



CAPE COD
COMMISSION

CAPE COD

Regional Wastewater Management Plan Regulatory & Planning Initiatives

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Federal Clean Water Act

SURFACE WATER QUALITY

The US Environmental Protection Agency regulates water quality under the Federal Water Pollution Control Act of 1972 and its subsequent amendments in 1977, 1981, and 1987. Collectively these are known as the Clean Water Act. The objective of the act is to maintain and restore the chemical, physical, and biological integrity of US waters. The act requires states to establish ambient water quality standards for water bodies based on the need to protect the use(s) designated for that water body.

MASSACHUSETTS SURFACE WATER QUALITY STANDARDS

Following the federal law, the Commonwealth of Massachusetts has adopted surface water standards for individual water bodies. The standards designate the most sensitive uses for which the water body must be “enhanced, maintained, and protected” (whether or not the designated use is currently attained); prescribe minimum water quality criteria necessary to sustain the designated uses; and contain the regulations necessary to achieve and maintain the designated use and, where appropriate, prohibit discharges.

Massachusetts has divided the coastal and marine surface waters into three classes: SA, SB, and SC, in descending order of the most sensitive uses that water body must attain. Additionally the state has special designations of Outstanding Resource Waters, Special Resource Waters, Shellfish (waters), and Warm Water. A brief description of these classes



and special designations follows. For more information see [M.G.L. c. 21, § 27. 314 CMR 4.00: Massachusetts Surface Water Standards](#).

SA Waters are designated as the highest quality providing excellent habitat for marine life and for primary and secondary contact recreation. In certain waters, excellent habitat may include seagrass and, where designated for shellfishing, SA waters are suitable for shellfish harvesting without depuration. Nearly all of the coastal waters of Cape Cod have been classified as SA.

SB Waters are designated as a habitat for marine life and for primary and secondary contact recreation. In certain waters, habitat may include seagrass. Where designated for shellfishing, these waters are suitable for shellfish harvesting with depuration. Several water bodies on Cape Cod have been classified as SB waters, particularly those that are used heavily for shipping and boating.

SC Waters are designated as a habitat for marine life and for secondary contact recreation. They may also be suitable for certain industrial cooling and process uses. There is no water body on Cape Cod that has been classified as SC.

Outstanding Resource Waters (ORW) denotes waters that “include Class A Public Water Supplies (314 CMR 4.06(1)(d)1) and their tributaries, certain wetlands as specified in 314 CMR 4.06(2) and other waters as determined by the department based on their outstanding socio-economic, recreational, ecological, and/or aesthetic values.” An application to nominate a water body as an ORW must be submitted in accordance with applicable department application procedures and requirements. Areas of Cape Cod that have been designated as ORW include waters within and adjacent to the Cape Cod National Seashore and Areas of Critical Environmental Concern.

Shellfishing Waters are subject to more stringent regulation in accordance with the rules and regulations of the Massachusetts Division of Marine Fisheries.

Warm Waters are those waters in which the dissolved oxygen and temperature criteria for warm-water fisheries apply.



IMPAIRED WATERS AND TOTAL MAXIMUM DAILY LOADS

The Clean Water Act requires states to assess the quality of surface waters based on the intended uses on a regular basis and to develop a list of impaired waters—those waters that do not meet the intended uses. The most recent list for Cape Cod waters is the [Cape Cod Coastal Drainage Areas 2004-2008 Surface Water Quality Assessment Report](#). Under Section 303(d) of the Clean Water Act, states are required to:

1. Identify those water bodies that are not expected to meet the Surface Water Quality Standards from technology-based controls; and,
2. Establish for those waters Total Maximum Daily Loads (TMDLs)—the maximum amount of a pollutant from any source and of any kind that a water body can have without violating water quality standards.

TMDLs are based on technical reports prepared by the Massachusetts Estuaries Project. TMDLs are formulated by the Massachusetts Department of Environmental Protection (MassDEP) and submitted to the US Environmental Protection Agency (US EPA) for approval after public comment. TMDLs are enforceable under the federal Clean Water Act.

Massachusetts submits a list of the conditions of surface waters to the US EPA every two years in compliance with the Clean Water Act. The “[Integrated List of Waters](#)” identifies each water body or segment of a water body as supporting a designated use or as impaired. If there are not sufficient data, the use is noted as “not assessed.” Many of the smaller and unnamed water bodies in Massachusetts have never been assessed and thus do not appear in the listing.

Each water body in the list is assigned to one of the following categories:

- Unimpaired and not threatened for all designated uses
- Unimpaired for some uses and not assessed for others
- Insufficient information to make assessments for any uses
- Impaired or threatened for one or more uses, but not requiring the calculation of a TMDL
- Impaired or threatened for one or more uses and requiring a TMDL



MASSACHUSETTS ESTUARIES PROJECT

In 2001 the Massachusetts Department of Environmental Protection and the University of Massachusetts School for Marine Science and Technology (SMAST), in collaboration with the Cape Cod Commission, established the Massachusetts Estuaries Project (MEP).

MEP scientists developed models that link nitrogen loading in a watershed to coastal water quality. Input into the models includes data on coastal water quality, tidal flushing, bathymetry, pond water quality, current and historic eelgrass coverage, water use, wastewater treatment plant performance (if any), landfill monitoring, watershed delineations, sediment nutrient regeneration, and nitrogen attenuation from wetlands, rivers, and freshwater ponds. The modeling results have confirmed earlier studies identifying on-site septic systems as the major source of nitrogen to coastal embayments.

The MEP has partnered with Cape Cod communities to evaluate coastal water quality and to develop technical reports recommending TMDLs for nitrogen in accordance with the requirements of the Clean Water Act.

