

The background of the cover is a composite image. The main part is a photograph of a forest stream with a stone bridge. The water is flowing over rocks, creating white rapids. The forest floor is covered in fallen leaves, and the trees are green. There are two vertical blue-tinted panels on the right side of the cover. The top panel shows a close-up of trees, and the bottom panel shows a close-up of the stream and rocks.

MASSACHUSETTS Nonpoint Source Management Program Plan 2014-2019



MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection

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CONTENTS

ACRONYMS.....	iv
FOREWORD.....	vi
SECTION 1: INTRODUCTION.....	1
SECTION 2: THE MASSACHUSETTS NPS PROGRAM.....	4
2.1 NPS POLLUTION AND MASSACHUSETTS WATERS.....	4
2.1.1 Definition of Nonpoint Source Pollution	4
2.1.2 Where Does NPS Pollution Occur?	5
2.1.3 Water Resources of Massachusetts	6
2.1.4 NPS Pollution and Water Quality Impairments	7
2.2 PRIMARY ELEMENTS OF THE MASSACHUSETTS NPS PROGRAM.....	9
2.2.1 Section 319 Nonpoint Source Competitive Grants Program.....	9
2.2.2 604(b) Grant Program - Water Quality Management Planning	11
2.2.3 NPS Education and Outreach.....	12
2.2.4 Interagency Activities.....	13
2.2.5 Watershed-Based Planning	14
2.3 MassDEP NPS PROGRAM ADMINISTRATION	14
2.3.1 Staffing and Support.....	14
2.3.2 Grant Proposal Evaluation Criteria	15
2.3.3 Grant and Project Management.....	16
2.3.4 NPS Program Reporting	18
2.3.5 Records and Documentation	19
2.4 NPS PROGRAM REVIEW AND ADAPTIVE MANAGEMENT	19
2.4.1 Adaptive Management.....	20
2.4.2 MassDEP Program Evaluation Objectives.....	21
2.4.3 Program Evaluation Elements	21
SECTION 3: PARTNERSHIPS AND COLLABORATION	24
3.1 SUMMARY OF PRIMARY PARTNER PROGRAMS	24
3.1.1 Massachusetts Department of Environmental Protection	26
3.1.2 Massachusetts Office of Coastal Zone Management (CZM)	32
3.1.3 Massachusetts Department of Agricultural Resources (MDAR)	33
3.1.4 Massachusetts Executive Office of Energy and Environmental Affairs (EEA)	36
3.1.5 Massachusetts Department of Fish and Game (DFG).....	38
3.1.6 Massachusetts Department of Conservation and Recreation (DCR).....	40
3.1.7 United States Environmental Protection Agency (USEPA), Region 1	41
3.1.8 United States Department of Agriculture (USDA)	47
3.2 OTHER PARTNER ORGANIZATIONS.....	50
3.3 PRIMARY SOURCES OF FUNDING TO ADDRESS NPS POLLUTION.....	51



SECTION 4: GOALS, OBJECTIVES AND MILESTONES.....	52
4.1 SECTION OVERVIEW.....	52
4.2 OVERVIEW OF THE PLAN'S VISION AND GOALS.....	52
4.3 MASSACHUSETTS NPS PROGRAM GOALS.....	53
4.4 OVERVIEW OF MATRIX OF NPS PLAN GOALS, OBJECTIVES, AND MILESTONES	54
SECTION 5: PRIORITIES.....	61
5.1 DEFINING PRIORITIES	61
5.1.1 Statewide Issues.....	61
5.2 NPS PRIORITIZATION FRAMEWORK	63
5.2.1 Framework.....	63
5.2.2 Setting Priorities - Tools.....	64
5.2.3 Balancing Priorities - Restoration and Protection	66
5.2.4 Implementing Priorities	67
5.2.5 Priorities and Watershed Planning.....	70
5.2.6 Priorities and the MassDEP NPS Program.....	71
5.3 SOURCES OF NONPOINT POLLUTION AND PRIORITIES	71
5.3.1 Categories of NPS Source Pollution in Massachusetts	72
5.3.2 Best Management Practices (BMPs) to Address NPS Sources	79
5.3.3 Laws and Regulations to Address NPS Sources	81
SECTION 6: MONITORING AND ASSESSMENT	85
6.1 OVERVIEW	85
6.2 KEY MONITORING PROGRAMS	85
6.2.1 MassDEP Division of Watershed Management (DWM).....	85
6.2.2 National Estuary Programs (NEPs)	92
6.2.3 Massachusetts Department of Fish and Game - Division of Fisheries and Wildlife (DFW).....	94
6.2.4 Massachusetts Department of Fish and Game - Division of Marine Fisheries (DMF).....	95
6.2.5 Department of Conservation and Recreation (DCR).....	96
6.2.6 Massachusetts Department of Public Health (DPH)	96
6.2.7 Office of Coastal Zone Management (CZM)	97
6.2.8 Massachusetts Water Resources Authority	97
6.2.9 Other Sources of Data	98
6.3 NPS MONITORING CHALLENGES AND GOALS	103
6.3.1 NPS Monitoring Challenges.....	103
6.3.2 Goals, Objectives and Milestones to Address Monitoring Challenges	104
SECTION 7: MASSACHUSETTS NPS RESOURCE LIBRARY	105
APPENDICES	
A: 2014 List of Priority NPS Impaired Waterbodies	
B: Massachusetts Office of Coastal Zone Management - Coastal Nonpoint Pollution Control Program	
C: Attorney General's Certification (<i>from original 1989 Massachusetts Nonpoint Source Management Plan</i>)	



ACRONYMS

ACEC	Area of Critical Environmental Concern
ACEP	Agricultural Conservation Easement Program
ACPP	Accelerated Conservation Planning Partnership
ACWA	Association of Clean Water Administrators
AEEP	Agricultural Environmental Enhancement Program
Ag-Energy	Agricultural Energy Grant Program
AIP	Agricultural Preservation Restriction Improvement Program
AMA	Agricultural Management Assistance
AU	Assessment Unit
BCG	Biological Condition Gradient
BMP	Best Management Practices
CAPS	Conservation Assessment and Prioritization System
CCA	Climate Change Adaptation
CCC	Cape Cod Commission
CCMP	Comprehensive Conservation and Management Plan
CFR	Code of Federal Regulations
CIG	Conservation Innovation Grants
CNCP	Massachusetts Coastal Nonpoint Pollution Control Program
CPR	Coastal Pollution Remediation
CRP	Conservation Reserve Program
CSO	Combined Sewer Overflow
CSP	Conservation Stewardship Program
CWA	Clean Water Act
CWSRF	Massachusetts Clean Water State Revolving Fund Program
CZARA	Coastal Zone Act Reauthorization Amendments
CZM	Massachusetts Office of Coastal Zone Management
DCR	Massachusetts Department of Conservation and Recreation
DER	Massachusetts Division of Ecological Restoration
DFG	Massachusetts Department of Fish and Game
DFW	Massachusetts Division of Fisheries and Wildlife
DM/WBE	Disadvantaged Minority and Women-owned Business Enterprises
DMF	Massachusetts Division of Marine Fisheries
DPH	Massachusetts Department of Public Health
DQO	Data Quality Objective
DWM	Massachusetts Division of Watershed Management
DWSP	Massachusetts Division of Water Supply Protection
DWSRF	Drinking Water State Revolving Fund
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EPRS	Employee Performance Review System
EQIP	Environmental Quality Incentives Program
EWP	Emergency Watershed Protection
FDI	Fisheries Dependent Investigations
FPE	Floodplain Easement
FSA	USDA Farm Service Agency
FVEP	Farm Viability Enhancement Program
GRTS	Grant Reporting and Tracking System
MACD	Massachusetts Association of Conservation Districts
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MassGIS	Massachusetts Office of Geographic and Environmental Information
MASSTC	Massachusetts Alternative Septic System Test Center

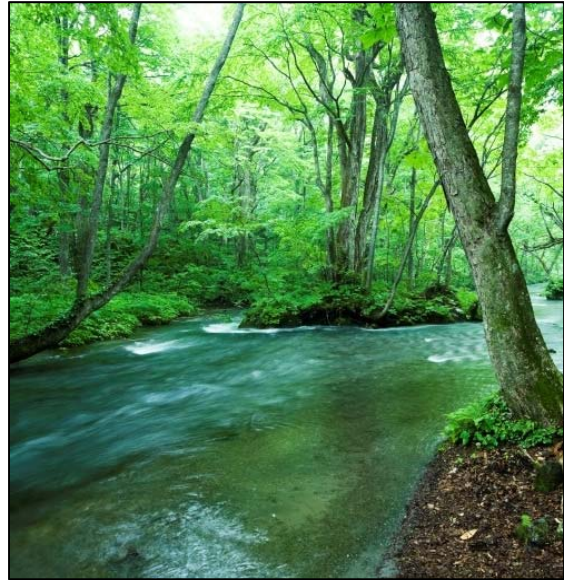


MaSTEP	Massachusetts Stormwater Technology Evaluation Project
MDAR	Massachusetts Department of Agricultural Resources
MEPA	Massachusetts Environmental Policy Act
MET	Massachusetts Environmental Trust
MLTC	Massachusetts Land Trust Coalition
MMARS	Massachusetts Management Accounting & Reporting System
MOU	Memorandum of Understanding
MPRSA	Marine Protection, Research, and Sanctuaries Act
MS4	Municipal Separate Storm Sewer Systems
MWRA	Massachusetts Water Resources Authority
NBEP	Narragansett Bay Estuary Program
NDZ	No Discharge Zone
NEP	National Estuary Program
NFIP	National Flood Insurance Program
NOX	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source Pollution
NRCS	USDA Natural Resources Conservation Service
NRD	Natural Resources Damages
NTP	Notice to Proceed
NWQI	National Water Quality Initiative
OTA	Massachusetts Office of Technical Assistance and Technology
OWR	Massachusetts Office of Water Resources
PCBs	Polychlorinated Biphenyls
PPA	Performance Partnership Agreement
PPG	Performance Partnership Grant
PO	Project Officer
QAPP	Quality Assurance Project Plan
QC/PE	Quality Control/Performance Evaluation
RASP	Resource Assessment Surveys Project
RCPP	Regional Conservation Partnership Program
RPI	Recovery Potential Integrated
RPST	Recovery Potential Screening Tool
SLAM	Site-Level Assessment Methodology
SO ₂	Sulfur Dioxide
SSA	Sole Source Aquifer
SWMI	Sustainable Water Management Initiative
TALU	Tiered Aquatic Life Use
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TSS	Total Suspended Solids
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WBP	Watershed-Based Plans
WHIP	Wildlife Habitat Incentive Program
WMA	Water Management Act
WPP	Watershed Planning Program
WQS	Water Quality Standards



FOREWORD

Since the passage of the Clean Water Act in 1972, states have, with direction from USEPA, dramatically improved the health of the water bodies of the United States. The greatest gains have been achieved by developing and implementing technologies to address pollution flowing into water bodies from fixed or “point” sources, such as industrial discharge outfalls. This is because collection and treatment from point sources, while expensive, is simpler from a technical perspective, more direct, and more measurable than addressing pollution from diffuse or “nonpoint” sources. Consequently, progress to address nonpoint source (NPS) pollution has, in Massachusetts and many other states, lagged behind the progress made to improve discharges from point sources.



NPS pollution can occur anywhere, and is typically most prevalent in areas where land development – ranging from cities to suburban backyards to farm fields - has altered local hydrology and increased the amount of pollutants that can be carried into water bodies by stormwater runoff. For this reason, the management of NPS pollution in Massachusetts is a statewide challenge requiring a cooperative effort between government agencies, private organizations, and the public.

Congress has tasked USEPA to oversee a planning framework which must be implemented by each state to address NPS pollution. This document updates the previous Massachusetts Nonpoint Source Management Program Plan, last updated in 1999. The updated plan follows the NPS Plan guidance provided by USEPA and includes all of the required elements.

This NPS Program Plan identifies both an overarching strategy and specific, measurable actions to reduce the impacts of NPS pollution and improve water quality in Massachusetts. This will be achieved through building and strengthening partnerships among governmental agencies, local watershed stewards, and the private sector, to:

- assess the extent and severity of NPS pollution in Massachusetts’ water bodies;
- develop and implement actions (Best Management Practices) to address NPS pollution in a cost effective manner that mimics natural processes to the extent possible; and
- develop educational programs and materials that inform citizens about the causes and effects of NPS, and alert them to land use decisions that residents can make to protect and enhance water quality in marine waters, rivers, stream, lakes and ponds within the Commonwealth.

For additional guidance regarding NPS pollution in Massachusetts or any aspect of the Massachusetts NPS Program described within this Plan, contact MassDEP at:



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SECTION 1: INTRODUCTION

The Massachusetts Nonpoint Source Management Program Plan (NPS Plan) presents a strategy for preventing, controlling, and reducing pollution from nonpoint sources to protect and improve the quality of the Commonwealth's waters. The NPS Plan was originally developed by the Massachusetts Department of Environmental Protection (MassDEP) and approved by the U.S. Environmental Protection Agency (USEPA) in 1989, pursuant to Section 319 of the Clean Water Act (CWA). Following revisions in 1994 and 1999, the 2014 NPS Plan has been updated to reflect the current priorities of the Massachusetts Nonpoint Source Program, the latest USEPA program guidelines, funding levels, and staff resources for the five-year period of 2014-2019.



MassDEP, as the agency designated to administer CWA programs for the Commonwealth, has established an overall vision for the Massachusetts NPS Program that focuses on protecting and restoring water quality:

Massachusetts NPS Program Vision: *The vision of the Massachusetts NPS Program is to bring the citizens of the state together to restore surface and groundwater impaired by nonpoint source pollution, to protect water quality in healthy watersheds, and to plan for and address human-induced and naturally-occurring changes in the environment.*

The following goals will be the primary focus of the Massachusetts NPS Program over the next 5 years:

1. Identify and expand opportunities to accomplish and leverage work by private, state, local, and federal partners;
2. Restore impaired waters, reduce nonpoint source pollutants, and mitigate the effects of climate change;
3. Protect unimpaired/high quality and threatened waters through planning, education, program coordination, and implementation of climate-ready BMPs;
4. Monitor waters for nonpoint source impairments and improvements to prioritize actions, measure success, and increase program efficacy; and
5. Instill, encourage, and nurture a passion for restoring water quality through education, capacity building, and building new partnerships.

Major updates to the 2014 NPS Plan include the following:

- The 2014 NPS Plan provides a significantly heightened focus on achieving results by identifying specific goals, objectives and measureable milestones for the 5-year planning period (2014-2019).
- An important focus of the NPS Plan is to describe programs and initiatives to strengthen partnerships between NPS partner programs. This includes increased opportunities to leverage funding for NPS pollution projects through improved inter-agency collaboration and program structure.



- The NPS Plan has been updated to remove references to NPS Program activities and partner programs that have changed or no longer exist, and to include current activities and tools that support NPS Program goals. New activities and tools include the Recovery Potential Screening Tool, the Massachusetts Watershed-Based Plan, the Massachusetts Clean Water Toolkit, the updated Coastal Nonpoint Source Control Plan, and new MassDEP monitoring programs that include both probabilistic and deterministic sampling.
- The NPS Plan has been shortened and simplified to make it easier to read and eliminate redundancy. A significant amount of supporting information is provided as a reference via a comprehensive NPS Resource Library (see Section 7).

NPS PLAN STRUCTURE AND REQUIRED ELEMENTS

The NPS Plan is organized into seven sections, as listed below:

Section	Description
1: Introduction	Provides an overview of the NPS Plan, including a summary of each section and a key to where each EPA-required element by can be found within the NPS Plan.
2: The Massachusetts NPS Program	Provides an overview of the state of water quality in Massachusetts and a description of the primary elements of the Massachusetts NPS Program.
3: Partnerships and Collaboration	Summarizes NPS partner programs and how their efforts coordinate to address NPS pollution statewide. Includes specific actions to increase collaboration between NPS partners.
4: Goals, Objectives and Milestones	Describes the state's vision for controlling NPS pollution and long-term goals of its NPS Program. Each long-term goal is further defined by objectives to be achieved between 2014 and 2019, and actions that will be undertaken by MassDEP and NPS partners to help achieve each objective.
5: Priorities	Describes how the state identifies waters impaired by NPS pollution and its priorities for addressing impairments. This section describes the primary categories of NPS pollution in Massachusetts and the major statewide issues will drive the Massachusetts NPS Program over the next five years.
6: Monitoring and Assessment	Describes how the state gathers data on NPS pollution and uses this data to set priorities, develop plans to address sources, and assess the efficacy of actions taken.
7: NPS Resource Library	A compilation of links to supporting documents, laws, and other references within the NPS Plan.

On April 12, 2013, USEPA issued an updated *Nonpoint Source Program and Grants Guidelines for States and Territories*. This guidance describes the eight key components of an effective state NPS Management Program. These eight components are listed below, with references to where each element is located within the 2014 NPS Plan.



USEPA NPS Program Components	MA NPS Plan	
	Section	Pages
1. The state program contains explicit short- and long-term goals, objectives and strategies to restore and protect surface water and ground water, as appropriate.	4	42-49
2. The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.	2	11
	3	17-38
	4	42-49
3. The state uses a combination of statewide programs and on-the-ground projects to achieve water quality benefits; efforts are well-integrated with other relevant state and federal programs.	2	4-15
	3	17-38
	6	67-83
4. The state program describes how resources will be allocated between (a) abating known water quality impairments from NPS pollution and (b) protecting threatened and high quality waters from significant threats caused by present and future NPS impacts.	5	47-66
5. The state program identifies waters and watersheds impaired by NPS pollution as well as priority unimpaired waters for protection. The state establishes a process to assign priority and to progressively address identified watersheds by conducting more detailed watershed assessments, developing watershed-based plans and implementing the plans.	5	47-66
	6	67-83
6. The state implements all program components required by section 319(b) of the Clean Water Act, and establishes strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. The state reviews and upgrades program components as appropriate. The state program includes a mix of regulatory, non-regulatory, financial and technical assistance, as needed.	2-6	all
7. The state manages and implements its NPS management program efficiently and effectively, including necessary financial management.	2	8-16
8. The state reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS management program at least every five years.	2	16-19



SECTION 2: THE MASSACHUSETTS NPS PROGRAM

This chapter provides an overview of the current state of water quality in Massachusetts and a description of the primary elements of the Massachusetts NPS Program.

2.1 NPS POLLUTION AND MASSACHUSETTS WATERS

2.1.1 Definition of Nonpoint Source Pollution

The USEPA provides the following definition of NPS pollution:



Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. The term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act. That definition states:

The term "point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

Unlike pollution from industrial and sewage treatment plants, NPS pollution comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.

<http://water.epa.gov/polwaste/nps/whatis.cfm>

As the definition states, the movement of water "over and through the ground" is a primary means by which water can become polluted by diverse sources that are found across the Massachusetts landscape. Examples of common NPS pollutants and associated land uses include:

- Excess fertilizers, herbicides, and insecticides from residential areas and agricultural lands;
- Oil, grease, and toxic chemicals from urban runoff, waste disposal, and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks; and
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

The major categories of NPS pollution sources in Massachusetts, as described in Section 5.3.1, include:

- Developed Areas
- Transportation
- Agriculture
- Forestry
- Hydromodification
- Atmospheric Deposition
- Landfills, Contaminated Areas and Waste Management Sites
- Natural Resource Extraction



In Massachusetts and throughout the United States, tremendous advances have been made over the past 25 years to clean up the aquatic environment by controlling point source pollution from industries and sewage treatment plants. According to the USEPA, states report that NPS pollution is the leading remaining cause of water quality problems (<http://water.epa.gov/polwaste/nps/whatis.cfm>). The effects of NPS pollutants on specific waters vary and may not always be fully assessed. However, these pollutants are known to have harmful effects on drinking water supplies, recreation, fisheries, and wildlife.

2.1.2 Where Does NPS Pollution Occur?

NPS pollution can occur anywhere. It can be found in polluted stormwater runoff entering lakes in Berkshire County, flowing off the streets of Worcester, and contributing to shellfish bed closures on Cape Cod. However, the prevalence of certain NPS pollutant sources and their degree of impact on receiving waters is often strongly correlated with specific land uses (see discussion in Section 5.3.1) and the density of land development. For example, NPS pollutants associated with pet waste (i.e., bacteria, nutrients) will generally be more prevalent in more densely populated areas that have more pets. In addition to often having a higher prevalence of NPS pollutant sources, more densely developed areas typically have less forest and other naturally vegetated lands that can act as a buffer between NPS pollutants and water bodies.



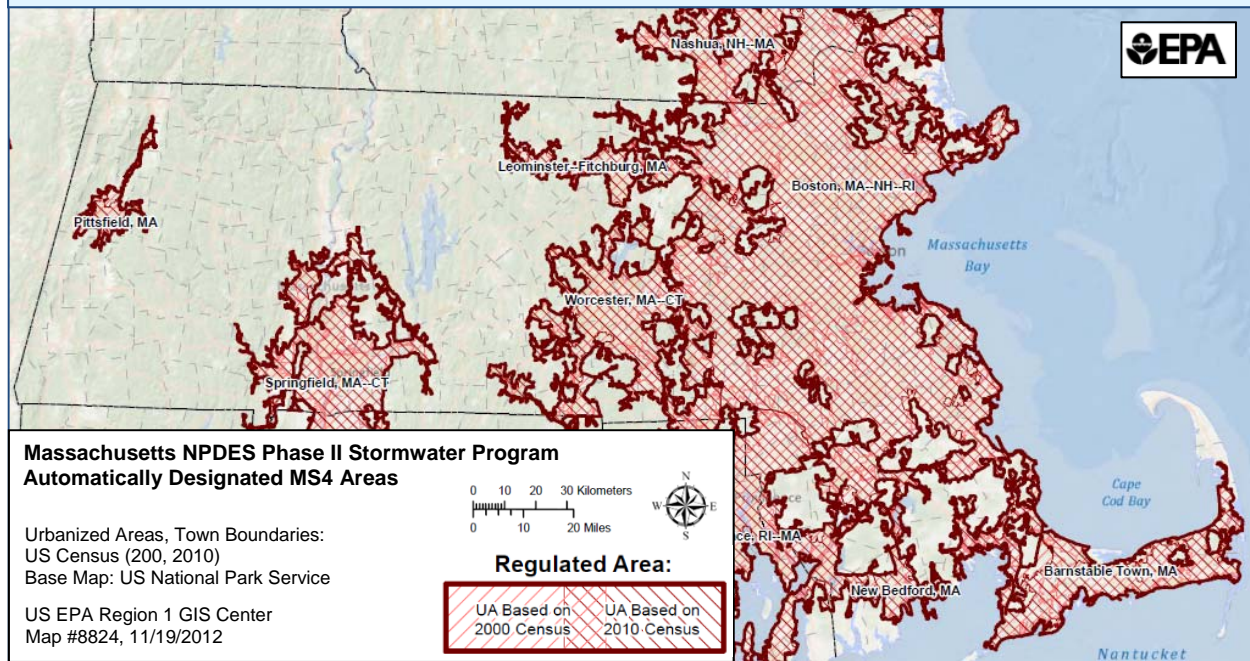
The Clean Water Act (CWA) authorizes EPA to regulate point sources that discharge into waters of the United States through the National Pollutant Discharge Elimination System (NPDES) permit program. Construction activities and industrial activities have been regulated since the early 1990s. Through subsequent studies conducted by the USEPA, urban stormwater was identified as a source of runoff that required regulation to protect water quality. In Massachusetts, NPS pollution is commonly carried by stormwater into municipal separate storm sewer systems (MS4s), from which it is often discharged untreated into local waterbodies. USEPA regulates discharges from MS4s in urbanized areas. MS4 operators must obtain a NPDES permit from USEPA and develop a stormwater management program to develop, implement and enforce a stormwater management plan to control pollutants discharged from its system to the maximum extent practicable.

As shown in the map below, 37% of Massachusetts land has been classified as urbanized area based on the 2010 census. As a result, stormwater from these areas is regulated as a MS4 area under the NPDES Phase II Stormwater Program. In regulated MS4 areas, there are significant restrictions on the use of grant funding through USEPA's Section 319 Program (see section 2.2.1), which is a main funding source for the Massachusetts NPS Program. **While acknowledging that the NPDES Program regulates urban runoff as a point source, the Massachusetts Nonpoint Program promotes a statewide, holistic approach to addressing stormwater pollution problems.** Although activities to control and prevent pollution from stormwater in urbanized areas may not be eligible for funding from the Section 319 NPS Competitive Grants Program described in Section 2.2, several other partner NPS programs are not subject to this restriction and are available to support stormwater mitigation in these areas.



Urbanized Areas and Regulated Municipal Separate Storm Sewer Systems (MS4s):

As shown in the USEPA map below, 37% of Massachusetts is classified as urbanized area (UA) and is therefore automatically regulated as a MS4 area under the NPDES Phase II Stormwater Program.



2.1.3 Water Resources of Massachusetts

Massachusetts ranks 45th out of the 50 states in surface area (approximately 7,840 square miles), yet its estimated 6.5 million inhabitants place it 15th in population (U.S. Census Bureau, 2009). More than 75 percent of the population resides in the eastern one-third of the state. As discussed above, areas of higher population density typically have a higher prevalence of NPS pollutant sources and less naturally vegetated land that can act as a buffer between NPS pollutants and water bodies.

Massachusetts is located within two geological provinces: the Coastal Plain and the New England Upland. Cape Cod and the Islands form the coastal plain and consist of low hills and plains covering unconsolidated sediments that form the most productive aquifers in the State. The New England Upland province consists of till and stratified drift above metamorphic and igneous rocks, and provides small productive aquifers. Groundwater is a significant source of water supply in small communities and is used almost exclusively on Cape Cod and the Islands. Surface water is the primary source of water supply for all of the major urban areas in the state. Two thirds of Massachusetts' residents depend upon surface water for their needs. The Massachusetts Water Resources Authority supplies communities in the Greater Boston area (about half the state usage of surface water) from the Quabbin and Wachusett reservoirs in the central uplands.

Annual precipitation averages about 45 inches and is fairly evenly distributed throughout the state. Average annual evaporation of surface water ranges from about 26 inches in Western Massachusetts to about 28 inches in the eastern half of the State. Yearly runoff ranges from about 20 inches in Cape Cod to about 32 inches in the northwestern corner of the State. The lowest runoff generally occurs during July, August, and September. Runoff is highest in March in the eastern sections of the state and April in the western sections and at higher elevations.

Massachusetts incorporates all or a portion of nine major drainage systems – Hudson, Housatonic, Connecticut, Thames, Narragansett Bay, Mount Hope Bay, Boston Harbor, Merrimack, and Coastal – which are comprised of the 27 watersheds that serve as the fundamental planning units of the



Massachusetts monitoring, assessment and management programs. A summary of some general surface water resource statistics for Massachusetts is provided in Table 2.1

Table 2.1 Summary of Massachusetts Water Resources Statistics

Rivers ¹	Number of Major Drainage Systems	9	<u>Information Sources</u> ¹ Halliwell, et al., 1982 ² National Hydrography Dataset (NHD) 1:24,000 ³ Ackerman, 1989 ⁴ Gil, 1985 and Maietta, 1984 ⁵ Costello, 2010 ⁶ Mass GIS 1:100,000 (DLG) by USGS
	Number of Watersheds or Drainage Areas	32	
	Number of Interstate Watersheds	12	
	Perennial River Miles ²	9,962	
Lakes	Number of Lakes and Ponds ⁶	3,191	
	Area of Lakes and Ponds (acres) ³	151,173	
Coastal Waters ⁴	Area of Harbors and Estuaries (sq. miles)	223	
	Total Coastal Miles	1,519	
Wetlands ⁵	Marine and Estuarine Wetlands (acres)	125,710	
	Freshwater Wetlands (acres)	472,368	
	Total Area of Wetlands (acres)	598,078	

2.1.4 NPS Pollution and Water Quality Impairments

In Massachusetts, water quality impairments associated with NPS pollution and other sources are assessed by MassDEP and reported to the USEPA in fulfillment of reporting requirements of Sections 305(b), 303(d) and 314 of the Clean Water Act (CWA), which are summarized as follows:

- **Section 305(b)** of the CWA codifies the process whereby waters are evaluated with respect to their capacity to support designated uses as defined in each of the states' surface water quality standards. These uses include aquatic life support, fish and shellfish consumption, drinking water supply, and primary (e.g., swimming) and secondary (e.g., boating) contact recreation. The 305(b) process entails assessing each of these uses for rivers, lakes, and coastal waters. Where possible, causes and sources of use impairment are also identified.
- **Section 303(d)** of the CWA and the implementing regulations at 40 CFR 130.7 require states to identify waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and to prioritize and schedule them for the development of total maximum daily load analyses (TMDLs). A TMDL establishes the maximum amount of a pollutant that may be introduced into a waterbody and still ensure attainment and maintenance of water quality standards. A TMDL must also allocate that acceptable pollutant load among all potential sources. The formulation of the 303(d) List includes a more rigorous public review and comment process than does reporting under section 305(b), and the final version of the list must be formally approved by the EPA.
- **Section 314** refers to the Clean Lakes Program, established in 1972 to provide financial and technical assistance to states in restoring publicly-owned lakes. This Program has not received funding since fiscal year 1995. Instead, USEPA has encouraged states to use s.319 funds to fund eligible activities that might have been funded in previous years under s.314.

Reporting on the water quality assessments described above is provided by MassDEP every two years through preparation of an *Integrated List of Waters*. The following overview of water quality in Massachusetts is based on information from the *Massachusetts Year 2012 Integrated List of Waters*, which can be viewed at www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf.

The Integrated List for 2012 assigns each of 2,181 assessment units (AUs) to one of the five categories presented in Table 2.2, based on upon their status with respect to designated use support.



Table 2.2 Description of Integrated List Impairment Categories

Integrated List Category	Description
1	Unimpaired and not threatened for all designated uses.
2	Unimpaired for some uses and not assessed for others.
3	Insufficient information to make assessments for any uses.
4	Impaired or threatened for one or more uses, but not requiring calculation of a Total Maximum Daily Load (TMDL), including: 4a: TMDL is completed 4b: Impairment controlled by alternative pollution control requirements 4c: Impairment not caused by a pollutant - TMDL not required
5	Impaired or threatened for one or more uses and requiring preparation of a TMDL.

Table 2.3 summarizes, by waterbody type, the number and total sizes of AUs appearing in each category of the *Massachusetts Year 2012 Integrated List of Waters*.

Table 2.3 Summary of Impaired Waters from Massachusetts 2012 Integrated List of Waters

Integrated List Category	Rivers		Lakes		Coastal Waters		Total AU's
	AU's	Size (miles)	AU's	Size (acres)	AU's	Size (sq. mi.)	
1	0	0.00	0	0.00	0	0.00	0
2	232	1,018.17	46	2,167.85	17	30.35	295
3	117	337.95	536	32,168.54	2	0.30	655
4a	31	126.91	151	47,918.59	106	33.17	288
4b	0	0.00	0	0.00	0	0.00	0
4c	25	101.08	198	15,217.27	0	0.00	223
5	327	1,570.25	242	20,924.77	151	179.48	720
Totals	732	3,154.35	1,173	118,397.00	276	243.31	2,181

A total of 33 waterbody segments (i.e., AU's) and 131 individual pollutants were removed from Massachusetts' 303(d) List when preparing the 2012 Integrated List. Ninety-three (93) of those pollutants were transferred to Category 4a because they are now covered by EPA-approved TMDLs. The remaining 38 pollutants were removed as the result of new assessments that either found that water quality standards are now met, or that the assessments leading to their original listing were flawed in some way. A small number of clerical errors were also corrected. Forty-eight (48) AU's and 165 individual pollutants were added to the 2012 303(d) List based on new assessments completed since the 2010 listing cycle. In addition, 46 non-pollutants were added to the Integrated List that will not require the development of TMDLs. The number of TMDLs that will be needed to address the newly-added impairments will be less than 164 since it is anticipated that several TMDLs will address multiple pollutants. Finally, 66 newly-listed pollutants were covered under addenda to previously approved TMDLs.

The *Massachusetts Year 2012 Integrated List of Waters* includes detailed information regarding known impairments within each of 27 major watersheds in Massachusetts. Impairments to specific water bodies within these watersheds are presented according to the Integrated List Categories in Table 2.2, with information also presented on the size of the impaired area (e.g., number of river miles, acres). Where relevant, specific impairment causes are listed for Category 5 Waters (waters requiring a TMDL), including impairment causes typically associated with NPS pollution such as phosphorus (total), sedimentation/siltation, bacteria (*Escherichia coli*), and others.



A more detailed description of programs related to monitoring and assessment of NPS pollution in Massachusetts is provided in Section 6 (Monitoring and Assessment) of this Plan. Section 5 (Priorities) discusses the process used by MassDEP to assign priority and progressively address identified impairments by conducting more detailed watershed assessments, developing watershed-based plans, and implementing the plans. Section 5 also describes the process used by MassDEP to assign priority for the protection of unimpaired waters.

2.2 PRIMARY ELEMENTS OF THE MASSACHUSETTS NPS PROGRAM

The 1987 Amendments to the Clean Water Act established the Section 319 Nonpoint Source Management Program. Under Section 319, states, territories and tribes receive federal grant money to establish NPS programs that will achieve and maintain beneficial uses of waters. State programs may use federal s.319 funds to support a wide variety of activities, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and NPS monitoring to assess the success of specific NPS watershed projects. This section of the NPS Plan describes the primary programs and activities that are directly managed by the staff of the MassDEP NPS Program. Section 3 provides a description of partner agencies and programs that the NPS Program collaborates with to fulfill the broader mission of this Plan.

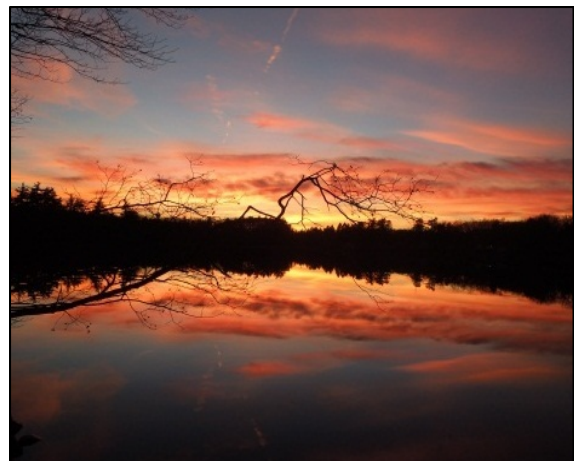
The MassDEP NPS Program currently receives approximately \$3 million annually in federal s.319 funds, which is split evenly between NPS watershed projects that implement Watershed-Based Plans and NPS Program funding. NPS Program funding currently supports \$600,000 in payroll for four full-time employees (FTEs). The remaining \$900,000 is available to support and build NPS staff capacity and for sub-award projects that support the goals of this NPS Plan. Sub-award projects are anticipated to include regional and statewide public outreach and education on NPS pollution, development of watershed-based plans, studies to advance knowledge of the scope and extent of unimpaired waters, support of inter-agency watershed protection projects, and projects to advance science that will help protect water quality (see further discussion in Section 5-Priorities). Although specific funding levels may vary from year-to-year, the overall distribution of s.319 funds is expected to remain evenly split between NPS watershed projects and NPS Program funding. MassDEP also anticipates that the NPS program will continue to employ a minimum of four FTEs and that the distribution of program funds between payroll and sub-award projects will be maintained approximately as described above.

2.2.1 Section 319 Nonpoint Source Competitive Grants Program

The United States Congress annually appropriates funds under Section 319 (s.319) of the Clean Water Act of 1987 (33 U.S.C.A., Sc. 1251 et. seq.) to assist states in implementing their approved NPS programs. Section 319 is administered by the USEPA, which oversees the awards to individual states and provides program oversight. The MassDEP Bureau of Resource Protection administers this award as part of the Massachusetts NPS Program.

The s.319 program focuses on the implementation of activities and projects for the control of NPS pollution. The awards are intended to provide financial support for the state's programs for controlling the major statewide categories of NPS pollution and for protecting or improving NPS-impaired or threatened water resources.

Each year, states must use at least 50% of their annual s.319 allocation (referred to as 319 Watershed Project Funds) to support NPS watershed projects that will



MassDEP maintains a variety of information on the s.319 grant program at:

<http://www.mass.gov/eea/agencies/massdep/water/grants/watersheds-water-quality.html#2>



implement Watershed-Based Plans (WBPs), or EPA-approved alternative watershed plans. In Massachusetts, a portion of the s.319 funds awarded to the state will be used for specific NPS watershed projects that improve or protect threatened or impaired priority freshwater and coastal waters. Projects funded under this program must implement WBPs, including measures that address the prevention, control, and abatement of NPS pollution, and must result in restoration of beneficial uses or achieving or maintaining state water quality standards. A Request for Responses for competitive projects is issued by MassDEP each spring. Proposals may be submitted by any interested Massachusetts public or private organization. The Department encourages all types of eligible, competitive proposals from all watersheds. Since 2001, MassDEP has particularly encouraged proposals that will begin implementation of Massachusetts's TMDL analyses, or that implement recommendations made in Diagnostic/Feasibility (D/F) or other studies for waters that do not meet Water Quality Standards. MassDEP also continues to encourage applicants to propose projects that support the Department's ongoing basin-wide water quality activities. The state NPS Program guidelines and priorities for s.319 grant funding may change from year to year. Potential grant applicants are strongly encouraged to contact MassDEP program staff to discuss their ideas prior to proposal development.

MassDEP provides updated information in advance of the grant round for each fiscal year. MassDEP typically announces several pre-RFR informational meetings for potential grant applicants, and provides information on priority project types for the upcoming round of grants. The following project categories are expected to be solicited over the next five years:

A. NPS Watershed Projects in Impaired Waters: The most competitive applicants will implement a Watershed-Based Plan using a combination of structural and non-structural BMPs addressing all impairments and leading to restoration of impaired waters. BMPs should be selected for optimal pollutant load removal, emphasizing source reduction. Proposed BMPs must be developed at least to the conceptual design stage and submitted with the proposal. Proposals must contain site specific information to demonstrate that the project is feasible and ready to be constructed within the project timeline.

B. Healthy Watersheds and Protection of High-Quality Waters: Implementation projects for climate change adaptation and resiliency and projects that protect high quality waters from the effects of NPS pollution are eligible for s. 319 funds. These proposals must also be supported with documentation of the problem, conceptual or better plans to explain the strategy and approach, and all other information necessary to demonstrate the feasibility and effectiveness of the proposed project. Additional information addressing the nine elements of the watershed-based plan supporting a project may be required for recommended projects.

C. Outreach and Education: Outreach and education is often recommended as an effective nonstructural BMP. Program-funded projects in this category will propose specific outreach and education activities and products, and will develop and implement an evaluation method to gauge the effectiveness of these activities. Such stand-alone outreach and education projects will support the goals and objectives identified in this Plan. These projects should have regional or statewide relevance and should include a deliverable that can be made available in both print and electronic form.

D. TMDL Development: s.319 funds can be used to develop high-priority NPS and mixed-source TMDLs. Projects proposing to develop TMDLs must comply with EPA requirements for the use of s.319 funds for such work, found in page 39 of the Guidelines (<http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf>). Development of high-priority TMDLs with NPS program funds will support fulfillment of the goals, objectives, and milestones of this Plan over the next 5 years.

All four types of projects are eligible for funding in MS4 areas, but only if the proposed work is not currently required under the existing NPDES stormwater permit.

In general, the most competitive implementation proposals will:



- provide thorough but concise information that demonstrates the project's feasibility and focuses on addressing program priorities;
- build upon previous 319-funded work and/or work that has been initiated by 604(b), CZM, MET, NRCS, Massachusetts Bays Program, or other programs; and
- have a realistic schedule for completion within two building seasons. Although total project timelines are typically three years, funds are generally available in the January-March time frame, allowing two full building seasons for the work to be completed.

Good projects from all watersheds are eligible for funding. However, projects that are consistent with specified priority areas or project types may receive additional points. These priorities may include:

- Projects addressing one or more segments on the MassDEP list of priority segments and watersheds developed using the Recovery Potential Screening Tool and in coordination with NPS Partner programs and priorities.
- Projects in specific basins or watersheds that represent agency priorities.
- Projects that follow work begun with funding from 604(b), CZM, MET, NRCS, Massachusetts Bays Program, or other NPS partner programs.

An intra- and inter-agency screening committee reviews all eligible s.319 proposals. Recommended proposals are approved by the Department to be included in the Department's yearly program plan, which is submitted to USEPA prior to the start of the federal fiscal year. Once the program plan has been approved, the Department enters into a contractual agreement with the applicant to conduct the project. A 40% non-federal match is required from the grantee. This match may be in cash or from in-kind services performed as part of the approved project activities. Project funds can only be used to implement Watershed-Based Plans, and activities such as research, program development, and general assessment and planning are generally not eligible for these funds. Project funds can be used to carry out monitoring to track the improvement gained by project work, to track the achievement of the WBP's milestones and restoration of water quality. The typical project timeline is for three years.

Since 2006, MassDEP has been working under a USEPA-approved Program Quality Assurance Project Plan (QAPP) that covers all projects, unless they include a sampling component or some types of modeling. As such, most s.319 funded projects no longer require a project-specific QAPP. The Program QAPP ensures that projects are solicited, selected, carried out, and reported using properly documented procedures and quality assured processes. An Operation and Maintenance Plan is required for each implementation project.

In April of 2013, EPA issued new s.319 program guidelines that removed the draft permit limitation, instead only prohibiting funding of final NPDES permit requirements. As of July 2014, the new Massachusetts permits are still in draft form and the 2003 permits remain in effect. Unregulated work in NPDES regulated areas will remain eligible until the new permits are finalized. Further coordination between MassDEP and USEPA Region 1 on this issue is a goal of this NPS Plan, to clarify policy with regard to the use of s.319 funds in NPDES-regulated areas.

2.2.2 604(b) Grant Program - Water Quality Management Planning

MassDEP uses CWA Section 604(b) funds from USEPA for water quality assessment and management planning.

The Department uses these funds to support watershed- or subwatershed-based NPS assessment and planning projects and statewide water quality monitoring and assessment activities. Section 604(b) projects are carried out to: 1) determine the nature, extent, and causes of water quality problems; 2) assess impacts and determine pollutant load reductions necessary to meet water quality standards; 3) develop green infrastructure projects that manage wet weather runoff to maintain or restore natural hydrology; and 4) develop assessments, preliminary designs, and implementation plans that will address



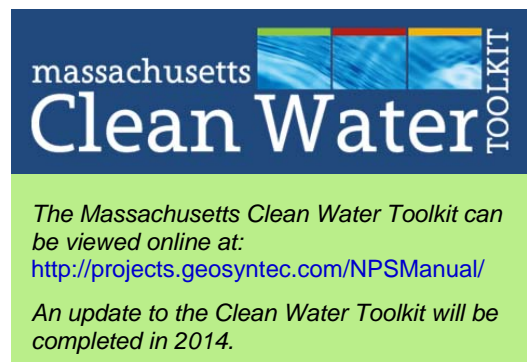
water quality impairments in impaired watersheds. Annual priorities are determined by departmental or partner activities and programmatic targets.

Each year MassDEP releases a Request for Responses for local competitive projects. Pursuant to CWA Section 604(b), eligible grant applicants must be either Regional Public Comprehensive Planning Organizations or Interstate Organizations. MassDEP has defined these to include regional planning agencies, councils of government, counties, conservation districts, cities and towns, and other sub-state public planning agencies and interstate agencies. MassDEP encourages eligible respondents to propose water quality assessment/planning projects that will lead to direct actions by municipalities and others to implement water quality improvements. The solicitation routinely includes a request for Watershed-based Plans and preliminary development of potential s.319 NPS watershed projects that implement Watershed-Based Plans. No local match is required.

2.2.3 NPS Education and Outreach

Key elements of the NPS Program's recent and ongoing activities related to education and outreach are described below.

