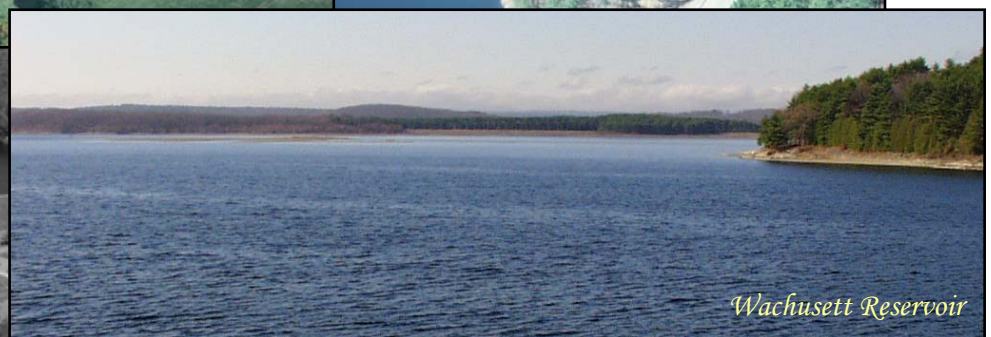
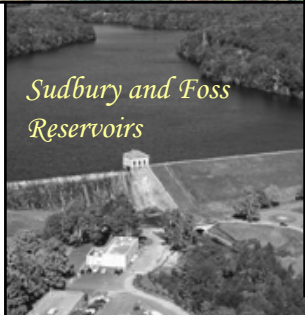
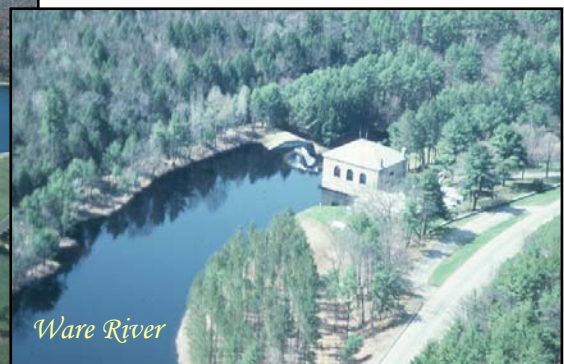




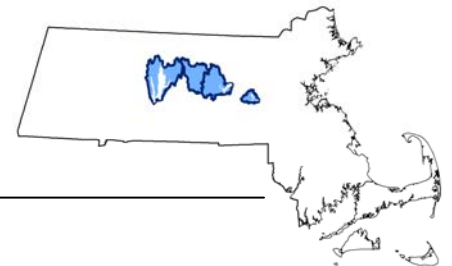
# 2008 Watershed Protection Plan Update

## Volume I

### The DCR Watershed System



December 2008



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Massachusetts Department of Conservation and Recreation  
Division of Water Supply Protection  
Office of Watershed Management

## Abstract

The Department of Conservation and Recreation, Division of Water Supply Protection, Office of Watershed Management manages and protects the drinking water supply watersheds that provide water for approximately 2.2 million Massachusetts residents. This Watershed System is comprised of three active water supply watersheds, the Quabbin Reservoir, Ware River, and Wachusett Reservoir, and an emergency supply comprised of the Sudbury and Foss Reservoirs. Watershed Protection Plans were initially developed for the active supply watersheds in 1991, with updates in 1998 and 2003 for the Wachusett Reservoir and 2000 for Quabbin Reservoir and Ware River. The Sudbury and Foss Reservoirs had a plan prepared in 1997. This *2008 Watershed Protection Plan* updates and unifies all of these documents. The breadth and complexity of the Watershed System and DCR's comprehensive approach to watershed management necessitated producing this plan in five volumes:

- Volume I – The DCR Watershed System
- Volume IIA – Quabbin Reservoir Watershed System
- Volume IIB – Ware River Watershed
- Volume IIC – Wachusett Reservoir Watershed
- Volume IID – Sudbury Reservoir and Foss Reservoir.

Volume I presents the over-arching concepts used to develop and implement the watershed protection programs for the entire system. The four subsequent volumes apply these general concepts to the unique characteristics and issues of each watershed.

The *2008 Watershed Protection Plan* continues DCR's successful efforts of managing the source of an unfiltered water supply. This plan update provides a structured methodology to assess changes in watershed threats, develops programs to address the threats, and prioritizes staff assignments so they are congruent with current watershed management issues. Each volume concludes with a five year work plan that presents major tasks for the Division of Water Supply Protection to achieve from Fiscal Years 2009 to 2013.

## Acknowledgements

This plan was prepared by the staff of the Department of Conservation and Recreation, Division of Water Supply Protection, Office of Watershed Management. Principal authors are: Volume I - Patricia Austin; Volume IIA - Lisa Gustavsen; Volume IIB - Paul Lyons; Volume IIC - Lawrence Pistrang; and Volume IID - Joel Zimmerman. The plan was produced under the supervision of DCR/DWSP senior staff: Jonathan Yeo, Division Director; John Scannell, Regional Director, Wachusett/Sudbury Section; William Pula, Regional Director, Quabbin/Ware Section; and Dan Clark, NR Section Director. MWRA contributions and review by Stephen Estes-Smargiassi, John Gregoire, Steve Rhode, Betsy Reilly, and David Coppes.

All maps were produced by DCR/DWSP Office of Watershed Management GIS staff Craig Fitzgerald, Phil Lamothe, and Paul Penner, using DWSP and MassGIS data. All photographs provided by the Office of Watershed Management.



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# 2008 Watershed Protection Plan Update

## Volume I: The DCR Watershed System

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## List of Acronyms

AST	Above Ground Storage Tanks
ATV	All Terrain Vehicle
BMPs	Best Management Practices
BOH	Board of Health
CFI	Continuous Forest Inventory
CGP	EPA Construction General Permit
CMR	Code of Massachusetts Regulations
DAR	MA Department of Agricultural Resources
DCR	MA Department of Conservation and Recreation
DEP	Department of Environmental Protection
DFS	MA Department of Fire Services
DPW	Department of Public Works
DWSP	DCR Division of Water Supply Protection
EOEEA	MA Executive Office and Energy and Environmental Affairs
EPA	US Environmental Protection Agency
EQ	Environmental Quality Section
EQA	Environmental Quality Assessment
FSC	Forest Stewardship Council
GIS	Geographic Information System
ICS	Incident Command System
MDC	Metropolitan District Commission
MEPA	MA Environmental Policy Act
MGD	Million Gallons per Day
MGL	Massachusetts General Law
MHD	MA Highway Department (MassHighways)
MWRA	Massachusetts Water Resources Authority
NPDES	National Pollutant Discharge Elimination System
NR	Natural Resources Section
NRCS	US Department of Agriculture Natural Resources Conservation Service
ORV	Off Road Vehicle
OWM	DCR/DWSP Office of Watershed Management
PILOT	Payments in Lieu of Taxes
PPCP	Pharmaceuticals and Personal Care Products s
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SDWAA	The 1986 Amendments to the 1974 Safe Drinking Water Act
SOP	Standard Operating Procedure
SWAP	DEP Source Water Assessment and Protection Program
SWTR	Surface Water Treatment Rule
USDA	United States Department of Agriculture
UST	Underground Storage Tank
WPR	Watershed Protection Restriction
WQSAT	Water Quality Sampling and Analysis Team
WsPA	Watershed Protection Act
YOP	Yearly Operational Plan

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# 1 Introduction

The Massachusetts Department of Conservation and Recreation, Division of Water Supply Protection, Office of Watershed Management (DWSP, or the Division) manages and protects the drinking water supply watersheds that provide water for approximately 2.2 million Massachusetts residents (see Figure I-1).

The mission of the Division is to utilize and conserve water and other natural resources to protect, preserve and enhance the environment of the Commonwealth and to assure the availability of pure water for future generations. This important mission is also very broad and requires a thoughtful and deliberative approach to develop programs that result in this goal. Watershed Protection Plans are an important tool used by the Division to implement programs that enable staff to carry out this mission. The purpose of this report is to update the existing Watershed Protection Plans. It summarizes an assessment process conducted by Division staff over the past year and recommendations to guide the watershed protection program for the next five years.

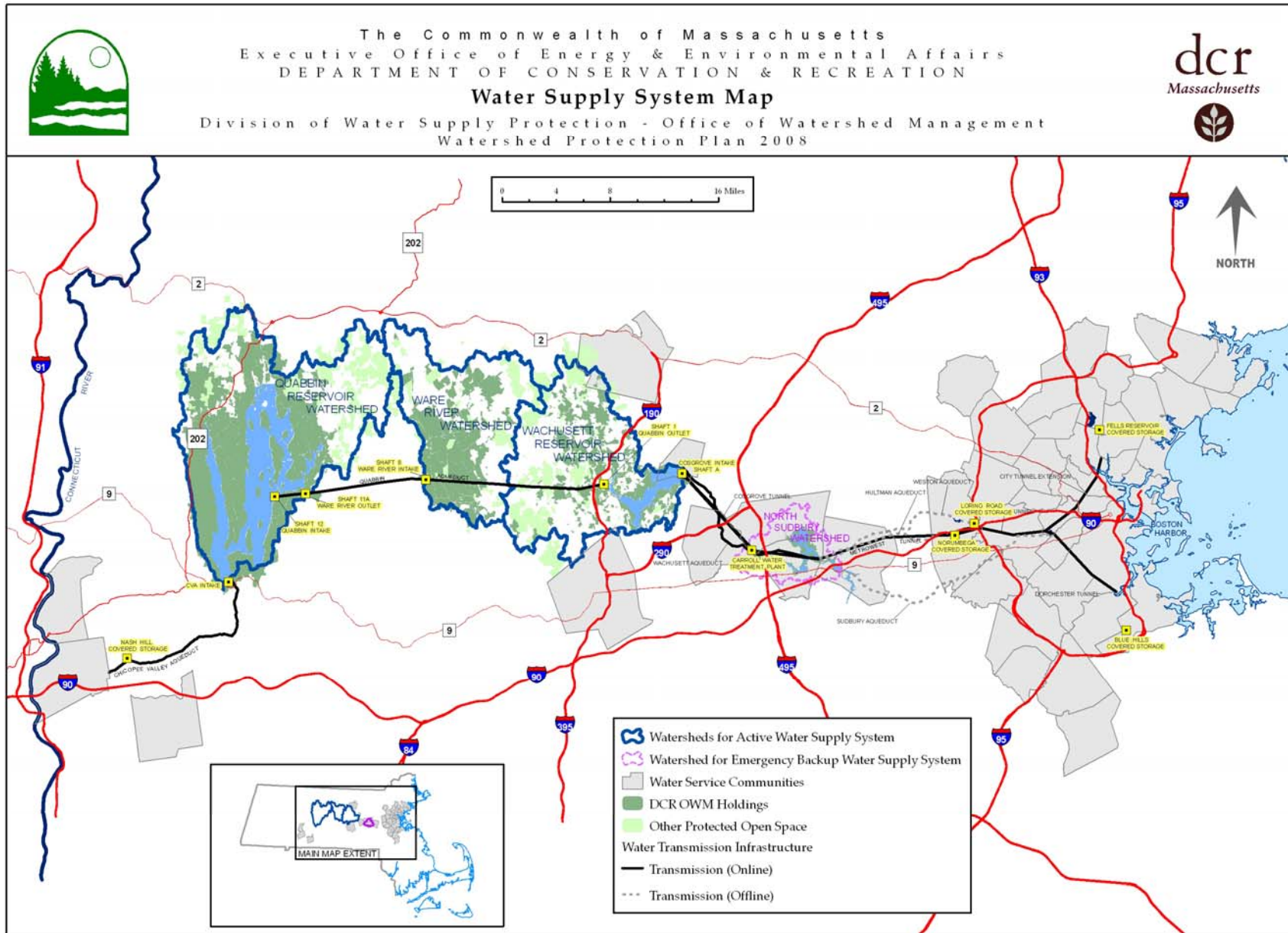
The Plan has been developed in five Volumes. Volume I presents the over-arching concepts used to develop and implement the watershed protection programs for the entire system. The four subsequent volumes apply these general concepts to the unique characteristics and issues of each watershed. They are:

- Volume IIA – Quabbin Reservoir Watershed System
- Volume IIB – Ware River Watershed
- Volume IIC – Wachusett Reservoir Watershed
- Volume IID – Sudbury Reservoir and Foss Reservoir.

Watershed protection planning process and implementation of plan recommendations has been on-going since DCR's first Watershed Protection Plans were completed in 1991. Significant accomplishments have been made to greatly increase protection of the water supply. These include acquisition of approximately 19,000 acres of land, passage of the Watershed Protection Act, implementation of successful bird harassment programs at both Quabbin and Wachusett Reservoirs, and construction of sewers (with transport to a treatment plant outside the watershed) in areas no longer suitable for on-site wastewater disposal. Priorities for watershed control programs change as water quality threats are contained. The process used to develop Watershed Protection Plans provides a structured methodology to assess changes in watershed threats, develop programs to address the threats, and review staff assignments to ensure that staff work priorities are congruent with the current watershed issues.

The Watershed Protection Plans for Quabbin Reservoir, Ware River, and Wachusett Reservoir has been submitted to the Massachusetts Department of Environmental Protection (DEP) for review and approval. Since there are no regulatory requirements for Watershed Protection Plans for emergency systems, the Sudbury Plan will not be submitted to DEP. The implementation period for the plans is 5 years, spanning from Fiscal Year 2009 through 2013 (July 1, 2008 through June 30, 2013).

**Figure I-1: DCR/MWRA Watershed System**



## 2 Watershed System Description

The source of water for the DWSP system comes from three separate watersheds: Quabbin Reservoir, Ware River, and Wachusett Reservoir. The system also has an emergency water supply source, the Sudbury Reservoir Watershed. The DWSP system is well protected with excellent source water quality. The system safe yield is well above current demands. The DWSP/MWRA system is shown in Figure I-1, and key characteristics are summarized in Tables I-1 through I-4.

**Table I-1: DCR/DWSP Watershed System Acreage**

	Watershed	Land Area	Reservoir Area	Total Watershed Area
Active System	Quabbin Reservoir	95,466	24,469	119,935
	Ware River	61,737	0	61,737
	Wachusett Reservoir	70,678	4122	74,800
Emergency System	Sudbury Reservoir	13,153	1,215	14,368
	Foss Reservoir #3	3,197	217	3,414

Source: DCR

**Table I-2: Summary of Protected Lands in the DCR/DWSP Watershed System**

	Watershed	DWSP Fee	DWSP WPR	Other Protected	Total Protected	Land Area	Protected As % of Land Area	Off-Watershed
Active System	Quabbin	53,220	830	13,589	67,639	95,466	70.9	4,301
	Ware	23,313	824	6,533	30,670	61,737	49.7	
	Wachusett	16,658	2,230	12,502	31,390	70,678	44.4	
	Total	93,191	3,884	32,624	129,699	227,881	56.9	
Emergency System	Sudbury and Foss	2,381	0	1,715	4,096	16,350	25.1	

Source: DCR. WPR = Watershed Protection Restriction, similar to a Conservation Restriction.

**Table I-3: Summary of Land Use in the DCR/DWSP Watershed System**

	Watershed	Land Use (%) excluding the Reservoirs						
		Forest	Wetland	Agriculture	Residential	Commercial Industrial	Open Water	Other
Active System	Quabbin	90.7	2.3	2.3	1.8	0.1	0.5	2.1
	Ware	81.0	3.1	3.7	5.0	2.0	2.5	3.1
	Wachusett	70.2	1.2	7.3	13.1	1.6	2.2	4.4
	Total	81.7	2.2	4.3	6.3	0.6	1.6	3.2
Emergency System	Sudbury and Foss	40.8	1.3	6.2	30.5	12.2	0.2	8.8

Source: DCR and MassGIS. Open Water excludes reservoir area.

**Quabbin Reservoir** is one of the largest single purpose water supply reservoirs in the world. The reservoir has 39 square miles of surface area and is 18 miles long. It has 118 miles of shoreline and holds 412 billion gallons when filled to capacity. The mean depth of the reservoir is 45 feet and the maximum depth is 141 feet. Quabbin is a young system, built over several years and completed in 1939. Due to the large size of the reservoir, several years were required to fill it. Quabbin Reservoir came on line in 1946.

The contributing watershed land area to the reservoir is 149 square miles (95,466 acres). The land is sparsely developed and largely protected through protective ownership or agreements. Current land use information shows that 93 percent is undeveloped forest, wetlands, and open water. The water quality in the reservoir is extremely good, the source is well protected, and the water has very low turbidity.

Waters from the **Ware River** can be diverted into the system. Water is collected at the Ware River intake and transported to Quabbin Reservoir via the Quabbin Aqueduct. The Ware River watershed is 61,740 acres. Approximately 86 percent of the watershed is undeveloped forest and wetlands.

The **Wachusett Reservoir** was completed in 1908. The reservoir was the primary water supply for the metropolitan Boston area prior to the construction of Quabbin. The reservoir is 8.4 miles in length and has a surface area of 6.45 square miles (4,122 acres), 37 miles of shoreline, an average depth of 44 feet, and a maximum depth of 129 feet in front of the dam. The contributing watershed land area is 111 square miles. The capacity of the reservoir is 65 billion gallons; roughly one-sixth that of Quabbin.

The **Sudbury System** consists of four reservoirs, with a 75 square mile watershed. The system is divided into 2 sub-basins, the North and South Basins. The North Basin contains the Sudbury and Foss (also called Framingham Reservoir No. 3) Reservoirs. These reservoirs are the emergency sources of water for the DWSP system. It is not feasible to use the reservoirs in the South Sudbury, Stearns Reservoir (also called Framingham No. 1) and Brackett Reservoir (also called Framingham No. 2), for water supply purposes due to high pollutant levels in both reservoirs. The South Sudbury portion is not included in the discussions presented in Volume IID.

DWSP partners with the Massachusetts Water Resources Authority (MWRA) to deliver water to the user communities. MWRA is responsible for treatment and transmission of the water. The relationship and duties of each respective agency are described in a 2004 Memorandum of Agreement (MOU) between the MWRA and the DWSP (see [www.mass.gov/dcr/watersupply/watershed/documents/2004dcrmwraMOU.pdf](http://www.mass.gov/dcr/watersupply/watershed/documents/2004dcrmwraMOU.pdf)). There are a total of 2.2 million people and 5,500 industrial users of the system in 48 communities, including three in Central Massachusetts. The system also provides a back-up water supply in three additional communities.

Ware River water can be transferred seasonally to Quabbin Reservoir via the Quabbin Aqueduct. Transfers are allowed only from October through June. Quabbin Reservoir is transferred regularly to Wachusett Reservoir through the Quabbin Aqueduct. Wachusett Reservoir is the terminal supply reservoir. Water is withdrawn through the Cosgrove intake at the eastern end of

Wachusett Reservoir, and is carried by the Cosgrove Tunnel to the distribution system. The safe yields and recent year's withdrawals from each source are summarized in Table I-4 below.

**Table I-4: Safe Yield and Withdrawals from Supply Sources**

	<b>Source</b>	<b>Watershed Land Area (sq. mi.)</b>	<b>Watershed Yield (MGD)</b>
Active System	Ware River	97	47
	Quabbin Reservoir	149	195
	Wachusett Reservoir	111	127
	Total	401	369
Emergency System	Sudbury Reservoir	21	N/A
	Foss Reservoir	5	N/A

Source: DCR and MWRA

Due to the large storage volumes, even with release requirements and operational constraints, 300 MGD can safely be supplied constantly even during a drought as severe as the 1960's drought. Withdrawals for water supply peaked in 1980 and 340 MGD, but have come down substantially due to MWRA's demand management programs. The most recent system average withdrawal was 221 MGD (2003 – 2007).

DWSP and MWRA have established a Reservoir Operations Group comprised of key staff from both agencies. This group meets quarterly to incorporate water quality considerations into system operations decisions. Some examples of the issues dealt with by this group include establishing a normal range of reservoir elevations for Wachusett Reservoir, decision-making for initiating Quabbin transfers, developing reservoir treatment thresholds for taste and odor organisms, and coordinating security and emergency-response capabilities.

MWRA and DWSP use a multi-barrier approach to protect the system from pollution. The multi-barrier approach relies on integrated programs, working to prevent or totally reduce the contamination of drinking water at all points in the system from source to tap. Source protection is guided by the DWSP watershed protection program. Water treatment is provided at the John J. Carroll Water Treatment Plant at Walnut Hill in Marlborough and the Ware Water Treatment Facility in Ware. Distribution pipeline maintenance and improvement program ensures that high-quality is maintained to the tap.

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## **3 Watershed Protection Program**

### **3.1 History**

The Boston area drinking water supply, like the city itself, has a long history. Cisterns were originally used in the 17th century. The need for water, which came from increasingly further distances, grew with Boston's population. The 18<sup>th</sup> century tapping of Jamaica Pond, using log pipes with three to four inch diameters over a distance of about five miles, was one of the first instances in the country of a community reaching out to another town for drinking water. During the 19th century, drinking water came mostly from Lake Cochituate in Natick; some communities were also served by the Mystic Lakes. Officials determined that these sources of supply would prove inadequate, so in 1878 a system of seven reservoirs was constructed to supplement the Cochituate system by holding back the Sudbury River.

The dawn of the 20<sup>th</sup> century saw limited yield, urbanization of the watersheds, and unsatisfactory water quality, which led to a 1895 study by the state health board that recommended the development of a reservoir along the South Branch of the Nashua River. The Wachusett Reservoir was the world's largest man-made reservoir when it was completed in 1908, however in a just a few decades it too was insufficient for the growing needs of eastern Massachusetts. Ultimately, the Quabbin Reservoir was created in the 1930s, using the Winsor dam to impound the Swift River and flood an area formerly occupied by the four Western Massachusetts towns of Dana, Enfield, Prescott, and Greenwich. At the same time, the Ware River was also identified as a drinking water source; diversions of water from the river are conveyed into the Quabbin Reservoir through the Quabbin tunnel from October through June when flows in the river are sufficient and water is needed.

The development of the DCR/MWRA watershed system has been shaped by feats of engineering and multiple laws (see Appendix B). The quantity of water available from these three watersheds, combined with water conservation measures implemented over the past twenty years, is a sufficient quantity for the foreseeable future (see Section 2). The following subsections provide a description of the most recent legal requirements and planning efforts that have had a role in the management of this renowned drinking water supply.

#### **3.1.1 Creation of the MWRA**

The DCR/MWRA water system was established by Chapter 372 of the Acts of 1984. The Act reassigned, as of June 30, 1985, various responsibilities of the former Metropolitan District Commission (MDC) Water Division to the MWRA and the MDC Division of Watershed Management (now the DCR/DWSP/OWM; see Section 3.1.8). A Memorandum of Understanding (MOU) was developed between the two agencies on April 9, 1986 that documented the responsibilities between the agencies concerning "the division of personnel, property, and responsibilities for maintenance, operations, policy making and long range planning pursuant to Chapter 372 of the Acts of 1984."

#### **3.1.2 SDWAA and SWTR**

The DCR/MWRA system is regulated as a Public Water Supply by the U.S. Environmental Protection Agency (EPA). EPA has delegated enforcement of the drinking water regulations to

the Massachusetts Department of Environmental Protection (DEP). The 1986 Amendments to the 1974 Safe Drinking Water Act (SDWAA) and the 1989 Surface Water Treatment Rule (SWTR) established major changes in drinking water regulations.

The impact of these changes to this system was evaluated in a MWRA project, summarized in the report *Safe Drinking Water Act Impact Study prepared for Massachusetts Water Resources Authority by CH2M Hill and Peer Consultants, March 8, 1989*. This study assessed existing conditions in the MDC/MWRA system, identified areas of noncompliance, and recommended actions necessary to come into compliance with the SDWAA. With respect to the watershed, the study found that:

The MDC and MWRA currently do not have a watershed control program that meets the site-specific conditions of the SWTR. To be in compliance with the site-specific conditions, and, thus, avoid filtration, the following conditions would have to be met.

- A. There must be a disinfection system that meets the criteria for Giardia cyst inactivation and residual maintenance.
  - a. A program must be developed in which the activities in the watershed are monitored and controlled by complete ownership of the land and/or by written agreements with landowners.
- B. A program must be implemented in which all activities that could affect source water quality are identified and controlled.
- C. Onsite sanitary surveys must be performed annually on the watersheds.
- D. It must be shown that the system in its current configuration has not had an identified waterborne disease outbreak, as determined by State and local health officials.
- E. The distribution system must meet the long-term MCL of the Total Coliform Rule.
- F. The water system must be in continuous compliance with the requirements for trihalomethanes.

Staff began work on developing a watershed program to address these needs.

### **3.1.3 DEP Guidance for Development of a Watershed Protection Plan**

In 1989, DEP issued guidance for development of watershed protection programs in the publication DEP DWS Policy 89-09 DEP Guidance on the Preparation of a Watershed Resource Protection Plan (WRPP). This policy described the minimum components for a Watershed Resource Protection Plan (WRPP):

It is DEP/DWS policy to accept for review a report describing a Watershed Resource Protection Plan which includes at a minimum, the information described below:

- A. Watershed Description
- B. Identification of Watershed Characteristics and Activities Detrimental to Water Quality
- C. Control of Detrimental Activities

- D. Monitoring
- E. Agreements and Land Ownership
- F. Management and Operations.

### **3.1.4 The 1991 Watershed Protection Plans**

MDC and MWRA worked to develop Watershed Protection Plans in accordance with the DEP guidance and to be used to guide the watershed protection program. Two separate plans were developed: *Watershed Protection Plan Quabbin Reservoir and Ware River Watersheds 1991* and the *Watershed Protection Plan Wachusett Reservoir Watershed 1991*. A separate plan was required for the Quabbin/Ware system because it provides water for communities served by the Chicopee Valley Aqueduct (CVA). The Quabbin Plan was submitted to DEP for review; DEP approved the plan and granted a waiver from the filtration requirements of the SDWA for the CVA in 1991.

The Wachusett Reservoir plan was not submitted when completed due to concerns about meeting the source water quality requirements for filtration waiver. MDC and MWRA did recognize the importance of watershed protection in all systems, filtered and unfiltered, and committed to implementing a strong watershed protection program at Wachusett although the plan was not formally submitted to the regulatory agencies. Significant resources were added in order to carry out recommendations contained in the Wachusett and Quabbin plans.

### **3.1.5 Wachusett Reservoir Filtration Waiver**

In 1993, MWRA requested a more flexible approach to SDWA compliance for Wachusett Reservoir, believing that filtration might not be necessary to meet the requirements of the Surface Water Treatment Rule. This decision was made, in part, due to the successful implementation of many programs developed in the 1991 Plan, as these controls produced dramatic improvements in source water quality. On June 11, 1993, the MDC and MWRA entered into an administrative consent order with DEP which set forth a compliance schedule for meeting the requirements of the SWTR for Wachusett Reservoir. The consent order permitted a dual track approach: MDC and MWRA would pursue aggressive watershed protection in order to obtain a filtration waiver; at the same time, MWRA would continue to do design work for filtration should the watershed protection measures fail to secure a Filtration Avoidance Determination. The Wachusett Watershed Protection Plan was submitted to DEP in 1993 with an updated implementation plan, and formally approved by DEP in 1994.

In October, 1998, the MDC and MWRA requested a redetermination from DEP to grant the system a waiver from filtration requirements. Since passage of the SWTR, the two agencies had accomplished major improvements in the watershed protection program as well as in water treatment and in the distribution system. Watershed Protection accomplishments included an aggressive land acquisition program to increase the holdings of protected lands, passage and implementation of the Watershed Protection Act which established land use controls in sensitive watershed areas, successful wildlife management program which improved source water quality, and commitment to sewer areas of the Wachusett Reservoir watershed that were not suitable for on-site wastewater disposal. This work was completed following the 1991 Watershed Protection Plans. In November, 1998, DEP granted MDC/MWRA a waiver from the requirements of filtration.

### **3.1.6 Watershed Protection Plan Updates 1998-2000**

An updated watershed protection plan for Wachusett Reservoir watershed, *Watershed Protection Plan Update for Metropolitan Boston Water System Wachusett Reservoir*, was developed as part of the filtration waver process.

DEP had developed a Program to Measure Success of Watershed Protection Efforts Conducted by Public Surface Water Supplies to Obtain, and Maintain, a Waiver from Filtration Requirements (“Measures of Success,” 1996). The Measures of Success identified programmatic milestones organized into ten categories:

1. Watershed Control
2. Public Access/Recreation
3. Wildlife Management
4. Infrastructure Improvements
5. In-lake Problems
6. Sampling
7. System Operation/Maintenance
8. Staffing
9. Emergency Planning/Response
10. Education/Multi-town coordination.

The 1998 Wachusett plan include a section that demonstrated compliance with all of DEP’s programmatic milestones. The Updated Wachusett Watershed Protection Plan was submitted to DEP in December 1998, and approved by DEP in February, 1999.

The Quabbin/Ware River 1991 plan was developed with an eight year implementation schedule. Therefore, the Quabbin/Ware plan was updated in 2000. Similar to the 1998 Wachusett plan, the Quabbin/Ware plan included a section that demonstrated compliance with all of DEP’s “Measures of Success” programmatic milestones. *The MDC/DWM Watershed Protection Plan Update Quabbin Reservoir Watershed and Ware River Watershed* was submitted to DEP in December 2000 and was approved by DEP in 2001.

### **3.1.7 SWAP**

The Federal Safe Drinking Water Act Amendments requires every state to examine existing and potential threats to the quality of all its public water supply sources and to develop a Source Water Assessment Program (SWAP). In 2002, DEP conducted a SWAP process for all public ground and surface water sources in Massachusetts, including one for the Massachusetts Water Resources Authority (MWRA) Quabbin Reservoir, Ware River, and Wachusett Reservoir. The SWAP noted that the MDC/MWRA system met DEP’s annual review of “Measures of Success” for implementation of Watershed Protection Plans and disinfection treatment processes. The SWAP further noted that MDC implemented DEP-approved Watershed Protection Plans to protect source waters since 1991. The MDC and MWRA plans were more representative of the true nature of the watersheds than the SWAP, which was developed by a uniform, statewide process based on information available for every source in the state.

### **3.1.8 DCR and the 2003 Update**

In July of 2003, the MDC was combined with the Massachusetts Department of Environmental Management. A new agency, the Department of Conservation and Recreation was created. The responsibilities of the MDC/DWM were transferred to the DCR Division of Water Supply Protection.

In December, 2003, a second update to the Wachusett Reservoir Watershed Protection Plan was completed. The *2003 Watershed Protection Plan Update for the Wachusett Reservoir Watershed* was submitted to DEP and approved by DEP in 2004. The 2003 plan included an updated “Measures of Success”. The 2003 plan also addressed the issues raised in the SWAP.

