king mackerel, tilefish, and tuna steak (Hg)
Do Not Eat: Bluefish caught off the Massachusetts coast (PCB)
Do Not Eat: Lobsters, flounder, soft-shell clams and bivalves from Boston Harbor (PCB and other contaminants)
NOTE: For assessment purposes Boston Harbor is broadly defined to include all coastal waters that drain into it.
Safe eating guidelines for everyone:
Do Not Eat: Fish and shellfish from the closed areas of New Bedford Harbor (PCB)
Do Not Eat: Lobster tomalley (PCB)

*More specific consumption advice is available for certain freshwater bodies that have been tested at: http://www.mass.gov/dph/fishadvisories (MA DPH 2009a) or by calling the Massachusetts Department of Public Health, Bureau of Environmental Health at 617-624-5757.

NOTE: Northeast Regional Mercury TMDL: On 20 December 2007 the U.S. EPA approved the Northeast Regional Mercury Total Maximum Daily Load (TMDL). This TMDL is a Federal Clean Water Act mandated document that identifies pollutant load reductions necessary for regional waterbodies to meet and maintain compliance with state and federal water quality standards. It was prepared by the New England Interstate Water Pollution Control Commission (NEIWPCC) in cooperation with the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. The TMDL covers inland waterbodies that are impaired primarily due to atmospheric deposition of mercury (Northeast States 2007). The TMDL target for Massachusetts is 0.3 ppm or less of mercury in fish tissue. The plan calls for a 75% reduction of in-region and out of region atmospheric sources by 2010 and a 90% or greater reduction in the future (NEIWPCC 2007). The TMDL will be reassessed in 2010 based on an evaluation of new on-going monitoring and air deposition data. Final targets will be determined at that time.
* Denotes waterbodies in mercury hot spot areas not covered by this TMDL which will require further evaluation.

Fish Consumption Use Assessment Summary
Parker River Watershed

Rivers
(Total mileage in watershed: 74.0 miles)
Support: 0 miles (0%)
Impaired: 0 miles (0 %)
Not Assessed: 28.0 miles (37.8%)
Not Assessed Other Waters: 46.0 miles (62.2%)

Lakes
(Total area in watershed: 559 acres
Support: 0 acres (0%)
Impaired: 201 acres (36.0%)
Not Assessed: 89 acres (15.9%)
Not Assessed Other Waters: 269 acres (48.1%)

Estuaries
(Total area in watershed: 7.0 sq miles)
Support: 0 sq miles (0%)
Impaired: 0 sq miles (0%)
Not Assessed: 6.3 sq miles (90%)
Not Assessed Other Waters: 0.7 sq miles (10%)

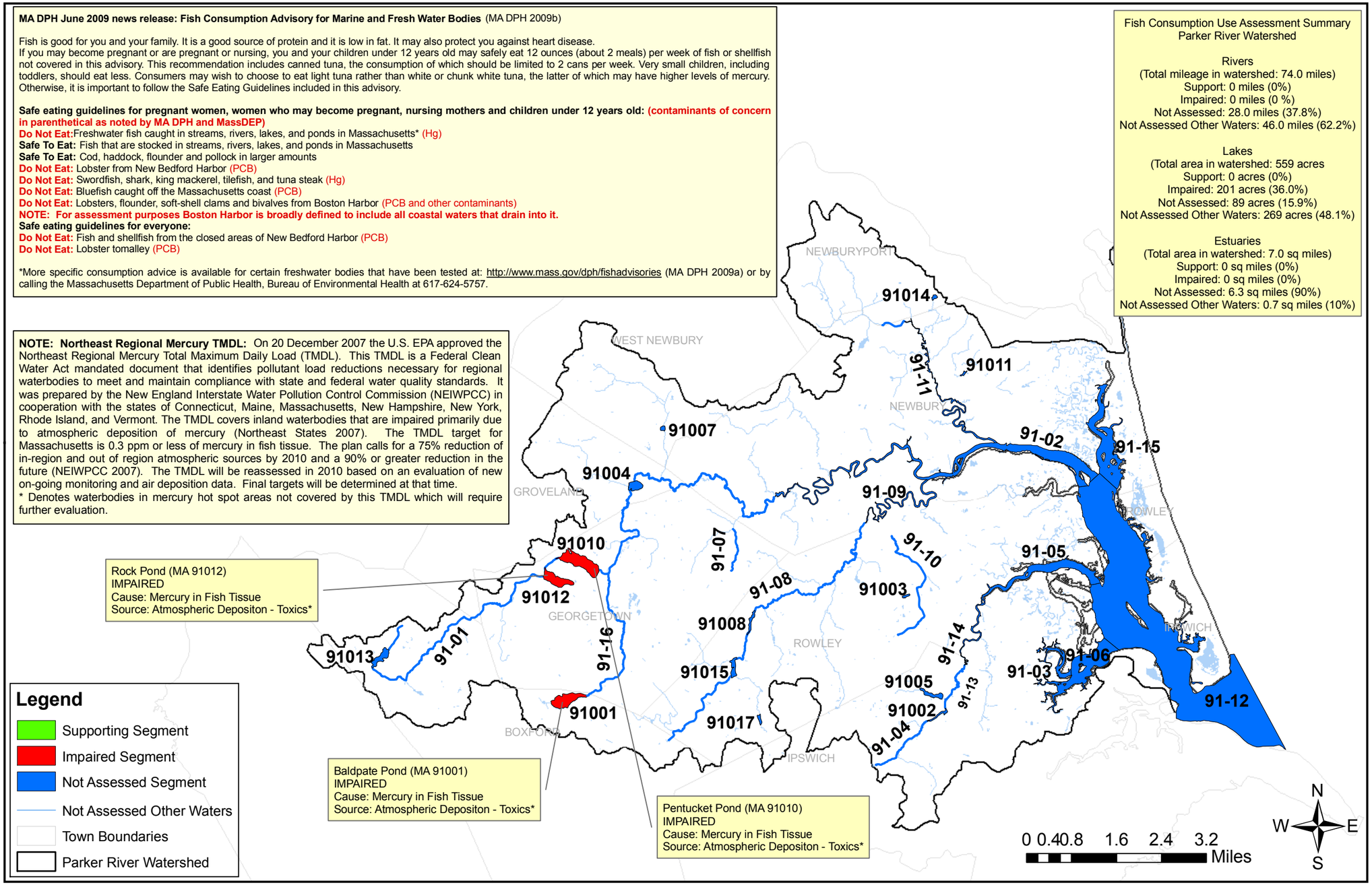

Figure 2. *Fish Consumption Use* assessment summary for rivers, estuarine, and lake segments in the Parker River Watershed and Coastal Drainage Area. Note: The *Fish Consumption Use* is supported when there are no unacceptable concentrations of pollutants in edible portions of fish, other aquatic life 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). 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.

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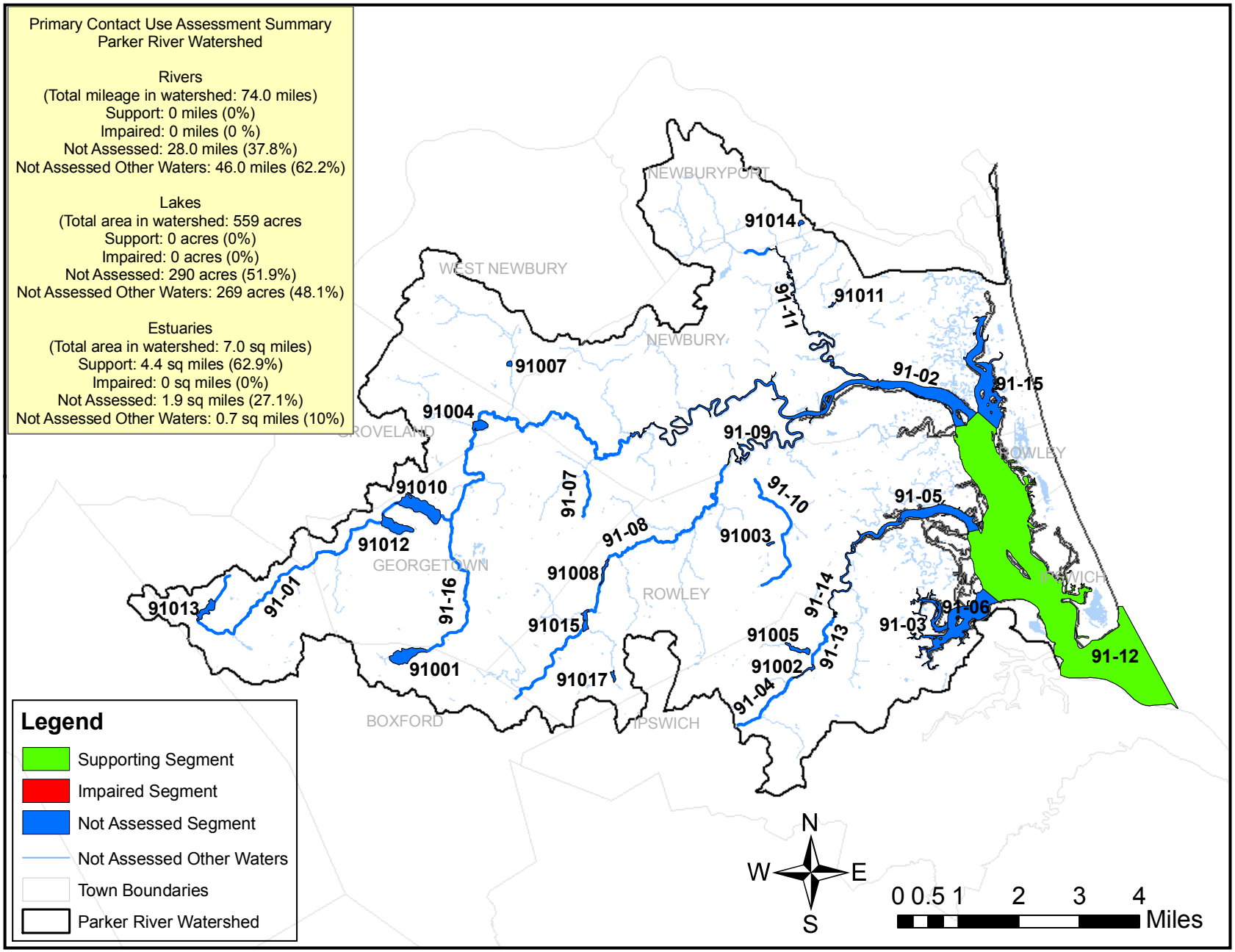

Figure 3. *Primary Contact Recreational Use* assessment summary for rivers, estuarine, and lake segments in the Parker River Watershed and Coastal Drainage Area. Note: The *Primary Contact Recreational Use* is supported when conditions are suitable (bacteria densities, turbidity and aesthetics meet the 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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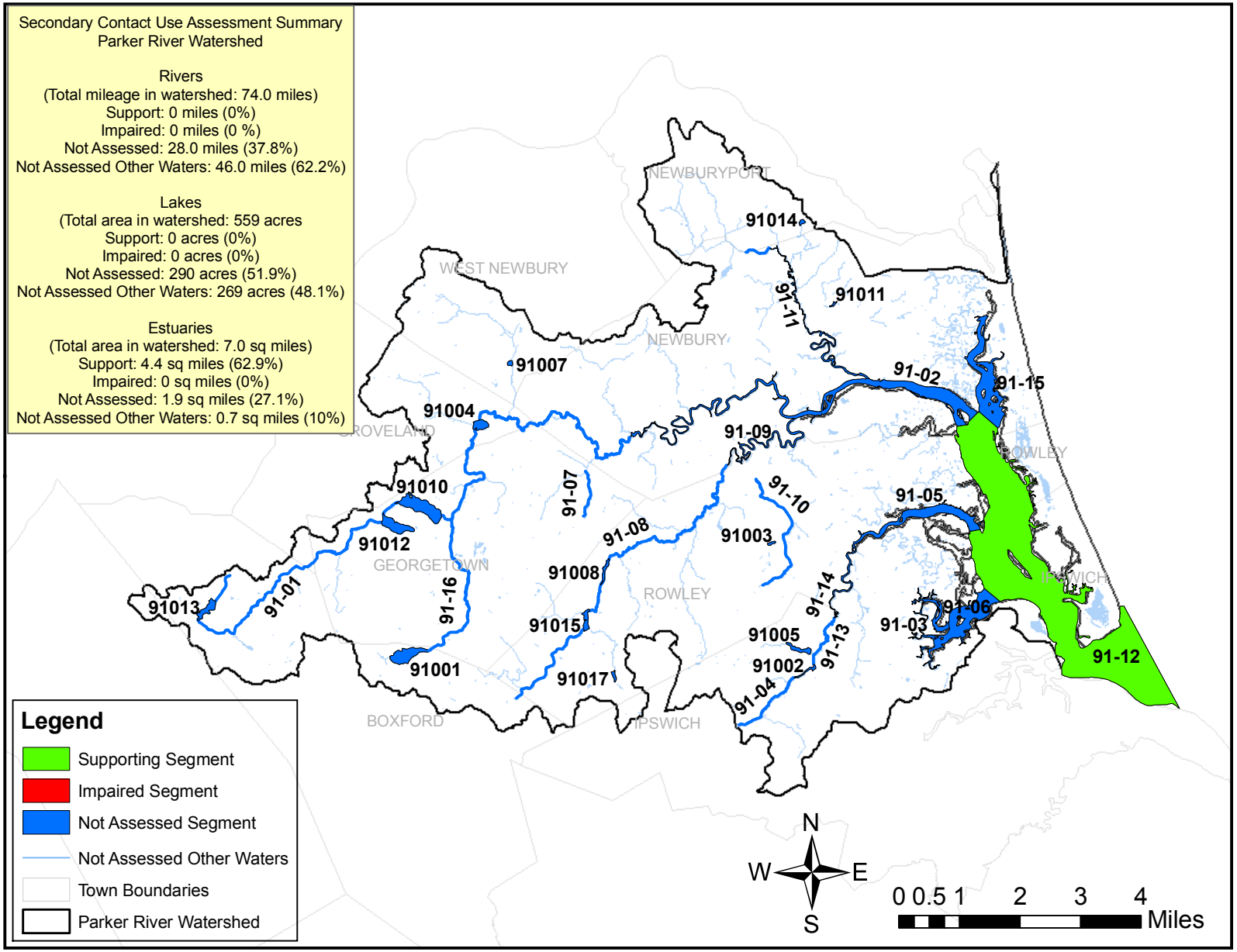