- **The Clean Water Toolkit:** USEPA guidance for NPS programs requires that state NPS Plans must *"identify best management practices and measures to control each category and subcategory of nonpoint sources"*. As a primary education tool to address this need, MassDEP has developed the Massachusetts Clean Water Toolkit. The Toolkit was created for use by municipal officials, residents, and land managers to promote understanding and implementation of the many different options for prevention and control of NPS pollution. The Toolkit is an interactive, web-based document that includes a wide range of BMP fact sheets and a "BMP Selector Tool" that helps users choose the best BMPs for specific NPS pollution problems.



- **Massachusetts Stormwater Technology Evaluation Project (MASTEP):** MASTEP, which was developed with funding from the MassDEP NPS Program through a s.319 grant, is a publicly accessible database of performance characteristics for innovative stormwater treatment technologies. The database provides a source of verified technical information on stormwater BMPs to Massachusetts conservation commissions, local officials, and other BMP users. For more information, visit: <http://www.mastep.net/documents/MASTEPdesc.pdf>
- **Massachusetts Alternative Septic System Test Center (MASSTC):** MASSTC began in 1999, testing advanced onsite septic treatment technologies under the USEPA Environmental Technology Initiative (ETI). Today, MASSTC is operated by the Barnstable County Department of Health and Environment with joint funding from USEPA and MassDEP. MASSTC continues to conduct testing and allow for the research and development of products that remove the myriad of contaminants found in domestic wastewater, with a particular focus on advanced nitrogen removal technologies in support of coastal ecosystem health. Its facility can accommodate over 20 concurrent tests, allowing companies to conduct research and development on their products or complete any number of standardized test protocols. For more information, visit: <http://www.masstc.org/>
- **Horsekeeping Information Sources:** MassDEP has developed a collection of fact sheets on horsekeeping and related NPS pollution prevention. These fact sheets and other helpful links related to horsekeeping and water quality can be found at: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/horsekeeping-and-water-quality.html>



- **Stormwater Management Demonstration Projects:** Through the s.319 grant program, MassDEP provides ongoing support for public education on new/emerging NPS control techniques through demonstration projects. Examples of ongoing (2013 through 2016) demonstration projects include the following:
 - *Boston Architectural College Green Alley & Roof Project:* This project has three goals: (1) reduce stormwater runoff from one of the most polluted sections of the Charles River Basin, (2) demonstrate and evaluate the use of sustainable design in existing structures and densely built urban neighborhoods, and (3) use the green roof and green alley as teaching tools for students, faculty, the design profession and the larger community, to encourage the use of sustainable design to reduce stormwater runoff and achieve other environmental goals.
 - *City of Boston Porous Pavement Green Alley NPS Demonstration Project:* This project will result in the design, construction, and monitoring of a permeable pavement retrofit in the City of Boston; outreach and education about the project; and a detailed analysis of the results of the project to enable replication of this technology, and to identify improvements or modifications that may be necessary. The permeable pavement will reduce stormwater volumes, reduce pollutant contributions to surface water bodies, increase groundwater recharge, reduce flooding problems, and improve aesthetics in the area. The result of this demonstration project will be to create design recommendations for the use of permeable pavements for retrofitting alleys throughout Boston and regionally.

2.2.4 Interagency Activities

NPS Program staff regularly participate in a variety of interagency activities, including the policy initiatives, committees and grant proposal review/selection teams listed below.

- USDA-Natural Resources Conservation Service (NRCS) State Technical Committee
- MassBays Program Management Committee
- Massachusetts Environmental Trust (MET) committee to review grant program Letters of Interest and proposals
- Massachusetts Office of Coastal Zone Management (CZM) committee to review Coastal Pollution Remediation (CPR) grant applications
- Quarterly meetings of the Massachusetts Association of Conservation Districts
- Massachusetts State Commission for Conservation of Soil, Water & Related Resources (NPS Program staff serve as the MassDEP representative on this commission)
- U.S. Geological Survey (USGS) quarterly meetings to review projects jointly funded by MassDEP and other topics requiring coordination between USGS and MassDEP
- NPS Program staff are active participants in the ongoing initiative to establish a Regulatory Certainty Program between MassDEP, the Massachusetts Department of Agricultural Resources (MDAR), and the NRCS.
- NPS Program staff are active participants in the ongoing Palmer River Watershed agricultural partnership pilot project in support of the NRCS National Water Quality Initiative (NWQI), which also involves MDAR and NRCS.

A detailed description of collaboration between the NPS Program and its many partner programs is provided in Section 3.



2.2.5 Watershed-Based Planning

The Massachusetts Watershed-Based Plan (WBP) template was first developed in 2006 in response to EPA guidelines requiring a nine element WBP to support the award of 319 implementation project funds. The purpose of the WBP template is to organize information about Massachusetts' watersheds and present it in a format that supports development WBPs which can be used as the basis for NPS watershed projects to restore water quality in the Commonwealth.

MassDEP is currently in the process of developing a major revision to the 2006 version of the WBP. MassDEP anticipates that the revised WBP template will use a statewide HUC-12 watershed-based approach designed to provide the maximum number of completed nine-element WBPs. Based on the availability of existing information sources for each watershed, MassDEP anticipates that the WBP template will result in a WBP that is either completed for each of the nine required elements, or will require varying levels of additional information to be completed by project proponents. The completed WBPs will meet USEPA guidelines to serve as the basis for s.319-funded NPS watershed projects. Advantages of this strategy include:

- Supports optimal use of the Recovery Potential Screening Tool;
- Flexibility to direct s.319 funds in response to local capacity or emerging issues;
- More opportunities to partner with other agencies and programs;
- More ability to develop timely and accurate proposals at the time of shovel readiness; and
- Not locked into watersheds where politics or land use changes may reduce the likelihood of implementation.

2.3 MassDEP NPS PROGRAM ADMINISTRATION

The state of Massachusetts has well-developed and effective programmatic and financial systems that ensure Section 319 dollars are used efficiently to maximize water quality benefits. An effectively administered MassDEP NPS Program is expected to achieve the milestones and objectives established in this Plan given current staff and financial resources. This involves managing the program with limited staff resources, ensuring that a water quality benefit will be received for expended funds, integrating NPS programs statewide as practicable and building partnerships to reduce redundancy and promote information sharing. The following section provides an overview of the management systems MassDEP uses to implement the state NPS Program.

The MassDEP NPS Program is administered in accordance with CWA requirements and national USEPA guidance for state NPS management programs. USEPA is the granting authority for activities funded under the CWA and USEPA Region 1 provides federal oversight for the MassDEP NPS Program. To work effectively with its federal oversight agency, the MassDEP NPS Program will meet grant conditions, work to achieve goals established in the annual Performance Partnership Agreement (PPA), attend regional and national NPS meetings, and provide comments on regional and national USEPA policies, guidance, and regulations concerning NPS pollution management.

2.3.1 Staffing and Support

MassDEP has historically used a portion of annual s.319 grant funding to support staff within the NPS Program and staff in administrative departments that assist the NPS Program. Funds from s.319 are incorporated into the MassDEP Performance Partnership Grant (PPG). Within the PPG, Section 319 administrative funds will be used to support staff that conduct the following types of MassDEP NPS Program-related activities:

- **Program Manager:** Conducts program planning, develops objectives and priorities, provides fiscal oversight and contract development, coordinates with other programs, s.319 project solicitation and program coordination, and preparation of NPS work plan and annual report;



- **Contracts Manager:** Oversees fiscal operations, including invoice processing, support of procurement and contracting, acquisition of supplies, financial reporting and coordination with DEP fiscal staff;
- **Project Officer:** Provides 319 project scope and contract preparation, review and approval of quarterly progress reports and invoices, site visits, approval of contract deliverables, and GRTS reporting; and
- **604(b) Program Coordinator:** Provides 604(b) work plan and Annual Report preparation, coordination with NPS Program administration and priorities, project solicitation, and project officer duties.

Clean Water Act grant programs are organized under the Division of Municipal Services along with Clean Water SRF programs, thus strengthening the organizational support for meeting CWA goals.

In addition to duties already described, the Project Officers (PO) meet with grantees at the beginning of each project to review reporting and invoicing procedures, the project site and project plans. Quarterly reports are reviewed to ensure that work is progressing in accordance with timelines. Changes in scope or budget can be made provided the PO reviews and approves the changes, which must be based on legitimate site challenges, opportunities to better utilize funds, or other amendments that will improve the project. Amendments must ensure that project outcomes will equal or better the original scope. Changes are not made to accommodate price increases, poor planning, or loss of match. MassDEP has prepared a [Grantee Guide](#) and other resources that are available to help grantees with invoicing and reporting procedures.

A portion of Section 319 funds are used for staff salaries (3.75 FTEs), staff travel for NPS purposes, office supplies, and field and laboratory equipment and supplies to support NPS monitoring staff. Program funds also pay an annual fee for a state single audit. The remainder of the program funds is competitively awarded to projects that are consistent with the Massachusetts NPS Management Plan. Grantees receiving competitive sub-awards are required to provide a 40% non-federal match as part of the grant-funded project. The 40% match for the balance of the s.319 allocation is comprised of contractual work undertaken by the Department, consistent with the PPG.

Each employee's activities are guided by an annual plan (Employee Performance Review System, EPRS) that is reviewed mid-year and negotiated annually. All personnel complete weekly time and activity reports (timesheets) through the Massachusetts Human Resource Division's online reporting system. Timesheets are approved by supervisors.

Finances are managed by the MassDEP Bureau of Resource Protection (Bureau) and MassDEP fiscal staff. Section 319 funds are fully incorporated into the MassDEP Program Partnership Grant (PPG) from USEPA, while 604(b) funds are outside the PPG. Fiscal tracking for both s.319 and 604(b) is the responsibility of Bureau staff, who provide monthly and quarterly spreadsheets that are used by program staff to track expenditures and compliance with match and federal DM/WBE requirements.

2.3.2 Grant Proposal Evaluation Criteria

In order to implement high quality projects that help fulfill the objectives of this NPS Management Plan, the MassDEP NPS Program and the grant review committee evaluate submitted proposals following a formal review process:

1. MassDEP follows strict procurement guidelines for issuing, receiving, and evaluating proposals as specified in [Massachusetts Administrative Code 801 CMR 21.00](#).



2. Proposals are received and logged in with a date stamp. Multiple copies of each proposal are required to be submitted. One copy of each proposal is distributed to each member of a pre-selected inter- and intra-agency review committee comprised of approximately six people. Reviewers are provided with a standard evaluation sheet and asked to review and rank each project.
3. After allowing time for reviewers to evaluate the proposals, the review committee meets to discuss the proposals and synthesize the information into ranking and recommendation. Eligible projects that satisfy program goals and requirements are recommended for funding. In addition to ensuring that funds will be directed toward projects in NPS-impaired waters, reviewers evaluate if:
 - the project is comprehensive and watershed-based;
 - the project has demonstration, outreach, and education value;
 - the project is likely to be completed on time and within budget;
 - feasibility issues such as permits and easements have been addressed; and
 - the applicant has a track record with this or any other program, and is known for either good or poor performance.
4. A Procurement Summary is written to describe the review process, summarize the committee evaluations, and make funding recommendations. Only projects that are eligible and meet or exceed the program requirements are recommended for funding. If not enough proposals are submitted to use the full s.319 allocation, the excess funds are held and redirected into future projects.
5. The procurement summary is reviewed and approved by the Commissioner of MassDEP and the office of the Secretary of the Executive Office of Energy and Environmental Affairs.
6. Projects recommended for funding are referred for final review and approval by USEPA Region 1 staff. Any comments or questions received are directed back to applicants for review and response.



2.3.3 Grant and Project Management

Project Initiation

Once projects are approved, NPS Program staff develop a Contract Scope of Work that is consistent with the project proposal. Where the review committee has made recommendations for changes or amendments to the scope, the changes are drafted by program staff and accepted/negotiated with the grantee. Each contract scope of work includes a QAPP, requiring either compliance with the Programmatic QAPP, or development of or compliance with a QAPP that is unique to the project. Final contracts are packaged with required documents and attachments, signed by the grantee, and forwarded by the MassDEP Contracts Manager to Boston, where the contract is finalized and signed by the Commissioner of MassDEP or an authorized designee.

Once a contract has become final, the grantee is notified with a Notice to Proceed (NTP). A letter stating the NTP date is prepared and forwarded along with a package of reporting materials. An essential element of this package is the [Grantee Guide](#), which spells out reporting and administrative requirements that the Grantee is expected to fulfill. Contracts for 319 grants are generally for a three-year period, and end on June 30.



Project Oversight

Once a project has been awarded, the contract scope of work describes the tasks and deliverables to be realized from the project. Through review of quarterly progress reports and close communication with grantees, MassDEP Project Officers and the s.319 Program Coordinator ensure that the work is progressing in accordance with the proposal and contract scope of work. In addition to filing quarterly progress reports, all grantees must maintain contact with program staff by telephone, email, and/or in person. Depending on the nature and location of the project, a MassDEP Project Officer may be assigned from the appropriate regional office. This helps to maintain contact and ensure project results consistent with the proposal and contract scope of work. Where no MassDEP Project Officer has been assigned, the s.319 Program Coordinator fulfills this function.

BMP Design and Implementation

Specific BMPs are developed by the applicants and presented in the project proposals. At the proposal stage, conceptual designs or better are required, and are typically drawn by professional engineers. Conceptual designs are at 30% or more design stage, and must be fully enough developed to allow reviewers to determine project feasibility and to assess whether the proposed BMPs represent an efficient, cost-effective strategy to meet program goals. Plans and maps must be sufficiently detailed to show property lines, resource areas, and watershed location. Where applicable, proposals should also address whether soils will support the proposed BMPs; whether wetlands permits will be required; and if the applicant controls, or can be assured of control, of the property where work will be done.

Once a project is underway, 319 funds are typically used to develop final BMP designs. Standard contract requirements for the BMP design and implementation task include these deliverables:

- Final design and construction plans for the BMPs as described, submitted for review and comment to the MassDEP project officer prior to construction. Final plans must be reviewed and stamped by a professional engineer (PE) prior to review and approval by the MassDEP Project Officer.
- Copies of construction permits and approvals.
- Final “as-built” drawings of the installed BMPs.

The MassDEP Project Officer reviews and approves these deliverables to ensure consistency with the project proposal and scope of work. MassDEP does not review and approve the engineering work, which is stipulated to be adequate as evidenced by the required PE stamp.

Following MassDEP approval of BMP designs, the grantee follows through with BMP installation. As part of the BMP design and implementation task of any grant, the grantee must supply a certificate/letter from the project engineer, designer, and/or or supplier stating that the BMPs were installed according to approved plans and design specifications.

The Grantee’s project manager is held responsible for specifying, procuring, inspecting, and accepting goods and services related to the project. By requiring PE-stamped construction plans and a certificate/letter from the designer or supplier stating that the BMPs were installed according to design specifications, MassDEP is assured that appropriate quality control and project oversight was exercised. Monitoring of quarterly progress reports and occasional site visits by MassDEP program staff support this assurance.

Development and implementation of an Operation and Maintenance Plan is a required task in each BMP implementation project. A final draft submittal must be reviewed and approved by MassDEP NPS Program staff.

Project Scope Changes

Problems and changes in scope of work are dealt with on a case-by-case basis, through a process also spelled out in the Grantees Guide. While most projects are able to proceed as planned, occasional difficulties may make it necessary to alter a scope of work, timetable, or deliverable. In negotiating changes, the goal is to stay as close as possible to the original proposal, and to achieve the same pollutant load removal and



resource improvement as was originally anticipated.

Project Close-Out

Each Grantee completes a Project Final Report that is submitted to EPA and kept on file at MassDEP. A Draft Final Report is submitted to MassDEP by April 30 of the closing year, to be reviewed, commented on, and revised in time for June 30 submittal. Project Final Reports summarize the work that was done, detail the modeled pollutant load removals achieved by each BMP, make recommendations for follow-up, and discuss lessons learned from the project. Final reports contain photographs and narrative about project results that are used to enhance public and agency understanding of the work that was done, and to promote technology transfer by encouraging others to learn from completed projects. Final Reports also summarize work completed in a format that translates easily into USEPA's Grant Reporting and Tracking System (GRTS) categories, to expedite reporting to USEPA.

Release of project retainage (10% of the contract amount) is contingent on satisfying all grant conditions, including submittal of a satisfactory Final Report and attaining or addressing Federal Fair Share goals for Disadvantaged Minority and Women-owned Business Enterprises (DM/WBE). The purpose of a Final Report is to summarize how the public funds were utilized to meet the goals of the project, and to serve as a technology transfer tool for others who may be contemplating similar work. Final Reports also serve as the basis for GRTS reporting to EPA. Final reports are submitted on CD as well as hard copy, and kept available for review at the DWM offices. A summary of projects ([Indicative Summaries](#)) is available to facilitate public review of available information. Indicative Summary Reports are updated annually to report on projects from the previous five years, and include an index by year and by watershed of all projects dating back to 1990.

2.3.4 NPS Program Reporting

As outlined in grant requirements and as committed to in the PPA, the MassDEP NPS Program will submit accurate and timely reports to USEPA to inform them of program status and accomplishments. Annual reporting requirements outlined below are based on 2014 grant requirements and deadlines. The MassDEP NPS Program will adjust reporting as necessary to comply with grant conditions, should revisions to national program guidance change reporting requirements.



Annual MassDEP NPS Program Reporting Requirements

Report	Description	Submitted By
Annual MassDEP NPS Program Workplan	Describes s.319-related work, including how the state is organized to implement and achieve the goals of this NPS Plan. Describes proposed projects and activities for the year consistent with NPS Plan objectives and milestones.	October 1
Annual MassDEP NPS Program Report	Describes progress made in implementing the MassDEP NPS Program, including a summary of major accomplishments and completed milestones, a description of s.319-funded statewide programs and completed s.319-funded watershed projects, a list of active s.319 projects with expected completion dates, and references to information summarizing water quality improvements and NPS pollutant load reductions for the state.	January 31
Annual 604(b) Workplan	Describes 604(b)-related work to assess water quality pollution in targeted basins pursuant to the 5-year basin schedule and the Massachusetts NPS Plan. Provides schedule for pass-through grant implementation and anticipated budgets for MassDEP staff and grants.	April 1
Annual 604(b) Program Report	Provides annual summary of 604(b) activities, including staff activities for positions funded by 604(b) and pass-through grant-funded activities. Includes comparison of staff accomplishments with outputs/outcomes specified in the Annual 604(b) Workplan and discussion of grant project expenditures.	December 31
GRTS Reporting	Includes GRTS Load Reduction Estimates, GRTS Annual Project Reports, and GRTS Mandated Elements	February 15

2.3.5 Records and Documentation

MassDEP maintains a complete file on each active project in the s.319 Program offices, located in Worcester. At this location, the s.319 Program Coordinator maintains project-specific paper and electronic files containing, at minimum, original proposals, contract documents, plans, correspondence, progress reports, and draft final reports. Information related to GRTS tracking and pollutant load calculations is kept in separate files, organized by year, at the same location. The s.319 Contracts Manager also maintains financial tracking and reporting information files, and maintains the electronic financial records in the Massachusetts Management Accounting & Reporting System (MMARS). Final reports for closed projects are kept in CD format at the Worcester office, with hard copies of the reports distributed to regional offices. All records are available for public review during normal MassDEP office hours, subject to applicable rules and regulations.

2.4 NPS PROGRAM REVIEW AND ADAPTIVE MANAGEMENT

The periodic, structured evaluation of any plan is a necessary activity, both to assess progress toward the achievement of goals and outcomes and to adjust strategies to account for changes in policy, science, or available information. MassDEP recognizes that successful implementation of the Massachusetts NPS Plan will require evaluation of goals and activities, and following through with appropriate steps to respond to new information.

This section addresses Element 8 of the “Key Components of an Effective State Nonpoint Source Management Program” guidance issued by the USEPA. Topics covered include an overview of the principles used to develop the program review strategy, the actions MassDEP will take to evaluate the NPS Plan, and how information gathered will advise future updates of the Plan.



2.4.1 Adaptive Management

The core of the program review framework is based on the concept of adaptive management. While there are numerous definitions, this Plan relies on the definition and management actions outlined in the 2009 publication, “Adaptive Management: The U.S. Department of the Interior Technical Guide (Guide).”¹ The Guide defines adaptive management as, “a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood.”

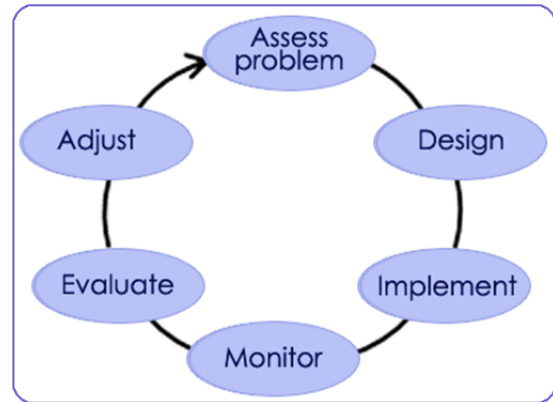


Diagram from “Adaptive Management: U.S. Department of the Interior Technical Guide, 2009.”

Adaptive management is an iterative process that occurs throughout the implementation of a plan. It relies on information gathering and assessment to advise corrective actions. Use of the process ultimately helps improve decision-making, creates a fact-based assessment of progress, and shapes future actions by building on lessons learned. As depicted in the diagram, the process is continuous and builds upon itself. An adaptive approach to program evaluation involves developing alternative ways to meet Plan objectives; predicting the outcomes of alternatives based on current information; implementing one or more of these alternatives; monitoring and assessing actions to determine progress; and using the results to update actions to achieve Plan goals. The steps to this approach include:

- **Assess Problem:** Using environmental data, input from stakeholders and partners, and self-evaluation, determine the NPS pollution issues to be addressed. This includes policy, science, funding, programmatic, and implementation challenges.
- **Design:** Develop a plan or solution to address the identified issues. This can include adaptations to existing policy; development of new programs, initiatives, or research; and study of environmental conditions. Critical to this step is the development of measurable goals, milestones, and tangible objectives to address the issue.
- **Implement:** Carry out the actions, tasks, or initiatives to address the identified issue. Execute the plan using the best available resources and clearly denote any limitations, barriers, or possible issues with achieving the plan outcomes.
- **Monitor:** Collect information (qualitative and quantitative) during the implementation of the plan that captures progress made towards the achievement of plan outcomes. This effort must be objective and be carried out in a manner that allows for measuring progress made as well as determination of barriers to success. Information gathering should be done on a set schedule using consistent methods and allow for aggregation of data to draw conclusions.
- **Evaluate:** Assess information gathered through the monitoring phase and compare to established metrics, interim benchmarks, or anticipated outcomes. Evaluation outputs should allow characterization of the rate or amount of progress made towards achieving a given outcome. In addition, data assessment should be able to highlight or identify barriers to success.
- **Adjust:** Makes changes to approaches, strategies, projects, or initiatives that are targeted to achieve a given outcome, but are not likely to be achieved based on data collected and analyzed. Focus resources and efforts on areas of a plan that need improvement and acknowledge actions that are leading to achievement of a goal or outcome.

¹ Williams, B. K., R. C. Szaro, and C. D. Shapiro. 2009. [Adaptive Management: The U.S. Department of the Interior Technical Guide](#). Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.



Ideally, as the process is executed over many cycles, actions taken to achieve the outcomes of a plan are modified to respond to challenges. Efforts are put into large-scale evaluation of plan goals and outcomes only after responding to identified challenges and measuring whether progress is being made. Adaptive management assumes that goals and outcomes of a given plan are reasonable and reachable. However, it also acknowledges that these goals and outcomes may have been developed with incomplete or inaccurate information, and that program goals and priorities, subject to USEPA approval, may shift over time in response to new information. Adaptive management also accounts for and helps identify new barriers, limitations, or changes that could inhibit achievement of goals.

2.4.2 MassDEP Program Evaluation Objectives

To evaluate progress of the goals set forth in the Plan and the efficacy of the MassDEP NPS Program, and to meet USEPA requirements, the following objectives have been set for the program evaluation strategy:

1. The strategy will set timeframes for key evaluation activities.
2. Evaluation efforts will be reported and shared with NPS partners and stakeholders.
3. MassDEP will supplement the formal processes in the Plan with more informal, ad hoc evaluations to adjust, reevaluate, or develop policy that would improve the NPS Program.
4. The greatest effort will be placed on addressing identified challenges to, or opportunities for, NPS Program improvement and achievement of the Plan's goals.
5. The strategy will recognize processes, policies, or practices that support the achievement of goals.
6. The strategy will encompass all MassDEP elements of the NPS Program, including policy, science, funding, partnerships, and outreach/education.

2.4.3 Program Evaluation Elements

- **Program Review:** MassDEP will use the Goals tables from Section 4 of this Plan (Table 4.1) as the foundation for its evaluation framework. Each year, the milestones for each objective under each goal will be reviewed and compared to implemented activities that supported their completion. Evaluations may range from simple narrative assessments of annual activities to more formal analyses of data collected to support the development of a NPS Success Story. If progress toward a given milestone does not occur, information will be collected and reported to explain the reason for lack of progress. If obstacles or issues are identified, possible solutions or remedies will be developed and reported. It may be necessary to reprioritize or revise some milestones for future revisions to the Plan; the rationale for these decisions will also be noted. All information will be used as a part of a comprehensive reevaluation of the NPS Plan and will be used to develop an outline of needed revisions to the Plan as a part of the update process, which is detailed at the end of Section 2.4.3. The adaptive management approach will be followed, as appropriate, for this formal program evaluation.

MassDEP will also continue to look for opportunities to improve current processes through its work with stakeholders, project partners, and its federal, state, and local NPS partners. This will include, at a minimum, gathering feedback from stakeholder forums, partner meetings, and customer interactions. Any smaller, incremental changes made to improve or clarify policy, enhance program efficacy, or incorporate new ideas will be reported as described below.

- **Timeframes:** Program evaluation will be completed annually, to coincide with the submittal of required Clean Water Act reports and annual reviews with USEPA as a part of tracking commitments established in the annual PPG Priorities and Commitments. This will apply to the evaluation of goals, objectives, and milestones set in the Plan, as well as any requirements established as a part of the PPG.



- **Reporting:** MassDEP will use the required NPS Program Annual Report to USEPA to report on the findings from annual program evaluations. An enhanced report, including evaluation and adaptive measures, will demonstrate commitment to achieving the goals of the Plan, highlight the work of partners in supporting the Plan, and identify needed actions to achieve Plan goals. Information on the impacts of NPS pollution and efforts to improve and protect water quality in the state will also be reported in the 305b/303d assessments.
- **Monitoring/Assessment** MassDEP will primarily use data collected from its water quality monitoring programs, as well as data from third party sources (See Section 6 for additional information) to conduct assessments of impaired and unimpaired waters as required by Section 303d of the Clean Water Act. The results of these assessments will be used to demonstrate incremental improvements in water quality that can be attributed to NPS pollution mitigation activities conducted on a watershed scale. The results of any studies focused on NPS pollution, including TMDLs, will also be used to develop a broader picture of the state of water quality in Massachusetts.

The goals for the next five years will be to:

1. Enhance and improve current monitoring programs to focus on NPS pollution analysis; and
2. Collect data in a manner that helps to assess the efficacy of MassDEP and NPS partner program efforts to improve and protect water quality.

MassDEP envisions that, as monitoring program improvements are implemented, future goals, objectives, and milestones of the Plan will rely more heavily on water quality monitoring data to demonstrate program successes. In the next five years, MassDEP is committed to implementing monitoring program improvements as outlined in Section 4 (NPS Program Goals, Objectives and Strategies) of this Plan to help answer critical questions regarding the scope and extent of NPS pollution in Massachusetts. As appropriate, the results of any analyses conducted by MassDEP or NPS partner monitoring programs will be included with reports submitted to USEPA.

- **Coordination:**

Federal/State: MassDEP will continue to work closely with USEPA on the coordination of all state and federal water quality programs in the state of Massachusetts. Annual joint program reviews with USEPA, as well as more informal meetings, will be critical to determining how well Plan activities are progressing toward meeting goals, identifying barriers or resource gaps that could impact achievement of goals, and what priorities will shape future iterations and updates of the Plan. MassDEP will use the annual program review meeting on PPG goals and objectives, as well as the results of EPA's annual review of the state's 319 program required under Section(h)(8), to gather input from USEPA on program performance as well as report on program successes/challenges. The NPS Program Annual report will also provide USEPA with an opportunity to gauge progress towards meeting NPS Plan goals. MassDEP and USEPA, over the next five year period, will work together to share information, assess the NPS state/federal partnership, explore ways to improve communication and data-gathering, and coordinate on federal activities that may impact NPS pollution in the state of Massachusetts.

NPS Partners: MassDEP will continue to work with the NPS partners, grantees, and other interested stakeholders to gather information on program efficacy, areas of possible improvement, and ways to enhance the efforts of others to achieve the goals set forth in this Plan. Section 4 of this Plan describes a number of objectives to increase stakeholder participation in the state NPS Program, which will help gather needed feedback on program successes and challenges. MassDEP is also committed to participating in both national and regional forums to share successes, learn from others, and advance policy on NPS pollution on both the state and federal level.



- **NPS Plan Updates:** MassDEP envisions that in year four of the NPS Plan, a formal evaluation of the Plan will be conducted. Sections of the Plan that are outdated will be identified. An analysis of the Goals section (Section 4) will be conducted and information will be compiled on the status of each goal and the associated objectives and milestones. Any objective or milestone that cannot reasonably be completed by the end of the five-year period will be identified. In some cases, it will be necessary to reexamine or redefine these based on available information or identified barriers. In other cases, new milestones will be developed that will support the achievement of the Plan goals. Goals set in this Plan are envisioned as being carried forward from this Plan to future Plans. However, MassDEP will assess whether new goals are needed based on changes in policy at the state or federal level. Information gathered and reported in previous submissions to USEPA will form the core of the NPS Plan update. Any updates to the NPS Plan will involve the NPS Partners. The state plans to have an updated, USEPA-approved NPS Management Program plan in place by October 1, 2019.



SECTION 3: PARTNERSHIPS AND COLLABORATION

3.1 SUMMARY OF PRIMARY PARTNER PROGRAMS

The Massachusetts NPS Program involves collaboration between the MassDEP NPS Program and a broad network of partner programs. A focus of this NPS Plan update has been to improve coordination with partner programs and identify opportunities to leverage funding for NPS pollution projects through improved interagency collaboration and program structure. In particular, strengthening partnerships with agricultural agencies is a high priority in order to leverage NPS project funds from the USDA-NRCS Farm Bill conservation programs and other sources.

Opportunities for improved interagency collaboration that are identified in this section are based on interagency planning sessions conducted as part of the NPS Plan update. As such, these new collaboration activities represent actions that have been agreed on by the relevant agencies as priorities and as achievable over the next five years.



Primary partner agencies that have specific and ongoing roles in the state NPS Plan are listed below in Table 3.1 and described in the sections that follow. Other partner organizations that play an important but less formalized role in managing NPS pollution in Massachusetts are discussed in Section 3.2. Partner program activities specifically focused on monitoring, evaluation, and assessment of water bodies are discussed in greater detail in Section 6.

It is important to note that the MassDEP NPS Program must take the lead role in coordinating interagency efforts related to this NPS Plan. It is the responsibility of the NPS Program to reach out to its partner programs, support them in their efforts related to NPS pollution, and coordinate with them to ensure that mutual goals are met.



Table 3.1 Summary of Primary Massachusetts NPS Partner Agencies

Agency	Programs/Activities Related to NPS Pollution
State Agencies	
Massachusetts Department of Environmental Protection (MassDEP)	<ul style="list-style-type: none"> • Lead agency for state NPS Program, responsible for program implementation, s.319 grant program, 604(b) program and NPS Program reporting to USEPA • Other primary MassDEP supporting programs include: <ul style="list-style-type: none"> – Division of Watershed Management (DWM), which includes the Watershed Planning Program (WPP), Wetlands Program, Drinking Water Program, and Wastewater Management Program – Massachusetts Clean Water State Revolving Fund Program (CWSRF) – Natural Resources Damages Program (NRD)
Massachusetts Office of Coastal Zone Management (CZM)	<ul style="list-style-type: none"> • CZM manages the Massachusetts Coastal Nonpoint Pollution Control Program, implemented in coordination with MassDEP as part of the state NPS Plan • Coastal Pollution Remediation Grant Program (CPR) • Massachusetts Bays National Estuary Program (MassBays)
Massachusetts Department of Agricultural Resources (MDAR)	<ul style="list-style-type: none"> • Agricultural Environmental Enhancement Program (AEEP) • Agricultural Preservation Restriction Improvement Program (AIP) • Farm Viability Enhancement Program (FVEP) • Agricultural Energy Grant Program (Ag-Energy)
Massachusetts Executive Office of Energy and Environmental Affairs (EEA)	<ul style="list-style-type: none"> • EEA Climate Change Initiatives • Massachusetts Environmental Trust (MET) • Dam and Seawall Repair and Removal Fund
Massachusetts Department of Fish and Game (DFG)	<ul style="list-style-type: none"> • Division of Ecological Restoration (DER) • Division of Fisheries and Wildlife (DFW) • Division of Marine Fisheries (DMF)
Massachusetts Department of Conservation and Recreation (DCR)	<ul style="list-style-type: none"> • Office of Water Resources (OWR) - Lakes and Ponds Program: includes monitoring and public education/outreach activities • Division of Water Supply Protection (DWSP): includes water quality sampling, monitoring, and reporting for Wachusett Reservoir and Quabbin Reservoir
Federal Agencies	
United States Environmental Protection Agency (USEPA), Region 1	<ul style="list-style-type: none"> • USEPA provides funding under s.319, 604(b) and other CWA programs. • USEPA Region 1 provides programmatic oversight of state NPS Programs within the region • USEPA also has regulatory jurisdiction over certain aspects of marina operations and urban stormwater pursuant to NPDES stormwater permits
United States Department of Agriculture (USDA)	<ul style="list-style-type: none"> • USDA Natural Resources Conservation Service (NRCS) activities focused on Farm Bill programs, including: <ul style="list-style-type: none"> – Environmental Quality Incentives Program (EQIP) – Conservation Innovation Grants (CIG) – Emergency Watershed Protection Program (EWP) – Conservation Stewardship Program (CSP) – Agricultural Management Assistance (AMA) – Agricultural Conservation Easement Program (ACEP) – Regional Conservation Partnership Program (RCPP) • USDA Farm Service Agency (FSA) programs, including the Conservation Reserve Program (CRP)



3.1.1 Massachusetts Department of Environmental Protection

a. Division of Watershed Management (DWM)

Program Description:

The DWM consists of programs that are charged with monitoring and regulatory activities affecting water quality and quantity within the state's major river basins. These programs focus on building local and regional partnerships to bring about water quality improvement, including the following which involve aspects of NPS management:

- **Watershed Planning:** The Watershed Planning Program (WPP) relies on the collection and assessment of quality-assured monitoring data to support a variety of mandated programs under the Federal Clean Water Act. The watershed planning program reports on the health of the state's waters and watersheds. This is largely accomplished through the development and implementation of various types of watershed assessments, some of which focus on a particular aspect of watershed health (i.e., water quality). WPP's efforts related to TMDLs, 303d listings, and monitoring/assessment of water bodies are described in Section 6 (Monitoring, Evaluation, and Assessment).
- **Drinking Water:** The Drinking Water Program ensures that safe drinking water is delivered by public water systems according to national and state standards. As USEPA's Primacy Agent for the federal Safe Drinking Water Act in Massachusetts, the Program regulates water quality monitoring, source approvals, water supply treatment, and distribution protection. It coordinates with MassDEP's WPP, EEA's Water Resources Commission, and DCR in regulating the quantity of water used for drinking water supplies and in promoting water conservation. The Program provides technical assistance to water suppliers, municipal boards, and other groups in developing source water protection plans, writing water supply bylaws, and compliance with water supply regulations. Other activities include approval of new water supply technologies, regulating water vendors, source approval for bottled water, and public education on drinking water issues.



The **Sustainable Water Management Initiative (SWMI)** was established as part of the MassDEP Drinking Water Program in 2010, with the goal of sustainable management of water resources that balances human and ecological needs. The 2012 SWMI Framework guides MassDEP's permitting of water withdrawals under the Water Management Act (WMA). Successful implementation of this initiative will enable clear, predictable, and science-based permitting; ensure prudent and sustainable water use; maintain healthy watersheds; and gradually improve degraded ones. Key policy and geographic priorities of note include:

- SWMI is focused on helping communities meet mitigation requirements related to water consumption (surface/groundwater withdrawals), with a strong focus on groundwater;
- Some stormwater improvements (e.g., those with a groundwater recharge and filtration component) could be eligible for SWMI funding. Projects involving recharge improvements (stormwater capture/harvesting) have potential for crossover with NPS pollution reduction. Since SWMI is state capital funded and mitigation work required under SWMI is not related to NPDES requirements, most SWMI work can be used as match for s.319 projects. Projects in wellhead protection areas would need to meet the Zone 2 requirements;
- SWMI classifies watersheds by biological category. The Massachusetts Recovery Potential Screening Tool (RPST) includes a SWMI layer in its ranking system. As described in greater detail in Section 5, Massachusetts includes a SWMI layer in the Recovery Potential Screening Tool (RPST). The RPST is a tool developed by USEPA that can help states



assess and rank the recovery potential of impaired waters and watersheds by analyzing a variety of metrics in three recovery-related categories (ecological metrics, stressor metrics, and social context metrics);

- SWMI permits will be issued for 1-2 watersheds per year. The NPS program should be aware of these watersheds to allow for greater project coordination. NPS Program staff should be included in the interagency consultation on these permits; and
 - For WMA permits, the process for evaluating mitigation projects is being studied and developed through pilot projects as this Plan is being written. The goal of the pilot projects is to evaluate how the SWMI framework will be applied to a diverse and select group of communities so that mitigation and minimization opportunities and costs of potential actions will be better known to the communities and agencies. The process of developing regulations is occurring on a parallel track. Since the regulations will codify how the SWMI framework will be implemented, the pilot analyses can inform and guide their development. MassDEP reiterates that it will not issue the regulations in final form until the pilots are reasonably completed. Four public water suppliers are participating in the pilot projects: Amherst, Danvers-Middleton, Dedham-Westwood, and Shrewsbury.
- **Wetlands:** The Wetlands Program ensures the protection of inland and coastal wetlands, tidelands, great ponds, rivers, and floodplains by administering and enforcing the Massachusetts Wetlands Protection Act, the Inland and Coastal Wetlands Restrictions Acts, and the 401 Water Quality Certification Program. By regulating activities that may alter wetlands, including stormwater standards, the Program ensures that the state's wetlands continue to provide valuable benefits such as flood control, prevention of pollution and storm damage, and protection of water supplies, fisheries, and wildlife habitat. Similar to the Watershed Planning Program (WPP), the Wetlands Program collects and assesses quality-assured monitoring data under the Federal Clean Water Act to report on the health of the state's wetlands in the 305(b) report.
 - **Wastewater Management:** MassDEP's wastewater programs protect public health and the environment through regulation of discharges from treatment plants, industrial facilities, sewers, and other sources. These programs also ensure the safety of septic systems and alternative septic treatment technologies. The state Title 5 Regulations (310 CMR 15.00) ensure proper and effective disposal of nonpoint source discharges from onsite wastewater systems.



NPS Program and DWM Collaboration

- **Watershed Planning:** The NPS Program Coordinator participates in weekly senior staff meetings with DWM watershed planning staff. Additional discussions related to program and priority integration are held on a frequent (often daily) basis, including policy topics such as the MassDEP vision for the 303(d) list and integration of DWM efforts with the state NPS Plan.
- **Drinking Water:** Coordination between the Drinking Water Program and NPS Program typically occurs when there is a wellhead protection issue related to NPS pollution. For example, NPS program staff will provide technical guidance on which BMPs may be most appropriate to protect a wellhead area from a specific NPS pollutant or source. In addition, the 604(b) Program has funded assessment projects that are directly related to drinking water and source water protection.

NPS Program staff participates in the SWMI mini-grant review/selection process. Many SWMI projects involve infiltration practices that are consistent with the goals of the NPS Program and could help leverage s.319 projects as matching funds.



- **Wetlands Program:** Coordination between the Wetlands Program and NPS Program typically occurs when there is a wetlands regulatory issue that includes a NPS pollution component, including permitting for s.319-funded projects. NPS Program staff provide similar statewide technical support to municipal Conservation Commissions. The NPS Program also coordinates with the Wetlands Program on development and program integration of the Conservation Assessment and Prioritization System (CAPS), described in Section 5.
- **Wastewater Management:** Coordination between the Wastewater Management Program and NPS Program occurs through joint participation in activities related to the Massachusetts Alternative Septic System Test Center (MASSTC). As further described in Section 2, MASSTC receives joint funding from USEPA and MassDEP.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and DWM are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan. These new activities are based on interagency planning sessions and follow-up communications (e.g., conference calls, phone discussions) conducted as part of the NPS Plan update. As such, these new collaboration activities represent actions that have been agreed on by the relevant agencies as priorities and as achievable over the next five years. The table below provides the location of each listed activity with Table 4.1, which is a comprehensive list of all goals and milestones proposed for the next five years as part of this NPS Plan update.

Table 3.2 NPS Plan - Increased DWM Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
1. Improved coordination between DWM-WPP monitoring programs and MassDEP and USEPA Clean Water Act programs (e.g., s.319, TMDL, 303d) is a critical need in order to make progress on the multiple objectives for state water quality monitoring. The NPS Plan includes planning efforts involving USEPA and MassDEP program leads as an important first step in this process of reaching agreement on the prioritization of resources and program goals.	Goal 4, Milestone 2.a. Goal 4, Milestone 4.a.
2. NPS Program needs related to monitoring/assessment could be addressed through better coordination with DWM watershed monitoring/assessment work. Setting priorities in advance of the development of DWM's annual work plans could allow for targeted or baseline monitoring of high priority NPS watersheds. The NPS Plan includes milestone activities focused on program coordination to select targeted and baseline monitoring watersheds and development of a pilot targeted monitoring program to assess BMP effectiveness.	Goal 4, Milestones 2.a-d Goal 4, Milestone 8.b.
3. Enhance groundwater recharge and protection of critical surface and subsurface water supplies; establish a partnership agreement between the NPS Program and SWMI	Goal 2, Milestone 6.a.
4. Assessment of water quality data by DWM-WPP to determine if improvements in water quality have occurred in watersheds with NPS-focused water quality improvement activities	Goal 4, Milestone 3.d.



b. Massachusetts Clean Water State Revolving Fund Program (CWSRF)

Program Description:

The CWSRF provides low-interest subsidized loans to assist municipalities in complying with federal and state water quality requirements. Sections 212, 319, and 320 of the federal Clean Water Act provide the statutory authority for CWSRF-funded programs. Initial federal funding for the CWSRF is provided through the USEPA. The CWSRF is authorized to provide financial assistance for construction of publicly-owned treatment works (s.212), projects that implement NPS management programs (s.319), and development and execution of an estuary conservation and management plan (s.320). Massachusetts also has a separate Drinking Water State Revolving Fund (DWSRF), which is a joint federal-state financing program providing subsidized interest loans to protect public health by improving water supply and infrastructure systems and protecting drinking water.



The CWSRF is jointly administered by the MassDEP Division of Municipal Services and the Massachusetts Water Pollution Abatement Trust. Each year, MassDEP solicits projects from municipalities and wastewater districts to be considered for subsidized loans. The current subsidy is provided via a 2% interest loan. In recent years, the program has operated with \$300 to \$350 million per year and has financed 50 to 70 projects annually. A CWSRF goal is to provide incentives to communities for projects with meaningful water quality and public health benefits and that address the needs of the communities and the watersheds.