### **3.2 Current Status**

The current DWSP Watershed Protection Plans have been approved by DEP’s Drinking Water Program. Implementation of the Watershed Protection Program is reviewed annually by DEP, as part of their annual inspection of the entire DWSP/MWRA system. Two inspections are conducted, one for the Chicopee Valley System and another for the Metropolitan Boston System. DEP has granted continued approval to DWSP and MWRA for both systems’ watershed protection programs.

### **3.3 Emergency System – Sudbury**

Sudbury Reservoir is classified an Emergency Water Supply Source by the Massachusetts Department of Environmental Protection (DEP). There is no current plan to re-activate the reservoir as a permanent active source.

There is no regulatory guidance regarding watershed protection for Emergency Water Supply Sources. Federal and State Drinking Water Regulations pertaining to Emergency Water Supply Sources mainly deal with issues that arise when there is need to bring an emergency source on line (e.g., issuance of boil water orders).

The Sudbury system is a valuable resource and DWSP conducts several management programs in the watershed. The level of protection, however, provided through DWSP programs are lower than for the active water supply watersheds. Though not required by federal and state drinking water regulations, a Watershed Protection Plan was prepared for the Sudbury Reservoir and Foss Reservoir in June 1997 and is being updated as part of the 2008 planning process.

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## **4 Sources of Pollution and Their Assessment**

A watershed protection program for a surface water supply must establish a comprehensive method to identify potential sources of pollution in the reservoir drainage. There are thousands of specific compounds that can pollute drinking water. DWSP has aggregated these compounds into five categories of pollutants that share common properties. These are: Pathogens, Nutrients, Turbidity, Hazardous Materials, and Pesticides. The contaminant categories are based on conventional definitions which have been adapted to incorporate practical aspects in order to assess potential sources and develop protection programs.

This Section presents a brief discussion of the major reasons for concern for each contaminant group. It includes the water quality testing done for specific analytes and a list of potential contaminants in the watersheds. This information is used by staff to develop a framework to screen watershed activities and develop programs to reduce or eliminate the risk of water contamination from the pollutants. The control programs are presented in Section 5.

Note that this discussion of water quality testing is focused on watershed testing of samples collected by DCR staff for watershed management decision making. The discussion does not consider the thousands of tests MWRA conducts annually on samples collected from the reservoirs, at the Carroll Water Treatment Plant, and throughout the distribution system. The result of MWRA's comprehensive testing is summarized in the Annual Consumer Confidence Report, distributed by MWRA and available at their website. MWRA met every standard for all 120 contaminants tested in 2007.

DWSP conducts extensive water quality monitoring of the surface waters in the active water supply watersheds. Routine water quality monitoring provides data that are used to assess current water quality conditions. Routine monitoring also allows staff to establish ranges of values for parameters considered normal or typical. Review of the routine data results allows screening for excursions from normal ranges, alerting staff to potential pollution events. Data collected in routine sampling over several years are used to assess watershed trends. Shorter term studies may be conducted to evaluate specific issues. Although it is often difficult to measure and/or link discrete water quality impacts to specific management actions, DWSP's goal is to base all management decisions on water quality impacts.

### **4.1 Pollutant Categories**

#### **4.1.1 Pathogens**

Pathogens are biological agents that can cause illness or disease. Pathogens can be transmitted to humans in many ways, including through polluted water sources. Prior to adoption of public health measures to protect water supplies, many illnesses in the United States were spread by the consumption of contaminated drinking waters. The adoption of conventional water treatment practices early in the twentieth century largely eliminated this problem. Outbreaks of diseases traced to water supplies have more recently reappeared. These illnesses were caused by pathogens that were not inactivated by conventional water treatment, including *giardia* and *cryptosporidium*. Over the last twenty years, water suppliers have redesigned water treatment and enhanced watershed protection measures to further improve the safety of public water supplies. It

is important to note, however, that on a global basis, contaminated drinking water remains a major public health issue.

Even though pathogens generally are removed or made inactive by disinfection practices, a multi-barrier approach to water protection features programs that work to remove any and all watershed sources. This reduces the chance of the contaminant getting into the source in the first place, but if it should, the disinfection practices will inactivate the contaminant.

Pathogens come from a living source, either human or animal. Improper disposal of human waste is a higher risk to water supply protection than animal waste because infectious pathogens are more likely to be in human waste. Animal waste may contain pathogens, called zoonotic pathogens that are capable of infecting humans. All sources of waste are a concern, and measures need to be taken to identify water pollution related to these sources.

DWSP water quality testing has traditionally relied on total coliform bacteria and fecal coliform bacteria. Due to changes in Massachusetts water quality standards as well as laboratory considerations, DWSP has recently added *Escherichia coli* (e. coli) as a test and dropped the total coliform test. Total coliform bacteria, fecal coliform bacteria and the e. coli used for water tests are non-pathogenic bacteria. The presence of these bacteria in a water quality sample indicates the presence of fecal waste, which could contain pathogens. The pathogens could be bacteria, viruses, or protozoa. Indicator bacteria tests are used because analyses using pathogenic organisms are difficult and expensive and handling pathogenic organisms in the laboratory may be hazardous.

The Federal Surface Water Treatment Rule (SWTR) requires that fecal coliform concentrations at a reservoir intake of an unfiltered system be no greater than 20 colonies per 100 mL in 90 percent of the samples in any six month period. This standard has never been exceeded at Quabbin Reservoir (see Volume IIA Section 2.5 and Figure IIA-8). Exceedences were relatively regular at Wachusett Reservoir prior to 1993, but the development and implementation of bird harassment activities on and around the reservoir resulted in a dramatic drop in both roosting gull populations and fecal coliform concentrations. The standard has not been exceeded at Wachusett Reservoir since the spring of 1999 (see Volume IIC Section 2.4 and Figure IIC-6).

DWSP has been able to use the indicator bacteria with field investigations to identify pollutant sources and take corrective actions. Field investigations may also identify two or more potential sources of fecal contamination. In these cases, the traditional indicator tests are inadequate to develop control strategies. DCR has worked with University of Massachusetts Department of Civil and Environmental Engineering faculty to develop microbial source tracking (MST) methods, and will continue to investigate MST applications for appropriate applications.

#### **4.1.2 Nutrients**

In discussions of water quality, DCR uses the term nutrients as a category of chemical compounds that promote aquatic plant growth, primarily certain forms of phosphorus and nitrogen. Elevated levels of nutrients and the subsequent increase in aquatic plant growth can be deleterious to aquatic life and can impact drinking water quality. DWSP uses Total Phosphorus, Ammonia-

nitrogen and Nitrate-nitrogen to evaluate the nutrient levels in the watershed streams and reservoirs.

DWSP collects nutrient samples from the reservoir and its tributaries. Nutrient levels in the active water supply watersheds are quite low. Phosphorus levels are extremely low, and require specialized laboratory methods for detections, provided by MWRA laboratory at Deer Island.

#### **4.1.3 Turbidity**

Turbidity is a measure of the clearness of a solution. Material suspended in water decreases the passage of light through the water. Suspended materials include soil particles (clay, silt, and sand), algae, plankton, microbes, and other substances. Increases in turbidity are generally first noted by visual inspection. Follow-up with turbidity measurements allows better documentation and quantification of erosion problems. DEP may establish site conditions that incorporate turbidity limits to develop controls on problem construction sites. DWSP has successfully used turbidity to monitor and develop controls for several problem sites.

Turbidity samples are collected from watershed streams as part of routine sampling and in special studies to evaluate specific issues, such as monitoring the effectiveness of erosion controls at a construction site. Samples collected for turbidity are analyzed by DWSP staff using a turbidity meter. Turbidity is a very important parameter in determining treatment effectiveness, and as such is extensively monitored by MWRA.

#### **4.1.4 Hazardous Materials**

Hazardous materials are defined as any solid, liquid, or gas that can harm people, other living organisms, property, or the environment. Hazardous materials may be radioactive, flammable, explosive, toxic, corrosive, biohazardous, an oxidizer, an asphyxiant, or may have other characteristics that render it hazardous in specific circumstances. Mitigating the risks associated with hazardous materials may require the application of safety precautions during their transport, use, storage and disposal.

DWSP does not routinely monitor for hazardous compounds in watershed locations. Should an incident occur where there has been a release of hazardous materials to the environment, the need for monitoring is evaluated by staff in coordination with DEP. DEP may require environmental monitoring by the responsible party for the spill. An example of this approach would be a transportation release of a hazardous material. DEP could require the responsible party to conduct sampling to assess impact to the environment. DWSP would provide input for plan development and would review the sampling program and sample results submitted by the responsible party. In some cases, DWSP may determine that there is a need to conduct additional testing. In this case, a sampling and analysis program would be developed in consultation with the MWRA. Samples would be collected by DWSP staff and analyzed at the MWRA Deer Island laboratory.

#### **4.1.5 Pesticides**

A pesticide is any substance or mixture of substances intended to prevent, destroy, repel, or mitigate a pest. Pesticides include insecticides, herbicides, fungicides, and other substances used

to control pests. Pesticides can cause harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms. Pesticides enter surface water primarily as runoff.

DWSP does not routinely test for pesticides in the watershed. Some testing has been done historically to evaluate sites where herbicides had been used, and typically results have been “non-detects”. DWSP has requested some environmental testing for herbicides as part of review of utility treatment of Rights-of-Way on DWSP lands. MWRA tests for pesticides as required by state and federal Drinking Water Standards. No pesticides have been detected through these tests. The results are summarized in the annual MWRA Consumer Confidence Report.

#### **4.1.6 Emerging Issues**

Public water suppliers must be aware of new and emerging issues that relate to delivering safe water to customers. There is an array of chemical and microbiological compounds of potential interest, currently not included in routine source or finish water monitoring of potential concern. In addition, advances in water quality monitoring instrumentation and technology enable the detection of compounds at ever decreasing detection limits. Although not specifically included in this assessment, DWSP will work with MWRA to keep abreast of concerns regarding new compounds. A strong watershed protection program is a valuable tool for preventing source water contamination from any emerging contaminants.

## **4.2 *Potential Sources of Contaminants***

In order to systematically evaluate contaminant sources, source categories have been defined for use in DWSP Assessments. DWSP updated the threat priority naming scheme in 2008 after a careful review of the source watersheds and protection programs. These revised categories are not related to DEP’s Source Water Assessment and Protection Program (SWAP) ranking of potential threats (see Section 3.17); DEP’s SWAP land use matrix and assessment rankings remain in place.

### **4.2.1 Wildlife**

Wildlife refers to the threat to water quality from wildlife populations. Examples include: pollution from bird waste, adverse impacts from deer browsing, and pollution from waste produced by and habitat manipulations from beaver. Pollutants most likely to be in waste generated by wildlife are pathogens, nutrients and turbidity.

### **4.2.2 Public Access and Recreation**

Public Access and Recreation refers to the threat to water quality from public access on DWSP owned properties. Activities include both allowed activities (e.g., hiking) and prohibited activities (e.g., swimming in the reservoir, dumping materials on DWSP properties). The pollutants most likely to be introduced to water from public access and recreation are pathogens, nutrients, and turbidity.

### **4.2.3 Timber Harvesting**

Timber harvesting on DWSP lands is a carefully monitored and regulated activity that is designed to enhance the ability of the watershed to protect water quality. The primary objective of DWSP's forest management is to create and maintain a complex forest structure, which forms a protective forest cover and a biological filter on the watershed land. This watershed protection forest is designed to be vigorous, diverse in species and age, actively accumulating biomass, conserving ecological and economic values, actively regenerating, and most importantly maintaining a predictable flow of high quality water from the land.

Timber Harvesting refers to the threat to water quality from logging activities. Examples include release of fuel, hydraulic fluids, or other materials related to operation of machinery, erosion, and improper disposal of sanitary wastes, and construction or improvements of roads to provide access to timber lots. The pollutants most likely introduced because of timber harvesting are turbidity and hazardous materials.

### **4.2.4 Wastewater**

Wastewater refers to the threat to water quality from wastewater treated in on-site systems or transported via sewers to (off-watershed) wastewater treatment plants. Examples include leachate from failing or improperly sited on-site (septic) system or release of untreated sewage from a sewer or pump station. The pollutants of concern in this category are pathogens, nutrients, and hazardous materials.

### **4.2.5 Roadways, Railways and Rights-of-Way**

Roadways, Railways and Rights-of-Way (ROWs) refers to the threat to water quality from roads and rail. This includes pollutants transported by stormwater runoff, releases of fuel or transported products caused by accidents, and maintenance practices such as herbicide treatment of ROWs. The pollutants of concern related to this category are hazardous materials and pesticides.

### **4.2.6 Agriculture**

Agriculture refers to the threat to water quality from growing and harvesting crops, and keeping livestock. This category includes horses and kennels. The pollutants of concern from agriculture are pathogens, nutrients, and pesticides.

### **4.2.7 Construction**

Construction refers to the threat to water quality from construction activities on a site. The activities of concern include earth moving with inadequate erosion and sediment controls and releases from construction equipment. The pollutants of concern related to construction are turbidity and hazardous materials.

### **4.2.8 Commercial, Industrial, and Governmental Sites**

Commercial, Industrial, and Governmental Sites refers to the threat to water quality from activities on sites in commercial, industrial, or governmental use. Examples of water quality

problems associated due to this type of use include increased runoff due to increased impervious surfaces commonly associate with these uses, and release of materials stored and used on site. The pollutants of concern most likely to be generated from commercial, industrial, and governmental sites are hazardous materials and pesticides.

#### **4.2.9 Residential Sites**

Residential Sites refers to the threat to water quality from practices associated with land in residential use. Examples include nutrient and pesticides from lawn care products and dog waste. A new issues that has emerged as this report has been developed is the concerns about pharmaceuticals and personal care products (PPCPs), which could be associated with residential land use. The major pollutants of concern for residential sites are pathogens, nutrients, hazardous materials and pesticides.

#### **4.2.10 Solid Waste Facilities**

Solid Waste Facilities refers to the threat to water quality from activities associate with operating and maintaining landfills and transfer stations. The pollutants of concern related to solid waste facilities are hazardous materials.

#### **4.2.11 Future Growth**

Future Growth refers to the threat to water quality from development of land that is currently undeveloped. Potential contaminants are related to zoning of the property, which could be residential, agricultural, commercial or industrial. All the pollutants in the matrix could be generated: pathogens, nutrients, turbidity, hazardous materials, and pesticides.

#### **4.2.12 Climate Change**

Climate Change refers to the threat to water quality from impacts of climate change, including higher water temperatures and changes in the timing, intensity, and duration of precipitation. Higher temperatures reduce dissolved oxygen levels, which can have an adverse effect on aquatic life. Where streamflow and lake levels fall, there will be less dilution of pollutants. Increased frequency and intensity of rainfall will produce more pollution and sedimentation due to runoff. Pollutants of concern related to climate changes are pathogens, nutrients and turbidity.

Table I-5 presents a summary of the potential contaminants and the most likely sources within DWSP watersheds. This table is presented as a guide for DWSP staff use in developing screening and control strategies, and is not meant as a definitive assessment of contaminant sources.

**Table I-5: Water Quality Contaminants and their Most Likely Sources in the Watersheds**

<i>Source</i>	<i>Contaminant</i>				
	<b>Pathogens</b>	<b>Nutrients</b>	<b>Turbidity</b>	<b>Hazardous Materials</b>	<b>Pesticides</b>
<b>Wildlife</b>	•	•	•		
<b>Public Access/Recreation</b>	•	•	•		
<b>Timber Harvesting</b>			•	•	
<b>Wastewater</b>	•	•		•	
<b>Roadways/Railways/ROWs</b>				•	•
<b>Agriculture</b>	•	•	•		•
<b>Construction</b>			•	•	
<b>Commercial, Industrial, and Governmental Sites</b>				•	
<b>Residential Sites</b>	•	•		•	•
<b>Solid Waste Facilities</b>				•	
<b>Future Growth</b>	•	•	•	•	•
<b>Climate Change</b>	•	•	•		

### ***4.3 Watershed Assessments of Potential Contaminant Sources***

Tables I-6 through I-9 present a summary of an assessment of potential contaminant sources in DCR watersheds. The assessment process was conducted by DCR staff, and updates similar assessment conducted to develop previous Watershed Protection Plans.

DCR believes that the water supply is very well protected. The importance rankings are for potential contaminants, and are relative to threats within the system. The rankings are developed to be used in the planning process to prioritize efforts and resources for control programs. They do not reflect the actual risk to the system posed by the contaminant sources.

Table I-10 presents a summary of the threat assessment for all watersheds, presented in Tables I-6 through I-9. The differences reflect the characteristics of each watershed, which are discussed in the watershed specific Volumes.

**Table I-6: Assessment of Potential Contaminant Sources - Quabbin Reservoir Watershed**

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Wildlife</b>	<ul style="list-style-type: none"> <li>• Beaver numbers and locations through removal by contractors and staff</li> <li>• Fecal samples</li> <li>• CVA water quality</li> <li>• Landfill surveys</li> <li>• Gull harassment program</li> <li>• Goose control program data</li> <li>• Aerial infra-red sampling</li> <li>• Regeneration monitoring;</li> <li>• Quabbin hunter moose surveys</li> <li>• Staff observations on browse</li> <li>• Satellite telemetry study</li> </ul>	<ul style="list-style-type: none"> <li>• The number of beaver removed is variable.</li> <li>• Water quality standards are being maintained.</li> <li>• Gulls are present at certain landfills and probably feeding nearby.</li> <li>• Gull numbers fluctuate daily and seasonally.</li> <li>• The number of geese nests and goslings have declined.</li> <li>• Deer densities are relatively stable and below threshold where regeneration would be impacted.</li> <li>• The deer densities in Quabbin Park are much higher than in the rest of the Reservation.</li> <li>• Regeneration continues to make strong progress.</li> <li>• 2006 hunter surveys indicated approximately 100 moose on the Reservation. Severe moose browse is observed locally.</li> </ul>	High

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Public Access/ Recreation</b>	<ul style="list-style-type: none"> <li>• Group, Research, and Night Access Permits</li> <li>• Ranger telephone log of group and night access permits</li> <li>• Gate key database</li> <li>• Watershed Ranger Patrol logs</li> <li>• Visitor Center Log</li> <li>• Boat Launch Area Database</li> <li>• Annual reports</li> <li>• Law enforcement data</li> <li>• Porta-potty data</li> <li>• 2005 Visitor Survey</li> <li>• EQAs</li> <li>• Recreational Facilities Attendants reports</li> <li>• Regional demographic data</li> </ul>	<ul style="list-style-type: none"> <li>• Requests for Access Permits have all increased over the past five years.</li> <li>• User conflicts have increased; permit conditions were updated in 2006 Access Plan to manage conflicts.</li> <li>• Public access monitoring is conducted primarily by Watershed Rangers.</li> <li>• Visitor education regarding rules is conducted formally by the Interpretative Services and informally by the Watershed Rangers and Boat Launch Area Staff.</li> <li>• Visitor Center is busiest on weekends and some holidays.</li> <li>• New opportunities exist to better coordinate with state and local law enforcement staff.</li> <li>• Seasonal Fishing Area attendants need more resources.</li> <li>• Informal public access to Division lands is increasing as watershed continue to develop residentially.</li> <li>• Need to investigate impacts of illegal dog walking through stormwater sampling.</li> </ul>	<b>High</b>

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Timber Harvesting</b>	<ul style="list-style-type: none"> <li>• Forestry access permits</li> <li>• Gate key database</li> <li>• Continuous Forest Inventory (CFI)</li> <li>• Annual internal DCR lot review</li> <li>• Cutting plan supervision and final review for return of Performance Bonds</li> <li>• Service Forester Reports</li> <li>• Private cutting plans and harvests</li> <li>• DEP Hazardous Spills database</li> <li>• Water quality monitoring data</li> <li>• Road maintenance review for annual priorities</li> </ul>	<ul style="list-style-type: none"> <li>• New Gate/Key system is being integrated with older permit/key system.</li> <li>• CFI re-measurement every decade has provided adequate long-term assessment of forest cover stability.</li> <li>• Lot review has maintained consistency of proposed silviculture with long-term management plans.</li> <li>• Supervision on the ground has provided adequate control of harvesting operations to meet implementation and regulatory standards and identified exceptions requiring retention of Performance Bonds.</li> <li>• Spill response plans are required for every lot.</li> <li>• Chief Forester receives copies of all cutting plans in watershed submitted to Service Forester.</li> <li>• Spill training workshops for local loggers had high attendance.</li> <li>• Limited targeted water quality monitoring has been established for research purposes.</li> </ul>	Low

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• WsPA database</li> <li>• BOH septic system data</li> <li>• EQ special investigations</li> </ul>	<ul style="list-style-type: none"> <li>• Gradual increase in septic loading watershed-wide, which may be offset by repairs of older systems.</li> <li>• BOH data is currently decentralized.</li> <li>• Over the past five years, the relationship between Title 5 repairs or replacements and the WsPA has greatly evolved.</li> <li>• Town based building permit is available, useful in some towns, and not useful in others.</li> <li>• Fecal coliform bacteria monitoring continues on a routine basis.</li> </ul>	Medium
<b>Roadways/ Railways/ ROWS</b>	<ul style="list-style-type: none"> <li>• DEP release database</li> <li>• Notification of spills from local fire chiefs</li> <li>• DWSP Culvert/ Road database.</li> <li>• Forestry staff access routes for future harvest operations</li> <li>• DCR staff roadwork maintenance</li> <li>• Complaints of problems from local maintenance of gravel roads</li> <li>• National Grid YOP</li> <li>• <i>Environmental Monitor</i></li> <li>• Watershed Ranger database</li> </ul>	<ul style="list-style-type: none"> <li>• Informal notification process and Environmental Assessment and Cleanup of Spills by DWSP staff needs improvement.</li> <li>• Database helps prioritize culverts needing replacement or upgrading.</li> <li>• DCR roads are prepared before timber harvest operations. Scheduled road maintenance and improvement work is combined with high priority roadwork throughout year.</li> <li>• Town gravel roadwork needs additional BMPs to address drainage and runoff problems</li> <li>• Coordination is working smoothly with National Grid on their YOP.</li> <li>• MassHighway projects in watershed are commonly learned about through the <i>Environmental Monitor</i>.</li> </ul>	Medium

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>• 1997 Agriculture Database</li> <li>• EQAs</li> <li>• Water quality monitoring data</li> <li>• DCR WPR Monitoring Reports</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in the watershed include loss of dairy farms and a general increase in pastures and horse farms</li> <li>• Dairy farm runoff threat recorded and resolved</li> <li>• Monitoring water for fecal coliform bacteria and turbidity continues to alert staff of potential problems</li> <li>• Some DCR WPRs allow agricultural activities with restrictions. DCR's WPRs have standards and are being monitored</li> <li>• Local realtors cite added value to lands near or abutting DCR lands.</li> </ul>	Low
<b>Construction</b>	<ul style="list-style-type: none"> <li>• WsPA filings database</li> <li>• Town Building Permits</li> <li>• Communication with local building inspectors</li> <li>• Water quality monitoring data</li> <li>• Neighbor complaints</li> <li>• <i>Environmental Monitor</i></li> <li>• MEPA and internal staff discussions</li> </ul>	<ul style="list-style-type: none"> <li>• Construction activity is occurring in ever more remote and/or problematic locations (e.g., slopes, within wetland buffer zones ).</li> <li>• Building permits in towns partially in the watershed are significantly higher than towns regulated by the WsPA.</li> <li>• Water quality monitoring can detect and document erosion problems.</li> <li>• Large projects are rare in Quabbin.</li> <li>• Word of mouth continues to serve to prevent problems.</li> </ul>	Low
<b>Commercial/ Industrial/ Governmental Sites</b>	<ul style="list-style-type: none"> <li>• EQAs</li> </ul>	<ul style="list-style-type: none"> <li>• Limited commercial activity occurs in the watershed.</li> <li>• Formal monitoring is conducted primarily through EQA process.</li> <li>• Impervious areas appear to be increasing through residential development.</li> </ul>	Low

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Residential Sites</b>	<ul style="list-style-type: none"> <li>• WsPA database</li> <li>• GIS analysis</li> <li>• Building Permit data analysis</li> <li>• EQA fieldwork</li> <li>• Special WQ sampling</li> <li>• DEP UST/AST Database</li> <li>• WPR Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Residential development projects which are proposed in compliance with WsPA standards but located immediately adjacent to Primary Zone or BVW pose threats from encroachments and prohibited alterations by homeowners.</li> <li>• Most watershed towns are increasing in population; several are fast-growing and several have potential to also grow rapidly.</li> <li>• Building permits in towns partially in the watershed are significantly higher than towns wholly in the watershed and regulated by the WsPA</li> <li>• There are two types of conservation restrictions in watershed – DCR (WPRs) and non-DCR (CRs). WPRs are monitored; CRs need to be inventoried and tracked.</li> </ul>	Low
<b>Solid Waste Facilities</b>	<ul style="list-style-type: none"> <li>• DEP Solid Waste Database</li> <li>• Town monitoring reports for closed sites (New Salem and Petersham)</li> <li>• Site reports from EQ, Rangers and other staff</li> <li>• Water Quality Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Solid waste is regulated at the state level by both hazardous waste (310 CMR 30.00) and solid waste management regulations (310 CMR 19.00).</li> <li>• WsPA prohibits siting of waste facility in watershed.</li> </ul>	Low

<b>Quabbin Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Future Growth</b>	<ul style="list-style-type: none"> <li>• Building Permit data and map</li> <li>• Protected Lands Map</li> <li>• WsPA Map</li> <li>• Town zoning maps and master plans</li> <li>• EOEEA buildout analyses</li> <li>• Air Quality Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Growth is increasingly all around the perimeter of the watershed.</li> <li>• Permanent protection has increased in the past decade.</li> <li>• Growth is increasingly random as remote parcels are liquidated and developed according to local zoning bylaws which specify a new dwelling on every one or two acres.</li> </ul>	Low
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>• Reservoir and Tributary water temperature data</li> <li>• Nutrient and Plankton data</li> <li>• Establishing carbon footprint</li> </ul>	<ul style="list-style-type: none"> <li>• Hybrid vehicles are replacing older models.</li> <li>• Biomass plant for heat at Quabbin has been installed.</li> <li>• Carbon sequestration with forestry.</li> <li>• Photovoltaics at Boat Launching Areas are being maintained and updated.</li> <li>• Invasive species and opportunistic organisms threaten forest health and composition and water quality and quantity parameters may be negatively affected.</li> </ul>	Med

**Table I-7: Assessment of Potential Contaminant Sources - Ware River Watershed**

Source	Ware River Watershed		
	Means of Assessment	Current Assessment	Importance
<b>Wildlife</b>	<ul style="list-style-type: none"> <li>• Moose sign surveys</li> <li>• Moose exclosures</li> <li>• Staff reports on beaver problems</li> <li>• Fecal coliform sampling</li> <li>• EQAs</li> </ul>	<ul style="list-style-type: none"> <li>• No reliable population estimates presently available.</li> <li>• Deer and moose are not a problem at present, but could impact DCR's ability to manage forests in future.</li> <li>• Beaver are mainly an infrastructure issue.</li> <li>• There are no exclusion zones presently defined at Ware River watershed.</li> <li>• Questions remain on expanding goose population and need for Gull control at local landfills.</li> </ul>	Low
<b>Public Access/ Recreation</b>	<ul style="list-style-type: none"> <li>• Anecdotal staff assessments</li> <li>• Group access permits</li> <li>• Ranger patrols (routine and targeted)</li> <li>• Gate checks</li> <li>• Ware River Watershed Advisory Committee input</li> <li>• Local Police Departments</li> </ul>	<ul style="list-style-type: none"> <li>• This source will become more of an issue in future as there is expansion pressure from snowmobiles, horses, and ORVs.</li> <li>• Significant illegal activities include ORVs, nighttime partying, dumping, use of non-designated areas by otherwise legal users.</li> <li>• Substantial staff time is spent on user conflicts.</li> </ul>	Medium
<b>Timber Harvesting</b>	<ul style="list-style-type: none"> <li>• DCR Land Management Plans</li> <li>• Annual lot review process</li> <li>• Cutting plans for operations on private lands adjacent to DCR lands</li> </ul>	<ul style="list-style-type: none"> <li>• Most concern is focused on road construction/upgrading and stream crossings and potential spills.</li> <li>• Service Foresters do good job of oversight.</li> <li>• DWSP forestry activities are very well controlled.</li> </ul>	Low
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• Local BOH data</li> <li>• WsPA review and database</li> <li>• Stream sampling for bacteria</li> <li>• EQAs</li> </ul>	<ul style="list-style-type: none"> <li>• Title 5 does good job ensuring adequate septic systems, as banks require inspections/upgrades upon property transfers.</li> <li>• Failed septic systems occasional occur and are repaired by homeowners.</li> </ul>	Medium

Source	Ware River Watershed		
	Means of Assessment	Current Assessment	Importance
<b>Roadways/ Railways/ ROWS</b>	<ul style="list-style-type: none"> <li>• Pesticide issues monitored via Vegetation Management Plans and Yearly Operating Plans</li> <li>• <i>Environmental Monitor</i></li> <li>• DEP spill reports</li> <li>• EQAs</li> <li>• Ranger Patrols</li> </ul>	<ul style="list-style-type: none"> <li>• Highways are a significant problem, especially reconstruction projects that involve drainage changes and/or direct discharges.</li> <li>• Road maintenance issues include sand, salt, and other materials that are not picked up or removed.</li> <li>• Ongoing potential for a spill releasing hazardous materials.</li> </ul>	Low/High
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>• Realtor inquiries (e.g., ability to keep horses)</li> <li>• DAR data</li> <li>• EQAs</li> <li>• WPR inspections</li> <li>• MassGIS landuse data</li> </ul>	<ul style="list-style-type: none"> <li>• Main issue is increase in hobby horse farms.</li> </ul>	Low
<b>Construction</b>	<ul style="list-style-type: none"> <li>• WsPA filings</li> <li>• NPDES applications</li> <li>• Town records</li> <li>• Staff site visits</li> <li>• MEPA</li> <li>• EQAs</li> <li>• WQ monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Development is occurring on hillsides that are less stable and more difficult to control.</li> <li>• Local boards not always effective in monitoring and controlling development.</li> </ul>	Medium-High
<b>Commercial/ Industrial/ Governmental Sites</b>	<ul style="list-style-type: none"> <li>• GIS Landuse analysis</li> <li>• EQAs</li> <li>• Data from local Fire Departments on permitted storage tanks</li> <li>• NPDES and DEP databases</li> </ul>	<ul style="list-style-type: none"> <li>• There are very few sites in Ware River watershed.</li> </ul>	Low
<b>Residential Sites</b>	<ul style="list-style-type: none"> <li>• GIS analysis</li> <li>• EQAs</li> <li>• WsPA filings</li> <li>• Water quality monitoring results</li> </ul>	<ul style="list-style-type: none"> <li>• Perception is that growth is accelerating.</li> <li>• Sewer and water infrastructure may be limiting factor.</li> <li>• A potential concern is encroachments onto DCR lands.</li> </ul>	Medium

