21Action Plan 2: Managing Stormwater Runoff

Problem

Untreated stormwater poses many threats to the environment. Runoff from rainfall and snowmelt carries natural and human-derived pollutants into wetlands, lakes, streams, estuaries and groundwater, which can affect water quality, habitat and living resources. Pollutants associated with stormwater runoff may include bacteria, road salt, nutrients, pesticides, metals and organic contaminants such as hydrocarbons. Stormwater also conveys sediments, atmospheric fallout and other particles that cause siltation of aquatic and wetland habitats, increased turbidity and declining water quality. Such sediment particles often serve as carriers of metals and organic contaminants that adsorb to particles. Stormwater also contributes floatable debris, resulting in littered shorelines and impacts on marine animals due to ingestion and entanglement. Stormwater pollutants can lead to swimming beach closures, loss of habitat and resources, and changes in species composition and diversity. In coastal areas, excessive stormwater pollutants (primarily bacteria) can also result in shellfish bed closures. Chronic runoff of polluted stormwater to sensitive resources can result in aesthetic impacts as well as economic impacts, such as those associated with the loss of commercial and recreational fisheries.

Figure 2-1. A stormwater discharge pipe in Onset Bay.

In the Buzzards Bay watershed, like other urbanized areas, water from melting snow and rain flowing off streets, parking lots, roofs, lawns, golf courses, agricultural land, and other pervious and impervious areas, carries contaminants to the bay and contributing streams, groundwater and wetlands in the watershed. This stormwater enters surface waters via storm drain systems, including catch basins, pipes and road cuts, and via other overland flow.

The BBNEP's 2003 *Atlas of Stormwater Discharges in the Buzzards Bay Watershed* documented more than 2,000 pipes and 600 road cuts that discharge to Buzzards Bay or to streams and wetlands near the coast in eight towns[a]. These discharges are summarized in Table 2-1 and Figure

[a] The study did not include the City of New Bedford, the Town of Acushnet, or the Elizabeth Island Chain of Gosnold. A description of this project is provided insubsequent pages of this Action Plan.

2-1. The atlas also mapped more than 12,000 catch basins, most of which were linked to the more than 2,600 discharges cited in Table 2-1. The actual number of catch basins associated with each discharge varied greatly, but most appeared to have only one or two catch basins draining various lengths of contributing road and other impervious surfaces. More than 375 miles of road and pipe connected to these mapped discharges.

Table 2-1. Summary of discharges by town, showing numbers of basins tied to treatment systems

Municipality	Pipes	Road cuts	Total	UA Total[1]
Bourne	169	62	231	220
Dartmouth	255	168	423	412
Fairhaven	224	25	249	185
Falmouth	202	40	242	242
Marion	227	53	280	167
Mattapoisett	276	42	318	172
Wareham	592	118	710	513
Westport	88	85	173	12
Grand Total	2,033	593	2,626	1,923

1. "UA Total" equals number of discharges mapped in the National Pollutant Discharge Elimination System Stormwater Phase II urbanized areas. This permit program is further described in the Background section of this Action Plan.

The extent of water quality impairments in Buzzards Bay has been documented to a considerable degree in the Massachusetts DEP's Section 303d list. Twenty-two of the roughly 32 major Buzzards Bay embayments are listed as impaired due to fecal coliform bacteria (Figure 2-3). Further evidence of the problem is illustrated by the distribution of shellfish bed restrictions in Buzzards Bay (Figure 2-4) and the temporary closures of swimming beaches in both fresh and salt water in the watershed. While some of these closures are related to municipal wastewater facility discharges, in most cases stormwater conveying pollutants from various non-point sources is the principal cause of the impairment.

Numerous studies in Massachusetts and nationwide have consistently pointed to stormwater as a major source of fecal coliform bacteria contributing to closures of swimming beaches and shellfish areas. Any stormwater pipe near a swimming beach represents a potential health risk and often contributes to floatable debris on beaches. On rare occasions, illegal sanitary hookups from septic systems to stormwater pipes have been found. However, many other "non-point" sources contribute to elevated fecal coliform levels in stormwater. These non-point sources include wildlife droppings, pet waste, overland run-off of manure from farms, and breakout from failed septic systems.

Figure 2-2. Stormwater discharges documented in the Atlas of Stormwater Discharges in the Buzzards Bay Watershed (BBPNEP 2003).

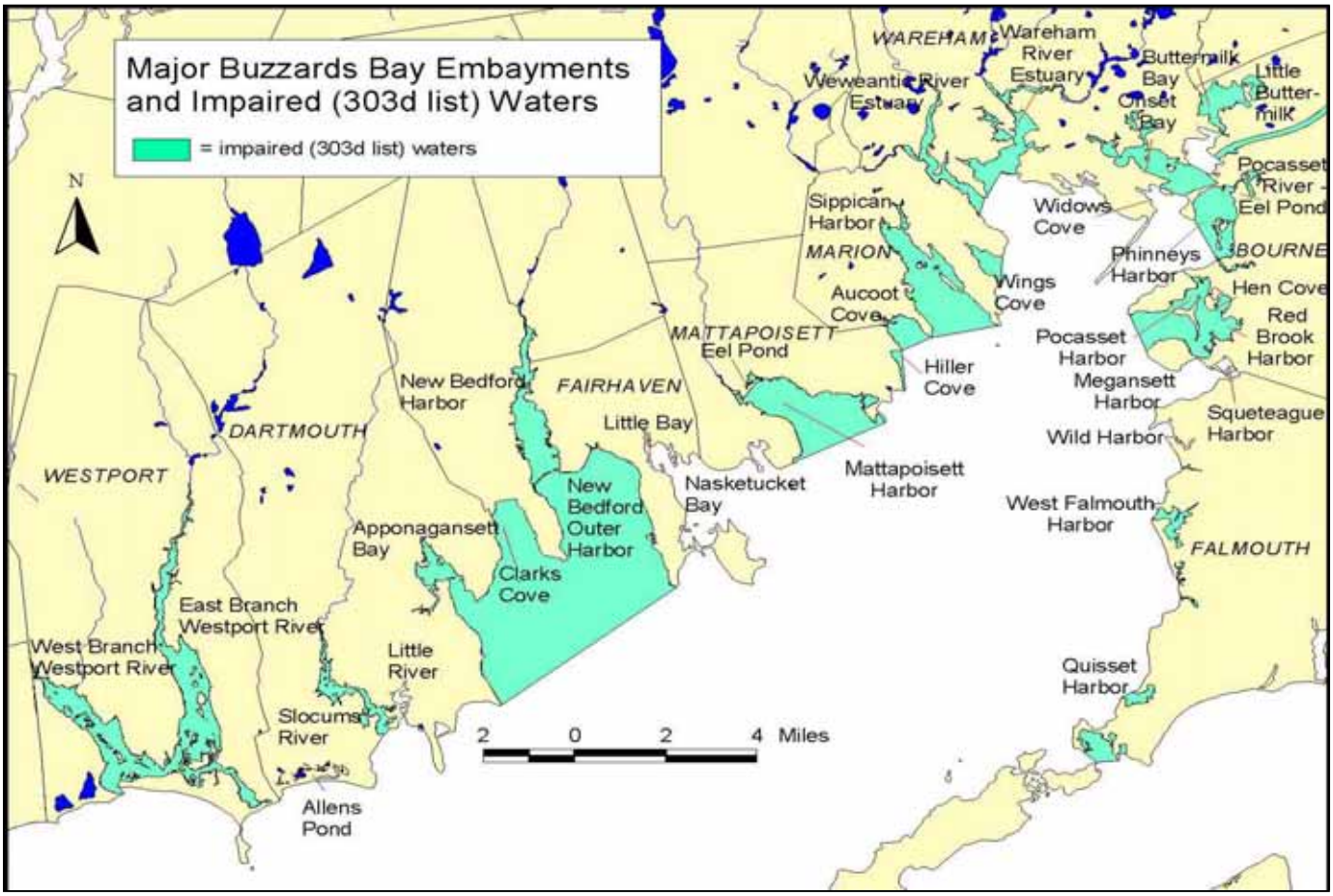

Figure 2-3. Waters of Buzzards Bay on the Massachusetts Section 303(d) list for waters impaired or threatened by pathogens. Note: West Pond and Cuttyhunk Pond on Cuttyhunk Island are not shown. Boundaries are approximate based on published verbal descriptions.

