Action Plan
Controlling Stormwater Runoff

Problem

Rainwater running off streets, parking lots, roofs, lawns, golf courses, agricultural land and other pervious and impervious areas carries a number of important contaminants into Buzzards Bay via stormwater drains. Paved roads and parking lots that are connected to Buzzards Bay by drainpipes offer major contaminant pathways for wastes that were once isolated from the Bay. Bacterial loading from stormwater runoff is forcing the closure of shellfish beds and sometimes the temporary closure of swimming beaches in Buzzards Bay embayments. Stormwater runoff is also contributing to other water quality problems, including pollution from hydrocarbons, metals, and floatable debris, and accelerated sedimentation. Although concerns remain about the long-term impact of metals and other pollutants discharged during storm events, this action plan is most concerned with the closure of shellfish beds due to fecal coliform bacteria in stormwater runoff.

At least three years of site-specific data from Buttermilk Bay, as well as data produced nationwide, have pointed to stormwater as a major source of bacterial contamination. Over 22 discharge points into Buttermilk Bay have been investigated. Although no illegal sanitary hookups to stormwater pipes were found, during rain events the stormwater pipes were found to discharge significant amounts of bacteria that led directly to shellfish bed closures.

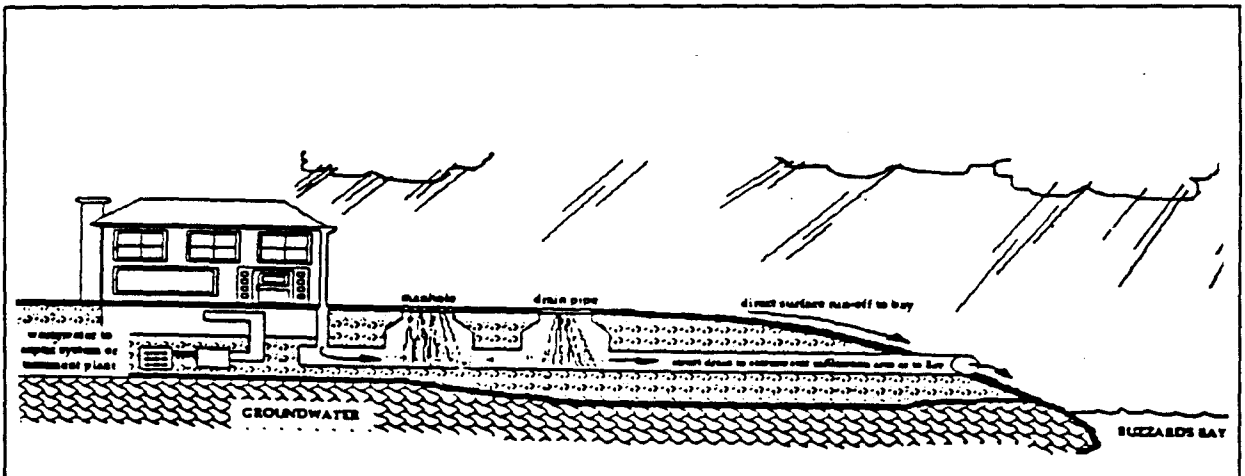

Figure 5.6. A multiple pipe system consists of pipes carrying residential wastewater and separate pipes carrying stormwater.

Background

EPA recently issued national regulations governing permitting of certain categories of stormwater discharges. These include stormwater discharges associated with industrial activity; discharges from large municipal separate storm sewer systems (systems serving a population of 250,000 or more); and discharges from medium municipal separate storm sewer systems (systems serving 100,000 or more, but less than 250,000). Unfortunately, these categories do not apply in Buzzards Bay – even New Bedford is under 100,000 population. However, the regional EPA office has indicated its willingness to issue permits, on a limited basis, for problem drains that adversely impact the Bay, its uses, or critical areas surrounding the Bay such as wetlands. These permits would require that stormwater discharges meet existing state water quality standards, including standards for fecal coliform.