Source	Ware River Watershed		
	Means of Assessment	Current Assessment	Importance
<b>Solid Waste Facilities</b>	<ul style="list-style-type: none"> <li>• MassGIS and DEP data</li> <li>• Monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>• No active facilities in Ware River watershed.</li> <li>• Several closed facilities.</li> <li>• Issues at Barre landfill, which is outside the watershed, include possible impacts from gulls and truck traffic through the watershed.</li> </ul>	Low
<b>Future Growth</b>	<ul style="list-style-type: none"> <li>• EOEА buildout analyses</li> <li>• Town data and master plans</li> <li>• Census data</li> <li>• Local newspapers</li> </ul>	<ul style="list-style-type: none"> <li>• Most towns in watershed utilize septic systems</li> <li>• Some towns face fast growth.</li> <li>• Sewer and water availability may be limiting factor in Rutland.</li> <li>• Barre and Templeton also have sewer systems, which could affect future growth.</li> </ul>	Medium-High
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>• WQ monitoring data</li> <li>• Regional research results</li> </ul>		Low

**Table I-8: Assessment of Potential Contaminant Sources – Wachusett Reservoir Watershed**

<b>Wachusett Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Wildlife</b>	<ul style="list-style-type: none"> <li>• Annual wildlife biologist surveys</li> <li>• Daily bird observations from August through April</li> <li>• Vernal pool mapping and assessment</li> <li>• EQA field investigations</li> <li>• Water quality sampling</li> <li>• Assessment of <i>Giardia</i> and <i>Cryptosporidium</i> in aquatic mammal</li> </ul>	<ul style="list-style-type: none"> <li>• Deer population expanding but not a problem at present.</li> <li>• Beaver and muskrat removed promptly from aquatic wildlife pathogen control zone near the reservoir intake or if threatening infrastructure.</li> <li>• Avian harassment and control activities have been very successful for past decade.</li> </ul>	High
<b>Public Access/ Recreation</b>	<ul style="list-style-type: none"> <li>• Ranger patrols with daily and monthly reporting</li> <li>• Division property boundary marking</li> <li>• EQAs</li> <li>• Public Access Plan review</li> </ul>	<ul style="list-style-type: none"> <li>• Inappropriate or illegal recreation activities do occur occasionally, as do a variety of unauthorized activities.</li> <li>• New barriers, parking areas, toilets, and educational signs have been constructed.</li> </ul>	Low
<b>Timber Harvesting</b>	<ul style="list-style-type: none"> <li>• The Wachusett Land Management Plan (2001-2010)</li> <li>• Annual cutting plans</li> </ul>	<ul style="list-style-type: none"> <li>• The Division has developed a low-maintenance forest which provides long-term water quality protection with limited intervention while also allowing selective harvesting.</li> <li>• The increasing presence of invasive plants is a significant developing problem and needs to be addressed.</li> </ul>	Low
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• Board of Health minutes, agendas, and records</li> <li>• Biannual update of sewer connection data</li> <li>• EQAs</li> <li>• WSPA database</li> <li>• Tributary water quality sampling</li> </ul>	<ul style="list-style-type: none"> <li>• More than fifty percent of homes in Holden and West Boylston are connected to the municipal sewer.</li> <li>• Homes in most of the other communities use individual septic systems which could fail if not properly maintained.</li> <li>• The sewer and associated pump stations are a potential threat to water quality.</li> </ul>	Medium

<b>Wachusett Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Roadways/ Railways/ ROWs</b>	<ul style="list-style-type: none"> <li>• Yearly Operating Plans</li> <li>• <i>Environmental Monitor</i></li> <li>• DEP spill database</li> <li>• EQAs</li> </ul>	<ul style="list-style-type: none"> <li>• Accidental releases in areas with direct discharges are a significant threat.</li> <li>• Stormwater transport of contaminants including sediment is also a problem.</li> <li>• The threat from Right-of-Way treatments is low.</li> </ul>	High/ High/ Low
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>• 1997 Consultant survey</li> <li>• DCR staff surveys and inspections</li> </ul>	<ul style="list-style-type: none"> <li>• There are 247 agricultural sites in the watershed (September 2007); almost all are small hobby farms or properties with a few horses.</li> <li>• Ten of twelve sites originally identified as significant threats are no longer considered a problem.</li> <li>• Owners of the two remaining farms are in the process of implementing best management practices.</li> </ul>	Low
<b>Construction</b>	<ul style="list-style-type: none"> <li>• WsPA filings</li> <li>• NPDES applications</li> <li>• Town records</li> <li>• EQ file review</li> <li>• EPA CGP NOI website</li> <li>• DEP BRP WM09 stormwater permits database</li> <li>• Cooperative review with DEP, and enforcement if needed, of stormwater projects</li> </ul>	<ul style="list-style-type: none"> <li>• Two major projects in the watershed caused considerable problems due to lack of sufficient environmental review and inadequate stormwater protection measures. Cooperative enforcement with EPA and DEP has brought both sites into compliance.</li> <li>• Current review of construction projects in the watershed is comprehensive and successful.</li> </ul>	Medium
<b>Commercial/ Industrial/ Governmental Sites</b>	<ul style="list-style-type: none"> <li>• DCR data</li> <li>• Federal RCRA database</li> <li>• DEP databases</li> <li>• Town listings</li> <li>• Telephone directories</li> <li>• EQAs</li> </ul>	<ul style="list-style-type: none"> <li>• A preliminary list has been developed but is incomplete.</li> <li>• Many facilities are clustered along Routes 12 and 122A in West Boylston and Holden.</li> <li>• Additional information is being gathered and inspections of sites will take place in the future.</li> <li>• Compliance with federal and state stormwater regulations should be confirmed.</li> </ul>	Low- Medium

<b>Wachusett Reservoir Watershed</b>			
<b>Source</b>	<b>Means of Assessment</b>	<b>Current Assessment</b>	<b>Importance</b>
<b>Residential Sites</b>	<ul style="list-style-type: none"> <li>• EQAs</li> <li>• Town records</li> <li>• EQ file review</li> <li>• WsPA database</li> <li>• Dept. of Fire Services and local fire dept. records on USTs</li> </ul>	<ul style="list-style-type: none"> <li>• No recent problems associated with lawn care, insect control, or household use of hazardous materials has been identified.</li> <li>• Increasing populations of dogs are suspected to be a significant source of fecal contamination in several tributaries.</li> </ul>	Low-Medium
<b>Solid Waste Facilities</b>	<ul style="list-style-type: none"> <li>• NPDES and DEP databases</li> <li>• Post-closure monitoring reports from Holden and West Boylston landfills</li> <li>• Water samples collected downstream of landfills</li> </ul>	<ul style="list-style-type: none"> <li>• There are four capped and closed facilities in the watershed and seven others (also closed and capped) in watershed towns but outside of the watershed.</li> <li>• There are also a few illegal landfills in the watershed that are now closed.</li> <li>• The Holden landfill continues to discharge contaminated leachate to the Quinapoxet River.</li> <li>• Arsenic has been detected in monitoring wells near the West Boylston landfill.</li> </ul>	Low
<b>Future Growth</b>	<ul style="list-style-type: none"> <li>• EOEEA buildout analyses</li> <li>• Town data and master plans</li> <li>• Watershed Protection Act filings</li> <li>• Land Procurement strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Ownership provides complete protection.</li> <li>• Partial control (Watershed Protection Restriction, ownership by other agencies, Chapter 61) provides some protection but does not eliminate risk.</li> </ul>	Medium
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>• Review of historic precipitation records, reservoir ice cover, and numbers of gulls and waterfowl</li> </ul>	<ul style="list-style-type: none"> <li>• Available information suggests that temperatures are increasing.</li> <li>• Changes in precipitation patterns could cause problems in the future. Invasive plants and insects could become an issue.</li> </ul>	Low

**Table I-9: Assessment of Potential Contaminant Sources - Sudbury Reservoir Watershed**

Source	Sudbury and Foss Reservoirs Watershed		Importance	
	Means of Assessment	Current Assessment	Sudbury Only	System-Wide
	<b>Wildlife</b>	<ul style="list-style-type: none"> <li>• Number of goose nests located and eggs treated annually</li> <li>• Number of adults and goslings observed annually</li> </ul>	<ul style="list-style-type: none"> <li>• Number of goose nests remains high.</li> <li>• Number of goslings has declined.</li> </ul>	Medium
<b>Public Access/ Recreation</b>	<ul style="list-style-type: none"> <li>• Ranger patrols</li> <li>• Abutters and general public reporting to DCR</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing Watershed Ranger presence will assist with controlling ongoing illegal activities, in particular trespassing, dumping, ATV riding, and swimming.</li> </ul>	High	Medium
<b>Timber Harvesting</b>	<ul style="list-style-type: none"> <li>• Sudbury LMP</li> <li>• Annual lot review process</li> </ul>	<ul style="list-style-type: none"> <li>• Concerns are road construction upgrading, stream crossings, and potential spills.</li> <li>• Service Foresters do good job of oversight.</li> </ul>	Medium	Low
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• MassGIS data</li> <li>• Mass DEP data</li> <li>• Municipal data</li> <li>• MWRA Water Quality testing</li> </ul>	<ul style="list-style-type: none"> <li>• Sewered: Framingham (MWRA), Marlborough, Westborough and Northborough (municipal); Unsewered: Southborough.</li> <li>• Septic system concerns are addressed by Title 5.</li> </ul>	Low	Lower

Source	Sudbury and Foss Reservoirs Watershed		Importance	
	Means of Assessment	Current Assessment	Sudbury Only	System-Wide
<b>Roadways/ Railways/ ROWS</b>	<ul style="list-style-type: none"> <li>• MassGIS</li> </ul>	<ul style="list-style-type: none"> <li>• There is an extensive network of roads and railways in the watershed. In particular, the Mass Turnpike and CSX railroad bisect Foss Reservoir.</li> <li>• There is an Emergency Response protocol for an accidental spill of oil.</li> </ul>	High	Medium
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>• MassGIS Land Use data</li> </ul>	<ul style="list-style-type: none"> <li>• Agriculture is not an issue in this suburban landscape.</li> </ul>	Low	Lowest
<b>Construction</b>	<ul style="list-style-type: none"> <li>• MEPA</li> </ul>	<ul style="list-style-type: none"> <li>• DCR's only control over construction is through 350 CMR 11.09(1).</li> <li>• Other state and federal environmental regulations have greater ability to control impacts from construction.</li> <li>• Reliance on local authorities, DEP, and EPA for implementation of stormwater controls and other methods to mitigate construction impacts.</li> </ul>	Low	Lower

Source	Sudbury and Foss Reservoirs Watershed		Importance	
	Means of Assessment	Current Assessment	Sudbury Only	System-Wide
<b>Commercial/ Industrial/ Governmental Sites</b>	<ul style="list-style-type: none"> <li>• MEPA</li> <li>• MassGIS</li> <li>• MWRA Water Quality testing</li> </ul>	<ul style="list-style-type: none"> <li>• Route 9 and I-495 corridors have an ongoing cycle of development and re-development. Existing Framingham Technology Park abuts Foss Reservoir.</li> <li>• There are several sites regulated by DEP.</li> <li>• There are no regulated Groundwater discharges in the watershed.</li> </ul>	Low	Lower
<b>Residential Sites</b>	<ul style="list-style-type: none"> <li>• MassGIS and MAPC data</li> <li>• DCR surveys</li> <li>• MWRA Water Quality testing</li> </ul>	<ul style="list-style-type: none"> <li>• Metrowest continues to be a desirable residential area.</li> <li>• Most locations immediately around the Sudbury and Foss Reservoirs are already developed, although opportunities exist for infill or redevelopment.</li> <li>• Encroachment by existing residents is an ongoing problem.</li> </ul>	Low	Lower
<b>Solid Waste Facilities</b>	<ul style="list-style-type: none"> <li>• MassGIS data</li> <li>• Mass DEP data</li> </ul>	<ul style="list-style-type: none"> <li>• There are three closed or inactive landfills in the watershed.</li> </ul>	Low	Lowest

Source	Sudbury and Foss Reservoirs Watershed		Importance	
	Means of Assessment	Current Assessment	Sudbury Only	System-Wide
<b>Future Growth</b>	<ul style="list-style-type: none"> <li>• EOEEA Build-out Analysis</li> <li>• MassGIS and MAPC data</li> </ul>	<ul style="list-style-type: none"> <li>• DCR owns the lands immediately surrounding Sudbury and Foss Reservoirs, so there is a minimum buffer against growth impacts on these reserve water supplies.</li> <li>• DCR property, however, is often viewed as a potential land bank for municipal needs.</li> </ul>	Low	Lowest
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>• Federal, State, Non-Profit, and Academic reports</li> <li>• State policies</li> </ul>	<ul style="list-style-type: none"> <li>• DCR lands represent 4,000 acres of permanently protected open space in a highly developed watershed.</li> </ul>	Low	Lowest

**Table I-10: DCR Watershed System Wide Assessment of Importance of Potential Contaminant Sources for Watershed Program Planning**

<i>Source</i>	<i>Active Supplies</i>			<i>Emergency Supply</i>	
	<b>Quabbin</b>	<b>Ware</b>	<b>Wachusett</b>	<b>Sudbury</b>	<b>System – Wide</b>
Wildlife	High	Low	High	Low	Low
Public Access/ Recreation	High	Medium	Medium	Medium	Medium
Timber Harvesting	Low	Low	Low	Low	Low
Wastewater	Medium	Medium	Medium	Low	Lower
Highways/ Railways/ ROW	Medium	Low; High during transfer	High/ High/ Low	Medium	Medium
Agriculture	Low	Low	Low	Low	Lowest
Construction	Low	Medium to High	Medium	Low	Lower
Commercial/ Industrial/ Governmental Sites	Low	Low	Low to Medium	Low	Lower
Residential Sites	Low	Medium	Low to Medium	Low	Lower
Solid Waste Facilities	Low	Low	Low	Low	Lowest
Future Growth	Low	Medium to High	Medium	Low	Lowest
Climate Change	Medium	Low	Low	Low	Lowest

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## 5 Division Programs to Address Contaminants and Their Sources

The DCR DWSP Watershed Protection Program provides a drinking water source of exceptionally high quality. It is important that this level of quality be maintained and enhanced for future generations, and DWSP and MWRA are strongly committed to this goal. In order to do this, DWSP has developed programs to control water quality threats identified in ongoing assessments. There are four overarching concepts of the DWSP guiding the control programs:

- 1. Protect the most sensitive areas of the watershed through ownership or agreements with land owners.** Direct ownership of critical land in the watershed system ensures maximum control over land use and provides the best protection of water quality. DWSP is the steward of a system developed over a hundred year span. Over 100,000 acres of land have been purchased to provide protection. DWSP is committed to increasing protection through acquisition in fee or of development rights of critical, unprotected areas of the watershed system.
- 2. Manage DWSP-owned properties to protect water quality and provide stewardship of natural resources.** Land Management impacts water quality. Land management decisions need to be evaluated with respect to impact on tributary and reservoir water quality. DWSP works to make decisions that will provide the best water quality and be a responsible steward of the resources it controls. Management decisions must be made on a wide variety of topics that influence vegetative cover, wildlife populations, biological diversity, cultural resources, boundaries and encroachments, fire control, access roads, and public access.
- 3. Work with watershed communities to protect water resources while accommodating community needs.** DWSP is a major landowner in the watershed communities. In addition, DWSP has control over environmentally sensitive areas of privately owned lands through the Watershed Protection Act. DWSP believes that pollution prevention programs on private lands in the watershed provide benefits for the local residents including local water supply source protection. DWSP provides Payment In Lieu of Taxes (PILOT) payments to the watershed communities for all DWSP properties.
- 4. Monitor to identify potential or existing water quality problems.** DWSP staff continuously monitors the watershed for potential water quality problems. Monitoring Programs include field surveillance and water quality sampling and analysis. When problems are identified, actions are taken to correct the problems. A key tool for correcting problems is federal, state, and local environmental regulations.

DWSP has developed thirteen programs to implement the Watershed Protection Concepts. The programs are listed in Table I-11 and described in this section. A subset of these programs is used in the Sudbury system. Since the Sudbury is an Emergency Supply, the Watershed Protection Program is less aggressive than that used in the active watersheds. DWSP believes that this is an appropriate level of watershed protection for an Emergency Supply.

**Table I-11: DWSP Watershed Protection Programs**

Goal	DWSP Watershed Protection Programs	Quabbin, Ware River, Wachusett	Sudbury
Protect land through ownership or agreement.	Land Procurement	✓	
	Land Preservation	✓	
Manage DWSP-owned properties to protect and enhance water quality, and provide stewardship of natural resources.	Land Management	✓	✓
	Wildlife Management	✓	✓
	Public Access Management	✓	✓
	Watershed Security	✓	✓
	Infrastructure	✓	✓
Work with watershed communities to foster watershed protection principles on land in private ownership.	Watershed Protection Act	✓	
	Technical Assistance and Community Outreach	✓	
	Interpretive Services	✓	✓
Monitor to identify potential or existing water quality problems.	Water Quality Monitoring	✓	✓
	Environmental Quality Assessments	✓	
	Emergency Response	✓	✓

Implementation of the DWSP Watershed Protection Plan is an iterative and ongoing process. It builds on an extensive body of work conducted by DCR staff. This work has been documented in a variety of reports which are referenced in Table I-12 and summarized in the Program descriptions. The programs described in this section are developed for a five-year implementation period that runs from Fiscal Year 2009 through 2013 (July 1, 2008 through June 30, 2013).

**Table I-12: DCR Watershed Protection Goals, Programs, Plans and Guidance Documents**

<b>Goal</b>	<b>DCR Watershed Protection Program</b>	<b>Applicable Plans, Reports or Guidance Documents</b>
<b>Protect land through ownership or agreement.</b>	Land Procurement	Land Acquisition Policy Panel.
	Land Preservation	Conservation Restriction monitoring guidelines; Baseline reports; Annual inspection reports.
<b>Manage DCR-owned properties to protect and enhance water quality, and provide stewardship of natural resources.</b>	Land Management	<i>Quabbin Land Management Plan 2007 – 2017; Ware River Land Management Plan 2003-2012; Wachusett Land Management Plan 2001 – 2010; Sudbury Land Management Plan 2004-2013.</i>
	Wildlife Management	Land Management Plans cited above; Annual Quabbin Reservation White-tailed deer impact management program report (1995 through 2006); Aquatic Wildlife Pathogen Control Zone (1999); Annual Canada Goose Population Control Program report; Long-term wildlife resource monitoring program (2005); Research Project: <i>Regional Movements, Feeding Behavior, and Roosting Patterns of Ring-billed, Herring, and Great Black-back Gulls Utilizing Wachusett and Quabbin Reservoirs, Massachusetts</i> (initiated in 2007).
	Public Access Management	350 CMR 11.09(2); <i>Quabbin Public Access Management Plan Update 2006; Ware River Public Access Plan 2000; Wachusett Public Access Plan 2003; Sudbury Public Access Plan 2002.</i>
	Watershed Security	Quabbin Watershed Ranger Plan.
	Infrastructure	<i>Quabbin Culvert Study, 2007; MWRA Emergency Action Plan for the Wachusett Reservoir Dam, Revised 2006; MWRA Emergency Action Plan for the Sudbury Reservoir Dam, Revised 2006; Building Inspection Reports; Executive Order No. 484 Leading by Example - Clean Energy and Efficient Buildings.</i>
<b>Work with watershed communities to foster watershed protection principles on land in private ownership.</b>	Watershed Protection Act	Watershed Protection Act; 350 CMR 11.00-11.08.
	Technical Assistance and Community Outreach	Watershed Protection Act.
	Interpretive Services	<i>Interpretation and Visitor Services Plan for Quabbin Reservoir, 1989.</i>

Goal	DCR Watershed Protection Program	Applicable Plans, Reports or Guidance Documents
Monitor to identify potential or existing water quality problems.	Water Quality Monitoring	Quabbin/Ware River Annual Water Quality Reports, 1989-2007; Wachusett Annual Water Quality Reports, 1989-2007; Wachusett Ten Year Water Quality Summary.
	Environmental Quality Assessments	350 CMR 11.09(1) and other state, federal and local regulations.
		Environmental Quality Assessment Reports: <i>Quabbin Northwest Sanitary District</i> , 2000, 2006, 2007; <i>Fever Brook Sanitary District</i> , 2003; <i>East Branch Swift River Sanitary District</i> , 2003; <i>Quabbin Reservation Sanitary District</i> , 2003, 2005, 2007; <i>Burnshirt, Canestro &amp; Natty Sanitary District</i> , 1992; <i>Coldbrook &amp; Longmeadow Sanitary District</i> , 1992, 1994, 2007 <i>East Branch Ware River Sanitary District</i> , 1994; <i>West Branch Ware River Sanitary District</i> , 2000, 2008; <i>Reservoir District (Wachusett)</i> , 2008; <i>Worcester District</i> , 2006; <i>Stillwater District</i> , 2006; <i>Quinapoxet District</i> , 2004 <i>Thomas Basin</i> , 2003.
	Emergency Response	<i>Wachusett/Sudbury Emergency Response Plan</i> , 2008

### 5.1 Land Procurement

DWSP uses capital funding to purchase land in private ownership, in order to provide permanent protection. For planning purposes, tasks under this program are related to active purchase of new properties.

#### Reference Reports and Materials

- Land Acquisition Policy Panel

#### Why This Is A Watershed Control Program

DWSP conducts its watershed land acquisition to protect sensitive watershed land from urbanization and to restore and maintain stable vegetative cover on the land (see Table I-13 and I-14). The pollutants that are generally associated with urbanization include: bacteria, pathogens, nutrients, sediments, heavy metals, and other contaminants associated with increased stormwater runoff. The 1986 SDWA Amendment Regulations and the 1992 Watershed Protection Act, along with increasing suburbanization, were the key driving forces behind the watershed land acquisition program.

## **Accomplishments**

Approximately \$121 million has been invested since 1985 in watershed land acquisition. 85 percent of these funds were spent in the Wachusett Reservoir watershed, which is the least protected and most vulnerable to development pressures.

A variety of goals was established for the program beginning in 1991. MWRA's 1993 Consent Order with DEP required DWSP to acquire 25 percent of the Wachusett Reservoir watershed in order to avoid filtration. DWSP achieved that goal through a combination of aggressive land acquisition and a "care and control agreement" with State Parks and Fish & Wildlife that incorporated their lands located in the watershed.

Both large-scale subdivision development and smaller scale commercial and residential development continues in the Wachusett Reservoir watershed. DWSP's future land acquisition efforts are focused on only about 15 percent of the remaining undeveloped land area.

**Table I-13: DWSP-Owned Land Within the Three Active Supply Watersheds, 1985-2007**

Watershed	1985		1998		2003		2007	
	Acres	% of Watershed	Acres	% of Watershed	Acres	% of Watershed	Acres	% of Watershed
Wachusett	5,608	7.9	15,861	22.4	18,387	25.9	18,888	26.8
Quabbin	51,792	54.3	54,203	56.9	54,321	57.2	54,050	56.6
Ware River	19,300	31.3	22,838	37.0	23,694	38.2	24,137	39.1

Source: DCR. Excludes Reservoir area. DWSP Owned Land includes both Fee and Watershed Protection Restriction holdings.

**Table I-14: DWSP-Owned Land and Other Protected Open Space within the Three Active Supply Watersheds**

Watershed	Wachusett		Ware		Quabbin		Total	
	Acres	% of Watershed	Acres	% of Watershed	Acres	% of Watershed	Acres	% of Watershed
DWSP Watershed	18,888	26.8	24,137	39.1	54,050	56.6	97,075	42.6
Other Protected Open Space	12,502	17.7	6,533	10.6	13,589	14.2	32,624	14.3
Total	31,390	44.5	30,670	49.7	67,639	70.9	129,699	56.9

Source: DCR and MassGIS. Excludes Reservoir area. DWSP Owned Land includes both Fee and Watershed Protection Restriction holdings.

## **Guiding Principles**

Modern hydrologic models show that land in and around tributaries, aquifers, and wetlands contains the greatest proportion of a basin's water at any given time. Scientific studies have demonstrated that there are critical low lying, water-rich areas in typical small New England watersheds that contribute the majority of runoff during storm events through saturated

subsurface and surface flow. As a precipitation event continues, the area included in saturated flow increases.

Studies show that pollutants added to these critical areas have a proportionately larger impact upon tributaries. Development focused in and around these water-rich areas, therefore, will have a proportionately larger negative impact upon the water resource. Land acquisition focused in these critical areas can protect the majority of the water resource through purchase of only a portion of a watershed. Pollution sources on upland areas will impact a proportionally smaller amount of the basin's water and for a limited amount of time. Where urban runoff occurs in upland areas, forested buffers around tributaries will help filter pollutants before they enter streams.

DWSP watershed scientists feel that non-point source pollution from private land within the watershed system is likely to be the most significant pollution source in the future. This type of diffuse pollution, largely manifested in turbidity, bacteria and pathogens, nutrients, and low levels of organics and metals, is best prevented and mitigated through protection of key undisturbed drainage land. It is a strong argument for a well-designed land acquisition program.

In order to determine the most appropriate and efficacious way to prioritize land procurement options in the Wachusett Watershed, DWSP formed the Land Acquisition Panel (LAP). LAP developed a land acquisition model that incorporated various geographic, hydrologic, and regulatory parameters to develop weighted criteria to identify critical parcels. The resulting Wachusett Land Acquisition Model Map has guided LAP's land acquisition prioritization process for the past fifteen years.

### **Goals For the Next Five Years**

It is important to recognize that there will always be opportunities to acquire important watershed property. The innumerable smaller holdings within the watersheds will continue to come forth as changes in ownership and market conditions motivate people to sell undeveloped tracts. Therefore, while the land procurement program is specifically defined until FY17, it is likely that the program will continue beyond that point. At the end of FY17, the program will be re-evaluated and new goals established.

- Use money allocated for land acquisition in MWRA's capital budget for the purchase of critical lands by fee and Watershed Protection Restriction.
- Pursue, whenever possible, acquisition of WPRs rather than fee interest.
- Consider only highly rated parcels (Category 4-7) within the Wachusett Reservoir watershed for future acquisition, as well as critical parcels within the Quabbin Reservoir watershed.
- Pursue opportunities to acquire land through gifts or through cooperative efforts with land trusts.

## ***5.2 Land Preservation/Watershed Protection Restriction***

Watershed Protection Restriction (WPR) is synonymous with the more common phrase Conservation Restriction. A WPR is a legal agreement between the Division and a private landowner where the landowner sells (or donates) the development rights of their property to the Division while maintaining ownership of the land. The WPR remains in effect in perpetuity and carries forward even if the landowner sells their property. As part of the WPR, the landowner must abide by a list of restrictions, which can include no construction, dumping, mining, and certain agricultural practices. This control program establishes baseline conditions on the WPR and conducts routine monitoring of the area to ensure compliance with the conditions of the WPR.

### **Reference Reports and Materials**

- EOEEA Conservation Restriction monitoring guidelines
- Baseline reports
- Annual inspection reports

### **Why This Is A Watershed Control Program**

The Division acquires WPRs to protect sensitive watershed land from urbanization and to restore and maintain stable vegetative cover on the land. The pollutants that are generally associated with urbanization include: bacteria, pathogens, nutrients, sediments, heavy metals, and other contaminants associated with increased stormwater runoff. The 1986 SDWA Amendment Regulations and the 1992 Watershed Protection Act, along with increasing suburbanization, were the key driving forces behind the watershed land acquisition program.

### **Accomplishments**

The first WPRs were purchased during the 1990s. Since then, several WPRs have been purchased each year. Recently, however, the proportion of WPRs to fee purchases has increased as there is more emphasis on initially trying to acquire a WPR on a piece of land before pursuing a fee option. To date, there are 38 WPRs in the Wachusett Reservoir watershed covering approximately 2,200 acres. In the Ware River watershed, there are 11 WPRs that encompass 800 acres. Finally, in the Quabbin Reservoir watershed, there are 17 WPRs that total 829.5 acres.

### **Guiding Principles**

Protecting land from development is a critical component of the Division's protection program. Land removed from development prevents new sources on non-point pollution. DWSP watershed scientists feel that non-point source pollution is likely to be the most significant pollution source in the future from private land within DWSP watersheds. This type of diffuse pollution (largely manifested in turbidity, bacteria and pathogens, nutrients, and low levels of organics and metals) is best prevented and mitigated through protection of key undisturbed drainage land and is a strong argument for a well-designed land acquisition program.

Land protected through WPRs provides a variety of benefits over traditional fee acquisitions. The landowner gets to retain ownership of their property, while the Division is ensured that all

future development rights have been relinquished. In addition, WPRs can be cost effective since that do not involve PILOT payments to watershed towns. The owner can tailor the WPR specifically to their situation, often including excluded areas where the restrictions of the WPR do not apply.

### **Goals For the Next Five Years**

As the Division acquires a greater proportion of WPRs in relation to fee acquisitions, the WPR monitoring program is faced with an increasing number of properties that need initial baselines and continued monitoring. In order to modernize the WPR process, several major modifications to the program are planned, including:

- Complete WPR baseline inspections on all overdue WPRs, and then re-inspect all WPRs at least annually.
- Create and maintain a digital database of all WPRs. A comprehensive database will be created to store WPR information. Existing data will be incorporated into the new database.
- Make the database information available to all DWSP staff.

### ***5.3 Land Management***

The Land Management Program incorporates principles from the current scientific knowledge of watershed and natural resource management to develop and implement policies, goals, and methods for managing DWSP land. The program addresses Land Protection, Forest Management, Wildlife Management, Management and Protection of Biodiversity, and Cultural Resources Protection, as well as maintenance of forest roads under DWSP control. The primary goal of this program is to assure the availability of pure water for future generations by managing a majority of DWSP land as highly diverse, vigorous, multiple age-class forest.