Every three years the Massachusetts Division of Marine Fisheries (DMF) completes sanitary surveys for shellfish areas in Buzzards Bay. These surveys contain a wealth of information on existing stormwater drains that are sources of fecal coliform bacteria and are causing or threatening to cause the closure of shellfish beds, as well as streams and rivers that have consistently elevated levels of coliforms. This information is provided in reports to all Buzzards Bay communities and provides an excellent summary of potential pollution sources. However, due to limited funding, actual stormwater discharges during runoff events from pipes are usually not monitored for fecal coliforms, nor are upstream pollution sources identified in the rivers and streams contributing to high fecal coliform loads.

Background

Prior to the late 1990s, the responsibility for controlling new storm drains was regulated largely at the local level through subdivision regulations and wetlands bylaws. Unfortunately, local regulations were inconsistent from one community to the next, and for the most part, municipalities did not adequately address management of the *rate*, *volume*, and *quality* of stormwater discharges. Management of all three parameters is now recognized as essential for improving or protecting water quality. In the late 1990's, however, the regulatory landscape expanded with additional state and federal authority to better address stormwater discharges to wetlands and surface waters. These changes coincided with increased local awareness and sophistication by local government pertaining to stormwater issues.

First, in 1992, Phase I of the National Pollution Discharge Elimination System (NPDES) program required the permitting of stormwater discharges from large municipalities (municipalities with a population of 100,000 or more) to federal wetlands. In 1996, the Massachusetts Department of Environmental Protection (DEP) adopted Stormwater Standards and Policy, to be implemented primarilty in association with the Wetlands Protection Act. This new policy prohibited "untreated stormwater discharges" to waters of the Commonwealth, required water quality treatment for runoff of up to 1-inch from impervous surfaces, identified appropriate "best management practices" (BMPs), required recharge of stormwater to balance the hydrologic budget and required operation and maintenance plans for stormwater facilities. These standards and policies are currently being updated by DEP.

In December, 1999, EPA published the "Phase II Final Rule" (Phase 2) for the NPDES program in the Federal Register. This rule expanded coverage of the stormwater permit program to include stormwater discharges from, "certain regulated small municipal separate storm sewer systems

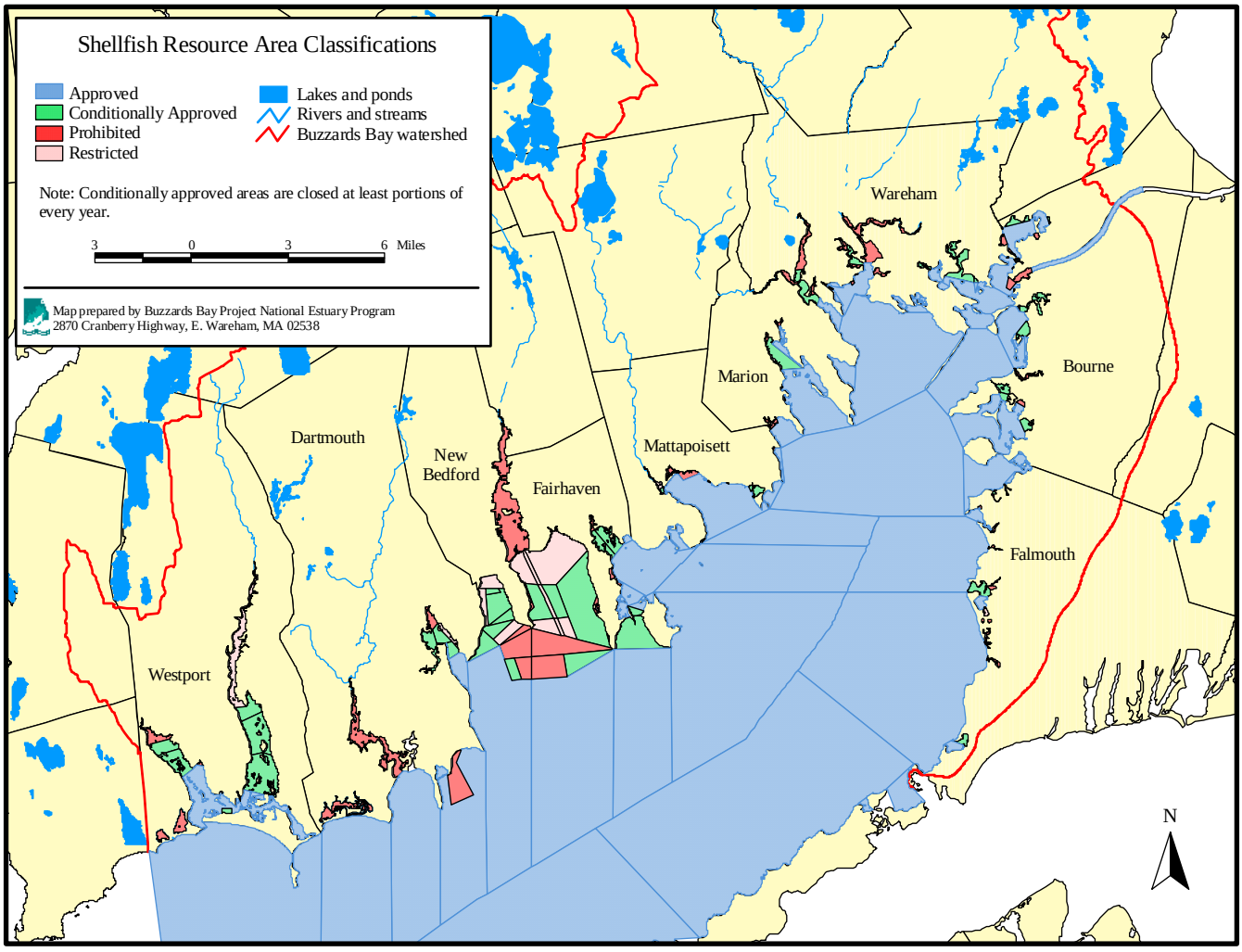

Figure 2-4. Shellfish Resource Area Classification in Buzzards Bay, circa July 1, 2000.

(MS4s); and construction activities disturbing between 1 and 5 acres of land (i.e., small construction activities)." The rule also revised "the 'no exposure' exclusion and the temporary exemption for certain industrial activities." In plain English, the rule required municipalities

located within “urbanized areas”, as defined by the U.S. Census Bureau, to submit permit applications (Notices of Intent) by 2003 for their municipally owned stormwater discharges ("MS4s"), as well as "industrial facilities", waste transfer stations, landfills, and sewage treatment plants (separate from the wastewater discharge permit). Due to an omission in the 1999 Phase II published rule, municipal and state DPW garages were exempt. Developers altering as little as 1 acre of land were also required to comply with the Phase II NPDES program beginning in 2003.

Perhaps even more significant than the adoption of the Phase II rule was the fact that the U.S. Census Bureau redefined "urbanized areas" for the 2000 census. This redefinition greatly expanded the geographic extent of the federal definition of urbanized areas, particularly in the northeast U.S. Because the U.S. EPA had used the U.S. Census urbanized maps as the jurisdictional boundary for the Phase II program, the geographic area covered by the program now included at least a portion of nearly every municipality in eastern Massachusetts, including every Buzzards Bay watershed community. These changes in the urbanized area are shown in Figure 2-5. While the geographic extent of the Phase II program may not seem appreciable for some municipalities, those areas covered essentially represent the existing moderately developed areas in each community, and more importantly triggers the requirement for management and regulatory actions in the municipalities as required in their permit.