At present, new storm drains are being regulated entirely at the local level through subdivision bylaws and road-drainage regulations. This type of local regulation is sometimes inconsistent from one community to the next. More of a problem, though, is that neither the federal permits nor local regulations address the majority of existing storm drains, which is the major problem.

The Massachusetts Division of Marine Fisheries recently completed sanitary surveys for open 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. This information is available to all Buzzards Bay communities and provides an excellent database of existing drains, their location, size, and probable impact to receiving waters.

In 1988, the Buzzards Bay Project initiated a demonstration of ways to remediate existing stormwater discharges. Under a grant from EPA, water from major storm drains (Electric Avenue in Bourne and Red Brook in Wareham) is being diverted so that it no longer flows directly into Buttermilk Bay. In the case of the Electric Avenue discharge pipe, a structure that resembles a large septic system with several leaching chambers was constructed to receive the stormwater flow and discharge it to the ground adjacent to the bay. Monitoring wells have been installed near the discharge points to determine the effectiveness of this method. Using a similar principle, the Red Brook drain will be diverted into a ponding area where the water can percolate naturally through the soil before it reaches the bay. These methods were chosen based upon results of National Urban Runoff Program and other appropriate projects. Evidence from these studies indicates that when facilities are properly located, sized and installed, they achieve high levels of stormwater treatment and result in insignificant groundwater degradation.

An archaeological investigation and easement arrangements have delayed the Red Brook project. However, monitoring at the Electric Avenue structure indicates that over 98% of the fecal coliform is being removed. These facilities will not only remove bacteria, but will also significantly reduce the concentrations of heavy metal, pesticides, and hydrocarbons in stormwater reaching the Bay. Some contaminants will settle to the bottom or float to the top of the settling tank and be pumped out regularly while ohter pollutants may be tied up in the unsaturated soil beneath the leaching field.

No single stormwater remediation technique solves all runoff problems. Accepted best management practices (BMPs) for stormwater include:

- Infiltration devices to increase the percolation of stormwater into soil and thus decrease overland runoff volume, including porous pavement, soak-away pits or dry wells, seepage or infiltration trenches, recharge or percolation basins and grass swales
- Wet detention basins to detain runoff and allow for settling of pollutants associated with sediments and reduction of nutrients through biological processes
- Public works cleaning practices to remove potential pollutants from streets and storm sewers, including street cleaning and cleaning catchbasins and stormsewer pipes.

A proper mix of stormwater control techniques can satisfy four major concerns: flooding, erosion, water quality, and groundwater recharge. Individual site conditions, type and use of receiving waters, and cost will determine the most appropriate design. Costs are usually determined by the system's capacity, which is primarily designed to handle the "first flush" from a storm, when contaminant levels are highest. Maintenance costs, however, may exceed construction costs with certain systems. Of the techniques listed, infiltration devices are most efficient at controlling coliform pollution from stormwater runoff.

The greatest potential for utilizing the full range of BMPs for stormwater control is in undeveloped areas where the reduction of future pollutant loadings can be realized for the least cost. There is a great opportunity in such areas to employ land-use planning, especially in subdivision designs, to reduce future runoff volumes and corresponding pollutant loads. Developing communities can incorporate structural measures to reduce runoff and can also implement construction-site erosion BMPs into their development plans.

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 Electric Avenue structure cost over $100,000 to complete. The Red Brook project is feasible only because the land owner is a conservationist who allowed an easement to the town. The costs of stormwater BMPs are usually borne by the municipality and its residents, but benefits accrue to all users of the municipality's coastal 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.

Major Issues

The State Department of Public Works (DPW) has as its primary mission the construction of safe roads. This includes the removal of stormwater from those roads as quickly as possible. Accordingly, resource protection and water quality considerations are secondary concerns for DPW. Also, bridge projects and widening of less than one lane on state roads are exempt from the Wetlands Protection Act. This exemption compromises the ability of local conservation commissions to protect wetlands. It is important to work with the DPW to ensure that water quality impacts

are considered during road and bridge construction. The activities of town DPWs should receive the same attention.