### **Reference Reports and Materials**

Chapter 26 of the Acts of 2003, § 290 directs the Office of Watershed Management to adopt periodic watershed management plans to provide for forestry, water yield, and public access among other purposes. As a result, the Division produces Land Management Plans for each of the watersheds on a ten year rotating schedule. The current plans are:

- *Quabbin Land Management Plan 2007 - 2017*
- *Ware River Land Management Plan 2003 - 2012*
- *Wachusett Land Management Plan 2001 - 2010*
- *Sudbury Land Management Plan 2004 - 2013*

### **Why this is Watershed Control Program**

The Division owns significant portions of each of the watersheds, ranging from approximately 10 percent at Sudbury to 57 percent at Quabbin. The management of these lands can have tremendous impacts on water quality. In addition, management of these lands requires a significant investment of resources and personnel.

### **Accomplishments**

Forestry practices at Quabbin Reservation were initially certified by the Forest Stewardship Council (FSC) in 1997, which was the first such “Green Certification” of public land in North America. All four watersheds are now “Green Certified.” Substantial reduction in deer densities at Quabbin since 1991 have allowed a 400 percent increase in forest regeneration. DWSP manages 419 miles of roads and fire lines.

### **Guiding Principles**

Forest cover provides the best protection for drinking water quality. Maintaining a vigorously growing multi-aged, multi-species forest will provide the best resistance and resilience to a variety of known and unknown threats. DWSP management decisions are based on the best available scientific information. All management activities on DWSP lands are performed in compliance with all environmental regulations. Environmental controls (ESC, BMPs, etc) shall be, at a minimum, equal to that which DCR would require of a private landowner doing work that is regulated by the Watershed Protection Act.

### **Goals for the Next Five Years**

DWSP will need to ensure there are sufficient legal and enforcement resources to pursue and correct encroachments. The growing moose population in the watersheds will have an influence on forest dynamics and management decisions. Invasive terrestrial species will also play a significant role in forest management.

- Complete and implement an Invasive Species Management Strategy.
- Continue and complete boundary marking and surveillance for entire system.
- Develop environmental process for all road and maintenance activities.
- Continue to explore and study the relationship of moose and forest regeneration.
- Update *Wachusett Land Management Plan* in 2010.
- Update *Ware River Land Management Plan* in 2012.
- Update *Sudbury Land Management Plan* in 2013.

## **5.4 Wildlife Management**

Wildlife management is the integration of a variety of scientific disciplines to try and achieve a balance between the needs of wildlife populations with the needs of people. Wildlife management often involves the manipulation of populations of a specific species in order to

achieve an explicit ecological or cultural goal. In addition, wildlife management can also include altering or enhancing certain habitats, protecting critical areas, and deploying artificial enhancements in degraded habitats.

### **Reference Reports and Materials**

- *Quabbin Land Management Plan 2007-2017*
- *Ware River Land Management Plan 2003-2012*
- *Wachusett Land Management Plan 2001-2010*
- *Sudbury Land Management Plan 2004-2013*
- *Annual Quabbin Reservation White-tailed Deer Impact Management Program Report (1995 - 2006)*
- *Aquatic Wildlife Pathogen Control Zone (1999)*
- *Annual Canada Goose Population Control Program Report*
- *Long-term wildlife resource monitoring program (2005)*
- *Research proposal: Regional Movements, Feeding Behavior, and Roosting Patterns of Ring-billed, Herring, and Great Black-back Gulls Utilizing Wachusett and Quabbin Reservoirs, Massachusetts (2007)*

### **Why This Is A Watershed Control Program**

The primary goal of the wildlife program is to protect wildlife and their habitats while minimizing or eliminating adverse impacts caused directly or indirectly by wildlife. Certain wildlife species can negatively impact water quality through the transmission and amplification of pathogens. In addition, wildlife can impact water supply infrastructures and have impacts on habitat and vegetation composition at broad scales. Unmanaged, these wildlife populations could have a potentially large impact on water quality and habitat conditions across the watershed system.

A large amount of public land is under the control of the Division, which has the responsibility to protect uncommon, rare, and otherwise significant species and habitats where they occur. Active wildlife management is often necessary to protect, encourage, or support rare and uncommon wildlife.

### **Accomplishments**

***Aquatic Wildlife Pathogen Control Zone:*** This program was established in 1999 at both Wachusett and Quabbin Reservoirs to target beaver and muskrat populations, both of which can play a role in the transmission and amplification of water-borne pathogens. A specific control zone is defined at each reservoir; individual animals are identified, removed, and studied. Surveys, and subsequent removal, are conducted year-round. A varying number of individuals are removed each year, and fecal samples are tested for the presence of *Giardia* and *Cryptosporidium*. Data collected to date indicate a relatively low level of infection.

***Canada Goose Population Control Program:*** This program, established at Wachusett Reservoir in 1996, at Quabbin in 1999, and at the Sudbury in 2006, addresses the growing concerns about

resident population of geese at the reservoirs. Complete surveys of all islands in each reservoir are conducted each spring to locate all active geese nests. All eggs in located nests are oiled to prevent hatching. The number of goslings and resident adult geese has declined substantially since the program was initiated.

***White-tailed Deer Impact Management Program:*** This program takes place specifically at Quabbin Reservation to maintain deer densities at levels that allow for continued tree regeneration and growth. The program started in 1991 as a response to concerns about the noticeable lack of regeneration across the landscape due to sustained high deer populations and over-browsing. Several thousand deer have been removed from the Quabbin Reservation during yearly controlled deer hunts. In response, regeneration increased 400 percent from 1989-2004.

***Bird Harassment Program:*** The Division has been monitoring gulls and other water birds since the early 1990s. Water quality sampling determined that roosting gulls in the vicinity of each reservoir intake structure were responsible for increased fecal coliform levels. In response, the Division has been actively harassing gulls since 1992 using boats, pyrotechnics, netting, distress tapes, and passive scare devices. The program has been very effective in moving roosting birds away from intakes and maintaining fecal coliform levels below the required threshold. The program runs year-round, though the most active harassment period is during the fall and winter.

### **Guiding Principles**

A tremendous amount of research has been conducted on wildlife's effect on water quality (see Land Management Plans). It is well documented that beaver and muskrat can carry, transmit, and amplify water-borne pathogens. In addition, gulls, geese, and waterfowl can act as host species for a variety of infectious pathogens. Further, high numbers of birds can contribute substantial amounts of fecal coliform into the water.

The landscape level effects of over-browsing white-tailed deer have also been well documented. Unmanaged herds can greatly alter the composition and abundance of understory vegetation and actually shift successional pathways away from preferred tree species to other types of vegetation (ferns, invasives, etc.). Regulated hunting is often used to manage deer populations at levels that allow for tree regeneration to successfully happen.

### **Goals for the Next Five Years**

Most existing wildlife management programs will continue into the future without major modifications. The Aquatic Wildlife Pathogen Control Zone, Deer Management Program, Bird Harassment Program, and Goose Population Program will continue for the next five years. In addition, other goals for the next five years include:

- Continue to implement bird controls at both reservoirs to ensure compliance with source water fecal coliform criteria. Initiate and complete a comprehensive study on the movements, behavior, and feeding patterns of ring-billed, herring, and great black-back gulls in central Massachusetts.
- Initiate and continue to study the browsing impacts of moose on forest regeneration.

- Initiate a random fecal sampling program for gulls and geese to test for pathogens.
- Continue the White-tailed deer management program. Transition the application procedure into an online application.
- Follow legislation related to moose management; provide testimony when necessary.
- Continue to implement the aquatic wildlife pathogen control zone at both reservoirs.
- Monitor landfills for gulls; work cooperatively with landfills to ensure adequate harassment.

## **5.5 Public Access Management**

The Public Access Management Program guides and controls public access and use of DWSP lands.

### **Reference Reports and Materials**

- *Quabbin Public Access Management Plan Update 2006*
- *Ware River Public Access Plan Update 2000*
- *Wachusett Public Access Plan Update 2003*
- *Sudbury Public Access Plan Update 2002*
- 350 CMR 11.09(2)

### **Why This Is A Watershed Control Program**

Human activity on or near water supply source waters can introduce disease-causing agents to the water supply. Water supply managers must develop policies to control public access and recreation on water supply lands. Since the reservoirs and the DWSP lands surrounding them are valuable environmental resources of the Commonwealth that are attractive to watershed residents and the general public, it is not feasible or desirable to ban all access by the public. Therefore, Public Access Management is necessary to allow some public access and still provide adequate water supply safety and security. DCR regulations 350 CMR 11.09 provides general conditions for water supply protection.

### **Accomplishments**

DWSP has comprehensive Public Access Plans for each of the four watersheds. These plans guide activities in the watersheds and are updated regularly. Watershed Rangers provide an effective and consistent official presence to visitors. Information signs for visitors were updated and improved, and education and outreach efforts to visitors have increased. Communication and cooperation with state and local police is ongoing and aids in protection of the reservoirs and watershed lands.

### **Guiding Principles**

Public access to Division properties is controlled to protect the public drinking water supply and is monitored to ensure that it is consistent with all applicable regulations. Existing authorized

activities will be periodically evaluated to ensure that they are consistent with water supply protection. Any proposals to change or create new recreational activities will be considered only when the proposed activity does not conflict with ongoing watershed management activities. The activity cannot degrade water quality, wilderness character, natural resources, or historic sites.

### **Goals for the Next Five Years**

It is anticipated that there will be continued interest by the public to increase access to Division lands. The Division will need to respond to these requests and determine if proposed activities are consistent with watershed protection principles. The Division will evaluate the need to increase Watershed Ranger Patrols in the Ware River watershed.

- Continue to implement the Public Access Management Plans.
- Update the *Ware River Public Access Management Plan*.
- Update the *Wachusett Public Access Management Plan*.
- Update the *Sudbury Public Access Management Plan*.
- Develop and distribute training materials for staff and local and state police.

## ***5.6 Watershed Security***

Watershed Security Programs provide surveillance of the watershed for potential threats to the system.

### **Reference Reports and Materials**

- Quabbin Watershed Ranger Plan
- MWRA Vulnerability Assessment

### **Why This Is A Watershed Control Program**

The events of September 11, 2001 have heightened concerns regarding security and the need to protect public works from possible terrorist action. The probability of intentional contamination of a drinking water supply is relatively low; however, it is possible to contaminate a portion of a drinking water system, resulting in adverse public health consequences. In addition, water suppliers need to be able to respond to any indication that contamination of the drinking water supply may have occurred. The Division must be able to evaluate the credibility of any contamination threat and identify appropriate response actions in a very short period of time

### **Accomplishments**

Watershed Rangers provide a visible presence and are available to monitor for and respond to suspicious activities. Security has been enhanced at key locations throughout the watershed and in DWSP facilities. Communication and coordination with MWRA has been enhanced. Incident

Command System (ICS) training has been provided to key staff. There is ongoing communication and coordination with local Emergency Responders. MWRA has prepared a vulnerability assessment, per EPA requirements.

### **Guiding Principles**

DWSP coordinates with MWRA on all security issues, in order to maintain comprehensive, system-wide approach. DWSP works cooperatively with local, state and federal responders. In the case of an emergency, DWSP will use ICS to develop and carry out a response.

### **Goals for the Next Five Years**

- Continue to coordinate with MWRA on all security issues, in order to maintain comprehensive, system-wide approach.
- Continue to work with local, state and federal responders.
- Continue to use Incident Command System (ICS) to respond to emergency situations. Provide adequate training on ICS to essential staff.
- Prepare Quabbin/Ware River Emergency Response Manual.

## ***5.7 Infrastructure***

This program maintains dams and buildings owned by the Division, and determines operating policies for the system. Hydroelectric power is generated at two locations within the system.

### **Reference Reports and Materials**

- *Quabbin Culvert Study 2007*
- *MWRA Emergency Action Plan for the Wachusett Reservoir Dam* Revised Dec. 2006
- *MWRA Emergency Action Plan for the Sudbury Reservoir Dam* Revised Dec. 2006
- Building Inspection Report
- Multiple Dam and Facility Inspection Reports
- Executive Order No. 484: *Leading by Example – Clean Energy and Efficient Buildings*

### **Why This Is A Watershed Control Program**

The watershed infrastructure must be maintained in order to provide water and to ensure public safety, and all regulations which apply to the operation and management of the system must be met. Yield, water quality, public safety, and generation of hydroelectricity must all be considered when making operating decisions. Buildings owned by the Division must comply with the Americans with Disabilities Act (ADA) Accessibility for Buildings Guidelines.

### **Accomplishments**

DWSP manages and maintains 60 small dams, 14 bridges, and 65 separate facilities ranging from administrative offices to maintenance garages and storage sheds throughout the watershed system.

### **Guiding Principles**

DCR will optimize delivery of high quality water for drinking water supply, while ensuring adequate volume in storage to respond to fluctuations in precipitation and demand, meeting downstream minimum flow release requirements, and preventing violation of minimum pool reservoir stage limitations. DWSP maximizes rainfall capture while minimizing spillage and controlling downstream flooding. DCR generates hydropower, when the system allows.

### **Goals for the Next Five Years**

- Continue to participate in Reservoir Operations Working Group which meets four times per year.
- Work with MWRA to complete periodic and as-needed updates of the Emergency Action Plans for Wachusett and Quabbin.
- Evaluate feasibility of removing unsafe or unnecessary small dams in the watersheds.
- Assess infrastructure and need for funds and mechanism to make needed repairs.

## ***5.8 Watershed Protection Act***

The Watershed Protection Act (WsPA) is a 1992 law passed by the Commonwealth to protect the sources of water to the Quabbin Reservoir, Ware River, and Wachusett Reservoir. The Act established restrictions on certain land uses in sensitive areas of these watersheds in order to protect water quality. See Figures IIA-10, IIB-16, and IIC-11 for WsPA protection zones in each watershed.

### **Reference Reports and Materials**

- Watershed Protection Act, Chapter 36 of the Acts of 1992
- Watershed Protection Regulations, 350 CMR 11.00-11.08

### **Why This Is A Watershed Control Program**

With the passage of the SWTR, there was growing concern regarding impact of land use on water quality. Both state and federal regulators recommended adoption of land use regulations for watershed areas not controlled by ownership or other agreements.

## **Accomplishments**

The Watershed Protection Act was the first protective legislation established for a water supply after promulgation of the SDWAA in 1982. It established additional protection for critical watershed areas.

## **Guiding Principles**

The goal of WsPA is to promote improved site designs in order to protect water quality, not to prevent development. Division staff works with landowners to develop projects that comply with WsPA regulations (see Table I-15). Outreach and education are important for land owners and town officials in order to find common areas of concern about the effects of development on water quality and ways to mitigate these impacts. Many other environmental regulations place limitations on land use and development, including the Wetlands Protection Act, the Rivers Protection Act, Stormwater Regulations, and Title 5. For this reason, it is very important to coordinate WsPA implementation with other environmental reviews.

**Table I-15: Watershed Protection Act Affected Areas**

<b>Watershed</b>	<b>Number of Affected Parcels</b>	<b>Acreage Affected by WsPA</b>			<b>Percent of Watershed Land Area</b>
		<b>Primary Protection Zone</b>	<b>Secondary Protection Zone</b>	<b>Total</b>	
Wachusett Reservoir	4,903	5,725	6,580	12,305	17.4%
Ware River	2,221	3,548	4,265	7,813	12.7%
Quabbin Reservoir	1,260	3,628	4,008	7,636	8.0%
Total	8,384	12,901	14,853	27,754	12.2%

Source: DCR

## **Goals for the Next Five Years**

As prime sites are no longer available for construction, there is increasing pressure to develop marginally developable land. These properties pose greater risks to water quality from both short-term site development impacts and long-term land use alterations.

- Continue to implement the Act.
- Evaluate the overlap of WsPA and other environmental regulations; develop methods for better coordination.
- Update parcel maps for all watershed towns.
- Work with DWSP Office of General Counsel to complete regulation revisions.

## ***5.9 Technical Assistance and Community Outreach***

DWSP staff provides assistance to local boards through project review, assistance with studies, development of local regulations, and training.

### **Reference Reports and Materials**

Watershed Protection Act, Chapter 36 of the Acts of 1992, §15

### **Why This is a Watershed Control Program**

The Commonwealth of Massachusetts has delegated significant authority for many environmental regulations to municipal governments. Municipal boards also have considerable authority over land use and development. There is a tremendous workload for implementing these regulations, including the knowledge to interpret and administer the regulations. Many boards rely largely, or entirely, upon volunteers to perform these functions. DWSP technical assistance program seeks to help the boards administer these regulations and maximize their compliance, thus increasing protection of shared resources. In addition, the Watershed Protection Act directed the agency to “provide a program for technical assistance to communities impacted by this act” that includes, but is not limited to, “planning studies, and zoning bylaw studies, health bylaw studies and subdivision by-law studies”

### **Accomplishments**

DWSP historically maintained contact with local boards, through the review of major development proposals, construction site inspections, and other situations pertaining to compliance with state and federal regulations. Through these efforts, the agency helped address a range of water supply pollutants, such as contamination from failed septic systems, sedimentation from construction, road drainage, and stormwater runoff. DCR’s involvement in local planning and environmental issues was greatly expanded with the passage of the WsPA in 1992 (see Section 5.8). A wide-range of assistance has been provided to watershed communities over the past fifteen years, including: providing continual technical support for reviewing complicated projects, sponsoring training opportunities, supporting innovative bylaw proposals, and funding the development of open space and master plans.

### **Guiding Principles**

DWSP utilizes technical assistance to foster relationships with watershed communities by working cooperatively, upon request by local boards, on projects of mutual concern. DWSP supports local implementation of state environmental regulations through training, project review, and professional services (including GIS mapping, environmental engineering, and planning).

### **Goals for the Next Five Years**

- Assess the interest and needs of towns for Technical Assistance.
- Develop and implement a strategy for addressing needs appropriately met by DWSP.

## ***5.10 Interpretive Services***

The Interpretive Services Program provides public education for students, local residents and visitors on importance of watershed protection.

### **Reference Reports and Materials**

- *Interpretation and Visitor Services Plan for Quabbin Reservoir*, 1989
- MGL c. 92 ½, §2

### **Why This Is A Watershed Control Program**

Educational programs are an effective way to protect watershed resources over the long term by instilling a better understanding and appreciation of stewardship of natural resources. Many water suppliers incorporate interpretive services into their watershed protection programs to enhance their measure of water quality and resource protection. Legislation requires the Division to “maintain a visitors’ informational center at the Quabbin reservation.”

### **Accomplishments**

DWSP has an established program of public education. Education is provided through school programs, interpretive programs on DWSP properties, Watershed Ranger contact with visitors, and the biannual *Downstream* newsletter. The Quabbin Visitor’s Center is open seven days a week on a year-round basis, with the exception of the Thanksgiving, Christmas, and New Years holidays, and the weekend between Christmas and New Years. The Center features exhibits, brochures, books, and videos about Quabbin Reservoir management and history.

### **Guiding Principles**

Educate visitors and watershed residents about watershed protection and environmental stewardship.

### **Goals for the Next Five Years**

- Develop Interpretive Service Plan for Ware River, Wachusett Reservoir, and Sudbury Reservoir watersheds.
- Update *Interpretation and Visitor Services Plan for Quabbin Reservoir*
- Develop materials and programs on Climate Change.

### ***5.11 Water Quality Monitoring***

DWSP has a comprehensive water quality monitoring program that is used to screen for potential pollutants, to measure the effectiveness of watershed management programs, to better understand the responses of the reservoir to a variety of physical, chemical, and biological inputs, and to assess the ecological health of the reservoir and the watershed. DWSP monitoring is entirely for internal assessment purposes. All system monitoring for compliance with SDWA is done by the MWRA, and is not discussed in this report.

#### **Reference Reports and Materials**

- Quabbin Reservoir/Ware River Annual Water Quality Reports, 1989 - 2007
- Wachusett Reservoir Annual Water Quality Reports, 1989 – 2007
- Wachusett Reservoir Ten Year Water Quality Summary

#### **Why This Is A Watershed Control Program**

Water quality sampling and watershed monitoring make up an important part of the overall mission of the Division. Water quality sampling and field inspections help identify tributaries with water quality problems, aid in the implementation of the Division's watershed protection plan, and ensure compliance with state and federal water quality criteria for public drinking water supply sources. Bacterial monitoring of tributaries provides an indication of sanitary quality and helps to protect public health. The Division also samples to better understand the responses of the tributaries to a variety of physical, chemical, and biological inputs, and to assess the ecological health of the watershed.

#### **Accomplishments**

DWSP and its predecessor agencies have conducted intensive water quality sampling throughout the history of this system. An extensive monitoring system is in place in the active system for tributary and reservoir sampling. DWSP staff collects water quality samples and provides analysis for physical and biological parameters. All bacteriological and chemical analyses are performed by MWRA at the Quabbin, Southborough, and Deer Island Laboratories.

***Quabbin Reservoir/Ware River Watersheds:*** 27 surface water monitoring stations were routinely monitored in 2006 (see Figures IIA-11 and IIB-9). These include all major tributary inflows to Quabbin Reservoir, most minor tributaries flowing to the Quabbin Reservoir or Ware River, and selected locations within the Quabbin Reservoir. Of the 27 monitoring stations, 14 stations were located within the Quabbin Reservoir watershed, and 10 tributary stations were located in the Ware River watershed to characterize this supplemental source water supply. The remaining three sampling stations are located within the reservoir. The reservoir stations are monitored monthly during the months of April through December, with samples collected from several depths at each location.

***Wachusett Reservoir Watershed:*** Environmental Quality staff collected routine water quality samples from 54 stations on thirty tributaries and from three stations on the reservoir during

2006 (see Figure IIC-12). Additional stations were sampled occasionally to support special studies or potential enforcement actions. Each tributary station was visited weekly throughout the entire year, as long as there was adequate flow. Temperature, dissolved oxygen, pH, and conductivity profiles were measured weekly in the reservoir in conjunction with routine plankton monitoring, and quarterly at two additional reservoir stations. Bacteria sampling was conducted once, twice, or four times per month at twenty-three reservoir locations to document the relationship between seasonal bacteria variations and roosting populations of gulls and geese on the reservoir as well as the impact of harassment on birds and bacteria concentrations.

***Sudbury Reservoir Watershed:*** DWSP does not currently monitor water quality in the Sudbury watershed. MWRA does conduct sampling as part of the Emergency Reservoirs Management Plan to monitor baseline water quality. The Division will coordinate with MWRA to establish a DCR monitoring program for both the Sudbury and Foss Reservoirs. DCR has conducted seasonal macrophyte investigations and will continue to conduct these studies. The Division will evaluate the need for tributary water quality monitoring.

### **Guiding Principles**

All of DWSP's efforts are concerned with maintaining or improving water quality; the water quality program thus supports other DWSP programs. EQ staff develops and implements water quality monitoring programs to help assess impacts to water quality. In some cases, water quality impacts may not be apparent due to limitations in methodology or due to extended time periods for impacts to become discernable. DWSP continually reviews its sampling programs to meet changing priorities and public health concerns, as well as to incorporate newly developed analytical methods and updated regulatory requirements. All monitoring programs are developed and executed in coordination with MWRA. To further this cooperation, DWSP and MWRA staff hold quarterly Water Quality Sampling and Analysis Team (WQSAT) meetings.

### **Goals for the Next Five Years**

- Continue water quality monitoring program.
- Develop and implement a water quality monitoring program for Sudbury Reservoir.
- Improve tributary flow (quantity) monitoring.
- Conduct additional stormwater sampling to better quantify stormwater loads.
- Consider monitoring for emerging contaminants.

## ***5.12 Environmental Quality Assessments***

Environmental Quality Assessments (EQA), which have also been called Sanitary Surveys, are comprehensive evaluations of threats to water quality and compliance with state regulations. The assessments incorporate field inspections, water quality data review, and records review. EQAs are conducted on sub-districts of the Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds.

## **Reference Reports and Materials**

### *Quabbin Reservoir Watershed:*

- Quabbin Northwest Sanitary District, Environmental Quality Assessment Report - 2000, 2006, 2007
- Fever Brook Sanitary District, Environmental Quality Assessment Report – 2003
- East Branch Swift River Sanitary District, Environmental Quality Assessment Report – 2003
- Quabbin Reservation Sanitary District, Environmental Quality Assessment Report - 2003, 2005, 2007

### *Ware River Watershed:*

- Burnshirt, Canestro & Natty Sanitary District, Environmental Quality Assessment Report – 1992
- Coldbrook & Longmeadow Sanitary District, Environmental Quality Assessment Report – 1992, 1994, 2007
- East Branch Ware River Sanitary District, Environmental Quality Assessment Report – 1994
- West Branch Ware River Sanitary District, Environmental Quality Assessment Report – 2000, 2008

### *Wachusett Reservoir Watershed:*

- Reservoir District Environmental Quality Assessment Report – 2008
- Worcester District Environmental Quality Assessment Report – 2006
- Stillwater District Environmental Quality Assessment Report – 2006
- Quinapoxet District Environmental Quality Assessment Report – 2004
- Thomas Basin Environmental Quality Assessment Report – 2003

## **Why This Is A Watershed Control Program**

It is essential that all waste sources be located and controlled in order to protect the water supply. The EQA provides a systematic method to conduct this process.

## **Accomplishments**

The Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds have been subdivided into smaller districts based on watershed hydrology to facilitate comprehensive assessment of potential threats. Assessments and summary reports have been prepared for four sanitary districts (which have been further divided into 12 sub-districts) in the Quabbin Watershed, four sanitary districts (which have been further subdivided into sixteen sub-districts) in the Ware River Watershed, and five districts in the Wachusett Watershed (see Figure IIA-11, Figure IIB-9, and Figure IIC-4 in accompanying watershed specific Volumes). A rotating schedule was developed to complete a detailed investigation of the entire Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds on a periodic basis. The Division's goal is to comprehensively evaluate each district once every five years; some districts are currently behind schedule.

## **Guiding Principles**

Watershed management staff have historically conducted sanitary surveys of the watershed. A 1938 Metropolitan Water District report described a Sanitary Survey of a watershed as follows: “A Sanitary Survey is primarily a determination of the amount and distribution of the waste products deposited on its surface or in its streams resulting from its occupancy by human agencies together with a determination of the effects of this waste disposal upon the character of the water draining from the watershed.” (House No. 262, Appendix B, Results of a Sanitary Survey of the Watershed Areas of the Metropolitan Water District, 1938.)

The Sanitary Survey program was re-instituted in the late 1980s with the creation of the Environmental Quality Section within the Division of Watershed Management. The Sanitary Surveys included field inspections, compilation of water quality data, review of environmental records, resource inventory, threat inventories, and, where needed, recommendations for corrective actions. The Sanitary Surveys were re-named in 1999 to Environmental Quality Assessments in order to minimize confusion between the DWSP program and a DEP program (DEP is required to conduct annual sanitary surveys of all water supplies).

The “modern” Sanitary Surveys preceded the development and implementation of Watershed Protection Plans, the first of which were published in 1991. There is much in common with the Sanitary Survey process and Watershed Protection approach. Sanitary Surveys/EQAs are an important component of the current Watershed Protection Program.

There are five protection programs that are encompassed by the Environmental Quality Assessments in this Watershed Protection Plan. They are listed below and discussed in more detail in sections 4.12.1 through 4.12.5:

1. Compliance with Environmental Regulation
2. Wastewater Management
3. Stormwater Management
4. Agriculture
5. Hazardous Materials and Waste.

## **Goals for the Next Five Years**

- Maintain multi-year cycle/rotation for completion of Environmental Quality Assessments.
- Complete EQAs that are behind schedule.
- Allocate greater resources to implement recommendations from completed EQAs and oversee, as necessary, remedial actions. Coordinate with DEP, local boards, and Office of General Counsel for compliance and enforcement issues.

### **5.12.1 Compliance with all Applicable Environmental Regulations**

DWSP's inspections, surveillance, and scientific data assessments seek out potential water quality threats. Once identified, corrective actions are pursued utilizing the legal support of all applicable environmental laws. DWSP relies on its own specific watershed protection regulations (350 CMR 11.00; see Appendix A) as well as a wide array of federal and state regulations to promote private land owners' responsibility for environmental and public health protection. DWSP works with the appropriate local, state, and/or federal government agency(ies) to enforce these laws.

#### **Reference Reports and Materials**

- Environmental Regulations summarized in Table I-16

#### **Why This Is A Watershed Control Program**

Section 11.09 of DWSP regulations states that no person shall engage in any activity which could degrade the quality of the Waters of the Watershed System. This regulation is very broad and, therefore, difficult to use as a basis for enforcement when pollution is documented. DWSP, however, can use federal, state and local regulations in cooperation with the corresponding authorities to require actions by responsible parties when conditions that pollute watershed resources are found.

#### **Accomplishments**

DWSP staff has worked with the US EPA, the Massachusetts DEP, and local boards and commissions to correct situations where pollution has entered watershed tributaries. Results have included both environmental remediation and fines.

#### **Goals for the Next Five Years**

Enforcement of environmental regulations' violations can require significant staff time, as well as support from DCR Office of General Counsel. Working with other agencies can be complicated due to procedural and administrative issues. Environmental regulations are complex; it is very difficult to interpret, and enforce, laws with overlapping jurisdiction, like those related to stormwater control.

- Use site inspections, environmental quality assessments, local board meetings, and information from Watershed Rangers to identify possible violations of state and federal regulations.
- Enforce the DWSP Watershed Protection regulations found in 350 CMR 11.00.
- Coordinate, as necessary, with DWSP Office of General Counsel, DEP, EPA, and other agencies, to promote compliance with 350 CMR 11.09 and other environmental regulations.
- Develop internal group to coordinate for consistency on interpretation of regulations and decisions regarding enforcement.
- Set up/re-instate formal coordination/cooperation process with DEP.
- Review the DWSP review process for herbicide treatment of Rights-of-Way.

**Table I-16: Environmental Regulations Employed in Watershed Protection Activities**

<b>Regulation</b>	<b>Authority</b>	<b>Issue</b>	<b>Relevance</b>
350 CMR 11.01-08	DWSP	Watershed Protection	Provisions of the Watershed Protection Act; establishes protective buffers around resource areas.
350 CMR 11.09	DWSP	Watershed Protection	Prohibits any action which could degrade the Waters of the Watershed System or interfere with their use as a source of water supply.
310 CMR 15.00 “Title 5”	DEP <i>Administered locally by board of health</i>	Subsurface Sewage Disposal	Regulates siting, design, and inspection of on-site systems.
310 CMR 10.00	DEP <i>Administered locally by conservation commission</i>	Wetlands	Restricts alteration and/or filling of wetlands; requires review of all projects within 100 feet of wetlands or within floodplains.
310 CMR 13.00	DEP <i>Administered locally by conservation commission</i>	Rivers Protection Act	Establishes protected wetland resource area – riverfront.
310 CMR 22.00	DEP	MA Drinking Water Regulations	State-wide regulations for all drinking water supplies.
40 CFR Parts 9, 122, 123 and 124	EPA <i>Administered by DEP</i>	Stormwater Phase II	Replaces/augments DEP Stormwater Management Policy; part of NPDES program.
310 CMR 40.0000 “21E”	DEP	Hazardous Waste Site Cleanup (Mass Contingency Plan)	Establishes a process for prioritization, investigation, and cleanup of hazardous materials releases.
310 CMR 40.0000	DEP	Underground Storage Tanks	Regulates design and construction of new or replacement tanks.
527 CMR 4.00 & 9.00	DFS, local fire department	Underground Storage Tanks	Regulates removal, installation and maintenance of USTs.
304 CMR 11.00	DWSP	Forest Cutting Practices Act	Regulates how forests are managed.
301 CMR 11.00 “MEPA”	EEA	Massachusetts Environmental Policy Act	Requires comprehensive environmental assessment and public review of major projects.
333 CMR 11.00	DAR	Pesticide Regulations	Restricts type and location of pesticides; requires filing of 5-year Vegetative Management Plans and annual Yearly Operating Plans.