Model results are presented in published technical reports, which identify how much nitrogen must be removed from wastewater to meet the TMDL in a particular coastal embayment. The reports are specific to wastewater because controlling runoff and fertilizer use is difficult to implement and enforce, and these sources account for far less nitrogen than septic system contribution.

See the [Environmental Assessment Section on Cape Cod Water Quality](#) for detailed information about marine water quality and TMDLs.

PEER REVIEW OF MASSACHUSETTS ESTUARIES PROJECT

In response to concerns raised by some Cape Cod communities regarding the validity of the MEP scientific approach, the Barnstable County Commissioners directed the Cape Cod Water Protection Collaborative to undertake a scientific peer review of the MEP process. The Collaborative organized an independent scientific peer review of the MEP methodology for developing appropriate TMDLs for the estuaries and embayments of Cape Cod, and for the use of that methodology as a basis for wastewater and nutrient management planning and implementation on Cape Cod.



The scientific peer review process was independent and objective, and operated externally from the Collaborative and from any other Cape Cod stakeholders.

The peer review panel found the MEP modeling approach to be appropriate and useful for evaluating alternative scenarios and informing nutrient management plans, and also found the MEP to be consistent with existing nationwide TMDL practices. The panel also found that the MEP modeling approach is scientifically credible, and the modeling approach is consistent with current understanding of existing conditions for Cape Cod estuaries, based on available data. The components in the approach are well known and documented. Computation of watershed nitrogen loads is strongly data-driven and quantitatively linked to estuarine nitrogen concentrations. For more information see the [MEP Peer Review Executive Summary](#) or the [full report of the MEP Scientific Review Panel](#).

POINT AND NON-POINT SOURCE WATER POLLUTION

DEFINITIONS

The definition of a point source of pollution as stated in Section 502(14) of the federal Clean Water Act is “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.”

The term “non-point source” is defined as any source of water pollution that does not meet the above legal definition of a “point source”. Non-point sources are typically described as those emanating from precipitation that has picked up natural and human-made pollutants as it moves over and through the ground. The U.S. EPA lists fertilizers, herbicides, pesticides, oil and grease, sediments and bacteria and nutrients from “faulty septic systems” as examples of non-point source pollutants. The U.S. EPA and the MassDEP currently deem on-site (Title 5) septic systems to be non-point discharges.



REGULATIONS

The Clean Water Act regulates point sources that discharge pollutants into navigable surface waters of the United States under the National Pollutant Discharge Elimination System (NPDES) permit program. In most cases, the NPDES permit program is administered by authorized states. Massachusetts is NOT a delegated NPDES permit state; however, permits are jointly issued by the U.S. EPA and the MassDEP and are equally and separately enforceable by both agencies.

At the present time, there is no federal law that regulates non-point source water pollution through enforcement actions. Although the Clean Water Act has some provisions that apply to groundwater, there have been legal disputes over whether the Clean Water Act's protection of navigable waters extends to tributary groundwater—groundwater that travels to navigable waters. Recently, the U.S. EPA has asserted it has the discretionary authority to regulate non-point source pollution in cases of groundwater contaminated from mining activities reaching navigable waters.

Cape Cod is currently the subject of a similar lawsuit. The Conservation Law Foundation (CLF) and Buzzards Bay Coalition (BBC) brought two lawsuits against the U.S. EPA, alleging they have violated two provisions of the Clean Water Act that they contend require the U.S. EPA to take certain actions to manage water quality in the embayments in and around Cape Cod.

The first claim, filed in 2010, alleges that the U.S. EPA is in violation of the Clean Water Act and the Administrative Procedures Act by approving 13 TMDLs on the Cape that do not identify discharges from septic systems, stormwater drainage and wastewater treatment facilities as point sources of nitrogen pollution. The plaintiffs claim that these sources should be subject to the stringent permitting requirements of the NPDES that regulates point sources. The U.S. EPA has argued that, while they do believe they have jurisdiction over these sources to groundwater that has a direct hydrologic connection to navigable waters of the United States, that jurisdiction is discretionary.

The second claim, filed in 2011, is that the U.S. EPA has failed to reapprove the Cape Cod Areawide Water Quality Management Plan that is submitted by the State under CWA §208(b)(3), 33 U.S.C. § 1288(b)(3). The U.S. EPA has argued that §208(b)(3) does not require annual updates of Areawide Water Quality Management Plans and, therefore, they are not responsible for annual reapprovals.



Despite all of this recent legal action and the potential outcomes of the Cape Cod lawsuits, by and large, non-point source water pollution is managed today through non-regulatory means, including assistance to states from federal planning and grant programs under the Clean Water Act. Among the non-regulatory strategies are watershed and land use planning, development of voluntary best management practices, technical assistance programs, and cost-sharing for implementation of prevention and control measures.

Massachusetts developed a non-point source management plan in 1988 pursuant to section 319 of the Clean Water Act. This plan, updated most recently in 1999, is an integrated strategy for the prevention, control and reduction of pollution from non-point sources. Federal funds are available for activities such as technical assistance, education, training, technology transfer, watershed restoration, and demonstration projects. Only those implementation strategies that are identified in the management plan are eligible for federal funding. See the [Massachusetts Nonpoint Source Management Plan](#) for more information.



Safe Drinking Water Act

The Safe Drinking Water Act, administered by the U. S. EPA, is the main federal law that protects the quality of drinking water and the rivers, lakes, reservoirs, springs and ground water wells that are the source of drinking water. The Act authorizes the U.S. EPA to set standards for drinking water quality to protect against natural and human-caused contaminants and to oversee the implementation of those standards on the state, local and water supplier levels. At present there are standards that regulate 83 different contaminants. Cape Cod was designated a Sole-Source Aquifer under the Safe Drinking Water Act in 1982.