As discussed above, the construction of stormwater treatment facilities can be costly. Any town that is contemplating such an effort 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 that are "cross-connecting" with the drain.

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 effect similar and equitable stormwater controls in order for the affected resource to be fully protected.

Most stormwater drains 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 (see discussion in Chapter 8). Alternatively, dry weather flows could merely indicate groundwater infiltration.

On pages 26 and 164, inadequacies of the fecal indicator are discussed. While it is true that many stormwater discharges are high in fecal coliforms and not necessarily high in pathogens, treatment is desirable for the removal of other pollutants.

Goals

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

2. Correct existing stormwater runoff problems that are causing or contributing to water quality degradation or shellfish-bed closures in Buzzard Bay.

Objectives

1. To institutionalize at the local level (through education and regulation) the use of best management practices for stormwater control in newly developed areas.

2. 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.

CCMP Commitments

Department of Environmental Protection (DEP)

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.

Target date: 6/93

Interim Action: DEP in association with EPA will conduct a pilot stormwater permitting project in one or two Buzzards Bay towns. During the fall of 1991, discharges in these towns will be monitored before and after rain events by DEP and EPA. In late 1991 and early 1992, using the information gathered during this sampling project, DEP and EPA will issue joint permits for those discharges which are causing a significant water quality impact. In addition, DEP will work with EPA and the Town(s) to develop a policy on how many new discharges can be allowed or what types of best management practices must be put into place without causing state water quality criteria to be exceeded.

The DEP Antidegradation Task Force will consider the results of the above project in developing its stormwater policy for adoption in the 1993 revisions of the state water quality criteria.

Buzzards Bay Municipalities

Bourne, Wareham, and Marion will pursue adoption of subdivision rules and regulations that require best management practices for stormwater runoff.

Target date: 1992

Other Recommended CCMP Actions

1. All other Buzzards Bay communities should adopt subdivision bylaws that require that best management practices for stormwater runoff be incorporated into any new development plans.

Target date: 1994.

BMPs such as porous pavement for driveways or parking lots, infiltration basins, and grass swales can be quite effective in reducing stormwater runoff from residential or commercial areas. By incorporating such practices as mandatory requirements for new areas of development, future stormwater impacts to Buzzards Bay and its resources can be avoided. In general, efforts should be made to retain and treat stormwater on site.The USDA Soil Conservation Service (SCS) should provide technical assistance to communities in developing BMPs for their subdivision bylaws. SRPEDD will help ensure consistency of regulations between communities that share watershed areas.

2. Each Buzzards Bay community should implement best management practices for storm drains that are contributing to shellfish-bed closures.

Target date: beginning immediately and as funds allow.

Communities should prioritize storm drains based on their effect on critical waters and the feasibility and cost of remediation (as described in the attached worksheet). Towns sharing an embayment or particular affected shellfish resources should coordinate their efforts to ensure that the remediation projects will result in the reopening of shellfish beds. SCS will provide technical assistance in helping communities determine BMPs for site-specific situations. The Buzzards Bay Project will provide communities with maps indicating major stormwater problems.

Implementation Costs

There are a number of Best Management Practices that can be used to control stormwater runoff. The Financial Plan provides a brief description of each BMP and the estimated costs for new construction, routine and non-routine maintenance, and retrofitting. See Financial Plan Volume II, Chapter 2 for potential sources of funding and revenue options.

3. The Commonwealth, through the Executive Office of Environmental Affairs, should provide funding for local stormwater remediation projects.

Target date: 1993.

The state should expand its current stormwater-remediation bond program to encompass all Buzzards Bay communities and should use funds generated through issuance of these bonds to finance stormwater remediation projects undertaken in the Buzzards Bay watershed. These funds should be preferentially directed to communities willing to match state funds with local funds.