### **5.12.2 Wastewater Management**

DWSP staff work with local and state regulators to ensure compliance with all applicable regulations to ensure wastewater is handled safely at all locations within the watershed. In Quabbin Reservoir and Ware River watersheds, all wastewater is treated with on-site systems. The Wachusett Reservoir and Sudbury Reservoir watersheds have areas that are sewered as well as areas served by on-site systems.

#### **Reference Reports and Materials**

- Rutland-Holden Trunk Sewer Legislation, including: Chapter 262, Acts of 1932; Chapters 460 and 501, Acts of 1938; Chapters 286 & 287, Acts of 1939
- DCR/MWRA Memorandum of Understanding
- Holden and West Boylston construction/expansion legislation and appropriations, including Chapter 15, Acts of 1996, Section 2420-7961 and FY99 supplemental appropriations for and relative to certain capital spending and bonded debt of the Commonwealth, Section 1599-4994
- DWSP monthly sewer flow reports to communities and Upper Blackstone Water Pollution Control Facility (UBWPCF)
- 310 CMR 15.00 (“Title 5”)

#### **Why This Is A Watershed Control Program**

Improper disposal of wastewater is a serious threat to any water supply, due to potential for contamination by pathogens.

#### **Accomplishments**

Problems in areas of the Wachusett Reservoir watershed, due to unsuitability for on-site septic systems, have been corrected with \$83 million construction of sewers. DEP has strengthened requirements for on-site wastewater, providing greater protection for water resources.

#### **Guiding Principles**

Any incident that could result in release of untreated waste to a water resource must be considered highest priority for action by DWSP staff.

#### **Goals for the Next Five Years**

- Review local records, water quality data, and other pertinent information in conducting Environmental Quality Assessments to identify potential problem sites or areas.
- Continue to monitor and enforce the provisions of Title 5, working with local boards of health and DEP.
- Provide technical assistance, upon request, to towns and/or neighborhood associations regarding on-site wastewater management issues.
- Continue to inventory on-site systems.
- Track connections to new sewer lines.

- Manage with MWRA the Rutland-Holden trunk sewer and Rutland Holden Relief trunk sewer. Prepare quarterly bills for user communities; pursue sewer agreements with Holden and Rutland.
- Review Operation & Maintenance plans for sewer pump stations.

### **5.12.3 Stormwater Management**

Stormwater carries pollutants from many different sources to watershed tributaries and reservoirs. The DWSP Stormwater Program develops and implements strategies to reduce pollutant loads from stormwater.

#### **Reference Reports and Materials**

- *Quabbin Culvert Report* (DCR, 2007)
- *Wachusett Reservoir Direct Discharge Report* (DCR, 2008)
- *Wachusett Stormwater Study* (Camp Dresser McKee, 1999)
- *Massachusetts Stormwater Handbook* (DEP, 2008)

#### **Why This Is A Watershed Control Program**

Water quality testing shows that pollutant concentrations increase dramatically during storm events, and significant portions of annual loads are contributed during storm events. DWSP has two avenues for implementing stormwater controls:

- Work with appropriate agencies to increase compliance with stormwater regulations, including Federal NPDES stormwater requirements and Massachusetts Stormwater Standards.
- Design and construct Stormwater Best Management Practices (BMPs) on DWSP lands.

#### **Accomplishments**

DWSP staff has worked with state and federal agencies for compliance with stormwater regulations. Joint enforcement action has been taken against sites with serious violations. Stormwater BMPs have been constructed on DWSP properties.

#### **Guiding Principles**

DWSP works to obtain compliance with stormwater regulations for all construction and development in the watershed. Stormwater BMPs are implemented, wherever possible, on DWSP properties to improve water quality and to serve as example of good construction practices. DWSP considers construction of stormwater treatment devices in sub-watersheds impacted by stormwater pollution.

### **Goals for the Next Five Years**

There are overlapping interests and jurisdiction for federal, state and local regulations. This complexity can make coordination and implementation challenging for DWSP staff and compliance burdensome for regulated parties.

- Continue to work with DEP and EPA for compliance with NPDES stormwater permitting requirements in the Active watersheds.
- Work with DEP and local conservations commissions to implement DEP Stormwater Management Standards in all projects subject to the regulation.
- Maintain maps of major conveyance structures in key areas of the active watersheds.
- Implement additional measures to treat or remove discharges from drainage in key areas of the watershed system.
- Construct state-of-the-art BMPs on DWSP property for stormwater treatment and provide training for local DPWs, conservation commissions, etc.
- Update percent impervious figures in active watersheds; assess correlation to tributary water quality in selected sub-watersheds.

#### **5.12.4 Agriculture**

Agriculture, for the purposes of watershed assessments, covers a broad range of activities, from farms with more than 100 animals to a property owner with one or two horses or other animals in their backyard. Agriculture also includes crops. The program maintains an ongoing inventory of locations with agriculture in proximity to water resources. DWSP staff work with property owners to develop BMPs when necessary.

### **Reference Reports and Materials**

- DWSP Agriculture Sites Inventory/Database
- 350 CMR 11.09(1)(b)2 – Watershed Protection regulations
- 310 CMR 22.20B(4) – MA State Drinking Water regulations

### **Why This Is A Watershed Control Program**

Even a few animals in close proximity to a stream can cause serious water quality problems for unfiltered surface water supplies.

### **Accomplishments**

Staff established an inventory of all operations in Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds. DWSP has worked with land owners and the USDA Natural Resource Conservation Service to install agricultural BMPs at several sites.

### **Guiding Principles**

The majority of agricultural sites in the watershed system are small-scale operations. DWSP staff try to work cooperatively with land owners to find solutions that allow animal keeping while protecting water resources. Establishing buffers, of at least 100 feet whenever possible, is the primary means of protection.

### **Goals for the Next Five Years**

- Monitor agricultural impacts to water quality; if impacts occur, contact agricultural land owner to rectify situation.
- Maintain inventory of small “hobby farms” that contain just a few animals, primarily horses, as well as other sites where animals are kept in a manner that may impact water quality. Develop and implement strategies to control impacts from horse keeping on small lots.
- Assess opportunities to educate landowners on animal management techniques that protect water quality. Coordinate with EEA, DAR, DEP, and other agencies to develop outreach materials that promote water quality protection.

### **5.12.5 Hazardous Materials and Waste**

DWSP monitors local and state databases for sites with hazardous materials and hazardous wastes (see Section 4.1.4 for definitions of hazardous materials). Staff verify that facilities are in compliance with all applicable regulations.

### **Reference Reports and Materials**

- DEP website databases
- Federal Resource Conservation and Recovery Act (RCRA) data

### **Why This Is A Watershed Control Program**

Maximum protection for potential hazardous material impacts to water quality is provided by ensuring that all sites are in compliance with applicable federal and state regulations. Maintaining an inventory of other agency databases supports DWSP’s emergency planning efforts.

### **Accomplishments**

DWSP continually reviews federal and state databases of underground and aboveground storage tanks (USTs/ASTs), hazardous materials generators, and release sites.

### **Guiding Principles**

Hazardous materials and wastes are well regulated by federal and state statutes. The most significant risk they pose is in the case of an accidental release, which is addressed in Section 5.13.

### **Goals for the Next Five Years**

- Monitor the DEP hazardous materials generators and release databases and inspect, as appropriate, sites within the watersheds.
- Investigate contaminated sites and hazardous waste generators through coordination with DEP's Bureau of Waste Site Cleanup and the EQA process.
- Update inventory of USTs and above-ground tanks in the watersheds. Evaluate need for outreach/public education, especially for schools and other municipal buildings.
- Review periodic reports on closed landfills in the watersheds.

### ***5.13 Emergency Response***

DWSP has developed emergency response capabilities to support local responders, such as fire and police departments. Components of this program include Incident Command training, responder training, purchase and staging of equipment, and mathematical modeling of potential spill scenarios.

### **Reference Reports and Materials**

- *Wachusett and Sudbury Reservoir and Watershed Emergency Spill Response/Prevention Plan, 2008*
- Emergency Action Plans for Quabbin Reservoir, Wachusett Reservoir, and Sudbury Reservoir (maintained by MWRA)

### **Why This Is A Watershed Control Program**

Release of chemicals and other products within the watersheds' transportation corridors is a potential threat to water quality. Should such an event occur, prompt response that recognizes the importance of the tributaries and reservoirs can minimize any impact to the water supply.

### **Accomplishments**

DWSP, working with MWRA, has deployed Emergency Response trailers in key areas throughout the watershed. Annual training has been conducted for DWSP staff in spill response, boom deployment, and Incident Command System. The training has been successful, as exemplified by DWSP's quick reaction to an accident and minor spill at the southern end of the Wachusett Reservoir. Response time was excellent, preventing any impact to the reservoir. Mathematical modeling of the reservoir, in conjunction with University of Massachusetts, Amherst, Department of Civil and Environmental Engineering, has been conducted to evaluate

spill scenarios. MWRA is currently working with a consultant to collect hydrodynamic data that will be used to refine these assessments.

### **Guiding Principles**

The role of DWSP staff is to assist local emergency responders should a release occur. DWSP staff provide expertise regarding the hydrologic characteristics of the reservoir and its tributaries, on-water spill control, and specialized equipment for reservoir response.

### **Goals for the Next Five Years**

- Provide emergency response support services; maintain response supplies and up-to-date contact lists.
- Maintain internal Emergency Response coordination committee with MWRA to provide emergency response and/or Incident Command System (ICS) training to staff and appropriate local emergency officials.
- Participate in a mock hazardous materials release for training purposes.
- Identify staff that need ICS 200 and 300 training, and provide for them.
- Plan and run annual tabletop or field exercises.
- Construct structural controls to reduce likelihood of spills reaching key areas of the reservoirs.
- Develop Quabbin/Ware Emergency Spill Response/Prevention Plan.

## ***5.14 Quabbin, Ware, Wachusett, and Sudbury Control Programs***

In this Section, Watershed Protection Programs have been described and tasks to implement the protection programs have been developed. The control programs provide a comprehensive approach to protecting the water supply. Table I-17 summarizes the potential sources of pollution and the programs most effective in dealing with them. This table demonstrates that DCR has developed multiple control programs for contamination threats.

**Table I-17: Potential Contaminant Sources and Watershed Control Programs**

Source	Control Program or Measure												
	Land Procurement	Land Preservation	Land Management	Wildlife Management	Public Access Management	Watershed Security	Infrastructure	Watershed Protection Act	Technical Assistance & Community Outreach	Interpretive Services	Water Quality Monitoring	Environmental Quality Assessment	Emergency Response
Wildlife			●	●	●						●	●	
Public Access/ Recreation			●	●	●	●	●			●	●	●	
Timber Harvesting			●				●				●	●	●
Wastewater	●	●						●		●	●	●	
Roadways/ Railways/ ROWs											●	●	●
Agriculture	●	●						●	●		●	●	
Construction	●	●						●	●	●	●	●	
Commercial, Industrial, and Governmental Sites	●	●						●	●	●	●	●	●
Residential Sites	●	●						●	●	●	●	●	
Solid Waste Facilities	●	●						●		●	●	●	
Future Growth	●	●	●	●	●			●	●	●	●	●	
Climate Change	●	●									●	●	●

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## 6 Implementation

### 6.1 Organization and Management

DWSP OWM currently employs 155 full-time staff who perform a variety of duties in locations that range over 100 miles, from Boston west through the Wachusett Reservoir and Ware River watersheds out to the Quabbin Reservoir watershed. Staff includes engineers, planners, wildlife biologists, aquatic biologists, foresters, bacteriologists, rangers, education specialists, skilled tradesmen, administrative assistants, accountants, bookkeepers, laborers and other skilled positions. Seasonal staff are utilized to for additional support, primarily during summer months, for activities like the Quabbin Fishing Program. Table I-18 shows OWM’s organizational groups; Tables I-19 to I-21 provide detailed descriptions of staffing responsibilities by work section.

**Table I-18: DCR/DWSP Office of Watershed Management Organization**

<b>Section</b>		
<b>Division (see Table I-19)</b>	<b>Wachusett/Sudbury (see Table I-20)</b>	<b>Quabbin/Ware (see Table I-21)</b>
Management: Division Director; Natural Resources Section Director	Management: Regional Director; Assistant Regional Director	Management: Regional Director; Assistant Regional Director
Budget and Administrative Support	Administrative & Technical Support	Administrative & Technical Support
Program Coordination & Technical Support – GIS	GIS – Wachusett	
Natural Resources		
	Environmental Quality	Environmental Quality
Program Coordination & Technical Support – Environmental Planning		Environmental Planning
	Civil Engineering	Civil Engineering
	Forestry	Forestry
	Watershed Rangers	Watershed Rangers
	Interpretive Services	Interpretive Services
	Watershed Maintenance	Watershed Maintenance

**Table I-19: Office of Watershed Management Responsibilities and Staffing**

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Management – Director, Natural Resources Section Director	1.9	<ul style="list-style-type: none"> <li>• Supervise all OWM Staff (through Senior staff and direct supervision).</li> <li>• Develop program goals and objectives</li> <li>• Ensure program goals and objectives are met</li> <li>• Oversee interagency coordination with MWRA</li> <li>• Coordinate and support programs and policies with other DCR divisions, EEA and other EEA agencies, and watershed communities and stakeholders</li> <li>• Consult with Watershed Advisory Committees</li> </ul>
Budget and Administrative Support	5.8	<ul style="list-style-type: none"> <li>• Provide personnel and other human resources related support</li> <li>• Provide budget and finance support</li> <li>• Provide contract administration support</li> <li>• Provide office management</li> </ul>
Natural Resources	7.5	<ul style="list-style-type: none"> <li>• Develop and implement Land Management Plans and Forestry Management Plans</li> <li>• Coordinate Land Acquisition Program</li> <li>• Monitor and enforce against encroachments</li> <li>• Monitor and enforce Division’s Watershed Preservation Restrictions</li> <li>• Provide wildlife management and mitigation</li> <li>• Coordinate clean-up of environmental problems on DCR properties, including building demolition</li> <li>• Develop and distribute <i>Downstream</i> newsletter, Fact Sheets, and provide educational and outreach programming</li> <li>• Provide research and monitoring to support Natural Resource planning</li> <li>• Monitoring and manage land based invasive plants</li> </ul>
Program Coordination & Technical Support – Environmental Planning	1	<ul style="list-style-type: none"> <li>• Coordinate implementation of Watershed Protection Act (WsPA)</li> <li>• Assist in the development and implementation of Watershed Protection Plans, Public Access Plans, Land Management Plans and other associated plans, policies, and publications</li> <li>• Coordinate Community Technical Assistance Program</li> <li>• Support interagency coordination with MWRA</li> <li>• Coordinate PILOT program with MWRA, DOR and Watershed towns</li> <li>• Coordinate and support programs and policies with other DCR divisions, EEA and other EEA agencies</li> <li>• Coordinate DCR DWSP web site</li> </ul>
Program Coordination & Technical Support – GIS	1	<ul style="list-style-type: none"> <li>• Coordinate GIS for Office of Watershed Management</li> <li>• Capture, maintain, administrative Spatial Databases</li> <li>• Integrate Office’s GIS program within EEA system</li> <li>• Provide data analysis for Office of Watershed Management</li> <li>• Distribute maps and digital information to Watershed Partners</li> </ul>
<b>Total</b>	<b>17.2</b>	

Please note that a partial Full Time Equivalent (FTE) staffing number represents either a half-time position or part of the person’s work responsibilities are shared with other sections of DCR.

**Table I-20: Wachusett/Sudbury Section Responsibilities and Staffing**

Section	FY09 FTE	Primary Responsibilities
Management -- Regional Director and Assistant Regional Director	2	<ul style="list-style-type: none"> <li>• Supervise Staff assigned to Wachusett/Sudbury Section</li> <li>• Develop Program Goals and Objectives</li> <li>• Ensure Program Goals and Objectives are met</li> <li>• Ensure interagency coordination with MWRA (Reservoir Operations, Water Quality Testing, Consent Order Compliance and Reporting)</li> <li>• Coordinate/Support programs &amp; Policies with other DCR divisions</li> <li>• Coordinate/Support Programs &amp; Policies with EEA/EEA agencies</li> <li>• Coordinate/Support Programs &amp; Policies with watershed communities and stakeholders</li> <li>• Consult with Watershed Advisory Committees, Friends Groups</li> </ul>
Administrative Support	7	<ul style="list-style-type: none"> <li>• Maintain payroll, employment and other records</li> <li>• Provide budget, accounting and contract administration support</li> <li>• Assist Director in special projects, as needed</li> <li>• Provide contract administration and database management for forestry program</li> <li>• Integrate OWM GIS program, provide data analysis, maps and digital information</li> </ul>
Environmental Quality	11  1 seasonal	<ul style="list-style-type: none"> <li>• Conduct water quality monitoring in reservoirs &amp; tributaries</li> <li>• Conduct Environmental Quality Assessments</li> <li>• Identify pollution sources and develop mitigation measures</li> <li>• Provide technical assistance to local boards</li> <li>• Provide engineering review for projects submitted under WsPA</li> <li>• Implement activities outlined in Watershed Protection Plan</li> <li>• Operate Wachusett Bird Control Program</li> <li>• Assist in implementing Wachusett Access Plan recommendations</li> <li>• Provide assistance for Emergency Response</li> <li>• Monitor watershed hydrology using staff gages; administer USGS contract for continuous/real time gages</li> <li>• Ensure interagency coordination with MWRA (Reservoir Operations, Water Quality Testing, Consent Order Compliance and Reporting)</li> <li>• Coordinate/Support programs &amp; Policies with other DCR divisions</li> <li>• Coordinate/Support Programs &amp; Policies with EEA/EEA agencies</li> </ul>
Forestry	2  1 seasonal	<ul style="list-style-type: none"> <li>• Implement forest management plan, including planning, tree marking, timber sale preparation and supervision of logging operations.</li> <li>• Conduct regeneration surveys and continuous forest inventories (CFI) to provide data to help guide forest management operations</li> <li>• Conduct or participate in other watershed management activities (e.g. boundary maintenance, encroachment issues)</li> </ul>

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Civil Engineering	4	<ul style="list-style-type: none"> <li>• Collect, monitor, and maintain records on weather/precipitation, reservoir elevations, river discharges and releases, water transfers and watershed yield</li> <li>• Coordinate and maintain records of all surveying required to determine property lines and boundaries, investigate encroachments and maintain records of all agency owned lands including new acquisitions</li> <li>• Collect, monitor and maintain records on weather/precipitation, reservoir elevations, river discharges and releases, water transfers and watershed yield</li> <li>• Conduct Snow Survey and calculate runoff potential in Wachusett Watershed</li> <li>• Conduct monthly inspections of Wachusett Dam, Sudbury Dam and other dams in the Wachusett and Sudbury watersheds; take necessary Piezometer readings when appropriate and maintain records</li> <li>• Conduct inspections and maintain records on all buildings and bridges in the Wachusett and Sudbury Watersheds</li> </ul>
Watershed Rangers	9	<ul style="list-style-type: none"> <li>• Maintain a positive visual presence in watersheds</li> <li>• Observe activities on watershed lands &amp; waters</li> <li>• Ensure Rules Compliance through education/public interaction</li> <li>• Coordinate enforcement of watershed rules with State/Environmental Police</li> <li>• Assist with Emergency Response Planning and Preparedness</li> <li>• Provide Emergency Response and general Watershed Security</li> </ul>
Interpretive Services	2	<ul style="list-style-type: none"> <li>• Conduct Watershed System based school programs</li> <li>• Conduct Program at Stillwater Farm Interpretive Site</li> <li>• Conduct Environmental Education teacher training</li> </ul>
Watershed Maintenance	32 4 seasonals	<ul style="list-style-type: none"> <li>• Perform primary land and facility maintenance activities on all watershed lands and resources</li> <li>• Maintain physical security barriers around reservoir and watershed facilities</li> <li>• Control shoreline vegetation and maintain fire roads</li> <li>• Maintain and repair all division equipment (motor vehicles, trucks, boats and heavy equipment)</li> <li>• Perform in Gull Program</li> </ul>
<b>Total FTEs</b>	<b>69</b>	
<b>Total Seasonals</b>	<b>6</b>	

**Table I-21: Quabbin/Ware Section Responsibilities and Staffing**

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Management – Regional Director; Asst. Regional Director	2	<ul style="list-style-type: none"> <li>• Supervise staff assigned to Quabbin/Ware River Section and oversee hirings, training, and other personnel-related issues</li> <li>• Develop and implement program goals and objectives, annual work plans and budgets</li> <li>• Oversee policy and plan development and implementation</li> <li>• Oversee day-to-day operations in the Section and supervision of Watershed Maintenance staff</li> <li>• Ensure interagency coordination with MWRA (re: Reservoir Operations, Water Quality Testing, Consent Order Compliance and Reporting)</li> <li>• Coordinate/Support programs &amp; policies with other DCR divisions, EEA and other EEA agencies</li> <li>• Coordinate/Support programs, policies and/or technical assistance with watershed communities and stakeholders</li> <li>• Consult with Watershed Advisory Committees</li> <li>• Oversee fleet management and FAMIS system</li> <li>• Manage Union issues</li> </ul>
Administrative & Technical Support	6	<ul style="list-style-type: none"> <li>• Assist in preparation and oversee implementation of the various watershed management plans</li> <li>• Oversee the preparation of quarterly reports and annual work plans and budgets</li> <li>• Administer research access permit program</li> <li>• Manage revenues and provide accounting for forestry, cemetery, deer hunt, and fishing programs.</li> <li>• Provide contract administration and database management for forestry program</li> <li>• Provide administrative services for cemetery, including deed preparation, funeral scheduling, and marker/monument settings.</li> <li>• Develop, monitor and report on energy efficiency and sustainability in all Section operations</li> <li>• Serve as liaison with EEA and other environmental agencies and organizations</li> <li>• Provide GIS and GPS support and services to Section staff</li> <li>• Provide IT support and other technical assistance to the Section</li> <li>• Assist Regional Director with special projects, as needed</li> <li>• Maintain payroll, employment and other records</li> <li>• Provide budget, accounting and contract administration and support</li> <li>• Oversee Emergency Response Planning and Training</li> <li>• Interact with other DCR Divisions regarding land management and other activities on non-DWSP lands</li> </ul>

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Environmental Quality	7.5	<ul style="list-style-type: none"> <li>• Conduct water quality monitoring in reservoir &amp; tributaries</li> <li>• Maintain and analyze water quality data in order to monitor the health of the watershed and reservoirs, and prepare periodic reports</li> <li>• Conduct Environmental Quality Assessments (“Sanitary Surveys”)</li> <li>• Identify pollution sources and seek mitigation</li> <li>• Implement and oversee the Quabbin gull harassment program</li> <li>• Provide environmental oversight for all Section activities that could impact water quality</li> <li>• Assist with the design and implementation of water quality research conducted by the University of Massachusetts</li> <li>• Provide technical review of proposed projects, as necessary</li> <li>• Provide technical assistance to watershed communities and organizations regarding water quality issues</li> <li>• Assist with public education efforts aimed at enhancing water quality protection on watershed lands</li> <li>• Assist with WsPA administration, as necessary</li> <li>• Assist with development and implementation of Watershed Protection Plans, Public Access Plans, and Land Management Plans</li> <li>• Assist with Emergency Response</li> <li>• Monitor streamflow, pathogens, algae, stormwater flows and macrophytes</li> <li>• Monitor environmental compliance in building (e.g., drinking water testing)</li> <li>• Assist with interagency coordination and information exchange with MWRA, DEP, MHD, other DCR divisions, EEA and other EEA agencies and NYC DEP</li> </ul>
Environmental Planning	1.5	<ul style="list-style-type: none"> <li>• Administer WsPA on Quabbin and Ware River watersheds.</li> <li>• Provide technical assistance to town boards and commissions in watershed communities</li> <li>• Research or develop technical tools and/or written materials on regulatory implementation, land use planning and other watershed protection topics</li> <li>• Coordinate with other agencies and local boards to enhance the development and enforcement of environmental protection regulations on watershed lands</li> </ul>

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Forestry	6 2 LTS 3 STS	<ul style="list-style-type: none"> <li>• Implement forest management plan, including planning, tree marking, timber sale preparation and supervision of logging operations</li> <li>• Conduct regeneration surveys and continuous forest inventories (CFI) to provide data to help guide forest management operations</li> <li>• Oversee field maintenance contracts, and the purchase and planting of tree seedlings and other nursery stock</li> <li>• Assist with development of the Quabbin and Ware River Land Management Plans</li> <li>• Implement invasive plant control program</li> <li>• Coordinate with other state and federal agencies regarding forestry and other land management operations</li> <li>• Assist with public education programs related to watershed management</li> <li>• Conduct or participate in other watershed management activities (e.g., boundary maintenance, encroachment issues)</li> </ul>
Civil Engineering	4.5*	<ul style="list-style-type: none"> <li>• Collect, monitor and maintain records on weather/precipitation, reservoir elevations, river discharges and releases, water transfers and watershed yield.</li> <li>• Conduct Snow Survey and calculate runoff potential in Quabbin Watershed</li> <li>• Conduct monthly inspections of Winsor Dam, Goodnough Dike and other dams in the Quabbin &amp; Ware River watersheds; take necessary Piezometer readings when appropriate and maintain records</li> <li>• Conduct inspections and maintain records on all buildings and bridges in the Quabbin &amp; Ware River Watersheds</li> <li>• Coordinate and maintain records of all surveying required to determine property lines and boundaries; investigate encroachments and maintain records of all agency owned lands including new acquisitions; provide assistance to private surveyors requesting historic surveying data on agency lands</li> <li>• Provide technical support and engineering assistance to other Quabbin units</li> <li>• Maintain all historical records consisting of the construction of dams, roads, bridges and buildings in the Quabbin &amp; Ware River Watersheds</li> <li>• Assist in Cemetery operation and maintenance including drafting burial plot plans, locating burial lots, maintaining records and facility maintenance and repair</li> <li>• Maintain, operate or oversee administration complex boiler system, fuel deliveries and weekly fuel tank inspections</li> <li>• Oversee and maintain Photovoltaic Systems at Quabbin Fishing Areas</li> </ul>

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Watershed Rangers	7 2 LTSs	<ul style="list-style-type: none"> <li>• Maintain a positive visual presence in watersheds</li> <li>• Monitor public activities on watershed lands &amp; waters</li> <li>• Ensure Rules Compliance through education/public interaction/signage</li> <li>• Coordinate enforcement of watershed rules with State/Environmental Police</li> <li>• Assist with Emergency Response planning and preparedness</li> <li>• Maintain Spill Response trailers</li> <li>• Provide Emergency Response and general watershed security</li> <li>• Maintain records of violations and public interactions</li> </ul>
Interpretive Services	3 1 LTS	<ul style="list-style-type: none"> <li>• Develop and conduct watershed based programs, displays and curricula for visitors &amp; school groups</li> <li>• Maintain and operate the Quabbin Visitors Center</li> <li>• Participate in other EEA Environmental Education programs (e.g., Envirothon)</li> <li>• Serve as press liaison for Section activities and events, in conjunction with DCR and EEA public information offices</li> <li>• Organize special events (e.g., Memorial Day services)</li> <li>• Maintain vital records collection for the 4 disincorporated Quabbin towns, and issue official records upon request; Assist visitors with genealogical research.</li> <li>• Manage and issue access permit requests for groups, special events, former residents and short-term research projects</li> <li>• Administer Quabbin controlled deer hunt application process, including data entry, database management, and orientations</li> <li>• Maintain recorded telephone information on access, programs and watershed management activities</li> <li>• Serve as liaison with other organizations, including Friends of Quabbin, Swift River Valley Historical Society, Valley Environmental Education Collaborative, Massachusetts Drinking Water Education Partnership, and Envirothon steering committee.</li> <li>• Develop informational materials on Quabbin fishing program, access issues and management activities</li> <li>• Provide graphics and other support to other Section programs for the development of brochures, publications and presentations</li> <li>• Maintain audio-visual collection for Quabbin Section, including photographs, slides and oral history tapes</li> </ul>

<b>Section</b>	<b>FY09 FTE</b>	<b>Primary Responsibilities</b>
Watershed Maintenance	31.5*	<ul style="list-style-type: none"> <li>• Perform primary maintenance activities on watershed lands, roads, facilities and other resources</li> <li>• Maintain physical security around reservoir and watershed facilities</li> <li>• Maintain roads, gates, barways, drainage structures, signs and other access controls</li> <li>• Maintain and repair all division equipment (motor vehicles, trucks, boats and heavy Equipment)</li> <li>• Provide staffing for the Gull Harassment and Controlled Deerhunt programs</li> <li>• Maintain Quabbin Park</li> <li>• Operate and maintain Quabbin Park Cemetery</li> <li>• Operate and maintain the 3 Boat Launch Areas at Quabbin Reservoir</li> </ul>
	12 STS	
<b>Total FTEs</b>	<b>69*</b>	
<b>Total Seasonals</b>	<b>20</b>	

\* Includes part-time (PT) employees who are considered to be 0.5 FTE each. LTS = Long-term Seasonal.  
STS = Short-term Seasonal

## ***6.2 MWRA Memorandum of Understanding and the Water Supply Protection Trust***

A Memorandum of Understanding (MOU) was signed in 2004 between the Department of Conservation and Recreation (DCR) and the Massachusetts Water Resources Authority (MWRA) that coordinates the implementation of the respective agencies responsibilities in regard to the “protection, construction, operation, maintenance and improvement of water supply resources, facilities, and infrastructure within the [Metropolitan Boston water supply] watershed and waterworks system” (see [www.mass.gov/dcr/watersupply/watershed/documents/2004dcrmwraMOU.pdf](http://www.mass.gov/dcr/watersupply/watershed/documents/2004dcrmwraMOU.pdf)). Section 7.0 of this MOU details the development of an annual Work Plan for the Office of Watershed Management.