Financial assistance is available for planning and project construction, including CSO mitigation, new and upgraded wastewater treatment facilities, infiltration/inflow correction, wastewater collection systems, and NPS pollution abatement projects, including green infrastructure projects. These projects can include landfill capping, community programs for upgrading septic systems, brownfield remediation, pollution prevention, and stormwater remediation. Non-structural projects are also eligible for CWSRF funding (e.g., planning projects for NPS problems that are consistent with the NPS Plan, identify pollution sources, and suggest potential remediation strategies).

MassDEP ranks projects using the Commonwealth's priority ranking system, which is reviewed annually to reflect changing priorities. The current criteria emphasize the following:

- the nature of the public health problem that the project will address;
- the criticality of the resources affected;
- the environmental benefits of the project;
- the effectiveness of the project solution;
- the extent to which the project is consistent with regional- or watershed-wide plans; and
- the extent to which projects qualify as green projects.

NPS Program and CWSRF Collaboration

Section 5 of this NPS Plan details the activities and categories of NPS pollution sources that are the focus of funding priorities for both the NPS Program and the CWSRF. Projects that address these priorities are eligible for funding under either program. The state portion of CWSRF project funding may be counted a match for Section 319 grants.

Throughout the history of its CWSRF, Massachusetts has leveraged the federal SRF grant to expand the available loan capacity and underwrite many more projects than would have been possible had the Commonwealth used the direct loan approach taken by most states. One consequence of the leveraged approach is that Massachusetts has been able to finance a number and variety of NPS planning and management projects over the years, despite the fact that NPS projects, due to scope and scale, are



generally not as competitive as traditional wastewater projects. Traditional wastewater projects, the so-called CWA Section 212 projects, naturally tend to have more impact on public health and environmental resources, thus score more highly in the rankings. Nonetheless, NPS projects are proposed and financed by Massachusetts' communities. Over the past 25 years (1989 to 2014), the CWSRF has funded \$152 million in NPS category work, including landfill closures, septic upgrades to sewer, and green infrastructure (all projects that fell within the NPS category of the SRF reporting system). Project types that the Commonwealth has, and will continue to finance include: Stormwater Management Plans, landfill capping and closure, on-site wastewater systems, package treatment plants, and water and energy efficiency projects.

Limited development of stormwater utilities in the Commonwealth seems to have limited the number of non-CSO stormwater projects that have been proposed by municipalities to compete for CWSRF loans. While water and wastewater systems can count upon their rate structures to underwrite financing costs, Massachusetts communities typically do not have similar revenue streams associated with stormwater management upgrades. Consequently, loans for stormwater improvements compete with other municipal expenses, such as schools, police, and public works. Anticipating that additional federal requirements and/or expanded development of stormwater utilities will occur in the near future, the CWSRF program anticipates a resulting additional demand for SRF financing. Given the maturity and capacity of the Massachusetts' CWSRF program, it is not anticipated that any kind of set-aside will be needed to insure that NPS projects can be sufficiently competitive to earn a listing on the state's Intended Use Plans.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and CWSRF are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.3 NPS Plan - Increased CWSRF Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
The NPS Program and CWSRF will coordinate on a new program partnership focused on protection of unimpaired/high quality waters.	Goal 3, Milestone 2.b.
Incorporate groundwater protection/recharge into watershed planning and implementation activities through partnership agreements with CWSRF, Groundwater Programs	Goal 5, Milestone 4.b.

c. Natural Resources Damages Program (NRD)

Program Description:

On behalf of the Secretary of Energy and Environmental Affairs who serves as the Commonwealth's Natural Resource Trustee, the MassDEP Bureau of Waste Site Cleanup implements the NRD Program to (1) assess injuries to natural resources resulting from releases of oil or hazardous materials and substances, (2) bring claims against responsible parties for monetary damages to compensate the public for these injuries, and (3) plan and implement projects to restore, replace, or acquire the equivalent of natural resources and the services that they provide to the environment and the public. The Commonwealth of Massachusetts manages natural resources such as fish, shellfish, wildlife, rare species, and groundwater, rivers, lakes, ponds, and wetlands, and holds them in trust for the public. The Trustees' duty is to exercise general care and oversight of the natural resources of the





Commonwealth; to propose and carry out measures for the protection, conservation, control, and use thereof; and to remedy any damage or destruction to the environment.

When a release of oil or hazardous materials or substances occurs, Trustees take action to:

- Conduct a pre-assessment screen to review available information and determine if a NRD assessment can and should be performed;
- Identify natural resources that have been lost, destroyed, or injured by toxic pollutants;
- Determine and quantify the spatial and temporal extent of injuries;
- Identify and evaluate feasible and cost-effective alternatives to restore resources to a baseline condition; and
- Seek appropriate compensation from polluters in the form of monetary damages or restoration actions.

Once these steps are completed, actions are taken to develop and implement restoration plans to restore the same or similar natural resources and services that have been injured. Program and related project funding comes from legal settlements. Funded activities depend on the nature of the natural resources and services that have been injured and the geographic area of consideration for use of funds depends on the specifics of each settlement. The scope of restoration can be very focused, for example in a particular sub-watershed, or extensive, for example throughout a major watershed. Restoration of some natural resources (e.g., migratory fish and birds) may take place in another watershed.

NPS Program and NRD Program Collaboration

Complex NRD settlements can take years to negotiate and the assessments are confidential, limiting possible partner coordination. However, the NRD Program often uses information and expertise from partners to help assess natural resource injuries. Once a settlement is finalized, the NRD Program conducts inter-agency consultation as part of the process to identify potential restoration projects. NRD funds can be used in a flexible manner (no strict funding schedule) and can be leveraged by s.319 grant projects and other programs (e.g., used as non-federal match requirement).

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and NRD Program are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.4 NPS Plan - Increased NRD Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
Where appropriate and consistent with other program goals, the NPS Program will coordinate with the NRD Program to address mutual restoration goals and leverage s.319 grant projects (e.g., help provide match requirement).	Goal 1, Milestone 2.f.



3.1.2 Massachusetts Office of Coastal Zone Management (CZM)

a. Massachusetts Coastal Nonpoint Pollution Control Program (CNPCP)

Program Description:

Under Section 6217 of the federal 1990 Coastal Zone Act Reauthorization Amendments (CZARA), states and territories with approved Coastal Zone Management Programs are required to develop a Coastal Nonpoint Pollution Control Program (CNPCP). In its program, a state or territory describes how it will implement nonpoint source pollution controls, known as management measures, that conform to those described in [Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters](#). This program is administered jointly by the National



Oceanic and Atmospheric Administration (NOAA) and USEPA. The management measures cover the range of potential NPS sources that can be found within the coastal zone and include urban sources (developed areas, septic systems, erosion and construction sites, watershed protection, and roads and highways), marinas and recreational boating, agriculture, forestry, hydromodification, and also wetlands restoration and protection efforts. In Massachusetts, CZM manages the CNPCP, which is implemented in coordination with MassDEP as part of the state NPS Plan which is specific to the Massachusetts Coastal Zone. CZM submitted a draft CNPCP Plan in 1996 and received full program approval from NOAA and USEPA in 1997. A long-term (15-year) strategy and short-term (5-year) goals were developed in 1999 with proposed goals and actions.

This NPS Plan update includes an update of long-term goals (15-year, through 2029) and short-term action items (5-year, through 2019) for the CNPCP. These goals and action items were updated by staff of CZM, MassDEP, and the CNPCP partner agencies. Current CNPCP goals and action items are incorporated into this NPS Plan and included as Appendix A to this Plan. CZM activities related to monitoring are described in Section 6.

b. Coastal Pollutant Remediation Grant Program (CPR)

Program Description:

The Coastal Pollutant Remediation (CPR) Grant Program funds roughly \$400,000 per year in projects throughout the designated Massachusetts coastal zone. \$8.7 million has been dispersed in program funding since 1994. The CPR Program has the following priorities:

- Characterize and treat urban runoff from municipal roadways;
- Improve coastal resources, such as shellfish beds, bathing beaches, and diadromous fish runs;
- Demonstrate traditional and innovative NPS pollution control methods; and
- Educate the public about stormwater runoff problems.

Three categories of coastal zone projects are funded by the CPR:

1. Assessment, identification, and characterization of NPS pollution from paved surfaces, which can include determining sources of roadway-related pollution, identifying appropriate stormwater control methods (also known as Best Management Practices or BMPs), and siting these BMPs;
2. Design/construction of BMPs to treat runoff from paved roads, highways, and municipal parking lots; and
3. Design and construction of commercial boat-waste pumpout facilities to reduce pollution related to discharges from vessel holding tanks.



NPS Program and CZM Collaboration

As stated above, the CNPCP has been developed and implemented in coordination with MassDEP as part of the state NPS Plan. Many of the NPS Program milestones in Section 4 support the CNPCP, and their completion will document progress in addressing protection from NPS pollution in the coastal zone.

In addition, the MassDEP NPS Program Coordinator and the 604(b) Program Coordinator participate as part of the CZM committee to annually review CPR grant applications. Through the 604(b) Program, MassDEP has worked collaboratively with the CPR program to conduct assessments and advance preliminary BMP designs in select watersheds. For instance, the 604(b) program funded preparation of BMP designs in Duxbury and Kingston that were subsequently constructed using CPR funds.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and CZM are listed below in Table 3.5. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the Massachusetts NPS Plan.

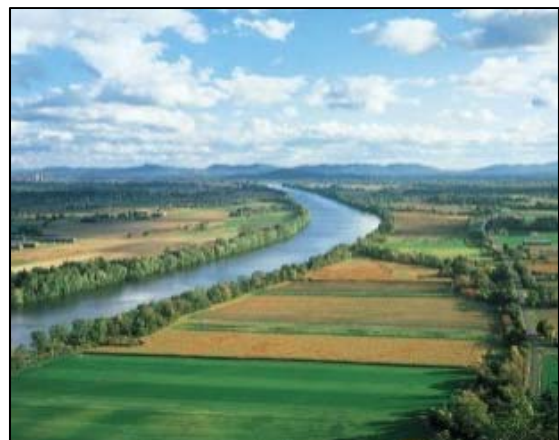
Table 3.5 NPS Plan - Increased CZM Collaboration Activities

Increased Collaboration Activity	Location in CNPCP 2014-2019 Implementation Plan
By 2019, working with MassDEP and other partner agencies, CZM will (1) develop and implement watershed-based strategies to mitigate adverse effects of climate change on waters and wetlands within the coastal zone, and (2) work with coastal zone stakeholders to plan for and implement adaptations to existing infrastructure to increase resilience and protect critical habitats from adverse effects of climate change.	1.D. Urban Areas: Watershed Protection
By 2018, working with MassDEP and other partner agencies, CZM will (1) develop and implement a comprehensive plan to assess and rank coastal zone watersheds to identify high-quality areas, and (2) establish programs to educate stakeholders on the importance of protection of these resources, target resources to protect these areas from future environmental impacts, and help align partner program resources to enhance efforts to protect water quality in these watersheds.	

3.1.3 Massachusetts Department of Agricultural Resources (MDAR)

MDAR's mission is to ensure the long-term viability of agriculture in Massachusetts. MDAR strives to support, regulate, and enhance the rich diversity of the Commonwealth's agricultural community to promote economically- and environmentally-sound food safety and animal health measures, and fulfill agriculture's role in energy conservation and production.

A brief summary of MDAR programs that are applicable to NPS pollution is provided below, followed by a discussion of opportunities for improved collaboration between MDAR and the NPS program.





- **Agricultural Environmental Enhancement Program (AEEP):** The AEEP is MDAR's primary program related to NPS pollution. AEEP supports agricultural operations with installation of conservation practices to improve water quality, air quality, and efficient water use. Farmers are reimbursed up to \$25,000 to install approved practices. In recent years, about \$345,000 has been awarded annually, with most projects ranging from \$12,000-\$25,000 (30-35 projects per year). Examples of eligible practices include manure storage, irrigation efficiency, water control structures, pesticide storage facilities, and fencing to keep livestock out of a water resource.
- **APR Improvement Program (AIP):** The purpose of the AIP is to help sustain active commercial farming on land that has already been protected through the MDAR Agricultural Preservation Restriction (APR) Program. AIP provides technical assistance and business planning to improve farm productivity and profitability. The AIP provides assistance to enhance the long-term use of the agricultural resource, which may include economic viability, environmental sustainability, resource conservation, family succession planning, infrastructure improvement, or other issues.
- **Farm Viability Enhancement Program (FVEP):** The FVEP seeks to improve the economic viability and environmental integrity of participating farms through development and implementation of farm viability plans. FVEP offers farmers environmental, technical, and business planning assistance to expand, upgrade, and modernize their operations. Capital for the implementation of the improvements recommended in the viability plan is available in exchange for an agricultural covenant on the farm property for a fixed term of five or ten years.
- **Agricultural Energy Grant Program (Ag-Energy):** This program funds projects to improve energy efficiency, promote farm use of alternative clean energy technologies, and help farmers switch from oil heating to natural gas. It is associated with NPS pollution control through funding of projects resulting in air quality improvements. Up to \$25,000 is available in two categories: (1) renewable energy and (2) energy efficiency. Priority is given to proposals that focus on technologies listed in the application. Priority projects for renewable energy have included geothermal, photovoltaics, wind, and solar thermal. Priority projects for energy efficiency have included precoolers, variable speed vacuum pumps, thermal blankets, reverse osmosis, and high efficiency refrigeration.
- **Accelerated Conservation Planning Partnership (ACPP):** The ACPP is a cooperative initiative among MDAR, NRCS, and the Massachusetts Association of Conservation Districts (MACD). The partnership is intended to accelerate conservation planning and the provision of technical assistance to farmers to address water quality and other resource concerns. Through the partnership, NRCS and MDAR jointly fund four conservation planners, a nutrient management planner, and support staff throughout the state.

NPS Program and MDAR Collaboration

- MDAR currently partners with USDA-NRCS and the Massachusetts Association of Conservation Districts.
- The AEEP focuses on priority practices, not geographic regions. Grant prioritization does award extra points based on local conditions (e.g., proximity to a Zone 2 or other sensitive environmental receptor based on GIS review). The NPS Plan targets this as an area for improved coordination – MassDEP and MDAR working together with a shared focus on priority watersheds, including project timing, grant prioritization, etc.
- A challenge exists with regard to the large number of smaller "hobby" farms, horse owners, and individuals that conduct agriculture-type activities but do not participate in traditional agricultural conservation programs.
- Another challenge for producers is how grant funds are dispersed. MDAR must have proof that activities have occurred, not just an invoice, before grant funds can be released. Many producers



do not have the cash to float larger projects, which explains the smaller grant awards. This represents an opportunity for coordination with the s.319 grant program which only requires an invoice for reimbursement and can therefore potentially offer quicker reimbursement to grantees.

- An option for program coordination would be for the s.319 program to make a direct grant to MDAR for specific project types (e.g., BMPs to reduce nutrient runoff from “hobby farms”).
- MassDEP and MDAR agreed that it would be beneficial to set mutually-agreed on priorities for grants and explore other coordination avenues to mesh like-focused programs. Opportunities for improved overall collaboration on these and related policy issues are summarized below.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and MDAR are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.6 NPS Plan - Increased MDAR Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
Expand membership of Section 319 grant review committee to include MDAR staff	Goal 1, Milestone 2.c.
Joint MDAR and MassDEP support of the Palmer River watershed NWQI agricultural partnership pilot project	Goal 1, Milestone 5.a.
Develop a data sharing Memorandum of Understanding (MOU) with NRCS and MDAR that is consistent with Section 1619 of the Food, Conservation, and Energy Act	Goal 1, Milestone 6.a.
Develop a partnership agreement (MOU) on collaboratively addressing NPS pollution from agricultural sources through program coordination, increased communication, and technical support to producers	Goal 1, Milestone 6.b.
Address NPS issues from agricultural sources through interagency policy/grant coordination and implementation of new nutrient regulations.	Goal 1, Milestone 6.c.
Establish a Regulatory Certainty Program between MassDEP, MDAR, and USDA-NRCS	Goal 1, Milestone 6.d.
Develop partnership between MassDEP and state animal inspectors to evaluate impacts of small hobby/horse farms	Goal 5, Milestone 4.d.
Develop partnership between MassDEP and Agricultural Commissions/State Pesticide Board	Goal 5, Milestone 4.e.

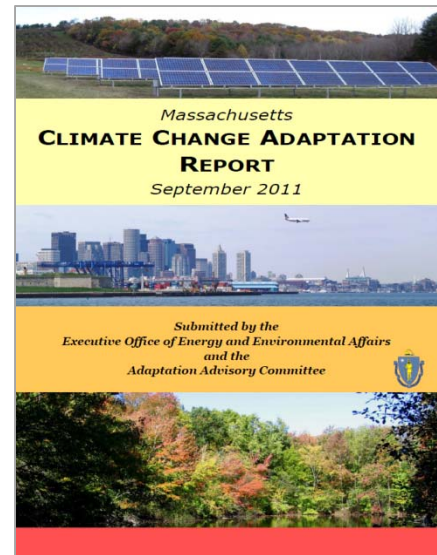


3.1.4 Massachusetts Executive Office of Energy and Environmental Affairs (EEA)

a. EEA Climate Change Initiatives

EEA has several recent and ongoing initiatives related to Climate Change Adaptation (CCA):

- *Massachusetts Climate Change Adaptation Plan*: A draft of this plan is currently under review by the Governor and EEA Secretary. When finalized, this will be a plan for Massachusetts state agencies that can be implemented over the next 12-16 months, including the following focus areas:
 - Vulnerability assessments;
 - Hazard mitigation for extreme weather events, including specific recommendations for both infrastructure protection and community support; and
 - Most of the concepts of the plan will be large scale, not necessarily specific to individual agency programs. Example: revisions to the state building codes.
- *Massachusetts Climate Change Adaptation Report* (2011): This report presents the state's strategy for addressing CCA, including strategies for addressing concerns that overlap with the NPS Program such as Strategies for Aquatic Ecosystems, Strategies for Water Resources Infrastructure, and Strategies for Water Quality Protection. This report recognizes the need for "strong coordinated efforts among various entities" and the importance of state investments which reflect potential climate change impacts. <http://www.mass.gov/eea/docs/eea/energy/cca/eea-climate-adaptation-report.pdf>
- Continued, ongoing work by the EEA Climate Change Adaptation Committee, which involves state agencies and stakeholders from various sectors in Massachusetts.



b. Massachusetts Environmental Trust (MET)

Funded primarily through license plates sales, MET provides approximately \$500,000 annually to fund projects with a typical maximum award of \$50,000. The scope of eligible activities is intentionally broad. MET tries to generally support statewide interests, but does have several historic program priorities, including marine mammal protection and fish passage. Examples of MET project categories include:

- Point and nonpoint source pollution;
- Water conservation and flow enhancement;
- River and estuary continuity and restoration;
- Monitoring marine, estuarine, and freshwater systems;
- Endangered and threatened species and habitat;
- Human health issues that result from degraded water resources;
- Environmental education pertaining to water resources;
- Low-income or "environmental justice" communities; and/or
- Research on emerging environmental issues.





c. Dam and Seawall Repair and Removal Fund

This program is funded by a \$20.1 million trust, and is intended to operate as a revolving fund. In FY 2014, just over \$5.2 million was offered to municipalities in the form of grants and loans. The program was also supplemented by \$7.6 million in capital funds for coastal infrastructure projects.

While projects which enhance public safety are a priority, evaluation criteria also include improvements to public health, water quality, climate change resiliency, and if the project will improve or expand functions of naturally occurring systems. The Fund accepts applications annually through a Request

for Responses from municipalities, non-profit organizations, and, in the case of dams only, private owners. Financing is offered through grants, loans, or a combination of the two.

For coordination with the NPS Program, including s.319 projects, it would require that linkages are made to the water quality benefits of dam removal, management and treatment of stormwater, protection of healthy watersheds, and associated improvements.



NPS Program and EEA Collaboration

- EEA staff participate on the review/selection committees for s.319 and 604(b) grants.
- As listed below, a goal of this NPS Plan is to expand collaboration between MassDEP and EEA with regard to public education on climate change and its connection to NPS pollution.
- In general, the relationship between MET and the s.319 Program is working well. NPS Program staff participate in the MET grant review/selection process. MET is invited to participate in s.319 grant review.
- There is currently no formalized collaboration between the NPS Program and the Dam and Seawall Repair and Removal Fund. This is an opportunity for improvement, as listed below.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and EEA are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.7 NPS Plan - Increased EEA Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
Expand EEA and MassDEP efforts to educate the public on climate change and the connection to NPS pollution. This will include publication of reports and development of agency action groups.	Goal 5, Milestone 3.c.
MassDEP staff will have ongoing involvement and participation in EEA climate change workgroups Incorporate EEA climate change plans into the NPS Program, TMDL guidance, and other programs	Goal 5, Milestone 4.b.
Expand membership of Section 319 grant review committee to include MET staff	Goal 1, Milestone 2.c
Revise funding criteria to include potential benefit to other programs such as the NPS Program.	Goal 1, Milestone 1.a.
Expand the Dam/Seawall Repair and Removal Fund review committee to include NPS program staff.	Goal 1, Milestone 2.c.



3.1.5 Massachusetts Department of Fish and Game (DFG)

a. Division of Ecological Restoration (DER)

DER's primary mission is to restore and protect aquatic ecosystems. DER provides approximately \$800,000 annually in state capital funds for restoration projects. Projects focus on physical habitat restoration (rivers/streams, inland/coastal wetlands) and flow restoration (monitoring and restoration projects). DER's emphasis is on projects that provide tangible ecological benefits and use practical approaches to achieve project goals.

DER also provides technical assistance, including water quality monitoring (see Section 6) and local ordinance development (e.g., cold water fishery protection bylaws).



NPS Program and DER Collaboration

- DER coordinates with MassDEP and other agencies on project funding prioritization. DER has provided input on the Recovery Potential Screening Tool (RPST) and participates in the review of s.319 grants. For an example of a recent restoration project (Eel river Restoration, Plymouth) involving a collaborative efforts between DER, MassDEP, USFWS, NRCS and other local, state, and federal partners, see:
http://water.epa.gov/polwaste/nps/success319/ma_eel.cfm
- Opportunity exists for increased NPS Program involvement on DER project review/selection, development of target areas for future projects, and development of review criteria to place more strategic focus on s.319 program priorities, including the protection of healthy watersheds and climate change adaptation.
- It may be possible to coordinate the DER and s.319 funding cycles. This could be a goal for multiple partner agency programs. In addition, developing unified outreach materials on grant programs could help the public understand various program priorities and help applicants seek out the right grant or grants for a given project.
- Watershed prioritization for DER projects is becoming important. For each priority watershed, it is critical to have local project partners that are committed to the project's success and have the capacity to be stewards of the project. In priority watersheds lacking strong local partners, it is critical for the agencies to help build this capacity through technical assistance and other means.

b. Division of Fisheries and Wildlife (DFW)

The DFW is responsible for the conservation - including restoration, protection, and management - of fish and wildlife resources for the benefit and enjoyment of the public. DFW's charge is the stewardship of all wild amphibians, reptiles, birds, mammals, and freshwater and diadromous fishes in the state, as well as endangered, threatened, and special concern species, including native wild plants and invertebrates.

As presented in greater detail in Section 6, DFW's statewide fisheries monitoring program generates





the largest source of data related to Massachusetts fisheries. This data is very useful to MassDEP, which uses it to establish baselines for biological community assessments. For example, MassDEP uses fish population data as a metric to establish what fish use is for a water body (i.e., cold water fishery vs. warm water fishery). DFW monitoring is often conducted as a “spot check” rather than a full community assessment.

NPS Program and DFW Collaboration

- A new activity for this updated NPS Plan is to provide additional prioritization for s.319 grant projects that protect or improve high quality waters as recommended by DFW.
- If DFW were to define the features of that characterize “high quality” for various categories of waters (e.g., cold water fisheries, warm water fisheries), this would enable the NPS program to support efforts to protect and improve these waters.

c. Division of Marine Fisheries (DMF)

The DMF is responsible for the development and promulgation of the Commonwealth’s laws governing commercial and recreational fishing activity conducted in the marine environment. The DMF conducts a variety of monitoring programs related to marine resources, and those which overlap with the goals of the NPS Program are described in Section 6. An important DMF monitoring program is shellfish growing areas, which includes a bacteria assessment and some water quality monitoring. This information is used to guide both closure and management activities in shellfish areas. MassDEP uses the data from these studies for shellfish use assessments.



NPS Program and DMF Collaboration

- As stated above, MassDEP uses DMF data for shellfish use assessments. This information is incorporated into the NPS prioritization framework as described in detail in Section 5.
- It would be helpful to the NPS Program if DMF were to designate “high priority” shellfish growing areas (and other important areas such as smelt and river herring spawning habitat). As discussed above under the DFW summary, this information would enable the NPS program to support efforts to protect and improve these areas. Additional follow-up with DMF staff is needed to explore this further.
- Improved sharing of DMF’s pollutant source data and water quality monitoring data would be useful to the NPS Program. This data would help to identify pollution sources and can be used to track water quality improvements after installation of BMPs.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and DFG are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.



Table 3.8 NPS Plan - Increased DFG Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
NPS Program involvement on DER project review/selection, development of target areas for future projects, and development of review criteria to place more strategic focus on s.319 program priorities	Goal 1, Milestone 2.c.
Coordinate the DER and s.319 funding cycles	Goal 1, Objective 4
Develop grant funding priorities that are consistent for MassDEP, DER, and other NPS grant agencies; develop a publicly-available guide detailing the types of projects that will receive priority from NPS partner grant programs	Goal 1, Milestone 1.a.
Establish a methodology for identifying unimpaired/high quality waters; NPS partner program programs help assess and identify unimpaired/high quality waters	Goal 4, Milestones 1.a.-b.

3.1.6 Massachusetts Department of Conservation and Recreation (DCR)

a. Office of Water Resources

The DCR Office of Water Resources (OWR) promotes water quality and conservation through several programs and sources of technical resources.

- OWR provides technical staff support to the Water Resources Commission, developing water resources policy and watershed planning efforts, coordinating review of proposed interbasin transfers, administering cooperative programs with USGS, and managing the Rainfall Program (a network of approximately 150 precipitation observation stations, operated by volunteers throughout Massachusetts, and a precipitation database for research and analysis). In addition, staff are undertaking an eight-year program developing water needs forecasts in support of MassDEP's Water Management Act permit renewal effort.
- The Lakes & Ponds Program conducts NPS projects primarily on DCR water bodies within the State Forests and Parks systems. Projects include stormwater improvements and control of invasive species. This program also provides technical assistance to communities and citizen groups, water quality monitoring at public beaches, and public education materials on lake issues.
- The Flood Hazard Management Program is the state coordinating office for the National Flood Insurance Program (NFIP). This program provides floodplain management technical information and assistance to community officials and others concerning the NFIP as well as coordinating statewide floodplain management policies to accomplish comprehensive flood loss reduction. This program also jointly administers, in conjunction with the Massachusetts Emergency Management Agency, the state's hazard mitigation programs through planning and project grants and technical assistance to community officials.
- DCR also maintains a large network of roads and trails. This work and related stormwater management approaches could potentially be enhanced through information exchange/education and development of newer standards to help address multiple NPS goals.





NPS Program and DCR Collaboration

- In recent years, direct collaboration between DCR and the NPS Program has generally been associated with s.319-funded projects for protection/improvements at water bodies on DCR property (e.g., swimming beached, lakes within the State Forests and Parks system). These projects typically involve implementation of BMPs to reduce sources of nutrients and/or bacteria.
- As stated above, DCR's role in maintaining its network of roads and trails represents an opportunity for increased collaboration with the NPS Program through information exchange/education and development of new maintenance and BMP standards.

3.1.7 United States Environmental Protection Agency (USEPA), Region 1

USEPA provides s.319 funding under the CWA to the Massachusetts NPS Program, and USEPA Region 1 provides programmatic oversight of state s.319 NPS Programs within the Region. A summary of USEPA programs and priority activities that support NPS pollution control is provided below, as adapted from <http://water.epa.gov/>.




- **Watersheds and Nonpoint Source Pollution Programs**

- **Clean Water Act Section 319:** The 1987 amendments to the Clean Water Act (CWA) established the Section 319 Nonpoint Source Management Program. Under Section 319, USEPA provides states, territories and tribes with federal grant money to establish NPS programs that will achieve and maintain beneficial uses of waters. State programs may use federal s.319 funds to support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific NPS watershed projects that implement Watershed-Based Plans. USEPA also provides Section 319 program oversight and guidance to states, territories and tribes.

For more information on USEPA's role in overseeing the Section 319 Program, visit: <http://water.epa.gov/polwaste/nps/cwact.cfm>. Detailed information on MassDEP's administration of the Section 319 Program in Massachusetts is provided in Section 2.

- **Clean Water Act Section 604(b):** Section 604(b) of the CWA provides that each state receive 1% of its CWSRF allotment (or \$100,000, if that is greater) to carry out planning under Sections 205(j) and 303(e) of the CWA. At least 40% of that amount must be allocated to regional planning organizations and appropriate interstate organizations. These funds have been used to support a wide variety of NPS planning activities in Massachusetts. USEPA Region 1 provides grant funding each year to MassDEP and oversees the state's use of these funds. The USEPA grant project officer also participates in the annual regional project review committee. Detailed information on MassDEP's administration of the 604(b) Program in Massachusetts is provided in Section 2.
- **Wetland Program Development Grants:** Wetland Program Development Grants program provide funding under Section 104(b)(3) of the CWA to states, tribes, local governments, and interstate agencies for projects to develop and refine comprehensive state/tribal/local government wetland programs. Examples of grant project activities include, but are not limited to:
 - Development of a state/tribal Wetland Program Plan;
 - Development of training materials and tools to help local decision-makers integrate wetland protection into watershed planning;
 - Development of protocols and assessment criteria that can be used to identify wetland restoration and protection priorities;



- Development of a wetland restoration/protection prioritization process that considers whether climate change may impact project success;
 - Development of monitoring protocols and assessment criteria that can be used to report the ambient condition of wetland resources;
 - Development of methods or strategies to incorporate wetland water quality standards into EPA approved state/tribal water quality standards.
 - Development of a sub-award program to help fund research, studies, experiments, trainings, surveys and demonstration projects by local, university, or nonprofit organizations.
 - Development of habitat and watershed based assessments that enable landscape level analysis for use in state and federal wetland regulatory and planning programs.
 - Recent grants to Massachusetts organizations have supported the development of a wetland conservation assessment and prioritization system (CAPS), and a climate change adaptation strategy for the MA wetlands program.
- **Long Island Sound Study (LISS):** The LISS is a partnership, led by USEPA, of federal, state, interstate and local agencies, universities, environmental groups, industry and the public working to protect and improve the health of the Sound. The Connecticut River watershed, which is partially in Massachusetts, drains to the Sound. MassDEP is a member of the Program's Management Committee. To address ongoing water quality degradation, USEPA approved a TMDL in 2001 calling for nitrogen reductions across the Sound's watershed, including the entire Connecticut River Basin. Since then, the estuary program has provided \$3.5 million to implement the TMDL. USEPA is currently undergoing review of the TMDL and MassDEP is an active member of the 5 State/USEPA TMDL workgroup.
- **Cape Cod Section 208 Plan:** Section 208 of the Clean Water Act was designed to propose solutions for water quality problems from point and nonpoint sources within state-specified geographic regions. Cape Cod is one such region in Massachusetts. Among other planning activities, it was developed to facilitate development and implementation of area-wide waste treatment management plans. It requires state governors to identify areas with water quality problems and designate an entity to develop these area wide waste treatment management plans. In January 2013, the Cape Cod Commission (CCC) was designated and directed to update the 1978 Cape Cod Section 208 Plan to address nutrient pollution. USEPA serves in several roles in the Section 208 Plan update, including participating in regional workgroups and meeting regularly with MassDEP and CCC staff on Plan development. USEPA is also responsible for providing final review and approval of the Plan upon its completion. For more information, visit: <http://watersheds.capecodcommission.org/>
- 
- **Healthy Watersheds Initiative:** The objective of the federal Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." While other EPA programs focus on restoring impaired waters, the Healthy Watersheds Initiative (HWI) augments the watershed approach with proactive, holistic aquatic ecosystem conservation and protection. The HWI includes assessment and management approaches that encourage states, local governments, watershed organizations, and others to take a strategic, systems approach to conserve healthy components of watersheds, and, therefore, avoid additional future water quality impairments. USEPA has partnered with The Nature Conservancy and stakeholders to work on the Taunton River Healthy Watershed Initiative project. For more information, visit: <http://water.epa.gov/polwaste/nps/watershed/index.cfm>.



- **Southern New England Coastal Watershed Restoration Program:** In 2014, USEPA issued a Request for Responses for \$2 million dollars in grant funding to protect, enhance and restore clean water, promote healthy diverse habitats and associated populations of fish, etc. The initial program focus will be on nutrient (both nitrogen and phosphorus) pollution.

- **Total Maximum Daily Load (TMDL) Program**

Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for impaired waters and develop TMDLs for these waters. A TMDL determines the maximum pollutant load that a waterbody can receive and still meet water quality standards.

In 2013, USEPA announced a new collaborative framework for implementing the 303(d) Program with States - [A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303\(d\) Program](#). While the Vision provides a new framework for implementing the 303(d) Program, it does not alter State and USEPA responsibilities or authorities under the CWA 303(d) regulations. MassDEP's activities related to TMDLs, 303(d) listings, and monitoring/assessment of water bodies are described in Section 6.

- **Drinking Water Program**

- **Source Water Protection:** There is no single federal program for implementing source water protection plans and activities. However, many federal, tribal, regional, and local programs have tools and resources that can be used to focus on protecting drinking water. Source water protection can benefit, and benefit from, other EPA programs, other federal programs and non-governmental programs. For more information, visit: [EPA's Office of Ground Water and Drinking Water](#)
- **Sole Source Aquifer Program:** EPA defines a sole or principal source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally and economically supply all those who depend on the aquifer for drinking water. For convenience, all designated sole or principal source aquifers are referred to as "sole source aquifers" (SSAs).

USEPA Region 1 has designated 7 SSAs in Massachusetts, as listed below:

Massachusetts Sole Source Aquifers

Broad Brook Basin of the Barnes Aquifer
Canoe River
Cape Cod
Head of the Neponset
Martha's Vineyard
Nantucket
Plymouth/Carver

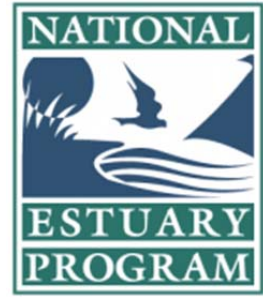
The SSA protection program is authorized by section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et seq.). SSA designation is one tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be extremely expensive. The designation protects an area's ground water resource by requiring EPA to review certain proposed projects within the designated area. All proposed projects receiving federal funds are subject to review to ensure that they do not endanger the water source. For more information, visit:

<http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/solesourceaquifer.cfm>



- **Ocean and Coastal Protection**

- **National Estuary Program (NEP):** The NEP was established under Section 320 of the 1987 Clean Water Act (CWA) Amendments as a USEPA place-based program to protect and restore the water quality and ecological integrity of estuaries of national significance. EPA has designated the Massachusetts Bays NEP and Buzzards Bay NEP in Massachusetts. The Narragansett Bay NEP and Long Island Sound watersheds are also partially in Massachusetts. Section 320 of the CWA calls for each NEP to develop and implement a Comprehensive Conservation and Management Plan (CCMP). The CCMP is a long-term plan that contains specific targeted actions designed to address water quality, habitat, and living resources challenges in its estuarine watershed. The MassBays and Buzzards Bay programs provide USEPA funding to Massachusetts communities to work on water restoration and protection projects. For more information, visit: <http://water.epa.gov/type/oceb/nep/index.cfm#tabs-2>.
- **Dredging and Disposal:** Regulation of dredged material disposal within waters of the United States and ocean waters is a shared responsibility of USEPA and the U.S. Army Corps of Engineers. The Marine Protection, Research, and Sanctuaries Act (MPRSA), is the primary federal environmental statute governing transportation of dredged material for the purpose of disposal into ocean waters, while CWA Section 404 governs the discharge of dredged or fill material into "waters of the United States." Under the CWA and MPRSA, the Corps is the permitting authority for the proposed disposal of dredged material. Permits for ocean dumping of dredged material are subject to USEPA review and concurrence. CWA section 404 permits are subject to USEPA review and 404(c) "veto" if EPA's environmental guidelines are not met. USEPA has the lead for establishing the environmental guidelines/criteria that must be met to receive a permit under CWA section 404 and the MPRSA. USEPA is also responsible for designating recommended ocean disposal sites for dredged material. For more information, visit: <http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/dredgemgmt.cfm>
- **Coastal Wetlands Initiative:** The Coastal Wetlands Initiative was established by USEPA in response to the loss of coastal wetland acreage identified through the U.S. Fish & Wildlife Service's and NOAA National Marine Fisheries Service's [Status & Trends of Wetlands in the Coastal Watersheds of the Eastern United States \(PDF\)](#). The initiative addresses the need to enhance conservation of coastal wetlands. For more information, visit: <http://water.epa.gov/type/wetlands/cwt.cfm>
- **Climate Change Adaptation:** Adapting to more extreme precipitation events, sea level rise, and other coastal issues is of particular importance in the Northeast climate region. For more information about the overall impacts of climate change in the Northeast, in addition to water impacts, visit: <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html>



- **Pollution Prevention**

- **Soak up the Rain:** In collaboration with state agencies, universities, watershed groups, and other organizations, EPA New England has launched *Soak Up the Rain*. This program is a call to action to all of us who care about clean water, who want to reduce flooding, who want to create healthier and more beautiful communities. For more information, visit: www.epa.gov/region1/soakuptherain/learnmore.html.
- **Green Infrastructure:** Green infrastructure is an approach that communities can choose to maintain healthy waters, provide multiple environmental benefits and support sustainable





communities. Unlike single-purpose gray stormwater infrastructure, which uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls. By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management, and much more.

Since 2007, EPA has actively supported the use of green infrastructure to manage wet weather. EPA has released a series of policy memos encouraging the use of green infrastructure to meet regulatory requirements, as well as a series of Strategic Agendas describing the actions the Agency is taking to promote green infrastructure. A central theme of recent Agendas is engaging with local communities through community partnerships and technical assistance programs. Since 2011, EPA has established partnerships with 10 communities, and has provided technical assistance to more than 20 communities. EPA Regions are key players in all of these efforts, and many offer a wealth of targeted information on their own green infrastructure websites. For more information, visit:

<http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>

USEPA also has regulatory jurisdiction over certain aspects of urban stormwater and marina operations pursuant to NPDES stormwater permits. Key activities related to urban stormwater and marinas that USEPA Region 1 plans to undertake in Massachusetts over the next five years are summarized below.

- **Urban Areas: Stormwater Management**

- Region 1 plans to issue a new small MS4 NPDES general stormwater permit for regulated communities in Massachusetts, and will provide technical assistance for carrying out the permit requirements, as needed. The Region will also issue a new individual NPDES stormwater permit for the City of Boston.
- Region 1 will complete a BMP performance management tool and make it available to communities to assist with estimating the phosphorus, nitrogen, TSS, and zinc pollutant load reduction that can be expected from the implementation of stormwater BMPs.
- USEPA provides a wide range of information about stormwater and available control practices and compliance tools on the agency website.
- Region 1 will continue to offer its *Soak Up the Rain* materials to educate homeowners, businesses, and communities about practices they can use to reduce stormwater impacts on water resources.



- **Urban Areas: Erosion, Sedimentation, and Construction Site Control**

- USEPA issued a new national Construction General Permit in February 2012. Information necessary to comply with the permit will be available on USEPA's website.

- **Urban Areas: Roads and Highways**

- Region 1 will issue a new individual stormwater permit to the Massachusetts Department of Transportation.



- **Marinas and Recreational Boating**

- Region 1 carried out an extensive technical assistance program for marina owners in the mid-2000s. No new assistance initiatives for marina operators are anticipated over the next five years.
- USEPA will issue a new multi-sector general permit, which will include requirements for marinas.

NPS Program and USEPA Collaboration

USEPA provides funding to MassDEP and its partners to carry out a range of programs that control nonpoint source pollution. The agency regularly meets with MassDEP managers and staff to identify partnership opportunities and to seek input on its program activities.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and USEPA are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.10 NPS Plan - Increased USEPA Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
Support the Taunton River USEPA Healthy Watershed Initiative Project by funding projects and providing agency (USEPA and MassDEP) resources	Goal 1, Milestone 5.b.
MassDEP/USEPA coordination on level of analysis requirements/documentation needs for USEPA Success Stories	Goal 4, Milestone 3.a.
Coordination on Clean Water Act monitoring requirements, resource allocations, and monitoring priorities, resulting in additional monitoring resources and an enhanced NPS monitoring program.	Goal 4, Milestone 4.a.
MassDEP will develop and disseminate a NPS Annual Report for the public and other stakeholders, which will include project descriptions and photos of ongoing and recently completed projects	Goal 5, Milestone 1.b.
Increase capacity of NPS partners with web-based PowerPoint presentations on topics such as healthy watersheds, grant opportunities, TMDLs, and monitoring (MassDEP will lead, with USEPA support)	Goal 5, Milestone 3.d.
MassDEP will reevaluate the current Massachusetts Watershed-Based Plan template and update/revise as needed to address USEPA priorities	Goal 5, Milestone 5.b.
MassDEP and USEPA will collaborate on new criteria for Section 319 projects that support the Healthy Watersheds Initiative and protection of unimpaired/high quality and threatened waters	Goal 3, Milestone 2.a
Promote the development of alternative watershed-based plans to support the Healthy Watershed Initiative and protection of unimpaired/high quality waters	Goal 3, Milestone 3.a.



3.1.8 United States Department of Agriculture (USDA)

A brief summary of USDA-Natural Resources Conservation Service (NRCS) and USDA-Farm Service Agency (FSA) programs that are applicable to NPS pollution is provided below, followed by a discussion of opportunities for improved collaboration between USDA and the NPS program.



a. **USDA – Natural Resources Conservation Service (NRCS)**

<http://www.nrcs.usda.gov/wps/portal/nrcs/site/ma>

- **Environmental Quality Incentives Program (EQIP):** EQIP provides financial and technical assistance to agricultural producers through contracts of up to 10 years. These contracts plan and implement conservation practices that address natural resource concerns and that improve soil, water, plant, animal, air, and related resources on agricultural land and non-industrial private forestland. A goal of EQIP is to help producers meet Federal, State, Tribal, and local environmental regulations. Applications must be supported by an NRCS-approved conservation plan which documents the practices that could be used to address natural resource concerns. Participants may receive payments up to \$300,000 for EQIP contracts during any 6-year period (up to \$450,000 for projects with special environmental significance).
- **Conservation Innovation Grants (CIG):** CIG is a voluntary competitive grant program intended to stimulate development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. CIG enables NRCS to work with public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG provides agricultural producers with more options for environmental enhancement and regulatory compliance.
- **Emergency Watershed Protection Program (EWP):** EWP is intended to help people and conserve natural resources by relieving imminent hazards to life and property caused by floods, fires, drought, windstorms, and other natural occurrences. EWP programs include:
 - **EWP-Recovery:** Eligible landowners must be sponsored by a legal subdivision of the State (e.g., city, conservation district). NRCS may pay up to 75% of construction costs for emergency measures. The remaining 25% must come from local sources such as cash or in-kind services. Impairments that the EWP addresses include debris-clogged stream channels, unstable streambanks, jeopardized water control structures and public infrastructures, wind-borne debris removal, and damaged upland sites stripped of protective vegetation by fire or drought.
 - **EWP-Floodplain Easement (FPE):** Privately-owned lands or lands owned by local and state governments are eligible if meeting one of the following criteria: (1) lands damaged by flooding at least once in the past year or twice in the past 10 years; (2) other lands in the floodplain that would contribute to restoration of flood storage and flow, provide erosion control, or improve management of the floodplain easement; or (3) lands that would be inundated or adversely impacted by a dam breach. FPE easements are restored to the extent practicable and may include structural and nonstructural practices to restore flood storage, control erosion, and improve the practical management of the easement.
- **Conservation Stewardship Program (CSP):** CSP participants receive annual land use payments for operation-level environmental benefits they produce. Under CSP, participants are paid for conservation performance - the higher the operational performance, the higher their payment. CSP encourages producers to address resource concerns in a comprehensive manner by undertaking additional conservation activities and improving, maintaining, and managing existing conservation activities.