Figure 4. *Secondary Contact Recreational Use* assessment summary for rivers, estuarine, and lake segments in the Parker River Watershed and Coastal Drainage Area. Note: The *Secondary Contact Recreational Use* is supported when conditions are suitable for any recreational or other water use during which 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.

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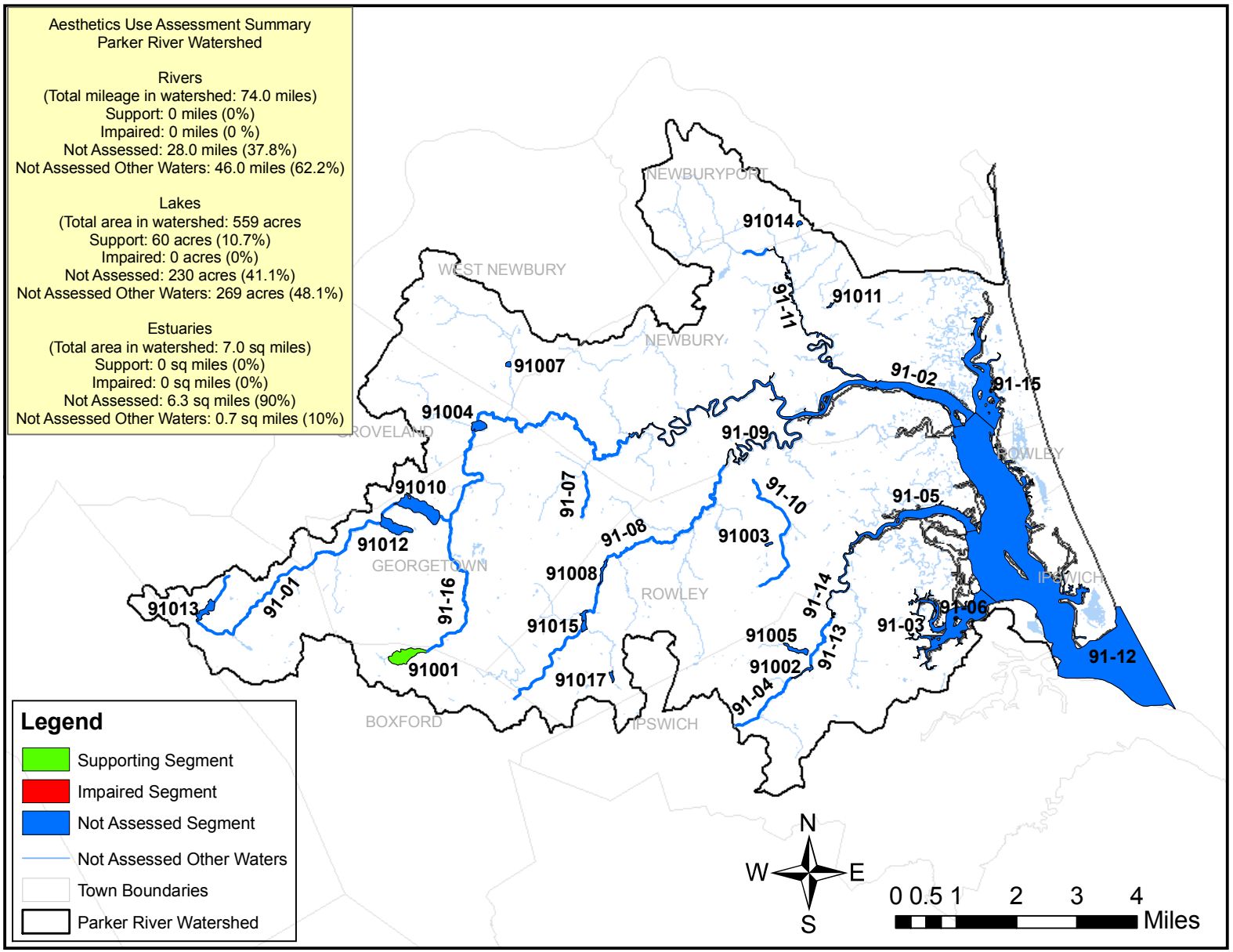

Figure 5. *Aesthetics Use* assessment summary for rivers, estuarine, and lake segments in the Parker River Watershed and Coastal Drainage Area.
Note: The *Aesthetics Use* is supported when surface waters are free from pollutants in concentrations or combinations that settle to form objectionable deposits; 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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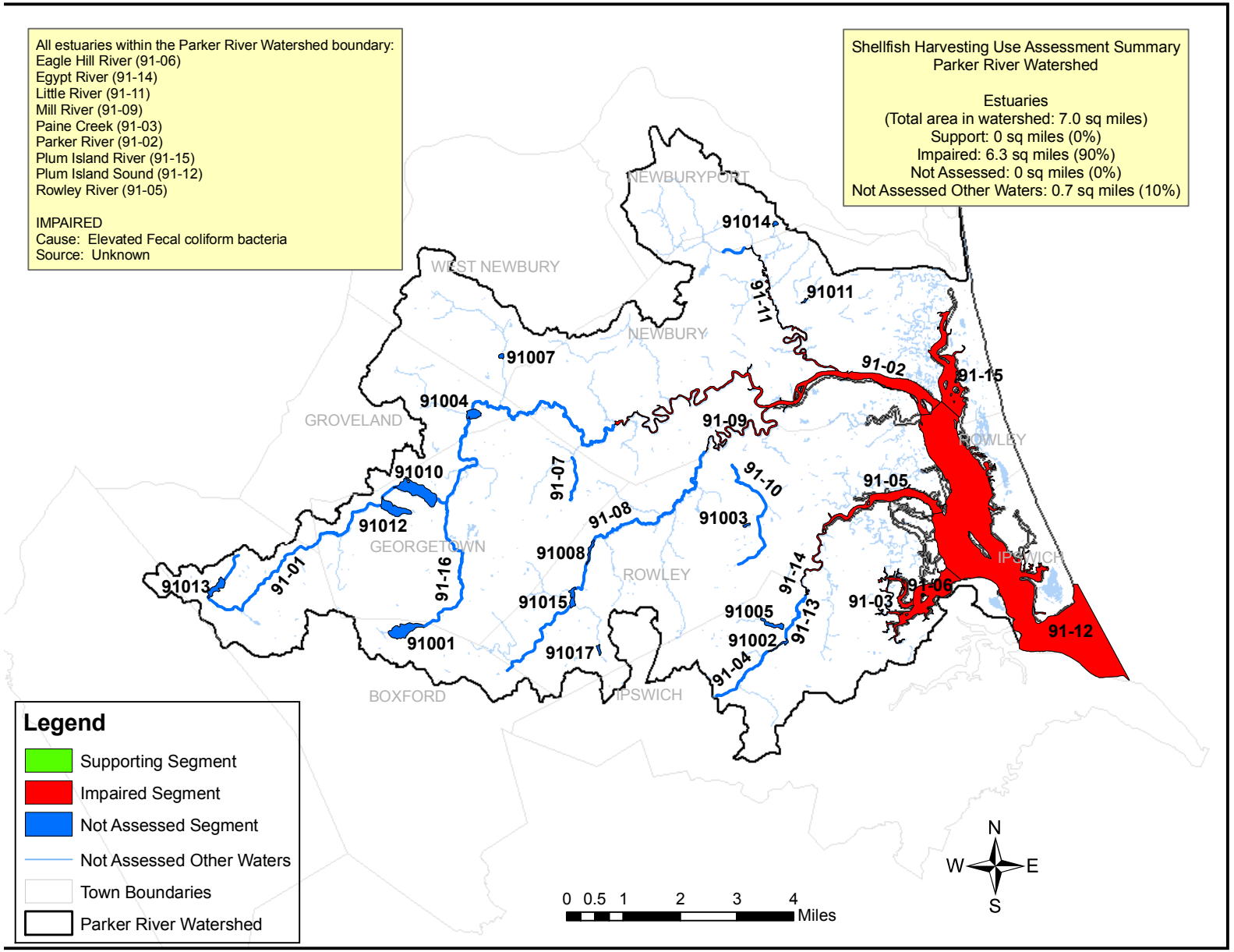

Figure 6. *Shellfish Harvesting Use* assessment summary for estuarine segments in the Parker River Watershed and Coastal Drainage Area. Note: The *Shellfishing Harvesting Use* is supported in Class SA waters when water quality is suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas).

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INTRODUCTION

The goal of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (Environmental Law Reporter 1988). To meet this objective, the CWA requires states to develop information on the quality of the Nation's water resources and report this information to the 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, every two years, the Massachusetts Department of Environmental Protection (MassDEP) must submit to EPA a statewide report that 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 gave states the option 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 the Assessment Methodology provided in Appendix A of this report.

This report presents the current assessment of water quality conditions in the Parker River Watershed and Coastal Drainage Area. The assessments are based on information that has been researched and developed by the MassDEP through the first three years (information gathering, monitoring, and assessment) of the five-year basin cycle in partial fulfillment of MassDEP's federal mandate to report on the status of the Commonwealth's waters under the CWA. Due to resource limitations, Division of Watershed Management (DWM) staff did not perform year two monitoring activities in the Parker watershed in 2004. Recent water quality monitoring data for the Parker River and other waters has been collected by the Parker River Clean Water Association and the Plum Island Ecosystem- Long Term Ecological Research (PIE-LTER) project. Specific requests for data quality control and quality assurance documentation were made to principal investigators for the PIE-LTER datasets available online; however it was not available and/or not provided. Neither group collected data under a Quality Assurance Program Plan or other detailed data quality document, a minimum requirement for utilizing data from outside organizations in the assessment process.

MASSACHUSETTS INTEGRATED LIST OF WATERS

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

The EPA approved the Massachusetts Year 2008 Integrated List of Waters in May of 2009. In that report each waterbody segment was placed in one of five major categories. Category 1 included those waters that were meeting all designated uses. No Massachusetts waters were listed in Category 1 because a statewide health advisory pertaining to the consumption of fish precludes any waters from being in full support of the fish consumption use. Waters listed in Category 2 were found to support some of the uses for which they were assessed but other uses were unassessed. Category 3 contained those waters for which insufficient or no information was available to assess any uses. Waters exhibiting impairment for one or more uses were placed in either Category 4 (impaired but not requiring a TMDL report) or Category 5 (impaired and requiring one or more TMDLs) according to the EPA guidance. Category 4 was further divided into three sub-categories – 4A, 4B and 4C – depending upon the reason that TMDLs were not needed. Category 4A included waters for which the required TMDL(s) had already been completed and approved by the EPA. However, since segments could only appear in one-category waters that had an approved TMDL for some pollutants, but not others, remained in Category 5. Category 4B was to include waters for which other pollution control requirements were reasonably expected to result in the attainment of the designated use before the next listing cycle (i.e., 2010). 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 2008 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 2008 Integrated List category and causes of impairment.

PARKER RIVER WATERSHED AND COASTAL DRAINAGE AREA DESCRIPTION

The Parker River Watershed and Coastal Drainage Area lies between the Merrimack and Ipswich River Watersheds in northeastern Massachusetts. All or parts of nine communities lie within the 82 square mile watershed; Boxford, Georgetown, Groveland, Ipswich, Newbury, Newburyport, North Andover, Rowley, and West Newbury. The Parker River Watershed and Coastal Drainage Area is generally rural-residential in nature, with minor industrial development mostly confined to the headwaters of the Little River tributary.