The legislature further enhanced the ability of the Office of Watershed Management to maintain this drinking water supply by establishing a Water Supply Protection Trust, created by Chapter 149 of the Acts of 2004, § 27, and written into the general laws at MGL c. 10, § 73. The trust provides a more efficient mechanism for MWRA’s funding of the Office of Watershed Management. The Trust has also allowed the Office of Watershed Management to efficiently manage its budget.

The Water Supply Protection Trust has a five person board of trustees responsible for approving the Office of Watershed Management’s annual work plan and budget each spring for the following fiscal year beginning in July. The members of the board of trustees are: 1.) the Secretary of the Executive Office of Energy and Environmental Affairs; 2.) the Executive Director of the MWRA; 3.) a representative jointly selected by the North Worcester County Quabbin Anglers Association, Inc. and the Quabbin Fishermen’s Association, Inc.; 4.) a representative from the Swift River Valley Historical Society; and 5.) the Chairman of the MWRA Advisory Board.

DWSP prepares annual Work Plans that meet all of the requirements set forth by the MOU. It contains the following elements:

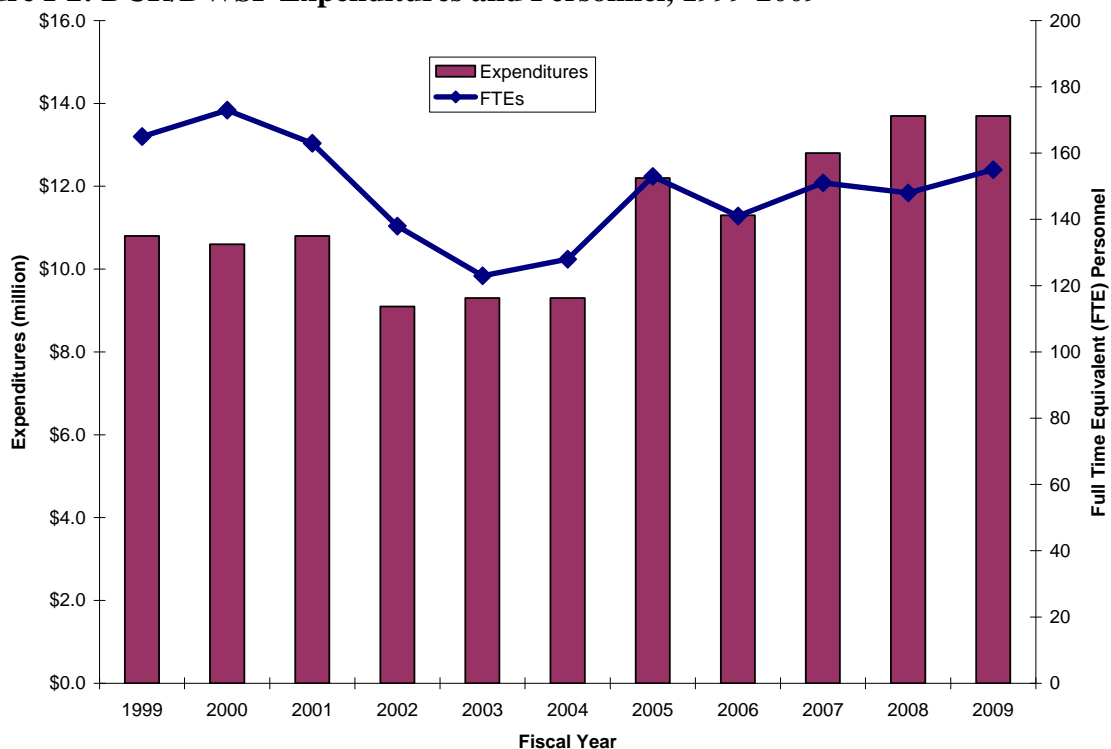
- Operations Plan
- Operating Budget
- Non-Land Capital Spending Budget
- Watershed Land Acquisition Capital Spending Budget
- Debt Service on Prior Land Acquisitions
- Payment in Lieu of Taxes Budget
- Staffing Plan and Organizational Chart
- Projected Revenues.

The Work Plan is a detailed description of proposed activities for the fiscal year, containing hundreds of specific items for attention by the Office of Watershed Management staff.

### 6.3 Budget

The creation of the Water Supply Protection Trust and the reporting parameters established by the MOU have created an efficient and transparent mechanism for MWRA’s funding of DWSP activities. DWSP was able to fill a significant backlog of position in 2005 and 2006, as well as establish a steady budget for capital improvements. The funding of major capital expenditures, Payments in Lieu of Taxes, and land acquisition are also the responsibility of MWRA. Figure I-2 displays the Office of Watershed Managements’ funding and staffing from 1999 to 2009. It is expected that the current levels will continue for the next five years.

**Figure I-2: DCR/DWSP Expenditures and Personnel, 1999-2009**



## 6.4 Five Year Work Plan

The Watershed Protection Planning process for the DWSP system has evaluated the system for threats to water quality, ranked the threats by potential to contaminate the water supply, and developed programs to control the potential threats. Section 5 provided system-wide goals and tasks for each control program for the next five years, which is the implementation period for this plan.

In the past, implementation of the Watershed Protection Plan was developed on a calendar year, and the Work Plans were done on a Fiscal year. Beginning with this plan, the Work Plans and WPP will both be done on the Fiscal Year. Tasks in the Annual Work Plans guide the activities of DWSP and are used to develop employee work plans. Quarterly progress reports are submitted to MWRA to keep the agency informed on DCR's progress towards achieving annual goals set out in the budget. Implementation also requires ongoing evaluation of the effectiveness of the programs and modification to adapt to changing conditions or concerns

Table I-22 provides a summary of the tasks to implement the control measures developed in Section 5. The table includes the watersheds where the tasks will be conducted and the DWSP sections with primary responsibility for their implementation. The control programs are developed in more detail in Volumes IIA through IID, which will be used to develop annual work plans, in cooperation and consultation with MWRA, for the Quabbin/Ware and Wachusett/Sudbury sections. These tasks were developed for a five year implementation period running for Fiscal Years 2009 through 2013 (July 1, 2008 through June 30, 2012).

**Table I-22: Major System-Wide Program Tasks to Support Watershed Protection Goals, FY2009-FY2013**

### KEY

Lead Section: ATS = Administrative and Technical Support, CE = Civil Engineers, EQ = Environmental Quality, EP = Environmental Planning, F = Forestry, GIS = Program Coordination & Technical Support – GIS, IS = Interpretive Services, NR = Natural Resources, P = Program Coordination & Technical Support- Planning; RD=Regional Director.

Watersheds: Q = Quabbin, WR = Ware River, W = Wachusett, S = Sudbury, All = Quabbin, Ware River, Wachusett, and Sudbury

Task No.	Task Description	Lead Section	Watersheds
<b>Land Procurement</b>			
1.	FY09 – FY12 allocate \$2 million annually for purchase of critical lands	NR	Q, W
2.	FY13 allocate \$1 million annually for purchase of critical lands	NR	Q, W
3.	Pursue opportunities to acquire land through gifts or through cooperation with other land trusts.	NR	Q, WR, W
<b>Land Preservation (Watershed Restriction Program)</b>			
4.	Complete baseline inspections for all new WPRs within six months of acquisition using established protocols and modern technologies.	NR	Q, WR, W

<b>Task No.</b>	<b>Task Description</b>	<b>Lead Section</b>	<b>Watersheds</b>
5.	Conduct annual inspection of existing WPRs. Resolve any areas of non-compliance that are documented.	NR	All
6.	Develop and use a comprehensive database with GIS mapping capability for all new and existing WPRs.	NR	All
<b>Land Management</b>			
7.	Update Wachusett Land Management Plan (2010), Ware River Land Management Plan (2012) and Sudbury Land Management Plan (2013)	NR	WR, W
8.	Complete and implement invasive species management plan	NR	All
9.	Continue/complete boundary marking surveillance.	F	All
10.	Develop/implement SOPs for all road and maintenance activities on DCR properties.	RD	All
11.	Manage/maintain all Division lands in accordance with Land Management Plans.	RD	All
<b>Wildlife Management</b>			
12.	Continue to implement bird controls at both reservoirs to ensure compliance with source water fecal coliform criteria.	EQ	Q, W
13.	Initiate and complete a comprehensive study on the movements, behavior, and feeding patterns of ring-billed, herring, and great black-back gulls in central Massachusetts	NR	All
14.	Initiate and continue to study the browsing impacts of moose on forest regeneration	NR	All
15.	Initiate a random fecal sampling program for gulls and geese to test for pathogens.	NR	All
16.	Continue the White-tailed deer management program. Transition the application procedure into an online application.	NR	All
17.	Follow legislation related to moose management; provide testimony when necessary	NR	All
18.	Monitor landfills for gulls; work cooperatively with landfills to ensure adequate harassment.	NR	All
<b>Public Access Management</b>			
19.	Continue to implement the Public Access Management Plans.	NR	All
20.	Update the Ware River, Wachusett, and Sudbury Public Access Management Plans.	WR	WR, W, S
21.	Develop and distribute training materials for staff and local and state police.	WR	All
<b>Watershed Security</b>			
22.	Coordinate with MWRA on all security issues, in order to maintain comprehensive, system-wide approach.	RD	All
23.	Work with local, state and federal responders.	RD	All
24.	Use Incident Command System (ICS) to respond to emergency situations. Provide adequate training on ICS to essential staff.	RD	All
25.	Prepare Quabbin/Ware River Emergency Response Manual.	RD	Q, WR

<b>Task No.</b>	<b>Task Description</b>	<b>Lead Section</b>	<b>Watersheds</b>
<b>Infrastructure</b>			
26.	Continue to participate in Reservoir Operations Working Group, meeting four times per year.	RD	All
27.	Work with MWRA to periodically update the Emergency Action Plans for Wachusett and Quabbin.	RD	Q, W
28.	Evaluate feasibility of removing unsafe or unnecessary small dams in the watersheds.	RD	Q, WR, W
29.	Assess infrastructure and need for funds and mechanism to make needed repairs.	RD	All
<b>Watershed Protection Act</b>			
30.	Continue to implement the Act.	EP/EQ	Q, WR, W
31.	Evaluate the overlap of WsPA and other environmental regulations; develop methods for better coordination.	EP/EQ	Q, WR, W
32.	Update parcel maps for all watershed towns.	EP/EQ	Q, WR, W
33.	Work with DWSP Office of General Counsel to complete revisions to regulations	EP/EQ	Q, WR, W
<b>Technical Assistance and Community Outreach</b>			
34.	Assess the interest and needs of towns for Technical Assistance.	EP/EQ, P	Q, WR, W
35.	Develop and implement a strategy for addressing needs appropriately met by DWSP.	P	Q, WR, W
<b>Interpretive Services</b>			
36.	Develop Interpretive Service Plan for Ware, Wachusett and Sudbury watersheds.	IS	WR, W, S
37.	Update the Quabbin Interpretive Service Plan.	IS	Q
<b>Water Quality Monitoring</b>			
38.	Continue water quality monitoring program. Participate in WQSAT to ensure coordination and communication on water quality issues with MWRA.	EQ	Q, WR, W
39.	Develop and implement a water quality monitoring program for Sudbury Reservoir.	EQ	S
40.	Evaluate and implement additional tributary flow (quantity) monitoring in order to assess loadings.	EQ	All
41.	Evaluate need for additional stormwater sampling to better quantify stormwater loads; implement.	EQ	Q, WR, W
42.	Evaluate need/efficacy of watershed monitoring of emerging contaminants; implement as makes sense.	EQ	Q, WR, W
<b>Environmental Quality Assessment</b>			
43.	Maintain multi-year cycle/rotation for completion of Environmental Quality Assessments. Where behind schedule: get caught up on EQAs in all districts.	EQ	Q, WR, W
44.	Implement recommendations for completed EQAs and oversee, as necessary, remedial actions.	EQ	Q, WR, W

<b>Task No.</b>	<b>Task Description</b>	<b>Lead Section</b>	<b>Watersheds</b>
45.	Improve data base for tracking, coordinating	EQ	Q, WR, W
<b>EQA-Compliance with Environmental Regulations</b>			
46.	Use site inspections, environmental quality assessments, local board meetings, and information from Watershed Rangers to identify possible violations of state and federal regulations.	EQ	Q, WR, W
47.	Enforce the DWSP Watershed Protection regulations found in 350 CMR 11.09. Coordinate, as necessary, with DWSP Office of General Counsel, DEP, EPA, and other agencies, to promote compliance with 350 CMR 11.09 and other environmental regulations.	EQ	Q, WR, W
48.	Develop internal group to coordinate for consistency on interpretation of regulations and decisions regarding enforcement.	D	Q, WR, W
49.	Review the DWSP review process for herbicide treatment of Rights of Way.		Q, WR, W
50.	Set up/re-instate formal coordination/cooperation process with DEP.		
<b>EQA-Wastewater Management</b>			
51.	On-site systems - Review local records, water quality data, and other pertinent information in conducting Environmental Quality Assessments to identify potential problem sites or areas.	EQ	Q, WR, W
52.	Continue to monitor and enforce the provisions of Title 5 working with BOHs and DEP.	EQ	Q, WR, W
53.	Provide technical assistance, upon request, to towns and/or neighborhood associations regarding on-site wastewater management issues.	EQ	Q, WR, W
54.	Develop database/inventories of on-site systems	EQ	Q, WR, W
55.	Track connections to new sewer lines.	EQ	W
56.	Manage with MWRA the Rutland-Holden trunk sewer and Rutland Holden Relief trunk sewer. Prepare quarterly bills for user communities; pursue sewer agreements with Holden and Rutland.	EQ	WR, W
57.	Review O&M for Pump Stations.	EQ	W
<b>EQA-Stormwater Management</b>			
58.	Continue to work with DEP and EPA for compliance with NPDES stormwater permitting requirements in the Active watersheds.	EQ	Q, WR, W
59.	Work with DEP and local conservations commissions to implement DEP Stormwater Management Standards in all projects subject to the regulation.	EQ	Q, WR, W
60.	Update/maintain maps of major conveyance structures in key areas of the active watersheds.	EQ	Q, WR, W

<b>Task No.</b>	<b>Task Description</b>	<b>Lead Section</b>	<b>Watersheds</b>
61.	Implement additional measures to treat or remove discharges from drainage in key areas of the watershed.	EQ	Q, WR, W
62.	Construct state of the art Stormwater BMPs in on DWSP property for stormwater treatment and to provide training for local DPWs, conservation commissions, etc.	EQ	Q, WR, W
63.	Update percent impervious figures in active watersheds; assess to see if there is a correlation to tributary water quality in selected sub-watersheds	EQ	Q, WR, W
<b>EQA-Agriculture</b>			
64.	Monitor agricultural impacts and agricultural land owner if water quality is impacted.	EQ	Q, WR, W
65.	Maintain inventory of “hobby farms” and other sites where animals are kept in a manner that may impact water quality.	EQ	Q, WR, W
66.	Assess opportunities to educate landowners on animal management techniques that protect water quality. Coordinate with EEA, DAR, DEP, and other agencies to develop outreach materials that promote water quality protection.	EQ	Q, WR, W
<b>EQA-Hazardous Materials and Waste</b>			
67.	Monitor the DEP hazardous materials generators and release databases and inspect sites within the watersheds, as appropriate.	EQ	Q, WR, W
68.	Investigate contaminated sites and hazardous waste generators through coordination with DEP’s Bureau of Waste Site Cleanup and the Environmental Quality Assessment process.	EQ	Q, WR, W
69.	Update inventory of USTs and above-ground tanks in the watersheds. Evaluate need for outreach/public education, especially for schools and other municipal buildings.	EQ	Q, WR, W
70.	Review periodic reports on closed landfills in the watersheds.	EQ	Q, WR, W
<b>Emergency Response (Spill Response)</b>			
71.	Provide emergency response support services, maintain response supplies and contact lists.	CE	All
72.	Maintain internal Emergency Response coordination committee with MWRA to provide emergency response and/or Incident Command System training to staff and appropriate local emergency officials.	CE	All
73.	Participate in a mock hazardous materials release for training purposes.	CE	All
74.	Identify staff that need ICS 200 and 300 training, and provide for them.	CE	All
75.	Plan and run annual tabletop or field exercises.	RD	All
76.	Construct structural controls to reduce likelihood of spills reaching reservoir in key areas.	CE	All
77.	Develop Quabbin/Ware Emergency spill Response/Prevention Plan	RD	Q, WR

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# Appendix A: Watershed Protection Regulations, 350 CMR 11.00

## WATERSHED PROTECTION

### 350 CMR 11

Department of Conservation and Recreation  
with corrections, May, 1994

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#### **11.01 Introduction and Purpose**

(1) Introduction - 350 CMR 11.00 is promulgated by the Commissioners of the Department of Conservation and Recreation pursuant to the authority granted under St. 1992 c. 36. St. 1992 c. 36, ' 2 amends M.G.L. c. 92, ' 104 by adding certain definitions which are used in 350 CMR 11.03; St. 1992 c. 36, ' 3 adds M.G.L. c. 92, ' 107A defining the jurisdiction and exemptions contained in 350 CMR 11.04 and 350 CMR 11.05, respectively; and St. 1992 c. 36, ' 4 amends M.G.L. c. 92, ' 108 by requiring the Division of Watershed Management, after consultation with the Department of Environmental Protection, to make rules and regulations for the protection of Watersheds as defined in St. 1992 c. 36.

In addition, St. 1992 c. 36 and M.G.L. c. 92 authorize the Department of Conservation and Recreation and the Division of Watershed Management to make rules and regulations to protect the Watersheds as defined in St. 1992 c. 36 and the Watershed System as defined in St. 1992 c. 36 and M.G.L. c. 92. The Department of Environmental Protection is also required under St.

1992 c. 36, ' 14 to adopt rules and regulations for the prevention of pollution and securing the sanitary protection of all waters used as sources of water supply in the Commonwealth other than in the Watersheds as defined in St. 1992 c. 36. Regulations currently exist for:

- (a) the sanitary protection of waters used by the Department of Conservation and Recreation (310 CMR 23.00);
- (b) land within Watershed Reservations (350 CMR 8.00);
- (c) sanitary rules and regulations for the Metropolitan Water Supply (350 CMR 9.00);  
and
- (d) fishing in Wachusett and Sudbury Reservoirs (350 CMR 10.00).

In order to facilitate review of all regulations promulgated by the Department of Conservation and Recreation and the Division of Watershed Management relating to Watersheds and the Watershed System, 350 CMR 11.09 includes regulations of general applicability to Waters of the Watershed System. The regulations in 350 CMR 11.09 are intended to supersede the regulations in 310 CMR 23.00, 350 CMR 8.01, 350 CMR 9.00, and 350 CMR 10.00, which shall be repealed on March 31, 1994.

(2) Purpose - The purpose of St. 1992 c. 36 is to improve the protection of the metropolitan water supply. St. 1992 c. 36 and 350 CMR 11.00 set forth a comprehensive scheme to regulate land use and activities within certain critical areas of the Watersheds and Watershed System.

The purpose of 350 CMR 11.00 is to define and clarify the restrictions and prohibitions set forth in St. 1992 c. 36 by establishing standard definitions and procedures under which the Division of Watershed Management may carry out its responsibilities under St. 1992 c. 36. 350 CMR 11.00 shall complement St. 1992 c. 36 and shall have the force of law on March 31, 1994.

### **11.02: General Provisions**

(1) Time Periods. Unless otherwise specifically provided in St. 1992 c. 36 or 350 CMR 11.00, computation of any time period referred to in 350 CMR 11.00 shall begin with the first day following the action which initiates the running of the time period. The last day of the time period so computed is to be included unless it is a Saturday, Sunday or legal holiday or any other day on which the office of the Division is closed, in which event the period shall run until the end of the next following business day. When the time period is less than seven days, intervening days when the Division is closed shall be excluded in the computation.

(2) Timely Filing. All Papers must be filed at the Division office or such other place as the Division shall specify in 350 CMR 11.00 within the time limits set forth herein.

Unless otherwise specifically provided in St. 1992 c. 36 or 350 CMR 11.00, Papers filed in the following manner shall be deemed to be filed as set forth herein:

(a) *Hand delivery during business hours.* By hand delivery during business hours shall be deemed filed on the day delivered.

(b) *Hand delivery during non-business hours.* By hand delivery at times other than during regular business hours shall be deemed filed on the next regular business day.

(c) *Mailing.* By placing in the United States Mail certified or registered mail, return receipt requested shall be deemed filed on the date received by the Division.

All Papers shall show the date received by the Division and the Division shall cooperate in giving date receipts to Persons filing Papers by hand delivery.

(3) Actions by the Division. Where St. 1992 c. 36 states that a particular action (except receipt of a request or notice) is to be taken by the Division, that action is to be taken by the person designated by 350 CMR 11.00 or, if by a committee, by more than half the members present at a meeting of at least a quorum. A quorum is defined as a Majority of the members then in office.

(4) Burden of Proof. Any Person who files a request for Advisory Ruling, a request for Watershed determination of applicability, an application for variance or a request for Exemption of a Tributary shall have the burden of producing credible evidence from a competent source in order to demonstrate to the Division or, in the case of an appeal, to the Commission, support for the position taken or the relief requested.

(5) Capitalized Terms. Any capitalized terms used in 350 CMR 11.00 shall have the meanings ascribed to such terms in 350 CMR 11.03.

### **11.03 Definitions**

Advisory Ruling means a ruling issued by the Division pursuant to 350 CMR 11.06(1).

Agriculture, Land in Agricultural Use and Normal Maintenance or Improvement of Land in Agricultural Use shall have the meanings ascribed to such terms in 310 CMR 10.04.

Alteration means:

- (a) draining, dumping, dredging, damming, discharging, excavating, filling or grading;
- (b) the erection, reconstruction or substantial expansion of any buildings or Structures;
- (c) the driving of pilings;
- (d) the construction or reconstruction or paving of roads and other ways;
- (e) the construction or reconstruction of utilities;
- (f) the changing of run-off characteristics;

(g) the intercepting or diverting of ground waters, surface waters, reservoirs, tributaries, or aquifers; and

(h) the installation or substantial expansion of drainage, sewage and water systems.

Applicability Decision means the written decision issued by the Division pursuant to 350 CMR 11.06(2)(e).

Aquifer means a geological formation, group of formations, or part of a formation in the Wachusett Watershed that is capable of yielding a significant amount of water to a well or spring, as determined by reference to the Maps, 350 CMR 11.07. The land directly overlaying an aquifer shall be deemed to be part of said aquifer.

Authority means the Massachusetts Water Resources Authority.

Bank means the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a Bordering Vegetated Wetland and adjacent Flood plain, or in the absence of these, it occurs between a water body and an upland. A bank may be partially or totally vegetated or may be comprised of exposed soil, gravel or stone. The upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a bank is the mean annual low flow level.

Bordering Vegetated Wetland means a wet meadow, except meadows used for the grazing of livestock, marsh, swamp, bog or other area, hydrologically connected to and bordering on a Tributary, Reservoir, Flood plain, or Surface Water, which supports at least 50 percent wetland species and as defined in the Wetlands Protection Act as defined herein.

Commission means the Department of Conservation and Recreation.

Commonwealth means the Commonwealth of Massachusetts.

Date of Issuance means the date a determination, order or decision is hand delivered or mailed as provided in 350 CMR 11.00.

Date of Submission means the date the Division assigns a file number to a request or application submitted pursuant to 350 CMR 11.06. Assignment of a file number shall not imply that a request, application or supporting documents have been determined adequate to support the relief requested, but only that the submission is complete in accordance with the requirements of 350 CMR 11.06.

Department means the Department of Environmental Protection of the Commonwealth of Massachusetts.

Discharge or Discharge of Pollutant means any addition of Pollutants or combination of Pollutants from any source including, but not limited to, discharges from surface runoff, which are collected or channelled by man and through pipes, sewers or other conveyances.

Disposal means the discharge, deposit, injection, dumping, spilling, leaking, incineration or placing into or on any land or water so that the matter disposed of may enter the environment or be emitted into the air or discharged into any waters, including Ground water.

Division means the Division of Watershed Management of the Commission.

Dwelling means any structure or building, or any portion thereof which is used, intended to be used, or designed to be occupied for human habitation purposes, including, but not limited to, houses, hotels, motels, apartments and condominiums.

Exemption Decision means a decision of the Division, in consultation with the Department, to exempt a Tributary from regulation under St. 1992 c. 36 issued pursuant to 350 CMR 11.06(4)(g).

Flood plain means the land adjoining a Tributary, Reservoir or Surface Water, which is subject to inundation from a flood having a 1 % chance of being equaled or exceeded in any given year, commonly known as the 100 year flood plain, as determined by reference to the Maps, 350 CMR 11.07.

Generate or Generation of Pollutants means the origination, creation or production of Pollutants.

Ground water means water below the land surface in a saturated zone, including perched ground water.

Hazardous Material or Waste means any material or waste, in whatever form, which because of its quantity, concentration, corrosivity, flammability, reactivity, toxicity, or infectious, chemical or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Hazardous Material or Waste shall include those materials listed in 40 CFR 261, or 310 CMR 40.900 Appendix I.

Impervious means not allowing entrance or passage of water due to the presence on or above the ground of material having a percolation rate of greater than 30 minutes per inch, including, but not limited to, pavement, concrete, stone, peat, loam and other organic matter.

Leaching Field means a soil absorption system as such term is defined in Title 5 (350 CMR 15.00).

List of Affected Parcels means the list developed by the Division from maps prepared pursuant to M.G.L. c. 92 ' 107A(q).

Lot means an area of land subject to St. 1992 c. 36 in one ownership with definite boundaries described in a deed or shown on a plan recorded in the registry of deeds or registered in the registry district of the land court.

Maps means the maps described in 350 CMR 11.07.

Majority means more than half of the members of any body making a decision pursuant to 350 CMR 11.00.

Natural Basin means an area bounded peripherally by a water parting and draining ultimately to a particular water course or body of water; the catchment area or drainage basin from within which the waters of a stream or stream system are drawn.

Owning an Interest in Real Property or Real Property Interest means having alone, or jointly or severally with others:

- (a) legal title to real property;
- (b) the care, charge or control of real property in any capacity including, but not limited to as agent, executor, executrix, administrator, administratrix, trustee, or guardian of the estate of the holder of legal title;
- (c) lessee under a written lease; or
- (d) an agent, trustee or other person appointed by the Courts of the Commonwealth.

Papers means all requests, documents, papers, notices, appeals and other written communications permitted or required by the regulations to be filed with the Division or the Commission.

Party Aggrieved means any Person who, because of an act or failure to act by the Division or the Commission under St. 1992 c. 36 or 350 CMR 11.00, may suffer an injury in fact which is different, either in kind or magnitude, from that suffered by the general public, and which is within the scope of the interests identified in St. 1992 c. 36. Such party must specify, in writing, sufficient facts to allow the Division or the Commission to determine whether or not the party is, in fact, aggrieved.

Person means an individual, partnership, corporation, firm, association or group, including a city, town, county, the Commonwealth or other governmental unit owning property or carrying on an activity regulated by St. 1992 c. 36.

Plans means such data, maps, engineering drawings, calculations, specifications, schedules and other materials, if any, deemed necessary by the Division to describe the Lot, portion of the Lot or the Alteration to determine the applicability of St. 1992 c. 36 or to determine the impact of the Alteration upon the interests identified in St. 1992 c. 36.

Pollutant means any substance, man-made or resulting from human activities, that can alter the biological, chemical, physical, or radiological character of water.

Reservoir means either the Wachusett or the Quabbin Reservoir.

Sewage Treatment Facility means any wastewater treatment facility used for treating, neutralizing or stabilizing sewage, including: treatment or disposal plants; the necessary

intercepting outfall and outlet sewers; pumping stations integral to such facilities; and equipment and appurtenances related to the foregoing.

Sewer System means pipelines or conduits, pumping stations, force mains, and all other structures, devices, appurtenances, and facilities used for collecting and conveying wastes to a site or works for treatment or disposal.

Storage means the actual or intended containment on a temporary basis or permanent basis which does not constitute Disposal.

Structure means a combination of materials assembled at a fixed location to give support or shelter, such as, but not limited to, a Dwelling, a building, framework, retaining wall, tent, reviewing stand, platform, bin, fence over six feet high, sign, flagpole, recreational tramway, mast for radio antenna or the like. The word “structure” shall be construed, where the context requires, as though followed by the words “or part or parts thereof.”

Subsurface Waste Water Disposal System means an on-site subsurface sewage disposal system as defined in Title 5 (310 CMR 15.00).

Surface Water(s) means water in the Watersheds, including any lake, spring, impoundment, and pond, as determined by reference to the Maps, 350 CMR 11.07. Surface water shall include the land located thereunder and the Banks thereto. Surface water shall exclude all Reservoirs, Tributaries, Aquifers, Ground waters, and man-made farm ponds used for irrigation, as well as so-called great ponds of the Commonwealth which do not drain into a Tributary or a Reservoir.

Title 5 means Title 5 of the Massachusetts Environmental Code governing standard requirements for the siting, constructing, repair, replacement and maintenance of on-site sewage treatment and disposal systems, 310 CMR 15.00.

Treatment means any method, technique, or process, including neutralization, incineration, stabilization or solidification, designed to change the physical, chemical or biological character or composition of any Hazardous Material or Waste so as to neutralize such Material or Waste or so as to render such Material or Waste less hazardous, non-hazardous, safer to transport, amenable to storage, or reduced in volume, except such method or technique as may be included as an integral part of a manufacturing process at the point of generation.

Tributary means a body of running water, including a river, stream, brook and creek, which moves in a definite channel in the ground due to a hydraulic gradient and which flows ultimately into a Reservoir in the Watersheds or the Ware River above the Ware River intake, as determined by reference to the Maps, 350 CMR 11.07. A Tributary shall include the land over which the water therein runs and the Banks thereto.

Uses and Activities means those uses and activities described in M.G.L. c. 92, ' 107A(a) and (b)(2) and 350 CMR 11.04(3).

Variance Decision means the written decision issued by the Division pursuant to 350 CMR 11.06(3)(g).

Waters of the Watershed System means all waters that in their natural course would flow into the Ware River above the Colbrook Diversion, the open channel of the Wachusett Aqueduct, the Quabbin, Wachusett, Sudbury and Foss reservoirs and any other lake, pond, reservoir, aqueduct, stream, ditch, watercourse or any other open water under the provision of M.G.L. c. 92, ' 109.