Another regulatory program that has been moving forward in recent years is the MA DEP program to develop Total Maximum Daily Loads (TMDLs) in accordance with the Federal clean Water Act to address pollutant loading to impaired waterbodies throughout the state. Of particular relevance in Buzzards Bay is the recently published Draft Pathogen TMDL for the Buzzards Bay Watershed, developed jointly by MA DEP, USEPA Region 1, and ENSR International. This TMDL has established a concentration discharge limit equivalent to the regulatory threshold for impaired waters. Thus, for stormwater discharges to waters closed to shellfishing, stormwater mean stormwater discharge concentrations cannot exceed 14 fecal coliform per 100 ml. Adoption of this TMDL by the MA DEP would have important implications for municipalities in addressing stormwater and pathogen sources, as well as for individual land owners with existing discharges. This TMDL would be implemented through the NPDES permit program, as well as through other local and state regulatory mechanisms. This TMDL would trigger a legal requirement for municipalities and others to retrofit existing stormwater discharges in order to meet prescribed loading allocations and associated water quality discharge standards.

The Coastal Pollutant Remediation Grant Program at the MA CZM office has also evolved into a positive funding mechanism for nonpoint source pollutant remediation in Buzzards Bay and other coastal MA areas. For several years, the BBNEP has received funding through MA CZM from the MA legislature to address nonpoint pollution in the watershed. The BBNEP used this money to fund specific projects through a mini-grant program. This program was so successful that MA CZM adopted the program for the entire Coastal Zone in Massachusetts. These grants have been successful in fostering public education and addressing nonpoint pollution from roadways and other land uses throughimplementation of innovative stormwater practices. This program continues as of fiscal year 2006.

Stormwater Management Design

Stormwater management is best accomplished as part of a holistic, integrated water management approach, and should not be simply viewed as problematic flood waters and as a pollution source. Stormwater should be considered part of the hydrologic cycle. To accomplish this, stormwater runoff volumes, rates and quality need to be managed to mimic and/or to restore natural

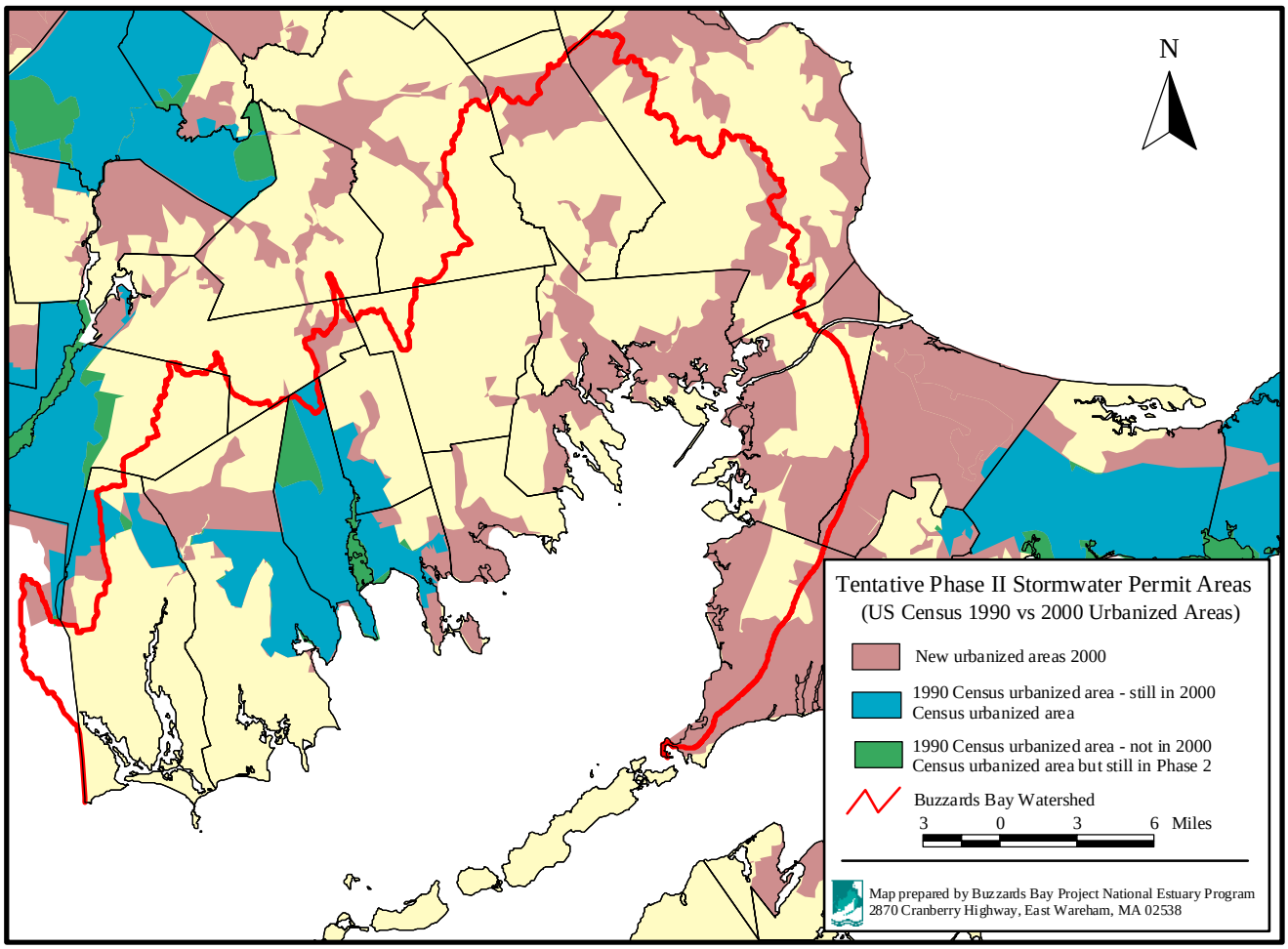

Figure 2-5. Newly defined urbanized areas from the 2000 US Census. All urbanized areas shown are included in the EPA NPDES Phase II Program for Municipal Small Storm Sewer Systems (MS4s).

conditions.

Treated stormwater runoff from impervious surfaces can be "re-used" as an irrigation source, as an alternative non-potable water supply source and for groundwater recharge and baseflow augmentation. From this standpoint, treated stormwater is a "resource" and not a 'wastewater" to be disposed of. Stormwater runoff from rooftops can be collected in rainbarrels or cisterns and used for the irrigation of gardens and landscaped areas, reducing the need to use drinking water for these purposes. It can also be infiltrated into the subsurface to recharge the groundwater system to restore drinking water supplies and to maintain critical (natural) freshwater baseflow that may alleviate the impacts of withdrawal rates to streams, wetlands and estuaries. Stormwater runoff can be managed to prevent water quality degradation of downstream resources.

Stormwater management must address four criteria:

1. Peak rate flood control: The large, infrequent storms (e.g., 2, 10, 25 and 100-year) must be managed to avoid flooding and erosion impacts.

2. Channel protection: The bank-full event (1-year) must be managed to balance pre- and post-

development runoff rates to avoid impacting stream banks and channels.

3. Recharge to groundwater: The goal of this criterion is to maintain the water balance at a site and within a watershed to the natural (pre-development) annual volume of recharge to groundwater after development occurs (in the post-development condition). Annual recharge (infiltration) depends on rainfall, runoff, and evapotranspiration during each rainfall event during a given year (See Figure 2-6), and simply put, these volumes are influenced by the combination of hydrologic soil groups (ability of a soil to infiltrate water), ground cover, and climate. For the Buzzards Bay Watershed as a whole, the annual recharge volume is approximately 20 – 24 inches per year across the entire watershed. In order to get this volume of water back into the ground, the site designer must size stormwater infiltration practices to capture and infiltrate the first 0.6 inches of runoff from impervious surfaces. This will result in a cumulative total annual recharge volume approximating the natural annual recharge volume.