The Parker River is the largest tributary to Plum Island Sound. It is formed at the confluence of two unnamed brooks in a wetland area in west Boxford. The river flows generally in a northeasterly direction through several small ponds and extensive wetland areas in the towns of Boxford, Georgetown, Groveland, and Newbury. In Newbury, the Parker River becomes tidal with the last nine miles of the river subject to the rise of the tide. The Parker River flows through extensive coastal wetlands to its mouth where it empties into Plum Island Sound. The Parker River National Wildlife Refuge is located at the mouth of the Parker River. This refuge consists of 4,650 acres of sand dunes, salt marsh, freshwater marsh, and glacial upland. Also included in the refuge are six miles of ocean beach along the eastern side of Plum Island.

This report contains assessment information for seven river segments which total 28.0 miles in length and represent approximately 38% of the estimated 74.0 perennial freshwater river miles in the Parker River Watershed and Coastal Drainage Area. There are 14 lakes segments that encompass 290 acres of the estimated 559 freshwater "lake" acres, and nine estuarine segments which encompass 6.3 mi^2 of the estimated 7.0 mi^2 in the watershed/area. In the interest of reporting on all river miles, lake acres, and estuarine areas in the Parker River Watershed and Coastal Drainage Area, any waters not currently assigned an assessment segment identification number are considered ***not assessed other waters***.

OBJECTIVES

This report is an update to the last water quality assessment report for the Parker River Watershed and Coastal Drainage Area that was published by DWM in August 2001 (Weinstein and Connors 2001). The new assessments are based on the most currently available validated water quality data/information developed by MassDEP as well as more recent data collected by external data sources in the watershed in partial fulfillment of MassDEP's federal mandate to report on the status of the Commonwealths waters under the CWA.

The methodology used to assess the status of water quality conditions of rivers, lakes, and estuaries in accordance with EPA's and MassDEP's use assessment methods is provided in Appendix A.

The objectives of this water quality assessment report are to:

1. evaluate whether or not surface waters in the Parker River Watershed and Coastal Drainage Area, defined as segments in the MassDEP/EPA databases, currently support their designated uses (i.e., meet Massachusetts Surface Water Quality Standards),
2. identify stressors impairing designated uses and any confirmed sources of those stressors,
3. identify the presence or absence of any non-native aquatic species (e.g., macrophytes), and
4. identify waters (or segments) of concern that will require additional data to fully assess water quality conditions.

ASSESSMENT REPORT FORMAT

In this report the assessment information for waters that are designated as segments is summarized in a table format (see example in Table 1). The tables summarize the assessment decisions for the *Aquatic Life, Fish Consumption, Shellfish Harvesting, Primary* and *Secondary Contact Recreation* and *Aesthetics* uses, the data that informed those decisions, the cause(s) of any impairment(s), and the confirmed source(s) for the impairment (Table 1).

Table 1. An example table format used to present assessment information in the 2004-2008 Parker River Watershed and Coastal Drainage Area Water Quality Assessment Report.

Example Brook (Segment MA91-99)
Location: Outlet Fake Pond, Town, to confluence with Name Brook, Town.
Segment Length: 4.4 Miles
Classification: Class B
2008 Integrated List of Waters: Category and status of TMDL needs as appropriate.

Designated Use	Use Assessment	Alert
Aquatic Life	**Impaired**	**No**

Each Designated Use is displayed in the first column of the table for each segment. The "Use Assessment" column states the assessment decision (support, impaired, not assessed) for the use. The "Alert" column is used when an issue was identified that is of concern (i.e., an "Alert Status" was noted for the use but the use was not assessed as impaired).

Text is provided in the body of the table to summarize information relevant to the assessment decision for each use. Example text:

MassDEP DWM measured dissolved oxygen, temperature, and pH six times at one site in 2003 and found no violations of the temperature or pH criterion and five violations of the dissolved oxygen criterion. The DO violations ranged from 2.9 mg/L to 3.6 mg/L.

When appropriate, "Cause(s) of Impairment" and "Source(s) of Impairment" identify the stressors leading to the impairment decision and the any confirmed source(s)of the stressor(s). The causes and sources are selected from lists in the EPA Assessment Database Version 2 (ADB).
Cause(s) of Impairment: e.g., Dissolved oxygen
Source(s) of Impairment: e.g., Unknown

Any data sources used to make an assessment decision are cited for each use and displayed in the bottom right corner. The numbers identified as the data sources correspond to the numbered citations in the Assessment Data Sources section following the tables.

Data Sources: xx

The *Drinking Water* use is not assessed in this report. MassDEP's Drinking Water Program (DWP) has primacy for implementing the provisions of the federal Safe Drinking Water Act (SDWA) and maintains current drinking supply monitoring data. More information is available on the MassDEP website at http://www.mass.gov/dep/water/drinking.htm.

SPECIAL NOTES

The following special note refers to unique assessment situations that apply to several segments and is best described in a separate section rather than repeated for each segment.

1. **Use of Parker River Watershed Association (MyRWA)Data –** MyRWA water quality monitoring data for the period 2002-2008 was acquired, summarized, and passed an external data review process, allowing that data to be used in making assessment decisions for the following parameters: E. coli and enterococcus bacteria, TP, TSS, conductivity, temperature, observed color, and observed odor. MyRWA Dissolved Oxygen data was determined to be appropriate only for informing assessment decisions and designating an alert status. MyRWA dissolved Oxygen data is summarized and noted when appropriate in the use assessment decisions, however it was not used to impair any uses.
2. **Fish Consumption Advisory for Marine and Fresh Water Bodies** - In July 2001 Massachusetts Department of Public Health (MA DPH) issued consumer advisories on fish consumption due to mercury contamination (MA DPH 2001). Their most recent news release on this issue in June 2009 recommends the following (MA DPH 2009):
   If you may become pregnant or are pregnant or nursing, you and your children under 12 years old may safely eat 12 ounces (about 2 meals) per week of fish or shellfish not covered in this advisory. 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. Otherwise, it is important to follow the Safe Eating Guidelines included in this advisory.'

Safe eating guidelines for pregnant women, women who may become pregnant, nursing mothers and children under 12 years old (contaminants of concern in parenthetical as noted by MA DPH and MassDEP):

Do Not Eat: Freshwater fish caught in streams, rivers, lakes, and ponds in Massachusetts (Hg)
Safe To Eat: Fish that are stocked in streams, rivers, lakes, and ponds in Massachusetts
Safe To Eat: Cod, haddock, flounder and pollock in larger amounts
Do Not Eat: Lobster from New Bedford Harbor (PCB)
Do Not Eat: Swordfish, shark, king mackerel, tilefish, and tuna steak (Hg)
Do Not Eat: Bluefish caught off the Massachusetts coast (PCB)
Do Not Eat: Lobsters, flounder, soft-shell clams and bivalves from Boston Harbor (PCB and other contaminants) NOTE: For assessment purposes Boston Harbor is broadly defined to include all coastal waters that drain into it.

Safe eating guidelines for everyone:

Do Not Eat: Fish and shellfish from the closed areas of New Bedford Harbor (PCB)
Do Not Eat: Lobster tomalley (PCB)

ASSESSMENT TABLES

BALDPATE POND (SEGMENT MA91001)

Segment Description: Boxford
Segment Size: 60 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Metals, Noxious aquatic plants).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Impaired**	**--**
The Aquatic Life Use is Impaired due to the presence of the following non-native aquatic macrophytes(s): Cabomba caroliniana and Potamogeton crispus. Approximately 25% of the lake (at depths below 6m) had dissolved oxygen measurements that were below standards during a September 2003 depth profile performed by DWM personel. This is also sufficient to result in the impairment of the Aquatic Life Use. **Cause(s) of Impairment:** Non-Native Aquatic Plants, Low Dissolved Oxygen **Source(s) of Impairment:** Unknown *Data Sources: 7, 8*		
Fish Consumption	**Impaired**	**--**
MassDEP conducted sampling of fish from Baldpate Pond in 1999, 2004 and 2008 in support of an intensive mercury sampling program in northeastern Massachusetts (Appendix B). Due to the presence of Mercury, MDPH has issued the following advisory (MA DPH 2009) for Baldpate Pond recommending: "Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body. The general public should not consume any of the affected fish species (Largemouth Bass) from this water body. The general public should limit consumption of non-affected fish from this water body to two meals per month." Because of the site-specific fish consumption advisory for Baldpate Pond due to Mercury contamination, the Fish Consumption Use is assessed as impaired. **Cause(s) of Impairment:** Mercury in Fish Tissue **Source(s) of Impairment:** Atmospheric Depositon - Toxics *Data Sources: 3*		
Primary Contact	**Not Assessed**	**--**
Secondary Contact	**Not Assessed**	**--**
Aesthetics	**Support**	**--**
Secchi Disk depth was 5.1m, and no objectionable deposits or odors were noted by DWM personel in 2003. The Aesthetics use is assessed as Support. *Data Sources: 8*		

BULL BROOK (SEGMENT MA91-04)

Segment Description: Headwaters, Ipswich to inlet Bull Brook Reservoir, Ipswich.
Segment Length: 1.4 miles
Segment Classification: A\PWS\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Drinking Water*	**Not Assessed**	--
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

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

BULL BROOK RESERVOIR (SEGMENT MA91002)

Segment Description: Ipswich
Segment Size: 7 acres
Segment Classification: A\PWS\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Drinking Water*	**Not Assessed**	--
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

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

CENTRAL STREET POND (SEGMENT MA91003)

Segment Description: Rowley
Segment Size: 3 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits (Appendix C, Table C3): Town of Rowley MAR041218

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

CRANE POND (SEGMENT MA91004)

Segment Description: Groveland
Segment Size: 22 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

DOW BROOK RESERVOIR (SEGMENT MA91005)

Segment Description: Ipswich
Segment Size: 16 acres
Segment Classification: A\PWS\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
WMA with surface water source(s) (APPENDIX C, Table C1):
Ipswich Water Department (registration 31614401, permit 9P231614401)
NPDES: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Drinking Water*	**Not Assessed**	--
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

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

EAGLE HILL RIVER (SEGMENT MA91-06)

Segment Description: Headwaters near Town Farm Road, Ipswich to the mouth at Plum Island Sound, Ipswich.
Segment Size: 0.35 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish areas N4.1 and N4.0 in the town of Ipswich. Both of these shellfish areas are classified as conditionally approved, and since this segment is classified SA the shellfishing use is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

EGYPT RIVER (SEGMENT MA91-13)

Segment Description: Outlet Bull Brook Reservoir, Ipswich to east of Jewett Hill (Latitude 42:42:23.40, Longitude 70:51:47.58 DMS), Ipswich.
Segment Length: 1.1 miles
Segment Classification: B\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits (Appendix C, Table C2): Town of Ipswich MAG640025

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

EGYPT RIVER (SEGMENT MA91-14)

Segment Description: East of Jewett Hill (Latitude 42:42:23.40, Longitude 70:51:47.58 DMS), Ipswich to confluence with Muddy Run and Rowley River, Rowley/Ipswich.
Segment Size: 0.01 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish area N4.2 in the towns of Ipswich and Rowley. This shellfish area is classified as conditionally approved, and since this segment is classified SA the shellfishing use is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

JACKMAN BROOK (SEGMENT MA91-07)

Segment Description: Northeast of intersection of Jewett and Tenney streets, Georgetown to confluence with Wheeler Brook, Georgetown.
Segment Length: 0.8 miles
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 2 - Attaining Some Uses (Aquatic Life, Aesthetics); Others Not Assessed.
NPDES Permits (Appendix C, Table C3): Town of Georgetown MAR041191

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

LITTLE CRANE POND (SEGMENT MA91007)

Segment Description: West Newbury
Segment Size: 4 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

LITTLE RIVER (SEGMENT MA91-11)

Segment Description: Scotland Road/Parker Street, Newbury/Newburyport to confluence with Parker River, Newbury.
Segment Size: 0.09 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits (Appendix C, Tables C2 and C3): Hero Coatings, Inc. MAG910009, Town of Newbury MAR041212

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish area N4.3 in the town of Newbury. This shellfish area is classified as prohibited; therefore the shellfishing use for this segment is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

MILL RIVER (SEGMENT MA91-08)

Segment Description: Headwaters - Outlet of small unnamed pond between Route 95 and Rowley Road, Boxford to Route 1, Rowley/Newbury (thru Upper Mill Pond formerly segment MA91015 and Lower Mill Pond formerly segment MA91008).
Segment Length: 6.9 miles
Segment Classification: B\WW\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Cause Unknown).
NPDES Permits (Appendix C, Table C3): Town of Rowley MAR041218