- **Agricultural Management Assistance (AMA):** AMA provides financial/technical assistance to address agricultural issues such as water management, water quality, and erosion control. Producers may construct or improve water management structures or irrigation structures; plant trees to improve water quality; and mitigate risk through production diversification or conservation practices, including erosion control, integrated pest management, or transition to organic farming. The program pays up to 75% of the cost of installing conservation practices. Total AMA payments shall not exceed \$50,000 per participant for any fiscal year.
- **Wildlife Habitat Incentive Program (WHIP):** With the enactment of the Agricultural Act (February 7, 2014), funding provided for the WHIP in FY-2014 is no longer available for obligations. WHIP is not reauthorized. Portions of the WHIP Statute were rolled into the Environmental Quality Incentives Program (EQIP) described above.
- **Regional Conservation Partnership Program (RCPP):** RCPP promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements. Through RCPP, NRCS and its partners help producers install and maintain conservation activities in selected project areas. Partners leverage RCPP funding in project areas and report on the benefits achieved.
- **Agricultural Conservation Easement Program (ACEP):** The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.
- **National Water Quality Initiative (NWQI):** Through the NWQI in 2014, NRCS will work with farmers and ranchers in 174 small watersheds throughout the Nation to improve water quality where this is a critical concern. In 2014, the third year of the NWQI, NRCS will provide nearly \$33 million in financial assistance to help farmers and ranchers implement conservation systems to reduce nitrogen, phosphorous, sediment and pathogen contributions from agricultural land. NRCS worked closely with partners, including federal and state agencies, and Soil and Water Conservation Districts, to refine the eligible priority watersheds for 2014. These partners assisted in selecting one to 12 priority watersheds in every state where on-farm conservation investments will deliver the greatest water quality improvement benefits. In Massachusetts, the Palmer River Watershed was selected as a priority watershed. NRCS coordinates with local and state agencies, conservation districts, nongovernmental organizations and others to implement this initiative. This strategic approach will leverage funds and provide streamlined assistance to help individual agricultural producers take needed actions to reduce the runoff of sediment, nutrients and pathogens into waterways where water quality is a critical concern.



b. Farm Service Agency (FSA)

- **Conservation Reserve Program (CRP):** CRP is a land conservation program. In exchange for yearly CRP rental payments, farmers agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. CRP



contracts are 10-15 years in length. The long-term program goal is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife.

NPS Program and USDA Collaboration

NPS Program staff regularly participate in the NRCS State Technical Committee meetings that determine distribution of EQIP funds and related Farm Bill program priorities in Massachusetts.

Collaboration between the NPS Program and USDA-NRCS on projects is currently complicated by the confidentiality requirements of Farm Bill Section 1619. These confidentiality requirements make it difficult for MassDEP to understand where NRCS-supported conservation work is being done within a given watershed, if NRCS programs are having measurable impacts on water quality, and where funds from other programs should be targeted. Improved data sharing between MassDEP and USDA-NRCS and an associated MOU are important goals of this the NPS Plan.

Opportunities for Improved Collaboration

NPS Plan activities that involve increased collaboration between the NPS Program and USDA are listed below. The activities listed are in addition to the ongoing collaboration activities listed above, and represent new activities that were not part of the previous (1999) version of the NPS Plan.

Table 3.11 NPS Plan - Increased USDA Collaboration Activities

Increased Collaboration Activity	Location in Table 4.1
NPS Program will continue to participate in the NRCS State Technical Committee meetings that determine distribution of EQIP funds and related Farm Bill program priorities in Massachusetts.	Goal 1, Milestone 2.e.
The Palmer River has been identified as a mutual priority watershed by NRCS, MDAR, and MassDEP through the NWQI.	Goal 1, Milestone 5.a.
Develop a data sharing agreement (MOU) with NRCS and MDAR that is consistent with Section 1619 of the Food, Conservation, and Energy Act (Farm Bill)	Goal 1, Milestone 6.a.
Develop a partnership agreement (MOU) on collaboratively addressing NPS pollution from agricultural sources through program coordination, increased communication, and technical support to producers	Goal 1, Milestone 6.b.
Establish a Regulatory Certainty Program between MassDEP, MDAR, and USDA-NRCS	Goal 1, Milestone 6.d.



3.2 OTHER PARTNER ORGANIZATIONS

In addition to the primary partners described in Section 3.1, the NPS Program relies on collaboration with numerous other partner organizations that play an important but less formalized role in managing NPS pollution in Massachusetts. These partners are described below according to NPS partner activity type. It is important to note that this section presents examples of the diverse NPS partners in Massachusetts and is not intended as a comprehensive listing of the many partners and potential partners that could be included.

1. NPS Watershed Planning and Project Implementation: Organizations that take a lead role in the planning and/or implementation of s.319 projects and other projects to reduce NPS pollution	
Other Partners	Public: municipalities, regional planning agencies, state agencies, Massachusetts Association of Conservation Districts, U.S. Army Corps of Engineers (USACE) Private: non-profit environmental organizations (e.g., lake associations, river/watershed associations), land trusts, private landowners
2. Monitoring, Data Collection and Research: Organizations that conduct programs or specific projects which collect data and conduct research that is relevant to NPS pollution and protection of healthy watersheds, and which furthers the goals of the NPS Plan	
Other Partners	Public: Massachusetts Department of Public Health, municipal Boards of Health, state universities/colleges (e.g., UMass-Amherst Water Resources Research Center), U.S. Geological Survey, USACE, MassDEP Conservation Prioritization and Assessment System (CAPS), Federal Emergency Management Agency, Massachusetts Emergency Management Agency, Massachusetts Water Resources Authority, National Oceanic and Atmospheric Administration (NOAA) Private: non-profit environmental organizations (e.g., volunteer monitoring programs), private universities/colleges
3. Land and Facility Management: Organizations that manage lands and/or facilities that influence NPS pollution	
Other Partners	Public: U.S. Forest Service, Massachusetts Department of Transportation, Federal Highway Administration, U.S. Department of Defense, U.S. National Park Service, Massachusetts Division of Forests and Parks, municipal highway departments and public works departments Private: private land owners, Trustees of Reservations, Mass Audubon, New England Forestry Foundation, land trusts
4. Public Policy, Advocacy, and Outreach: Organizations that engage in activities which further the goals of the NPS Plan through public policy initiatives, environmental advocacy, and public education/outreach	
Other Partners	Public: state agencies, federal agencies, municipal boards (e.g., Conservation Commissions), National Estuaries Program Private: non-profit environmental organizations (e.g., Massachusetts Rivers Alliance, Conservation Law Foundation, Mass Audubon, The Nature Conservancy, Massachusetts Association of Conservation Commissions, Massachusetts Congress of Lake and Pond Associations, The Trust for Public Land)



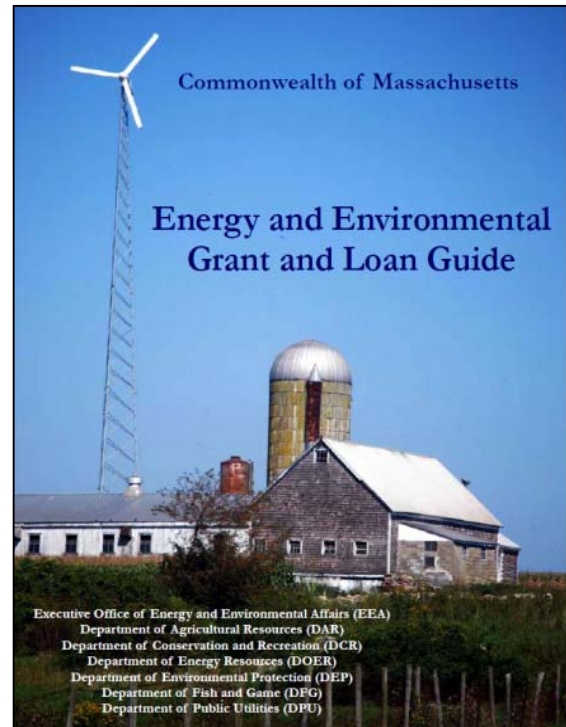
3.3 PRIMARY SOURCES OF FUNDING TO ADDRESS NPS POLLUTION

There are a wide variety of grants and loans that are available to address sources of NPS pollution, including those summarized under the partner program descriptions in Section 3.1. Many of these programs are not focused on addressing NPS pollution directly – assistance programs may fund conservation, planning, or pollution reduction activities that would, in turn, reduce NPS pollution.

To help Massachusetts citizens and organizations navigate available grant and loan funding programs, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) has developed an ***Energy and Environmental Grant and Loan Guide*** (<http://www.mass.gov/eea/docs/eea/grants/grant-loan-guide.pdf>).

This guide, which is updated annually, provides essential information on each program, including a description of the program's purpose, eligible applicants, expected funding level for this fiscal year, application deadlines, program website, and program contact information. The guide is organized by the following program categories:

- Agricultural
- Emergency Planning
- Energy
- Forestry
- Land & Recreation
- Waste & Recycling
- Water
- Other



The guide also provides an index for those looking for a particular grant program by name or by agency.

The funding programs described in Section 3.1 and in the *Energy and Environmental Grant and Loan Guide* are intended to provide an overview of the primary sources of grant and loan funding to restore or protect water quality within the state. Anyone planning a project is encouraged to consult with any of the various NPS partner agencies to obtain additional information on possible available financial resources. The availability of funds and grant/loan application windows change; refer to the listed websites for each program for the most up-to-date information.



SECTION 4: GOALS, OBJECTIVES AND MILESTONES

4.1 SECTION OVERVIEW

This section addresses Element No. 1 of the “Key Components of an Effective State Nonpoint Source Management Program” guidance issued by the USEPA in April 2013. It contains a detailed set of goals, objectives, and strategies to restore and protect surface water and groundwater in Massachusetts. This chapter describes the state’s vision to address NPS pollution for the next five years, and details MassDEP’s strategy to meet its NPS goals.



4.2 OVERVIEW OF THE PLAN’S VISION AND GOALS

MassDEP is the lead agency for NPS control in Massachusetts. Although MassDEP is the principle author of this statewide NPS Plan, the vision for Massachusetts and the goals of the Plan are shared by a myriad of citizens, groups, municipalities, businesses, and public agencies. In addition, many other state and federal agencies, operating under their own enabling legislation, pursue goals and objectives that are harmonious with those of the MassDEP NPS program. The Plan’s goals and vision cannot be realized in a short amount of time, nor can they be realized by MassDEP alone. Achieving the vision relies on the cooperation of many different programs, actions, and initiatives working toward a common goal. This Plan recognizes that MassDEP must continue to work with its many partners on a watershed-by-watershed basis to improve and protect the water resources of the Commonwealth.

While the Plan focuses on MassDEP’s actions for the next five years, it also highlights and relies on the important work others will accomplish during this time. Achieving the vision of the Plan relies on the collective support, cooperation, and resources of MassDEP and its partners and stakeholders. This Plan builds on their efforts and describes how MassDEP will support its partners as they also strive to realize their goals. Some NPS goals will be easier to achieve than others, but all efforts will move the state toward achieving the vision.

The vision statement is a critical component of goal setting, as it defines the ultimate endpoint for the goals and activities that will direct and prioritize work over the next five years. Progress toward meeting this vision will be important, not only for building the programs and making needed changes, but also for showcasing and celebrating the successes that will be achieved. Incremental progress toward achievement of the Plan’s vision will demonstrate the commitment of MassDEP and its partners to addressing the many challenges created by NPS pollution.

The vision for the Plan focuses on protecting and restoring water quality:

Statewide Nonpoint Source Pollution Vision: *The vision of the Massachusetts NPS Program is to bring the citizens of the state together to restore surface and groundwater impaired by nonpoint source pollution, to protect water quality in healthy watersheds, and to plan for and address human-induced and naturally-occurring changes in the environment.*

The vision of the Plan links strongly to the mission statement of MassDEP, who will work together with the NPS partners to implement the Plan and achieve measurable results over time:

MassDEP Mission Statement: *The Department of Environmental Protection is the state agency responsible for ensuring clean air and water, the safe management of toxics and hazards, the recycling of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources.*



This Plan is built to realize the NPS vision through the achievement of specific goals. These goals are designed to build upon existing programs; coordinate with the focus or mission of others; and organize a variety of federal, state, and local programs to increase efficacy and ensure that limited resources are managed in a manner to deliver maximum results. These goals reflect a strategically focused state NPS management program designed to achieve and maintain state water quality standards and to maximize water quality benefits and the beneficial uses of the resources of the Commonwealth.

4.3 MASSACHUSETTS NPS PROGRAM GOALS

1. Identify and expand opportunities to accomplish and leverage work by private, state, local, and federal partners.

Partnerships are key to comprehensive watershed management, and strong, effective partnerships form the foundation of this NPS Plan. Such partnerships can accomplish great things – the pooling of resources, setting of mutual priorities, and building on the actions of partner programs help to overcome resource limitations, policy, or geographic limitations of any partner program. This Plan recognizes that building successful partnerships takes skill, time, and patience. In order to achieve its long-term NPS goals, MassDEP is committed to building and maintaining partnerships to address NPS pollution in Massachusetts and achieve greater successes for all partnerships and programs.

2. Restore impaired waters, reduce nonpoint source pollutants, and mitigate the effects of climate change.

Restoration and protection of the Commonwealth's natural resources continues to be a primary focus for the NPS Plan. Many actions taken on the local, state, and federal levels have improved water quality in the state, but more work remains. Implementing on-the-ground efforts, such as the installation of water quality-focused BMPs in critical areas of impaired watersheds, is a priority of the NPS program and Plan. In addition to addressing traditional sources of NPS pollution, this Plan is forward-thinking, looking to also address the new water quality challenges associated with climate change. Coordinated efforts among the NPS partners, better collection and use of water quality data, and the interest of well-educated and motivated stakeholders will help restoration programs become more effective.

3. Protect unimpaired/high quality and threatened waters through planning, education, program coordination, and implementation of climate-ready BMPs.

In support of EPA's Healthy Watersheds Initiative, and supported by federal NPS program guidelines, protection of existing priority resources and high water quality is also a goal of this Plan. To achieve this component of the Plan vision, new approaches and programs will be created and new partnership opportunities will arise. Efforts will be made to understand and mitigate the effects of climate change on restored or protected waters. Work accomplished in the next five years will be crucial to laying the foundations for future programs, allocation of resources, and research needed to better target protection activities for maximum results. As with all goals in the Plan, this work must be undertaken with an understanding of how human activities impact the natural environment, and where policy and law must be reexamined to balance the needs of water quality protection and land use.

4. Monitor waters for nonpoint source impairments and improvements to prioritize actions, measure success, and increase program efficacy.

MassDEP will lead the implementation of strategies and activities to monitor water quality and assess NPS pollution in Massachusetts waters. MassDEP recognizes that water quality data and systematic assessments of water quality are needed to not only determine the scope and extent of NPS pollution, but also to evaluate the effectiveness of efforts to restore and protect water quality. Understanding what works and what does not work allows for refinement of approaches and the use of proven methods of addressing NPS pollution. With limited resources and great demands to monitor waters in the state, MassDEP will work with others to address gaps in



knowledge, share and pool data, and align programs to answer important questions. The need for coordinated efforts between MassDEP and its NPS program partners is heightened by the limitations placed on the use of s.319 funds for NPS monitoring, as described in the USEPA NPS Program Guidelines.

5. Instill, encourage, and nurture a passion for restoring water quality through education, capacity building, and building new partnerships.

Capacity building means raising the necessary level of awareness and the abilities of stakeholders to address issues related to NPS pollution in an effective and efficient manner. MassDEP recognizes that additional tools are needed to educate citizens, implement programs, and achieve the vision of this Plan. Sustainable watershed partnerships that include citizens, private industries, and government agencies who each bring multiple strengths and resources to the table can provide the long-term interest and focus needed for effective, local watershed management. Building these partnerships requires a solid foundation of knowledge, communication, and access to resources. Capacity building, education, and training play critical roles in addressing NPS pollution in the state.

4.4 OVERVIEW OF MATRIX OF NPS PLAN GOALS, OBJECTIVES, AND MILESTONES

The Plan identifies an effective statewide NPS pollution program for Massachusetts that is consistent with USEPA program requirements (April 2013, *Nonpoint Source Program and Grants Guidelines for States and Territories*). This Plan also incorporates the Massachusetts Coastal Zone Management Program NPS Plan and provides a statewide framework for addressing NPS pollution and improving water quality.

The Massachusetts NPS Plan was developed with the understanding that additional MassDEP 319 Nonpoint Source Program staff may be added when circumstances allow, but with a realistic expectation that the program will continue to operate with current staff. In addition to better coordination with partnership efforts, additional capacity will come through the judicious use of 319 funds to engage consultants and grantees for program work, while still meeting the USEPA requirement that at least 50% be used for watershed project implementation.



Following the USEPA guidance, the Plan presents goals, objectives, activities, and milestones. Goals and objectives in this Plan address nonpoint sources of surface water and groundwater pollution, which is a key precept of the Clean Water Act. Each of the five long-term goals presented in Section 4.3 is defined by a set of objectives to be achieved within the next five years. Each objective has a set of specific milestone activities that will be undertaken by MassDEP and/or the NPS partners to help achieve the objective. The Plan outlines the steps that will be taken to implement each milestone activity, how success will be measured, and a target deadline for completion. Table 4.1 presents a matrix of goals, objectives, milestone activities, responsible parties, and a schedule.

Activities in this Plan are designed to demonstrate reasonable progress toward accomplishing the long-term goals as expeditiously as possible. However, the Plan recognizes that it will be necessary to periodically re-evaluate progress and make adjustments during the next five-year period, both within the Plan and to programs that support the implementation of the Plan. Adaptive management strategies, detailed in Section 2.4 of this Plan, will be critical to responding to challenges, identifying obstacles, and using successes to lead to new actions.



The annual milestones are specific outcomes, designed to be measurable and to allow for USEPA to determine satisfactory progress in accordance with Section 319(h)(8). The milestones describe outcomes and key actions expected during the implementation period of the plan, which will run from 2015 through 2019.

To the greatest extent practicable, the Plan includes long-term goals and shorter-term objectives that are integrated with other key environmental and natural resource programs. Since there is no comprehensive program or single agency with the resources needed to accomplish all goals of this Plan, collaboration and teamwork among the NPS partners is essential to reach these goals.

Table 4.1 Matrix of NPS Plan Goals, Objectives, and Milestones

☒ = ongoing activity ☑ = completed activity

Goal 1: Identify and expand opportunities to accomplish and leverage work by private, state, local, and federal partners					5-Year Schedule				
Objectives	Milestones	Agency Lead	Partners	Measure of Success	2015	2016	2017	2018	2019
1. Align partner grant priorities to maximize environmental benefits	1.a. Develop a document describing possible NPS goals activities consistent with partner program activities	MassDEP	NPS partners	A report outlining the types of partner projects that will receive priority consideration by MA NPS grant programs	☒	☒	☒	☑	
2. Increase communication between partners	2.a. Create a statewide NPS Recovery Roundtable to coordinate efforts among key partners and set watershed priorities	MassDEP	NPS partners	NPS Recovery Roundtable is formed and meets at least annually	☒	☒	☒	☒	☒
	2.b. Development of a website to consolidate and advertise NPS-focused grants and assistance	MassDEP	NPS partners	Website is developed and active	☒	☒	☑		
	2.c. Conduct joint reviews of grant application proposals	MassDEP	NPS partners	MassDEP membership on partner review committees	☒	☒	☒	☒	☒
	2.d. Improve the sharing of information on NPS pollution issues, restoration, and protection activities	MassDEP	NPS partners	Inter-agency sharing of annual reports, data, and related information via list serve and web posting	☒	☒	☒	☒	☒
	2.e. NPS Program will continue to regularly participate in the NRCS State Technical Committee meetings that determine distribution of NRCS EQIP funds and related Farm Bill program priorities in Massachusetts	MassDEP	NRCS, MDAR	Continued State Technical Committee participation by NPS Program staff	☒	☒	☒	☒	☒
	2.f. Where appropriate and consistent with other program goals, the NPS Program will coordinate with the NRD Program to address mutual restoration goals and leverage s.319 grant projects (e.g. help provide match requirement).	MassDEP		Annual coordination between the NPS Program and NRD Program to discuss potential project and funding coordination.	☒	☒	☒	☒	☒
3. Fund locally-led projects and increase program efficacy	3.a. Identify local capacity in impaired and unimpaired/high quality watersheds; solicit new grant proposals	MassDEP	NPS partners	Number of new grantees awarded NPS funds each year	☒	☒	☒	☒	☒
	3.b. Develop priorities and processes for funding large scale NPS projects that require partnerships because they exceed the funding capacity of any single program.	MassDEP	NPS partners	Multi-partner large scale restoration or NPS watershed project	☒	☒	☒	☑	
4. Where feasible, seek to coordinate grant funding cycles	4.a. Evaluate strategy to coordinate solicitation and review periods for key grant programs	MassDEP	NPS partners	A report outlining how key NPS program funding cycles can be aligned	☒	☒	☑		
	4.b. Develop grant review criteria that can be used by all NPS partner programs	MassDEP	NPS partners	Common criteria than can be used by participating agencies to evaluate grant applications	☒	☒	☒	☑	
	4.c. Develop a unified benefits sheet, which can be used by the NPS program to document NPS benefits realized by partner activities	MassDEP	NPS partners	Common criteria to detail NPS partner grant project benefits	☒	☑			
	4.d. Report NPS benefits from partner grant projects based on reports from 4.c.	MassDEP	NPS partners	Partner grant project load reductions entered into GRTS	☒	☒	☑		
5. Establish geographic focus areas	5.a. Support the Palmer River Watershed NWQI agricultural partnership pilot project	MassDEP	MDAR, NRCS	Provide s. 319 funds to support technical staff efforts related to the Palmer River NWQI pilot project.	☒	☒	☒	☑	
	5.b. Support the Taunton River USEPA Healthy Watershed Initiative Project	MassDEP	USEPA	Fund or support project/resources in watershed	☒	☑	☑	☑	☑
	5.c. Continuously evaluate MassDEP and partner priorities, making adjustments as needed	MassDEP	NPS partners	Annual evaluation of priorities and adjustments noted in Annual Report to USEPA	☒	☒	☒	☒	☒
6. Strengthen partnerships with state and federal agricultural programs	6.a. Develop a data sharing agreement with NRCS that is consistent with Section 1619 of the Farm Bill	MassDEP	MDAR, NRCS	Signed MOU by MassDEP, NRCS	☒	☒	☒	☑	
	6.b. Develop/ratify partnership agreement, focused on addressing NPS pollution from agricultural sources through program coordination, increased communication, and technical support to producers	MassDEP	MDAR, NRCS	Signed MOU between MDAR, NRCS, MACD, MassDEP	☑				
	6.c. Address NPS issues from agricultural sources through policy/grant coordination and implementation of new nutrient regulations	MassDEP	MDAR	Identification of program changes to support MDAR and MassDEP NPS efforts	☒	☑			
	6.d. Work with MDAR, MACD, and NRCS to establish a Regulatory Certainty Program	MassDEP	MDAR, NRCS, MACD	Creation of written guidelines and policy	☒	☒	☒	☒	☑
7. Improve TMDLs	7.a. NPS Program review of TMDLs to improve reasonable assurances	MassDEP		Annual report of TMDLs reviewed; NPS Program comments incorporated into final TMDL documents	☒	☑			
	7.b. Solicit high priority TMDLs to be funded by Section 319 grants	MassDEP		Annual s.319 solicitation which includes TMDL development as a category.	☒	☒	☒	☒	☒

Table 4.1 Matrix of NPS Plan Goals, Objectives, and Milestones (Continued)

☒ = ongoing activity ☑ = completed activity

Goal 2: Restore impaired waters, reduce nonpoint source pollutants, and mitigate the effects of climate change.					5-Year Schedule				
Objectives	Milestones	Agency Lead	Partners	Measure of Success	2015	2016	2017	2018	2019
1. Address urban/rural sources of NPS pollution	1.a. Clearinghouse of grants/assistance for urban and rural communities	MassDEP	NPS partners	Web-based listing of grants/resources available to support communities	☒	☑			
	1.b. Partnership with Massachusetts Stormwater Program	MassDEP		Enhanced outreach/education and coordination on NPS issues related to new MS4 permit requirements	☒	☒	☒	☒	☒
	1.c. Support land protection and preservation activities that improve water quality	MassDEP	NPS partners	Funding and support for project with a substantial land conservation component as NPS prevention and remediation	☒	☒	☒	☒	☑
	1.d. NPS watershed restoration projects that target water quality impairments by implementing Watershed-Based Plans.	MassDEP	NPS partners	A target of 6-10 NPS watershed restoration projects funded and closed each year	☒	☒	☒	☒	☒
2. Restore aquatic habitats	2.a. Restoration of fresh and salt water habitats (e.g., dam removals, tidal flow improvement)	DER	MassDEP	At least one restoration project designed/completed as match for s.319	☒	☒	☒	☒	☑
3. Encourage increased local actions to address NPS pollution	3.a. Provide updated BMP manual and outreach materials	MassDEP	NPS partners	Publication and distribution of NPS Toolkit and Tree Canopy BMP manual	☒	☒	☑		
	3.b. Promote and support the development of stormwater utilities	MassDEP	CWSRF	Solicitation of s.319 and CWSRF projects that promote and support the development of stormwater utilities (e.g., development of feasibility studies, rate structure studies, etc.)		☒	☒	☒	☒
4. Target resources to critical watersheds	4.a. Continuous evaluation of MassDEP and partner NPS priorities	MassDEP	USEPA	Evaluation of priorities in Annual Report to USEPA and workplan	☒	☒	☒	☒	☒
	4.b. State-wide/program-wide key NPS priority development	NPS partners		List of key partner priorities that are common to all state NPS partner grant programs	☒	☒	☒	☒	☒
5. Mitigate the effects of airborne NPS pollution	5.a. Encourage the use of alternative and innovative energy practices	NPS partners		Inclusion of alternative and innovative energy practices in at least one SRF-funded project per year	☒	☒	☒	☒	☒
6. Promote new regulations and existing programs to increase infiltration, improve stormwater management, and protect groundwater	6.a. Enhance groundwater recharge and protection of critical surface and subsurface water supplies	MassDEP	SWMI, NPS Partners	SWMI projects funded as match for s.319			☑		
	6.b. Promote model ordinances, innovative community approaches	MassDEP	EEA	Webpage devoted to successful local rules, regulations, ordinances, utilities, or other methods to address or correct activities that contribute to NPS pollution	☒	☒	☒	☑	
7. Promote/assist development of complete watershed-based plans to guide NPS watershed projects.	7.a. Reevaluate the current Massachusetts Watershed-Based Plan (WBP) template and improve as needed to address USEPA priorities	MassDEP	USEPA	Updated WBP template that supports development of complete (9-element) WBPs. A completed WBP will be required for each s.319 NPS watershed restoration project (estimated 6-10 per year).	☒	☒	☒	☒	☒
8. Support and promote watershed planning by NPS partner agencies	8.a. Work with the Cape Cod Commission to update the existing Section 208 Area-Wide Water Quality Management Plan for Cape Cod, incorporating approaches to address nutrients and other NPS pollution issues	MassDEP	CCC	Completion and approval of the revised Section 208 plan	☑				
	8.b. Work with state and federal partners to support the Long Island Sound Study (LISS) to reduce nitrogen loadings	MassDEP		Continued participation by MassDEP as a member of the LISS Program Management Committee.	☒	☒	☒	☒	☒
9. Increase the effectiveness of NPS BMPs	9.a. Advance the work of the Massachusetts Stormwater Technology Evaluation Project (MaSTEP)	MassDEP	MaSTEP	MaSTEP-verified analysis of BMPs effectiveness for use to address NPS pollution and used by MassDEP, municipalities and other NPS stakeholders for project decisions	☒	☒	☒	☑	
10. Work to address NPS pollution from onsite wastewater systems	10.a. Advance the work of the Massachusetts Septic System Test Center (MASSTC)	MassDEP	MASSTC	Publication of septic system advances and technology designed to reduce NPS pollution and improve effectiveness of treatment	☒	☒	☒	☒	☒
11. Address NPS pollution from forestry operations	11.a. Continued implementation of the Massachusetts Forest Cutting Practices Act (MFCPA) and its coordination with Wetlands Protection Program performance standards.	MADCR		MFCPA permits issued, including filing of a Forest Cutting Plans with MADCR.	☒	☒	☒	☒	☒
12. Address NPS pollution from landfills, contaminated areas and waste management sites	12.a. Continued implementation of the Massachusetts Superfund Law (M.G.L. Chapter 21E), the Massachusetts Solid Waste Facility Regulations (310 CMR 19:00) and Regulations for Land Application of Sludge and Septage (310 CMR 32:00).	MassDEP, USEPA		Permits issued and site remediation activities implemented (for 21E sites) pursuant to the regulations listed under Milestone 12.a.	☒	☒	☒	☒	☒
13. Address NPS pollution from natural resource extraction sites	13.a. Continued implementation of the Federal Clean Water Act, Sections 401, 402, and 404.	MassDEP, USEPA,	USACE	Permits issued for natural resource extraction sites pursuant to Federal Clean Water Act, Sections 401, 402, and 404.	☒	☒	☒	☒	☒

Table 4.1 Matrix of NPS Plan Goals, Objectives and Milestones (Continued)

☒ = ongoing activity ☑ = completed activity

Goal 3: Protect healthy and threatened waters through planning, education, program coordination, and implementation of climate-ready BMPs					5-Year Schedule				
Objectives	Milestones	Agency Lead	Partners	Measure of Success	2015	2016	2017	2018	2019
1. Identify unimpaired/high quality and threatened waters	1.a. Establish benchmarks and criteria to identify unimpaired/high quality and threatened waters	MassDEP		RPST output in support of prioritization strategy	☒	☑			
2. Incentivize work in unimpaired/high quality watersheds	2.a. New criteria for Section 319 projects that support the Healthy Watersheds Initiative and protection of unimpaired/high quality and threatened waters	MassDEP	USEPA	New NPS policy on the use of funds to support Healthy Watershed Initiative projects and protection of unimpaired/high quality waters			☑		
	2.b. Solicit projects focused on protection of unimpaired/high quality waters	MassDEP	CWSRF	Formal solicitation in 604(b) and 319 RFRs	☒	☑			
3. Incorporate protection into watershed planning	3.a. Promote the development of alternative watershed-based plans to support the Healthy Watershed Initiative and protection of unimpaired/high quality waters	MassDEP	USEPA	Development of one alternative watershed-based plan	☒	☒	☒	☒	☑
4. Develop criteria, methods, and program approaches to protecting water quality	4.a. Pilot test new initiatives to protect unimpaired/high quality waters	MassDEP	NPS partners	Establish a pilot watershed for statewide NPS partner actions, based on USEPA guidance on Healthy Watershed projects that is anticipated in 2015	☒	☒	☒	☑	
	4.b. Determine the success of the pilot initiatives	MassDEP	NPS Partners	Restoration/protection of at least one unimpaired or high quality water	☒	☒	☒	☒	☑
5. Engage local partners on climate change adaptation, resiliency planning, and protection of healthy waters	5.a. Educate partners and stakeholders through on-the-ground projects showcasing climate change adaptation principles in healthy watersheds	MassDEP	Regional Planning Agencies	Projects funded in support of Regional Planning Agency outreach and education work	☒	☒	☒	☒	☑
6. Promote and support land conservation efforts	6.a. Engage conservation organizations involved with land protection efforts with NPS-focused education/outreach	MassDEP	Conservation Orgs.	Education materials to support conservation projects in watersheds with identified healthy waters	☒	☒	☒	☒	☑
	6.b. Support land protection and preservation in watersheds with unimpaired/high quality waters, including drinking water sources and groundwater zones	MassDEP		Funding criteria and priorities for Section 319 eligible projects	☒	☑			
7. Work to assess and protect watershed stream stability	7.a. Assess the anthropogenic sources of streambank and bottom instability and possible mitigative measures	MassDEP		Development of geomorphic assessment methods and pilot watershed assessment report	☒	☒	☒	☒	☑
	7.b. Support projects that protect and enhance watershed stability, restore streams, and use geomorphic data to create long-term viable solutions to stream stability	MassDEP		Target funding for at least one NPS watershed project each year that supports this objective	☒	☒	☒	☒	☒
8. Promote and support NPS pollution prevention on forest lands.	8.a Provide technical assistance and outreach efforts to the forest cutting community	MADCR		Annual summary of technical assistance and outreach efforts provided through the MADCR Forest Stewardship Program.	☒	☒	☒	☒	☒

Table 4.1 Matrix of NPS Plan Goals, Objectives, and Milestones (Continued)

☒ = ongoing activity ☑ = completed activity

Goal 4: Monitor waters for nonpoint source impairments and improvements to prioritize actions, measure success, and increase program efficacy					5-Year Schedule				
Objectives	Milestones	Agency Lead	Partners	Measure of Success	2015	2016	2017	2018	2019
1. Establish methods to categorize and assess unimpaired/high quality waters	1.a. Establish a methodology for identifying unimpaired/high quality waters	MassDEP	NPS partners	Methodology for NPS project prioritization developed for unimpaired/high quality waters	☒	☒	☑		
	1.b. NPS partner monitoring programs help assess and identify unimpaired/high quality waters	MassDEP	NPS partners	Methodology for use of third party information in unimpaired/high quality water characterizations	☒	☒	☒	☑	
2. Integrate NPS monitoring needs into MassDEP monitoring programs	2.a. Integration of NPS sampling plan into state surface water monitoring program, including sampling design and protocols	MassDEP		Revised monitoring strategy	☒	☒	☒	☑	
	2.b. Advance selection of watersheds for baseline monitoring	MassDEP		Selection factors developed to identify watersheds, set priorities, and evaluate needed resources for baseline and follow-up monitoring	☒	☒	☑		
	2.c. Post implementation monitoring to assess water quality improvements	MassDEP		Evaluation of program needs/available resources	☒	☒	☒	☑	
	2.d. Monitoring in the Palmer River Watershed in support of the NWQI project	MassDEP		Continue bacteria source tracking in the Palmer River watershed	☒	☒	☒	☒	☒
3. Assess existing data and report on water quality improvements	3.a. Clarification of delisting requirements and level of analysis requirements/documentation needs for USEPA Success Stories	MassDEP	USEPA	Mutually accepted process for the research and development of USEPA Success Stories	☒	☒	☒	☑	
	3.b. Identification of watersheds that are likely to show water quality improvements as a result of watershed-focused improvement activities	MassDEP		List of waterbodies likely to show measurable improvements due to watershed-based improvement activities	☒	☒	☑		
	3.c. Annually assess selected watersheds for possible follow- up success story monitoring (e.g. review existing data and information to determine if additional monitoring is recommended)	MassDEP		Develop and implement monitoring plan to assess changes in water quality attributable to NPS implementation activities	☒	☒	☒	☑	
	3.d. Assessment of water quality data by DWM-WPP to determine if improvements in water quality have occurred in watersheds with NPS-focused water quality improvement activities	MassDEP		1. At least one USEPA Success Story success story submitted to and accepted by USEPA annually, if possible.	☒	☒	☒	☒	☑
				2. At least one WQ-10 success story (documenting a NPS-impaired water body that has been partially or fully restored) over the next five years, if possible.	☒	☒	☒	☒	☑
4. Improve resource allocation to meet mandates	4.a. Coordination on Clean Water Act monitoring requirements, resource allocations, and NPS monitoring priorities	MassDEP	USEPA	Negotiate additional monitoring resources and an enhanced NPS monitoring program, including NWQI monitoring	☒	☒	☑		
5. Determine impacts of NPS sources	5.a. Conduct water quality monitoring programs in selected watersheds to identify impacts of NPS sources.	MassDEP		Water quality monitoring programs conducted in selected watersheds to identify impacts of NPS sources	☒	☒	☒	☒	☑
	5.b. Monitoring and assessment activities in 604(b) and s.319 projects support identification of NPS pollution sources	MassDEP	604(b) and s.319 grantees	Develop and implement 604(b) and s.319 monitoring and assessment project monitoring plans to identify and assess NPS pollution sources	☒	☒	☒	☒	☑
6. Increase use of volunteer data in the assessment of the scope and extent of NPS pollution	6.a. Organize current volunteer monitoring efforts and expand through guidance, technical support, and leveraging of resources.	MassDEP		Increased availability of QAPP or QAPP-equivalent data that can be used by MassDEP in the assessment of the scope and extent of NPS pollution	☒	☒	☒	☒	☑

☒ = ongoing activity ☑ = completed activity

Table 4.1 Matrix of NPS Plan Goals, Objectives, and Milestones (Continued)

Goal 5: Instill, encourage, and nurture a passion for restoring water quality through education, capacity building, and building new partnerships					5-Year Schedule				
Objectives	Milestones	Agency Lead	Partners	Measure of Success	2015	2016	2017	2018	2019
1. Communicate grant successes to spark further actions	1.a. Collection of data on grant successes for education/outreach	MassDEP	NPS partners	Annual publication and update of 319 and 604(b) project indicative summaries	☒	☒	☑		
	1.b. MassDEP will develop/disseminate a NPS Annual Report for the public and other stakeholders, which will include project descriptions and photos of ongoing and recently completed projects	MassDEP		Annual report highlighting successes and completed project overviews	☒	☒	☒	☒	☒
	1.c. CZM will continue to provide mid-year project summaries and end-of-year project reports to NOAA for the CPR grant program. In addition, CZM will also develop an indicative project summaries informational document for the CPR program, and will post this on the CZM website.	CZM		Mid-year project summaries and end-of-year project reports to NOAA. Indicative project summaries for the CPR Program posted to the CZM website.	☒	☒	☒	☒	☒
2. Engage the public in setting priorities	2.a. Stakeholder meetings/forums to gather input	MassDEP		Annual public stakeholder listening session	☒	☒	☒	☑	
	2.b. Communicate NPS-focused information to stakeholders	MassDEP	NPS partners	Create email list and augmented with information submitted by NPS partners	☒	☒	☒	☑	
	2.c. Project success presentations, hosted by grant recipients	MassDEP		At least one presentation annually that highlights a completed, successful 319 grant-funded project	☒	☒	☒	☑	
3. Educate the public and increase the capacity of NPS partners	3.a. Improve the existing MassDEP 319 website	MassDEP		Improved website with additional information on partner programs, information on grant opportunities, and education materials	☒	☒	☑		
	3.b. Targeted education to unique population segments and types of NPS sources, such as environmental justice communities and hobby farms	MassDEP	NPS partners	Report on NPS sources and activities with recommendations for targeted education approaches	☒	☒	☒	☒	☒
	3.c. Expand efforts to educate on climate change and NPS	EEA	MassDEP	Publication of Massachusetts state agency reports related to climate change adaptation, including the linkage to NPS pollution. Continued work by state agency-led action groups devoted to addressing climate change.	☒	☒	☑		
	3.d. Increase capacity of NPS partners with topic-driven web-based PowerPoint presentations	MassDEP	USEPA	Development of at least four presentations on topics such as unimpaired/high quality watersheds, grant opportunities, TMDLs, and monitoring	☒	☒	☑		
	3.e. Expand/update the Massachusetts Clean Water Toolkit to include green infrastructure practices	MassDEP		Updated online web-based Clean Water Toolkit manual	☑				
4. Engage new partners to address NPS pollution	4.a. Incorporate statewide climate change plans into MassDEP NPS Program	MassDEP		MassDEP involvement in statewide climate change workgroups	☒	☒	☑		
	4.b. Incorporate groundwater protection/recharge into watershed planning and implementation activities	MassDEP	CWSRF	Number of projects funded and implemented	☑				
	4.c. Encourage land trusts to participate in protection of healthy watersheds/high quality and unimpaired watershed protection	MassDEP	MA Land Trust Coalition (MLTC)	Land conservation project incorporating healthy watershed priority area	☒	☒	☒	☒	☒
	4.d. Develop partnership with state animal inspectors to evaluate impacts of small hobby/horse farms	MassDEP	MDAR	Coordination agreement on information sharing/education on NPS	☒	☒	☑		
	4.e. Develop partnership with Agricultural Commissions/State Pesticide Board	MassDEP	MDAR	Coordination agreement on NPS information sharing/education	☒	☒	☑		
5. Integrate the State NPS Plan into education and outreach activities	5.a. Report on success and challenges related to progress on NPS Plan Goals, Objectives, and Milestones	MassDEP		Section of Annual Report to USEPA devoted to NPS Plan updates, submitted each year	☒	☒	☒	☒	☒
	5.b. Revise the State NPS Plan to reflect successes, challenges, and new program directions	MassDEP	NPS partners	Annual revisions through Workplans, and an approved NPS Management Program Update for the next cycle (including milestones for 2020-2024) to be in place by October 1, 2019.	☒	☒	☒	☒	☑
6. Improve data quality	6.a. Development of common data collection/analysis procedures.	MassDEP	NPS partners	NPS partner monitoring programs use a single QA/QC plan for all NPS water quality data collection.	☒	☒	☒	☒	☑



SECTION 5: PRIORITIES

5.1 DEFINING PRIORITIES

The goals presented in this Plan are ambitious, addressing a broad range of activities and program challenges. Recognizing the magnitude of the NPS problem and the limits on resources and funding, the Plan creates a realistic framework that will help direct resources to the projects and partners that can make the greatest gains in remediating NPS pollution, thereby building a strong statewide approach to addressing the NPS pollution problem.



The priorities of this Plan focus on the targeting of funds from programs administered by MassDEP. A second goal of the Plan is to work with other agencies and entities to coordinate activities and align funding sources on a common set of NPS priorities, where practical and feasible. MassDEP will, over the next five years, evaluate, adapt, and modify these priorities to achieve greater results, integrate with other partner programs, and respond to new or changing policy or science related to NPS pollution. Any changes to priorities will be coordinated with and approved by USEPA.

This section addresses Elements No. 4 and 5 of the “Key Components of an Effective State Nonpoint Source Management Program” guidance issued by the USEPA. As such, it describes the following:

1. How MassDEP identifies waters impaired by NPS pollution.
2. How MassDEP sets priorities for addressing NPS pollution in Massachusetts;
3. How resources will be allocated between water quality restoration and protection of high quality waters; and
4. The primary categories and subcategories causing water quality impairments, threats, and risks across the state, including an overview of how these sources of impairments influence funding of projects within the overall set of priorities.

5.1.1 Statewide Issues

While there are a wide range of NPS pollutants, sources of NPS pollution, and other concerns relevant to the restoration and protection of water quality in the state of Massachusetts, four major statewide issues will drive the Massachusetts NPS Program over the next five years. These issues will shape NPS Plan goals, priorities, program partnerships, and implementation activities across the state. Working to address these issues is critical to addressing the major barriers to improved water quality in the state and the overall control of nonpoint source pollution.

a. Sedimentation

Sediment is the loose sand, clay, silt, and other soil that settles to the bottom of a waterbody. The U.S. Environmental Protection Agency lists sediment as the most common pollutant in rivers, streams, lakes, and reservoirs. While natural erosion produces nearly 30 percent of the total sediment in the United States, erosion from human use of land accounts for the remaining 70 percent.