The Act applies to the more than 170,000 public drinking water systems in the country and requires their evaluation by third party analytical laboratories. The Act does not cover systems that service fewer than 25 individuals or apply to bottled water. There are 17 public water suppliers on Cape Cod.

The US EPA Primacy Agent for the federal Safe Drinking Water Act is the Massachusetts Department of Environmental Protection, Division of Watershed Management's Drinking Water Program. The Program regulates water quality monitoring, new source approvals, water supply treatment, distribution protection and the reporting of water quality data.

DRINKING WATER AND ZONE II WELLHEAD PROTECTION AREAS

Massachusetts' drinking water regulations ([310 CMR 22.00](#)) are intended to protect public health by ensuring that all water used for public consumption is safe, fit and pure to drink. The regulations identify contaminants that must be controlled, establish limits on the allowable concentrations of these contaminants and mandate the type and frequency of monitoring required ensuring compliance with the regulations.

The regulations also define a Zone II as “that area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.” Also known as wellhead protection areas, all Cape towns have protected Zone IIs through zoning



and Board of Health bylaws. Municipalities identify areas as potential Zone IIs and submit them to the state.

The state regulations, the Cape Cod Regional Policy Plan's Minimum Performance Standards and numerous local zoning and general bylaws have been established to prohibit or limit land uses in Zone IIs that have the potential to degrade drinking water quality. State and Commission regulations do not specifically prohibit large wastewater treatment and disposal facilities in Zone II's but the Regional Policy Plan limits their use in Zone IIs for the restoration of water quality.



Massachusetts Department of Environmental Protection

STATE TITLE 5 REGULATIONS ON WASTEWATER FLOWS

The Massachusetts Department of Environmental Protection (MassDEP) regulates wastewater flows less than 10,000 gallons per day under Title 5, the state Sanitary Code. Title 5 typically covers such uses as conventional on-site septic systems, alternative systems, such as denitrifying systems (often called “Innovative/Alternative,” or I/A, systems), as well as composting toilets and other kinds of systems in use on individual properties or cluster developments. Title 5 presumes residential wastewater flows at 110 gallons per day per bedroom (e.g., Title 5 presumes that a four-bedroom house will generate 440 gallons per day). Non-residential wastewater generation is typically based on use and square footage, or the number of restaurant seats.

TITLE 5 DESIGNATION OF NITROGEN SENSITIVE AREAS

MassDEP has identified certain areas as particularly sensitive to pollution from on-site wastewater systems, therefore requiring the imposition of loading restrictions. These Nitrogen Sensitive Areas (NSAs) include:

- Interim Wellhead Protection Areas and department-approved Zone IIs of public water supplies
- Areas with private wells
- Nitrogen-sensitive embayments or other areas, which are designated as nitrogen sensitive under Title 5 based on appropriate scientific evidence

The design flow for wastewater is restricted to 440 gallons per day per acre in NSAs. There are exceptions for aggregate flows and systems with enhanced nitrogen removal. See [310 CMR 15.000: The State Environmental Code, Title 5: Standard Requirements for the Siting, Construction,](#)



[Inspection, Upgrade and Expansion of On-Site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage](#). See sections 15.216 (aggregate flows) and 310 CMR 15.217 (enhanced nitrogen removal) for additional information.

The nitrogen-loading restrictions in NSAs apply to new construction only and do not affect existing Title 5 systems. Those systems are regulated through the inspection process and the definition of “failing” systems in 310 CMR 15.303 and 15.304. Title 5 has special requirements for repairing failed systems and for the construction of new systems in NSAs.

MassDEP has not yet designated any area on Cape Cod as an NSA.

GROUNDWATER DISCHARGE PERMITS

Flows in excess of 10,000 gallons per day are regulated under the state Groundwater Discharge Permit Program. Systems requiring a groundwater discharge permit require a significant removal of nitrogen because the Cape Cod Aquifer is designated as a non-degradation resource. Groundwater discharge permits for Cape Cod require an effluent treatment level of at least 10 milligrams per liter of nitrate, which is almost a two-thirds reduction in the amount of nitrogen leaving a septic system. In the last 10 years, groundwater discharge permits for projects located in watersheds to nitrogen-sensitive embayments have been held to a “no-net nitrogen” standard by MassDEP. This means that any nitrogen released into the watershed must be “offset” by the removal of nitrogen from an existing source, typically by connecting a nearby existing development to remove nitrogen via wastewater treatment.

WATER POLLUTION ABATEMENT DISTRICTS

MassDEP may propose water pollution abatement districts consisting of one or more cities or towns, or designated parts thereof. If MassDEP deems that such a district is necessary for the prompt and efficient abatement of water pollution, it may, after a public hearing, mandate the formation of such a district. See Section D on Management Districts



([page 15](#)) for additional information about Water Pollution Abatement Districts and other management districts.

COMPREHENSIVE WASTEWATER MANAGEMENT PLANS

The state also reviews towns Comprehensive Wastewater Management Plans (CWMPs) under the Massachusetts Environmental Policy Act (MEPA). MEPA thresholds mandate review for construction and upgrades to wastewater treatment and disposal facilities ([MEPA Regulations 301 CMR 11.03 Review Thresholds](#)). The state also reviews CWMPs under MassDEP “Selection, Approval and Regulation of Water Pollution Abatement Projects Receiving Financial Assistance from the State Revolving Fund” ([310 CMR 44.00](#)).

