

Action Plan

Managing Sewage Treatment Facilities

Problem

All sewage facilities cause, or have the potential to cause, local decline in water quality. In many instances, sewage treatment facilities have caused regional declines in the health of coastal ecosystems. The type of treatment provided, the location of the discharge, and the types of wastes collected by sewers are critically important to the impacts caused by these systems. As population in the Buzzards Bay drainage basin grows, there will be a need to expand the capacity of existing facilities or to create new ones. Most of these systems are publicly owned sewage treatment facilities (also called publicly owned treatment works, or POTWs), hence the operation of these facilities and the siting of future sewage treatment facilities is critically important to the local and regional water quality in Buzzards Bay.

Background

There are six publicly owned treatment works (sewage treatment facilities) in the Buzzards Bay drainage basin (Table 5.6). One of these facilities discharges to groundwater (Falmouth); the others discharge to surface water.

The federal Water Pollution Control Act of 1972 required that, by 1983 (later adjusted to 1988), sewage treatment facilities that discharge to surface waters must provide a minimum of secondary treatment (biological processes that remove a minimum of 85% of the organic matter). The Act does not apply to Falmouth, because it has a groundwater discharge. All facilities, except New Bedford, have now complied with the

Table 5.6. Buzzards Bay POTWs

City POTW	Design Capacity	Average Discharge	Population Served	Treatment Level	Improvements Underway	Site Of Discharge
Dartmouth	2.0 MGD	2.8 MGD	10,000	Secondary	2.8 MGD	Marine
Fairhaven	5.0 MGD	4.9 MGD	15,000	Secondary		Marine
Falmouth	0.8 MGD	0.6 MGD	1,500	Second/Tertiary	-	Groundwater
Marion	0.6 MGD	0.4 MGD	2,100	Secondary	--	Freshwater
New Bedford	30 MGD	23 MGD	102,000	Primary	Secondary	Marine
Wareham	1.8 MGD	1.0 MGD	10,000	Secondary	--	Freshwater

Act. Because there are special problems faced by New Bedford and the upgrade of its treatment facility, these issues are discussed separately in Chapter 6.

For the most part, detrimental effects from the discharges of sewage treatment facilities are localized near the sites of discharge. These effects are most acute when the discharge occurs in poorly flushed areas. Both the New Bedford and the Dartmouth

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plants discharge to well-mixed portions of Buzzards Bay, although the New Bedford discharge is of such a magnitude that it has appreciable effects over a broad area. The Fairhaven treatment facility discharges to New Bedford's Inner Harbor and would be a significant source of pollution except that resources in this area are significantly impacted by other pollution. The Wareham and Marion facilities discharge to streams or rivers that flow into small embayments (Wareham River estuary and Aucoot Cove, respectively), and nitrogen from these facilities is probably impacting the receiving waters, especially in the poorly flushed Wareham River estuary. The Falmouth facility discharges some effluent from the secondary treatment lagoons by spray irrigation. This removes large amounts of nitrogen from this part of the total facility volume. Both the spray irrigation and the infiltration beds servicing the lagoons leach into groundwater and will eventually impact West Falmouth Harbor with nitrogen inputs. There has not been enough study to determine to what degree these embayments have been, or will be, impacted.

State and federal governments regulate the discharges of sewage treatment facilities through permits granted under the National Pollutant Discharge Elimination System (NPDES). These permits set allowable concentrations of pollutants in the effluent from treatment plants. Discharge permits generally have requirements limiting the concentrations of suspended solids, biochemical oxygen demand (BOD), fecal coliform bacteria, and chlorine that can be in the effluent. Nutrient levels (nitrogen and phosphorus), in the discharge also cause problems in the receiving waters, but are typically not addressed in the permit.

If an industry tied into the system is known to produce toxic materials, or if there has been an identified contaminant problem in the past, the permit may also contain chemical-specific limits, so that special attention can be focused on the contaminants of concern. All permits require self-monitoring by the discharger in order to demonstrate compliance with the specified permit limits. According to federal and state law, municipal plants that treat industrial and commercial contaminants must institute a pretreatment program. This program is designed to identify the sources of toxic compounds and require the contributor to reduce or remove these materials prior to discharge into the sewer system. Each individual contributor must therefore remove specified pollutants from the flow before it is discharged into the municipal system. In some cases, industries are issued their own permits to discharge directly to the receiving water. The requirements for these permits are always at least as strict as those for a municipal discharge.

Three of the existing municipal facilities in Buzzards Bay (Table 5.4) are in either the planning or construction phase of capacity expansion or treatment-level upgrade. New Bedford is under a court order to upgrade its treatment level to secondary by 1994.