4. The State Legislature should not continue to exempt bridge work and road widening by the state DPW from review by local conservation commissions.

Target date: 1992.

Eliminating this exemption will allow Buzzards Bay communities to protect sensitive wetlands from stormwater runoff from roads.

5. SCS should institute a program for implementing best management practices on agricultural lands in the Buzzards Bay area.

Target date: 1991.

SCS has targeted Buzzards Bay under its new "hydrographic unit initiative" and has begun a three-year program for providing education and technical assistance to reduce nonpoint-source pollution from agricultural operations and stormwater. In addition, cost sharing has been expanded for construction or installation of agricultural BMPs.

WORKSHEET FOR PRIORITIZING STORMWATER DRAINAGE MITIGATION PROJECTS[1]

PART I — DESCRIPTION OF AREA

The first part of the prioritizing process is to physically describe the area of the proposed mitigation. Make a copy of a map of the area from any convenient source (town assessor's map, commercially produced, or enlarged section of U.S. Geological Survey map) and attach it to this worksheet. On the map, note the locations of all potential sources of additional contamination within 500 yards of the proposed mitigation project. Then describe these potential sources below in as much detail as possible. This information is extremely important because it helps determine the probability that mitigating this drainage problem will be successful (i.e., result in a noticeable improvement in water quality after its completion).

NAME OF DRAINAGE AREA PROPOSED FOR MITIGATION (reference drain by street, receiving water, and adjacent landmarks)

DESCRIPTION OF POTENTIAL SOURCES OF CONTAMINATION IN THE AREA NEAR THE PROPOSED MITIGATION SITE.

OTHER DISCHARGE PIPES:

DISTANCE IN FEET FROM RESOURCE:

BOAT RAMPS:

BERMED SECTIONS OF ROADS:

MARINAS:

SEPTIC SYSTEMS:

OTHER:

PART II — CALCULATION OF NUMERICAL INDEX

The second part of the prioritizing process is to calculate a numerical index for ranking proposed projects. The index incorporates information about the relative importance and present state of the resource impacted (i.e., how is the shellfish/swimming resource now classified?).

Question 1. Does the discharge impact an area containing shellfish?

Score 5 if YES

Score 0 if NO

Question 1 score_____

Question 2. Does the discharge enter a swimming area?

Score 5 if YES

Score 0 if NO

Question 2 score_____

Question 3. Usage of the swimming area.

Score 20 if public beach, heavily used with all facilities

Score 15 if public beach, no facilities

Score 5 if other (small beaches with limited access)

Question 3 score_____

Question 4. As a result of the discharge, do the waters at the adjacent beach experience elevated fecal coliform counts following rain events?

Score 20 if fecal coliform >199 FC/100 ml

Score 10 if fecal coliform >49 FC/100 ml but < 200 FC/100 ml

Score 5 if fecal coliform >0 FC/100 ml but <50 FC/100 ml

Question 4 score_____

Question 5. Is there sufficient data to demonstrate that remediation of this source will significantly improve water quality in the area?

Score 15 if professional judgement of DMF that this is a significant source and its clean up may cause reclassification of the area.

Score 10 if some substantiating data by DMF and other sources

Score 5 if professional judgement not substantiated by significant data

Question 5 score_____

Question 6. Is the area productive for shellfish?

Score 20 if very productive

Score 15 if moderately productive

Score 10 if has some production

Score 5 if no history of significant production

Question 6 score_____

Question 7. Is the shellfish harvesting area now open?

Score 20 if YES

Score 10 if SEASONALLY

Score 5 if CLOSED

Question 7 score_____

INDEX CALCULATION

TOTAL SCORE QUESTIONS 1 THROUGH 7_____

1 This worksheet was developed by the Cape Cod Marine Water Quality Task Force and has been slightly modified.