The [MassDEP Bureau of Municipal Facilities’ Guide to Comprehensive Wastewater Management Planning](#) outlines the process for development of a CWMP. According to the guidance, “The planning exercise requires a community to perform a needs analysis: identifying problem areas including areas with poor soils areas with failing septic systems and densely developed areas. Different wastewater treatment options including on-site septic systems, decentralized systems, or a centralized community-wide system are also analyzed for applicability in addressing the identified wastewater issues while considering environmental concerns (groundwater recharge, pollution prevention) and costs. Public input is sought throughout the CWMP process.”



Management Districts and Other State Enabling Legislation

Management districts are legal, geographic entities established to provide environmental services, such as funding, building, and managing infrastructure or programs. A number of different legal mechanisms establish management districts to restore and maintain water quality; these may be especially useful for managing shared resources. MassDEP summarized these in its 2003 report: [The Massachusetts Estuaries Project: Embayment Restoration and Guidance for Implementation Strategies](#). The following information and much of the language below is from that document.

Additional information can be found in a 2004 report to Barnstable County: [Enhancing Wastewater Management on Cape Cod: Planning, Administrative and Legal Tools](#).

Districts that are established for wastewater infrastructure provide important advantages for difficult and expensive nutrient pollution issues because of their inherent focus on the issue, their flexibility in structure, and the numerous funding options available to them. Cape Cod has 17 districts that were established for the sole purpose of drinking water infrastructure; they provide a good comparison to other institutional mechanisms.

Focus:

Districts provide a targeted approach to issues specific to a certain geographic area. They allow the management clarity and specificity that is sometimes lacking in the wide spectrum of activities carried out by local governments.

Flexibility:

Management districts can be structured and funded differently depending upon the services provided, the geographic area, and the available funding. Examples of flexibility include:

- Services for watersheds, lakes, and estuaries whose boundaries cross municipal boundaries



- Services that differ from those traditionally offered by a municipality, such as management of on-site wastewater systems
- Services based on regulations and programs of multiple authorities, each with its own set of requirements, performance criteria, and involved parties
- A comprehensive range of services, or a single service. Districts also have flexibility to provide services themselves, contract with other providers, or establish performance standards that district members must meet.

Funding:

Districts can be designed to generate fees or levy taxes solely on the individuals benefiting from the services, without increasing costs to other taxpayers. Districts can issue bonds and notes and raise revenues to carry out their stated purposes. For services traditionally provided by individual property owners, such as on-site wastewater system maintenance, the pooling of services offered by a district can save money for individual homeowners.

Management districts can be established under Massachusetts law through:

- General state laws,
- Special act of the legislature, or
- Municipality's home rule authority, its bylaws, and regulations.

GENERAL STATE LAW

Massachusetts General Laws have three legal options for the establishment of management districts: Water Pollution Abatement Districts, Independent Water and Sewer Commissions (that can include Intermunicipal Agreements), and Regional Health Districts.



WATER POLLUTION ABATEMENT DISTRICT

The Massachusetts Clean Waters Act ([MGL Section 28. \(a\)](#)) authorizes MassDEP to propose, and, in some cases, mandate, the establishment of water pollution abatement districts that consist of one or more cities or towns, or designated parts thereof. MassDEP can also require such a district to implement a water pollution abatement plan, subject to approval.

A regional water pollution abatement district is an independent entity, administered by a district commission, with authority to:

- Adopt bylaws and regulations;
- Acquire, dispose of, and encumber real and personal property, including acquiring real property by eminent domain;
- Construct, operate, and maintain water pollution abatement facilities; and
- Issue bonds and notes and raise revenues to carry out the purposes of the district by means of apportioned assessments on the member municipalities.

This mechanism does not require a special act of the Legislature. To date, MassDEP has not exercised its authority under this legislation.

INDEPENDENT WATER AND SEWER COMMISSIONS AND INTERMUNICIPAL AGREEMENTS

Massachusetts law authorizes a municipality to establish an independent water and sewer commission within its boundaries and to enter into inter-municipal agreements for the purpose of jointly performing a service that a municipality is authorized to do individually, or to allow one municipality to perform a service for another. The Cape Cod Commission is working with towns to develop sample inter-municipal agreements.

REGIONAL HEALTH DISTRICTS

Massachusetts law authorizes two or more municipalities to form a regional health district, with the powers and duties equivalent to those



exercised by the boards of health and health departments of the constituent municipalities. The primary purpose of a regional health district does not appear to be pollution abatement, but the language is broad enough to encompass the wastewater regulatory powers of a board of health.

SPECIAL ACT OF THE LEGISLATURE

The Massachusetts Constitution authorizes municipalities to file home rule petitions requesting enactment of a special law—the legal mechanism that has been most often used to establish a region-wide district. A special law may also be necessary or appropriate when a municipality seeks to manage a service within its boundaries in a manner that goes beyond or is inconsistent with applicable general or special laws.

MUNICIPAL HOME RULE AUTHORITY, BYLAWS, AND REGULATIONS

A municipality has the authority under the Massachusetts Constitution to exercise any power or function that the Legislature has the power to confer on it and which is not inconsistent with the Constitution or a state law or prohibited by the municipality’s charter. Municipalities may adopt zoning or general bylaws to regulate a wide range of uses and activities within all or a portion of their boundaries. For example, a zoning bylaw may establish an aquifer protection district that encompasses the boundaries of the zone of contribution to a public water supply well (Zone II) and prohibit certain new land uses within that area.