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
The Aquatic Life Use is Impaired due to the presence of the following non-native aquatic macrophytes(s) in Lower Mill Pond, which is now considered part of the Mill River: Trapa natans **Cause(s) of Impairment:** Non-Native Aquatic Plants **Source(s) of Impairment:** Unknown *Data Sources: 7, 9*		
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

MILL RIVER (SEGMENT MA91-09)

Segment Description: Route 1, Rowley/Newbury to confluence with Parker River, Newbury.
Segment Size: 0.09 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits (Appendix C, Table C2): Governor Dummer Academy MA0030350 (discharge to unnamed tributary of the Mill River)

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish area N4.4 in the towns of Newbury and Rowley. This shellfish area is classified as prohibited; therefore the shellfishing use for this segment is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

OX PASTURE BROOK (SEGMENT MA91-10)

Segment Description: Headwaters - Outlet of small unnamed impoundment east of Bradford Street, Rowley to the outlet of a small unnamed impoundment west of Ox Pasture Hill, Rowley.
Segment Length: 2.5 miles
Segment Classification: B\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 2 - Attaining Some Uses (Aquatic Life, Aesthetics); Others Not Assessed.
NPDES Permits (Appendix C, Table C3): Town of Rowley MAR041218

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	**--**
Fish Consumption	**Not Assessed**	**--**
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	**Y**
DWM personel conducted bacteria source tracking on this segment of Ox Pasture brook in Rowley during 2007. Only two enterococci samples were collected at any given station thus no geometric mean can be calculated. However, multiple values were recorded in Ox Pasture Brook that were over the standard and thus this use is identified with an alert status. *Data Sources: 6*		
Secondary Contact	**Not Assessed**	**Y**
DWM personel conducted bacteria source tracking on this segment of Ox Pasture brook in Rowley during 2007. Only two enterococci samples were collected at any given station thus no geometric mean can be calculated. However, multiple values were recorded in Ox Pasture Brook that were over the standard and thus this use is identified with an alert status. *Data Sources: 6*		
Aesthetics	**Not Assessed**	**--**

PAINE CREEK (SEGMENT MA91-03)

Segment Description: Headwaters to confluence with Eagle Hill River, Ipswich.
Segment Size: 0.06 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish area N4.1 in the town of Ipswich. This shellfish area is classified as conditionally approved, and since this segment is classified SA the shellfishing use is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

PARKER RIVER (SEGMENT MA91-01)

Segment Description: Source north of Silver Mine Road, Boxford to Central Street, Newbury (excluding Sperry Pond segment MA91013, Rock Pond segment MA91012, Pentucket Pond segment MA91010, and Crane Pond segment MA91004).
Segment Length: 12.3 miles
Segment Classification: B\WW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Metals, (Flow alteration*)). * denotes a non-pollutant.
NPDES Permits (Appendix C, Tables C2 and C3): Georgetown Water Department MAG640048, Town of Boxford MAR041184, Town of Georgetown MAR041191, Town of Groveland MAR041195, Town of Newbury MAR041212

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	**Y**
Flow in the Parker River is occasionally regulated by the mill and ponds upstream. USGS documented mean flows for October of 2007 of 1.2 cubic feet per second. The Aquatic Life Use is assessed with an alert status due to flow alterations. There are 6 dams on this segment of the Parker River. All have fish passage in various levels of passability. "Despite the numerous obstructions to passage, the river has managed to sustain a river herring population over the years" (Brady 2004) . All 8 DFG fish stations sampled in this segment were dominated by macrohabitat generalist species. DFG documented low numbers of fish and almost all macrohabitat generalist species. However, for most samples very short electroshocking times were recorded and it is unclear if the low numbers of fish are related to very limited water quantity or habitat limitations. The numerous dams could impact fish movement and account for more lentic habitats and macrohabitat generalists. *Data Sources: 4, 5*		
Fish Consumption	**Not Assessed**	**--**
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	**--**
Secondary Contact	**Not Assessed**	**--**
Aesthetics	**Not Assessed**	**--**

PARKER RIVER (SEGMENT MA91-02)

Segment Description: Central Street, Newbury to mouth at Plum Island Sound, Newbury.
Segment Size: 0.6 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits (Appendix C, Table C3): Town of Newbury MAR041212

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
The upper portion of this segment is contained within shellfish area N4.4 in the towns of Newbury and Rowley. This shellfish area is classified as prohibited. The middle portion of this segment is contained within shellfish area N4.3 in the town of Newbury. This shellfish area is classified as prohibited. The lower portion of this segment is contained within shellfish area N4.0 in the towns of Newbury and Rowley. This shellfish area is classified as conditionally approved. This segment of the Parker River is designated class SA, therefore both prohibited and conditionally approved shellfishing areas result in the impairment of the shellfishing use for this segment. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

PENN BROOK (SEGMENT MA91-16)

Segment Description: Outlet Baldpate Pond, Boxford to confluence with Parker River, Georgetown.
Segment Length: 3.0 miles
Segment Classification: B
2008 Integrated List of Waters: Not Listed.
NPDES Permits (Appendix C, Table C3): Town of Georgetown MAR041191

Designated Use	Use Assessment	Alert
Aquatic Life	**Support**	--
The presence of creek chubsucker, a fluvial species that is intolerant to pollution, at two of the three locations sampled makes Penn Brook unique among the Parker watershed streams sampled recently by MA DFG. Two intolerant fish species (creek chubsucker and banded sunfish) comprised at least 30% of the fish population at the two most upstream stations. The dominance of creek chubsucker at the upper most station is also an indicator of good water quality. The Aquatic Life Use is assessed as support based upon the fish community data. *Data Sources: 10*		
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

PENTUCKET POND (SEGMENT MA91010)

Segment Description: Georgetown
Segment Size: 92 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Metals, Pathogens, (Exotic species*)). * denotes a non-pollutant.
NPDES Permits (Appendix C, Table C3): Town of Georgetown MAR041191

Designated Use	Use Assessment	Alert
Aquatic Life	**Impaired**	**--**
The Aquatic Life Use is Impaired due to the presence of the following non-native aquatic macrophytes(s): Cabomba caroliniana **Cause(s) of Impairment:** Non-Native Aquatic Plants **Source(s) of Impairment:** Unknown *Data Sources: 7, 9*		
Fish Consumption	**Impaired**	**--**
Due to the presence of Mercury, MDPH has issued the following advisory (MA DPH 2009) for Pentucket Pond recommending:"Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body. The general public should not consume any of the affected fish species (Largemouth Bass, Black Crappie) from this water body. The general public should limit consumption of non-affected fish from this water body to two meals per month." Because of the site-specific fish consumption advisory for Pentucket Pond due to Mercury contamination, the Fish Consumption Use is assessed as impaired. **Cause(s) of Impairment:** Mercury in Fish Tissue **Source(s) of Impairment:** Atmospheric Depositon - Toxics *Data Sources: 3*		
Primary Contact	**Not Assessed**	**--**
Secondary Contact	**Not Assessed**	**--**
Aesthetics	**Not Assessed**	**--**

PLUM ISLAND RIVER (SEGMENT MA91-15)

Segment Description: From "high sandy" sandbar just north of the confluence with Pine Island Creek, Newbury to confluence with Plum Island Sound, Newbury.
Segment Size: 0.39 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish area N4.0 in the town of Newbury. This shellfish area is classified as conditionally approved, and since this segment is classified SA the shellfishing use is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

PLUM ISLAND SOUND (SEGMENT MA91-12)

Segment Description: From the mouth of both the Parker River and Plum Island River, Newbury to the Atlantic Ocean, Ipswich (Includes Ipswich Bay).
Segment Size: 4.44 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
This segment is contained within shellfish areas N3.0, N4.0, N6.0 and N6.1 in the towns of Ipswich, Newbury and Rowley. Shellfish area N3.0 is classified as approved and 25 acres (0.87%) of this segment lie within this area. Shellfish area N4.0 is classified as conditionally approved and 2020 acres (70.58%) of this segment lie within this area. Shellfish area N6.0 is classified as approved and 698 acres (24.39%) of this segment lie within this area. Shellfish area N6.1 is classified as approved and 119 acres (4.16%) of this segment lie within this area. In summary, 25.26% of this segment is supporting the shellfishing use. However, since 74.74% of this Class SA segment falls in areas that are conditionally approved or prohibited, the shellfishing use is impaired. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Support**	--
With the exception of one beach being closed for one day in 2007 , no other closures have been reported for the four beaches (Clark, Steep Hill, Pavillion, and Crane) along the shoreline of this segment between 2002 and 2007. *Data Sources: 2*		
Secondary Contact	**Support**	--
With the exception of one beach being closed for one day in 2007 , no other closures have been reported for the four beaches (Clark, Steep Hill, Pavillion, and Crane) along the shoreline of this segment between 2002 and 2007. *Data Sources: 2*		
Aesthetics	**Not Assessed**	--

QUILLS POND (SEGMENT MA91011)

Segment Description: Newbury
Segment Size: 2 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	**Y**
The Aquatic life Use is given Alert Status because an unidentified Myriophyllum species has been collected in Quills Pond *Data Sources: 7*		
Fish Consumption	**Not Assessed**	**--**
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	**--**
Secondary Contact	**Not Assessed**	**--**
Aesthetics	**Not Assessed**	**--**

ROCK POND (SEGMENT MA91012)

Segment Description: Georgetown
Segment Size: 49 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Metals).
NPDES Permits (Appendix C, Table C3): Town of Georgetown MAR041191

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Impaired**	--
MassDEP conducted sampling of fish from Rock Pond in 1999, 2004, 2005, 2007 and 2009 in support of an intensive mercury sampling program in northeastern Massachusetts (Appendix B). Due to the presence of Mercury, MDPH has issued the following advisory (MA DPH 2008) for Rock Pond recommending: "Children younger than 12 years or age, pregnant women, women of childbearing age who may become pregnant, and nursing mothers should not eat any fish from this water body. The general public should not consume any of the affected fish species (Largemouth Bass) from this water body. The general public should limit consumption of non-affected fish from this water body to two meals per month." Because of the site-specific fish consumption advisory for Rock Pond due to Mercury contamination, the Fish Consumption Use is assessed as impaired. **Cause(s) of Impairment:** Mercury in Fish Tissue **Source(s) of Impairment:** Atmospheric Depositon - Toxics *Data Sources: 3*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

ROWLEY RIVER (SEGMENT MA91-05)

Segment Description: Confluence with Egypt River and Muddy Run, Rowley/Ipswich to mouth at Plum Island Sound, Rowley/Ipswich.
Segment Size: 0.27 square miles
Segment Classification: SA\ORW
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Pathogens).
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Shellfish Harvesting	**Impaired**	--
The upper portion of this segment is contained within shellfish area N4.2 in the towns of Ipswich and Rowley. This shellfish area is classified as conditionally approved. The lower portion of this segment is contained within shellfish area N4.0 in the towns of Ipswich and Rowley. This shellfish area is classified as conditionally approved. Since both areas are classified as conditionally approved and this segment is classified SA the shellfishing use is impaired for this segment. **Cause(s) of Impairment:** Fecal Coliform **Source(s) of Impairment:** Unknown *Data Sources: 1*		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

SPERRYS POND (SEGMENT MA91013)

Segment Description: Boxford
Segment Size: 26 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits: None

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

STATE STREET POND (SEGMENT MA91014)

Segment Description: Newburyport
Segment Size: 4 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 4c - Impairment Not Caused by a Pollutant (Exotic species*). * denotes a non-pollutant.
NPDES Permits (Appendix C, Table C3): Town of Newburport MAR041213

Designated Use	Use Assessment	Alert
Aquatic Life	**Impaired**	**--**
The Aquatic Life Use is Impaired due to the presence of the following non-native aquatic macrophytes(s): Cabomba caroliniana. **Cause(s) of Impairment:** Non-Native Aquatic Plants **Source(s) of Impairment:** Unknown *Data Sources: 7*		
Fish Consumption	**Not Assessed**	**--**
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	**--**
Secondary Contact	**Not Assessed**	**--**
Aesthetics	**Not Assessed**	**--**

WILSON POND (SEGMENT MA91017)

Segment Description: Rowley
Segment Size: 5 acres
Segment Classification: B
2008 Integrated List of Waters: This segment is on the 2008 Integrated List of Waters in Category 3 - No Uses Assessed.
NPDES Permits (Appendix C, Table C3): Town of Rowley MAR041218

Designated Use	Use Assessment	Alert
Aquatic Life	**Not Assessed**	--
Fish Consumption	**Not Assessed**	--
This waterbody does not have a site-specific fish consumption advisory. All applicable statewide fish consumption advisories issued by Massachusetts Department of Public Health (MA DPH) due to mercury contamination apply to this waterbody (See Special Note 2).		
Primary Contact	**Not Assessed**	--
Secondary Contact	**Not Assessed**	--
Aesthetics	**Not Assessed**	--

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APPENDIX A
Assessment Methodology
guidelines for evaluating designated use status of Massachusetts surface waters - 2010

WATER QUALITY CLASSIFICATION

The Massachusetts Surface Water Quality Standards (SWQS) designate the most sensitive uses for which the surface waters of the Commonwealth shall be enhanced, maintained and protected; prescribe minimum water quality criteria required to sustain the designated uses; and include provisions for the prohibition of discharges (MassDEP 2006). These regulations should undergo public review every three years. The surface waters are segmented and each segment is assigned to one of the six classes described below. Each class is identified by the most sensitive and, therefore, governing water uses to be achieved and protected. Surface waters may be suitable for other beneficial uses, but shall be regulated by the Department of Environmental Protection to protect and enhance the designated uses.