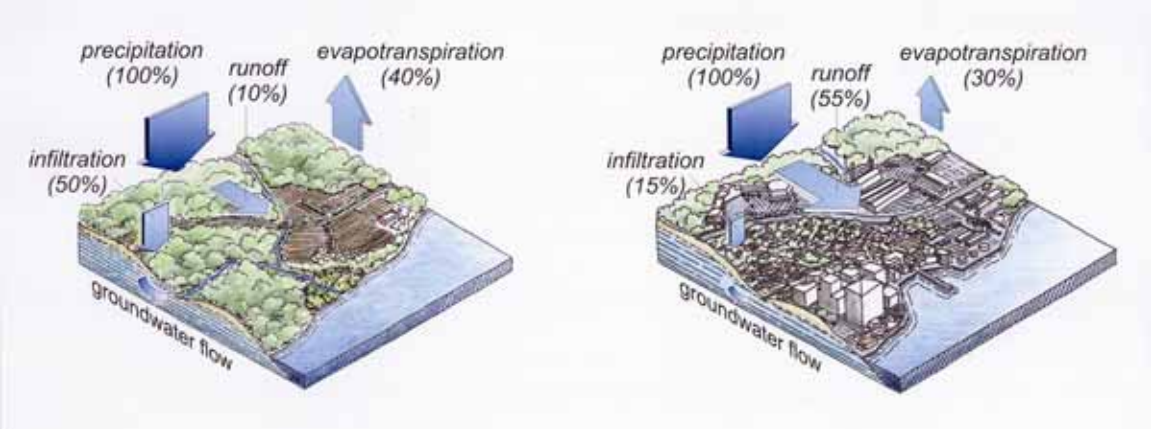

Figure 2-6. In increase in impervious surfaces vegetation resulting from development (as shown on right) shifts the water balance from a more natural state (as shown on left), causing a significant increase in the volume of runoff and a decrease in infiltration and evaporation as a percentage of precipitation.

However, to truly balance the water budget, stormwater recharge should also compensate for "consumptive" drinking water losses. These are primarily related to lawn and landscape irrigation, which result in water losses via additional evapotranspiration and runoff. This could be accomplished by either promoting the use of rainwater storage structures (e.g., rainbarrels/cisterns) as an alternative irrigation source or by increasing the stormwater management recharge requirement from 0.6 inches to 1.0 inches of runoff.

4. Water quality: The Massachusetts Stormwater Standards and Policy (established by DEP) requires that the first 0.5 inch (or 1.0 inch in critical areas) be effectively treated. This is based upon the so called "first flush" principle where most pollutants are transported by smaller rainstorms during the first portion of larger events. While this is true for suspended solids, this principle is not directly applicable for bacteria and nitrogen. Therefore, the larger 1.0 inch design event is more applicable for the Buzzards Bay Watershed.

A broad range of best management practices (BMPs) have been developed to manage stormwater runoff. While some of these BMPs have been shown to be effective at removing at least 80% of the total suspended solids (TSS), the minimum required state and federal standard, only certain management practices are effective at treating fecal coliforms and nitrogen (two of the critical pollutants of concern for Buzzards Bay). These BMPs that treat both nitrogen and fecal coliforms are:

1. Filtration practices: Sand filters, organic filters and infiltration systems (with proper pre-treatment) that trap bacteria.

2. Vegetated practices: Bioretention areas, rain gardens, vegetated swales and constructed wetlands that provide for nutrient uptake and/or nitrification-dentrification processes.

Proper design, construction and operation and maintenance of all stormwater BMPs is critical to their success. Without this, stormwater facilities provide only a false sense of security. In addition, stormwater BMPS should be repaired, rebuilt or retrofitted as needed if they are observed to be malfunctioning, improperly sized, or otherwise failing to meet the stormwater management control objectives.

Accomplishments in Addressing Existing Stormwater Discharges

By far, the greatest amount of federal and state financial resources associated with BBNEP implementation efforts and technical assistance has been spent on remediation of existing stormwater discharges. A key first step in remediation is locating the discharges and source areas. The BBNEP published an "Atlas of Stormwater Discharges in the Buzzards Bay Watershed" in 2003 to serve as a tool for guiding remediation projects, as well as an educational tool. The Coalition for Buzzards Bay (CBB), a local citizens' non-profit group, coordinated a BBNEP funded mapping project by interns from the Massachusetts Maritime Academy to locate and describe all stormwater catch basins, conveyance piping, and discharges in most of the Bay area. This information was eventually refined and improved upon by BBNEP staff with funding from the Massachusetts Highway Department, and in 2001 the BBNEP drafted a stormwater atlas of every known storm drain pipe and associated catch basin in eight Buzzards Bay municipalities. A final atlas was published in 2003. A sample map is included in Appendix D.

These discharges contribute to shellfish bed closures and water quality degradation throughout the bay watershed. Funding for these projects was provided by the BBNEP through its EPA funded Municipal Grant Program, by the Massachusetts Department of Environmental Protection through the federal Nonpoint Source Pollution (Clean Water Act Section 319) Program, and by the Massachusetts Office of Coastal Zone Management's (CZM) Coastal Pollutant Remediation (CPR) Program. A recent CZM project completed in 2006 evaluated the effectiveness of stormwater BMPs that were constructed using CPR funding and found that while these facilities have tremendous potential for pollutant remediation, maintenance was lacking at many facilities, compromising the effectiveness of these BMPs. The BBNEP staff continues to help local officials in the identification of funding sources and the development of successful projects. This allows the BBNEP and local communities to leverage Estuary Program funds far beyond their limits. Rough estimates contained in the CCMP Financial Plan on the remediation costs for all of the Bay's untreated discharges were approximately $10 million.

The BBNEP has been greatly assisted in this work through a partnership with the USDA Natural Resources Conservation Service in which NRCS staff works with the BBNEP in design and review of various forms of stormwater remediation facilities. These projects include such varied forms of stormwater BMPs as traditional stormwater infiltration structures, innovative constructed wetland systems, improved agricultural management practices, and urban sewer/stormwater cross connection remediation.

Improved Management of Stormwater in New Development

Preventing new untreated discharges to surface waters was one of the most important goals outlined in the 1992 Buzzards Bay CCMP. It was common sense considering the high cost of

remediating existing discharges; it is simply true that an ounce of prevention is worth a pound of cure. At the time of completion of the 1992 CCMP, all of the towns surrounding Buzzards Bay had regulations on the books addressing the construction of new stormwater conveyance systems to control flooding or stormwater volume, consistent with state and federal flood control and roadway engineering standards. The stormwater drainage design was generally focused on addressing the site being drained rather than addressing any downstream impacts from stormwater runoff, and/or impacts on the hydrologic budget. Often these rules required that stormwater be delivered as quickly and as directly as possible to the nearest water body or wetland with little or no attention to the quality of the stormwater and its effect on water resources and shellfish habitat. Only if both stormwater quantity and quality are addressed can a town expect to prevent new problems with shellfish bed closures and water quality degradation. Another problem the BBNEP observed was that requirements among town boards were not consistent and sometimes even contradictory.

To address these problems, the BBNEP developed a model stormwater management regulation entitled, Unified Rules and Regulations for Stormwater Management for use by Planning Boards, Boards of Health, and Conservation Commissions, which was released in January 1996. BBNEP also provided technical assistance and educational outreach to communities interested in adopting these standards. To date, these standards were adopted by Rochester (Planning Board Subdivision Rules and Regulations), Marion (Planning Board Subdivision Rules and Regulations, Plan and Site Review), Fairhaven (Planning Board Subdivision Rules and Regulations) and Falmouth (Conservation Commission Rules and Regulations). In the spring of 2006, the BBNEP published a revised set of unified standards to incorporate low impact development techniques, recharge, and more effective water quality and channel erosion protection measures.

Major Issues

There appears to be a general lack of public knowledge and recognition of the importance of stormwater management and the impacts from poorly managed stormwater runoff on surrounding properties and downstream resources. Additionally, stormwater runoff is still generally viewed as a waste that should be disposed of rather than a resource that is integral to the water budget. This makes it difficult to implement local regulatory changes to address stormwater management, and it limits the support for making stormwater improvements within a community. In addition, stormwater management design for permitting purposes requires engineering skills and more recently, site planning skills. Therefore, it is becoming increasingly necessary to incorporate a technical review and technical expertise on behalf of the local boards and commission in the local permit process. Education of the public, local boards and commissions, municipal employees, as well as engineers and site planners about stormwater management and the details of stormwater management design is critical to successful protection of our vital water resources.