A local board of health has broad authority to regulate wastewater independently of general municipal bylaws. This board is authorized to promulgate “reasonable” regulations, including those that exceed the minimum requirements of Title 5, provided the board of health makes explicit the local conditions that exist and/or reasons that support more stringent regulation.

Although cross-boundary management districts are common across the United States, they are uncommon in Massachusetts where there is a tradition of strong local government. Table RPI-1 shows examples of cross-boundary districts that have been established in Massachusetts.



TABLE RPI-1: Cross-boundary Management Districts in Massachusetts

TOWN	COVERAGE/PURPOSE	LEGAL AUTHORITY
Tri-town Septage District: Town-wide program in Orleans, Brewster, Eastham	Initially there was an on-site inspection and testing program, as well as operation of a septage treatment plant. This was paid by discharge fees to property owners. On-site program was terminated once all systems were inspected. Board of Health sends out reminder letters to pump every three years.	Special legislation
Tri-town Health District: Town-wide in Lenox, Lee, and Stockbridge	Outreach/education to on-site owners: I/A information, technical assistance, tax credit information, information on proper maintenance	Board of Health
Buttermilk Bay Watershed within the towns of Plymouth, Wareham, and Bourne	Three towns adopted nitrogen-loading goals and limits on growth recommended by the Buzzards Bay Project, in order to limit future nitrogen inputs to Buttermilk Bay	Intermunicipal agreement
Town-wide, tri-town nitrogen management strategy (Plymouth, Wareham, and Bourne)	Bourne and Plymouth adopted zoning bylaw changes to increase minimum lot size to reduce future growth potential, and also adopted a water protection overlay district that included nitrogen-limit goals. Wareham zoning was deemed adequate. Wareham and Bourne also extended sewerage around the bay. (Source: Dr. Joseph Costa, personal communication, 1/23/03)	Local zoning and other bylaws

SOURCE: Massachusetts Department of Environmental Protection



Cape Cod Commission

The Cape Cod Commission (Commission), the Cape’s regional planning agency, was created by an act of the Massachusetts Legislature in 1990 in response to the rapid development pressure of the 1980s. The increased pace of development focused attention on the need to manage growth, guide land use, and address environmental problems in a comprehensive way throughout all of Cape Cod. The Commission has planning, technical, and regulatory tools that can be applied to wastewater management on Cape Cod.

CAPE COD REGIONAL POLICY PLAN

The [Cape Cod Commission Act](#) established a Commission regulatory function to review and approve, condition, or deny development projects that exceed Development of Regional Impact (DRI) thresholds. The act includes a provision that the Commission develop and implement a [Regional Policy Plan](#) (RPP) that would contain the minimum performance standards (MPS) for its regulatory review of proposals. The Commission published the first version of the Regional Policy Plan in 1991; it has been updated and revised every five years.

The initial water resources section of the Regional Policy Plan recognized that many of the Cape’s embayments were suffering from water quality impacts associated with nitrogen from septic systems. In the late 1990s the plan’s minimum performance standards for development not exceeding a critical nitrogen loading limit and maintaining or improving coastal water quality were interpreted as the “no net” nitrogen load policy (coastal water quality MPS are shown below; [page 19](#)). This means that development in a watershed to a nutrient-overloaded system cannot add any more nitrogen to the watershed or that the amount of nitrogen added by the project must be offset by an equivalent reduction.

The “no net” policy may be achieved by (1) providing wastewater treatment for the development or redevelopment and additional treatment capacity for nearby land uses; (2) installation of alternative denitrifying technologies for existing septic systems in the same Marine Water Recharge Area; and/or, (3) an equivalent monetary contribution of



\$1,550 per kg/yr of nitrogen towards a municipal or watershed effort that achieves the intent of the “no net” load policy. The implementation of the policy was fairly successful and accepted by the towns and the regulated community. It resulted in increased levels of wastewater treatment from proposed package plants, the construction of package plants with excess capacity to hook in neighboring areas, and hundreds of thousands of dollars in mitigation funds for towns to pursue mitigation and/or Comprehensive Wastewater Management Plans (CWMPs). Most importantly, it resulted in an acceptance that coastal eutrophication was an important matter for Cape Cod and that better treatment of wastewater was required.

The 2009 Regional Policy Plan changed the “no net” policy to reflect the newly adopted TMDLs by MassDEP and EPA as the critical nitrogen loading limit. The performance standard interprets the adopted TMDL as a “fair share.” The fair share is the TMDL equivalent load on a per-acre rate using the watershed and sub-watershed area. DRI project nitrogen loading calculations are reviewed by staff to evaluate how the proponent could best meet the intent of the fair share. The Commission has developed a “Turbo-Loader” spreadsheet that assists staff and project proponents to calculate nitrogen loading and to compare their respective mitigation amount under the fair share.

The Commission’s regulatory review of a CWMP is presently guided by the planning guidance and minimum performance standards of the Regional Policy Plan. The pertinent technical sections of the RPP include water, resources, open space, natural resources, planning, and historic preservation. Some of the requirements in the water section are similar to MassDEP requirements, but some are quite different. The Commission has recently developed [local planning guidance](#) for DRI review of CWMPs and other local wastewater planning efforts.

The pertinent standards for the RPP water section are listed below:

WR3.6 Public and Private Wastewater Treatment Facilities

Public and private wastewater treatment facilities may be used within Marine Water Recharge Areas subject to MPS WR5.2 and MPS WR6.1 through MPS WR6.9 below.



WR4.3 Public and Private Wastewater Treatment Facilities

Public and private wastewater treatment facilities may be used within Freshwater Recharge Areas subject to Goal WR6 and MPS WR6.1 through MPS WR6.9 below.