Sedimentation includes accumulations of clean sediments as well as sediments contaminated with pollutants from spills, legacy anthropogenic activities, or high levels of nutrients. Sediments may be located in rivers, streams, lakes, bays, and wetlands or





accreted behind or within man-made structures such as dams, levees, or canals. Any sediment with the reasonable potential to move from its present location due to normal flows of water, flood events, or released due to intentional or unintentional events could be considered a source of pollutants.

Sedimentation is a natural process, but increased levels of sediment in waterbodies is a water quality concern. Both the physical and chemical properties of sediments are a NPS concern. **Sediments can smother critical aquatic habitats, cause physical harm to aquatic organisms, and adversely affect drinking water supplies, water supply intakes, and permitted outfalls.** Phosphorus, in particular, attenuates to sediment, making sediment an efficient transporter of phosphorus into nearby waterbodies. Under certain conditions, phosphorus-laden lake bottom sediments can be significant contributors of phosphorus into the water column.

b. Nutrients

The term "nutrients" refers to primarily to nitrogen and phosphorus. While nutrients naturally enter waterbodies through the processes of organic matter breakdown, anthropogenic activities have created new problems by increasing the amounts of these nutrients. Of particular concern is nutrient runoff from lawns, fields, and other areas where fertilizers are used inappropriately or without adequate nutrient management strategies. Increased nutrients produce visible and harmful effects - streams and lakes with high nutrient levels can promote excessive plant and algal growth. Toxic cyanobacteria blooms caused by excessive nutrients result in beach closures. When the plants and algae die, the dead and decaying vegetation depletes the water's oxygen supply. This, in turn, leads to the death of fish and other aquatic organisms. This phenomenon can occur in stagnant streams, small ponds, or across larger waterbodies.



Nutrients move relatively easily from upland areas to waterbodies. Nitrogen readily dissolves in water and is often directly transported from field to stream through drainways or from lawns through storm sewers. Phosphorus is less soluble in water, but attaches to soil particles, allowing it to enter waterbodies through sediment run-off.

Nutrients affect human health. Consuming excessive levels of nitrate, a form of nitrogen often found in fertilizer, can cause **serious illness and sometimes death**. In infants, the conversion of nitrate to nitrite by the body can interfere with the oxygen-carrying capacity of the child's blood. In certain cases, high nutrient loads can cause or contribute to the development of cyanobacteria blooms that produce toxin that is harmful to humans and other organisms. High nitrate levels in drinking water are unsafe for consumption. Nutrients are also found in animal and human waste, which means many sources of bacteria also contribute nutrients.

c. Pathogens

Waterborne pathogens are **disease-causing microorganisms**, including bacteria, viruses and pathogenic protozoa. Pathogens are found in the feces of humans, pets, livestock and wildlife. These sources can contaminate water bodies via direct surface runoff, septic system failures, combined sewer overflows, etc. When transmitted to humans, pathogens can cause a wide range of illnesses, such as gastro-intestinal illness, Giardia, and Norwalk virus. Fecal coliform bacteria, such as *Escherichia coli* (*E. coli*) are common bacteria found in the digestive track of all warm-blooded animals. *E. coli*, like many other kinds of bacteria, is not always harmful to humans. However, because it is relatively easy and economical to monitor for *E. coli* and because it is often found in conjunction with bacteria that do make humans sick, *E. coli* is often used as an indicator that





waters are polluted with animal or human waste. During rainfalls, snow melts, or other types of precipitation, untreated wastes containing *E. coli* may wash into creeks, rivers, streams, or lakes. People may be exposed to elevated levels of *E. coli* when these waters are used for recreation or as a source of untreated drinking water.

The sources of this type of bacteria are diverse: combined sewer overflows (CSOs), illegal straight pipe discharges, run-off from urban and agricultural areas, failing septic systems, and natural levels associated with wildlife are all common sources. While there are rules and regulations governing the treatment of human waste and the management and use of animal manure, runoff of bacteria continues to be an issue in Massachusetts.

d. Climate Change

Climate change includes a wide range of issues, from abnormal fluctuations in historic temperature ranges, increased or more severe storms, to drought or periods of significantly decreased rainfall. Climate change impacts stem from human activities that have released pollutants to the atmosphere, resulting in measurable impacts to weather patterns, including temperature and precipitation cycles. The combustion of fossil fuels is believed to be the primary underlying cause of these changes. Climate change enhances adverse impacts from many NPS pollutants, typically through increased run-off, decreased efficiency of existing NPS BMPs, abnormal water levels and flow rates, and watershed instability due to storm-related hydrologic changes.



NPS pollution impacts associated with climate change include **increased run-off, thermal and physical alterations to waterbodies, and damage to infrastructure such as roads, levees, and communities in low-lying areas that were not previously prone to flooding**. Although climate change is a global issue, Massachusetts has embarked on a number of statewide studies and initiatives to begin to address this issue. Practices that focus on addressing the root causes of climate change, such as energy efficiency improvements, as well as NPS practices designed with enhanced resilience to climate change effects are considered viable for addressing this source.

5.2 NPS PRIORITIZATION FRAMEWORK

5.2.1 Framework

MassDEP has developed the following NPS prioritization framework and project evaluation methodology to meet a number of important goals and directives:

- Priorities support the achievement of the goals set forth in the NPS Plan.
- The framework uses current and available information, from both social and scientific sources, to direct activities to the watersheds and waterbodies that can be restored or protected in the most expeditious manner.
- The framework integrates with other NPS partner priorities to provide project support for NPS-related activities across the state. This will help maximize positive outcomes from the actions and activities of partner programs.
- Priorities are clear to partners and anyone seeking funding from MassDEP for NPS-project funding. Clarity will help applicants develop highly competitive proposals that address all NPS program priorities.
- Priorities are flexible and adaptable in response to changing conditions in Massachusetts' water resources, advances in science and technology, new policy directives, partnership opportunities,



and unique projects that could make significant improvements to NPS pollution conditions in the state.

- Priorities meet the goals and needs of MassDEP, USEPA, and project partners.

5.2.2 Setting Priorities - Tools

The foundation of these priorities is derived from the analysis of information such as water quality data, pollution sources, water quality stressors, and the strength of partnerships and local capacity to carry out projects. This provides an objective analysis of the watersheds in the state and an ability to rank these areas based on the potential for achieving desired goals, such as restoration of water quality or protection of existing resources. Each year, MassDEP identifies a list of priority waterbodies where NPS-focused projects will likely achieve the maximum benefit. The Recovery Potential Screening Tool and the Conservation Assessment and Prioritization System are important tools used to help set these priorities.

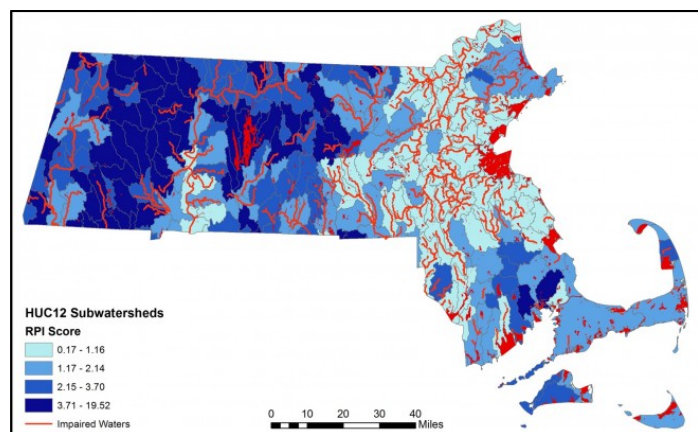
Recovery Potential Screening Tool (RPST)

The RPST was originally developed by USEPA as a Total Maximum Daily Load (TMDL) prioritization-planning tool. However, soon after the tool was developed, it became clear that it could be modified to address a wide range of screening and prioritization goals. In Massachusetts, the RPST has been adapted by the NPS Program with assistance from USEPA. The resulting RPST for Massachusetts is being used to assess the recovery potential of impaired waterbodies and watersheds and generally serves as a screening and assessment method for NPS pollution project funding prioritization.

The philosophy behind the RPST approach is summarized by USEPA:

Restoring the nation's tens of thousands of impaired waters represents an immense workload. No restoration program, public or private, has the resources to work on all impaired waters at once. Well-informed planning is essential. Optimizing the strategies by which so many waters are restored can produce more and earlier successes and have profound effects on restored waters' benefits to society and the environment. The concept of recovery potential - the restorability of a water body - is a primary consideration in restoration programs whose main goal is to bring about recovery. <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/recovery/overview.cfm>

The RPST is ideally suited for NPS program use because its approach parallels the process used to review and recommend NPS competitive grant proposals: that is, projects with high ecosystem value, stressors that can be addressed and mitigated, and strong local capacity to carry out the project. The RPST offers the advantage of being able to compare the relative merits and restorability of all HUC 12 or HUC 14 subwatershed units in a basin or statewide. The RPST evaluates, for each watershed, indicators that are associated with the likelihood that a restoration or protection effort may succeed. Indicators are selected based on the goals of the project, so that, for instance, screenings to help prioritize corridor protection and land acquisition work would differ from screenings to prioritize highly impaired watersheds. Measuring the same indicators across all watersheds allows for systematic, consistent, and information-based comparison.



The tool creates a combined Recovery Potential Integrated (RPI) score, which is the likelihood of project success, given its:

The tool creates a combined Recovery Potential Integrated (RPI) score, which is the likelihood of project success, given its:



- **Ecological capacity:** The ecological index score reflects overall condition and the capacity of the watershed to regain or retain functionality, based on metrics related to natural watershed processes and structure. It is derived from data that describe a watershed's condition and capacity to regain function.
- **Exposure to stressors:** The stressor index score reflects the pressures on watershed condition from several primary sources of pollutants and water quality impairments.
- **Social context:** The social context score includes many factors, such as community involvement, incentives, economics, governance, regulation, and planning status. These factors, often strongly influence the level of effort and complexity of making improvements.

The RPST indicators are based on data that have been selected by water quality experts familiar with the datasets and the desired outcomes. MassDEP spends considerable time in the selection of appropriate indicators and the development of RPST scores for the waterbodies in the state. MassDEP also collaborates with other partners to evaluate outcomes and "reality check" results.

The annual solicitations for MassDEP NPS funds provided by USEPA to carry out sections 319 and 604 of the Clean Water Act include the results of RPST screenings for NPS priority project areas.

Conservation Assessment and Prioritization System (CAPS)

CAPS has been developed by MassDEP wetlands program staff, in partnership with CZM and UMass Amherst, with support from the USEPA Wetland Development Program Grant program and USEPA Water Quality Management Planning Grant funds provided by the American Recovery and Reinvestment Act of 2009. CAPS output provides a key RPST indicator of ecological integrity. Ecological integrity is defined as the ability of an area to support biodiversity and the ecosystem processes necessary to sustain biodiversity over the long term. CAPS is an ecosystem-based approach that utilizes computer modeling to assess the ecological health of lands and waters, and to subsequently identify and prioritize land for habitat and biodiversity conservation. CAPS is used by MassDEP both as source of data for the RPST and as a tool for the general assessment of water resources.

In addition to setting MassDEP NPS priorities, CAPS can help other NPS programs set restoration/protection goals. In 2006, MassDEP issued the "Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands." In this guidance, MassDEP utilized CAPS to create maps that depict Habitat of Potential Regional or Statewide Importance, which facilitated a new approach to wildlife habitat management via assessment and mapping of important wildlife habitat for use in wetland protection review. These maps have been completed for all Massachusetts communities.

Massachusetts's List of Priority NPS Impaired Waterbodies

Each year, MassDEP develops a **List of Priority NPS Impaired Waterbodies**, using the RPST and CAPS. The 2014 List of Priority NPS Impaired Waterbodies is provided as Appendix A. MassDEP develops this list using water quality assessments, the 303d List, and funding requirements for NPS grants. This specific, focused list of waters is used to identify, to interested stakeholders, places within the state where MassDEP funds could be used to address NPS pollution issues. This list is also available to the NPS Partners to help guide and coordinate other water quality improvement and protection programs. The list is published with the annual MassDEP Request for Responses (RFR) for NPS grants. The list of NPS pollution impaired waters is developed and refined using the following process:

1. The RPST is used to identify HUC-12 subwatersheds that are most highly recoverable from NPS pollution impacts. The RPST indicators that are used for this exercise prioritize unimpaired or minimally impaired watersheds with strong local capacity to support restoration efforts. RPST output is a map showing quartile priorities at the HUC-12 level. CAPS watershed assessment data is a primary source for identifying the healthiest watersheds, while the 303d impairments and degree of impervious cover are used to identify most-stressed subwatersheds.



2. A map of 303d-listed waterbodies is overlain on the RPST map. Healthy (top 50%) watersheds without impairments are screened out for this exercise (but may be used to identify watersheds for unimpaired or protection work).
3. For remaining high priority watersheds, maps of MS4 regulated areas are compared to watershed maps found in MassDEP Water Quality Assessment Reports. Impaired segment locations are reconciled with regulated areas, and the waterbodies located in regulated areas are screened out as ineligible to receive s.319 funds.
4. For remaining waterbodies, the Integrated List of Waters is examined to identify segments impaired by NPS causes that would most likely respond to NPS-focused BMPs and remediation efforts.
5. The resulting segments and watersheds are considered highest priority for restoration.

Future work to develop priority lists will include incorporation of partner priorities and opportunities. MassDEP will annually meet with partners to develop shared priorities and strategies to identify 1) mutual restoration goals and 2) mutual goals for protection or restoration of high quality or unimpaired waters. MassDEP will identify waters for protection using a similar approach to the one described above for NPS restoration projects.

5.2.3 Balancing Priorities – Restoration and Protection

Much progress has been made to improve water quality in Massachusetts, but more work remains. USEPA's FY14 Guidelines for the Clean Water Act s.319 grant program allow states flexibility to use its program funds and a limited amount of watershed project funds for activities to protect unimpaired/high quality waters where a state identifies this as a priority, and has described a process for identifying such waters. Consistent with these new EPA program guidelines, MassDEP recognizes that the mission of the NPS Program has evolved and that it is important to consider the protection of waters and watersheds that are not listed as impaired.



However, the primary focus of the NPS Program remains on the restoration of impaired waters, and the majority of s.319 funds available for NPS watershed projects (which must implement Watershed-Based Plans) are directed at remediation of water quality impairments. Waters impaired by NPS pollution in Massachusetts greatly outnumber waters that have been fully or partially restored, thus highlighting the critical need to focus on this task. The greatest benefit to the citizens of the state will come from work that restores impaired waters by reducing NPS pollution from their contributing watersheds. Additionally, any activities that would enhance or heighten the efficacy of restoration activities would also be prioritized based on the greatest benefit concept.

Protection of water quality in unimpaired or restored waters will be a secondary, but important priority. As noted in the Goals section of the Plan, MassDEP will be involved in a number of activities intended to advance knowledge about the scope and extent of unimpaired waters, support inter-agency watershed protection projects, and advance science in areas that will help projects and protect water quality. These areas of focus include:

1. Identification of unimpaired/high quality and threatened waters;
2. Incentivizing work in unimpaired/high quality watersheds, such as supporting the USEPA Healthy Watershed Initiative;
3. Incorporating climate change adaptation principles into watershed planning;



4. Incorporating water quality protection into watershed planning;
5. Development of pilot criteria, methods, and program approaches to protecting water quality;
6. Engaging partners on climate change adaptation, resiliency planning, and protection of unimpaired/high quality waters;
7. Promoting and supporting land conservation efforts; and
8. Working to assess and protect stream stability.

Any MassDEP NPS-funded project or allocation of resources will address the missions of restoration and/or protection. The greatest amount of s.319 funding is dedicated to implementation of restoration work. Where possible and practical, projects that are focused solely on restoration will be given high consideration, followed by projects that seek to accomplish both restoration and protection, and last, projects focused solely on protection. MassDEP will continually evaluate this approach, looking to maximize benefits from all NPS activities wherever possible.

5.2.4 Implementing Priorities

MassDEP has aligned funding priorities between the Section 319 and 604(b) programs to maximize project benefits and address NPS pollution. Detailed description of these USEPA/MassDEP grant programs and their specific NPS areas of focus are found in Section 2 (Section 319, 604(b)) of this Plan. The direction set by these programs focuses work at the subwatershed level, targeting projects that have the greatest demonstrated potential to restore water quality through on-the-ground installation of NPS-focused BMPs. Assessment and planning work supported by federal CWA s.604(b) funds frequently leads to projects that are implemented through MassDEP's 319 Nonpoint Source Competitive Grant program. The majority of the projects will continue to focus on addressing impaired waters identified in the Massachusetts Integrated List of Waters, implementing recommendations from approved TMDLs and Watershed-Based Plans, and continuing successful work started by projects previously funded by MassDEP or NPS partner programs. Additionally, education/outreach, demonstration projects, assessment, and protection of unimpaired waters will be the focus of MassDEP's NPS work across the state. In all cases, projects selected for funding will support the goals and objectives of the Plan.

Restoration of Waters Impaired by NPS Pollution

MassDEP will continue to focus the majority of s.319 program funding toward NPS watershed projects which implement Watershed-Based Plans to address Category 5 impairments or TMDL recommendations. When evaluating these types of projects, MassDEP will focus funding on projects that can demonstrate the greatest benefits for water quality improvement. Projects that will result in significant load reductions of pollutants causing identified impairments will receive higher prioritization. Further, projects that would install or construct BMPs that can serve multiple functions will be encouraged.

Multiple function BMPs are any structural or non-structural practice that would achieve a suite of benefits, including increased resilience of the BMPs to climate change, protection of groundwater, enhanced groundwater recharge, and improved in-stream habitat. These benefits are in addition to improvement in water quality through addressing sources of NPS pollution. Priority will also be given to projects that continue work initiated under a previous 319 grant or other NPS partner program such as section 604(b), CZM's Coastal Pollution Remediation Grants, the Massachusetts Environmental Trust, or USDA-NRCS Farm Bill programs.

New projects in areas covered by Municipal Separate Storm Sewer System (MS4) permits may not be considered by MassDEP for Section 319 grant funding. USEPA nonpoint program guidelines do not allow s.319 funds to be used to fund any urban stormwater activities that are required by a municipal separate storm sewer (MS4) and other NPDES stormwater permits. Work in unregulated areas of partially regulated communities remains fully eligible. A goal of the NPS Plan is to work with USEPA to establish a clear policy on projects that may be funded by Section 319 within MS4 communities. This funding restriction only applies to Section 319 grants and does not limit projects eligible for CWSRF, 604(b), or partner funds.



Outreach/Education/Demonstration/Assessment

Education about the causes and solutions to NPS pollution, demonstration of new or innovative NPS pollution control technology, and the characterization of the scope and extent of NPS pollution in Massachusetts are major themes in the goals of this Plan. Work on these activities is therefore a priority of MassDEP and its NPS programs.

Outreach and education is often recommended as an effective nonstructural BMP, to both instruct on the topic of NPS pollution and motivate changes in behavior at the local level. To achieve the greatest benefit of outreach and education, as well as minimize duplication, projects in this category are typically focused on a regional or statewide approach. In some cases, these are stand-alone projects, but are also a component of an effective on-the-ground project. Projects that meet this priority should provide benefits that continue beyond the life of the grant-funded project.



The purpose of demonstration projects is to evaluate and accelerate the transfer and adoption of new/innovative BMPs, technologies, and/or institutional approaches. Existing technologies or practices that have not been previously utilized or accepted in a watershed may be considered to be innovative and could qualify as demonstration projects. Overall, demonstration projects can serve to support or augment outreach/education activities by providing “hands-on” examples and real-world training opportunities.

Assessment activities to advance the NPS Plan and the knowledge base of partners in Massachusetts is another MassDEP priority. These projects gather and analyze information that is used to develop targeted projects designed to restore or protect water quality. Alternatively, the outputs of these projects are used to advise policy changes, strengthen or target education efforts, or characterize NPS pollution sources in a given watershed. Assessment activities are largely funded by the 604(b) program and focus on:

- **Water Quality Assessment:** Identification and characterization of a specific NPS pollution problem site or resource of particular concern via water quality sampling. Results are used to develop recommendations for BMP implementation projects and management strategies consistent with MassDEP's policies and programs.
- **Assessment of the Effectiveness of Stormwater Best Management Practices:** Assessment of costs (including operation and maintenance), treatment effectiveness, and water quality improvements from existing stormwater management systems.
- **Assessment of Land Use Activities:** Identification and mapping of current land use activities within a river basin or drainage area, including known and potential sources of point and nonpoint pollution and permitted water withdrawals and discharges.
- **Assessment of Local and Regional Environmental Awareness, Activities, and Concerns:** Identification and assessment of local and regional needs, and the status of education and technical assistance relative to managing NPS pollution within a river basin or drainage area. Plan and coordinate resource protection efforts of various groups.
- **Wetlands Assessment and Restoration Planning:** Identification and planning for potential wetlands restoration projects.
- **Assessment of Local Water Quality Protection Measures:** Analyses of the range and effectiveness of local control measures such as bylaws, regulations, and enforcement provisions within a river basin or drainage area.



Protection of Unimpaired Waters

MassDEP recognizes that protecting areas of the state where water quality currently meets or exceeds applicable state standards is highly desirable. Resources will be directed to programs and partnerships that can leverage greater resources to ensure that high quality and restored waters are not further degraded over time. MassDEP will focus on supporting the USEPA Healthy Watershed Initiative, land conservation projects, stream and watershed stability projects, and climate change adaptation projects with connections to NPS pollution, as detailed in the goals and objectives of the Plan. Projects that demonstrate a significant ability to protect existing water quality or avoid impending changes to water quality (including groundwater) will be given consideration under this priority. MassDEP has set goals in this NPS Plan to develop policy and procedures to support focused work on protection of unimpaired waters by:



- Establishing benchmarks and criteria to identify unimpaired/high quality and threatened waters
- Developing new criteria for s.319 projects that support the Healthy Watersheds Initiative and protection of unimpaired/high quality and threatened waters
- Soliciting projects focused on protection of unimpaired/high quality waters

Healthy Watersheds Initiative

A healthy and resilient watershed is one that can withstand and/or recover from harmful environmental impacts and can sustain its health and the provision of ecosystem services into the future. It is one in which the vulnerability to flooding is minimized, hydrologic functionality is maintained, water quality supports healthy native communities of plants and animals, and water-related uses such as recreation and drinking water are protected and maintained. There should be an interconnected network of natural land cover throughout the watershed, especially in the riparian and shoreline zones, providing critical habitat areas and supporting natural flow processes. Healthy and resilient watersheds maintain ecosystem services, such as helping to assure availability of water for human consumption and industrial use with less treatment costs.

In 2013, USEPA, The Nature Conservancy (TNC), and the Association of Clean Water Administrators (ACWA) jointly signed a Memorandum of Understanding (MOU) to promote the Healthy Watersheds Initiative (HWI). This MOU formalizes collaboration between these groups as they strive to develop and implement healthy watersheds programs in states and with regional aquatic ecosystem programs. These programs include working with states and other partners to identify healthy watersheds statewide, to implement healthy watershed protection plans, to integrate such protection into EPA programs, and to increase awareness and understanding of the importance of protecting our remaining healthy watersheds.

In Massachusetts, the first HWI project is located in the Taunton River basin. This project is a team effort including USEPA, TNC and stakeholders in the Taunton River watershed. The goal of the project is to identify the key actions needed to keep the watershed healthy and resilient and to implement as many of these actions possible. The project will include a compilation of existing data into a healthy watershed report, which will enable communities to make informed decisions related to the watershed's future health and resilience.



5.2.5 Priorities and Watershed Planning

Achieving or maintaining water quality standards and the restoration of beneficial uses is a state and national priority. States are required by USEPA to establish a process for prioritizing and progressively addressing waters and watersheds impaired or threatened by NPS pollution. This process relies on detailed watershed assessments and development of nine-element watershed-based plans (WBPs) to support implementation work.

WBPs are a tool that helps Massachusetts municipal officials, watershed groups, and other stakeholders understand more about conditions in their watersheds. By identifying priority water quality problems and providing recommendations for action, WBPs provide the basis for developing competitive grant projects. Similarly, reported problems and modeled predictions of HUC-wide causes can be used as a basis for monitoring and assessment work. Overall, WBPs help good projects in all basins to become eligible for s.319 implementation funds

MassDEP has addressed the need for WBPs by developing a statewide Massachusetts WBP template to organize information about Massachusetts' watersheds and present it in a format that supports development WBPs which can be used as the basis for NPS watershed projects to restore water quality in the Commonwealth. The initial 2006 WBP template was a map-based web tool that presented synthesized information from the many basin plans and reference documents that exist for each of Massachusetts' 27 major planning basins, and used a nested approach within each basin to make the information available by HUC 12 subwatershed unit. The WBP framework addressed the nine elements specified by EPA as the critical components of a watershed-based plan.

MassDEP is currently in the process of developing a major revision to the 2006 version of the WBP. MassDEP anticipates that the revised WBP template will use a statewide HUC-12 watershed-based approach designed to provide the maximum number of completed nine-element WBPs. Based on the availability of existing information sources for each watershed, MassDEP anticipates that the WBP template will result in a WBP that is either completed for each of the nine required elements, or will require varying levels of additional information to be completed by project proponents. The completed WBPs will meet USEPA guidelines to serve as the basis for s.319-funded NPS watershed projects. Advantages of this strategy include:

- Supports optimal use of the Recovery Potential Screening Tool;
- Flexibility to direct s.319 funds in response to local capacity or emerging issues;
- Increased opportunities to partner with other agencies and programs;
- Ability to develop timely and accurate proposals at the time of shovel readiness; and
- Not locked into watersheds where politics or land use changes may reduce the likelihood of implementation.

Although WBPs are an important planning tool for the NPS program, MassDEP also envisions the need for additional planning projects and will support planning efforts by MassDEP programs as well as NPS partners, subject to the conditions set forth in [current USEPA guidance](#). These include:

- **Water Supply/Water Quality Source Protection Planning:** Development of water supply planning and protection strategies for communities with public water supplies within a sub-basin. This would apply to both surface and groundwater sources.
- **Water Supply Development Planning:** Assessment of future water supply needs within a basin or sub-basin. This would apply to both surface and groundwater sources.
- **Total Maximum Daily Loads (TMDLs):** Development of reports and assessment needed to complete reports and implementation strategies.



- **Alternative Watershed Plans:** Development of NPS pollution-focused plans to address specific unique circumstances in a given watershed, such as when the impairment is not specific to a pollutant, when the state must respond to a NPS pollution emergency or urgent NPS public health risk, when a small-scale water quality problem results from only a few sources, or to protect assessed unimpaired/high quality waters.

5.2.6 Priorities and the MassDEP NPS Program

To lead statewide efforts to improve water quality, MassDEP must invest resources in its own programs to help others build capacity, develop projects, educate stakeholders, assess waters, and broaden the base of knowledge on NPS treatment technologies. This will require responding to unique opportunities to leverage funds, work with partners, or make a timely investment that will reap larger rewards in the future. To that extent, MassDEP will continue to improve and develop the NPS Program in order to accomplish the goals and objectives of this Plan. MassDEP envisions working closely with USEPA to identify potential projects. These projects will be considered in light of the priorities set forth in this Plan and the tangible benefits of a given project to meet one or more goals of this Plan.

5.3 SOURCES OF NONPOINT POLLUTION AND PRIORITIES

Many of the sources and solutions to NPS pollution in Massachusetts are common to other states in the region. Understanding the pollution pathways for NPS is important, not only for developing effective solutions, but for developing strategies to manage limited resources and to channel those resources to projects that will have the greatest likelihood of positively changing water quality in the state. The majority of sources of NPS pollution come from land management activities that are conducted in ways that allow for the movement of pollutants to the rivers, streams, lakes, ground water and coastal waters of the state. Some sources of NPS are regulated or controlled through existing federal, state, or local regulatory programs, while other sources are not specifically regulated. These unregulated sources represent true NPS that must be addressed through voluntary programs that focus on the use of structural or non-structural practices to mitigate the impacts of NPS pollutants.



These sources will require new approaches and much larger scale solutions that are outside the scope of the Plan. They are included and discussed as appropriate, both to provide a complete picture of the NPS pollution sources in the state and to direct future actions by MassDEP and its partners.

The Plan acknowledges that there may be unique factors that affect the scope and magnitude of these sources. Given the needs presented in Section 4 (NPS Program Goals, Objectives and Strategies) to assess, monitor, and study NPS pollution across the state, it is the intent of the Plan and MassDEP to approach addressing these sources using the prioritization protocol set forth in this section. In future iterations of the Plan, greater attention and resources may be committed to these sources based on their regional or statewide significance, after additional analysis has been conducted.

Since this is a statewide Plan, these NPS sources are characterized in broad terms. This is intended to orient and organize partner programs and create a common language to communicate information to stakeholders. For the purposes of MassDEP's NPS programs, these sources provide a guide to the types of restoration and protection projects that could be considered eligible for grant funding or as in-kind match for grant funding.



5.3.1 Categories of NPS Pollution Sources in Massachusetts

a. Developed Areas

This category includes a wide range of activities and issues associated with buildings, lawns, roads, marinas, and other structures. With denser development there is an increase in impervious surfaces, which impact local hydrology by reducing the area where precipitation can soak naturally into the ground. Developed areas also increase the amount of pollutants – such as fertilizers, septic system leachate, and motor oil from vehicles – that can be carried by stormwater runoff into water bodies and wetlands. Developed sites range in size from backyards to golf courses, single-family homes to skyscrapers, and from small dirt roads to highways. Within this category, possible pathways for NPS pollution to enter surface and groundwater include:



- **Stormwater Runoff:** This includes water that flows on and over buildings, grassed areas, parking lots, and other features found within cities, towns, and rural communities. Runoff from impervious areas includes highways, roads, parking areas, rooftops, and similar facilities. Since, by definition, water cannot infiltrate into the ground from impervious surfaces, NPS pollutants on these surfaces are washed via rain and snowmelt into storm drains and adjacent waterbodies. Runoff from pervious areas, such as lawns, parkland, recreational areas, and golf courses also contribute pollutants. Contamination of runoff and groundwater from applied fertilizers, pesticides and other materials such as wastes from domestic animals are common NPS pollution issues. Stormwater runoff from developed areas is also typically warmer than runoff from undeveloped areas, and can contribute to thermal impacts to water bodies.

Within developed areas, street drains receive runoff from the land, building roofs, pavement, and through infiltration/inflow from groundwater. Street catch basins are often receptacles of accidental and illegal dumping of wastes, including waste oils. As such, storm drains are a potential conduit for nearly any type of NPS pollutant. Past practices of locating drain outfalls at ponds, streams, and estuaries has resulted in direct contamination of water bodies with pollutants including heavy metals, sediment, particulates, organic matter, nutrients, and bacteria. Structures such as dry wells, catch basins, and similar structures designed to discharge untreated stormwater runoff and cooling water into the ground are conduits for NPS pollution. If designed, sited, and constructed correctly, many infiltration devices can be positive controls and not sources of pollutants. Finally, BMPs that are intended to treat NPS can become sources of NPS if they are not properly designed, operated, and maintained.

- **Onsite Wastewater Disposal Systems:** Also called septic systems, these systems are intended to treat wastewater effluent from homes and businesses in areas that are not served by sewers. This includes traditional systems comprised of septic tanks and leach fields as well as innovative and alternative systems that provide advanced treatment. Properly designed, sited and maintained septic systems provide effective treatment of pathogens and phosphorus. Nitrogen is less effectively treated, although several innovative and alternative designs show promise. Achieving optimal nitrogen removal is especially important in coastal areas, as nitrogen is a cause of severe water quality degradation in marine environments.

System failures caused by improper operation and maintenance or poor design commonly result in above-ground breakouts of untreated leachate that may contaminate surface and groundwater with nutrients and pathogens. Commercially sold septic tank additives, disposal of pharmaceuticals, and introduction of other improper materials can be a source of toxic organic compounds that are not treated by the system and a cause of catastrophic system failure.



- **Construction Site Erosion:** Removal of existing vegetation and the excavation and grading operations associated with construction sites can result in increased rates and volumes of runoff. Sheet, rill, and gully erosion may result from these changes. As construction sites are built out, increased impervious surfaces can enhance runoff and cause offsite erosion or related NPS pollutant issues.
- **Marinas and Recreational Boating:** Commercial and recreational boat mooring and fleeting facilities are unique sources of NPS pollution. Boat washing, fueling, and septage off-loading are potential sources of NPS pollution. Fleeting facilities where bulk or liquid materials are loaded or unloaded can also be sources of NPS pollution.

b. Transportation

This category includes a variety of activities involving the creation, maintenance, and use of corridors for transportation. This includes roads, railroads, and airfields, as well as support areas such as marshalling yards, equipment storage, and maintenance facilities. NPS pollutants may originate from vehicles that use transportation corridors, from materials transported, or from routine maintenance activities. Construction of new corridors frequently crosses or comes close to drainage ways, streams, and other waterbodies. Erosion of soil from disturbed areas may directly enter waters. Reconstruction activities, including resurfacing, and ditch/slope maintenance can result in runoff of petroleum products and erosion of soil from disturbed areas. An increase in rates and volume of runoff may also be caused by land use changes associated with transportation corridors. Improperly sized culverts and roadway encroachment on stream channels increase watershed vulnerability to hydrologic instability and the impacts of climate change. Specific issues include:



- **Highways, State Roads, Streets:** The impervious surface on streets and highways allows the buildup of NPS pollutants that are readily washed away by rain events. In addition to the runoff of oils and greases from vehicles, NPS pollution comes from the use of road salts, sand, and other deicing compounds. Roadway deicing storage areas are potential sources of NPS pollutants to both surface and groundwater. Spills or accidental releases of transported materials are a potential source of NPS pollution.
- **Rural Roads:** Unimproved roads may be sources of sediment and dust. In addition, tacifiers and related compounds can be washed off roads during rainfall events.
- **Railroads:** Oils, greases and fuel are potential sources of NPS pollution. Additionally, areas where bulk or liquid materials are loaded/unloaded from railcars can be sources of a variety of NPs pollutants.
- **Aviation:** Chemicals associated with deicing, as well as aircraft maintenance areas are sources of NPS pollutants.

c. Agriculture

This category includes activities that occur on land and water that focus on the production of crops and livestock, as well the storage, management, and use of materials such as animal feed, fertilizer, pesticides, and waste products. This broad category encompasses cranberry bogs, cornfields, orchards, vegetables growing, confined animal operations, and shellfish beds. Although not commercial in nature, small hobby



farms, horse stables, home gardens, and similar small-scale activities also generate agricultural NPS pollutants. Many of the day-to-day activities associated with agriculture manage NPS pollution with voluntary BMPs, tailored to the unique aspects of a given operation. Some NPS pollution from agriculture comes from the unintentional misuse of regulated chemicals or inappropriate application of fertilizers or other inputs. Animal husbandry practices, particularly collection and management of manure and the management of barnyard runoff, also influence NPS. Within the agriculture category, possible pathways for NPS pollution to enter surface and groundwater include:



- **Croplands and Gardens:** The two major sources of potential surface and groundwater contamination from agricultural cropland are nutrient and pesticide/herbicide runoff. Nutrient contamination may result from the over application of inorganic (commercial fertilizers) and organic (manure) fertilizers. These fertilizers may contain highly water-soluble nitrogen compounds that have the potential to leach to groundwater. Conversely, less water-soluble nitrogen compounds are subject to surface runoff into surface water bodies. Pesticide and herbicide contamination may result from products that are used to control a wide variety of insects and undesirable plants. If not properly applied, excess chemicals can be carried into surface and groundwater from rain or irrigation. Pesticides and herbicides have the potential to contaminate surface waters from erosion in the same manner as nutrients. Another potential source is wash or rinse water from pesticide/herbicide spraying equipment. Water used to clean the inside of spray tanks or equipment is often drained in a small land area that may lead to groundwater contamination. Lastly, cropland is subject to sheet, rill, and gully erosion when surface runoff is not properly managed, resulting in sediment deposition and loading of associated pollutants to adjacent waterbodies. Conservation tillage practices and cover crops can greatly reduce this NPS pollution threat.
- **Barnyards/Animal Feeding Operations:** Runoff of animal wastes, particularly where large amounts of animals or wastes are kept, may result in the direct runoff of nutrients and bacteria into surface waters. Manure piles and holding areas in close proximity to surface waters, or that drain into conduits to surface water bodies, pose a particularly large threat. These threats are magnified for manure storage lagoons that hold large amounts of animal wastes. Significant groundwater impacts from animal holding or animal waste storage areas are also possible in areas where the water table is high or where infiltration rates are high. Lastly, animal watering and feeding areas can become denuded of vegetation due to high traffic and can become sources of soil erosion.
- **Production:** Another potential NPS pollution source is wash and processing water. Milk room wash water and crop cleaning and processing wash water have the potential for contaminating surface or groundwater when not properly treated or managed.
- **Grazing:** Pollution of surface and groundwater may occur from overgrazing, grazing near waterways, removal of riparian vegetation, overstocking of pastureland resulting in the loss of cover, and the direct discharge of animal manures to waterways and water bodies. Animals allowed in or near streams will directly contaminate water, and will cause watershed





instability when hoofs destroy riparian vegetation that would otherwise stabilize banks and channels. In addition, groundwater contamination may occur in a similar manner to those described for organic manure loading.

- **Irrigation/drainage:** Cropland that receives additional water through alterations to drainage or application via pumps and other appurtenances is more vulnerable to erosion and runoff of chemicals and nutrients. Excess water that cannot be used by plants or absorbed into soil can carry NPS pollutants to surface waters. Sub-surface drainage, such as field tiles, can enhance the transport of NPS pollutants to both surface and groundwater.
- **Specialty Crops:** Cranberries are a prime example of a specialty crop that may have direct impacts on surface waters. Due to the required cultural practices for growing cranberries, large amounts of water are used for irrigation, crop frost protection, and harvesting. The water used in cranberry bogs is typically obtained from surface waters in close proximity to the bogs. This water is normally drawn from the surface water body, used and retained as required, and returned to the water body. Excessive or improper application of fertilizers and pesticides, as well as accidents and vandalism, may result in direct introduction of pesticides and fertilizer to adjacent surface waters. Another potential impact on surface water may result from the aerial application of pesticides to cranberry bogs. Due to the close proximity of cranberry bogs and surface waters, pesticide drift may occur and result in direct input of low levels of pesticides to surface waters.
- **Aquaculture:** Also known as fish or shellfish farming, aquaculture refers to the breeding, rearing, and harvesting of plants and animals in all types of water environments, including ponds, rivers, lakes, estuaries, and the ocean. It produces food fish, sport fish, baitfish, ornamental fish, crustaceans, mollusks, algae, sea vegetables, and fish eggs. Aquaculture includes the production of seafood from hatchery fish and shellfish that are grown to market size in ponds, tanks, cages, or raceways. This category also includes the growing of aquatic plants used in a range of food, pharmaceutical, nutritional, and biotechnology products. These operations have the potential to cause NPS pollution from nutrients (typically from excess food/nutrient supplements that break down in water), chemicals (e.g., anti-fouling agents/biocides), and waste products from biota.



d. Forestry

This category includes activities focused on the management of forested areas for the purpose of planting and harvesting trees for timber and other associated wood products. While forestry activities are minimal in the coastal zone, both public and private lands in the western portions of Massachusetts are managed for forestry. Within this category, possible pathways for NPS pollution to enter surface and groundwater include:



- **Harvesting:** Activities associated with cutting and removing timber can cause increased soil erosion. Access and skid roads, stream crossings, and log landings are the primary sources. Increased erosion can result in suspended or bed load sediments in streams, ponds, reservoirs, and lakes. Clear-cutting or patch-cutting large areas may result in hydrologic modifications that could cause accelerated channel or sheet erosion.
- **Reforestation:** Site preparation may result in the temporary loss of cover and result in sheet and rill erosion. Use of herbicides to suppress existing vegetation may result in water contamination.
- **Christmas Tree Plantations:** Site preparation and annual weed control with herbicides may result in accelerated sheet and rill erosion and water contamination.
- **Harvesting Equipment:** Spillage and leakage of stored fuels or power equipment may result in water contamination.



In Massachusetts, potential NPS pollution impacts associated with forestry are primarily addressed through continued implementation of the [Massachusetts Forest Cutting Practices Act](#) and its coordination with Wetlands Protection Program performance standards, and pro-active education on efforts such as forestry BMPs. The statewide MADCR Forest Stewardship Program exists to offer technical assistance and outreach efforts to the forest cutting community.

e. Hydromodification

This category includes any anthropogenic alteration of the bed, banks, flow path, bottom depth, velocity, water volume, or water regime of a river, lake, stream, shoreline, or wetland. Historically, waterbodies have been reshaped for a variety of purposes, such as enhancing water supplies, flood control, drainage, and creation of areas to construct roads, buildings, and other structures. Massachusetts has over 3000 dams, with the Blackstone watershed having the highest dam density in the country. It is now recognized that these alterations have adverse effects on water quality and watershed stability, most often resulting in destabilized stream channels, head cutting of stream profiles, and displacement of water from wetlands filled or drained. Interference with natural channel process and hydrologic function leaves the watershed vulnerable to the impacts of climate change. Within this category, a number of NPS pollution pathways are recognized:



- **Channelization:** Maintenance or construction of ditches, channels, rivers, or alteration of natural channels to redirect flow may result in direct discharges of soil and sediment to flowing waters. Unstable channels, eroding slopes, and spoil material may erode, releasing sediments to water. Removal of riparian vegetation may cause temperature increase in downstream areas, stream scouring, increased flows, and flooding.
- **Dam Construction/Reconstruction:** Earth moving and construction activities may result in soil erosion and sediment delivery to waters. Thermal and hydrologic modifications frequently occur where the reservoir area or storage is large. Flooding of upstream wetlands may result in



alterations in pH of unbounded waters and release of nutrients. Additionally, earthwork dams may also contribute sediments from erosion or failures.

- **Earth Fills:** Filling of wetlands and other natural storage areas may displace flood storage and alter peak downstream flows. Erosion of unstabilized fill may cause sedimentation in streams and lakes.
- **Streambank/Shoreline Erosion:** Areas of denuded banks of streams and lakes can contribute increased amounts of soil to adjacent waterbodies. This type of erosion can result from enhanced or unnatural stream flows or increased wave action from watercraft. Bank stabilization techniques involving hard armoring may actually enhance bank erosion upstream and downstream of a given site due to increased water velocity or changes to the natural flow of water through a stream or river. Climate change can have a significant impact on watershed stability.

f. Atmospheric Deposition

This category includes a wide range of activities that cause or contribute to the release of pollutants to the atmosphere. These pollutants eventually return to the landscape, often great distances from the original source. The atmosphere as a significant source of pollution to surface water and the effects of man-made sources were demonstrated by the impacts of acid rain (sulfur dioxide and nitrogen oxides: SO_2 and NO_x) on lakes, and later was found to cause mercury, polychlorinated biphenyls (PCBs), and nutrient impairment. Pollutant pathways include:

- **Wet Deposition:** Pollutants in the atmosphere can be picked up by precipitation or act as condensation nuclei for precipitation formation and thereby be deposited to surface water and land in the form of rain or snow.
- **Dry Deposition:** Particles in the air are deposited onto surface water and land surfaces at a rate that depends on the particle size, wind speed, and other factors. Gaseous pollutants can also be deposited to water and land.
- **Volatilization:** Previously deposited gaseous and semi-volatile chemicals, such as mercury and PCBs, can be re-emitted to the atmosphere as the result of many factors, including chemical reactions and changes in temperature or wind speed.