Inland Water Classes

- *CLASS A* - These waters include waters designated as a source of public water supply and their tributaries. They are designated as excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation, even if not allowed. These waters shall have excellent aesthetic value. These waters are protected as Outstanding Resource Waters.
- *CLASS B* - These waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. Where designated in 314 CMR 4.06, they shall be suitable as a source of public water supply with appropriate treatment ("Treated Water Supply"). Class B waters shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.
- *CLASS C* - These waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for secondary contact recreation. These waters shall be suitable for the irrigation of crops used for consumption after cooking and for compatible industrial cooling and process uses. These waters shall have good aesthetic value.

Coastal And Marine Classes

- *CLASS SA* - These waters are designated as an excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, sea grass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas). These waters shall have excellent aesthetic value.
- *CLASS SB* - These waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). These waters shall have consistently good aesthetic value.
- *CLASS SC* - These waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for secondary contact recreation. They shall also be suitable for certain industrial cooling and process uses. These waters shall have good aesthetic value.

The Clean Water Act (CWA), Section 305(b), water quality reporting process is an essential aspect of the Nation's water pollution control effort. It is the principal means by which EPA, Congress, and the public evaluate existing water quality, assess progress made in maintaining and restoring water quality, and determine the extent of remaining problems. By this process, states report on waterbodies within the context of meeting their designated uses. These uses include: *Aquatic Life, Fish Consumption, Drinking Water, Primary Contact Recreation, Secondary Contact Recreation, Shellfish Harvesting* and *Aesthetics*. Two subclasses of Aquatic Life are also designated in the Massachusetts Surface Water Quality Standards (SWQS): Cold Water Fishery – waters capable of sustaining a year-round population of cold water aquatic life, such as trout – and Warm Water Fishery – waters that are not capable of sustaining a year-round population of cold water aquatic life (MassDEP 2006).

The SWQS, summarized in Table A1, prescribe minimum water quality criteria to sustain the designated uses. Furthermore, these standards describe the hydrological conditions at which water quality criteria must be applied (MassDEP 2006). In rivers the lowest flow conditions at and above which aquatic life criteria must be applied are the lowest mean flow for seven consecutive days to be expected once in ten years (7Q10). In waters where flows are regulated by dams or similar structures the lowest flow conditions at which aquatic life criteria must be applied are the flows equal to or exceeded 99% of the time on a yearly basis or another equivalent flow that has been agreed upon (see Mass DEP 2006 for more detail). In coastal and marine waters and for lakes the Massachusetts Department of Environmental Protection (MassDEP) will determine on a case-by-case basis the most severe hydrological condition for which the aquatic life criteria must be applied.

The availability of appropriate and reliable scientific data and technical information is fundamental to the 305(b) reporting process. It is EPA policy (EPA Order 5360.1 CHG 1) that any individual or group performing work for or on behalf of EPA establish a quality system to support the development, review, approval, implementation, and assessment of data collection operations. To this end MassDEP describes its Quality System in an EPA-approved Quality Management Plan to ensure that environmental data collected or compiled by the MassDEP are of known and documented quality and are suitable for their intended use. For external sources of information, MassDEP requires the following: 1) an appropriate Quality Assurance Project Plan (QAPP) including a laboratory Quality Assurance /Quality Control (QA/QC) plan; 2) use of a state certified lab (or as otherwise approved by DEP for a particular analysis); and 3) sample data, QA/QC and other pertinent sample handling information documented in a citable report. This information will be reviewed by MassDEP to determine its validity and usability to assess water use support. Data use could be modified or rejected due to poor or undocumented QAPP implementation, lack of project documentation, incomplete reporting of data or information, and/or project monitoring objectives unsuitable for MassDEP assessment purposes.

EPA provides guidelines to states for making their use support determinations (EPA 1997 and 2002, Grubbs and Wayland III 2000 and Wayland III 2001). The determination of whether or not a waterbody supports each of its designated uses is a function of the type(s), quality and quantity of available current information. Although data/information older than five years are usually considered "historical" and used for descriptive purposes they can be utilized in the use support determination provided they are known to reflect the current conditions. While the water quality standards (Table A1) prescribe minimum water quality criteria to sustain the designated uses, numerical criteria are not available for every indicator of pollution. Best available guidance from available literature may be applied in lieu of actual numerical criteria (e.g., freshwater sediment data may be compared to *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario* 1993 by D. Persaud, R. Jaagumagi and A. Hayton). Excursions from criteria due solely to "naturally occurring" conditions (e.g., low pH in some areas) do not constitute violations of the SWQS.

Each designated use within a given segment is individually assessed as ***support*** or ***impaired***. When too little current data/information exist or no reliable data are available, the use is ***not assessed***. In this report, however, if there is some indication that water quality impairment may exist, and it 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 ponds, rivers, and estuaries have never been assessed; the status of their designated uses has never been reported to EPA in the Commonwealth's 305(b) Report or the Integrated List of Waters nor is information on these waters maintained in the waterbody system database (WBS) or the new assessment database (ADB). These waterbodies are considered ***not assessed other waters.***

Table A1. Summary of Massachusetts Surface Water Quality Standards (MassDEP 2006, MA DPH 2002, FDA 2003).

Dissolved Oxygen	Class A and Class B Cold Water Fishery (BCWF) and Class SA: ≥6.0 mg/L Class A and Class B Warm Water Fishery (BWWF) and Class SB: ≥5.0 mg/L Class C: Not <5.0 mg/L at least 16 hours of any 24-hour period and not <3.0 mg/L at any time. Class SC: Not <5.0 mg/L at least 16 hours of any 24-hour period and not <4.0 mg/L anytime. For all classes, where natural background conditions are lower than the criteria stated for each class, DO shall not be less than natural background conditions. Natural seasonal and daily variations that are necessary to protect existing and designated uses shall also be maintained.
Temperature	Class A CWF: ≤68°F (20°C) based on the mean of the daily maximum temperature over a seven day period in cold water fisheries, unless naturally occurring and ΔT due to a discharge ≤1.5°F (0.8°C). Class A WWF: ≤83°F (28.3°C) and ΔT due to a discharge ≤1.5°F (0.8°C). Class BCWF: ≤68°F (20°C) based on the mean of the daily maximum temperature over a seven day period in all cold water fisheries, unless naturally occurring, and ΔT due to a discharge ≤Δ3°F (1.7°C) Class BWWF: ≤83°F (28.3°C) and ΔT due to a discharge ≤5°F (2.8°C) in rivers (based on the minimum expected flow for the month) and ΔT due to a discharge ≤3°F (1.7°C) in the epilimnion (based on the

Table A1. Summary of Massachusetts Surface Water Quality Standards (MassDEP 2006, MA DPH 2002, FDA 2003).

	monthly average of maximum daily temperatures) in lakes, Class C and Class SC: ≤85°F (29.4°C) and ∆T due to a discharge ≤5°F (2.8°C) Class SA: ≤85°F (29.4°C) nor a maximum daily mean of 80°F (26.7°C) and ∆T due to a discharge ≤1.5°F (0.8°C) Class SB: ≤85°F (29.4°C) nor a maximum daily mean of 80°F (26.7°C) and ∆ T due to a discharge ≤1.5°F (0.8°C) between July and September and ≤4.0°F (2.2°C) between October and June. *For all classes, natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. There shall be no changes from natural background conditions that would impair any uses assigned to each class, including those conditions necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms.* For CWF waters, where a reproducing cold water aquatic community exists at a naturally higher temperature, the temperature necessary to protect the community shall not be exceeded and natural daily and seasonal temperature fluctuations necessary to protect the community shall be maintained. Class B, C, SA, SB, and SC: See MassDEP 2006 for language specific to alternative effluent limitations relating to thermal discharges and cooling water intake structures.
pH	Class A, Class BCWF and Class BWWF: 6.5 - 8.3 SU and ∆0.5 outside the natural background range. Class C: 6.5 - 9.0 SU and ∆1.0 outside the natural background range. Class SA and Class SB: 6.5 - 8.5 SU and ∆0.2 SU outside the natural background range. Class SC: 6.5 - 9.0 SU and ∆0.5 SU outside the natural background range. There shall be no change from natural background conditions that would impair any use assigned to each class.
Solids	All Classes: *These waters shall be free from floating, suspended, and settleable solids in concentrations or combinations that would impair any use assigned to each class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.*
Color and Turbidity	All Classes: *These waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use.*
Oil and Grease	Class A and Class SA: *Waters shall be free from oil and grease, petrochemicals and other volatile or synthetic organic pollutants.* Class SA: *Waters shall be free from oil and grease and petrochemicals.* Class B, Class C, Class SB and Class SC: *Waters shall be free from oil, grease, and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life.*
Taste and Odor	Class A and Class SA: *None other than of natural origin.* Class B, Class C, Class SB and Class SC: *None in such concentrations or combinations that are aesthetically objectionable, that would impair any use assigned to each class, or that would cause tainting or undesirable flavors in the edible portions of aquatic life.*
Aesthetics	All Classes: *All surface waters shall be 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.*
Toxic Pollutants	All Classes: *All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. For pollutants not otherwise listed in 314 CMR 4.00, the National Recommended Water Quality Criteria: 2002, EPA 822-R-02-047, November 2002 published by EPA pursuant to Section 304(a) of the Federal Water Pollution Control Act, are the allowable receiving water concentrations for the affected waters, unless the Department either establishes a site specific criterion or determines that naturally occurring background concentrations are higher. The Department shall use the water quality criteria for the protection of aquatic life expressed in terms of the dissolved fraction of metals when EPA's 304(a) recommended criteria provide for use of the dissolved fraction* (see Mass DEP 2006 for more detail regarding permit limits, conversion factors, site specific criteria).
Nutrients	*Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to these Standards.*
Bacteria (MassDEP 2006 and MA DPH 2002)	Class A: *At water supply intakes in unfiltered public water supplies:* either fecal coliform shall not exceed 20 organisms/100 ml in all samples taken in any six month period, or total coliform shall not exceed 100 organisms/ 100 ml in 90% of the samples taken in any six month period. If both total and fecal coliform are measured, then only the fecal coliform criterion must be met.

Table A1. Summary of Massachusetts Surface Water Quality Standards (MassDEP 2006, MA DPH 2002, FDA 2003).