WR2.3 Restrictions on Private Wastewater Treatment Facilities

Public and private wastewater or treatment facilities with Title 5 design flows greater than 10,000 gallons per day shall not be permitted in Wellhead Protection Areas, except as provided in MPS WR5.2 below and subject to MPS WR6.1 through WR6.9.

WR5.2 Public and Private Wastewater Treatment Facilities

Use of public and private wastewater treatment facilities shall be as follows: Within Water Quality Improvement Areas that are in Wellhead Protection Areas, public and private wastewater treatment facilities may be used to remediate existing problems; within Water Quality Improvement Areas that are in Freshwater and/or Marine Water Recharge Areas, public and private wastewater treatment facilities may be used in conjunction with any development or redevelopment.

WR1.2 Identification of Drinking Water Wells

Development and redevelopment shall identify their proposed drinking water wells and existing private drinking water wells on abutting properties within 400 feet and assess the impact of the development on the water quality of these wells and all other existing wells that may potentially be affected by the proposed development. Septic systems and other sources of contamination shall be sited to avoid adversely affecting downgradient existing or proposed wells.

WR3.1 Critical Nitrogen Load Standard for Development

In watersheds to estuaries/embayments where a critical nitrogen load has been determined, through either a Total Maximum Daily Load (TMDL), or a Massachusetts Estuaries Project-accepted



technical report, development and redevelopment shall not exceed the identified critical nitrogen loading standard for impact on marine ecosystems, except as provided in WR3.3. The Commission shall maintain a list and map of estuary/embayment critical nitrogen loading standards that shall be the basis for applying this MPS; the list and map will be updated on a regular basis as TMDLs are approved by the Massachusetts Department of Environmental Protection and the US Environmental Protection Agency.

WR6.1 Private Wastewater Treatment Facilities

Private treatment facilities shall be permitted only if the implementation timetable of an approved Comprehensive Wastewater Management Plan indicates that there are no feasible public treatment facility options available within three years of the proposed date of construction of a project.

WR6.2 Tertiary Treatment

All public and private wastewater treatment facilities with greater than a design flow of 10,000 gallons per day shall be designed to achieve tertiary treatment with denitrification that meets a maximum 5-ppm total nitrogen effluent discharge standard or through modeling that demonstrates that 5 ppm in groundwater at the downgradient property boundary will be achieved.

WR6.3 Hydrologic Balance

Sewage treatment facilities and their collection and discharge areas shall maintain the hydrologic balance of the aquifer and demonstrate that there are no negative ecological impacts to surface waters.

WR6.4 Development Density Limitations

The construction of private wastewater treatment facilities shall not allow development to occur at a higher density than would be allowed by local zoning unless anticipated and approved through a Commission approved Comprehensive Wastewater Management Plan.



WR6.5 Ownership and Maintenance of Treatment Facilities

The construction of private wastewater treatment facilities shall be consistent with municipal capital facilities plans as applicable. Development and redevelopment using private wastewater treatment facilities shall specify that the municipality shall have the opportunity to assume ownership and maintenance responsibilities for such facilities where desired by the municipality.

WR6.6 Restrictions in FEMA Flood Zones/Other Sensitive Areas

Public and private wastewater treatment facilities shall not be constructed in FEMA V-Zones and floodways, Areas of Critical Environmental Concern (ACECs), wetlands and buffer areas, barrier beaches, coastal dunes, or critical wildlife habitats. Public and private wastewater treatment facilities may be constructed in FEMA A-Zones only to remediate water quality problems from existing development within such A-Zones and consistent with MPS CR2.2 and CR2.8.

WR6.7 Long-term Ownership of Treatment Facilities

The long-term ownership, operation, maintenance and replacement of private wastewater treatment facilities shall be secured as a condition of approval in accordance with Commission, state, and local guidelines

WR6.8 Sludge Disposal

Applications for approval of public and private wastewater treatment facilities shall include a plan for sludge disposal.

WR6.9 Operation, Monitoring, and Compliance Agreement

Private wastewater treatment facilities greater than 2,000 gallons per day (gpd) design flow that require advanced treatment efficiencies greater than that allowed by a DEP permit to meet Commission Minimum Performance Standards, shall demonstrate operation, monitoring and compliance through a Operation, Monitoring and Compliance agreement between the Board of Health and the Cape Cod Commission.



WR6.10 Improvement of Existing Wastewater Treatment

Development and redevelopment are encouraged to increase aggregation and improve the level of treatment of existing wastewater flows.

WR6.11 Water Quality Remediation

When allowing additional development in areas where existing high-density development or large numbers of failing septic systems have led to public health or water quality problems, development is encouraged to install a private wastewater treatment facility or DEP-approved alternative systems with enhanced nitrogen removal as a remedial measure.

DRI REVIEW OF MUNICIPAL COMPREHENSIVE WASTEWATER MANAGEMENT PLANS

A Development of Regional Impact (DRI) is a proposed development that is likely to present development issues significant to more than one municipality in Barnstable County. Projects are referred to the Cape Cod Commission for review as DRIs by a variety of means. The Commission is required to review the proposed development and either approve, approve with conditions, or deny the development proposal.

Municipalities are typically required to file an Environmental Impact Report (EIR) with the Massachusetts Environmental Policy Act (MEPA) Unit for the development of Comprehensive Wastewater Management Plans (CWMPs; see Section II, C, 6). The [Cape Cod Commission Act](#) (Section 12(i)) requires that the Commission shall review as a DRI any proposed development project for which the Massachusetts Secretary of Energy and Environmental Affairs requires the preparation of an Environmental Impact Report. As a result, the Commission conducts a regulatory review, concluding with a written approval containing findings and conditions for all CWMPs proposed by Cape towns. CWMPs typically trigger EIR review because they involve construction of a new wastewater treatment and disposal facility with a capacity of 2,500,000 gallons per day, or because they result in construction of one or more new sewer



mains 10 or more miles long. CWMPs may also trigger mandatory EIR thresholds for land and wetland alterations, impacts to endangered or threatened species or archeological sites, and other factors.