Air pollutants are not only deposited directly to the surface of waterbodies, but are also deposited to the surrounding land and then enter surface waters indirectly through stormwater runoff and groundwater seepage. Two major issues arise from atmospheric deposition – precipitation containing NPS pollutants, and clean precipitation that causes air-deposited pollutants to run off surfaces and into waterbodies. Addressing these pollutants at the source, typically through existing regulatory requirements, is the first line of defense. The use of alternative energy technology can significantly reduce atmospheric NPS.

g. Landfills, Contaminated Areas, and Waste Management Sites

This category includes activities related to consolidation and management of wastes generated by residential, commercial, and industrial processes, including sewage. Many of these activities are regulated, and extensive requirements are typically placed on these sites. However, the potential for offsite transport of NPS pollutants remains, as does the potential for better management with improved BMPs. Within this category, possible pathways for NPS pollution to enter surface and groundwater include:



- **Landfills:** This includes both operating and closed landfills that are or have been used for disposal of garbage and other residential, commercial, and industrial wastes considered non-hazardous material. Surface runoff from these areas may contribute sediment to nearby waters and transport a variety of contaminants washed from the material. The decomposition of these wastes generates large volumes of liquids, which mix with other accumulated depositions to form a variety of compounds that may percolate to surface and subsurface waters.
- 
- **Hazardous Waste Areas:** These may be located over defined or non-defined areas where hazardous wastes of chemical, biological, or mineral material is stored, has been stored, or is spread on the land. Contamination of surface and groundwater may result from runoff or percolation of water through the area.
 - **Brownfields:** A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Contamination of surface and groundwater may result from runoff or percolation of water through the area, albeit at lower levels than a site contaminated with a classified hazardous waste.
 - **Organic Waters/Sludge/Septage:** This includes treated and untreated plant and animal residues from food processing facilities such as shellfish depuration and fruit pumice, as well as approved sludge from anaerobic digesters, waste treatment plants, and septic tanks. Concentration of these materials in stockpiles or applications to the soil present a potential for runoff to surface waters. Some of these products are high in nitrogen, which may be discharged to ground and surface waters. Heavy metals are often associated with sludge from treatment plants serving industrial customers.
 - **Waste Application Areas:** These are areas specifically identified for the application of liquid or solid agricultural waste such as milk room wastes, lagoon effluent, and liquefied manures. There is the potential for contamination by runoff and/or infiltration of nutrients, bacteria, and chemicals. This category also applies to areas specifically identified for approved applications of sludge, septage, or other non-farm wastes.
 - **Composting Areas:** Land areas used for the composting of agricultural, industrial, and residential wastes may represent another potential source of pollution. The degree of potential contamination is difficult to determine since the threat is based on the types of materials that are being composted and the site-specific composting procedures. Materials that contain high levels of nutrients and that are exposed to rain represent an increased risk to groundwater or runoff to surface waters.

In Massachusetts, potential NPS pollution impacts associated with landfills, contaminated areas, and waste management sites are primarily addressed through the Massachusetts Superfund Law (M.G.L. Chapter 21E), the Massachusetts Solid Waste Facility Regulations (310 CMR 19:00) and Regulations for Land Application of Sludge and Septage (310 CMR 32:00).

As discussed in Section 3.1.1, the Massachusetts Natural Resources Damages Program (NRD) also plays a role in mitigating impacts associated with releases of oil or hazardous materials and substances. Where appropriate and consistent with other program goals, the NPS Program will coordinate with the NRD Program to address mutual restoration goals and leverage s.319 grant projects (e.g., help provide match requirement).



h. Natural Resource Extraction

This category includes activities dedicated to the recovery of sand, gravel, rock, oil, natural gas, and other natural materials that are obtained by excavation, drilling, boring, or other methods. Within this category, possible pathways for NPS to enter surface and groundwater include:

- **Surface Extraction Areas:** These are gravel pits, surface mines, and similar areas. Exposed soil and mineral resources are subject to wind and water erosion. Both surface and groundwater hydrology may be changed due to these land use changes.
- **Processing Facilities:** Sorting, washing, and other processing facilities or storage of extracted and waste resources may contribute dust and solids to nearby waterways.
- **Offshore Drilling Areas:** These operations run the risk of releasing oil or related material to the offshore waters, thereby causing coastal pollution and marine fisheries habitat pollution.



In Massachusetts, potential NPS pollution impacts associated with natural resource extraction are primarily addressed through implementation of the Federal Clean Water Act, Sections 401, 402, and 404. In addition, municipalities may enact local bylaws to further control potential impacts associated with natural resource extraction.

5.3.2 Best Management Practices (BMPs) to Address NPS Sources

NPS BMP Categories

The management of NPS pollution often involves a combination of practices designed to prevent and intercept the entry of NPS pollutants into waters along the entire pathway from source to receiving water. Most BMPs address one specific stage of this pathway, although they may be applied in different situations and to different sources.

NPS BMPs can be more effective if governmental agencies, private sector interests, and stakeholder groups coordinate projects and implement solutions that address NPS sources in a holistic manner. BMPs can either complement each other - erosion control BMPs typically increase the effectiveness and reduce the maintenance requirements of a site's sediment controls - or undermine each other - armoring stream banks may increase flow velocity and channel erosion downstream. In general, controlling NPS pollutants through prevention where possible is the most cost effective approach. Control of these pollutants generally becomes more difficult and expensive the farther they travel down the stormwater pathway.

General categories of NPS BMPs are described below.

- **Preventive BMPs** are management techniques or designs that prevent or reduce the exposure of substances to precipitation, storm water, or surface waters. All policies and practices that prevent the release of materials to the open air, soil, or water are preventive BMPs. Such practices and safeguards comprise a large part of the rules, guidelines, and permit requirements for facility management and for the storage, transport, processing, and disposal of wastes and hazardous materials administered by MassDEP and other regulatory agencies. Examples include:





- Planning, policy, and regulatory activities
 - Housekeeping to contain and cover materials and wastes, or keep them indoors
 - Land conservation
 - Groundwater seepage abatement and control
 - Recycling and composting, including rainwater harvesting
 - Household hazardous waste collections
 - Public education and outreach
- **Erosion Control BMPs** maintain the integrity of the land surface to prevent material at the surface from entering storm water or surface water. These practices include BMPs such as mulches, erosion control mats and blankets, vegetation establishment and protection, and riprap.
 - **Cleanup BMPs** remove or remediate NPS pollutants which have contaminated a specific area. In most cases of significant contamination, the selection and implementation of these BMPs are governed specifically under agency rules. Other cleanup BMPs, such as cleanup of litter or illegally disposed materials, are more discretionary. Examples include:
 - Spill response
 - Contaminated site cleanup
 - Trash-litter cleanup
 - Street sweeping
 - Plugging of oil and gas wells
 - Source removal
 - **Run-on and Runoff Control BMPs** reduce the volume, velocity, and erosive force of storm water through diversion, infiltration or absorption of storm water into the surface or through physical impediments which slow the flow of storm water. Examples include:
 - Channel systems, including vegetated swales
 - Low Impact Development (LID) BMPs, such as bioretention, rain gardens and permeable pavements
 - Rainwater harvesting/detention
 - Sand filters
 - Vegetative filter strips, riparian buffers
 - Hydrodynamic separators
 - **Sediment Control BMPs** detain runoff before it leaves a site to filter out and/or precipitate suspended particles, including soluble pollutants which may be attached to solid particles. Example BMPs include constructed wetlands, detention basins, inlet and outlet protection, and silt fencing.





- **Channel, Stream Bank, and Streambed Protection BMPs** protect the integrity of stream beds and stream banks to prevent erosion and loss. Stream banks can be protected or restored either by increasing resistance of the bank to erosion or by decreasing the energy of the water at the point of contact with the bank, for example by deflecting or interrupting flows. Examples include:
 - Prevention of disturbance by exclusion of livestock, off-road vehicles, etc.
 - Vegetative bank stabilization, including live stakes, live fascines, and brush mattresses
 - Reinforcing or armoring exposed surfaces (e.g., gabions, stone toe protection)
 - Channel shaping to reduce velocity and erosive force
 - Log, rootwad, and boulder revetments
- **Habitat Restoration BMPs** are a special subset of biological erosion control and stream protection BMPs. They establish or protect the natural communities which most effectively protect waterways and riparian areas from erosion. Examples include:
 - Reestablish hydrology of wetlands, riparian areas
 - Restoration of wetland native plant communities
 - Riparian buffer, connecting streams or channels to floodplains



The Massachusetts Clean Water Toolkit

The USEPA guidance for NPS programs requires that state NPS Plans must “*identify best management practices and measures to control each category and subcategory of nonpoint sources*”. MassDEP has developed the *Massachusetts Clean Water Toolkit* as the primary education tool to address this need. The Toolkit is extensively cross-referenced to other BMP guides, manuals, fact sheets, and applicable specifications that have been proven to be effective.

The Toolkit was created for use by municipal officials, residents, and land managers to promote understanding and implementation of the many different options for prevention and control of NPS pollution. The Toolkit is an interactive, web-based document that includes a wide range of BMP fact sheets and a “BMP Selector Tool” that helps users choose the best BMPs for specific NPS pollution problems.

5.3.3 Laws and Regulations to Address NPS Sources

Authority to Control NPS Pollution

Massachusetts waters are protected from environmental degradation by a coordinated system of Federal and State control. The Federal Clean Water Act, 33 U.S.C. §§ 1251 et seq. (Federal Act), seeks to prevent water pollution by point sources primarily by requiring facilities that discharge pollutants into surface waters of the United States to obtain Federal permits that limit the amount of pollutants that may be discharged. The Federal Act also preserves a significant State role in the Federal permitting process. Subject to USEPA review, States establish their own water quality standards. *Id.* at § 1313. In addition, States retain the right to impose pollution control limits that are more stringent than the “floor” set by Federal law. *Id.* at §§ 1311(b)(1)(C), 1370. Before a Federal permit may issue, the relevant State first must certify that the permittee’s activities will not violate the State’s water quality standards. *Id.* at § 1341. This “State certification” process ensures that holders of Federal permits respect and uphold State standards.



The Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53 (State Act), confers on MassDEP "the duty and responsibility ... to enhance the quality and value of water resources and to establish a program for prevention, control, and abatement of water pollution." G.L. c. 21, § 27. Like the Federal Act, the State Act creates a comprehensive permitting program to ensure water quality standards are met. *Id.* at §§ 27(6), 43-44. No one may "discharge pollutants ... [or] engage in any other activity that may reasonably be expected to result, directly or indirectly, in discharge of pollutants into waters of the [C]ommonwealth ... without a currently valid permit" issued by [MassDEP]. *Id.* at § 43(2). Permits may include not only discharge limitations but also any "additional requirements ... necessary to safeguard the quality of the receiving waters." *Id.* at § 43(7). Violation of the terms of a permit is punishable by civil and criminal penalties. *Id.* at § 42.

In addition to establishing the permit program, the State Act directs that MassDEP to establish water quality standards. See *id.* at § 27(5). The State Act also confers on MassDEP the authority to adopt "rules and regulations which it deems necessary for the proper administration of the laws relative to water pollution control and to the protection of the quality and value of water resources." G.L. c. 21, § 27(12). Unlike the Federal Act, the State Act seeks to prevent water pollution by nonpoint sources by requiring dischargers of pollutants into surface waters or groundwater of the Commonwealth to obtain State permits that limit the amount of pollutants that may be discharged. The body of regulations through which the Department exercises the broad authority delegated to it under the State Act appears mainly at 314 C.M.R. 1.00-18.00. "The statutory purpose of the Act, expressed through its text, makes it clear that [MassDEP] has the discretion to create regulations that will best preserve and also restore the quality of our waters." *Friends & Fishers of the Edgartown Great Pond, Inc. v. Department of Env'tl. Protection*, *supra* at 838.



The State Act is also embedded in a network of environmental laws and regulations. For instance, in 1996, MassDEP issued the Stormwater Policy that established the Stormwater Management Standards. Since that time, MassDEP has applied the Stormwater Management Standards pursuant to its authority under the State Act and the Wetlands Protection Act, G.L. c. 131, § 40. In accordance with the Wetlands Regulations, 310 CMR 10.05(6)(b), Conservation Commissions and MassDEP issue Final Orders of Conditions requiring that stormwater be managed in accordance with the Stormwater Management Standards. MassDEP also applies the Stormwater Management Standards when reviewing projects that require a 401 Water Quality Certification. MassDEP has incorporated the Stormwater Management Standards into the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(b)(1)(a), and the regulations for 401 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Regulations, 314 CMR 9.06(1)(a).

MassDEP continues to apply the Stormwater Management Standards pursuant to its authority under the State Act. Acting jointly with the USEPA, MassDEP issues general permits regulating certain municipal separate storm sewer systems and construction dewatering. Through the State's 401 Water Quality Certification, the general permit for municipal separate storm sewer systems (i.e., the MS4 Permit) requires compliance with the Stormwater Management Standards.

In addition, in Massachusetts, some stormwater infiltration BMPs may be subject to additional requirements of the Underground Injection Control (UIC) Program, Drinking Water Protection Program, Ground Water Discharge Program, and the Massachusetts Stormwater Management Standards.



Infiltration BMPs are regulated as Class V underground injection wells used to drain stormwater runoff if they meet certain criteria defining a well in Massachusetts UIC regulations at 310 CMR 27.02. The Underground Injection Control Regulations, 310 CMR 27.00, require the owner or operator of an existing (or proposed) stormwater infiltration device meeting the definition of a Class V underground injection well to register with the MassDEP UIC Program and Massachusetts Groundwater Discharge Permit Regulations (314 CMR 5.00).

Agricultural activities, broadly defined, are exempted from many environmental regulations. The Wetlands Protection Act, G.L. c. 131, § 40, does not apply to “work performed for normal maintenance or improvement of lands in agricultural use or aquacultural use” or to maintenance of drainage and flooding systems of cranberry bogs. This exemption applies only to lands already in such use and not to improvement of land for such use.

USEPA has principal responsibility nationwide for the consistent regulation of pesticide use. The Massachusetts Department of Agricultural Resources (MDAR) regulates all aspects of pesticide use, including herbicides, fungicides and rodenticides, under the Massachusetts Pesticide Control Act, M.G.L. c. 132B and regulations published at 333 C.M.R. 2.00. However, regulatory exemptions for agricultural use are somewhat limited in the Quabbin and Wachusett watersheds under G.L. c. 92, § 107A(h) and regulations promulgated by the Department of Conservation and Recreation published at 350 C.M.R. 11.04 and 11.09. MDAR has also published regulations at 333 C.M.R. 11.00 that address the application of herbicides to maintain rights-of-way.

In addition, permits from MassDEP for discharges to surface or groundwater are required for “concentrated animal production facilities,” some aquaculture facilities, and some silvicultural point sources under G.L. c. 21, § 43 and regulations at 314 CMR 3.05 and 5.05.

Finally, Title 5 of the State Environmental Code, entitled *Minimum Requirements for the Subsurface Disposal of Sanitary Sewage*, published at 310 C.M.R. 15.00, regulates the siting, construction, upgrade, and maintenance of on-site sewage disposal systems. Title 5 dovetails with MassDEP’s Groundwater Discharge Permit Program under 314 C.M.R. 5.00 which applies to all discharges of sanitary sewage to the ground.



Primary Laws and Regulations Addressing NPS Source Categories in Massachusetts

In addition to the regulatory authority summarized above, specific laws and regulations that address each of the primary NPS pollution source categories described in section 5.3.1 are listed below.

NPS Source Category	Applicable Law or Regulation
a. Developed Areas	Federal Clean Water Act, Section 401 and 402 – 314 CMR 9.00 (Massachusetts 401 Water Quality Certifications) Massachusetts Wetlands Protection Act, M.G.L. ¹ c.131, §§ 40 and 40A – 310 CMR 10.00 Underground Injection Control Regulations, 310 CMR 27.00 Subsurface Sanitary Sewage Disposal, State Environmental Code-Title V – 310 C.M.R. 15.00
b. Transportation	Federal Clean Water Act, Section 402
c. Agriculture	Massachusetts Pesticide Control Act, M.G.L. ch.132B – 333 CMR 2.00 Pesticide Board, Rights of Way Management – 333 CMR 11.00 Permit Requirements for Surface/Groundwater Discharges (concentrated animal production facilities, some aquaculture) M.G.L. c. 21 § 43 – 314 CMR 3.05 and 5.05; 314 CMR 5.00
d. Forestry	Massachusetts Forest Cutting Practices Act – M.G.L. ch.132, § 40-46 – 304 CMR 11:00 M.G.L. ch. 48, § 16.
e. Hydromodification	Federal Clean Water Act, Sections 401 and 404 – 314 CMR 9.00 Chapter 91 Waterways License
f. Atmospheric Deposition	Federal Clean Air Act, 42 U.S.C. §§ 7401 – M.G.L. 111, §§ 142A-142J Massachusetts Clean Air Act; 310 CMR 7.00: Air Pollution Control
g. Landfills, Contaminated Areas, and Waste Management Sites	The Massachusetts Superfund Law, M.G.L. Chapter 21E Solid Waste Facility Regulations (310 CMR 19:00) Land Application of Sludge and Septage (310 CMR 32:00)
h. Natural Resource Extraction	Federal Clean Water Act, Sections 401, 402, and 404

1. Massachusetts General Laws (M.G.L.)



SECTION 6: MONITORING AND ASSESSMENT

6.1 OVERVIEW

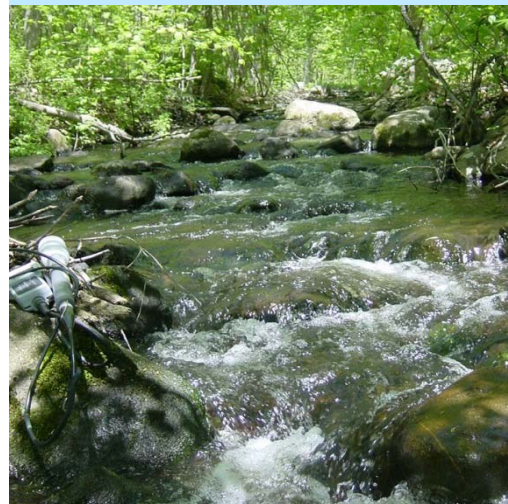
One of the key elements for the Massachusetts NPS Program is gathering and analyzing water quality information on the overall condition of waters within the state. This is critical to establishing baseline conditions, which help determine waterbodies that may be impaired or threatened by NPS pollution. In addition, water quality monitoring is needed to assess the effectiveness of efforts to address NPS sources with BMPs and non-structural controls, such as policy changes, education, and public outreach.

As required by the federal Clean Water Act (CWA), Massachusetts must identify waters impaired by NPS pollution based on currently available information (e.g., in reports under CWA sections 305(b), 319(a), 303(d), 314(a), and 320), and revise its list periodically as newer assessment information becomes available. As feasible, the state must also identify important unimpaired waters that are threatened or otherwise at risk from NPS pollution. NPS Plans must also contain a description of monitoring and other evaluation programs that will be conducted to help determine short- and long-term NPS management program effectiveness.

This section presents an overview of the key monitoring programs in Massachusetts. An overview of current NPS monitoring challenges facing Massachusetts is presented, along with a discussion of the five-year goals designed to address these challenges.

Water Quality Monitoring: The repeated sampling of environmental conditions at predetermined locations in order to provide a set of data to conduct assessments.

Water Quality Assessment: The overall process of evaluating the physical, chemical, and/or biological nature of water in relation to natural quality, human effects, and intended uses.



6.2 KEY MONITORING PROGRAMS

There are number of entities involved in the collection, analysis, and assessment of water quality data. Some programs have very specific regulatory or geographic focuses, while others are broad and cover regions or the entire state. The programs summarized in this section provide the majority of water monitoring data that is used to determine the scope and extent of NPS pollution issues, determine potential sources, and evaluate efforts to improve or protect water quality in given waterbodies.

6.2.1 MassDEP Division of Watershed Management (DWM)

Mission/Focus

With passage of the Federal Clean Water Act (CWA), Congress acknowledged the importance of water monitoring and assessment by requiring states to report on the quality of their waters (Section 305b) and to identify and prioritize impaired waters for corrective actions (Section 303d). Section 106(e)(1) and 40 CFR Part 35.168(a) require that the USEPA award Section 106 funds to a state only if it has provided for, or is carrying out as part of its program, the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor and to compile and analyze data on the quality of navigable waters in the state, and has made provisions for annually updating the data and including them in the Section 305(b) report.

In 2003, the USEPA published *Elements of a State Water Monitoring and Assessment Program* in an effort to increase consistency among state water monitoring programs and to provide a framework for determining if those programs meet the requirements of CWA Section 106(e)(1). This report called on



each state to formulate a “comprehensive monitoring program strategy that serves all water management needs and addresses all State water, including all waterbody types (e.g., streams, rivers, lakes, Great Lakes, reservoirs, estuaries, coastal areas, wetlands and groundwater).” In formulating this strategy, states were to incorporate the following ten basic elements of a water resource monitoring program:

- Long-term Monitoring Program Strategy
- Monitoring Objectives
- Monitoring Design
- Core and Supplemental Water Quality Indicators
- Quality Assurance
- Data Management
- Data Analysis/Assessment
- Reporting
- Programmatic Evaluation
- General Support and Infrastructure Planning

In addition to the elements listed above, each state’s monitoring strategy should identify technical issues and resource needs that were precluding the establishment of an adequate monitoring program, and formulate a long-term plan for implementing such a program.

MassDEP is designated to administer the CWA programs for the Commonwealth. MassDEP first published *A Water Quality Monitoring Strategy for the Commonwealth of Massachusetts* in September 2005. MassDEP currently has a draft revised monitoring strategy titled “*Testing the Waters*” *A Strategy for Monitoring and Assessing the Quality of Massachusetts’ Waters to Support Multiple Water Management Programs*” (dated January 2013). Although still in draft form, this document (the “Monitoring Strategy”) describes the current status of the MassDEP monitoring program. The Monitoring Strategy re-examines program priorities and data needs and sets forth a monitoring plan that continues to embody USEPA’s fundamental ten elements and meets the requirements of CWA Section 106(e)(1).

MassDEP’s long-term goal is to implement a comprehensive monitoring program that will serve all water quality management needs, while addressing streams, rivers, lakes, reservoirs, estuaries, coastal areas, wetlands, and groundwater. This long-term goal includes monitoring as required to carry out the state’s NPS Program. The Monitoring Strategy describes how monitoring data from all of these waters will be gathered and used within the context of MassDEP’s water resource management programs. Because of resource limitations, the full program will not be fully implemented over a short period of time. Therefore, the Monitoring Strategy includes the prioritization of individual monitoring program elements for implementation as resources become available. For example, high priority has been placed on obtaining technical support staff to address data management inadequacies that limit the availability of timely scientific data for multiple purposes. A high priority has also been placed on obtaining additional resources to collect data to support simulation modeling and the derivation of Total Maximum Daily Loads (TMDL) and to expand the MassDEP’s assessment monitoring capability. In the short term, lower priority has been placed on the development of a state-wide fixed-site network for contaminant loadings and trends. MassDEP plans to incorporate new components into the existing program elements over time.

MassDEP Monitoring Program (Overview)

The MassDEP Monitoring Strategy provides a highly detailed description of monitoring objectives, program design, quality assurance, data management, data analysis and assessment, reporting, and other USEPA required elements. The program summary provided below is intended as an overview. More detailed information is provided, and updated periodically, on the MassDEP Water Quality Monitoring webpage at:

<http://www.mass.gov/eea/agencies/massdep/water/watersheds/water-quality-monitoring-program.html>.

- **Monitoring Objectives:** The monitoring program is designed to provide data and information from streams, rivers, lakes, reservoirs, estuaries, coastal areas, wetlands, and groundwater to support the following major objectives:



1. Assess the Status or Condition of Massachusetts' Waters
 2. Determine Contaminant Loads and Trends
 3. Implement Pollution Control Strategies (Clean-up Plans)
 4. Identify Emerging Issues and Develop Policies and Standards
 5. Measure Project or Program Effectiveness
 6. Expand the availability of monitoring data and information to other parties
- **Core and Supplemental Water Quality Indicators:** MassDEP uses a hierarchy of water quality indicator types ranging from those emphasizing program-focused activities, such as the *number of discharge permits issued*, to greater reliance on resource-focused measures, such as the assessment of *biological integrity*. The kinds of indicators comprising the hierarchy are:
 1. Response Indicators: Measures of integrated or cumulative reactions to exposure and stress, such as biological community indices.
 2. Exposure Indicators: Measures of environmental variables that suggest a degree of exposure to stressors, such as water-column pollutant levels or ambient toxicity.
 3. Stressor Indicators: Activities that impact the aquatic environment, such as pollutant discharges and changes in land-use and habitat.
 4. Administrative Indicators: Regulatory actions by the USEPA, the State, and local entities and responses by the regulated community.

In general, monitoring programs focus on measuring exposure, response and, to a lesser degree, stressor indicators. The following table provides a breakdown of core and supplemental indicators used for assessing and managing the aquatic life and water contact recreational uses (including rivers, lakes, and coastal waters), as defined in the Massachusetts Water Quality Standards (WQS).

Indicator Type	Aquatic Life	Recreation
Core	Macroinvertebrate community Fish community Periphyton/Phytoplankton Macrophyton Habitat quality* Flow Dissolved oxygen pH Temperature Turbidity Suspended solids Lake trophic status	Pathogens (e.g., <i>E. coli</i>) Transparency Algal blooms, chlorophyll Macrophyte density Land-use/% impervious cover
Supplemental	Toxic pollutants (e.g., metals) Toxicity tests (water, sediment) Tissue chemical assays Nutrients Chlorophyll Sediment chemistry Organism condition factor Non-native species Land-use/% impervious cover Fish kills Pollutant loadings	Aesthetics Objectionable scums, sheens, debris, deposits Flow/water level Sediment quality Color/Turbidity pH

* Includes water quantity, geomorphology, stream substrate, riparian zone vegetation, eelgrass distribution, and estuarine substrate

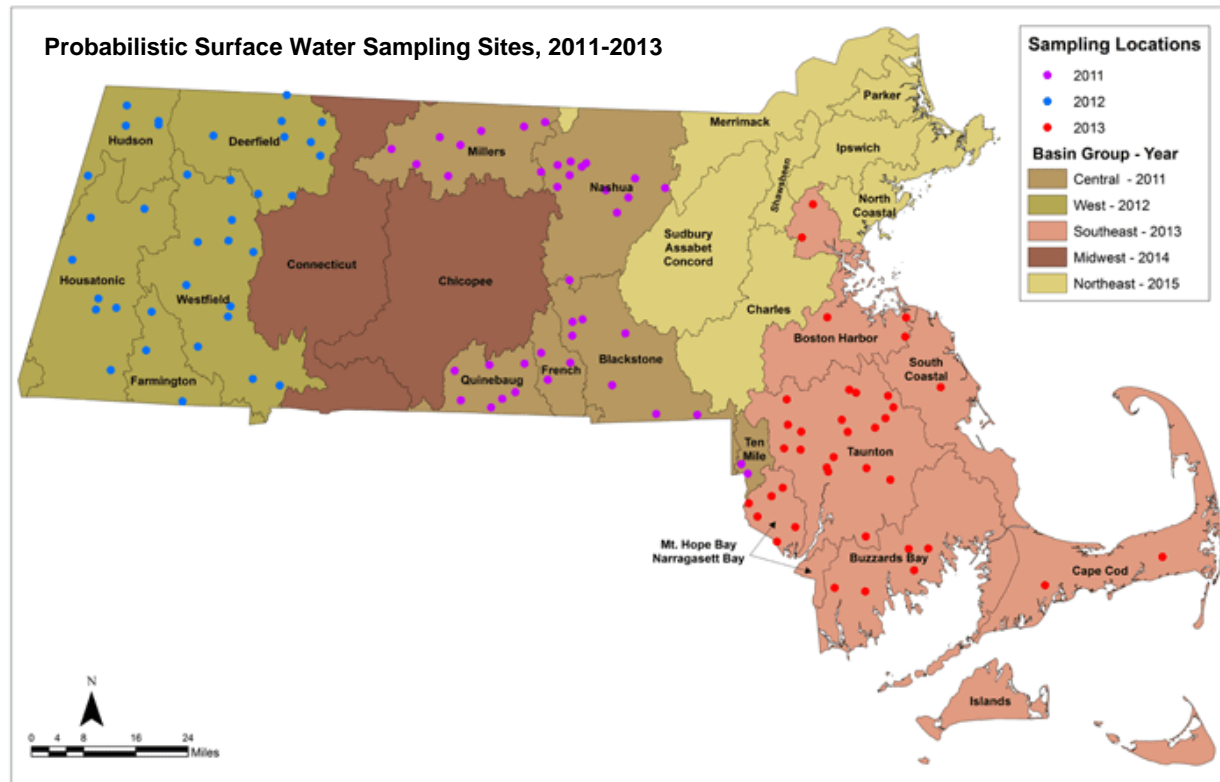


The table below summarizes the core and supplemental indicators that can be used to assess and manage the human health-related water uses designated in the Massachusetts WQS.

Indicator Type	Finfish/Shellfish Consumption	Drinking Water
Core	Mercury PCBs Pesticides Shellfish bed closures	Primary drinking water standards: e-coli, organic compounds & inorganic constituents, radionuclides (UV254)
Supplemental	Other contaminants of concern Pathogens	Secondary drinking water standards or other health-based advisories: color, iron

- **Monitoring Design:** To meet the water resource assessment and restoration goals of the CWA, MassDEP has organized monitoring and assessment objectives into two general categories. Section 305(b) objectives include determining the quality or designated use support status of all waters of the Commonwealth and assessing changes in quality or use support status over time (i.e., trend analysis). As a subset of the 305(b) assessed waters, Section 303(d) requires the identification of waters impaired by pollutants, for which Total Maximum Daily Loads (TMDLs) are required. All of these objectives can be fulfilled through the implementation of an integrated monitoring network that incorporates both probabilistic and targeted design elements, as described below. The ultimate goal of MassDEP's surface water monitoring program is to expend about 35% of annual monitoring resources on the probabilistic monitoring effort to satisfy the reporting requirements of CWA Section 305(b), while allotting the remaining 65% to deterministic or targeted data collection efforts.
- **Probabilistic Sampling Networks:** MassDEP began full implementation of probabilistic sampling in 2011 and conducts this sampling on a five-year cycle in conjunction with the other components of the state's water quality monitoring strategy. This program uses sampling data from randomly selected sites to generate an unbiased assessment of water quality conditions throughout the state. To provide complete coverage, both spatially and temporally, states are encouraged to adopt networks of randomly selected sampling sites that will allow for statistically unbiased assessments that can be applied at larger scales. Because statistically-valid inferences can be drawn for an entire population of water bodies by monitoring a set of sites randomly selected from that population, a probabilistic design can achieve the goal of reporting in Section 305(b) reports the status of all waters without actually having to monitor them all.

In 1993, the twenty-seven major watersheds and coastal drainage areas in Massachusetts were placed on a rotating five-year schedule for monitoring, assessment, TMDL development, surface water permitting, and non-point source pollution control. In 2010, Massachusetts' watersheds were regrouped on a regional basis to take advantage of potential benefits to monitoring survey logistics of more closely aligned watersheds, and to more equitably distribute the Commonwealth's total river miles among the five groups. The new watershed alignment also facilitated the execution of a new statistically-based probabilistic monitoring program component.



To aid in developing use assessments, probabilistic monitoring is currently conducted in shallow headwater streams and small tributaries and is proposed for lakes and ponds, as summarized below.

- **Shallow Streams:** In 2010, MassDEP's surface water monitoring program initiated the implementation of a new, statistically-valid sampling design for Massachusetts' shallow streams. While making up the vast majority of river miles in the Commonwealth, many of these headwater streams and small tributaries to main stem rivers had not been monitored in the past, and a probabilistic design was chosen to provide an estimate of the condition of those water body types. The goals of the probabilistic survey are to provide an unbiased assessment (Support/Impaired) of the aquatic life, recreational and aesthetic uses in wadeable (i.e., 1st – 4th Strahler Order), non-tidal perennial streams of Massachusetts, and, over time, to provide an analysis of trends in the use assessments of those streams.
- **Lakes and Ponds (proposed):** MassDEP recognizes a need to establish a more comprehensive monitoring program for assessing the condition of Massachusetts' lakes and ponds. While such a program could adopt a deterministic monitoring design, a probabilistic sampling design would allow for statewide inferences to be drawn on the status of all water bodies from an assessment of a random sample. In either case, monitoring of lakes and ponds should be expanded to provide adequate spatial, temporal and analytical coverage to assess all designated uses.
- **Groundwater:** Public drinking water wells across the state provide ground water sampling opportunities. Raw water testing of those wells provides information on the quality of





groundwater that, through the use of a probability-based sampling design, could provide an assessment of the overall quality of groundwater throughout Massachusetts.

- **Deterministic Sampling Networks:** A broad array of monitoring program elements “target” particular sites, areas or issues that require directed, and often comprehensive, sampling and analytical coverage. Targeted monitoring may be project-specific or issue-specific, but is often more site-specific and is sometimes of shorter duration than is monitoring to assess uses or detect trends. Targeted designs may be used to confirm causes and identify sources of impairments for reporting pursuant to sections 305(b) and 303(d) of the CWA, and to develop and implement control strategies such as TMDLs, NPDES permits, or Best Management Practices (BMP). Furthermore, targeted monitoring may provide data and information to define new and emerging issues or to support the formulation of water quality standards and policies. In any case, this category encompasses monitoring designs that are typically not implemented as fixed-site networks and may not always follow the rotating watershed schedule. However, MassDEP’s goal is to incorporate several deterministic monitoring program elements into the five-year rotating watershed schedule to take advantage of the benefits to monitoring survey logistics of more closely aligned watersheds. These program elements are summarized below.
 - **Targeted Monitoring to Identify Sources, Support TMDL Development and Clean-up Strategies (proposed):** To date, the majority of MassDEP’s monitoring to support TMDL development has been limited to that performed in lakes as described below under “Targeted Monitoring of Massachusetts’ Lakes”. However, the agency must develop TMDLs for a large number of river, lake, or estuary segment-pollutant combinations in the coming years. Computer models and other forecasting tools will be used to evaluate and make recommendations for pollutant allocation alternatives that are feasible and cost-effective. Monitoring will have to be expanded to include rivers and streams in order to calibrate and verify these models before they can be used to predict the impact of various loading scenarios. Monitoring will also be needed to evaluate the effectiveness of pollution control measures.
 - **Targeted Monitoring of Massachusetts Lakes (existing):** Lake sampling by MassDEP currently consists of biological surveys of the macrophyton community, “in-situ” measurements using metered probes, and limited water quality sampling to provide data for the calculation of TMDLs or the derivation of nutrient criteria. Lake surveys are generally conducted on multiple days for TMDL development and consist of bathymetric mapping; physical, chemical and biological sampling of the open water areas, tributary stream(s), and outlet; and mapping of the aquatic macrophyton community. Lakes are typically sampled during the summer months when productivity is highest.
 - **Targeted Monitoring to Assess Bioaccumulation (existing):** The goal of this monitoring element is to provide data for the assessment of the risk to human consumers associated with the consumption of freshwater finfish. Originally, fish collection efforts were generally focused on waterbodies where wastewater discharge data or previous water quality studies indicated potential toxic contamination problems. Later, concerns about mercury contamination from both local and far-field sources led to a broader survey of waterbodies throughout Massachusetts. In both cases, the analyses have been restricted to edible fish fillets. This “Toxics-in-Fish” monitoring program is a cooperative effort of the MassDEP, the Department of Fish and Game (DFG), and the Department of Public Health (DPH).
 - **Coastal Monitoring:** Monitoring of the coastal waters of Massachusetts is a multi-agency, multi-objective, effort that utilizes a variety of monitoring approaches, including the five-year rotating watershed cycle, deterministic sampling, and probabilistic monitoring designs. The DWM currently focuses its monitoring efforts on the freshwater inputs to coastal waters because the major contributions of contaminants that affect coastal waters are derived within their watersheds (including the freshwater portions). This monitoring is generally performed in accordance with the five-year watershed cycle. The MassDEP Wetlands Protection Program has also developed eelgrass distribution maps to support ongoing monitoring efforts



(<http://www.mass.gov/eea/agencies/massdep/water/watersheds/eelgrass-mapping-project.html>).

Data pertaining to the saltwater portions of coastal waters are collected by other agencies and organizations and are used by the DWM to meet a variety of objectives. For example, the DWM uses data from the Division of Marine Fisheries (DMF) for assessing the status of coastal waters based on shellfish area closures due to bacterial contamination. Agencies, such as the Massachusetts Water Resources Authority (MWRA), as well as some citizen-monitoring groups provide data on water chemistry and biological conditions that DWM uses to assess coastal waters for the use-support status of designated uses. The Massachusetts Office of Coastal Zone Management (CZM) administers a number of monitoring programs related to salt marsh integrity, invasive species, sea grasses, probabilistic monitoring of sediment and water quality, and the general water quality status of coastal waters. Finally, the MassDEP is working in conjunction with the UMASS School for Marine Science and Technology (SMAST) to develop site-specific criteria for nitrogen loading to nutrient-sensitive coastal embayments of Southeastern Massachusetts.

- **Wetlands Monitoring and Assessment:** Ongoing efforts by MassDEP to refine water quality standards for wetlands are focusing on the development of biological criteria within the framework of USEPA's Biological Condition Gradient (BCG) and Tiered Aquatic Life Use (TALU) conceptual models.

The MassDEP Wetlands Program, together with the University of Massachusetts-Amherst (UMass) and CZM, has been working since 2007 to develop a program to monitor and assess wetlands. This USEPA-funded effort is focused on the development and application of assessment methods at two levels of resolution. First, work is continuing on the refinement and application of the Conservation Assessment and Prioritization System, or CAPS, a Level 1 (i.e., landscape-level) assessment model that has been under development by UMass for several years (see <http://www.masscaps.org/>).

Because CAPS does not use field-based information to assess ecological conditions, site-level assessment methodologies (SLAMs) are being developed that utilize field data to evaluate wetland condition and calibrate the CAPS model. Efforts are ongoing to identify dose-dependent relationships that may exist between the field data and the metrics modeled in CAPS, and to develop Indices of Biological Integrity (IBI's) to incorporate into the SLAMs.

- **Targeted Monitoring to Locate Sources of Bacterial Contamination** (currently implemented only at the MassDEP Southeast Regional Office): Bacterial contamination is one of the leading causes of water use impairment in Massachusetts waters. To combat this problem laboratory and manpower resources have been established in MassDEP's regional offices aimed at the formulation and implementation of protocols for locating sources of bacteria. The sampling strategy includes the bracketing of suspected point sources (e.g., pipes, ditches, culverts) and non-point sources (e.g., specific land-use types, small tributaries, neighborhoods). Sampling stations also include baseline "pour point" stations established during screening level sampling to document and track reference conditions.

- **Fixed-Site Sampling Networks**

- **Fixed-site Monitoring Network for Defining Reference Conditions (existing):** The DWM has identified the need to characterize the reference condition for Massachusetts' surface waters to support multiple program objectives, including the interpretation of biological data obtained from the probabilistic monitoring network, the development of nutrient criteria and biocriteria, and the assessment of climate change. For example, the DWM is currently exploring the development of tiered aquatic life uses that will increase the accuracy of aquatic life use assessments and improve water quality goal-setting processes. An understanding of the inter-year and intra-year variation within indices of biotic integrity used for assessment is



a critical initial step toward the development and implementation of biocriteria and tiered aquatic life use. Long-term monitoring of least-impaired streams will help to define how global changes in climate are affecting water chemistry and biota in Massachusetts' waterbodies.

- **Fixed-site Monitoring Network for Contaminant Loadings and Trends (proposed):** A monitoring program is proposed to determine the mass transport of contaminants carried by major rivers in Massachusetts at strategic locations. This information is needed at the mouths of major rivers to quantify loads delivered to coastal waters, such as Boston Harbor, and major inland waterways, such as the Connecticut River. Information is also needed at state boundaries to determine contaminant loads entering and leaving Massachusetts. The sampling approach suited to the loads monitoring objective is fixed-station monitoring, where the same sites are sampled repeatedly over time and over a range of hydrologic conditions. Repeated sampling over time also generates data that may be suitable for determining trends in water-quality conditions.

6.2.2 National Estuary Programs (NEPs)

Mission/Focus

The NEP was established under Section 320 of the 1987 Clean Water Act (CWA) Amendments as a USEPA place-based program to protect and restore the water quality and ecological integrity of estuaries of national significance. There are four NEPs that include watershed areas within Massachusetts – the Massachusetts Bays NEP, Buzzards Bay NEP, Narragansett Bay NEP, and Long Island Sound NEP. Section 320 of the CWA calls for each NEP to develop and implement a Comprehensive Conservation and Management Plan (CCMP). The CCMP is a long-term plan that contains specific targeted actions designed to address water quality, habitat, and living resources challenges in its estuarine watershed. Although NEPs are not required to have monitoring programs, USEPA recommends that each NEP have a strategy for using available monitoring data for its decision-making. Programs that support or are related to monitoring for the NEPs are summarized below. The Narragansett Bay NEP and Long Island Sound NEP do not conduct monitoring in Massachusetts.



Monitoring Programs (Overview)

- **Massachusetts Bays NEP (MassBays)** <http://www.mass.gov/eea/agencies/mass-bays-program/>
 - The MassBays monitoring plan is currently (July 2014) being updated.
 - MassBays funded a 2012 MA-DMF project to develop a process for prioritization of restoration opportunities. This project was intended to address the following questions:
 1. Are there significant information gaps within the MassBays region that need to be identified when developing habitat restoration priority lists?
 2. What is a sustainable methodology for assessing priority restoration sites on a larger, regional scale?

By identifying and prioritizing restoration activities within the MassBays region, DMF can make appropriate decisions when administering the In-Lieu Fee (ILF) program or other funding sources to achieve the goal of no net loss to aquatic habitat area, functions and



values. Development of a project ranking tool will also allow DMF and other stakeholders to compare potential restoration projects across multiple habitat types and communities, with the goal of improving project selection and the likelihood of restoration success. MassBays funding for this project was also based on the idea that the prioritization method could also be used for MassBays projects. The project results outline priority habitat areas for restoration and a process for comparing restoration opportunities.

- MassBays funded a recent project in the Neponset Estuary to investigate the full range of water quality monitoring programs that were occurring in the watershed.
- The MassBays Annual Workplan establishes annual priorities for the Program and for each of the five MassBays regions. The Workplan identifies geographic and topical priorities as well as specific project priorities. A number of site/waterbody/regional projects are identified with specific monitoring components, including volunteer monitoring efforts supported by MassBays staff.

- **Buzzards Bay NEP**

The Buzzards Bay CCMP was updated in November 2013, including the following approaches related to monitoring (<http://buzzardsbay.org/newccmp-monitoring.htm>):

1. Shellfish bed closures, eutrophication data, and eelgrass bed cover are some of the key water quality measures that must be tracked, but in the long run, the state's list of impaired waters (as river miles and water acres) will be the ultimate measure of success of actions taken to comply with the Clean Water Act. This also means considerable effort will be needed to monitor and characterize the many unassessed freshwater and marine bodies in the bay and watershed.
2. While programmatic and environmental data are collected by the USEPA, the Buzzards Bay Coalition, Buzzards Bay NEP, and DEP, more effort is needed to make this information available on line, and where needed, synthesizing and aggregating data to show watershed comparisons and trends in time.
3. Programmatic actions by municipalities to comply with permits and watershed TMDL goals are both short-term and long-term measures to be tracked. Government will need to expand funding to research institutions to enable managers to better discern threats from emerging issues and concerns.

- **Narragansett Bay (NBEP)**

- A major focus for the NBEP will be generating a Status and Trends Report for Narragansett Bay and its watershed. The Program Manager and Scientist will develop an approach to completing this report, which will specify the range of topics to be addressed, to be reviewed by the Science Advisory Committee. The process will be coordinated with partners that have committed to related scientific synthesis including researchers and the participants in Watershed Counts, the Rhode Island Environmental Monitoring Collaborative, and similar entities in Massachusetts.
- The NBEP has contributed to a large data set of dissolved oxygen concentrations in Narragansett Bay for the period 1999-2012 through the spatial surveys known as the "insomniacs/day-trippers" program. State managers and researchers are interested in analysis of these data as a means to further understanding hypoxic conditions in the bay. Toward this end, the NBEP will provide funding, via a contractual agreement, to support a data analysis project.
- The NBEP scientist can support continued development of strategic monitoring designs for the bay watershed. The NBEP can play a value-added role in assessing needs from a bi-state perspective, identifying key gaps, and encouraging partners that conduct field monitoring or develop capacity to eliminate the gaps. With limited capacity, it is envisioned



that the NBEP will provide strategic input on bay and watershed monitoring but that data collection efforts will be largely accomplished through its partners, including state agencies, academic institutions, the Narragansett Bay National Estuarine Research Reserve, Narragansett Bay Commission, and others.