Local stormwater management regulations and standards, NPDES Phase II permitting, and the MA DEP Stormwater Policy generally focus on new development and redevelopment, but do not focus on stormwater impacts from existing developments. Implementation of management measures to address water quality improvements through retrofits to existing development is generally not receiving much attention. However, with the potential adoption of the Pathogen TMDL for Buzzards Bay, and the next round of NPDES permitting to start in 2008, communities will need to begin to address stormwater from existing development to bring them into compliance.

Implementation of an effective and comprehensive stormwater management program can be expensive. With significant growth expected in the next decade throughout the Buzzards Bay watershed, together with the evolution of more technical stormwater and water quality

regulations, coordination and implementation of a stormwater management program in any given community will likely be fairly expensive. Communities need to consider innovative mechanisms and models to fund a stormwater program, including technical oversight and engineering review, enforcement, and maintenance of stormwater practices.

The management solutions for controlling stormwater discharges range from simple to complex, inexpensive to costly, and can involve different levels of government as well as private landowners. In developed areas, structural controls may be expensive to implement and land for retention basins may be either prohibitively expensive or not available at all. The costs of installing stormwater BMPs are usually borne by the municipality and its residents, but benefits accrue to all users of the municipality's water resource. These benefits can include restored recreational opportunities, maintenance of land values due to the aesthetic appearance of receiving waters, and, of greatest relevance here, restored or continued shellfishing opportunities.

Any town that is contemplating the construction of stormwater treatment facilities must consider all facets of the issue, including land acquisition, installation techniques, cost, treatment effectiveness, and maintenance requirements. Sampling data may be needed to determine the relative impact of each drain on water quality degradation. Before targeting a particular storm drain for action, the town should ensure that the problem is not emanating from septic systems or other illicit discharges that are "cross-connecting" with the drain.

The NPDES Phase II Program requires that communities (MS4s) covered by the program prepare and implement a stormwater management plan in accordance with a five-year schedule each community sets in an initial Notice of Intent. While U.S. EPA and MA DEP require that each MS4 file an annual report to provide an update on progress, and the reports are posted on the internet, there is little other enforcement to ensure that communities are following the schedule. At the same time, most communities are understaffed to meet all the responsibilities outlined in their NOIs. Communities need technical assistance to work efficiently and effectively to meet the Phase II requirements, together with other water quality requirements such as the pending pathogen TMDL for Buzzards Bay.

The Massachusetts Highway Department (MassHighway) has as one of its primary concerns the construction and maintenance of safe roads. Until recently, this typically included the removal of stormwater from those roads as quickly as possible. Accordingly, resource protection and water quality considerations must be balanced with MassHighway's primary mission of building safe roads. In January 2006 MassHighway released an updated manual for the design of State roads, this manual, entitled "Project Development and Design Guidebook" features more emphasis on design flexibility, streamlined procedures, and improved collaboration between MassHighway and the cities and towns it serves. MassHighway also developed a Stormwater Handbook for Roads and Bridges (May 2004) and is required to meet NPDES Stormwater Phase II permit requirements for the storm sewer systems from the roads and facilities operated by MassHighway. These new guidance manuals coupled with the regulatory requirement of Phase II will help foster a climate where Buzzards Bay towns will work collaboratively with MassHighway to ensure that water quality and quantity impacts are evaluated in a comprehensive manner for road and bridge planning, design and construction projects. The activities of town DPWs should receive the same attention.
Transportation planning should avoid siting new traffic corridors or hubs near sensitive receiving waters, and an Alternatives Analysis should identify sites that pose minimal or least impact due to stormwater runoff. Existing corridors/hubs near sensitive resources should be remediated.

Stormwater runoff from more than one town may be contributing to water quality degradation or shellfish-bed closures in a specific embayment. Each contributing town must implement similar and equitable stormwater controls in order for the affected resource to be fully protected.

Most stormwater drainage outfalls in Buzzards Bay are primarily wet weather discharges only. Those that have continuous dry weather flows may be an indication of illegal cross connections with sewer lines or septic systems. Many that do have dry weather discharges may merely indicate groundwater infiltration, or in some communities, the discharge of sump pumps from basements.

Federal implementation of the Phase II requirements cover all applicable areas of a regulated community, whereas state implementation of the DEP Stormwater Policy only covers activities within the jurisdiction of the Wetlands Protection Act (i.e., within a regulated resource area and/or a buffer to a regulated resource area). Municipalities implementing Phase II program requirements will have the flexibility to implement a stormwater program across the entire municipal limits either in accordance with the provisions of the DEP Stormwater Policy or to a greater level as offered by the BBNEP Model Stormwater Bylaw, updated in the spring of 2006.

Action Plan 2: Managing Stormwater Runoff

Goals

1. Prevent new or increased untreated stormwater flows to Buzzards Bay and contributing watershed areas that would adversely affect shellfish harvesting areas, swimming beaches, water quality, and wetlands.

2. Correct existing stormwater runoff flows to Buzzards Bay and contributing watershed areas that are adversely affecting shellfish harvesting areas, swimming beaches, water quality, and wetlands.

3. Maintain and restore natural hydrologic conditions to provide baseflow conditions to streams, wetlands and estuaries.

Objectives

1. To institutionalize at the local level (through education, laws, and regulations) the use of appropriate best management practices for stormwater management associated with new development, redevelopment, and agriculture.

2. To develop effective stormwater pollution remediation projects that include proper design, construction, operation and maintenance of facilities.

3. To establish and implement clear criteria to manage stormwater for flood control, channel protection, groundwater recharge, water quality and wetland habitat.

Changes to the Goals and Objectives contained in the 1992 CCMP

Goal 1 was not changed.

Goal 2 was made similar to goal 1 by expanding the endpoints. Revised from: Correct existing stormwater runoff problems that are causing or contributing to water quality degradation *or shellfish-bed closures in Buzzard Bay.*

Goal 3 is new.

Objective 1 expanded from: To institutionalize at the local level (through education and regulations) the use of best management practices for stormwater control *in newly developed areas*.

Objective 2 was simplified somewhat from: To develop a regional and local program to execute appropriate mitigation measures for existing stormwater discharges. The program would include construction, operation, and maintenance of stormwater control structures.

Objectives 3 and 4 are new.

4. To provide guidance and incentives for better site design that reduces stormwater runoff, provides for re-use of stormwater and reduces the need for structural practices.

CCMP Recommendations and Commitments

Buzzards Bay National Estuary Program

2.1 The BBNEP will update its 1996 municipal model regulations to better incorporate more stringent performance standards for fecal coliform bacteria and nitrogen removal and Low Impact Development (LID) principles and to achieve the goals and requirements of the municipal Phase II NPDES program. The BBNEP will incorporate the LID bylaw model now being developed by MCZM and the work of DCR and promote this work among municipalities.

Responsible Agent(s): BBPNEP
Commitment: The BBNEP has committed to this task
Legislation required: None
Estimated Costs: Using existing staff for development, and new ½ FTE to work with towns
Potential Funding: 319 or other grant
Implementation Strategy: Review policies by other states and organizations, grant needed for in depth technical assistance
Performance Tracking:

Target Date: Initiate by December 2006
Comment: The level of technical assistance of BBP support to the towns will be defined by available grant funding.

The following Action Item has been removed from Watersheet Zoning AP and should be inserted into the Stormwater AP, per comments.