DISTRICTS OF CRITICAL PLANNING CONCERN

The Cape Cod Commission may propose the designation of certain areas of critical value to Barnstable County as Districts of Critical Planning Concern (DCPCs) that must be preserved or maintained due to one or more of the following factors:

- the presence of significant natural, coastal, scientific, cultural, architectural, archaeological, historic economic or recreational resources or values of regional, state-wide, or national significance; or
- the presence of substantial areas of sensitive ecological conditions that render the area unsuitable for development; or
- the presence or proposed presence of a major capital public facility or area of public investment.

A DCPC is a powerful planning tool that allows for the adoption of special rules and regulations to protect, preserve, or promote an area, depending on the purpose of the DCPC. Certain local boards and commissions may nominate as a DCPC land within their own municipal boundaries, as well as land in a contiguous town (for example, a town could nominate land in a shared watershed to a nitrogen-sensitive embayment that lies within a neighboring town). DCPCs may also be nominated by the Cape Cod Commission, the Board of County Commissioners, and the Barnstable County Assembly of Delegates. Upon nomination to the Commission, the DCPC is considered by the Commission, which may in turn recommend it to the Assembly of Delegates and County Commissioners for adoption by county ordinance. Ultimately, implementing regulations are adopted and locally enforced by the town(s) to carry out the purposes of the DCPC. In terms of wastewater nitrogen control, in one example, a DCPC could be used to specify growth expectations in watersheds that are shared between one or more towns. The DCPC is a very flexible land use planning tool that could have many applications for wastewater and growth planning on the Cape.



CAPE COD
COMMISSION

TECHNICAL SERVICES

As the region's leading planning agency, the Cape Cod Commission supports its regulatory and planning mission with the provision of technical services by professional staff in almost every issue area for various county, local, state, and federal agencies. In the area of water resources, the Commission staff has provided support on water supply, freshwater ponds, coastal water quality, wastewater management, and groundwater cleanup. Staff members develop both quantitative and qualitative methods that result in finding cost-effective solutions for common problems shared across the region. Staff members have provided fundamental expertise in the development of local and regional wastewater management planning and in the development of the [tools and resources](#) provided as part of this regional planning effort.



Barnstable County Department of Health and the Environment

MASSACHUSETTS ALTERNATIVE SEPTIC SYSTEM TEST CENTER

The [Massachusetts Alternative Septic System Test Center](#) has been operating since 2000 to research and test advanced on-site wastewater treatment systems. The Center is operated by the [Barnstable County Department of Health and the Environment \(BCDHE\)](#) and is located at the Massachusetts Military Reservation. Although the Center's initial emphasis was on nutrient-reducing technologies, it has more recently been conducting research on the efficacy of commercial and soils-based septic systems for removal of pharmaceuticals and personal care products. The Center has been instrumental in forming and conducting many internationally recognized standards for both secondary and tertiary wastewater treatment. Ancillary projects include the support of research efforts on wastewater diversion techniques, such as composting toilets and urine diversion, and their efficacy for addressing the nutrient management issues in sensitive watersheds.

INNOVATIVE/ALTERNATIVE SEPTIC SYSTEMS PERFORMANCE TRACKING

More than 1,500 innovative/alternative (I/A) septic systems have been installed on Cape Cod in an attempt to reduce the amount of nitrogen in percolating wastewater. These systems range in their complexity, but all require regular maintenance. Some also require monitoring. Since 1999, [BCDHE](#) has maintained a database to assist regulators in the task of tracking performance and adherence to maintenance schedules. Regular performance and compliance updates are provided to local regulatory boards. More recently, to aid the public and engineering professionals, the department has created an



interactive tool to chart performance of all technologies used within Barnstable County. This tool additionally assists wastewater planners to develop realistic performance expectations, thus facilitating accurate Comprehensive Wastewater Management Plans. Occasionally, printed compendia of the information are distributed to local boards and commissions. The department also maintains [training tools](#) to instruct boards of health regarding the proper application of these technologies.

COMMUNITY SEPTIC MANAGEMENT LOAN PROGRAM

The [Barnstable County Department of Health and the Environment](#) initiated the [Community Septic Management Loan Program](#) to assist homeowners by defraying the costs of septic system upgrades through provision for a 20-year betterment. More recently the program has assisted in providing support for the actual connection costs to centralized systems or combined packaged or cluster treatment systems. For more information visit the [Community Septic Management Loan Program](#) website.



Municipal Authority

Municipalities have authority and responsibility over wastewater flows within their jurisdiction in several ways. Boards of health and conservation commissions have jurisdiction over on-site septic systems in certain instances, and stormwater and low-impact development (LID) are typically municipal efforts. What follows is a brief description of board of health and conservation commission authorities, as well as information on the municipal role in stormwater and LID. For more information, see the [Sewers and Smart Growth: Challenges, Opportunities, and Strategies](#) report.

BOARDS OF HEALTH

Municipal boards of health are responsible for enforcing compliance on the local level of Title 5 of the state environmental code ([310 CMR 15.00](#)) that governs wastewater flows of less than 10,000 gallons per day. These board of health responsibilities include:

- issuing permits and licenses for septic systems, septic installers and sewage haulers;
- controlling lot sizes and setbacks for purposes of siting septic system components;
- conducting inspections of septic systems;
- permitting the use of alternative systems, including denitrifying septic systems; and,
- mandating monitoring of alternative systems where applicable.