Class A criteria apply to the *Drinking Water Use*. Class B and SB criteria apply to *Primary Contact Recreation Use* while Class C and SC criteria apply to *Secondary Contact Recreation Use*.	Class A other waters, Class B: Where *E.* coli is the chosen indicator at public bathing beaches as defined by MA DPH: The geometric mean of the five most recent *E. coli* samples taken within during the same bathing season shall not exceed 126 colonies/ 100 ml and no single sample taken during the bathing season shall exceed 235 colonies/ 100 ml (these criteria may be applied on a seasonal basis at the Department's discretion). Where Enterococci are the chosen indicators at public bathing beaches*:* The geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies /100 ml and no single *Enterococci* sample taken during the bathing season shall exceed 61 colonies /100 ml. For other waters and, during the non bathing season, for waters at public bathing beaches: The geometric mean of all *E. coli* samples taken within the most recent six months shall not exceed 126 colonies/ 100 ml typically based on a minimum of five samples and no single sample shall exceed 235 colonies/ 100 ml. These criteria may be applied on a seasonal basis at the Department's discretion. The geometric mean of all *Enterococci* samples taken within the most recent six months shall not exceed 33 colonies/ 100 ml typically based on a minimum of five samples and no single sample shall exceed 61 colonies/ 100 ml. These criteria may be applied on a seasonal basis at the Department's discretion. Class C: *The geometric mean of all E. coli samples taken within the most recent six months shall not exceed 630 E. coli/ 100 ml, typically based on a minimum of five samples and 10% of such samples shall not exceed 1260 E. coli/ 100 ml.* This criterion may be applied on a seasonal basis at the discretion of the Department. Class SA: Waters designated for shellfishing: *Fecal coliform bacteria shall not exceed a geometric mean (Most Probable Number (MPN) method) of 14 organisms/100 ml, nor shall more than 10% of the samples exceed an MPN of 28 organisms/100 ml, or other values of equivalent protection based on sampling and analytical methods used by the Massachusetts Division of Marine Fisheries and approved by the National Shellfish Sanitation Program in the latest revision of the Guide for the Control of Molluscan Shellfish Areas (more stringent regulations may apply, see 314 CMR 4.06(1)(d)(5)).* Class SB: Waters designated for shellfishing: *Fecal coliform median or geometric mean MPN shall not exceed 88 organisms/100 ml, nor shall more than 10% of the samples exceed an MPN of 260 organisms/100 ml or other values of equivalent protection based on sampling and analytical methods used by the Massachusetts Division of Marine Fisheries and approved by the National Shellfish Sanitation Program in the latest revision of the Guide for the Control of Molluscan Shellfish Areas (more stringent regulations may apply, see 314 CMR 4.06(1)(d)(5)).* Class SA and Class SB: At public bathing beaches, as defined by MA DPH: No single *Enterococci* sample taken during the bathing season shall exceed 104 colonies /100 ml and the geometric mean of the five most recent *Enterococci* samples taken within the same bathing season shall not exceed 35 colonies /100 ml. At public bathing beaches during the non-bathing season and in non bathing beach waters: No single *Enterococci* sample shall exceed 104 colonies/ 100 ml and the geometric mean of all samples taken within the most recent six months, typically a minimum of five samples, shall not exceed 35 colonies/ 100 ml. These criteria may be applied on a seasonal basis at the discretion of the Department). Class SC: *The geometric mean of all Enterococci samples taken within the most recent six months shall not exceed 175 colonies/ 100 ml, typically based on the five most recent samples, and 10% of such samples shall not exceed 350 colonies/ 100 ml. This criterion may be applied on a seasonal basis at the discretion of the Department.*

Note: *Italics are direct quotations.* Δ criterion (referring to a change from natural background conditions) is applied to the effects of a permitted discharge.

DESIGNATED USES

The Massachusetts Surface Water Quality Standards designate the most sensitive uses for which the surface waters of the Commonwealth shall be enhanced, maintained and protected. Each of these uses is briefly described below (MassDEP 2006):

- *AQUATIC LIFE* - suitable habitat for sustaining a native, naturally diverse, community of aquatic flora and fauna, including, but not limited to, wildlife and threatened and endangered species and for their reproduction, migration, growth and other critical functions. Two subclasses of aquatic life are also designated in the standards for freshwater bodies: *Cold Water Fishery* - capable of sustaining a year-round population of cold water aquatic life, such as trout; *Warm Water Fishery* - waters that are not capable of sustaining a year-round population of cold water aquatic life. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass.
- *FISH CONSUMPTION* - pollutants shall not result in unacceptable concentrations in edible portions of marketable fish or for the recreational use of fish, other aquatic life or wildlife for human consumption.
- *DRINKING WATER* - used to denote those waters used as a source of public drinking water. They may be subject to more stringent regulation in accordance with the Massachusetts Drinking Water Regulations (310 CMR 22.00). These waters are designated for protection as Outstanding Resource Waters under 314 CMR 4.04(3).
- *SHELLFISH HARVESTING* (in SA and SB segments) – Class SA waters where designated shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas); Class SB waters where designated shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas).
- *PRIMARY CONTACT RECREATION* - suitable for any recreation or other water use in which there is prolonged and intimate contact with the water with a significant risk of ingestion of water. These include, but are not limited to, wading, swimming, diving, surfing and water skiing.
- *SECONDARY CONTACT RECREATION* - suitable for any recreation or other water use in which contact with the water is either incidental or accidental. These include, but are not limited to, fishing, including human consumption of fish, boating and limited contact incident to shoreline activities. Where designated, secondary contact recreation also includes shellfishing, including human consumption of shellfish. Human consumption of fish and shellfish are assessed as the *Fish Consumption* and *Shellfish Harvesting* uses, respectively.
- *AESTHETICS* - all surface waters shall be 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.
- *AGRICULTURAL AND INDUSTRIAL* - suitable for irrigation or other agricultural process water and for compatible industrial cooling and process water.

The guidance used to assess the *Aquatic Life, Fish Consumption, Drinking Water, Shellfish Harvesting, Primary* and *Secondary Contact Recreation* and *Aesthetics* uses follows.

Note: Waterbodies affected by Combined Sewer Overflow (CSO) discharges are qualified in the standards, however, unless a variance has been granted and states otherwise, excursions from criteria are not allowed during storm events (designated uses are still applicable).

AQUATIC LIFE USE

This use is suitable for sustaining a native, naturally diverse, community of aquatic flora and fauna, including, but not limited to, wildlife and threatened and endangered species and for their reproduction, migration, growth and other critical functions. The results of biological (and habitat), toxicological, and chemical data are integrated to assess this use. The nature, frequency, and precision of the MassDEP's data collection techniques dictate that a weight of evidence be used to make the assessment, with biosurvey results used as the final arbiter of borderline cases. The following chart provides an overview of the guidance used to assess the status (support or impaired) of the *Aquatic Life Use*.

Variable	***Support*** Data available clearly indicates support or minor modification of the biological community. Excursions from chemical criteria (Table A1) not frequent or prolonged and may be tolerated if the biosurvey results demonstrate support.	***Impaired*** There are frequent or severe violations of chemical criteria, presence of acute toxicity, or a moderate or severe modification of the biological community.
BIOLOGY		
Rapid Bioassessment Protocol (RBP) III*	Non/Slightly impacted	Moderately or Severely Impacted
Fish Community	Best Professional Judgment (BPJ)	BPJ
Habitat and Flow	BPJ	Dewatered streambed due to artificial regulation or channel alteration, BPJ
Eelgrass Bed Habitat (Howes *et al.* 2003, Costello 2003)	Stable (No/minimal loss), BPJ	Loss/decline, BPJ
Non-native species	BPJ	Non-native species present, BPJ
Plankton/Periphyton	No/infrequent algal blooms	Frequent and/or prolonged algal blooms
TOXICITY TESTS**		
Water Column/Ambient	≥75% survival either 48 hr or 7-day exposure	<75% survival either 48 hr or 7-day exposure
Sediment	≥75% survival	<75% survival
CHEMISTRY-WATER**		
Dissolved oxygen (DO) (MassDEP 2006, EPA 1997)	Infrequent excursion from criteria (Table A1), BPJ (minimum of three samples representing critical period)	Frequent and/or prolonged or severe excursion from criteria [river and shallow lakes - exceedances >10% of representative measurements; deep lakes (with hypolimnion) - exceedances in the hypolimnetic area >10% of the surface area during maximum oxygen depletion].
pH (MassDEP 2006, EPA 1999a)	Infrequent excursion from criteria (Table A1)	Criteria exceeded >10% of measurements.
Temperature **(**MassDEP 2006,EPA 1997) [Note: typically the analysis of this variable is applicable to a summer index period ranging anywhere from mid-June through early September.]	Infrequent excursion from criteria (Table A1)	Small datasets: Criteria exceeded >10% of measurements. Deployed probe (long term) datasets: CWF: excursion based on mean of the daily maximum temperatures over a 7-day period. WWF: BPJ (e.g., >10% days in a 30 day period or three consecutive days in a 30 day period exceed 28.3°C, or 7-day average of daily maximum temperatures exceeds 28.3°C)
Toxic Pollutants (MassDEP 2006, EPA 1999a) Ammonia-N (MassDEP 2006, EPA 1999b) Chlorine (MassDEP 2006, EPA 1999a)	Infrequent excursion from criteria (Table A1) Ammonia toxicity increases with increasing pH and temperature[1]. 0.011 mg/L (freshwater) or 0.0075 mg/L (saltwater) total residual chlorine (TRC)[2]	Frequent and/or prolonged excursion from criteria (exceeded >10% of measurements).

AQUATIC LIFE USE (CONTINUED)

CHEMISTRY-SEDIMENT**		
Toxic Pollutants (Persaud *et al.* 1993)	Concentrations ≤ Low Effect Level (L-EL), BPJ	Concentrations ≥ Severe Effect Level (S-EL)[3], BPJ
CHEMISTRY-TISSUE		
PCB – whole fish (Coles 1998)	≤500 μg/kg wet weight	BPJ
DDT (Environment Canada 1999)	≤14.0 μg/kg wet weight	BPJ
PCB in aquatic tissue (Environment Canada 1999)	≤0.79 ng TEQ/kg wet weight	BPJ

*RBP II analysis may be considered for assessment decision on a case-by-case basis, **For identification of impairment, one or more of the following variables may be used to identify possible causes/sources of impairment: NPDES facility compliance with whole effluent toxicity test and other limits, turbidity and suspended solids data, nutrient (nitrogen and phosphorus) data for water column/sediments. [1] At maximum pH = 7.3 SU and maximum temperature = 23.6°C (worse case conditions in terms of ammonia toxicity encountered during the 2003 Blackstone River survey), the chronic criterion for fish early life stages present is 2.76 mg N/L. When this concentration was exceeded, actual in-situ pH and temperature data were utilized to compare the data to the criteria table. [2] The minimum quantification level for TRC is 0.05 mg/L. [3] For the purpose of this report, the S-EL for total polychlorinated biphenyl compounds (PCB) in sediment (which varies with total organic carbon (TOC) content) with 1% TOC is 5.3 ppm while a sediment sample with 10% TOC is 53 ppm.

Note: National Academy of Sciences/National Academy of Engineering (NAS/NAE) guideline for maximum organochlorine concentrations (i.e., total PCB) in fish tissue for the protection of fish-eating wildlife is 500μg/kg wet weight (ppb, not lipid-normalized). PCB data (tissue) in this report are presented in μg/kg wet weight (ppb) and are not lipid-normalized to allow for direct comparison to the NAS/NAE guideline.

FISH CONSUMPTION USE

Pollutants shall not result in unacceptable concentrations in edible portions of marketable fish or for the recreational use of fish, other aquatic life or wildlife for human consumption. The assessment of this use is made using the most recent 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 2009a). The MA DPH 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 consumer advisories on fish consumption due to mercury contamination (MA DPH 2001). Their most recent news release on this issue in June 2009 recommends the following (MA DPH 2009b):

'Fish Consumption Advisory for Marine and Fresh Water Bodies

Fish is good for you and your family. It is a good source of protein and it is low in fat. It may also protect you against heart disease. A varied diet, including safe fish, will lead to good nutrition and better health. If you may become pregnant or are pregnant or nursing, you and your children under 12 years old may safely eat 12 ounces (about 2 meals) per week of fish or shellfish not covered in this advisory. 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. Otherwise, it is important to follow the Safe Eating Guidelines included in this advisory.'

Safe eating guidelines for pregnant women, women who may become pregnant, nursing mothers and children under 12 years old: **(contaminants of concern in parenthetical as noted by MA DPH and MassDEP)**

Do Not Eat: *Freshwater fish caught in streams, rivers, lakes, and ponds in Massachusetts** (Hg)

Safe To Eat: *Fish that are stocked in streams, rivers, lakes, and ponds in Massachusetts*

Safe To Eat: *Cod, haddock, flounder and pollock in larger amounts*

Do Not Eat: *Lobster from New Bedford Harbor* (PCB)

Do Not Eat: *Swordfish, shark, king mackerel, tilefish, and tuna steak* (Hg)

Do Not Eat: *Bluefish caught off the Massachusetts coast* (PCB)

Do Not Eat: *Lobsters, flounder, soft-shell clams and bivalves from Boston Harbor* (PCB and other contaminants)

NOTE: For assessment purposes Boston Harbor is broadly defined to include all coastal waters that drain into it.

Safe eating guidelines for everyone:

Do Not Eat: *Fish and shellfish from the closed areas of New Bedford Harbor* (PCB)

Do Not Eat: *Lobster tomalley* (PCB)

*More specific consumption advice is available for certain freshwater bodies that have been tested at: http://www.mass.gov/dph/fishadvisories or by calling the Massachusetts Department of Public Health, Bureau of Environmental Health at 617-624-5757.

The following is an overview of EPA's guidance used to assess the status (support or impaired) of the *Fish Consumption Use*. Because of the statewide advisory no waters can be assessed as support for the *Fish Consumption Use*. Therefore, if no site-specific advisory is in place, the *Fish Consumption Use* is not assessed.