2.2. Encourage "green" marinas, boatyards, docks and waterfront construction.

Responsible agent(s): BBNEP, CBB, and BBAC for education and outreach to marina operators and towns, EPA for improved stormwater permit program compliance (multi sector general permit for stormwater in the NPDES program). CZM to implement a clean marina program
Legislation required:
Estimated costs:
Potential funding:
Schedule:
Implementation strategy:

a) Improve marina compliance with MSGP "Industrial" Stormwater NPDES permit program

2.3 The BBNEP should develop and manage a grant program to support Buzzards Bay communities in retrofitting stormwater discharges.
Responsible Agent(s): BBNEP
Commitment: The BBNEP has committed to this.
Legislation required: None
Estimated Costs: 1/2 FTE (Planning Assistant)
Potential Funding: MCZM and/or Federal 319 Grant program
Implementation Strategy: Work closely with towns and citizen groups.
Performance Tracking: # of acres existing development managed by an effective stormwater practice
Target Date: Initiated June 2007
Comment:

2.4 The BBNEP and the BBAC will create a "Stormwater /LID Round Table" for developers, businesses, municipalities, and state and federal officials to promote understanding and use of stormwater management and LID, obtain funding, and to assist the private and public sectors in implementing controls of nonpoint source pollution.
Responsible Agent(s): BBNEP and BBAC
Commitment:
Legislation required: None
Estimated Costs:
Potential Funding:
Implementation Strategy: Training workshops, outreach materials, demonstration projects, school and university projects, fund research projects or demonstration projects, media involvement.
Performance Tracking:
Target Date:
Comment:

2.5 The BBNEP and BBAC will work with other existing nearby coastal NGOs, educational and research institutions to promote stormwater management and LID techniques. Examples of such organizations include, but are not limited to:

Coalition for Buzzards Bay
SeaGrant institutions
Woods Hole Science and Technology Education Partnership (WHSTEP)
Coastal Training Program, MA CZM
University of Massachusetts at Dartmouth (UMass-Dartmouth)
Woods Hole Oceanographic Institution

Responsible Agent(s): BBEP and BBAC
Commitment:
Legislation required: None
Estimated Costs:
Potential Funding: Coastal Training Program, MA CZM
Implementation Strategy: Training workshops, outreach materials, demonstration projects, school and university projects, fund research projects or demonstration projects, media involvement.
Performance Tracking:
Target Date:
Comment: Should this be consolidated with 2.4?

Commonwealth of Massachusetts

2.6 DEP will work cooperatively with EPA and CZM to revise its 1996 Stormwater Standards and Policy to better address volume, quality, and rate of stormwater discharges, and to require reductions in fecal coliforms and other pollutants (such as nitrogen). Revised standards will minimize environmental degradation, help to restore impaired waters, and reduce other ecological impacts of stormwater discharges. DEP should also develop a policy to exempt constructed wetlands designed for stormwater management purposes from jurisdiction as resource areas under the Wetlands Protection Regulations, so as not to discourage project applicants to include these BMPs in their site plans.

Responsible Agent(s): DEP, Bureau of Resource Protection
Commitment: DEP has recently convened a Stormwater Advisory Committee that has made several recommendations to strengthen the recharge criteria and methods, incorporate new provisions for LID and redevelopment projects, and provide additional guidelines on BMP pollutant removal effectives. The Advisory Committee identified a number of additional regulatory issues that should be incorporated into a revised Stormwater Policy, such as requirements for fecal coliform bacteria and nitrogen load reduction. These issues were raised as future items to be addressed. A recommendation was made to change the policy on wetlands jurisdiction for constructed wetlands, exempting them.
Legislation required: None
Estimated Costs: Several FTE staff commitments
Potential Funding: State Legislature if required
Implementation Strategy: Review policies by other states, EPA, stormwater organizations
Performance Tracking: Adoption of regulations
Target Date: December 2006 (constructed wetlands exemption) and June 2007 (bacteria and nitrogen performance standards).
Comment: Currently, the stormwater management policy requires 80% TSS removal. Most commercial BMPs that meet this standard do little to remove fecal coliforms or nitrogen which are impairing 22 Buzzards Bay embayments (303d listed). The list of acceptable BMPs needs to be further refined to specifically address the pollutants of concerned for Buzzards

Bay.

2.7 DEP will provide an adequate number of staff to help ensure compliance with the Phase II NPDES stormwater program and the Buzzards Bay TMDL for bacteria (pending, draft under review).

Responsible Agent(s): Bureau of Resource Protection
Commitment: DEP has not yet committed to this task
Legislation required: None
Estimated Costs: 3 additional FTEs statewide
Potential Funding: State Legislature if required
Implementation Strategy: Review policies by other states, EPA, stormwater organizations
Performance Tracking:
Target Date: Beginning 2006 FY
Comment: Currently two employees are working with 207 Massachusetts municipalities to address nonpoint source pollution, including local program review, permit compliance, and technical assistance. This level of support is not adequate to ensure the success of the program.

2.8 The Commonwealth, through the EOEA and DEP, will continue to provide funding for local stormwater remediation projects, including within Phase II areas.

Responsible Agent(s): EOEA, MCZM, DEP, DCR
Commitment: The agencies have not committed to this task
Legislation Required:
Estimated Costs: $500,000 annually directed to Buzzards Bay
Potential Funding:
Implementation Strategy:
Performance Tracking: Dollars awarded
Target Date: beginning immediatly and as funds allow.
Commitment: CZM CPR Grant program is available
Comment: dependent on State legislature and administration support.

2.9 The State Legislature should discontinue exemption of bridge work by the Massachusetts Highway Department from review by local conservation commissions when it passes special legislation to fund road widening or bridge repair or expansion.

Performance Tracking:

Responsible Agent(s): Legislators
Commitment:
Legislation Required:
Estimated Costs: None.
Potential Funding:
Implementation Strategy: Outreach and education of legislatures by towns, BBP, and state agencies
Performance Tracking:
Target Date: Immediately
Comment: The legislature continues this practice. Often MHD still meets with Conservation Commissions to resolve wetland issues, but this does not always occur for exempted projects. Eliminating this exemption will help Buzzards Bay communities to better protect sensitive wetlands from stormwater runoff from roads. MCZM should deny federal consistency for federally funded projects.

Federal Agencies

2.10 NRCS should continue their ongoing program to assist farmers to implement best management practices on agricultural lands in the Buzzards Bay area. Specifically, more detailed recommendations should be developed to minimize nitrogen and phosphorous loading from fertilizers and fecal coliform loading where manure is used as a fertilizer. NRCS should work with DEP to develop updated guidance on understanding the exemptions and responsibilities afforded to agriculture under the MA Wetlands Protection Act, and how to incorporate agriculture under the MA Stormwater Policy. Farm plans should be reviewed annually and performance monitored to ensure that BMPs are being implemented. Adequate staff should be provided to ensure that farmers are implementing their farm plans.

Performance Tracking:

Responsible Agent(s): NRCS
Commitment NRCS has not yet committed to this.:
Legislation Required:
Estimated Costs: adequate FTEs
Potential Funding:
Implementation Strategy: Outreach and education of legislatures by towns, BBP, and state agencies
Performance Tracking:
Target Date: Immediately
Comments: There is inadequate follow up to ensure that farmers are adhering to their farm plans.

2.11 The US EPA should target enforcement in the Buzzards Bay watershed for businesses and developers not complying with the multi-sector general permit and construction permits in the Phase II stormwater NPDES program. Phase II stormwater permit applications, focusing on implementation of the required Stormwater Pollution Prevention Plans, should be tracked through mandatory inspections and reporting review.

Responsible Agent(s): EPA
Commitment:
Legislation Required:
Estimated Costs: adequate FTEs
Potential Funding:
Implementation Strategy:
Performance Tracking:
Target Date: Immediately
Comments: Only a small fraction of projects and regulated industries are believed to be complying with the stormwater management program.

2.12 Federal and State agencies should create a "Stormwater Revolving Fund" for grants to municipalities to improve stormwater management, or create one locally based on income from fees for Phase II permitting. (Thus the developer helps defray the cost of stormwater management).

Responsible Agent(s):
Commitment:
Legislation required:
Estimated Costs: $500,000 annually
Potential Funding:
Implementation Strategy:
Performance Tracking:
Target Date:
Comment: The state/federal Revolving fund can already be used for stormwater, so should the

first part of this be dropped?