Watershed Reservation(s) means land within the Watershed System and described in St. 1972 c. 737 as amended by St. 1990 c. 436.

Watershed(s) means the Natural Basin from within which water drains or in the natural course would drain into the Quabbin Reservoir, the Wachusett Reservoir, or the Ware River upstream of the Ware River intake.

Watershed System means:

(a) all real and personal property interests held by or on behalf of the Commonwealth immediately prior to the effective date of St. 1992 c. 36 in and for the Department of Conservation and Recreation water system which were part of or appurtenant to the Quabbin Watershed, Quabbin Reservoir, Ware River Watershed, Wachusett Watershed, Wachusett Reservoir, North and South Sudbury watersheds, Sudbury Reservoir, Framingham Reservoirs 1, 2 and 3, Blue Hills Reservoir, Bear Hill Reservoir, Spot Pond Reservoir, Fells Reservoir, Weston Reservoir, Norumbega Reservoir, Chestnut Hill Reservoir, including land, easements, buildings, Structures, all equipment, machinery, vehicles and appliances, improvements, water rights and rights in source of water supply; and

(b) all enlargements and additions to the former Department of Conservation and Recreation water system acquired or constructed by the Division for the purpose of the Watershed System, including land, easements, buildings, Structures, equipment, machinery, vehicles, and appliances, improvements, reservoirs, dams, water rights and rights in sources of water supply, but excluding the Waterworks System of the Authority.

Waterworks System means waterworks system as defined in M.G.L. c. 92 App. and 360 CMR 10.00 et seq.

Wetlands Protection Act means the Wetlands Protection Act, M.G.L. c. 131, ' 40 and regulations promulgated pursuant thereto, 310 CMR 10.00 et seq.

#### **11.04: Jurisdiction**

(1) Areas Regulated. Areas regulated by St. 1992 c. 36 and 350 CMR 11.00 include those portions of the Watersheds which lie:

(a) within 400 feet of the Bank of a Reservoir;

- (b) within 200 feet of the Bank of a Tributary or Surface Waters;
- (c) within the area between 200 and 400 feet of the Bank of a Tributary or Surface Waters;
- (d) within the Flood plain of a Tributary or Surface Waters, including that flood plain;
- (e) within Bordering Vegetated Wetlands that border on Tributaries or Surface Waters or Reservoirs;
- (f) within land that overlays an Aquifer with a potential well yield of 100 gallons per minute or more as determined in accordance with St. 1992 c. 36 and 350 CMR 11.00; or
- (g) within land that overlays an Aquifer with a potential well yield of one or more but less than 100 gallons per minute pursuant to a finding by the Division, in consultation with the Department, that regulation of said Aquifer is necessary for the protection of the quality of the water in the Surface Waters, Aquifers, Reservoirs or Tributaries.

(2) *Presumptions - Properties Identified in the List of Affected Parcels.* For purposes of 350 CMR 11.00, all properties identified in the List of Affected Parcels shall be presumed to be in an area regulated under 350 CMR 11.04(1)(a) through (g). Any property which is not identified in the List of Affected Parcels shall be presumed not to be in an area regulated under 350 CMR 11.04(1)(a) through (f).

(3) *Uses and Activities Regulated or Prohibited.*

(a) Any Alteration, or the Generation, Storage, Disposal or Discharge of Pollutants is prohibited within those portions of the Watershed that lie:

1. within 400 feet of the Bank of a Reservoir (350 CMR 11.04(1)(a)); or
2. within 200 feet of the Bank of a Tributary or Surface Waters (350 CMR 11.04(1)(b)).

(b) 1. Within those portions of the Watershed that lie:

- a. within the area between 200 and 400 feet of the Bank of a Tributary or Surface Water (350 CMR 11.04(1)(c));
- b. within the Flood plain of a Tributary or Surface Water (350 CMR 11.04(1)(d));
- c. within Bordering Vegetated Wetlands that border on Tributaries or Surface Waters or Reservoirs (350 CMR 11.04(1)(e));

d. within land that overlays an Aquifer with a potential well yield of 100 gallons per minute or more as determined in accordance with St. 1992 c. 36 and 350 CMR 11.00 (350 CMR 11.04(1)(f)); or

e. within land that overlays an Aquifer with a potential well yield of one or more but less than 100 gallons per minute, pursuant to a finding by the Division, in consultation with the Department, that regulation of said Aquifer is necessary for the protection of the quality of the water in the Surface Waters, Aquifers, Reservoirs or Tributaries (350 CMR 11.04(1)(g)),

2. the following uses are prohibited:

a. the Disposal of Pollutants from either privately or publicly owned Sewage Treatment Facilities;

b. the placement of the Leaching Field of a Subsurface Waste Water Disposal System less than four feet above the maximum water table level as measured at the time of annual high water;

c. the storage of liquid petroleum products of any kind; provided, however, that an end user of such product, such as a resident in connection with normal residential use or a person responsible for supplying heat to a residence, may store a reasonable volume of such material so long as such storage is in a free standing container inside of the Structure, which Structure shall include at a minimum a foundation thereof with a poured cement slab floor or a concrete reservoir of sufficient volume to hold 125 percent of the tank's capacity;

d. the Treatment, Disposal, use, generation or Storage of Hazardous Material or Waste, except a reasonable volume of Hazardous Material or Waste incidental to normal residential use;

e. the Storage and the Disposal of solid waste other than a reasonable volume incidental to normal residential use;

f. the outdoor Storage of road salt or other de-icing chemicals; provided, however, that 350 CMR 11.00 shall not prohibit the outdoor Storage of sand, gravel or materials used in road construction which are not Hazardous Materials or Waste;

g. the outdoor Storage of fertilizers, herbicides and pesticides;

h. the use or Storage of pesticides or herbicides which carry a mobility rating as provided for by the United States Environmental Protection Agency or which have been determined by the Commonwealth using

United States Environmental Protection Agency standards to pose a threat or potential threat to Ground water;

i. the outdoor, uncovered Storage of manure;

j. the servicing, washing or repairing of boats or motor vehicles other than as reasonably incidental to normal residential use;

k. the operation of junk and salvage yards;

l. the rendering Impervious of more than ten percent of any Lot or 2,500 square feet, whichever is greater;

m. the excavation of gravel and sand to a depth greater than six feet above the maximum water table, except where incidental to the construction of permitted Structures;

n. the Alteration of Bordering Vegetated Wetlands;

o. any other activity which could degrade the quality of the water in the Watersheds as determined by the Division after consultation with the Department; provided, however, that de-icing may be performed on a roadway under procedures approved by the Commonwealth's Secretary of Environmental Affairs; or

p. the construction of any Dwelling which exceeds a density of two bedrooms per acre or any use which may generate more than 220 gallons of sanitary sewage per acre per day.

(c) In addition to, and without limiting, the prohibitions contained in 350 CMR 11.04(3)(a) and (3)(b), within those portions of the Watersheds which overlay Aquifers with potential well yields of between 100 and 300 gallons per minute as determined by the Division, or land whose regulation has been determined to be necessary for the protection of the quality of the water in the Surface Waters, Aquifers, Reservoirs and Tributaries, pursuant to 350 CMR 11.04(1)(g), the construction of any Dwelling which exceeds a density of one and one-third bedrooms per acre and any use which may generate more than 147 gallons of sanitary sewage per acre per day are prohibited.

(d) In addition to, and without limiting, the prohibitions contained in 350 CMR 11.04(3)(a), (3)(b) and (3)(c), within those portions of the Watersheds that overlay Aquifers with potential well yields of over 300 gallons per minute as determined by the Division, the construction of any Dwelling which exceeds a density of one bedroom per acre and any use which may generate more than 110 gallons of sanitary sewage per acre per day are prohibited.

(e) In making the calculation required under 350 CMR 11.04(3)(b)2.1. all contiguous real property within an area described in 350 CMR 11.04(1) owned by the same Person shall be used, in the aggregate; provided, however, that said area may be so used in making such calculation for only one Lot.

(f) In making the calculation required under 350 CMR 11.04(3)(b)2.p., all contiguous real property within an area described in 350 CMR 11.04(1) owned by the same Person shall be used, in the aggregate, to determine the total acreage for density purposes; provided, however, that said area may be so used for determining area density for only one Lot.

### **11.05: Exemptions**

The provisions of 350 CMR 11.04 shall not apply to the following:

(1) Uses, Structures or Facilities in Existence. Uses, Structures or facilities lawfully in existence or for which all applicable municipal, state and federal permits and approvals, other than building permits and permits for septic systems, were obtained prior to July 1, 1992;

(2) Reconstruction, Extension or Structural Change. Any reconstruction, extension or structural change to any Structure lawfully in existence on July 1, 1992, provided that such reconstruction, extension or structural change:

(a) does not constitute a substantial change to or enlargement of that lawfully existing Structure; and

(b) does not degrade the quality of the water in the Watershed;

(3) Lot in Existence. The construction of one single-family Dwelling on any Lot existing as such prior to July 1, 1992, or the division of an owner occupied Lot existing as such as of July 1, 1992 into one additional Lot for a single family dwelling; provided that, wherever possible, there shall be no Alterations within the areas described in 350 CMR 11.04(1)(a) and 11.04(1)(b);

(4) Construction - Sewer System. The construction of any Dwelling described in 350 CMR 11.04(3)(b)2.p., 11.04(3)(c) or 11.04(3)(d) if a Sewer System existed prior to July 1, 1992 to which a direct connection shall be made without expansion of capacity and said connection is used for all sanitary sewage of any Dwelling or other Structure resulting from said construction;

(5) Tributaries. Tributaries, or portions thereof, which the Division, in consultation with the Department, has exempted pursuant to 350 CMR 11.00, upon a determination that such exemption will pose no significant risk to the quality of the water, after taking into account the rate of flow, slope, soil characteristics, proximity to a Reservoir or the Ware River above the Ware River intake, the current level of water quality and the current degree of development;

(6) Work of the Division. The Division, in the performance of its responsibilities and duties to protect the quality of the water in the Watersheds, or the Authority in the performance of its responsibilities and duties to maintain, operate and improve the Waterworks System;

(7) Conversion of Land for Agricultural Use. Conversion of Land for Agricultural Use or preparation of Land for Agricultural Use; provided, however, that such conversion shall be made under a plan approved by the United States Department of Agriculture, Soil Conservation Service and the Commission, in consultation with the Commonwealth's Department of Food and Agriculture;

(8) Maintenance of Public Roadways in Existence. The maintenance, repair, replacement or reconstruction of public roadways existing as of September 1, 1989 or railroad track and rail bed existing as of September 1, 1990, including associated drainage systems, that are necessary to preserve or restore the facility's serviceability for the number of travel lanes and uses existing as of September 1, 1990; provided, however, that in the case of any replacement the design is substantially the functional equivalent of, and is of similar alignments to that which is being replaced; provided, further, that design plans and specifications for said work on roadways, or railroad track and rail beds are provided to the Division prior to the work's commencement;

(9) Maintenance or Improvement - Agricultural. Activities relating to normal maintenance or improvement of Land in Agricultural Use; provided, however, that such activities do not impair the quality of the water;

(10) Construction of Public Highways. The construction of public highways, railroad track and rail beds and facilities directly related to their operation; provided, that the Commonwealth's Secretary of Environmental Affairs has determined that such highway or transportation service construction project requires direct access to or location in the lands described in 350 CMR 11.04(1) to avoid or minimize damages to the environment and that said Secretary and the Division have determined that such construction does not materially impair the quality of the water in the Watersheds;

(11) Maintenance of Public Utilities. The maintenance, repair or expansion of lawfully located Structures or facilities used in the service of the public to provide electric, gas, water, sewer, telephone, telegraph and other telecommunication services; provided, however, that such maintenance, repair or expansion activities, Structures, or facilities do not materially impair the quality of water in the Watersheds as determined by the Division after consultation with the Department;

(12) Maintenance of Public Utilities - Wetlands. The maintenance, repair or replacement, but not the substantial changing or enlargement of, an existing and lawfully located Structure or facility used in the service of the public and used to provide electric, gas, water, sewer, telephone, telegraph and other telecommunication services in Bordering Vegetated Wetlands; provided, however, that such maintenance and repair activities do not materially impair the quality of water in the Watersheds;

(13) Clean up or Prevention of Releases. The undertaking by any Person, municipality, the United States government or the Commonwealth of temporary operations to clean up, prevent or mitigate releases of Hazardous Material or Waste;

(14) Changes in Agricultural Crops Produced. Changes in agricultural crops produced;

(15) *Agricultural Technologies*. The use of new or existing agricultural technologies that do not degrade the quality of water in the Watersheds more than the present agricultural technologies that such new or existing agricultural technologies replace; and

(16) *Municipal Sewage Treatment Facility or Water System*. The construction of a new municipal Sewage Treatment Facility or new municipal water system if the Division determines that water quality will not be adversely impacted from said construction and provided that such new systems comply with all existing regulations and standards applicable to water pollution abatement districts.

## **11.06: Procedures**

### (1) Advisory Rulings

(a) *Request for Advisory Ruling*. Any person Owning an Interest in Real Property may, by written request to the Division at the addresses specified in 350 CMR 11.11 by certified mail or hand delivery, request an Advisory Ruling as to:

1. whether such Person's property is located within an area regulated by St. 1992 c. 36 or 350 CMR 11.00; or
2. whether existing or proposed Structures, Uses or Activities on such Person's property are permitted under St. 1992 c. 36 or 350 CMR 11.00 by virtue of the exemptions set forth in 350 CMR 11.05.

(b) *Information Required*. Such written request shall identify the property by street address and include:

1. a copy of the current Assessor's Map showing the location of the property or reference to the applicable Assessor's Map by sheet and parcel number;
2. a copy of (or reference to) the most recent edition of the Massachusetts Geographic Information System map based on the United States Geological Survey, 1 to 25,000 scale, quadrangle maps, showing the location of the property;
3. a copy of such Owner's deed as recorded in the applicable registry of deeds; and
4. copies of any plans, mortgage inspection plans and tape surveys of the property which are available.

(c) *Issuance of Advisory Ruling*. Within 30 days of the Date of Submission of a request for Advisory Ruling, the Division may issue a written ruling to the Person who submitted the request, or in its sole discretion, the Division may notify such Person that a request for Watershed determination of applicability is required pursuant to 350 CMR 11.06(2).

(d) *Remedy.* The Person to whom an Advisory Ruling is issued shall have no right to appeal such ruling, but may at such Person's election, submit a request for Watershed determination of applicability or an application for variance in accordance with 350 CMR 11.00. A Person who has not been issued an Advisory Ruling within 30 days may, at such Person's election, resubmit the request, or submit a request for Watershed Determination of Applicability or an application for variance in accordance with 350 CMR 11.06.

(e) *Authorization; limitations.* Any Advisory Ruling hereunder shall be issued by the Division pursuant to and subject to the limitations of M.G.L. c. 30A, ' 8.

## (2) Requests for Watershed Determinations of Applicability

(a) *Filing.* Any Person Owning an Interest in Real Property who desires a determination as to whether or not:

1. such Person's property is located within an area regulated by St. 1992 c. 36 or 350 CMR 11.00;
2. proposed Structures, Uses or Activities on such Person's property are permitted under St. 1992 c. 36 or 350 CMR 11.00;
3. a reconstruction, extension or structural change constitutes a substantial change or enlargement or one which will degrade the quality of water under 350 CMR 11.05(2);
4. Alterations within areas described in 350 CMR 11.04(1)(a) and 11.04(1)(b) in connection with construction permitted under 350 CMR 11.05(3) are possible;
5. the maintenance, repair or replacement activities described in 350 CMR 11.05(9), (10) or (11) will impair or materially impair the quality of the water in the Watersheds; or
6. a new municipal Sewage Treatment Facility or new municipal water system will have an adverse impact on water quality under 350 CMR 11.05(16),

may submit to the superintendent of the Reservoir of the Watershed in which such property is located at the address specified in 350 CMR 11.11, by certified mail or hand delivery, a request for Watershed determination of applicability (See 350 CMR 11.13).

(b) *Land Surveyor Determination.* Any request for Determination under 350 CMR 11.06(2)(a)1. shall be accompanied by a written determination of a land surveyor registered with the board of registration of professional engineers and land surveyors of the Commonwealth as to whether such Person's real property interests are located within areas regulated by St. 1992 c. 36.

(c) *Related Statement.* Requests for Watershed Determinations other than those in 350 CMR 11.06(2)(a)1. shall include a detailed description of the Structures, Uses and Activities which are proposed.

(d) *Additional Materials.* All surveys and additional materials or studies required to make a determination, whether or not requested by the Division, shall be prepared and delivered at the sole cost of the Person desiring the determination.

(e) *Issuance of Applicability Decision.* Within 60 days of the Date of Submission of such request for Watershed Determination, the Division shall issue a written Applicability Decision to the Person who submitted such request, in form suitable for recording in the registry of deeds or registration in the registry district of the land court where the property is located (See 350 CMR 11.13), which shall contain a brief statement of the reasons for the Decision. If the Division fails to issue the Applicability Decision within such 60 day period, the Division shall be deemed to have:

1. concurred with the land surveyor's determination set forth in a request for Determination under 350 CMR 11.06(2)(a)1.; or

2. determined that the proposed Structures, Uses and Activities on such Person's property described in the request for Determination are permitted by St. 1992 c. 36 and 350 CMR 11.00; or

3. determined that such Structures, Uses and Activities will not impair or materially impair the quality of water in the Watersheds.

(f) *Appeal.* A Person to whom the Division's Applicability Decision has been issued, who seeks to appeal such Decision, shall file a Notice of Claim for an Adjudicatory Proceeding with the Commission at the address specified in 350 CMR 11.11 within 21 days from the Date of Issuance of the Decision by the Division. The procedures for appeal before the Commission shall be as set forth in 801 CMR 1.00 et seq. At the time of filing of such Notice of Claim, a copy shall also be filed with the Division.

### (3) Variances

(a) *Variances.* The Division may grant a variance from the provisions of St. 1992 c. 36 and 350 CMR 11.00 with respect to particular Structures, Uses and Activities, and shall grant, upon request, a variance with respect to crossings of Tributaries and Bordering Vegetated Wetlands, where the Division specifically finds that owing to circumstances relating to the soil conditions, slope, or topography of the land affected by such Structures, Uses or Activities, desirable relief may be granted without substantial detriment to the public good and without impairing the quality of water in the Watersheds.

(b) *Presumptions and Standards for Required Findings.*

1. There shall be a presumption that granting a variance from the applicability of St. 1992 c. 36 and 350 CMR 11.00 to specific Structures, Uses and Activities is contrary to the achievement of the purpose of St. 1992 c. 36. This presumption may be rebutted only by the submission of credible evidence by the Person submitting the application for variance to establish that such variance may be granted without substantial detriment to the public good and without impairment of water quality in the Watersheds.

2. The standard of substantial detriment to the public good shall mean a factual determination by the Division of the overall effect of the proposed Structure, Use or Activity at a particular location in relation to the purpose of St. 1992 c. 36.

3. The standard of impairment of water quality shall mean:

a. the risk of water quality impairment presented by Structures, Uses and Activities which are permissible under all other relevant federal, state and local laws, but would not be permissible under 350 CMR 11.00 without a variance; and

b. the cumulative risk of water quality impairment from all Structures, Uses and Activities allowed under current regulations over time.

(c) *Applications.* Any Person Owning an Interest in Real Property may make an application for variance to the Division (See 350 CMR 11.13) by filing the same by certified mail or hand delivery with the Division at the address specified in 350 CMR 11.11. A copy of the application for Variance shall be sent to the Department at the address specified in 350 CMR 11.11.

(d) *Detailed Statement.* The application for variance shall include a detailed description of the Structures, Uses and Activities proposed on such Person's property. The application for variance shall include detailed information regarding each specifically enumerated factor stated in 350 CMR 11.06(3)(a). Detailed information regarding each factor shall be provided as follows:

1. *Soil Conditions.* A map prepared at a minimum scale of 1"=100' indicating the soil types as mapped by the USDA Soil Conservation Service ("SCS") shall be provided. Site specific soils data, including borings, test pits and percolation tests, may be submitted including copies of all field logs, notes, observations, conclusions and test methods employed. A detailed analysis of the soil characteristics of erodibility and permeability shall be provided. Permeability should be described in terms of percolation rate measured as minutes per inch as specified in Title 5 (310 CMR 15.00).

2. *Slope.* Calculations of the ground slope at all lands within the areas that would be subject to St. 1992 c. 36 if the variance were not granted shall be provided. The results of such calculations shall be presented graphically on a map prepared at a

scale of 1"=100' or larger, expressed as percent slope. Where applicable, the average slope of a Tributary measured as the change in elevation divided by the distance in stream miles from the upstream point of the Tributary at or near such Person's property to the downstream point of the Tributary at or near such Person's property shall also be stated.

3. *Topography.* A topographical plan at a minimum scale of 1"=100' or larger showing contour elevations at two foot intervals shall be submitted. Said plan shall be prepared and stamped by a professional surveyor or engineer registered in the Commonwealth of Massachusetts and shall show the location of all areas which would be subject to St. 1992 c. 36 if the variance were not granted. The plan shall show the location of all Ground water, soil and percolation test locations. Such topographic information as depth to the maximum annual high Ground water table, depth to ledge or refusal, and distances from all mapped and unmapped streams, ponds and water bodies shall also be provided.

4. *Water Quality.* The application shall include a detailed analysis of the impacts on Surface Water and, where applicable, Ground water quality of any proposed Structure, Use or Activity which would be allowed if the variance is granted. An evaluation of the potential impact of such proposed Structure, Use or Activity on water quality by reference to the Department's Surface Water Quality Standards for Class A Surface Waters and Outstanding Resource Waters of the Commonwealth, set forth in 314 CMR 4.00 *et seq.*, and/or where applicable, the Massachusetts Ground Water Quality Standards, set forth in 314 CMR 6.00 *et seq.* shall be provided. The application shall include the water quality data and results to support each analysis and shall provide a detailed description of any methodology employed in performing such analysis to show that water quality will not be impaired by the Structure, Use and Activity for which the variance is being requested, whether during construction or upon continued use or operation of such Structure, Use or Activity.

5. *Mitigating Measures.* The application shall include an analysis of any mitigating measures which will be used which would enable the Division to grant a variance without substantial detriment to the public good and without impairing the quality of water in the Watersheds.

(e) *Additional Materials.* All surveys and additional materials or studies required to act on an application for variance, whether or not requested by the Division, shall be prepared and delivered at the sole cost of the Person submitting the application.

(f) *Public Hearing.* Within 30 days of the Date of Submission of the application for variance with the Division, the Division shall hold a public hearing. Notice of the time and place of the public hearing shall be given by the Division, at the expense of the Person who submitted the application, not less than five days prior to such hearing by publication in a newspaper of general circulation in the city or town where the property in question is located and by mailing a copy of such notice to the Person who submitted the

application at the address specified in the application, and to the Building Inspector, Conservation Commission, and Board of Health in such city or town. At the request of the Person who submitted the application filed with the Division at least two days before the date of such hearing, the date of the hearing may be rescheduled to a time which is mutually convenient for such Person and the Division, provided that such rescheduled time shall permit re-publication of notice as provided herein.

The public hearing may be continued, with the consent of the Person who submitted the application, to an agreed upon date, which shall be announced at the hearing. At the public hearing, such Person may be represented by counsel and/or professional consultants and may present oral or written evidence and oral or written testimony of witnesses.

(g) *Variance Decision.* Within 30 days of the close of the public hearing, the Division shall issue a written Variance Decision on the application for variance. If the variance is granted, the Division may impose in the Variance Decision such reasonable conditions, safeguards and limitations as it may find desirable in its sole discretion, which, based on the application for variance and the evidence presented at the public hearing, are necessary to protect the water in the Watersheds. If a variance is denied, the Variance Decision shall contain a brief statement of the reasons for the denial. The granting of a variance is limited to the provisions of St. 1992 c. 36. All other applicable laws, regulations and ordinances shall not be affected by the granting of a variance.

(h) *Recording of Variance Decision.* No variance granted hereunder shall take effect until a Variance Decision (See 350 CMR 11.13) shall have been recorded and indexed in the grantor index in the registry of deeds or registered in the registry district of the land court for the county or district where the property is located, containing any conditions applicable thereto and describing the land by metes and bounds or by reference to a recorded or registered plan showing the property's boundaries.

(i) *Appeal.* A Person to whom a Variance Decision is issued, who seeks to appeal the Division's Variance Decision, shall file a Notice of Claim for an Adjudicatory Proceeding with the Commission at the address specified in 350 CMR 11.11 within 21 days from the Date of Issuance of the Variance Decision by the Division. The procedures for appeal before the Commission shall be as set forth in 801 CMR 1.00 *et seq.* At the time of filing of such Notice of Claim, a copy shall also be filed with the Division.

#### (4) Exemption of a Tributary

(a) *Exemption of a Tributary.* The Division, in consultation with the Department, may exempt a Tributary, or portions thereof, upon a determination that such exemption will pose no significant risk to the quality of water, after taking into account the following factors:

1. rate of flow;

2. slope;
3. soil characteristics;
4. proximity to a Reservoir or the Ware River above the Ware River intake;
5. the current level of water quality; and
6. the current degree of development.

(b) *Presumptions and Standards for Required Findings.*

1. The standard of no significant risk to the quality of water refers to:
  - a. the risk of water quality impairment presented by Structures, Uses and Activities which are permissible under all other relevant state, federal and local laws, but would not be permissible under 350 CMR 11.00 without an exemption; and
  - b. the cumulative risk of water quality impairment from all Structures, Uses and Activities allowed under current regulations over time.
2. There shall be a presumption that exempting a Tributary or portion thereof is contrary to the achievement of the purpose of St. 1992 c. 36. The presumption may be rebutted only by the submission of credible evidence by the Person submitting the request for Exemption to establish that such exemption will pose no significant risk to the quality of water, taking into account the factors enumerated at 350 CMR 11.06(4)(a).

(c) *Requests for Exemption.*

1. A request for Exemption of a Tributary may be made by:
  - a. An affected landowner;
  - b. Any state agency or regional planning commission;
  - c. The Board of Selectmen, City Council, Mayor, Planning Board or Conservation Commission of any city or town which would be affected by the exemption; or
  - d. The Governor or any member of the General Court.
2. A request for Exemption of a Tributary shall be made to the Division (See 350 CMR 11.13) by filing the same by certified mail or hand delivery with the Division at the address specified in 350 CMR 11.11. A copy of the request for

Exemption of a Tributary shall be sent to the Department at the address specified in 350 CMR 11.11.

(d) *Detailed Statement.* The request for Exemption of a Tributary shall include detailed information regarding each specifically enumerated factor listed in 350 CMR 11.06(4)(a)1. through 6. Such detailed information shall be provided based on conditions existing as of the time of the request and based on conditions which would, or may, result if such exemption were granted and if development occurred to the maximum extent and type allowed by current law. Detailed information on each factor shall be provided as follows:

1. *Flow Rate.* The request shall include the flow rate of the Tributary stated as the annual average daily stream flow, reported as cubic feet per second (“cfs”) as measured at the downstream point of discharge for the Tributary or portion thereof, taking into account the entire contributing drainage area. Such flow rate may be based on field data collected in accordance with accepted stream flow measurement methods as established by the United States Geologic Survey, or estimated based on procedures established by the United States Geologic Survey. The request shall describe, in depth, the basis and method employed for the reported flow rate to assess full build-out scenarios.

2. *Slope.* The request shall state the average slope at the Tributary measured as the change in elevation divided by the distance in stream miles from its source to the downstream point of discharge. The ground slope of all lands adjacent to the Tributary within the areas that would be subject to St. 1992 c. 36 if the exemption were not granted shall be calculated and the results of such calculations shall be presented graphically on a map prepared at a scale of 1”=100' or larger, expressed as percent slope.

3. *Soil Characteristics.* A map prepared at a minimum scale of 1”=100' shall be submitted indicating the soil types as mapped by the SCS. Site specific soils data supporting or contradicting the SCS soil mapping including borings, test pits and percolation tests may be submitted including copies of all field logs, notes, observations, conclusions and test methods employed. A detailed analysis of the soil characteristics of erodibility and permeability shall be provided. Permeability should be described in terms of a percolation rate measured as minutes per inch as specified in Title 5 (310 CMR 15.00).

4. *Proximity to a Reservoir or the Ware River above the Ware River Watershed.* Proximity of the Tributary proposed to be exempted to a Reservoir or the Ware River above the Ware River intake shall be indicated by reference to the Protection Zone, defined by the Department's Division of Water Supply, Watershed Resource Protection Plan Policy as Zone A, Zone B and Zone C. The measured distance in stream miles from the downstream discharge point of the Tributary or portion thereof in question from that Tributary's ultimate point of

confluence with a Reservoir or stream miles above the Ware River intake shall be stated.

5. *Water Quality.* The request shall include water quality monitoring data for the Tributary consisting of, at a minimum, monthly samples for a continuous one year period at a sampling station located at or near the downstream point of discharge of the Tributary or portion thereof for which exemption is requested. Water quality data of the Division and the Department may be utilized in satisfaction of this requirement where such data is available. Minimum analysis shall include fecal coliform bacteria, color, turbidity, temperature, pH, dissolved oxygen, total suspended solids, total phosphorus, ammonia nitrogen and chloride. A detailed analysis of the water quality data with reference to the Department's Surface Water Quality Standards for Class A Surface Waters and Outstanding Resource Waters of the Commonwealth, 314 CMR 4.00 et seq., shall be provided. The request shall include a detailed analysis of the impact on water quality of any potential Structures, Uses or Activities allowed if the exemption is granted.

6. *Development.* A general plan showing existing land use within the contributing drainage area upstream at the point of discharge of the Tributary or portion thereof shall be provided. The request shall include a calculation of the percent imperviousness of the contributing drainage area based on the existing land uses shown and shall indicate the change of percent imperviousness which may result from any Structures, Uses or Activities allowed or proposed if the exemption is granted.

7. *Other Information.* The request shall include a detailed description of the Structures, Uses and Activities which are or may be proposed to occur within those areas which would be subject to St. 1992 c. 36 without the exemption and shall include an analysis of any mitigating measures which will be used which would ensure that granting the exemption would present no substantial risk to the quality of water.

(e) *Additional Materials.* All surveys and additional materials or studies required to act on a request for Exemption of a Tributary, whether or not requested by the Division, shall be prepared and delivered at the sole cost of the Person submitting the request.