Variable	***Support*** No restrictions or bans in effect	***Impaired*** There is a "no consumption" advisory or ban in effect for the general population or a sub-population for one or more fish species or there is a commercial fishing ban in effect.
MA DPH Fish Consumption Advisory	Not applicable, precluded by statewide advisories(Hg)	Waterbody has site specific MA DPH Fish Consumption Advisory

Northeast Regional Mercury TMDL: On 20 December 2007 the U.S. EPA approved the Northeast Regional Mercury Total Maximum Daily Load (TMDL). This TMDL is a Federal Clean Water Act mandated document that identifies pollutant load reductions necessary for regional waterbodies to meet and maintain compliance with state and federal water quality standards. It was prepared by the New England Interstate Water Pollution Control Commission (NEIWPCC) in cooperation with the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. The TMDL covers inland waterbodies that are impaired primarily due to atmospheric deposition of mercury (Northeast States 2007). The TMDL target for Massachusetts is 0.3 ppm or less of mercury in fish tissue. The plan calls for a 75% reduction of in-region and out of region atmospheric sources by 2010 and a 90% or greater reduction in the future (NEIWPCC 2007). The TMDL will be reassessed in 2010 based on an evaluation of new on-going monitoring and air deposition data. Final targets will be determined at that time.

DRINKING WATER USE

The term *Drinking Water Use* denotes those waters used as a source of public drinking water. These waters may be subject to more stringent regulation in accordance with the Massachusetts Drinking Water Regulations (310 CMR 22.00). They are designated for protection as Outstanding Resource Waters in 314 CMR 4.04(3). MassDEP's Drinking Water Program (DWP) has primacy for implementing the provisions of the federal Safe Drinking Water Act (SDWA). Except for suppliers with surface water sources for which a waiver from filtration has been granted (these systems also monitor surface water quality) all public drinking water supplies are monitored as finished water (tap water). Monitoring includes the major categories of contaminants established in the SDWA: bacteria, volatile and synthetic organic compounds, inorganic compounds and radionuclides. The DWP maintains current drinking supply monitoring data. The suppliers currently report to MassDEP and EPA the status of the supplies on an annual basis in the form of a consumer confidence report (http://yosemite.epa.gov/ogwdw/ccr.nsf/Massachusetts). Below is EPA's guidance to assess the status (support or impaired) of the drinking water use.

Variable	***Support*** No closures or advisories (no contaminants with confirmed exceedances of maximum contaminant levels, conventional treatment is adequate to maintain the supply).	***Impaired*** Has one or more advisories or more than conventional treatment is required or has a contamination-based closure of the water supply.
Drinking Water Program (DWP) Evaluation	See note below	See note below

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

SHELLFISHING USE

This use is assessed using information from the Department of Fish and Game's Division of Marine Fisheries (DMF). A designated shellfish growing area is an area of potential shellfish habitat. Growing areas are managed with respect to shellfish harvest for direct human consumption, and comprise at least one or more classification areas (MA DFG 2009). The classification areas are the management units, and range from being approved to prohibited (described below) with respect to shellfish harvest. Shellfish areas under management closures are *not assessed.* Not enough testing has been done in these areas to determine whether or not they are fit for shellfish harvest, therefore, they are closed for the harvest of shellfish.

Variable	***Support*** SA Waters: Approved[1] SB Waters: Approved[1], Conditionally Approved[2], or Restricted[3]	***Impaired*** SA Waters: Conditionally Approved[2], Restricted[3], Conditionally Restricted[4], or Prohibited[5] SB Waters: Conditionally Restricted[4] or Prohibited[5]
DMF Shellfish Project Classification Area Information (MA DFG 2000)	Reported by DMF	Reported by DMF

NOTE: Designated shellfish growing areas may be viewed using the MassGIS datalayer available from MassGIS at http://www.mass.gov/mgis/dsga.htm. This coverage currently reflects classification areas as of September 30, 2009 (MA DFG 2009)..

[1] **Approved** - "...open for harvest of shellfish for direct human consumption subject to local rules and regulations..." An approved area is open all the time and closes only due to hurricanes or other major coastwide events.

[2] **Conditionally Approved** - "...subject to intermittent microbiological pollution..." During the time the area is open, it is "...for harvest of shellfish for direct human consumption subject to local rules and regulations…" A conditionally approved area is closed some of the time due to runoff from rainfall or seasonally poor water quality. When open, shellfish harvested are treated as from an approved area.

[3] **Restricted** - area contains a "limited degree of pollution." It is open for "harvest of shellfish with depuration subject to local rules and state regulations" or for the relay of shellfish. A restricted area is used by DMF for the relay of shellfish to a less contaminated area.

[4] **Conditionally Restricted** - "...subject to intermittent microbiological pollution..." During the time area is restricted, it is only open for "the harvest of shellfish with depuration subject to local rules and state regulations." A conditionally restricted area is closed some of the time due to runoff from rainfall or seasonally poor water quality. When open, only soft-shell clams may be harvested by specially licensed diggers (Master/Subordinate Diggers) and transported to the DMF Shellfish Purification Plant for depuration (purification).

[5] **Prohibited -** Closed for harvest of shellfish.

PRIMARY CONTACT RECREATION USE

This use is suitable for any recreational or other water use in which there is prolonged and intimate contact with the water with a significant risk of ingestion of water during the primary contact recreation season (1 April to 15 October). These include, but are not limited to, wading, swimming, diving, surfing and water skiing. The chart below provides an overview of the guidance used to assess the status (support or impaired) of the *Primary Contact Recreation Use*. Excursions from criteria due to natural conditions are not considered impairment of use.

Variable	***Support*** Criteria are met, no aesthetic conditions that preclude the use	***Impaired*** Frequent or prolonged violations of criteria and/or formal bathing area closures, or severe aesthetic conditions that preclude the use
Bacteria (105 CMR 445.000) Minimum Standards for Bathing Beaches State Sanitary Code) (MassDEP 2006)	At "public bathing beach" areas: Formal beach postings/advisories neither frequent nor prolonged during the swimming season (the number of days posted or closed cannot exceed 10% during the locally operated swimming season). Collected samples* meet the geometric mean criteria (Table A1). Shellfish Growing Area classified as "Approved by DMF.	At "public bathing beach" areas: Formal beach closures/postings >10% of time during swimming season (the number of days posted or closed exceeds 10% during the locally operated swimming season). Collected samples* do not meet the geometric mean criteria (Table A1).
Aesthetics (MassDEP 1996) - *All surface waters shall be 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* [growth or amount] *species of aquatic life*		
Odor, oil and grease, color and turbidity, floating matter	Narrative "free from" criteria met or excursions neither frequent nor prolonged, BPJ.	Narrative "free from" criteria not met - objectionable conditions either frequent and/or prolonged, BPJ.
Transparency (MA DPH 1969)	Public bathing beach and lakes – Secchi disk depth ≥1.2 meters (≥ 4') (minimum of three samples representing critical period).	Public bathing beach and lakes - Secchi disk depth <1.2 meters (< 4') (minimum of three samples representing critical period).
Nuisance organisms	No overabundant growths (i.e., blooms) that render the water aesthetically objectionable or unusable, BPJ.	Overabundant growths (i.e., blooms and/or non-native macrophyte growth dominating the biovolume) rendering the water aesthetically objectionable and/or unusable, BPJ.

* Data sets to be evaluated for assessment purposes must be representative of a sampling location (at least five samples per station recommended) and the season being analyzed, as described in the SWQS (see Table 1). Samples collected on one date from multiple stations on a river are not considered adequate to assess this designated use. Because of low sample frequency (i.e., less than ten samples per station) an impairment decision will not be based on a single sample exceedance (i.e., the geometric mean of five samples is < 126 *E. coli* colonies/100 ml but one of the five sample exceeds 235 *E. coli* colonies/100 ml). The method detection limit (MDL) will be used in the calculation of the geometric mean when data are reported as less than the MDL (e.g., use 20 cfu/100 ml if the result is reported as <20 cfu/100 ml). Those data reported as too numerous to count (TNTC) will not be used in the geometric mean calculation; however frequency of TNTC sample results should be presented.

SECONDARY CONTACT RECREATION USE

This use is suitable for any recreation or other water use in which contact with the water is either incidental or accidental. These include, but are not limited to, fishing, boating and limited contact incident to shoreline activities. Following is an overview of the guidance used to assess the status (support or impaired) of the *Secondary Contact Use*. Excursions from criteria due to natural conditions are not considered impairment of use.

Variable	***Support*** Criteria are met, no aesthetic conditions that preclude the use	***Impaired*** Frequent or prolonged violations of criteria, or severe aesthetic conditions that preclude the use
Bacteria (MassDEP 2006)	Collected samples* meet the Class C or SC geometric mean criteria (see Table A1). Shellfish Growing Area classified as "Approved" by DMF.	Collected samples* do not meet the Class C or SC geometric mean criteria (see Table A1).
Aesthetics (MassDEP 2006) - *All surface waters shall be 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* [growth or amount] *species of aquatic life*		
Odor, oil and grease, color and turbidity, floating matter	Narrative "free from" criteria met or excursions neither frequent nor prolonged, BPJ.	Narrative "free from" criteria not met - objectionable conditions either frequent and/or prolonged, BPJ.
Transparency (MA DPH 1969)	Public bathing beach and lakes – Secchi disk depth ≥1.2 meters (≥ 4') (minimum of three samples representing critical period).	Public bathing beach and lakes - Secchi disk depth <1.2 meters (< 4') (minimum of three samples representing critical period).
Nuisance organisms	No overabundant growths (i.e., blooms) that render the water aesthetically objectionable or unusable, BPJ.	Overabundant growths (i.e., blooms and/or non-native macrophyte growth dominating the biovolume) rendering the water aesthetically objectionable and/or unusable, BPJ.

*Data sets to be evaluated for assessment purposes must be representative of a sampling location (at least five samples per station recommended) over time. Because of low sample frequency (i.e., less than ten samples per station) an impairment decision will not be based on a single sample exceedance. Samples collected on one date from multiple stations on a river are not considered adequate to assess this designated use.

AESTHETICS USE

All surface waters shall be 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. The aesthetic use is closely tied to the public health aspects of the recreational uses (swimming and boating). Below is an overview of the guidance used to assess the status (support or impaired) of the *Aesthetics Use*.

Variable	***Support*** Narrative "free from" criteria met	***Impaired*** Objectionable conditions frequent and/or prolonged
Odor, oil and grease, color and turbidity, floating matter	Narrative "free from" criteria met or excursions neither frequent nor prolonged, BPJ.	Narrative "free from" criteria not met - objectionable conditions either frequent and/or prolonged, BPJ.
Transparency (MA DPH 1969)	Public bathing beach and lakes – Secchi disk depth ≥1.2 meters (≥ 4') (minimum of three samples representing critical period).	Public bathing beach and lakes - Secchi disk depth <1.2 meters (< 4') (minimum of three samples representing critical period).
Nuisance organisms	No overabundant growths (i.e., blooms) that render the water aesthetically objectionable or unusable, BPJ.	Overabundant growths (i.e., blooms and/or non-native macrophyte growth dominating the biovolume) rendering the water aesthetically objectionable and/or unusable, BPJ.

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APPENDIX B
Parker River Watershed
Summary of Baldpate and Rock Ponds Fish Toxics Monitoring 1999 through 2009

Introduction

Fish toxics monitoring is a cooperative effort between three Massachusetts Department of Environmental Protection (MassDEP) Offices/Divisions----Watershed Management (DWM), Research and Standards (ORS), and Environmental Analysis; the Massachusetts Department of Fish and Game (MA DFG); and the Massachusetts Department of Public Health (MA DPH). Fish toxics monitoring is typically conducted to assess the concentrations of toxic contaminants in freshwater fish, identify waterbodies where those concentrations may pose a risk to human health if consumed, and identify waters where toxic contaminants may impact fish and other wildlife.

MassDEP conducted sampling of fish from Baldpate Pond in Boxford and Rock Pond in Georgetown in May 1999 as part of the ongoing fish toxics monitoring program and in support of an intensive mercury sampling program in northeastern Massachusetts designed by ORS. Subsequent sampling of fish in Baldpate Pond was conducted in 2004 and 2008 and in Rock Pond in 2004, 2005, 2007 and 2009. Mercury concentrations in edible fillets (mg/kg wet weight) were analyzed in two species, yellow perch (*Perca flavescens*) and largemouth bass (*Micropterus salmoides*) (Maietta 2010 and Rose 2008).

Methods

Field sampling methods are described in detail in the project report as are the sample handling and preparation methods (MassDEP 1999 and MassDEP 2006). The analytical methods employed by the laboratory and precision and accuracy data are also described.

Results

The results of MassDEP ORS Mercury Research Project sampling for Baldpate and Rock ponds are provided in Tables B1 and B2. Data generated from the 1999, 2004, and 2005 surveys were provided by ORS and no additional data validation procedures were conducted by DWM (Rose 2010). The 2007, 2008 and 2009 survey data were verified against the laboratory reports and data qualifiers from the laboratory are noted as appropriate (MassDEP 2009). Lab duplicate precision estimates for mercury for the 2007, 2008 and 2009 datasets were within the acceptance criteria range of 0 – 20 RPD. Lab accuracy estimates for mercury using lab-fortified matrix and quality control samples were within the acceptance criteria range of 70-130% recovery. Lab accuracy estimates for mercury using lab-fortified blanks and lab blanks were within the acceptance criteria range of 85 – 115% recovery and ND, respectively. All raw data files, field sheets, lab reports, chain of custody forms, data entry QC documentation, and other metadata may be requested from MassDEP.