All of the discharges are sources of bacterial contamination and require closure areas around the outfalls for the protection of public health. These discharges have a significant impact on shellfish resources and sometimes close swimming beaches. This is particularly true for New Bedford and Dartmouth and, to a much lesser extent, for the other communities. All of these treatment plants use chlorine to disinfect the treated wastewater. Although chlorine is an efficient and cost-effective means of disinfection, there is concern that chlorine residuals in wastewater discharged to the

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Bay may have detrimental effects on marine life and the long-term viability of the ecosystem.

The Ocean Sanctuaries Act prohibits any new discharges from wastewater treatment plants directly into Buzzards Bay. This includes any increase over the design capacity of the discharge, even if it is of significantly higher quality. Thus, a community cannot increase its volume of discharge in response to increased development or sewer use. An amendment to the Act was passed in January 1990 to allow for a variance procedure administered by the Department of Environmental Management. However, in keeping with the spirit of the Ocean Sanctuaries Act, any variance that is considered must meet very stringent criteria. In general, municipal wastewater discharges will only be allowed when an existing discharge had degraded or threatens to degrade Buzzards Bay and when a land application is not feasible.

The antidegradation provision of the Commonwealth's water quality standards is a potent regulatory tool that protects the beneficial uses of the state's waters from contamination by municipal treatment plants and other sources. The antidegradation policy (1) safeguards present water quality conditions necessary to protect existing uses; (2) maintains water quality that exceeds the level necessary to support propagation of fish, shellfish, wildlife, and recreation unless lower water quality is necessary to accommodate economic or social development; and (3) maintains and protects outstanding resource areas designated by the state in an absolute fashion with no qualifications.

Major Issues

Population in the basin will grow, and there will be future need to increase the capacity of existing facilities or introduce new facilities. To protect marine water quality, the preferred option for disposing sewage appears to be land-based disposal, particularly if it includes tertiary treatment (as is the case in Falmouth). But in many areas, land-based application is not a feasible option, either because of hydrologic conditions or shortage of suitable land. In these cases, other alternatives must be considered that would best protect human health and the environment. In most cases, disposal of primary or secondary effluent to surface waters is not desirable, particularly if they are nitrogen-sensitive, or have significant living resources or uses.

All treatment plants produce sludge as a by-product. Given the capacity problem at local landfills to receive sludge, the long-term disposal is an issue. Sludge with low concentrations of toxic materials can be composted and used as a soil additive. However, sludge with high concentrations of toxic materials is harder and more costly to dispose of. Toxicants in sludge result largely from materials entering the sewer systems from homes and industry. For this reason, the reduction of toxic contaminants entering the waste must be accomplished through aggressive programs of industrial pollution prevention and if necessary, pretreatment and homeowner toxic use reduction.

Many of the treatment plants in the area have antiquated sewer collection systems. These are either combined sanitary/stormwater systems, or they were intentionally designed to allow for the draining of groundwater from low areas. The introduction of stormwater and groundwater into the collection system reduces the effectiveness of the

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plant. Although the cost is prohibitive to correct all the sources of groundwater and stormwater to these systems, correction of the major problem areas can improve plant operation and capacity. Water-conservation measures are also very effective at reducing volume of flow at treatment facilities.

Goal

Achieve water quality standards and protect natural resources at all POTW discharge points.

Objectives

To improve POTW efficiencies by setting limits on chlorine residual discharges and monitoring for effective effluent disinfection, encouraging industrial pollution prevention and pretreatment efforts, and reducing nitrogen inputs.

CCMP Commitments

Department of Environmental Protection (DEP)

DEP will designate all existing aquatic Areas of Critical Environmental Concern (ACECs) as outstanding resource waters subject to the highest level of protection under the Antidegradation provisions of the Clean Water Act. DEP will work with the Buzzards Bay Project, Coastal Zone Management, and the Cape Cod Commission to determine if additional areas within the Buzzards Bay watershed should be designated as ACECs.

Target date: 1992

Environmental Protection Agency (EPA)

EPA will conduct evaluations of Dartmouth, Wareham and Fairhaven municipal discharges. Using the ten criteria established under Section 403(c) of the Clean Water Act, EPA will ensure that these discharges are not having an adverse impact on coastal water quality and ecosystems.

Target date: 9/91

Other Recommended CCMP Actions

1. The state management framework for protecting the quality of surface water should be made more comprehensive to address nitrogen from existing and future sewage treatment facilities. In particular, DEM should enforce the Ocean Sanctuary Act.

2. Communities should develop and implement plans to reduce effluent volume.

These plans should include strategies to reduce groundwater infiltration and stormwater inputs, as well as to promote water conservation by individuals and businesses.

3. Communities should develop and implement programs of industrial pretreatment and industrial and household hazardous waste reduction where appropriate.

4. Future sewage treatment facilities and outfalls should be sited so that they minimize pathogen contamination, nitrogen impacts, and threats to human health and marine ecosystems.