Regional Planning Agencies

2.13 Southeast Regional Planning and Development District (SERPDD) and the Cape Cod Commission (CCC) should actively provide outreach and training for the adoption and implementation of model stormwater management bylaws and regulations. Recommendations should be consistent with those of the BBNEP.

Responsible Agent(s):
Commitment: No
Legislation required: None
Estimated Costs: negligible
Potential Funding:
Implementation Strategy:
Performance Tracking:
Target Date: 7/2007
Comment:

2.14 CCC should incorporate the Buzzards Bay bacterial total maximum daily load (TMDL) limits for Buzzards Bay in their regulatory reviews or design recommendations for the stormwater management facilities associated with projects under their review. They should also require project applicants to investigate stormwater re-use as an alternative water supply for non-potable uses.

Responsible Agent(s): SRPEDD and CCC
Commitment:
Legislation required: CCC must revise their regulations
Estimated Costs: negligible after initial training and regulatory adoption, compliance costs for developers
Potential Funding: NA
Implementation Strategy: revised review standards adopted, revised regulations for CCC
Performance Tracking: change in regulations or review strategy
Target Date: 7/2007
Comment:

Municipalities

2.15 Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish bed closures or other impacts to wetlands, water quality, or other natural resources. The communities to commit to work with the BBNEP to develop a priority list (and map) of existing discharges. The list should be posted on the community's website to provide outreach and education to residents and to build support for annual town meeting appropriations for remediation projects.

Responsible Agent(s): DPWs are lead
Commitment: Towns have agreed to this task, but cannot adopt a schedule because implementation depends on available funds. BBNEP has committed to assist.
Legislation Required:
Estimated Costs: at least $40,000,000 required
Potential Funding:
Implementation Strategy: Continue pursuing state and federal grants, obtain match through in-kind local support and funding through town meeting.
Performance Tracking: Number of storm discharges remediated, % of total, acres of shellfish beds opened.
Target Date: beginning immediately and as funds allow.

Comment: This remains one of the most costly and most significant issues in Buzzards Bay. The level of effort by the municipalities is limited by local capacity to provide funds or manpower if a local match is required for state or federal grants.

2.16 Each Buzzards Bay watershed municipality will implement its Phase II stormwater management plan and meet or exceed the implementation schedule outlined in its Notice of Intent. Implementation will include:

a) mapping of all stormwater discharges, catch basins, and drainage networks

b) implementation of maintenance BMPs for existing networks

c) update stormwater regulations of Conservation Commissions, Boards of Health, and Planning Boards, and adopt stormwater bylaws to ensure consistency, and compliance with Phase II permit requirements, including meeting one-acre thresholds for projects requiring stormwater management compliance, and preventing new untreated stormwater discharges to wetlands and surface waters.

Responsible Agent(s): Planning Boards, DPWS, and Conservation Commissions principally, Building Inspectors, etc.
Commitment: Each community is committed to this, through the NPDES Permit
Legislation required: Municipal bylaws, regulations, and policies
Estimated Costs: varies
Potential funding: stormwater fees or utility, others
Implementation Strategy:
Performance Tracking:
Target Date: June 2009 Comments: There is inadequate follow up to ensure that farmers are adhering to their farm plans.
Comment: Towns need to address projects that may not go through the permit process like ANRs, and adopt adequate site plan review regulations.

2.17 Each Buzzards Bay watershed municipality will develop and implement a catch basin and storm drainage network maintenance program: They will also maintain and update the stormwater discharge and drainage system database provided by the BBNEP and BBAC.
Performance Tracking:

Responsible Agent:
Commitment:
Legislation Required:
Estimated Costs:$20,000 to $50,000 per town
Potential Funding:
Implementation Strategy: CZM CPR funding can be used to assist in the funding of these projects to develop a maintenance program. Funds should be obtained for joint purchase of vacuum trucks or other maintenance equipment to share costs.
Performance Tracking:
Target Date: June 2007
Comments: Keeping catch basins free of sediments and debris is one of the biggest stormwater concerns and can have an immense impact on the receiving waters.

2.18 Each municipality should establish a stormwater management authority who is adequately funded and will be responsible for adopting and implementing stormwater bylaws and regulations and will also be responsible to ensure that BMPs are properly designed, constructed, operated and maintained.

Responsible Agent: The Stormwater authority can be the Board of Selectmen, the DPW, the Planning Board, the Conservation Commission or a newly-established Stormwater Management Authority as authorized under the MGL Chapters 40, Section 1A and Chapter

83, Section 16.
Commitment:
Legislation Required:
Estimated Costs: initial costs will vary depending upon which agency is selected. Operational costs could be funded through permit fees.
Potential Funding:
Implementation Strategy:
Performance Tracking:
Target Date: December 2006
Comments: Experience has shown that DPWs and other existing town department/agencies are under-funded to adequately carry out this responsibility. If towns are unable to increase funding to these existing departments/agencies a Stormwater Management Authority with revenue-generating authority is the preferred approach.
Note: The BBAC has advised this recommendation be deleted because there is not widespread support for a separate new regulatory within each municipality.

2.19 Buzzards Bay watershed municipal Conservation Commissions will work with USDA-NRCS to review farm plans of farmers conducting work as an agricultural exemption as required under the state wetland regulations.

Responsible Agent(s): Conservation Commissions
Commitment: The towns have not committed to this task
Legislation required: None- existing regulations
Estimated Costs: adequate staffing required
Potential Funding: Town Meeting if required
Implementation Strategy: Contact farmers not appearing before the commission who are undertaking work contributing sediment discharge to waters and wetlands, and review for compliance with the NRCS farm plans if applicable, and otherwise insure compliance with state wetlands protection laws. Also contact US Army Corps of Engineers to report apparent violations.
Performance Tracking: documentation of actions by conservation commissions
Target Date: Begin immediately
Comment:

Non-Governmental Organizations

2.20 The Buzzards Bay Action Committee should review progress on this action plan annually.

Responsible Agent(s): BBAC
Commitment: The BBAC has committed to this task
Legislation required: None
Estimated Costs: None
Potential Funding: NA
Implementation Strategy: The action plan review should be conducted during one of the BBACs regular monthly meetings
Performance Tracking:
Target Date: Ongoing
Comment: Review of CCMP progress is part of the BBAC's primary mission

2.21 The BBNEP and BBAC will assist communities in implementing stormwater programs by helping to seek funding and by providing technical assistance, including workshops and bylaw review.

Responsible Agent(s): BBAC
Commitment: The BBAC has not committed to this task

Legislation required: None
Estimated Costs:
Potential Funding: NA
Implementation Strategy:
Performance Tracking:
Target Date: Ongoing
Comment:

2.22 The Coalition for Buzzards Bay should reactivate its "Don't Dump in Catch Basin" program in every community.

Responsible Agent(s): CBB
Commitment: The CBB has committed to this task
Legislation required: None
Estimated Costs: ¼ FTE for program coordinator salary plus volunteers
Potential Funding: member support, various state grant programs
Implementation Strategy: Coordinator and volunteers will work with municipal DPWs and local citizen groups and volunteers.
Performance Tracking:
Target Date: Starting 2005
Comment: The Coalition had an active don't dump campaign in the 1990s funded in part by the Buzzards Bay Project

2.23 The Coalition for Buzzards Bay will provide trained volunteers to assist municipal Boards of Health, Shellfish wardens, and the Buzzards Bay Project identify upstream sources of fecal coliforms contributing to shellfish bed closures.

Responsible Agent(s): CBB
Commitment: The CBB has committed to this task..
Legislation required: None
Estimated Costs: Testing costs can be paid by the Buzzards Bay Project. CBB requires ¼ FTE for program coordinator salary, plus trained volunteers
Potential Funding: member support, various state grant programs
Implementation Strategy: Coordinator and volunteers will work with municipal boards of health and shellfish wardens, especially those preparing subwatershed management plans for 319 program eligibility.
Performance Tracking:
Target Date: Starting 2005 and ongoing
Comment: The Coalition has participated with the Buzzards Bay Project previously on such monitoring. The CBB has committed to actively advocate for stormwater remediation efforts and updated stormwater bylaws in Buzzards Bay municipalities.