(f) *Public Hearing.* Within 30 days of the Date of Submission of the request for Exemption of a Tributary with the Division and the Department, the Division and the Department shall hold a public hearing. Notice of the time and place of the public hearing shall be given by the Division, at the expense of the Person who submitted the request, not less than five days prior to such hearing by publication in a newspaper of general circulation in the city or town where the property in question is located and by mailing a copy of such notice to the Person who submitted the request at the address specified in the request, and to the Building Inspector, Conservation Commission and Board of Health in such city or town. At the request of the Person who submitted the request filed with the Division at least two days before the date of such hearing, the date of the hearing

may be rescheduled to a time which is mutually convenient for such Person, the Division and the Department, provided that such rescheduled time shall permit re-publication of notice as provided herein. The public hearing may be continued, with the consent of the Person who submitted the request, to an agreed upon date, which shall be announced at the hearing. At the public hearing, such Person may be represented by counsel and/or professional consultants and may present oral or written evidence and oral or written testimony of witnesses.

(g) *Exemption Decision.* Within 60 days of the close of the public hearing, the Division shall issue a written Exemption Decision on the request for Exemption of a Tributary. If the exemption is granted, the Division may impose in the Exemption Decision such reasonable conditions, safeguards and limitations as it may find desirable in its sole discretion, which, based on the request for Exemption of a Tributary and the evidence presented at the public hearing, are necessary to protect the water in the Watersheds. If the exemption is denied, the Exemption Decision shall contain a brief statement of the reasons for the denial. The granting of an exemption is limited to the applicability of St. 1992 c. 36. All other applicable laws, regulations and ordinances shall not be affected by the granting of an exemption.

(h) *Notice of Exemption.* Notice of the Exemption Decision shall be mailed to the Person who submitted the request, and to the City Council or Board of Selectmen in the city or town where the Tributary is located. Notice shall also be published once in a newspaper of general circulation in such city or town, provided, however, that a failure to publish shall not affect the validity of the Exemption Decision. A record of the Exemption Decision shall be kept on file with the Division and, if a Tributary or portion thereof is exempted, the affected area shall be shown on the most recent edition of the Massachusetts Geographic Information System Map (See 350 CMR 11.07).

(i) *Appeal.* A Person to whom an Exemption Decision is issued, who seeks to appeal the Division's Exemption Decision, shall file a Notice of Claim for an Adjudicatory Proceeding with the Commission at the address specified in 350 CMR 11.11 within 21 days from the Date of Issuance of the Exemption Decision by the Division. The procedures for appeal before the Commission shall be as set forth in 801 CMR 1.00 et seq. At the time of filing of such Notice of Claim, a copy shall also be filed with the Division.

(5) Work Pending Appeal of Applicability Decision, Variance Decision or Exemption Decision - No Alterations shall be made or Structures, Uses or Activities commenced until a final administrative or judicial determination has been made and all appeal periods shall have expired if the Division issues:

(a) an Applicability Decision that the property is located in an area regulated by St. 1992 c. 36, that the Structures, Uses or Activities proposed are prohibited by St. 1992 c. 36 under 350 CMR 11.04(3), or that the Structures, Uses or Activities will impair or materially impair the quality of water in the Watersheds; or

- (b) a Variance Decision denying the variance requested in an application for variance; or
- (c) an Exemption Decision denying a request for Exemption of a Tributary.

### **11.07: Maps**

(1) *Aquifers*. The location and potential well yield of Aquifers shall be determined by reference to the most recent edition of maps generated by the Massachusetts Geographic Information System based on the United States Geological Survey Water Resource Atlases.

(2) *Flood plains*. The location of Flood plains shall be made by reference to the most recent edition of the Flood Hazard Boundary Maps issued by the Federal Emergency Management Agency.

(3) *Surface Waters and Tributaries*. The location of Surface Waters and Tributaries shall be determined by reference to the most recent edition of maps generated by the Massachusetts Geographic Information System based on the United States Geological Survey, 1 to 25,000 scale quadrangle maps.

(4) *Adoption of More Accurate Maps*. With respect to any of the maps referred to in 350 CMR 11.07, the Division, in consultation with the Department, may adopt more accurate maps pursuant to notice and a public hearing as provided by M.G.L. c. 30A. The Division shall file any of such maps which are adopted with the Clerk of the House of Representatives and Clerk of the Senate and such maps shall not take effect until 90 days have elapsed from the time of said filing. Copies of maps which have taken effect shall be filed with the Chief Executive Officers of all cities and towns within the Watersheds, provided that the Division's failure to do so shall not invalidate the maps or any actions taken by the Division in connection therewith.

### **11.08: Relationship of Act with other State and Municipal Statutes, Ordinances and Regulations**

350 CMR 11.00 is intended solely for use in administering St. 1992 c. 36; nothing contained herein should be construed as preempting or precluding more stringent protection of the areas regulated by St. 1992 c. 36 by other statutes, ordinances, by-laws or regulations. The duties and obligations imposed by St. 1992 c. 36 shall be in addition to all other duties and obligations imposed by any general or special law or regulation or any by-law, ordinance or regulation lawfully adopted pursuant thereto.

### **11.09: General Rules and Regulations for the Protection of Watersheds and the Watershed System**

In order to facilitate review of all regulations promulgated by the Commission and the Division relating to Watersheds and the Watershed System, this Section includes regulations of general applicability to Waters of the Watershed System. The regulations in 350 CMR 11.09 are intended to supersede the regulations in 310 CMR 23.00, 350 CMR 8.01, 350 CMR 9.00, and 350 CMR 10.00.

(1) Waters of the Watershed System.

(a) No Person shall take or divert any Waters of the Watershed System of the Commission and no Person shall corrupt, render impure, waste or improperly use any such water.

(b) No Person shall:

1. engage in any construction activity involving filling, dredging, grubbing or altering land without adequate provisions to prevent erosion resulting in clay, silt or other turbidity laden waters from entering the Waters of the Watershed System;
2. construct, establish or maintain any agricultural facility or place where animal manure may be deposited or accumulated without adequate provision to prevent any manure or other Pollutant from flowing or being washed into the Waters of the Watershed System;
3. engage in any other activity which could degrade the quality of Waters of the Watershed System or interfere with their use as a source of water supply.

(c) No Person shall allow a condition to exist on such Person's property which could result in the direct or ultimate discharge of any Pollutant into the Waters of the Watershed System.

(d) Any records of any board of health or health agent concerning matters within the Watershed shall be open to inspection by the employees and agents of the Commission and the Department.

(e) Whenever an incident occurs, is likely to occur, or a situation exists that threatens to add Pollutants to the Waters of the Watershed System, the Person causing or contributing to the pollution or potential pollution shall notify the Commission and the Department immediately.

(2) Watershed System.

(a) General Regulations.

1. Entrance on and exit from land of the Watershed System shall be made through gates or other designated areas.
2. No Person is allowed within any land of the Watershed System, except from one hour before sunrise to one hour after sunset, unless authorized by a written permit from the Commission or its designee.
3. Powered boats are prohibited within the Waters of the Watershed System except in areas designated by the Commission or its designee.

4. All acts which pollute or may pollute the water supply are prohibited. No litter or refuse of any sort may be thrown or left in or on any land or water within any Watershed System. All Persons within said System shall use the sanitary facilities provided for public use.

5. All acts which injure the property of the Commonwealth are prohibited. No Person shall injure, deface, destroy, remove or carry off any property, real or personal, under the care and control of the Commission, including but not limited to, all historic artifacts and natural materials. The removal of gravel, topsoil, stones, boulders, or other earthen material is prohibited from the Watershed System except for removal for official use for land management purposes by Commission staff. No Person shall build or construct any object or structure of the property of the Commonwealth except with the written permission of the Commission or its designee.

6. Cooking and all fires are prohibited within the Watershed System.

7. No Person shall wade or swim in any reservoir except wading while using boots for the purpose of launching boats at designated boat launch areas.

8. No Person shall wade or swim in any Tributary or Surface Waters on or within the property of the Commonwealth except at areas designated by the Commission or its designee.

9. Organized sports activities, including but not limited to orienteering and baseball, are prohibited in the Watershed System except by written permit from the Commission or its designee.

10. Any violation of 350 CMR 11.09 will be deemed sufficient cause for revocation of fishing privileges for a period of time not less than one year from the time of violation. The Commission and its employees are not responsible for any damage to or loss of property sustained by fishermen, or for any injury or loss of life which may be incurred in connection with public use of the reservoirs and Watershed System.

11. Breach of peace, profanity or other disorderly conduct offensive to the general public is strictly prohibited within the Watershed system. Possession of and drinking of alcoholic beverages is prohibited within said System.

12. No Person shall drive a motorized vehicle within the Watershed System except upon roads authorized for such use by the Commission or its designee. Recreational vehicles are prohibited on all Watershed System property except the use of snowmobiles in areas designated by the Commission or its designee. Motor vehicles shall be parked only in areas designated by the Commission or its designee. Operators of motor vehicles shall obey all regulatory signs unless otherwise directed by a police officer or person in charge. No Person shall

willfully obstruct the free passage of vehicles or Persons within the Watershed System. Vehicle access for official use may be granted by the Commission or its designee.

13. No Person shall bring any animal within any Watershed System property except for horses and dogs at the Ware River Watershed at areas designated by the Commission or its designee.

14. The use of bicycles, skis and other means of non-motorized transportation within the Watershed system shall be permitted only in areas designated by the Commission or its designee.

15. No Person, except in an emergency, shall bring, land or cause to descend within any Watershed System property any aircraft except with a written permit from the Commission or its designee.

16. Parades, games, fairs, carnivals, fishing derbies, bazaars, gifts or solicitations for raising or collecting funds shall not be permitted within the Watershed System without written approval of the Commission or its designee.

17. Lotteries, raffles, gambling and games of chance are prohibited; and no Person shall have possession of machinery, instruments or equipment of any kind for use of same in the Watershed System.

18. Public assemblies of more than 25 persons shall not be allowed within the Watershed System without a written permit from the Commission or its designee.

19. No Person shall engage in any business, sale or display of goods or wares within the Watershed System without a written permit from the Commission or its designee.

20. Commercial signs and advertising are prohibited in the Watershed System.

21. No Person shall have possession of or discharge any weapon, firearm, fireworks, or other explosive on or within the Watershed System except at times and areas designated by the Commission or its designee. All forms of target shooting are prohibited on or within the Watershed System.

22. No Person may hunt, shoot or trap animals on or within any Watershed System property except at times and in areas designated by the Commission or its designee.

23. All Persons within the Watershed System shall obey the lawful directions of regulatory signs, police officers or persons in charge, or of Federal or Commonwealth wardens or enforcement officers.

24. The Watershed System or parts thereof may be closed for public access at the discretion of the Commission or its designee when necessary to protect the lands and waters under the care and control of the Commission.

25. The possession of all types of metal detectors or similar devices is prohibited on all of the Watershed System property.

(b) Special Regulations for Quabbin Reservoir.

1. Persons in compliance with Commonwealth Fish and Game Laws and Regulations, will be allowed to fish from shore in areas designated by the Commission or its designee. A valid state fishing or sporting license is required by any Person renting or launching a boat at any Commission facilities subject to 350 CMR 11.09. Reasonable fees for the use of boats, for rental of outboard motors for fishing purposes, or use of Commission facilities including parking and boat ramps, may be charged by the Commission.

2. Persons permitted to fish from boats shall, at all times, be responsible for the sanitary condition of the boats. Persons under 16 years of age must be accompanied by a Person possessing a valid fishing license in order to boat on Quabbin Reservoir.

3. Only boats of a minimum length of 12 feet, and of a type considered safe by the Commission representative in charge, shall be used. No inboard motors, collapsible boats, sailboats, pontoon boats, square sterned canoes, or other similar craft will be permitted in the water, and no boats will be permitted in the water except in areas designated for boating by the Commission or its designee. Outboard motors shall have a rating of not more than one-half the BIA or OBC rated horsepower for the boat and shall not exceed 20 horsepower, except that outboard motors for Commission boats less than fourteen 14 feet six inches in length shall not exceed ten horsepower. Boats less than 14 feet six inches in length will be limited to three occupants, and boats of that length and in excess thereof may be licensed to carry four occupants. No boats shall carry more than four occupants. Canoes and jon boats of a minimum length of 12 feet, and of a type considered safe by the Commission representative in charge, shall be used and only in areas designated for boating by the Commission on Pottapaug Pond above the regulating dam and at Gate 31 above the regulating dam. Canoes less than 16 feet and jon boats less than 14 feet six inches in length will be limited to two occupants, and canoes and jon boats in excess thereof may be licensed to carry three occupants. All boats must be in compliance with current Commonwealth Boating Laws. All boats must be clean and contain no refuse of any kind. Commission personnel shall have the right to inspect all private boats launched at Commonwealth facilities and may deny access in order to protect water quality or the safety of occupants. Chock blocks must be used on vehicles when removing boats from the Reservoir.

4. No Person shall operate a motor boat at a speed other than reasonable and proper or in such a manner as to annoy or endanger the occupants of other boats.

5. Fishing from the shorelines of the Quabbin Reservoir and its Tributaries within the Watershed System or from boats shall be allowed only during a season designated by the Commission or its designee. All privately-owned boats, motors and other equipment must be removed from the property of the Commission each day.

6. Boats shall not leave the mooring areas before dawn, and must return at the time posted at each mooring area. The beaching of boats at any point except at the designated mooring and landing areas is strictly prohibited, except in cases of extreme emergency.

(c) Special Regulations for Ware River.

1. Persons in compliance with Commonwealth Fish and Game Laws and Regulations will be allowed to fish in the Ware River in areas designated by the Commission or its designee.

2. Powered boats and powered canoes are prohibited within the Ware River Watershed Reservation.

(d) Special Regulations for Wachusett Reservoir.

1. Persons in compliance with Commonwealth Fish and Game Laws and Regulations will be allowed to fish from the shore of Wachusett Reservoir in areas designated by the Commission or its designee.

2. Boating is prohibited in Wachusett Reservoir.

3. Fishing from the shoreline of the Reservoir shall be allowed only during a season designated by the Commission or its designee.

(e) Special Regulations for Sudbury Reservoir.

1. Persons in compliance with Commonwealth Fish and Game Laws and Regulations will be allowed to fish from the shore of Sudbury Reservoir in areas designated by the Commission or its designee.

2. Boating is prohibited on Sudbury Reservoir except in areas designated by the Commission or its designee.

### **11.10: Enforcement**

Any Person who, without lawful authority, takes or diverts any Waters of the Watershed System or corrupts or defiles any such Waters or any source of such Waters or who violates and refuses to comply with any rule, regulation or order of the Commission shall be subject to the fines set forth in M.G.L. c. 92, ' 111. The provisions of 350 CMR 11.00 shall be enforced upon petition of the Commission or of any town or Person interested by the Supreme Judicial Court or Superior Court or any justice of either court as provided in M.G.L. c. 92, ' 112. In addition, upon written request by the Division, the Department shall have the authority to enforce the provisions of St. 1992 c. 36 and 350 CMR 11.00 by all legally permitted enforcement mechanisms including, but not limited to: issuing notices of noncompliance; convening pre-enforcement conferences; issuing water supply orders pursuant to M.G.L. c. 111, ' 160; and imposing administrative penalties pursuant to M.G.L. c. 21A, ' 16 and 310 CMR 5.00. Such written request by the Division to the Department may seek enforcement for a specified type of violation or area, for a designated group of cases or for an individual matter.

### **11.11: Miscellaneous**

#### (1) Addresses - Offices of Division

Department of Conservation and Recreation

Quabbin Reservoir

485 Ware Road

Belchertown, Massachusetts 01007

Department of Conservation and Recreation

Wachusett Reservoir

P.O. Box 206

Clinton, Massachusetts 01510

#### (2) Address of Commission -

Department of Conservation and Recreation

251 Causeway Street, Suite 600

Boston, Massachusetts 02114

#### (3) Address of Department -

Department of Environmental Protection

Commonwealth of Massachusetts

Regional Division

One Winter Street

Boston, Massachusetts 02108

(4) Access to Property by Division - Any Person making a request for Watershed determination of applicability, an application for variance or a request for Exemption to the Division shall, upon request, allow the Division or its duly authorized representatives to inspect the property in question in order to assist the Division in the determination which is to be made. Personnel of the Division may enter, at reasonable times, any property, public or private, for the purpose of investigating or inspecting any condition relating to the discharge or possible discharge of Pollutants into the Watershed System and may make such tests as may be necessary to determine the existence and nature of such discharge as provided in M.G.L. c. 21, ' 4.

#### **11.12: Severability**

If any provision or any part of 350 CMR 11.00 or the application thereof is held to be invalid, such invalidity shall not affect any other provision of 350 CMR 11.00.

#### **11.13: Forms**

Forms for use under the Watershed Protection Act shall be as follows:

Form 1 - Request for Watershed Determination of Applicability

Form 2 - Applicability Decision

Form 3 - Application for Variance

Form 4 - Variance Decision for Recording in Registry of Deeds

Form 5 - Request for Exemption of a Tributary

Forms 1, 3 and 5 and a Guidance Document, which may be of assistance in completing the forms, may be obtained from the Division at the addresses specified in 350 CMR 11.11(1) and (2).

#### **REGULATORY AUTHORITY**

350 CMR 11.00: St. 1992, c. 36.



## Appendix B: Chronology of Government Bodies Associated with Boston’s Metropolitan Water Works System

This chronology was developed in 2005 by Sean Fisher, DCR Archivist.

Year(s)	Action
1836	St 1836, c 272: Boston Hydraulic Company [1836-18??] incorporated.
1843	St 1843, c 76: Spot Pond Aqueduct Company [1843-18??] incorporated (see also St 1845, c 219).
1846	St 1846, c 167: “An Act for Supplying the City of Boston with Pure Water”; Long Pond (renamed Lake Cochituate) selected as the water supply source.
1846-1850	Boston Water Commissioners [1846-1850] established and authorized to construct, maintain and operate Cochituate Water Works.
1846-1848	Lake Cochituate constructed.
1848	Boston City Document No. 50 (1848): Celebration of the Introduction of the Water of Cochituate Lake into the City of Boston, October 25, 1848.
1850	1st Cochituate Water Board [1850] established for one year to maintain and operate Cochituate Water Works.
1851-1876	2nd Cochituate Water Board [1851-1876] established to maintain and operate Cochituate Water Works.
1860	George R. Baldwin and Charles L. Stevenson publish <i>Report on Supplying the City of Charlestown with Pure Water</i> (written in 1859). This report recommends the Mystic Pond as the water supply source.
1861	St 1861, c 105: “An Act for Supplying the City of Charlestown with Pure Water”.
1862-1865	Water Commissioners of the City of Charlestown Water Works [1862-1865] is a government body of the City of Charlestown established to construct the Charlestown Water Works (also known as the Mystic Water Works) as recommended by the 1860 report.
1862-1864	Charlestown Water Works constructed.
1865-1876	Mystic Water Board [1865-1876] is a government body of the City of Charlestown established to maintain and operate the Charlestown Water Works.
1865	<i>Report of the Commissioners and Chief Engineer of the Charlestown Water Works</i> , February 1865, is published and provides a history of its construction.
1867-1871	Mystic Water Board supplies water, in addition to Charlestown, to Chelsea, Somerville, East Boston, and Everett.
1867	St 1867, c 208: Spot Pond Water Company [1867-1870] incorporated.
1868	Cochituate Water Board publishes <i>A History of the Introduction of Pure Water into the City of Boston, with a Description of its Cochituate Water Works, etc.</i> , 1868 (written by Nathaniel J. Bradlee).
1870	St 1870, c 160: Towns of Melrose, Malden and Medford purchase the Spot Pond Water Company, and the Water Commissioners of these three towns are authorized to construct, manage and operate Spot Pond Water Works (see also St 1887, c 388).
1872	St 1872, c 177: Sudbury River Act authorizes the Cochituate Water Board to provide for an additional water supply.

Year(s)	Action
1873	Boston City Document No. 29 (1873): Report of the Cochituate Water Board on an Additional Supply of Water for the City of Boston recommends a plan to implement the Sudbury River Act of 1872.
1874	City of Boston annexes the City of Charlestown.
1875-1880	Sudbury River Conduit constructed by Cochituate, then Boston, Water Board as recommended by Boston City Document No. 29 (1873).
1875	St 1875, c 80: Cochituate Water Board and Mystic Water Board merge together to form the Boston Water Board [1876-1895].
1876	Boston Water Board publishes <i>History of the Boston Water Works from 1868 to 1876</i> (written by Desmond FitzGerald).
1882	Boston Water Board publishes <i>Boston Water Works: Additional Supply from Sudbury River: Description of the Work</i> (written by Alphonse Fteley).
1892	St 1892, c 371: City of Boston Park Commission is authorized to take the lands of the Jamaica Pond Aqueduct Corporation [1795-1893], and through an agreement between the Park Commission and the Boston Water Board, the Water Board takes the Corporation's pipe system.
1893	St 1893, c 459: "An Act Relative to Procuring a Water Supply for the City of Boston and its Suburbs" authorizes the State Board of Health to investigate a metropolitan water supply.
1895	House No. 500: Report of the Massachusetts State Board of Health upon a Metropolitan Water Supply, February 1895, recommends the establishment of the Metropolitan Water Board.
1895	St 1895, c 488: Establishment of the Metropolitan Water Board [1895-1901] and authorizes the taking by this Board of the Metropolitan Water Works of the Boston Water Board, and the Spot Pond Water Works of the Towns of Melrose, Malden and Medford.
1895	St 1895, c 449: Boston Water Board is abolished, and the Boston Water Department is established.
1895	Boston Water Board publishes <i>A Short Description of the Boston Water-Works 1876</i> (written by Desmond FitzGerald).
1896	Construction of Boston Water Board's (now Water Department) Basin/Dam No. 5 (Sudbury) is taken over by the Metropolitan Water Board as authorized by St 1895, c 488.
1898	Maintenance and operations of Boston Water Board's (now Water Department) Metropolitan Water Works is taken over by the Metropolitan Water Board as authorized by St 1895, c 488.
1900	<i>Water Supply and Work of the Metropolitan Water District (Boston and Its Vicinity) in the Commonwealth of Massachusetts</i> is published by the Metropolitan Water Board for the Board of Paris Exposition Managers for Massachusetts.
1901	St 1901, c 168: Metropolitan Water Board merges with the Board of Metropolitan Sewerage Commissioners [1889-1901] to form the Metropolitan Water and Sewerage Board [1901-1919], within which there is the Water Works. The two boards as separate government bodies are abolished.
1906	As a result of the Annual Convention of the American Water Works Association being held in Boston, Water Works Distribution Department Engineer Dexter Brackett writes a history of the "Metropolitan Water Works" project for the Proceedings.

Year(s)	Action
1919	St 1919, c 350, s 123: Metropolitan Water and Sewerage Board merges with the Metropolitan Park Commission [1893-1919] to form the Metropolitan District Commission [1919-2003], within which there is the Water Division [1919-1985].
1919	Resolve 1919, c 49: A joint board consisting of the Department of Public Health and the Metropolitan District Commission authorized to investigate additional water supply sources.
1922	House No. 1550: Report of the Joint Board consisting of the State Department of Public Health and the Metropolitan District Commission relative to Water Supply Needs and Resources of the Commonwealth, January 1922 (March 1922). This report forms the basis for the functions of the Metropolitan District Water Supply Commission [1926-1947].
1924	St 1924, c 491: A special commission known as the Metropolitan Water Supply Investigating Commission authorized to investigate additional water supply sources.
1925	House No. 900: Report of the Metropolitan Water Supply Investigating Commission Constituted to study further the Water Supply Needs of the Metropolitan District, the City of Worcester and Such Other Cities and Towns as may require Water from the Metropolitan Water System, December 1925 (January 1926). This report was rejected by the Legislature in favor of House No. 1550 (1922), except that the Legislature adopted the recommendation of House No. 900 (1925) of establishing a new agency--the Metropolitan District Water Supply Commission--to construct the system.
1926	St 1926, c 375: The Metropolitan District Water Supply Commission [1926-1947] is established to construct Quabbin Reservoir; the Commissioner of the Metropolitan District Commission concurrently serves as Chairman of this special commission. The MDC Water and Sewerage Divisions remain within the MDC and retain construction, maintenance and operation functions of the existing works.
1932	Dexter Bracket's 1906 history is updated by Chief Engineer William E. Foss and published by the MDC.
1940	October 23: <i>A General Description of the Water Supply of the Boston Metropolitan District and the Work of the Massachusetts Metropolitan District Water Supply Commission in Extending the Sources of Supply and Improving the Methods of Distribution</i> (published on the occasion of the opening of the Commission's New Pressure Aqueduct into Norumbega Reservoir, Weston).
1945	Mystic Reservoir transferred to Tufts College.
1947	St 1947, c 583: The Metropolitan District Water Supply Commission merges into the Metropolitan District Commission, abolishing the special construction commission, and the MDC assumes the maintenance and operations of the Quabbin Reservoir system in its Water Division (as recommended by House No. 1713 [1938]). The remaining and future construction of water and sewerage works is conducted by the newly established Construction Division [1947-1972] (s 2) of the MDC. The MDC Water and Sewerage Divisions retain their maintenance and operation functions.
1947	St 1947, c 557: As recommended by a Special Commission in its Report to the Legislature (House No. 115 [1947]), the Metropolitan District Commission transfer care and control of Lake Cochituate, Ashland Reservoir, Hopkinton Reservoir, and Whitehall Reservoir to the Department of Conservation (later Department of Environmental Management; now DCR) for state park purposes. These reservoirs were no longer required for water supply purposes.
1948-1949	Lawrence Basin of the Chestnut Hill Reservoir transferred to Boston College for construction of athletic stadium.

Year(s)	Action
1956	Forbes Hill Reservoir and Standpipe transferred to the City of Quincy for park purposes.
1972	MDC Construction Division is renamed the Engineering Division (also known as the Construction Engineering Division)
1974-1975	MDC Parks Engineering Division merges into the Engineering Division and retains the name Engineering Division.
1982	<i>City of Quincy v. Metropolitan District Commission, et al.</i> is filed on December 17th in Norfolk County Superior Court, Civil Action (Docket No. 138477). The City of Quincy brings civil action against the MDC and the Boston Water and Sewer Commission and seeks injunctive, remedial and declaratory relief from the pollution of Boston Harbor, Quincy Bay and adjacent waters. In June 1983, three additional parties are joined in the complaint as defendants.
1983	July 8: Judge Paul G. Garrity appoints a Special Master, Harvard Law School Professor Charles M. Haar, to investigate the case.
1983	August 9: Special Master Charles M. Haar issues his findings, entitled <i>Report of the Special Master Regarding Findings of Fact and Proposed Remedies</i> (also known as the Haar Report). One of the recommendations is for the preparation of a financial plan by an independent expert financial consultant “setting forth mechanisms for obtaining the funds necessary to carry out the construction, rehabilitation and maintenance programs recommended in this report” (p.163). The Special Master further recommends that the financial report evaluate whether the sewerage division of the MDC should be “spun off and responsibility placed in an independent, autonomous, self-sustaining financial authority, with the advantages and flexibility of a public authority” (p.165).
1983	September 9: Judge Garrity issues a Procedural Order suspending proceedings so long as all the defendants “make a voluntary moral commitment to accept and to comply with” all of the Special Master's recommendations. August/September: plaintiff and defendants ratify an agreement to comply with the Special Master's recommendations.
1983	November 21: the Executive Office of Environmental Affairs contracts with Bank of Boston's Public Finance Group in compliance with the financial plan recommendation.
1984	February 8: the Public Finance Group of the Bank of Boston, contracted as the financial consultant, issues its report, entitled <i>Protecting Water Resources: A Financial Analysis, A Report Analyzing the Funding Requirements of Water and Sewerage Services in the Boston Metropolitan Area</i> . Here, for the first time since the action was brought before the court in December 1982, the scope was expanded to encompass the metropolitan water system: “Perhaps more frightening, however, was the realization that the financial and organizational structure which had permitted this deterioration to develop and persist was the same structure which today governs the provision and delivery of the region's most basic of needs clean water. In contrast to its failings regarding sewerage, this structure has to date performed a laudatory job of satisfying the Greater Boston area's needs for water resources. Nevertheless, in the very early stages of its research the Bank became increasingly concerned that the same structural flaws which had resulted in Boston Harbor's current plight could, in five to ten years, jeopardize the efficient delivery of water to the region's inhabitants.” (pp.i-ii) Recommendation: “The maintenance and improvement of both the metropolitan water and sewerage systems could be more effectively funded and implemented through a combined authority.” (p.iv)

Year(s)	Action
1984	<p>April 19: Governor Michael Dukakis sends to the Legislature legislation (House No. 5915) for the establishment of a Metropolitan Water Resources Authority that “will transfer to a new, independent authority the operations and capital improvement responsibilities for the metropolitan sewer system and the metropolitan water system now in the charge of the Metropolitan District Commission”; see also H6319, H6363, S2272, and S2363.</p> <p>Note For a detailed account of the Boston Harbor case, see Charles M. Haar, <i>Mastering Boston Harbor Courts, Dolphins, and Imperiled Waters</i> (Harvard University Press, 2005), and Eric Jay Dolin, <i>Political Waters The Long, Dirty, Contentious, Incredibly Expensive but Eventually Triumphant History of Boston Harbor</i> (University of Massachusetts Press, 2004).</p>
1984	<p>December 19: St 1984, c 372: The Water Division, along with the Sewerage Division, of the Metropolitan District Commission, are removed from the Metropolitan District Commission to establish the Massachusetts Water Resources Authority [1985-present]. The Metropolitan District Commission retains maintenance and operation functions of the water supply reservoirs/dams and their watersheds through the establishment of the Division of Watershed Management [1985-2003] (s 42).</p>
1991	<p>July 1991: <i>City of Quincy v. Metropolitan District Commission, et al.</i>, dismissed.</p>
1999	<p>Spot Pond transferred from MWRA to MDC for park purposes.</p>
2002	<p>Chestnut Hill Reservoir transferred from MWRA to MDC for park purposes.</p>
2003	<p>St 2003, c 41: Merges the Metropolitan District Commission [1919-2003] and the Department of Environmental Management [1975-2003] into a new agency called the Department of Conservation and Recreation [2003-present]. DCR shall have three divisions: Division of Urban Parks and Recreation [2003-present] representing the MDC Metropolitan Park System [dating from 1893]; the Division of State Parks and Recreation [2003-present] representing the DEM Division of Forests and Parks [dating from 1898]; and the Division of Water Supply Protection [2003-present] within which there are two offices: Office of Watershed Management representing the MDC Division of Watershed Management [1985-2003] and the Office of Water Resources representing the DEM Office of Water Resources [1956-2003] (see also St 2003, c 26, s 698, and many other sections).</p>
2004	<p>St 2004, c 149, s 27: Creates the Water Supply Protection Trust.</p>