<http://www.nbep.org/workplans/NBEP2013-2014WorkPlan.pdf>

6.2.3 Massachusetts Department of Fish and Game - Division of Fisheries and Wildlife (DFW)

Mission/Focus

DFW is responsible for the conservation - including restoration, protection and management - of fish and wildlife resources for the benefit and enjoyment of the public. DFW's charge is the stewardship of all wild amphibians, reptiles, birds, mammals, and freshwater and diadromous fishes in the state, as well as endangered, threatened, and special concern species, including native wild plants and invertebrates.



DFW's monitoring activities help to identify priority habitat areas, cold water fisheries, and other important habitat that requiring protection. DFW monitoring data is used by MassDEP in the Recovery Potential Screening Tool (RPST, see Section 5.2.2), which provides a screening and assessment method for NPS pollution project funding prioritization.

Monitoring Programs (Overview)

- **Fish Conservation:** DFW is involved in several fisheries conservation activities. Most of these activities are focused on gathering data about fish and fish habitats across the state.
 - Statewide Fisheries Survey and Inventory: Waterbodies in watersheds are sampled as part of a 5 year basin cycle using a standard sampling protocol.
 - Target Fish Community Development: The Target Fish Community illustrates what a river fish population should look like in southern New England, and represents a measurable goal for restoration efforts. Currently the agency is involved in inventory processes.
 - Coldwater Fishery Resource Identification (CFR): This project's goal is to identify waters that DFW considers to be coldwater fisheries resources. The identified CFRs are organized geographically by watershed and the information is updated annually.
- **Biodiversity Initiative:** The Biodiversity Initiative consists of three interrelated programs:
 1. Ecological Restoration Program
 2. Upland Habitat Management Program
 3. Forest Management Program

Specific monitoring activities include:

- Establish biological monitoring and silvicultural prescriptions for active management sites on DFW lands that will achieve forest structure and composition goals.
 - Establish biological monitoring and passive management prescriptions (e.g., invasive plant control, prescribed fire application, public recreation use) for forest reserve areas.
 - Forest management activities include mapping of forest and non-forest cover types, and biological monitoring of plant and animal populations.
- **State Wildlife Conservation Strategy:** This document (also known as the MassWildlife Action Plan) includes (in Chapter 8) a recognition of the need to monitor conservation efforts to: 1) ensure that



time and money are providing desired results; and 2) determine if changing conditions (e.g. climate, development) require a change in strategy.

<http://www.mass.gov/eea/docs/dfg/dfw/habitat/cwcs/mass-cwcs-final.pdf>

6.2.4 Massachusetts Department of Fish and Game - Division of Marine Fisheries (DMF)

Mission/Focus

The Division of Marine Fisheries is responsible for the development and promulgation of the Commonwealth's laws governing commercial and recreational fishing activity conducted in the marine environment. Central to the vision is a commitment to balance our living marine resources with our coastal culture through innovation, collaboration, and leadership.

Monitoring Programs (Overview)

- **Resource Assessment Surveys Project (RASP):** The RASP's mission is to collect and analyze data to provide the basis for resource management actions. Fish are sampled using standardized spring and fall surveys of Massachusetts' territorial waters. Surveys are timed to coincide with seasons when either adults or juveniles are available inshore.

www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/resource-assessment-surveys-project.html

- **Fisheries Dependent Investigations (FDI):** FDI collects, processes, and manages operational, biological and economic data from commercial fisheries. This fisheries-dependent data is collected at-sea and shore-side and is used to document fishery performance, supplement and enhance stock assessments, and support fisheries management. Fisheries sampled include: pot fisheries targeting American lobster, black sea bass, and scup; trawl fisheries targeting groundfish, squid, silver hake, Atlantic herring and Atlantic mackerel; hook fisheries targeting groundfish, striped bass, spiny dogfish, haddock, and scup; gillnet fisheries targeting groundfish, and spiny dogfish; and seine fisheries targeting Atlantic herring, and menhaden.

<http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/fisheries-dependent-investigations.html>

- **Shellfish Sanitation Surveys:** Public health protection is achieved as a result of sanitary surveys of shellfish growing areas to determine their suitability as shellfish sources for human consumption. These surveys include: 1) an evaluation of pollution sources that may affect an area, 2) evaluation of hydrographic and meteorological characteristics that may affect distribution of pollutants, and 3) an assessment of water quality. Each growing area must have a complete sanitary survey every twelve years, a triennial evaluation every three years and an annual review in order to maintain a classification, which allows shellfish harvesting.



Two DMF laboratories located in Gloucester and New Bedford test water and shellfish samples for fecal coliform bacteria to determine the classification of shellfish growing areas and potential pollution sources. Shellfish are also tested for various poisonous or deleterious substances based upon an assessment of pollution sources impacting growing areas as determined by the sanitary survey and also as a result of pollution events such as oil and chemical spills. Contaminants periodically recovered from shellfish include: hydrocarbons, heavy metals, pesticides and polychlorinated



biphenyl's (PCB's). Action levels and Tolerances have been established by the U.S. Food & Drug Administration (FDA) for various contaminants to protect the public.

- **Other DMF Monitoring:** DMF conducts a variety of species- and habitat-specific monitoring programs focused on key commercial and recreational fish species. These programs include monitoring of lobster, tautog, bluefin tuna, striped bass, shark, smelt spawning habitat, and artificial reef sites. The full range of DMF monitoring, research and related programs are described at: <http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/>

6.2.5 Department of Conservation and Recreation (DCR)

- **Water Quality Sampling and Watershed Monitoring:** Activities to monitor water quality within major water supply reservoirs and their watersheds are conducted by the DCR Division of Water Supply Protection - Environmental Quality Section staff at Wachusett Reservoir in West Boylston and at Quabbin Reservoir in Belchertown. Annual Water Quality Reports are produced for both the Wachusett Reservoir and the Quabbin Reservoir & Ware River watersheds. These reports detail the results of sampling performed in the tributaries and the reservoirs for bacteria, nutrients, conductivity, temperature, turbidity, algae, hydrogen ion activity, and giardia/cryptosporidium.
- **Lakes & Ponds Program:** Massachusetts has over 3,000 lakes and ponds that provide opportunities for recreation and valuable habitat for a wide diversity of plants and animals. This program works with local groups and municipalities to protect, manage, and restore these valuable aquatic resources. Program staff provide technical assistance to communities and citizen groups, help to monitor water quality at various public beaches to ensure public safety, and provide educational materials to the public about various lake issues such as non-native species, algal blooms, and impacts associated with NPS pollution.



A key goal of the Lakes & Ponds Program is to prevent further infestation of lakes and ponds by non-native invasive aquatic plants, and to work towards controlling and removing existing populations of these plants. To meet this goal, the Weed Watchers Program was developed to train local lake groups to monitor their ponds for the presence of exotic invasive species and to develop a removal plan if an infestation is found. Weed Watcher volunteers:

- receive training in the identification and removal of invasive species, boat ramp signs, permitting guidelines, and reporting forms;
- patrol their lake every other week during the summer for the presence of invasive species in key locations (boat ramps, inlets and shallow coves etc.); and
- complete and return a yearly summary of the monitoring results.

If a potential infestation is found, the Weed Watchers group will work with DCR staff to identify the species and to develop and implement a removal plan. The DCR Lakes and Ponds Program also provides guidance on permitting invasive species control projects. The DCR web site highlights the efforts of the Weed Watcher groups.

6.2.6 Massachusetts Department of Public Health (DPH)

- **Beach Monitoring:** The Beaches Bill monitoring program is a major data source of bacteria and beach posting/closing information. Administered by DPH, communities are required to report their beaches monitoring data (most beaches sampled weekly) and decisions to post/close their beaches over the course of each year's beach season. DPH publishes annual reports of these data and periodically (~ every two years) and provides MassDEP-DWM analysts with a copy of their database



(MA DPH 2011b). To date, the beach closing/posting information has been used by DWM analysts as a surrogate indicator of water quality conditions rather than using the actual bacteria data for assessments. This surrogate was chosen by DWM analysts until such a time as all data quality assurance considerations (e.g., QAPP, QAQC, sample collection, analysis, data quality, and validation procedures) for the bacteria data are in place. The current assessment decision guidance for using these data is that postings/advisories at “public bathing beach” areas should be neither frequent nor prolonged during the swimming season (the number of days posted or closed should not exceed 10% during the locally operated swimming season). DWM analysts calculate the number of days and the percentage of time during each beach season (typically over a five year window or as an update to the last reporting cycle) that each marine beach was posted/closed. An area is considered to be in support of *Primary Contact Recreational Use* if marine beach(es) along the shoreline of an estuarine segment are posted for $\leq 10\%$ of the swimming season. If postings exceed 10% of the swimming season(s), the *Primary Contact Recreational Use* will be assessed as impaired. Data for multiple beaches located along the shoreline of a segment that may lead to conflicting assessment decisions are handled on a case-by-case basis by the DWM analysts. See the [DPH Beach and Algae webpage](#) for links to annual beach quality reports, water quality information, and other related topics.

6.2.7 Office of Coastal Zone Management (CZM)

Mission/Focus

CZM's mission is to balance the impacts of human activity with the protection of coastal and marine resources. As a networked program, CZM works with other state agencies, federal agencies, local governments, academic institutions, nonprofit groups, and the general public to promote sound management of the Massachusetts coast. CZM is funded primarily through the Commonwealth of Massachusetts, the National Oceanic and Atmospheric Administration (NOAA), and the USEPA.

Monitoring Programs (Overview)

- **Water Quality at State Beaches:** CZM coordinates with the Massachusetts DPH and certain nonprofit organizations to provide information to the public on conditions at coastal beaches throughout Massachusetts. See the [DPH Beach and Algae webpage](#) for additional information.
- **Coastal Wetland Monitoring:** CZM works with the MassDEP Wetlands Program to monitor wetlands within the Massachusetts Coastal Zone.



6.2.8 Massachusetts Water Resources Authority

- **Harbor and River Monitoring:** The Massachusetts Water Resources Authority's (MWRA) has been monitoring water quality in Boston Harbor and its tributaries since 1989. The Harbor monitoring program is required by MWRA's National Pollutant Discharge Elimination System permit. All Harbor and tributary areas affected by combined sewer overflows (CSOs) in Boston, Chelsea, Cambridge, and Somerville are included in the monitoring program.

MWRA makes at least 20 visits to each sampling location every year. Some sampling locations in the Harbor are only visited between April and December because of freezing in winter. The locations are spread out, and measured in both wet and dry weather. Most of the waters included in this monitoring program are designated for recreational use. Three bacterial indicators are and/or have been used to assess suitability for recreational use, fecal coliform, *E. coli* and *Enterococcus*.

Long-term Harbor monitoring helps in identifying change in water quality over time. Since MWRA was created in 1984, the Boston Harbor Project made significant improvements in the infrastructure of



Greater Boston's wastewater treatment system. MWRA has also improved CSO treatment and control.

Massachusetts Bay Monitoring: The bay monitoring program measures water quality from stations near the Deer Island Treatment plant outfall, which discharges all of the treated water from the MWRA system nine miles from shore. The program also includes monitoring stations as far as Cape Cod Bay. "Nearfield" stations are located within seven kilometers (4.3 miles) of the MWRA Deer Island Treatment outfall diffuser. "Farfield" stations include all stations in Boston Harbor; the coastal, offshore, and northern boundary regions; and Cape Cod Bay.

- **CSO Monitoring:** The CSO monitoring area includes the "receiving waters" of all CSO communities in greater Boston. These areas include the Inner Harbor, Boston Harbor embayments, and tributary rivers. Monitoring focuses on measuring the water quality impacts of CSOs, i.e., bacteria and nutrient loadings. Dissolved oxygen, sewage indicator bacteria, nutrient concentrations and water clarity are also measured.



CSOs affect a large area of Boston Harbor, discharging along the shoreline into streams, rivers, estuarine areas and beaches. To allow for an intensive study of each affected body of water, receiving waters are divided into geographic areas based on tributary locations and proximity to CSOs. Each area is monitored on a rotating schedule, with all areas sampled equally. Monitoring areas are: Charles River, Mystic River/Alewife Brook, Inner Harbor, Northern Dorchester Bay/Carson Beach, Southern Dorchester Bay/Tenean Beach, Neponset River, and Quincy Bay/Wollaston Beach. Beach monitoring is carried out in conjunction with DCR.

6.2.9 Other Sources of Data

Use of reliable scientific data and technical information from external sources has become an integral part of MassDEP DWM's waterbody assessments. DWM assembles data and information from a wide variety of sources. In cases where there is no recent DWM data to employ, waterbody health decisions may have to be based solely on external (non-DWM), non-direct or secondary data. Because DWM has limited control over QA planning and implementation for outside monitoring activities, the degree to which QAPPs, SOPs and other QA/QC measures are in place varies from project to project. Data reviews can be formal and documented or informal data quality assessments based on best professional judgement. Although external data evaluation takes place in different ways, DWM strives to verify the accuracy and evaluate the quality of all the external data used in decision-making. The following general list provides some of the possible sources of information for DWM's watershed assessment, TMDL and other work.



Federal Agencies

- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service



- U.S. Army Corps of Engineers
- National Oceanographic and Atmospheric Administration
- U.S. Geological Survey

State Agencies

- MassDEP - Drinking Water Program
- MassDEP - Wetlands and Waterways Program
- MassDEP - Watershed Permitting Program
- Massachusetts Office of Coastal Zone Management (CZM)
- Massachusetts Department of Conservation and Recreation (DCR)
- Massachusetts Division of Marine Fisheries
- Massachusetts Division of Fisheries and Wildlife
- Massachusetts Department of Public Health (DPH)
- Massachusetts Water Resources Authority (MWRA)
- Massachusetts Office of Geographic and Environmental Information (MassGIS)

Municipalities

- Municipal Conservation Commissions
- Municipal and Industrial NPDES Permit Monitoring Requirements (including contracts for toxicity testing)
- Public drinking water system testing

Private Consulting Firms

- Miscellaneous project data

Academic and Research

- Colleges, universities and other academic/research institutions
- Scientific/engineering literature, including conference and symposium papers

Volunteer Monitoring Organizations

- Watershed associations
- Lake and pond associations

The types of secondary data gathered by DWM for potential use vary widely depending on the source (chemical, biological, ecological, regulatory, etc.), including:

- measured surface water quality/quantity data
- hydrologic and water quality model output
- measured pollutant loads
- literature values and data
- historical environmental data
- permit records (e.g., Discharge Monitoring Reports)
- geographic information system data
- beach and shellfish bed closure records
- measured fish tissue contaminants
- sediment quality data
- weather records.



External Data Submittals to the Watershed Planning Program

MassDEP has developed guidance for the submittal of water quality data by external data providers to the DWM-Watershed Planning Program (WPP). Data that is submitted and provided to WPP may be used to make decisions regarding surface water quality assessments as required by Sections 305(b) and 303(d) of the Clean Water Act (CWA). Detailed information on data submittal can be found in the [Data Submittal Guidelines for External Data](#). Submittal of Quality Assurance Project Plans (QAPPS) for MassDEP review is a separate process and is explained in the [QAPP Submittal and Approval Process](#).

- **External Data Review Process:** DWM solicits, accepts and reviews data and information from all available sources. In general, in order for data to be used, certain quality criteria must be met. For most external data sources, DWM attempts to perform preliminary review of these data involving a baseline evaluation based on the following three main criteria. Failure to meet one or more of these basic criteria seriously undermines the level of confidence in the data.
 1. Monitoring is performed consistent with an acceptable Quality Assurance Project Plan including acceptable standard operating procedures;
 2. Data resulted from use of an acceptable, preferably state-certified lab (certified for the applicable analyses) that has a documented, acceptable laboratory Quality Assurance Plan (QAP) and Standard Operating Procedures (SOPs); and
 3. Results are documented in a citable report that includes QA/QC analyses and data management.

Additional review criteria for submitted secondary data are applied using best professional judgement, in order to evaluate the usability of the data by DWM. These include:

- Clarity, organization, detail, completeness and accuracy of the raw and/or analyzed data (including field sheets, notebook pages, QC analyses, spreadsheet data, etc.)
- Availability of completed Chain-of-Custody (COC) forms
- Overall precision of field duplicates/replicates compared to project DQOs contained in the QAPP for the secondary data.
- Estimated accuracy of lab analyses, using field blank data, raw bench sheets, Quality Control/Performance Evaluation (QC/PE) samples, spiked sample matrices, and positive/negative controls (for bacteria samples), as compared to project DQOs
- Level of QAPP implementation (i.e., documentation of actual QC measures to ensure data quality, such as the frequency of instrument calibration and maintenance, problem identification and response, and personnel training)
- Evaluation of field audit information (if available)
- Assessment of holding time violations
- Frequency of field QC sampling (vs. QAPP)
- Side-by-side and/or inter-laboratory QC audit information, if available, to assess inter-group and/or inter-lab precision (if available)
- Personal communication with project lead(s) and/or QC officer(s), if needed, to address questions (such as, were sample data representative of a waterbody at a specific location?).
- Appropriateness and accuracy of the data analyses.
- Method consistency/variability among project participants and over time throughout the duration of the project.



Based on this review, data may be accepted, accepted with caveat/qualification or rejected. Some data may be considered usable while other data are not due to analyte-, method- or situation-specific complications. In some cases, it may be necessary for DWM to postpone decisions regarding the usability of external data, pending submittal of additional information, lack of staff resources to adequately review the data, or for other reason(s). Where desired information is not on file, DWM staff may make requests to data providers to provide missing information.

While DWM may use acceptable secondary data, DWM does not formally manage any secondary (non-DWM) data in its primary data repository, WRATS. To manage large secondary data sources, such as Discharge Monitoring Reports (DMRs) and herbicide applications, stand-alone DWM databases are used (e.g., ToxTD and HERB). These databases assist in the review and evaluation of the data. For ToxTD data, most of the review is performed during the data entry process by DWM staff. Discrepancies, obvious errors, questionable entries are noted and the authors of the external DMR reports and toxicity reports are contacted for clarification. Based on the outcomes of these communications, revised reports may be received by DWM, or explanatory notes recorded on the existing report. Similar steps are taken for the HERB program database.

- **External Data Categories:** WPP categorizes external data into 3 general levels, which are related to the monitoring objectives (i.e., why the data was collected):
 1. Educational/Stewardship-level
 2. Screening level, and
 3. Regulatory/Assessment level.

While extremely important, data collected primarily for educational and/or stewardship purposes (level 1) generally does not meet the rigor (i.e., accuracy, precision, frequency, comparability, overall confidence, etc.) required for use in making water quality assessment decisions or in developing TMDLs. Although this type of data can be submitted, it is unlikely the data will be used for 305(b) or 303(d)-related decision making.

Screening-level data (level 2) are also very important and welcome, but generally fail to meet one or more WPP criteria required for direct use in water quality assessments or TMDLs. Level 2 data may meet the data quality objectives in the submitter's Quality Assurance Project Plan (QAPP), but not those in the WPP's monitoring program QAPP approved by USEPA. Level 2 data may be used to direct future WPP sampling efforts and as supporting evidence.

Level 3 assessment-level data have been deemed by MassDEP, based on the WPP's external data review procedures, to be directly usable for 305(b) and 303(d) decision-making. These data are considered scientifically sound and legally defensible, and are typically the result of extensive planning, attention to detail, relatively stringent data quality objectives, training, standard field and lab procedures, metadata collection, project organization, and data verification. Contingent upon WPP staff review and approval, these data can help determine if a waterbody is meeting water quality standards or is impaired.

- **External Data Submittals:** All external data submitted electronically are reviewed using a consistent procedure. Use of WPP's data submittal template is the preferred format for external data submittals. Once data are received by WPP, a standard data review spreadsheet is used to facilitate and document the review. ***NOTE: QAPP approval, submittal of the data integrity statement and/or data submittal does not guarantee that the associated data will be used by the WPP.***
 - **When to Submit Data:** Surface water quality or quantity data/information of all types is welcome at any time. Depending on when data are received, external data may be eligible for consideration in the current assessment cycle. If not received in time, external



data/information will be considered in the next assessment cycle. Biennial integrated waterbody assessments are conducted in even-years (e.g., 2016). Selected groups may also receive direct solicitations for data from WPP.

➤ **What Information to Include in the Data Submittal**

1. Cover letter/email.
2. Data Files: External data submittals must be sent electronically, and should contain the data elements described in the DWM-WPP [Data Submittal Template for WPP](#). Data sent using other formats may not be reviewed for usability by the DWM-WPP. The Excel data file(s) can be sent via email to WQData.Submit@state.ma.us, acceptable file transfer protocol or CD. Data file(s) must include quality control data (i.e., blanks, duplicates, etc.). All submitted data should be citable.
3. [Statement of Data Integrity](#)
4. Electronic copy of approved QAPP
5. In addition to the final data submittal, a summary report (optional) may also be provided. Suggested content for data reports can be found in the [Recommended Content of Data Report Submittals for CWA Reporting Purposes](#) document.

- **Where to Send the Data:** Electronic data files and related information can be sent to the DWM-WPP email: WQData.Submit@state.ma.us.

For regular mail delivery (e.g., CD), data can be sent to the following address:

External Data Coordinator
Massachusetts Department of Environmental Protection
Division of Watershed Management-Watershed Planning Program
627 Main St., Worcester, MA. 01608



6.3 NPS MONITORING CHALLENGES AND GOALS

6.3.1 NPS Monitoring Challenges

During the initial stages of this NPS Plan update, MassDEP and NPS partner organizations met to discuss the status of water quality monitoring in Massachusetts. Several key challenges that impact NPS monitoring activities by MassDEP and the NPS partner organizations were identified:

1. Greater Focus on Monitoring and Identifying NPS Pollution Sources

USEPA indicated that, generally, NPS pollution monitoring in the state of MA needed to be improved to help meet the goals/objectives of the state NPS Program. Demonstration of measurable improvements to water quality associated with the implementation of s.319 funds, as well as the efforts of other federal/state programs, is a primary focus of USEPA for NPS pollution monitoring. Particularly when multiple consecutive s.319 projects have been completed in a specific area, there is a need to assess if water quality improvements have resulted from these projects.

2. Program and Policy Challenges

a. USEPA metrics for s.319 programs are not well aligned with the majority of MassDEP DWM-WPP monitoring programs, which focus on Federal Clean Water Act requirements under Sections 305b and 303d for the assessment of use attainment in waterbodies and identification of sources of impairment. For sources of NPS pollution, identification is challenging and constrained by existing DWM-WPP missions and resource allocations. These same constraints also limit the ability of DWM-WPP to conduct the type of monitoring that is typically required to document water quality improvements associated with s.319 NPS watershed projects and other NPS Program activities.

b. USEPA guidelines require the state water quality agency to undertake monitoring that will demonstrate the effectiveness of conservation practices implemented by NRCS in the Palmer River watershed under the National Water Quality Initiative (NWQI). Tetra Tech, under contract to USEPA, developed a monitoring plan that found significant challenges associated with this requirement. MassDEP, with USEPA, has been conducting a bacteria source tracking program in the target watershed for several years, and it was hoped that this would provide adequate baseline data for the NWQI task. Tetra Tech found that significant additional sample collection would be necessary to detect a meaningful signal after several years, and only if conservation practices could be implemented over a very large portion of the watershed using a carefully designed implementation plan. With USEPA agreement, in lieu of the required monitoring for FY2015 and 2016, MassDEP has provided s.319 funds to the Massachusetts Association of Conservation Districts for technical support to increase the rate of outreach, education and implementation in the Palmer River watershed.

3. Coordination of Monitoring Programs

Improved coordination between MassDEP and USEPA water programs, such as s.319, TMDL, NPDES, Monitoring, and 303d was seen as a critical need in order to make progress on the multiple objectives for state water quality monitoring. The need for coordinated efforts between MassDEP and its NPS program partners is heightened by the limitations placed on the use of s.319 funds for NPS monitoring, as described in the USEPA NPS Program Guidelines. A planning effort involving MassDEP and USEPA program leads is a recommended first step in this process. MassDEP monitoring efforts related to NPS pollution can be aided by USEPA program coordination and agreement on the prioritization of resources and program goals.

MassDEP s.319 program needs related to monitoring/assessment could be addressed through better coordination with DWM-WPP monitoring/assessment activities. Setting priorities in advance of the development of DWM-WPP monitoring work plans could allow for targeted monitoring or baseline monitoring in high priority NPS watersheds. Implementing these monitoring work plans would require significant internal lead time, and flexibility to meet state/federal monitoring goals. DWM is open to conducting targeted NPS monitoring projects as resources allow. In order to justify targeted monitoring (e.g., to determine NPS implementation project effectiveness), a substantial amount of s.319 funded work would need to be completed (e.g., more than just a single BMP installation).



4. New and Emerging NPS Issues

There is strong interest in cyanobacteria (blue-green algae) monitoring as a NPS concern. Some monitoring of this type was conducted in recent years by the Massachusetts Department of Public Health until grant funding from the U.S. Centers for Disease Control and Prevention was eliminated. MassDEP is evaluating monitoring approaches to characterize the scope and extent of this issue. Limitations in funding/human resources, as well as gaps in the science are barriers to a comprehensive approach on this issue. Further, cyanobacteria may or may not be true indicator of nutrient/NPS pollutant loadings. Nutrient sinks in lakes/ponds as well as poorly understood algal bloom catalysts need to be studied.

6.3.2 Goals, Objectives and Milestones to Address Monitoring Challenges

The goals, objectives, and milestones listed in the table below are included in this NPS Plan to address the monitoring challenges described in Section 6.3.1. The goals/objectives/milestones are excerpted from Table 4.1 in section 4 of this Plan, which includes additional information about agency lead, partners, measures of success, and implementation schedule.

Goal 4 (from Table 4.1): Monitor waters for NPS impairments and improvements to prioritize actions, measure success, and increase program efficacy		
Objectives	Milestones	Challenges Addressed
1. Establish methods to categorize and assess unimpaired/high quality waters.	1.a. Establish methodology to identify unimpaired/high quality waters	1, 3
	1.b. NPS partner monitoring programs help assess and identify unimpaired/high quality waters	1, 3
2. Integrate NPS monitoring needs into MassDEP monitoring programs	2.a. Integration of NPS sampling plan into state surface water monitoring program, including sampling design and protocols	1, 3
	2.b. Advance selection of watersheds for baseline monitoring	1, 3
	2.c. Post-implementation monitoring to assess water quality improvements	1, 3
	2.d. Monitoring in Palmer River Watershed to support the NWQI project	2, 3
3. Assess existing data and report on water quality improvements	3.a. Clarification of delisting requirements and level of analysis requirements/documentation needs for USEPA Success Stories	2
	3.b. Identification of watersheds that are likely to show water quality improvements as a result of watershed-focused improvement activities	1, 2
	3.c. Annually assess selected waterbodies for possible follow-up success story monitoring (e.g. review existing data and information to determine if additional monitoring is recommended)	1, 2, 3
	3.d. Assessment of water quality data by DWM-WPP to determine if improvements in water quality have occurred in watersheds with NPS-focused water quality improvement activities	1, 2, 3
4. Improve resource allocation to meet mandates	4.a. Coordination on Clean Water Act monitoring requirements, resource allocations, and monitoring priorities	3
5. Determine impacts of NPS sources	5.a. Conduct water quality monitoring programs in selected watersheds to identify impacts of NPS sources.	1, 4
	5.b. Monitoring and assessment activities in 604(b) and s.319 projects support identification of NPS pollution sources	1, 3
6. Increase use of volunteer data for assessment of scope and extent of NPS pollution	6.a. Organize current volunteer monitoring efforts and expand through guidance, technical support, and leveraging of resources	3, 4



SECTION 7: MASSACHUSETTS NPS RESOURCE LIBRARY

The tables below provide links to NPS information resources that are referenced throughout this NPS Program Plan.

7.1 LINKS TO NPS RESOURCES

Description	Link	NPS Plan page #
USEPA Nonpoint Source Pollution definition	http://water.epa.gov/polwaste/nps/whatis.cfm	3
Massachusetts 2012 Integrated List of Waters	http://www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf	6
Massachusetts Section 319 Nonpoint Source Competitive Grants Program webpage	http://www.mass.gov/eea/agencies/massdep/water/grants/watersheds-water-quality.html#2	7
USEPA Section 319 Nonpoint Source Program and Grants Guidelines for States and Territories	http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf	8
Massachusetts Clean Water Toolkit	http://projects.geosyntec.com/NPSManual/	9
Massachusetts Stormwater Technology Evaluation Project (MASTEP) description	http://www.mastep.net/documents/MASTEPdesc.pdf	10
Massachusetts Alternative Septic System Test Center (MASSTC) website	http://www.masstc.org/	10
MassDEP Horsekeeping and Water Quality Fact Sheets	http://www.mass.gov/eea/agencies/massdep/water/watersheds/horse-keeping-and-water-quality.html	10
MassDEP Grantee Guide	http://www.mass.gov/eea/docs/dep/water/gg2012.pdf	12
Guidelines for MA Administrative Code 201 CMR 21.00	http://www.mass.gov/bb/regs/801021.html	12
Indicative Project Summaries - Massachusetts Section 319 NPS Competitive Grant Program	http://www.mass.gov/eea/docs/dep/water/319sum12.pdf	14
U.S. Department of the Interior Adaptive Management Documents	http://www.doi.gov/initiatives/AdaptiveManagement/documents.html	16
USEPA Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters	http://water.epa.gov/polwaste/nps/czara/index.cfm	25
Massachusetts Climate Change Adaptation Report (2011)	http://www.mass.gov/eea/docs/eea/energy/cca/eea-climate-adaptation-report.pdf	28
USEPA NPS Success Stories: Eel River	http://water.epa.gov/polwaste/nps/success319/ma_eel.cfm	29
USEPA website	http://water.epa.gov/	32
USEPA Clean Water Act Section 319 webpage	http://water.epa.gov/polwaste/nps/cwact.cfm	32
Cape Cod Section 208 Plan	http://watersheds.capecodcommission.org/	33
USEPA Healthy Watersheds Initiative webpage	http://water.epa.gov/polwaste/nps/watershed/index.cfm	33
USEPA CWA 303(d) Program - Framework for Implementing CWA 303(d) Program	http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm	33
USEPA Groundwater/Drinking Water Programs	http://water.epa.gov/drink/index.cfm	34
USEPA Sole Source Aquifer Protection Program	http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/solesourceaquifer.cfm	34
USEPA National Estuary Program Overview	http://water.epa.gov/type/oceb/nep/index.cfm#tabs-2	34
USEPA Dredged Material Management webpage	http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/dredgemgmt.cfm	34



7.1 LINKS TO NPS RESOURCES (continued)

Description	Link	NPS Plan page #
Status and Trends of Wetlands in Coastal Watersheds of Eastern United States	http://www.fws.gov/wetlands/Documents/Status-and-Trends-of-Wetlands-in-the-Coastal-Watersheds-of-the-Eastern-United-States-1998-to-2004.pdf	35
USEPA Coastal Wetlands webpage	http://water.epa.gov/type/wetlands/cwt.cfm	35
USEPA Climate Change webpage	http://www.epa.gov/climatechange/impacts-adaptation/northeast.html	35
USEPA Soak Up the Rain Program	http://www.epa.gov/region1/soakuptherain/	35
USEPA Green Infrastructure webpage	http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm	35
USDA-NRCS, Massachusetts webpage	http://www.nrcs.usda.gov/wps/portal/nrcs/site/ma	37
Massachusetts Energy and Environmental Grant and Loan guide	http://www.mass.gov/eea/docs/eea/grants/grant-loan-guide.pdf	40
USEPA Recovery Potential Screening overview	http://water.epa.gov/lawsregs/lawsquidance/cwa/tmdl/recovery/overview.cfm	51
Massachusetts Forest Cutting Practices Act	http://www.mass.gov/eea/agencies/dcr/conservation/forestry-and-fire-control/chapter-132-ma-forest-cutting-practices-act.html	61
MassDEP Water Quality Monitoring Program webpage	http://www.mass.gov/eea/agencies/massdep/water/watersheds/water-quality-monitoring-program.html	68
MassDEP Eelgrass Mapping Project	http://www.mass.gov/eea/agencies/massdep/water/watersheds/eelgrass-mapping-project.html	72
Conservation Assessment and Prioritization Systems (CAPS) webpage	http://www.masscaps.org/	72
Massachusetts Bays National Estuary Program	http://www.mass.gov/eea/agencies/mass-bays-program/	73
Buzzards Bay National Estuary Program	http://buzzardsbay.org/newccmp-monitoring.htm	74
Narragansett Bay Estuary Program -2013 Workplan	http://www.nbep.org/workplans/NBEP2013-2014WorkPlan.pdf	74
Massachusetts 2005 Comprehensive Wildlife Conservation Strategy	http://www.mass.gov/eea/docs/dfg/dfw/habitat/cwcs/mass-cwcs-final.pdf	75
MA-DMF Fisheries Dependent Investigations webpage	http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/fisheries-dependent-investigations.html	76
MA-DMF Programs and Projects webpage	http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/	76
DPH Beaches and Algae	http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/beaches-algae/	77
MassDEP External Data Submittal Guidelines	http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/cn000-72a.doc	79
MassDEP QAPP Submittal and Approval Process	http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/cn000-70a.doc	79
Guidelines for Use of the MassDEP-DWM-WPP Data Submittal Template	http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/datatemp14.xlsx	81
MassDEP Statement of Data Integrity	http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/integfrm.doc	81
MassDEP Recommended Content of Data Report Submittals for CWA Reporting	http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/cn000-74a.doc	81
MassDEP Total Maximum Daily Loads (TMDLs)	http://www.mass.gov/dep/water/resources/tmdls.htm	A-1
MassDEP Water Quality Assessment Reports	http://www.mass.gov/eea/agencies/massdep/water/watersheds/water-quality-assessments.html#2	A-1



7.2 LINKS TO LAWS AND REGULATIONS RELATED TO NPS POLLUTION

Federal Laws/Regulations	Link
Federal Clean Water Act: <ul style="list-style-type: none"> – Section 401 (Certification) – Section 402 (National Pollutant Discharge Elimination System) – Section 404 (Wetlands/Waters of U.S.) 	<ul style="list-style-type: none"> – http://water.epa.gov/lawsregs/guidance/wetlands/sec401.cfm – http://water.epa.gov/lawsregs/guidance/wetlands/section402.cfm – http://water.epa.gov/lawsregs/guidance/wetlands/sec404.cfm
Federal Clean Air Act, 42 U.S.C. §§ 7401	http://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/pdf/USCODE-2011-title42-chap85.pdf
Massachusetts State Laws/Regulations	Link
Massachusetts 401 Water Quality Certifications; 314 CMR 9.00	http://www.mass.gov/eea/agencies/massdep/air/regulations/310-cmr-7-00-air-pollution-control-regulation.html
Massachusetts Wetlands Protection Act, M.G.L. ¹ c.131, §§ 40 and 40A; 310 CMR 10.00	http://www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-10-00-wetlands-protection-act-regulations.html
Underground Injection Control Regulations, 310 CMR 27.00	http://www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-27-00-underground-injection-control.html
Subsurface Sanitary Sewage Disposal, State Environmental Code-Title V; 310 C.M.R. 15.00	http://www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-15-00-septic-systems-title-5.html
Massachusetts Forest Cutting Practices Act M.G.L. ch.132, § 40-46; 304 CMR 11:00 M.G.L. ch. 48, § 16.	http://www.mass.gov/eea/docs/dcr/legal/3041100.pdf https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter48/Section16
Chapter 91 Waterways License	https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIV/Chapter91
Massachusetts Clean Air Act, M.G.L. 111, §§ 142A-142J; – 310 CMR 7.00: Air Pollution Control	http://www.mass.gov/eea/agencies/massdep/air/regulations/310-cmr-7-00-air-pollution-control-regulation.html
The Massachusetts Superfund Law, M.G.L. ch. 21E	https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter21e
Solid Waste Facility Regulations; 310 CMR 19:00	http://www.mass.gov/eea/agencies/massdep/recycle/regulations/310-cmr-19-00.html
Land Application of Sludge and Septage; 310 CMR 32:00	http://www.mass.gov/eea/agencies/massdep/water/regulations/310-cmr-32-00-land-application-of-sludge-and-septage.html
Permit Requirements for Surface/Groundwater Discharges, M.G.L. c. 21 § 43 <ul style="list-style-type: none"> – 314 CMR 3.00 (Surface Water Discharges) – 314 CMR 5.00 (Groundwater Discharges) 	http://www.mass.gov/eea/agencies/massdep/water/regulations/314-cmr-3-00-surface-water-discharge-permit-program.html http://www.mass.gov/eea/agencies/massdep/water/regulations/314-cmr-5-00-groundwater-discharge-permits.html
Massachusetts Pesticide Control Act, M.G.L. ch.132B – 333 CMR 2.00	http://www.mass.gov/eea/docs/agr/legal/reg/333-cmr-2-00.pdf
Pesticide Board, Rights of Way Management – 333 CMR 11.00	http://www.mass.gov/eea/docs/agr/legal/reg/333-cmr-11-00.pdf

Appendix A:

2015 List of Priority NPS Impaired Waterbodies

January 2, 2014

The following Massachusetts waterbodies are proposed as nonpoint source impaired waters that are most likely to respond to remediation efforts that will result in meeting water quality standards. Proposals that would address these impaired segments with watershed-based projects will receive prioritization for funding in the FFY 2015 319 funding round.

Waterbodies listed here are defined by segment or waterbody number in the Water Quality Assessment Reports for the respective basins, (<http://www.mass.gov/eea/agencies/massdep/water/watersheds/water-quality-assessments.html#2>). Water quality impairments are found in the Final Massachusetts 2012 Integrated list of Waters (<http://www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf>)

This list has been developed using the following approach:

1. The Massachusetts Recovery Potential Screening Tool was used to identify HUC-12 subwatersheds that are most highly recoverable. Watersheds showing high and medium-high recoverability potential (darkest and next darkest blue) were selected.
2. For watersheds selected in Step 1, maps of MS4 regulated areas were compared to watershed maps found in the Water Quality Assessment Reports. Segment locations were reconciled with regulated areas, and the waterbodies located in regulated areas were screened out as ineligible to receive 319 funds.
3. For remaining waterbodies, the Integrated List of Waters was examined to identify segments impaired by causes most likely to respond to NPS BMPs and remediation efforts.
4. The targeted waterbodies are shown below, with the water quality impairments that can most effectively be addressed through NPS BMPs and suggested BMP types to be implemented.
5. Applicants are referred to Water Quality Assessment Reports found at <http://www.mass.gov/dep/water/resources/wqassess.htm#wqar> for information about Category 4C (non-pollutant) impairment causes shown in parentheses in the table below.

This is a partial list. Applicants wishing to work in other watersheds are encouraged to follow similar methodology in order to identify competitive, high priority projects. Contact Jane Peirce at 508-767-2792 or jane.peirce@state.ma.us for assistance and access to resources.