Table B1. Summary (mean, min, max) mercury concentrations (wet weight) in Baldpate Pond (Boxford) fish tissue (Rose 2010 and MassDEP 2009). *Note: these data are not normalized to size.*

Sampling Year	Species Code[1]	Mean Hg concentration (µg/g)	Min – Max Hg concentration (µg/g)	Sample size (n)
1999	YP	0.61	0.37 – 1.0	9
1999	LMB	1.3	1.1 – 1.6	9
2004	YP	0.20	0.10 – 0.24	4
2004	LMB	0.42	0.12 – 0.64	15
2008	YP	0.18	not applicable	1
2008	LMB	0.82	0.3 – 2.5	15

[1] Species code: YP = yellow perch (*Perca flavescens*), LMB= largemouth bass (*Micropterus salmoides*)

Table B2. Summary (mean, min, max) mercury concentrations (wet weight) in Rock Pond (Georgetown) fish tissue (Rose 2010 and MassDEP 2009). *Note: these data are not normalized to size.*

Sampling Year	Species Code[1]	Mean Hg concentration (µg/g)	Min – Max Hg concentration (µg/g)	Sample size (n)
1999	YP	0.86	0.52 – 1.1	9
1999	LMB	1.6	1.2 – 1.9	9
2004	YP	0.38	0.14 – 1.1	30
2004	LMB	0.83	0.12 – 2.1	14
2005	YP	0.4	0.1 – 0.8	30
2005	LMB	1.0	0.6 – 2.6	15
2007	YP	0.26	0.09 – 0.65	30
2007	LMB	1.0	0.5 – 2.2	15
2009	YP	0.34	0.10 – 0.60	30
2009	LMB	0.7	0.5 – 1.4	15

[1] Species code: YP = yellow perch (*Perca flavescens*), LMB= largemouth bass (*Micropterus salmoides*)

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APPENDIX C
SUMMARY OF WMA REGISTRATION AND PERMITTING AND NPDES PERMITTING INFORMATION
PARKER RIVER WATERSHED AND COASTAL DRAINAGE AREA

Table C1. Water Management Act (WMA) Registrations and Permits in the Parker River Watershed and Coastal Drainage Area.

SYSTEM NAME	REGISTRATION ID	PERMIT ID	REGISTERED VOLUME (MGD)	PERMITTED VOLUME (MGD)	SOURCE NAME	PWS SOURCE ID	SOURCE LOCATION
ROWLEY COUNTRY CLUB (now known as Carriage Pines Golf Club)	V31625401		0.03	0	POND #1		ROWLEY
					POND 2		ROWLEY
THE GOLF CLUB AT TURNER HILL LLC		9P231614402	0	0.111	WELL B-1		IPSWICH
					WELL B-7		IPSWICH
BYFIELD WATER DISTRICT	31620501	9P231620501	0.17	0	FOREST ST. BEDROCK WELL	3205001-04G	BYFIELD
					8" G.P. WELL	3205001-02G	BYFIELD
GEORGETOWN WATER DEPARTMENT	31610501	9P31610501	0.43	0.32	MARSHALL WELL	3105000-03G	GEORGETOWN
					COMMISSIONERS WELL	3105000-04G	GEORGETOWN
					TUBULAR WELL FIELD	3105000-01G	GEORGETOWN
					DUFFY'S LANDING WELL	3105000-05G	GEORGETOWN
IPSWICH WATER DEPARTMENT	31614401	9P231614401	0.64	0.34	DOWS BROOK RESERVOIR	3144000-01S	IPSWICH
					BROWNS GP WELL	3144000-02G	IPSWICH
					MILE LANE GP WELL	3144000-01G	IPSWICH
ROWLEY WATER DEPARTMENT	31625402	9P31625401	0.36	0.19	STATION #3-BOXFORD ROAD	3254000-03G	ROWLEY
					STATION 2-HAVERHILL ST.	3254000-02G	ROWLEY
					PINGREE FARM WELLFIELD	3254000-04G	ROWLEY

Table C2. Summary of NPDES Permitting Information in the Parker River Watershed and Coastal Drainage Area.

PERMITTEE	**NPDES #**	**SEGMENT**
Georgetown Water Department	MAG640048	MA91-01
The Georgetown Water Department is authorized (MAG640048 issued January 2001) to discharge from the Georgetown Water Treatment Plant to the Parker River. The facility reports a maximum daily flow of 0.0592 MGD.		

PERMITTEE	**NPDES #**	**SEGMENT**
Governor Dummer Academy	MA0030350	Unnamed tributary to MA91-09

The Governor Dummer Academy in Byfield is authorized (MA0030350 issued in December 2003) to discharge 0.052 MGD (average monthly) via outfall #001of treated effluent to an unnamed intermittent freshwater tributary of the Mill River. The facility's whole effluent toxicity limits are $LC_{50} \geq$ 100% and C-NOEC = 100% effluent using *Ceriodaphnia dubia* as test species two times per year (May and August). The facility's ammonia nitrogen limit is 1.0 and 1.5 mg/L (average monthly and daily maximum, respectively).

According to the Fact Sheet used to develop the NPDES permit: "*Since the last permit renewal in September of 1996, the WWTF has been extensively modified in order to bring it into compliance with an enforcement agreement with MassDEP. Full operation of the new facility began in August of 2000. Biological treatment is now completed using membrane bioreactor technology (MBR) units which consist of hollow fiber strand membrane modules and permeate pumps. The MBR installation consists of one 27,000 gallon tank holding 14 treatment modules. These modules can be removed separately and cleaned or replaced. The permeate pumps draw the wastewater through the membrane while the solids are kept in suspension by coarse air at the bottom of the membrane. Recycling with this system provides biological treatment and solids reduction and also ammonia reduction by establishment of high levels of nitrification. This treatment process does not require secondary clarification. The decanted effluent from the MBR tank is pumped directly to the existing UV disinfection units. Note that the sand bed filters are no longer used and this area has been re-graded. The effluent from the UV units is piped to a nearby outfall which then discharges to an unnamed intermittent stream, a tributary to the Mill River. Waste sludge from the MBR tank is pumped to sludge holding tanks, which have a capacity of approximately 7,000 gallons. This sludge is then removed and trucked by hauler to the Fitchburg or Upper Blackstone WWTF's for final disposal.*

The school has a sewerage collection system serving the campus and includes gravity sewers and five pump stations. Since issuance of the existing permit in 1996, the permittee has corrected excessive infiltration and inflow flows into the sewer system. Based on recent influent flow and precipitation/wet weather records maintained by the facility's staff, infiltration and inflow to the sewer system now appears to be minimal."

Effluent

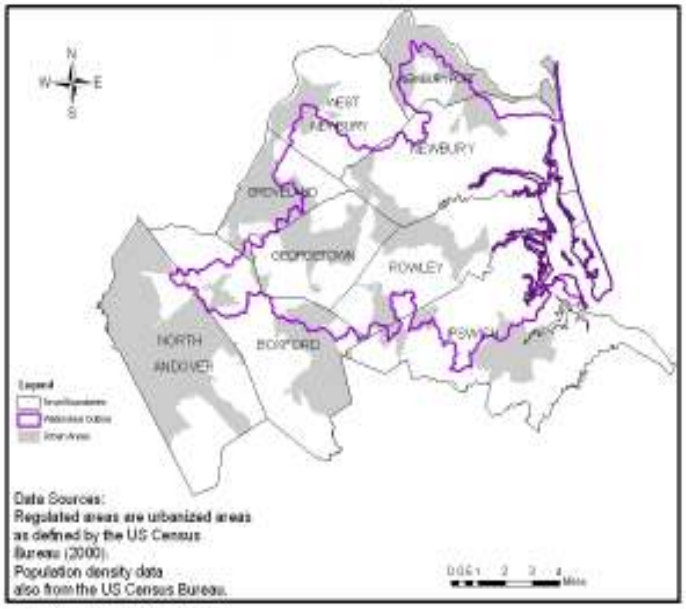
Modified acute and chronic whole effluent toxicity tests were conducted on the Governor Dummer Academy (MA00303550) treated sanitary effluent which discharges via outfall 001 to a small unnamed fresh water tributary of the Mill River just upstream of Route 1 in the village of South Byfield. No acute whole effluent toxicity (i.e., all LC_{50}'s were >100% effluent) was detected by either *C. dubia* or *P. promelas* in the tests conducted between April 2001 and May 2009 (n=24 and 13 tests, respectively). The CNOEC test results were reported as 100% effluent with the exception of four of the 22 valid *C. dubia* tests (CNOECs = 50% effluent in April 2001 and December 2003, 25% effluent in September 2003, and <6.25% effluent in August 2007) and one of the 12 valid *P. promelas* tests (CNOEC = 25% effluent in September 2004).

PERMITTEE	**NPDES #**	**SEGMENT**
Hero Coatings, Inc.	MAG910009	MA91-11
Hero Coatings, Inc. of Newburyport is authorized (MAG910009 issued in September 2005) to discharge site remediation wastewater to the Little River. The remediation general permit replaced the facility's individual permit (MA0039985) which was inactivated by EPA in October 2005.		

PERMITTEE	**NPDES #**	**SEGMENT**
Town of Ipswich	MAG640025	MA91-13
The Town of Ipswich is authorized (MAG640025 issued in February of 2002) to discharge filter backwash from the Ipswich Water Treatment Plant into the Egypt River (permit mistakenly says discharge to Bull Brook, tributary to Egypt River). The facility reportedly had problems and was bypassing their lagoons in 2006; this issue has been resolved. New recycling pumps were installed at the facility and under normal operations there is no longer a discharge from the water treatment plant. Although a toxicity test using *Ceriodaphnia dubia* was supposed to have been done in August 2002, since the facility rarely discharges this requirement was waived.		

Stormwater Discharges

The NPDES Phase II General Permit program requires NPDES permit coverage for stormwater discharges from small municipal separate storm sewer systems (MS4s), and construction activity disturbing one acre or more of land in a mapped "urbanized area" defined and delineated by the US Bureau of Census in 2000 http://www.epa.gov/npdes/pubs/fact2-2.pdf. Large and medium MS4s (populations over 100,000) were permitted during Phase I of the NPDES stormwater program. Under EPA's Phase II program, the definition of "municipal" includes Massachusetts communities, U.S. military installations, state or federal owned facilities such as hospitals, prison complexes, state colleges or universities and state highways. An MS4 is a system that: discharges at one or more a point sources; is a separate storm sewer system (not designed to carry combined stormwater and sanitary waste water); is operated by a public body; discharges to the Waters of the United States or to another MS4; and, is located in an "Urbanized Area". The NPDES Stormwater Phase II General Permit requires operators of regulated small municipal separate storm sewer systems (MS4s) to develop a stormwater management program that prevents harmful pollutants from being washed or dumped directly into the storm sewer system, and subsequently discharged into local waterbodies. Certain Massachusetts communities were automatically affected (either in full or part) by the Phase II rule based on the urbanized area delineations from the 2000 U.S. Census.



Urbanized areas in Parker River Watershed

As a result of the census mapping, 9 communities in the Parker River Watershed were located partially in the regulated Urbanized Area (see Table above). Communities that are partially regulated need to comply with the Phase II permit only in the mapped Urbanized Areas. All Parker River drainage area communities applied to EPA and MassDEP for coverage under the Phase II stormwater general permit, during 2003 and early 2004. EPA issued stormwater general permits to all 9 Parker River Watershed municipalities. After administrative review, and in coordination with MassDEP, will complete a thorough review of the communities' stormwater management program during the five-year permit term. Phase II stormwater general permits expire on 1 May 2008 but remain in effect until a new permit is issued. All communities must reapply for coverage under the update general permit. The updated general permit will likely require some monitoring within the MS4 Phase II area including outfalls and receiving waters and the general permit will require a more detailed and better defined Illicit Discharge Detection and Elimination Program (IDDEP). For detailed community maps see http://www.epa.gov/region01/npdes/stormwater/ma.html.

Table C3. NPDES Phase II Stormwater Permit Information for the Parker River Watershed and Coastal Drainage Area Communities.

Community	Permit #	Permit Issued	Mapped Regulatory Area in Community
Boxford	MAR041184	12/4/2003	Partial
Georgetown	MAR041191	9/26/2003	Partial
Groveland	MAR041195	12/10/2003	Partial
Ipswich	MAR041199	9/18/2003	Partial
Newbury	MAR041212	9/26/2003	Partial
Newburyport	MAR041213	12/4/2003	Partial
North Andover	MAR041214	10/7/2003	Partial
Rowley	MAR041218	8/22/2003	Partial
West Newbury	MAR041231	1/8/2004	Partial