Status of Previous Recommendations in the 1992 CCMP

1. DEP will work cooperatively with EPA to develop a policy including criteria to determine when permits for stormwater discharges are required. DEP will include these criteria in its State Water Quality Standards. DEP will also consolidate its regulatory authority for controlling stormwater runoff.
👍*Status: The DEP accomplished much of this through stormwater remediation policy adopted in 1996, and through adoption of the Phase II NPDES stormwater permit program with the US EPA.*

2. All Buzzards Bay communities should adopt subdivision bylaws that require that best management practices for stormwater runoff be incorporated into any new development plans.
👍👎*Status: Some town boards adopted regulations that are helped reduce environmental impacts of stormwater, others did not. The new NPDES Phase II requirements establishes a new set of standards that all Buzzards Bay municipalities must now adopt.*

3. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures. Communities should prioritize storm drains based on their effect on critical waters and the feasibility and cost…. Target date: beginning immediately and as funds allow.
👍👎*Status: Individual subwatershed assessments over the years, and the 2004 BBP stormwater atlas are continuing to help establish priorities. With local funding, and state and federal grants, municipalities have been continually addressing problematic stormwater discharges, but progress has been slow, and thousands of discharges must still be addressed. This single task remains one of the most important undertakings in the CCMP.*

4. The Commonwealth, through the Executive Office of Environmental Affairs, should provide funding for local stormwater remediation projects.
👍*Status: For three years, the state legislature provided funds to EOEA ($200,000 annually) for Buzzards Bay watershed stormwater grants. This program was so successful MCZM expanded the program statewide as the Coastal Pollution Remediation (CPR) program at roughly $400,000 annually. CZM also dedicated hundreds of thousands annually in their 6217 NPS program to municipal NPS projects. DEP also aggressively targeted Section 319 NPS grant to stormwater remediation, including millions of dollars to Buzzards Bay communities since 1991. The existence of the Buzzards Bay CCMP made Buzzards Bay municipalities eligible for 319-grants by meeting their watershed plan requirements.*

5. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures. Communities should prioritize storm drains based on their effect on critical waters and the feasibility and cost….
👍👎*Status: Individual subwatershed assessments over the years, and the 2004 BBP stormwater atlas are continuing to help establish priorities. With local funding, and state and federal grants, municipalities have been continually addressing problematic stormwater discharges, but progress has been slow, and thousands of discharges must still be addressed.*

6. NRCS should institute a program for implementing best management practices on agricultural lands in the Buzzards Bay area.
👍 *Status: This program was in place in the early 1990s.*

7. The State Legislature should not continue to exempt bridge work by the [Massachusetts Highway Department] from review by local conservation commissions when it passes special legislation to fund road widening.
👍👎*Status: The legislature continues this practice, although it occurs less frequently, and often MHD still meets with Conservation Commissions to resolve wetland issues*

Stormwater Action Plan Success Stories:

Vegetated Bioretention BMP, Marion
The Town of Marion, Massachusetts received a grant from MA CZM to design and construct a series of stormwater management treatment practices for a portion of Marion Village draining to Island Wharf and Sippican Harbor. The more than 5-acre watershed was developed over the last two hundred years with unmanaged stormwater runoff discharging directly to the harbor. Past landfill and high groundwater restricted the application of most conventional stormwater treatment practices. A series of bioretention systems (also commonly referred to as biofilters and/or rain gardens) were identified as the most appropriate practices for the area. The bioretention systems are landscaped features designed to pond up to 9-inches of water during a rain event, and treat stormwater runoff via filtration through a soil media.

Design plans and specifications were developed for:

- more than half a dozen bioretention locations;
- modification and enhancement of the enclosed drainage system;
- repaving and grading of parking and turf areas; and
- erosion and sediment control for facility construction.

Stormwater BMPs were installed in 2005 and are being monitored to document their effectiveness.

Stormwater Remediation and Mamagement, Buttermilk Bay
Extensive work in Buttermilk Bay at the northeast corner of the Bay between the towns of Wareham and Bourne early in the CCMP development process revealed a total of 20 stormwater discharges, which were delivering the majority of bacterial and other pollutant loadings to the embayment. As a result, large portions of Buttermilk Bay were closed to the harvest of shellfish.

After nearly a decade of work, all but the most minor discharges to Buttermilk Bay have or are currently being remediated. Due to availability of sandy soils along the shores of Buttermilk, infiltration of stormwater was the preferred alternative at all of the sites. Stormwater remediation has proved more difficult in the western portions of the Bay watershed where soil impermeability and high groundwater have ruled out infiltration as a viable alternative.

Funding Buttermilk Bay:

- Electric Avenue, Wareham $100,000 (EPA)
- Buttermilk Bay Stormwater 319, Bourne $144,000 (MA DEP 319 Nonpoint Pollutant Remediation Program)
- Red Brook, Wareham $65,000 (EPA)
- Indian Mound Beach, Wareham $111,562 (MCZM Coastal Pollutant Remediation Program); 2000 CPR Grant: $60,000 (CZM)

Grant awards represent Federal and State funding support and do not include local contributions.

Wetland for Stormwater Treatment, Marion

Sprague Cove is on the western side of Sippican Harbor in the Town of Marion. The Cove's shellfish beds, immediately adjacent to the town's only public bathing beach, were closed due to bacterial contamination from stormwater runoff. Two storm drain systems discharged into Sprague Cove, the largest of which drained a 64 acre area of roads and driveways in the densely developed lower portions of Marion village.

In 1991, the Town of Marion and the Buzzards Bay Project began exploring options for treating this stormwater runoff prior to discharge. The result was the design (provided by NRCS) and construction of a 3-acre manmade wetland system to treat the "first flush" of stormwater entering the Cove. Stormwater contaminants such as bacteria, sediments, and nutrients are removed through natural physical and biological processes within the staged wetland and open water system. Along with the water quality benefits, the Sprague Cove stormwater wetland provides enhanced wildlife and fish habitat and replaces a filled parking area that was formerly a salt marsh.

The system was constructed in 1995 with funding from the Buzzards Bay Project, an EPA/DEP 319 Nonpoint Source Pollution grant, the Town of Marion, US Fish and Wildlife Service, and private contributions. Once the construction was completed, a large citizen effort was mobilized to plant the system with a variety of wetland species such as cattail, bulrush, and lily in order to make the system function like a wetland to remove contaminants. The Sprague Cove Project has been and continues to be not only an extremely successful stormwater remediation project but an equally important community environmental education and wetlands restoration effort. Initial water quality monitoring during the summer of 1996 has revealed large reductions in fecal coliform bacteria by the system.

Stormwater BMPs, Onset Bay

Driven in large part by a $1.9 million investment by the Town of Wareham to extend municipal sewer service to portions of Onset village, the BBNEP assisted town managers in pulling together funding and technical assistance toward coordinating the installation of stormwater BMPs in conjunction with planned sewer installation. The result was a comprehensive remediation of all wastewater and stormwater flows contributing to the closure of 111 acres of shellfish harvest beds in the East River, Broad Cove, and Muddy Cove. Muddy Cove was classified as Prohibited to harvest and East River/Broad Cove was Seasonally Approved for partial harvest of shellfish. Once complete, this work will have addressed all primary pollution sources to the Coves and is expected to reopen much of the area to harvest.

- Riverside & Onset Design, Wareham $15,000 (BBNEP Municipal Grant Program)
- Riverside & Oneset Construction, Wareham $100,000 (BBNEP Municipal Grant Program)
- Point Independence Construction, Wareham $71,600 (MCZM Coastal Pollutant Remediation)
- Point Independence Design, Wareham $15,000 (MCZM Coastal Pollutant Remediation Program)

Grant awards represent Federal and State funding support and do not include local contributions.