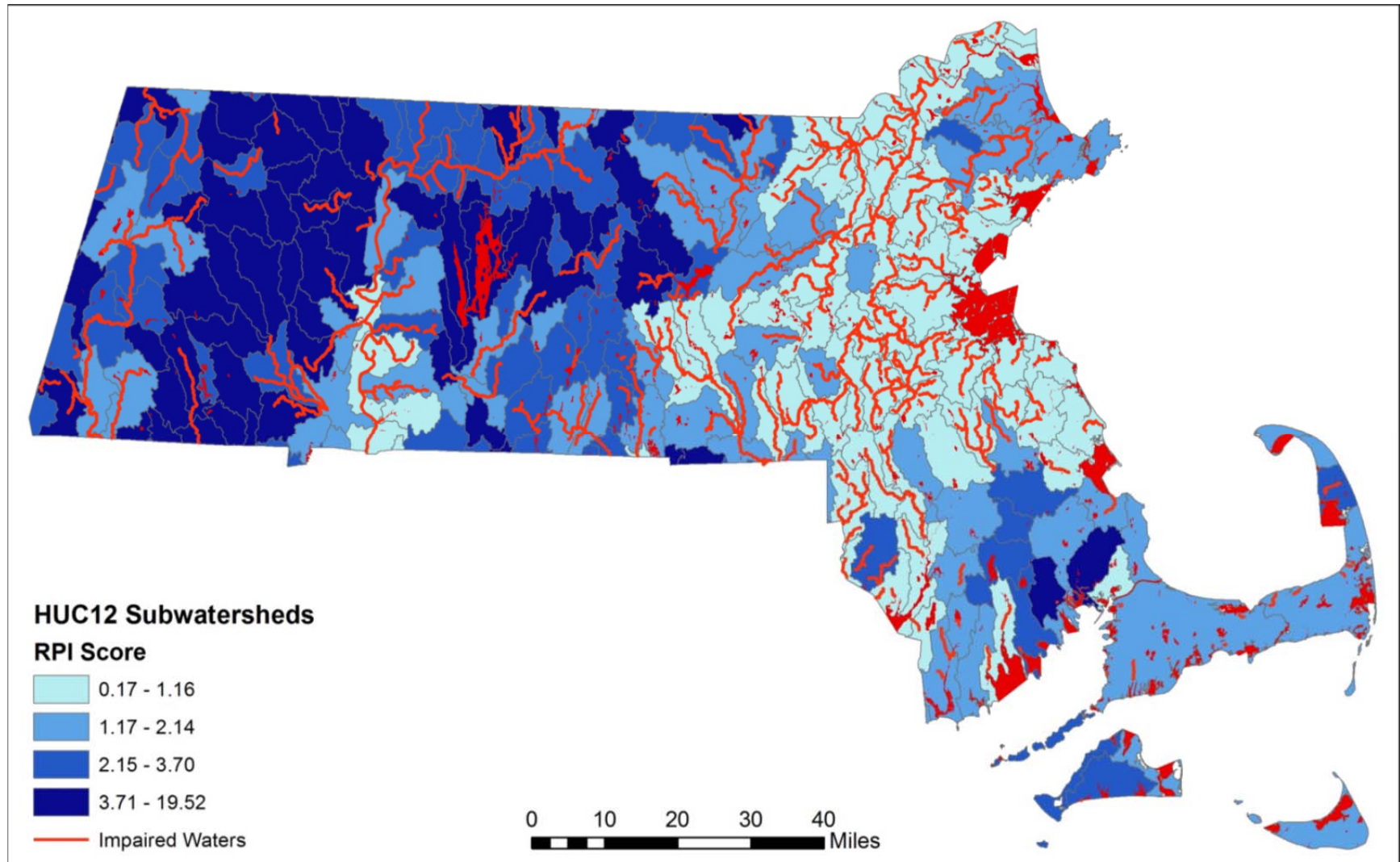
BASIN	Segment ID	Description	Size	Impairment Cause	BMP type
Deerfield					
South River	MA33-08	Emments Road, Ashfield to confluence with Deerfield River, Conway.	12.96 MILES		
				Fecal Coliform	bacteria
				(Physical substrate habitat alterations*)	Sediment, dam removal, bank stabilization
Chickley River	MA33-11	Headwaters Savoy Mountain State Forest, Savoy to confluence with Deerfield River, Charlemont.	11.08 MILES		
				Fecal Coliform	bacteria
Green River	MA33-30	From Greenfield swimming pool dam (northwest of Nashs Mill Road), Greenfield to confluence with the Deerfield River, Greenfield . (formerly segment MA33-10 and part of segment MA33-09)	3.74 MILES		
				Fecal Coliform	bacteria
Farmington					
Big Pond	MA31004	Otis	325.20 ACRES		
				Oxygen, Dissolved	nutrients
Shaw Pond	MA31036	Becket/Otis	80.43 ACRES		
				Oxygen, Dissolved	nutrients
Upper Spectacle Pond	MA31044	Sandisfield/Otis	52.66 ACRES		
				Oxygen, Dissolved	nutrients
York Lake	MA31052	New Marlborough	28.76 ACRES		
				Oxygen, Dissolved	nutrients
Hoosic					
Cheshire Reservoir, North Basin	MA11002	[North Basin] Cheshire	284.02 ACRES		
				Nutrient/Eutrophication Biological Indicators	nutrients
				Turbidity	nutrients
Mauserts Pond	MA11009	Clarksburg	50.90 ACRES		
				Enterococcus	bacteria
Cheshire Reservoir, South Basin	MA11019	[South Basin] Cheshire/Lanesborough	91.72 ACRES		
				Excess Algal Growth	nutrients

North Branch Hoosic River	MA11-02	From USGS Gage, North Adams to confluence with Hoosic River, North Adams.	1.54 MILES		
				(Other flow regime alterations*)	Site specific
				(Alteration in stream-side or littoral vegetative covers*)	Sediment, bank stabilization
				Fecal Coliform	bacteria
Hoosic River	MA11-03	Headwaters, outlet Cheshire Reservoir, Cheshire to Adams WWTP discharge, Adams.	8.84 MILES		
				(Physical substrate habitat alterations*)	Sediment, dam removal, bank stabilization
				Temperature, water	Streamside vegetation
				(Other flow regime alterations*)	Site specific
				Fecal Coliform	bacteria
				(Alteration in stream-side or littoral vegetative covers*)	Sediment, bank stabilization
Hoosic River	MA11-04	Adams WWTP discharge, Adams to confluence with North Branch Hoosic River, North Adams.	5.39 MILES		
				(Alteration in stream-side or littoral vegetative covers*)	Sediment, bank stabilization
				(Other flow regime alterations*)	Site specific
				Fecal Coliform	bacteria
Hoosic River	MA11-05	Confluence with North Branch Hoosic River, North Adams to the Vermont State line, Williamstown.	8.23 MILES		
				(Other flow regime alterations*)	Site specific
				Fecal Coliform	bacteria
				(Alteration in stream-side or littoral vegetative covers*)	Sediment, bank stabilization
Green River	MA11-06	Headwaters southwest of Sugarloaf Mountain (west of Ingraham Road), New Ashford to confluence with Hoosic River, Williamstown.	12.50 MILES		
				Fecal Coliform	bacteria
Paull Brook	MA11-20	Headwaters, outlet of Mt. Williams Reservoir, North Adams to confluence with unnamed tributary, Williamstown.	2.09 MILES		
				Fecal Coliform	bacteria

Housatonic					
Lake Buel	MA21014	Monterey/New Marlborough	194.40 ACRES		
				Dissolved oxygen saturation	nutrients
				Oxygen, Dissolved	nutrients
				Phosphorus (Total)	nutrients
Housatonic River	MA21-04	Confluence of Southwest Branch Housatonic River and West Branch Housatonic River, Pittsfield to outlet of Woods Pond, Lee/Lenox (pond was formerly segment MA21120).	12.32 MILES		
				Fecal Coliform	bacteria
Lake Garfield	MA21040	Monterey	256.90 ACRES		
				Nitrogen (Total)	nutrients
				Oxygen, Dissolved	nutrients
Laurel Lake	MA21057	Lee/Lenox	173.51 ACRES		
				Dissolved oxygen saturation	nutrients
				Oxygen, Dissolved	nutrients
				Phosphorus (Total)	nutrients
Wahconah Falls Brook	MA21-11	Headwaters, outlet of Windsor Reservoir, Windsor to confluence with East Branch Housatonic River, Dalton.	3.38 MILES		
				Fecal Coliform	bacteria
Housatonic River	MA21-19	Outlet of Woods Pond, Lee/Lenox to the Risingdale Impoundment dam, Great Barrington (impoundment formerly segment MA21121).	19.88 MILES		
				Excess Algal Growth	nutrients
				Phosphorus (Total)	nutrients
Millers					
Gales Pond	MA35024	Warwick	11.73 ACRES		
				Turbidity	nutrients
Millers River	MA35-03	Confluence with Otter River, Winchendon to South Royalston USGS Gage, Royalston.	3.52 MILES		
				Phosphorus (Total)	nutrients
Laurel Lake	MA35035	Erving/Warwick	44.43 ACRES		
				Oxygen, Dissolved	nutrients

Millers River	MA35-04	South Royalston USGS Gage, Royalston to Erving Center WWTP (formerly known as Erving Paper Company), Erving.	18.46 MILES		
				Fecal Coliform	bacteria
				Phosphorus (Total)	nutrients
Beaver Brook	MA35-09	Fernald School discharge, Templeton to confluence with Millers River, Royalston.	3.43 MILES		
				Fecal Coliform	bacteria
Westfield					
Westfield River	MA32-05	Confluence with Middle Branch Westfield River, Huntington to Route 20 Bridge, Westfield.	17.84 MILES		
				Turbidity	nutrients
				Excess Algal Growth	nutrients
Powdermill Brook	MA32-09	Source, east of Pitcher Road, Montgomery to confluence with Westfield River, Westfield.	9.54 MILES		
				Turbidity	nutrients
				Sedimentation/Siltation	Sediment, bank stabilization
				Excess Algal Growth	nutrients
Moose Meadow Brook	MA32-23	Source in wetland west of Bungy Mountain, Montgomery to confluence with Westfield River, Westfield.	8.18 MILES		
				Fecal Coliform	
				Turbidity	nutrients
Little River	MA32-36	From the dam northwest of Gorge Road, Russell to Horton's Bridge, Westfield. (formerly part of segment MA32-26)	5.80 MILES		
				Escherichia coli	bacteria
Jacks Brook	MA32-39	Headwaters, east of Fowler Road, Westfield to inlet of Crane Pond/Little River, Westfield.	2.4 MILES		
				Escherichia coli	bacteria

Output from the Recovery Potential Screening Tool with s. 319 eligible impairments, 2013



Appendix B:

Massachusetts Office of Coastal Zone Management Coastal Nonpoint Pollution Control Program



**15-Year Program Strategy (2014 to 2029)
5-Year Implementation Plan (2014 to 2019)**

INTRODUCTION

In the 1998 Final Administrative Changes to the Coastal Nonpoint Pollution Control Program (CNPCP) Guidance, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Environmental Protection Agency (USEPA) required states to develop a 15-year program strategy and a 5-year implementation plan as part of their CNPCP. The guidance emphasizes the need for state coastal programs to coordinate the development of this fifteen-year strategy and five-year plan with their respective Section 319 Nonpoint Source Programs.

This 15-Year Program Strategy/5-Year Implementation Plan presents updated long-term goals (15-year; 2014 to 2029) and 5-year (2014-2019) action/implementation efforts for the Massachusetts Office of Coastal Zone Management (CZM) CNPCP. This document was developed and is being submitted in coordination with the 2014 update to the Massachusetts Nonpoint Source Management Plan. This document is an update to the CNPCP prepared in 2000, and was developed through a series of planning sessions conducted between December 2013 and February 2014, involving staff of CZM, the Massachusetts Department of Environmental Protection (MassDEP), the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), the USEPA, and Geosyntec Consultants. Additional input on specific topics was also provided from other CZM partner agencies, including:

- Massachusetts Department of Agriculture (MDAR);
- Massachusetts Department of Conservation and Recreation (DCR);
- Massachusetts Department of Transportation (MassDOT); and
- Massachusetts Division of Ecological Restoration (DER).

To provide appropriate historical context and sense of continuity between the previous and current versions of the 15-Year Program Strategy/5-Year Implementation Plan, each section lists previous actions that have been achieved and/or are no longer planned for the period of 2014 to 2019.

For each of the six major source categories of the CNPCP, this document describes important long-term goals to be realized within a 15-year strategy timeframe. The document then lists specific implementation actions and benchmarks that can be anticipated to occur within the 5-year plan window. For each action item, the responsible organizations have been listed. In some cases, the specific action item may be an implementation effort that has been planned by the organization, but which requires funding that has not yet been secured.

Unless otherwise noted in the CNPCP, action items will be worked on continuously over the 5-year planning period, rather than in specific years. Massachusetts CZM, as the coordinator of the CNPCP, will review the 5-year action/implementation efforts annually until 2019. In 2019, CZM will complete a more comprehensive review of implementation efforts, report on progress, shortcomings, and new opportunities. A renewed 5-year implementation plan will be developed for the 5-year period of 2019 to 2024. In addition, the 15-year long term goals will be reviewed and revised if necessary.

URBAN AREAS

A. Urban Areas: Stormwater Management

1. Long Term (15 Year) Goal:

By 2029, implementation of the Massachusetts Stormwater Management Standards will continue to reduce water quality impairments, remove waters from the state's 303d list, restore segments not supporting, and protect supporting beneficial uses such as shellfish beds and swimming beaches.

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- Increase compliance of stormwater policy implementation through continued technical assistance and education efforts by CZM, MassDEP, MassBays and Buzzards Bays staff, including:
 - Specific targeted hands-on technical assistance to local officials, such as Conservation Commissions, through CZM, MassDEP, NRCS, and the MassBays and Buzzards Bay National Estuary Programs (NEPs).
 - Contingent on MassDEP funding, guidance documents, technical assistance and workshops related to stormwater management.
 - Offer NPDES Phase II assistance to affected municipalities, such as workshops, technical assistance, and guidance materials.
- Increase compliance and enforcement of stormwater plans through enforcement activities of local conservation commissions and MassDEP, including inspections at project sites. The role of MassDEP will be in support of conservation commissions.
- Increase compliance and implementation of stormwater plans through grants, including:
 - CZM will continue to implement the Coastal Pollutant Remediation (CPR) grant program, funding stormwater assessment and remediation projects in coastal watershed municipalities. Require CPR grant recipients to (1) complete an Operation & Maintenance (O/M) Plan for relevant implementation projects and (2) provide an agreement and documentation of O/M activities for the life-cycle of the BMP.
 - In addition to mid-year project summaries and end-of-year project reports provided to NOAA, CZM will develop an indicative project summaries informational document for the CPR grant program. These summaries will provide information (project description, constituent of concern and resource, remediation scheme/technology and any follow-up info) for past CPR projects. The goal of the document is to provide information (in the form of brief case studies) to municipal decision-makers regarding stormwater mitigation options. CZM will maintain this information on its web page.
 - Other grant programs that promote development and implementation of Low Impact Development and Green Infrastructure practices and other green technology stormwater mitigation practices.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- Continued implementation of the MassDEP Circuit Rider Technical Assistance in each regional office. *(This will not be continued due to staffing limitations.)*
- MassDEP to re-write of the Hydrology Guidance document for conservation commissions, local officials, and others. *(This has been achieved.)*
- Continued review and fine-tuning of the Massachusetts Stormwater Standards through the Stormwater Advisory Committee and Technical committee. *(This has been achieved.)*

- CZM, working with MassDEP, STEP, and UMass, will develop and implement pilot testing project for innovative stormwater treatment technologies, evaluating performance of separate installations of several different technologies. *(This has been achieved.)*
- MassDEP will work with local communities and watershed groups to implement stormwater “daylighting” efforts in the Charles and Neponset. Stormwater daylighting is a technique that uncovers stormwater conduits and exposing (or restoring) the channel as a more natural streambed. *(This has been achieved.)*

B. Urban Areas: Onsite Disposal Systems (Title 5)

1. Long Term (15 Year) Goal:

By 2029, reduce impairments to surface waters and drinking water supplies through improved treatment and disposal of wastewater.

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- Conduct outreach to communities (especially in Barnstable County) on EEA’s Alternative Nutrient Attenuation Strategies Policy.
- MassDEP will continue to offer technical assistance through specific training to local Boards of Health, soil evaluators, and system inspectors.
- MassDEP will continue funding assistance programs, including the Community Septic Management Program and the Clean Water State Revolving Fund.
- MassDEP will continue to evaluate and approve proposals for facilities planning that include an integrated approach to wastewater management, i.e. the use of on-site system upgrades coupled with conventional wastewater treatment facilities to address town-wide or area-wide wastewater needs in an economical fashion. Continued activities will include providing enhanced subsidies, in the form of 0% interest loans from the Clean Water State Revolving Fund, to nutrient management projects resulting from comprehensive wastewater management plans. Also included is continued implementation of the Section 208 plan for Cape Cod, which was developed in part to encourage and facilitate the development and implementation of area-wide waste treatment management plans.
- Continued and expanded use of MassDEP web site to act as a clearinghouse for publications and information related to disposal of wastewater.
- MassDEP will continue to evaluate and revise the Title 5 regulations, as appropriate, to improve the regulations as necessary.
- MassDEP will issue wastewater management guidance to municipalities to support correction of major problems in most environmentally sound manner. For the planning period of 2014-2019, this will be achieved through the anticipated completion and approval of the Section 208 Plan for Cape Cod by 2015.
- MassDEP will continue to support the work of the Massachusetts Septic System Test Center, contributing to the reduction of coastal nonpoint contamination by onsite disposal systems in the followings ways:
 - The Test Center will provide verification of contaminant (nutrient, organic load and pathogen) removals by innovative/alternative (I/A) onsite disposal systems which can provide superior quality of effluent discharged to ground water.
 - The Test Center will provide verification of the performance of conventional Title 5 onsite disposal systems to serve as benchmark for comparison with I/A technologies and will

provide needed data on levels of contaminants released to ground water by conventional systems.

- The Test Center will provide a platform for research and development testing of new onsite disposal technologies, components and materials for technology vendors and MassDEP, which may improve both I/A and conventional performance. The Test Center will provide outreach on I/A and conventional technologies to Boards of Health, health agents, system designers and the public in the form of facility tours and training workshops, published reports on verified technology performance furnished to MA Boards of Health, publication of testing results on the Test Facility webpage on the Buzzards Bay NEP website, and through print media articles.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- MassDEP will continue education efforts for affected public and others, including Wastewater News and Waterlines. *(This has been achieved.)*
- MassDEP and STEP will continue to encourage the development of and approve innovative/alternative technologies for the onsite treatment and disposal of sewage. *(This has been achieved.)*

C. Urban Areas: Erosion, Sedimentation and Construction Site Control

1. Long Term (15 year) Goal:

By 2029, through continued implementation of the Wetlands Protection Program performance standards, local site planning and project review through the Subdivision Control Act, and pro-active education on efforts such as conservation planning and sensitive development, the quantity of water resources assessed as non-supporting due to turbidity or suspended solids from site development sources will be substantially reduced.

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- Through MassDEP and local conservation commissions: ongoing compliance and enforcement of erosion control measures at project sites.
- Technical assistance to assist Massachusetts communities in their development, adoption, and implementation of these local by-laws and regulations through the Massachusetts' National Estuary Programs (Massachusetts Bays NEP and Buzzards Bay NEP) and other state efforts such as the CZM regional offices and MassDEP wetland staff.
- Regional planning agencies in Massachusetts, such as the Cape Cod Commission, the Metropolitan Area Planning Council, the Merrimac Valley Planning Commission, and the Southeastern Regional Planning and Economic Development District, will also provide direct assistance to communities to support local level control of stormwater, erosion and sediment and chemical controls.
- The Middlesex Conservation District will continue to offer the program service to its 52 communities to review Erosion and Sedimentation Control Plans for all soil disturbing projects over 5000 sq. ft. The district charges on an hourly basis so the program has built in sustainability.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- North Shore Region Conservation Subdivision Pilot: CZM to continue to work with an alliance of local officials, developers, engineers, realtors, conservation organizations, and state agencies to create and promote innovative sustainable development designs that protects land and water resources while maximized the economic potential. The Alliance intends to begin bylaw

distribution and outreach program in spring 2000, focusing on the Parker River Area of Critical Environmental Concern (ACEC) communities in Phase One. Phase Two will include targeting communities outside the ACEC but having impact to that ecosystem. *(This has been achieved.)*

- The current publication, *Massachusetts Guidelines for Erosion & Sediment Control in Urban and Suburban Areas*, will be scanned and posted on the Web in its entirety (including pictures). *(This has been achieved.)*
- MassDEP, with CZM, MassBays NEP, and Buzzards Bay NEP, will work to develop state-endorsed model by-laws and regulations for local municipalities. (Guidelines related to this topic were provided in the *Massachusetts Guidelines for Erosion & Sediment Control in Urban and Suburban Areas*.)

D. Urban Areas: Watershed Protection

1. Long Term (15 Year) Goals:

a. Watershed Protection

By 2029, CZM and its partner agencies will develop and implement a comprehensive plan to assess and rank watersheds within the coastal zone, with the intent of:

1. Identifying and prioritizing the protection of high-quality watersheds;
2. Establishing programs to educate stakeholders on the importance of protection of these high quality watersheds;
3. Targeting resources to protect these high quality watersheds from future environmental impacts to the greatest extent practical; and
4. Aligning partner program resources to enhance and improve existing efforts to protect water quality in these high quality watersheds.

b. Climate Change Adaptation

By 2029, working with partner agencies on the local, state, and federal level, CZM and its partner agencies will:

1. Develop and implement watershed-based strategies to plan for and implement practices that mitigate the adverse effects of climate change on waters and wetlands within the coastal zone; and
2. Work with coastal zone stakeholders to plan for and implement adaptations to existing infrastructure to increase resilience and protect critical habitats from the adverse effects of climate change.

2. Actions/Implementation Efforts (to 2019):

a. Watershed Protection

- MassDEP, CZM and other program partners will continue work to monitor and assess sources of NPS contamination in the Massachusetts coastal zone;
- CZM will continue to fund watershed protection projects through the Coastal Pollution Remediation (CPR) grant program, including projects to protect high quality watersheds.
- CZM staff will coordinate with MassDEP staff to identify high priority Section 319 grant projects within the Massachusetts coastal zone, including projects to protect high quality watersheds, which will reduce NPS pollutants through improved stormwater management practices and other techniques.

- CZM will coordinate with MassDEP, MDAR and USDA-NRCS to implement Agricultural BMP's within high priority areas of the Massachusetts coastal zone.
- CZM, MassDEP and other agency partners will make recommendations for the protection and preservation of high priority lands that have sensitive habitat and/or will further the goal of protecting high priority resource areas from NPS pollution.
- CZM and MassDEP will continue to promote the promulgation of municipal conservation zoning bylaws or similar environmentally prudent zoning to protect natural resources from NPS pollution; CZM, MassDEP and other agency partners will continue to engage watershed organizations and municipalities in NPS pollution control through outreach and education efforts.

b. Climate Change Adaptation

- Update applicable CZM policy to include climate change as a new driving factor for NPS pollution causes and solutions.
- Working with partner agencies, promote new regulations and broaden existing programs to incorporate climate change for projects designed to increase infiltration, improve stormwater quality, and protect groundwater.
- Working with local agencies, units of government, and stakeholder organizations, increase awareness of the effects of climate change on water quality and promote solutions that mitigate the effects of climate change on water resources.
- Support and promote watershed planning by NPS partner agencies, including analysis and consideration of the effects climate change will have on current and future NPS pollution sources.
- Promote the design, siting, and construction of BMPs that address NPS pollution and are capable of withstanding the effects of climate change on water levels, flooding frequency, wave action, and related factors.
- Support projects to restore aquatic habitats adversely affected by NPS pollution and climate change.
- Support efforts to research, design, and demonstrate BMPs that address NPS pollution and are resilient to climate change impacts.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- Watershed teams will provide technical assistance and guidance to watershed organizations and municipal boards regarding the implementation of the Phase II Stormwater rules. *(This has been achieved.)*
- Watershed will implement rapid watershed planning tools and techniques to assess small subwatersheds, using impervious cover as the indicator for stream quality. *(This has been achieved.)*
- Watershed teams will engage local constituents and work to control NPS pollution by weighing in on NPDES permits and implementing TMDL's before, during, and after the public participation process. *(The watershed teams referenced no longer exist.)*
- The Watershed Initiative supports the efforts of watershed organizations and other groups by offering various funding opportunities, such as watershed stewardship service contracts to make environmental improvements; volunteer monitoring grants for volunteer groups to collect water quality data, and Communities Connected by Water service contracts for watershed organizations to work with municipalities to integrate growth planning with environmental protection. *(The Watershed Initiative no longer exists.)*

E. Urban Areas: Roads and Highways

1. Long Term (15 Year) Goal:

By 2029, all new state and local roads, highways, bridges, and facilities will be full compliance with the Stormwater Management Standards or MS4 permit where applicable and practicable. Existing roads, highways, bridges and facilities will incorporate adequate NPS Best Management Practices when reconstruction, widening or drainage work is planned OR such BMPs will be programmed when water quality assessments demonstrate violations of standards.

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- State Highway Facilities will continue compliance through implementation of the MassDOT Environmental Management System.
- MassDOT and the MADCR will implement NPDES Phase II requirements within established times.
- MassDOT will obtain an Individual MS4 Permit.
- MassDOT will finalize its assessment of highway drainage to impaired waters.
- Where warranted, MassDOT will continue to design and construct water quality mitigation projects to reduce pollutant loading to the maximum extent practical.
- MassDOT will update its Stormwater Handbook for Roads and Bridges.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- A minimum of four regional workshops will be held on the new MHD policy/"meeting-the-stormwater-standards" document (MHD Volume 1). *(This has been achieved.)*
- MHD will finalize the road and highway engineering and BMP specifications document (MHD Volume 2). *(This has been achieved.)*
- A minimum of four regional workshops will be held on the MHD Volume 2 Document. *(This has been achieved.)*

MARINAS AND RECREATIONAL BOATING

A. Marinas and Recreational Boating: Marina Siting

1. Long Term (15 Year) Goal:

By 2029, all new, upgraded and expanded marine facilities sited in Massachusetts receive planning and implementation assistance from the CZM marina technical assistance staff prior to or during CZM federal consistency or MEPA review. As a result, new and expanded marinas are designed and sited in such a manner as to minimize impacts on water quality and aquatic resources.

2. Actions/Implementation Efforts (to 2019):

The following actions and benchmarks are anticipated:

- During pre-application technical assistance or permitting review (by CZM or other state and federal agencies), designs for new, upgraded or expanded marinas will incorporate pump-outs, improved fueling facilities stormwater management, and hull maintenance facilities where feasible.
- Continue to Maintain the Massachusetts Clean Marina Guide on the CZM website.

- Continue to provide technical assistance related to the siting, design, construction and operation of marine facilities.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- CZM will publish the marina guidance document and deliver it to marine facility operators and other target audiences, such as town harbormasters, marine industry reps, and others. *(This has been achieved.)*
- CZM and its contractors will hold workshops throughout Massachusetts; to publicize and teach the use of the marina guidance document. *(This has been achieved.)*
- CZM will run a pilot small-grants program to fund pollution prevention technologies at public and private marine facilities. *(This has been achieved.)*

B. Marinas and Recreational Boating: Marina Operation

1. Long Term (15) Goal:

By 2029, implementation of the Massachusetts Clean Marina Program, federal regulatory programs, and state regulatory programs (CZM federal consistency, Stormwater Policy and Management Standards, MEPA, and Chapter 91) will reduce water quality impairments, remove waters from the state's 303 d list, restore segments not supporting, and protect supporting beneficial uses such as shellfish beds and swimming beaches.

2. Action/Implementation Efforts (to 2019):

- CZM will continue to provide technical assistance related to the siting, design, construction and operation of marine facilities.
- USEPA carried out an extensive technical assistance program for marina owners in the mid-2000s. USEPA does not currently anticipate any new assistance initiatives over the next 5 years for marina operators.
- USEPA will issue a new multi-sector general permit, which will include requirements for marinas.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- CZM and the Massachusetts Office of Technical Assistance and Technology (OTA) marina technical assistance team is created and staff are educated and prepared to provide expertise in the siting, design, construction and operation of marine facilities. *(This has been achieved.)*
- CZM will publish the marina guidance document and deliver it to all marine facility operators and other target audiences, such as town harbormasters, marine industry reps, and other. *(This has been achieved.)*
- Boater education brochures will be developed and distributed to inform the boating public of issues concerning recreational boat use and water and aquatic habitat degradation. Brochures will contain recommendations and steps to prevent and minimize such impacts. *(This has been achieved.)*
- CZM and its contractor will hold vie workshops will be held in fall 2000 in five regions throughout Massachusetts' to publicize the release of the document and provide specific technical assistance and education. Contingent on available funding, a second and third phase of workshops will be run in 2001 and 2003. *(This has been achieved.)*
- CZM will run a pilot small-grants program to fund BMPs and other environmental improvements for existing marine facilities. This program will likely provide small grants, cost-share or no/low interest loans for: vacuum sanders for hull maintenance; hull washing facilities; purchase, operation and maintenance of pump-out facilities; public and boater education; fueling station

retrofitting and maintenance; and solid, liquid, recyclable and hazardous waste management. *(This was achieved using one-time funding from USEPA.)*

- Contingent on available funding, a Clean Marina Program will be piloted and evaluated to encourage marinas to develop and implement marina management plans. Participants in the program receive publicity from the state, a flag to fly over their facility and are free to use a Clean Marina logo in any advertisements and correspondence. Program is developed as a positive approach, which recognizes the efforts of marinas to protect the resources that provide their livelihood. *(This program was piloted and dropped due to lack of industry interest.)*
- CZM and OTA will pilot a technical assistance and inspection program. In two ACECs, all marina operations will be offered a visit and review for implementation of good housekeeping and BMPs. Technical advice and steps to implement BMPs will be delivered through an audit plan. *(This action item has been supplanted by the new multi-sector permit which gives marina enforcement jurisdiction to EPA.)*
- CZM will work with MassDEP and other agencies to explore mechanisms for the coordination of annual marina operator's license with MassDEP's Chapter 91 program, and how efforts may be initiated to conduct inspections, make NPS control recommendations, and utilize compliance action if necessary. *(This action item has been supplanted by the new multi-sector permit which gives marina enforcement jurisdiction to EPA.)*

C. Marinas and Recreational Boating: Pump-Out Facilities

1. Long Term (15 Year) Goal:

By 2029, state waters of Massachusetts will continue to be regulated as an approved No-Discharge Area. Pump-out facilities will be installed and maintained so that one facility exists for every 450 boats with marine sanitary devices.

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- Contingent on continued Clean Vessel Act Grant Program funding, the DFG-Division of Marine Fisheries grants program will continue to fund purchase, operation and maintenance of pump-out facilities at private new and existing marine facilities, in support of statewide NDA designation. Increased emphasis will be given to supporting operation and maintenance for existing facilities.
- Support the efforts of local harbor masters and state environmental police pursuant to the statewide No discharge Zone (NDZ) designation.
- CZM will continue to maintain the Massachusetts Clean Marina Guide on the CZM website.
- CZM will continue to disseminate boater education brochures via the CZM website to inform the boating public of the need, requirement, and availability of pump-out facilities.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- The boater education brochure and others will be distributed to all Massachusetts' boaters with their registrations. *(This has been achieved.)*

D. Marinas and Recreational Boating: Recreational Boating and Public Education

1. Long Term (15 Year) Goal:

By 2029, education efforts aimed at improvements in recreational boating best management practices will result in advances in the number of vessels equipped with pump-out ready holding tanks (marine sanitary devices).

2. Actions/Implementation Efforts (to 2019):

The following benchmarks and actions are anticipated:

- CZM will continue to disseminate the Massachusetts Clean Marina Guide via the CZM website.
- CZM will continue to disseminate boater education brochures via the CZM website to inform the boating public of the need, requirement, and availability of pump-out facilities.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- This brochure and others will be distributed to all Massachusetts' boaters with their DFWELE registrations. (This has been achieved, see bullet above regarding future website dissemination)
- Contingent on funding, CZM will work to develop educational signage and provide these signs to marine facilities. (This has been achieved and is now done by towns)
- Contingent on funding, CZM will run workshops targeted towards recreational boaters and boating groups will be organized and held to educate boaters about environmental concerns. *(This has been achieved; funding is not available for continuation.)*
- CZM participates and organizes activities for the National Clean Boating Campaign. *(CZM does not have staff to dedicate to this.)*

AGRICULTURE

1. Long Term (15 Year) Goal:

MDAR, in partnership with NRCS, MACD, and MassDEP, will continue efforts to implement Best Management Practices through Conservation Farm Plans and will continue to provide technical and financial assistance to support the achievement of meeting water quality standards.

2. Actions/Implementation Efforts (to 2019):

The following efforts will be continued in order to build on progress towards achieving water quality goals.

- **Regulatory Certainty Pilot Program:** MDAR is partnering with NRCS, MACD and MassDEP to develop a pilot Regulatory Certainty Program in the Palmer River Watershed. Regulatory certainty is a process which incentivizes the adoption of agricultural conservation practices on farms. Farmers that are implementing site specific conservation practices to address water quality, and who are voluntarily participating in the Regulatory Certainty Program, are presumed to be doing all that they can to comply with water quality mandates.
- **Accelerated Conservation Planning Partnership:** The Accelerated Conservation Planning Partnership is a cooperative initiative among MDAR, NRCS, and the Massachusetts Association of Conservation Districts (MACD). The partnership is intended to accelerate conservation planning and the provision of technical assistance to farmers to address water quality and other resource concerns. Through the partnership NRCS and MDAR, this program jointly funds four conservation planners, a nutrient management planner and support staff throughout the state.
- **Farm Inspections:** MDAR will continue to actively engage small, medium and large animal operations in the state on water quality issues. MDAR staff will continue to conduct farm inspections, make note of technical assistance needed, and provide farm owners with information on funding opportunities.
- **Agricultural Environmental Enhancement Program (AEEP):** Originally started as a fencing program in 1999, AEEP has steadily provided funding to farmers over the past 15 years for implementation of conservation practices to protect water quality. Since 1999, the program has

funded 456 projects statewide that improve water quality, conserve water, reduce greenhouse gas emissions, and conserve energy. Agricultural operations have received over \$5 million dollars to help them address environmental concerns on their farms. In FY 2013, 31 projects were funded totaling \$369,210. For FY 2014, another 30 farms are expected to be funded in the amount of \$345,000. This program is expected to continue at a similar level of funding through planning period of 2014-2109.

- **Nutrient Management Planning Legislation:** State legislation requiring planning for the application of all forms of nutrients, including manure, was passed in 2012 (Chapter 262 of the Acts of 2012, An Act Relative to the Regulation of Plant Nutrients). Updated regulations associated with this legislation are expected to be released in 2014.
- **Pesticide Mixing, Loading and Storage Guidelines:** MDAR will continue to promote proper use, handling and storage of agricultural pesticides, consistent with the state guidelines developed in 1998 (viewable [online](#)).
- **Pesticide Collection Events:** MDAR will continue to conduct pesticide collection events statewide. Multiple events statewide were coordinated by MDAR with funding through EPA were conducted through the years 1998 to 2001 (80,000 lbs. collected); 2005 to 2008 (28,322 lbs. and 2640 gallons collected) and 2012 (18,548 lbs. and 1172 gallons collected).
- **Drip and Automated Irrigation Systems:** MDAR will continue to fund the implementation of drip irrigation systems on farms. Since 2008, MDAR has funded over 100 auto-irrigation systems on cranberry farms. Auto-irrigation systems are a widely adopted technology in the cranberry sector and have resulted in significant savings in fuel and water use on frost nights and when irrigating.
- **USDA-NRCS Farm Bill Programs:** As described in Section 3.1.8 of the Massachusetts Nonpoint Source Management Plan, Farm Bill programs funded through the United States Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS) and USDA-Farm Service Agency (FSA) will continue to be important to controlling nonpoint source pollution in the Massachusetts coastal zone and statewide.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

Over the past 14 years (since development of the 2000 CNPCP), there have been significant changes in funding levels and organization of both state and federal agency programs related to agricultural planning and NPS pollution prevention. Significant progress has been made in implementing the actions identified in the 2000 CNPCP for this category. A summary of actions that were achieved is provided below, based on discussions between staff of CZM, MDAR and other program partners:

- A. *Agriculture - Farm Planning:* Farm Planning is a continuing and ongoing effort, as described in the summary MDAR and USDA-NRCS program descriptions provided above.
- B. *Agriculture - Nutrient Management and Animal Feeding Operation:* MDAR, with support from USDA-NRCS programs, continues to conduct farm inspections which address this sub-category via technical assistance. MDAR also continues to fund related projects to enhance and protect water quality. As described above, new state legislation addressing agricultural nutrient control was passed in 2012 and associated regulations are expected in 2014.
- C. *Agriculture - Grazing, Erosion and Sediment Control:* MDAR, with support from USDA-NRCS programs, continues to conduct farm inspections which address this sub-category via technical assistance. MDAR also continues to fund related projects to enhance and protect water quality.
- D. *Agriculture - Irrigation:* For this sub-category, MDAR continues to fund and implement drip irrigation systems to address the issues related to improved water management. MDAR reports that they have funded over 100 of these systems.

- E. *Agriculture - Pesticide Control Program*: MDAR has funded pesticide container collection and recycling events collection events; has implemented new mixing, loading, and storage guidelines; and continues to implement these guidelines. These new guidelines were developed and implemented in response to the original 6217 planning effort.
- F. *Agriculture - Assistance Grants*: Although funding and programs have changed, MDAR continues to work with partners to provide assistance and grants to farmers for environmental improvements as part of their Agricultural Environmental Enhancement Program (AEEP, see description above).

FORESTRY

A. Forestry: Forest Cutting Practice

1. Long Term (15 Year) Goal:

By 2029, through continued implementation of the Forest Cutting Practices Act and its coordination with the Wetlands Protection Program performance standards, and pro-active education on efforts such as forestry BMPs, less than 5% of water resources will be assessed as non-supporting and no wetland enforcement orders will be issued due to forestry operations.

2. Actions/Implementation Efforts (to 2019):

- The MADCR Forest Stewardship Program will continue to provide statewide technical assistance and outreach efforts to the forest cutting community. Although activities of this program are not anticipated within the coastal zone, this program's statewide activities will include coastal zone forestry operations as necessary.
- The MADCR Forest Stewardship Program website will be updated on a continuing basis and will include information on forestry regulations, program information and availability of technical assistance.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

No significant forestry operations have occurred in the Massachusetts coastal zone in recent years and none are anticipated during the planning period of 2014-2019. The statewide program activities of the MADCR Forestry Stewardship Program and the regulatory structure of the Forest Cutting Practices Act have been ongoing and will continue to guide forestry activities in the coastal zone as needed.

HYDROMODIFICATION

A. Hydromodification: Erosion & Sediment Control from Dams, Wetlands Protection Program, Chapter 91 Program, MCZM Dredging Program

1. Long Term (15 Year) Goal:

Continue to implement the Wetlands Protection Program performance standards, Chapter 91 permits and licensing, and 401 Water Quality Certification to prevent or minimize impacts from channelization, stream and coastal bank hardening, and channel dredging. Maximize the opportunities for restoration of coastal and riparian habitat.

2. Actions/Implementation Efforts (to 2019):

- Development of comprehensive Dredged Material Management Guidance document and innovative web site.

- Early resource identification and location through interactive GIS-based marine Resource Characterization tools.
- Continue joint-processing (federal and state agencies) pre-application meetings and guidance for all channel and dredging modification project.
- Federal and state agency personnel technical coordination and education meetings.
- Public meetings and outreach efforts for state Designated Port Areas.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- Regulatory committee, chaired by DEP, to revise Dredged Material Management regulations (310 CMR 9.00) (*This has been achieved.*)
- Contingent on funding, another round of Riverfront Protection Act workshops will be developed and implemented by DEP. (*This has been achieved; funding is not available for continuation.*)

B. Hydromodification: Erosion & Sediment Control and Dams - Dam Safety Program

1. Long Term (15 Year) Goal:

Continue to implement the DCR Dam Safety Program's erosion control provisions for slopes, embankments, and crests of existing and new dams to prevent these structures from becoming sources of NPS pollution.

2. Actions/Implementation Efforts (to 2019):

- Continue implementation of the state's dam safety law (MGL Chapter 253) licensing provisions and protocols. All projects (new, reconstruction, or repair) require strict erosion and sedimentation controls.
- In-water siltation controls are also mandatory requirements for all projects (new, reconstruction, or repair).
- DCR Dam Safety Program staff inspect existing dams according to the requirements of MGL Chapter 253, which was revised in 2003 to require dam owners to hire engineers to conduct inspections as follows:
 - High Hazard Potential dams - every 2 years;
 - Significant Hazard Potential dams - every 5 years; and
 - Low Hazard Potential dams - every 10 years.

The revisions Chapter 253 also directed the Dam Safety Program to require, via enforcement, repair or removal of structurally deficient dams in order for owners to bring dams into compliance. The revisions also authorized the Dam Safety Program to conduct enforcement, including assessing fines for non-compliance. Pursuant to the law change, revised regulations were promulgated in November of 2005.

VI. WETLAND RESTORATION AND ASSESSMENT

A. Wetlands Restoration and Assessment: Wetland Restoration Efforts

1. Long Term (15 Year) Goal:

- a. By 2019, restore 2,500 acres of Massachusetts's coastal wetlands.
- b. By 2019, ecological assessment methodologies for wetlands will be fully developed and utilized by state planning groups, regional non-profits and volunteers, and local officials as an effective tool for identifying wetland sites requiring remediation/restoration, evaluating the success of

restoration projects, inventorying subwatersheds or land holdings, and for piloting wetlands biocriteria.

2. Actions/Implementation Efforts (to 2019):

- By 2019, review and update existing inventories of the entire Massachusetts coastline to identify tidally restricted salt marshes that are feasible to restore (DER with other agencies and groups).
- DER will continue to work with Massachusetts Audubon Society, CZM, ACEC Program, and other partners to implement the Great Marsh Restoration Plan. Activities will focus on restoration of the salt marshes in the Great Marsh, and protection of the Great Marsh from anticipated sea-level rise.
- Continue to identify and support wetland restoration projects under the GROWetlands (Groups Restoring Our Wetlands) Initiative.
- Maintain an active working relationship with our Coastal America partners under the “Resolution to Restore Massachusetts Wetlands” (a Coastal America agreement signed in 1994). Engage federal agencies as partners on specific projects as appropriate. *(Note: Completed and continues)*
- DER will continue to participate in the Massachusetts Corporate Wetlands Restoration Partnership.
- Continue to establish protocols for project monitoring and report results of projects and the program overall.
- In order to increase understanding of restoration project results and the functions of restored wetlands and to improve restoration techniques, we will build working relationships with academic institutions to establish research projects at selected wetland restoration sites. *(Note: Completed and continues)*
- DER will continue to target education and outreach programs to local, state, and federal stakeholders to ensure understanding of and support for wetland restoration.

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- Complete 10 watershed wetlands restoration plans identifying priority restoration sites in 10 watersheds. This goal was not completed and is not included in the current implementation plan due to lack of staffing resources. One watershed-scale wetland restoration plan is currently being developed by DER.

B. Wetland Assessment

1. Long Term (15 Year) Goal:

By 2029, ecological assessment methodologies for salt marsh wetlands and freshwater herbaceous and shrub marshes will be fully developed and utilized by state planning groups, regional non-profits and volunteers, and local officials as an effective tool for identifying wetland sites requiring remediation/restoration, evaluating the success of restoration projects, inventorying subwatersheds or land holdings, and for piloting wetlands biocriteria.

2. Actions/Implementation Efforts (to 2019):

- CZM will continue to work with MassDEP to develop and refine wetlands assessment tools, including the CAPS (Conservation Assessment and Prioritization System) Model developed in partnership with UMass Amherst. Opportunities to expand the use of CAPS will be evaluated by CZM and MassDEP.

- CZM will continue to work with MassDEP to incorporate wetland condition assessments into routine MassDEP watershed-scale water quality assessments.
- CZM and MassDEP will continue to participate and work with USEPA's New England Biological Assessment of Wetlands Working Group.
- CZM will continue to utilize methodologies to evaluate the trajectory of condition in early wetlands restoration projects. As part of this, CZM will continue to engage volunteers in the use and application of wetland assessment methodologies.
- CZM will continue to participate in USEPA's New England Biological Assessment of Wetlands Workgroup.
- CZM staff will present papers and give presentations on wetland assessment as necessary/requested

Actions from 2000 CNPCP that have been achieved and/or will not continue in 2014-2019

- Continue work on EPA Region I Pilot: Cape Cod Bay Salt Marsh Assessment Project to refine methodologies for salt marshes degraded by proximate land use and tidal restrictions. Indicators include aquatic macro-invertebrates, vegetation, avifauna, fish, pore and surface water chemistry, and hydrology. *(This has been achieved.)*
- Develop and test indicator protocol for fish or nekton for addition as a viable and effective component of the salt marsh assessment toolbox. *(This has been achieved.)*
- Through the North Shore Volunteer Wetland Health Project, continue to refine the volunteer training modules and handbook. *(This has been achieved.)*

Appendix C:

Attorney General's Certification

(from original 1989 Massachusetts Nonpoint Source Management Plan)

VI

ATTORNEY GENERAL'S CERTIFICATION

I hereby certify, pursuant to my authority as the chief legal officer of the Commonwealth of Massachusetts, that in my opinion, the laws of the Commonwealth of Massachusetts provide adequate authority for the Department of Environmental Quality Engineering to implement the Massachusetts Nonpoint Source Management Program, submitted to the United States Environmental Protection Agency pursuant to the 1987 amendments to the Clean Water Act, 33 U.S.C. § 319.

The following state statutes or regulations, which are fully effective as of this date, provide the legal authority for implementation of the Massachusetts Nonpoint Source Management Program:

1. In General: G.L. c. 21, § 27 (duties and responsibilities of the Division of Water Pollution Control within the Department of Environmental Quality Engineering;
2. Silviculture: G.L. c. 132, §§ 40-46 and 304 C.M.R. 11.00 concerning forest cutting practices;
3. Construction: G.L. c. 131, § 40 (Wetlands Protection Act); G.L. c. 41, §§ 81K-81GG (the Subdivision Control Law);
4. Land disposal: G.L. c. 111, §§ 150A, 150A 1/2 (1987 Solid Waste Act); 310 C.M.R. 19.00 (regulations concerning landfills); 310 C.M.R. 32.00 (regulations concerning the land application of sludge and septage).


In addition, the program recommends enactment/promulgation of additional authorities:

1. Establishment of a soil erosion and sedimentation control law. A proposed bill is currently pending in the legislature.
2. Amendments to the subdivision control law, G.L. c. 41, §§ 81K - 81GG, to address stormwater runoff and

nonpoint source controls. Review and proposals for amendments are scheduled to be accomplished one year after approval of the final plan; legislation would be filed within two years of approval;

3. Amendment of G.L. c. 90 to require that prior to commencement of any local road work using Chapter 90 funds, the local road/highway authority must have a nonpoint source stormwater management plan approved by the local Conservation Commission. Action on this is scheduled to be complete by the end of the third year following approval.
4. Pesticides: Under current G.L. c. 132B, expansion of the State Limited Use category to include a provision for Drinking Water Protection. No schedule has been developed as this is currently only a draft recommendation.
5. Enactment of legislation to create a state nonpoint source pollution control program. Legislation filed in 1988 proposed grants to public entities to conduct diagnostic/feasibility studies and implementation projects. Also, the proposed bill would allow the state to match any available funds from § 319 of the federal Clean Water Act.
6. Possible revisions to Title 5 (310 C.M.R. 15.00, regulations concerning the disposal of sanitary sewage). Review and revision is scheduled for completion by the end of the second year following approval.

Based on my evaluation of existing authority, I hereby certify that the Department of Environmental Quality Engineering has the authority to implement the provisions of the Nonpoint Source Management Plan.


James M. Shannon
Attorney General
Commonwealth of Massachusetts

May 17, 1989
Date