Boards of health are responsible for defining what constitutes a bedroom for the purposes of septic system design flow requirements.

Boards of health may also promulgate regulations more strict than imposed by Title 5. For example, under Title 5 a leaching field must be located at least 50 feet from a coastal bank, coastal dune, coastal beach, salt marsh, or vegetated wetland bordering on any creek, river, stream, pond, or lake. All Cape towns have increased this setback to 100 feet.



Boards of health may also issue variances and exemptions from certain requirements of local regulations.

CONSERVATION COMMISSIONS

Conservation commissions may have jurisdiction when a septic system is upgraded if the existing system is not located with adequate depth to groundwater or if the leach field is less than the distance required from a wetland resource. If an existing system is repaired or upgraded, the new system must meet the requirements to be outside the 100-foot buffer to the extent possible.

STORMWATER

Stormwater pollution originates when precipitation picks up bacteria, nutrients, pesticides, oils, and other contaminants as it flows over the land. When precipitation flows over impervious surfaces, such as roads and parking lots, it is quickly transported to water bodies through stormwater catchments or by simply running off roads and into water bodies. Stormwater pollution is a significant contributor to water quality degradation across the country.

The federal Clean Water Act and state laws and regulations require communities to treat and manage stormwater, an expensive mandate that has increasingly challenged the budgets of municipalities. Most Cape towns are now subject to Phase II regulations of the Clean Water Act's National Pollutant Discharge Elimination System permitting program. The Phase II permit may mandate significant increases in the requirements for catch basin cleaning, street sweeping, and monitoring. Meeting TMDLs for nutrients and bacteria may also require enhancement of a town's stormwater management system.

Constricted municipal budgets and inadequate federal and state grants and loans have led many communities to cut back on necessary maintenance and capital improvements to stormwater infrastructure. Delaying maintenance leads to increased degradation to water resources and higher expenses in the future to repair infrastructure.



STORMWATER UTILITIES

Concerns about meeting regulatory requirements to improve stormwater systems have led many communities to adopt stormwater utilities to pay for the cost of stormwater infrastructure and maintenance. According to the US EPA, more than 800 such utilities existed in the United States in 2009. Massachusetts passed enabling legislation ([MGL Chapter 83, Section 16](#)) several years ago allowing municipalities to create stormwater authorities and charge utility fees. Another piece of legislation ([MGL Ch 40 Section 1A](#)) provides a definition of a district for the purpose of water pollution abatement as well as for other purposes. Municipalities can use these two laws together to create an authority to manage stormwater and to charge utility fees. At least two Massachusetts towns have done so.

Funding mechanisms for stormwater utilities can take several different forms. As impervious area is the most important factor influencing stormwater runoff, it is therefore a major element in each method. The Equivalent Residential Unit method (also known as the Equivalent Service Unit method) is the most common approach, accounting for 80 percent of all stormwater utilities. Under this method the utility charges an amount proportional to the impervious area on the parcel, regardless of the parcel's total area. A representative sample of single-family home parcels is used to determine the impervious area of a typical parcel. This area is called one Equivalent Residential Unit or ERU. Generally all single-family homes up to a defined maximum total area are billed a flat rate for one ERU. In other some cases, several tiers of single-family home flat rates are established, an approach that improves the equitability of the charge to homeowners. The impervious areas of non-single family home parcels are usually individually measured.

The Intensity of Development method is another approach to allocate costs for stormwater. It is based on the percentage of impervious area relative to the entire size of a parcel. Developed parcels are charged based on their intensity of development, which is defined as the percentage of impervious area of the parcel. Vacant or undeveloped parcels are charged a lower fee. Because this method accounts for stormwater from pervious portions of parcels, it is more equitable than the Equivalent Residential Unit method. However, this method is more difficult to implement because the pervious and impervious areas of all parcels must be evaluated.



A third option is the Equivalent Hydraulic Area method in which parcels are billed on the basis of the stormwater runoff generated by their impervious and pervious areas. The rate charged for impervious areas is much higher than that for pervious areas. As parcels are billed on the basis of individual measurements of pervious and impervious areas, this approach is more time-consuming.

In 2009, the Town of Yarmouth, in collaboration with other organizations and agencies, sponsored a workshop to determine how the town could meet existing stormwater management needs and regulations and the feasibility of a utility to provide a user fee structure to support stormwater needs ([Yarmouth, Town of 2009](#)). The town identified flooding, aging infrastructure, inability to inspect and maintain existing stormwater structures, unfunded regulatory mandates, and shellfish bed and beach closings as the most compelling reasons to seek additional sources of funding for stormwater management.

Workshop participants determined that a tax increase or a stormwater user fee were the only methods capable of raising a stable and adequate revenue stream to meet needs. Participants also discussed the feasibility of creating a water quality utility to address wastewater and stormwater together. Another option discussed was the creation of a regional stormwater utility in which towns retained autonomy for local systems but shared resources to manage the infrastructure.

LOW-IMPACT DEVELOPMENT

Low-impact Development (LID) is a comprehensive, conservation-based approach to land use planning. LID maintains the pre-development hydrology of a site through the use of natural stormwater best management practices including bio-retention filters, vegetated swales, shared driveways, pervious concrete, green roofs, and other strategies that promote the infiltration, filtering, storage, and evaporation of water on location. See pages 20–27 of the [Technology Assessment: Green Infrastructure and Alternative Approaches](#) section.

