Stormwater

Casco Bay Plan

STORMWATER
in Casco Bay

To protect and restore Casco Bay from the adverse effects of stormwater, the Management Committee established the following goal and objectives:

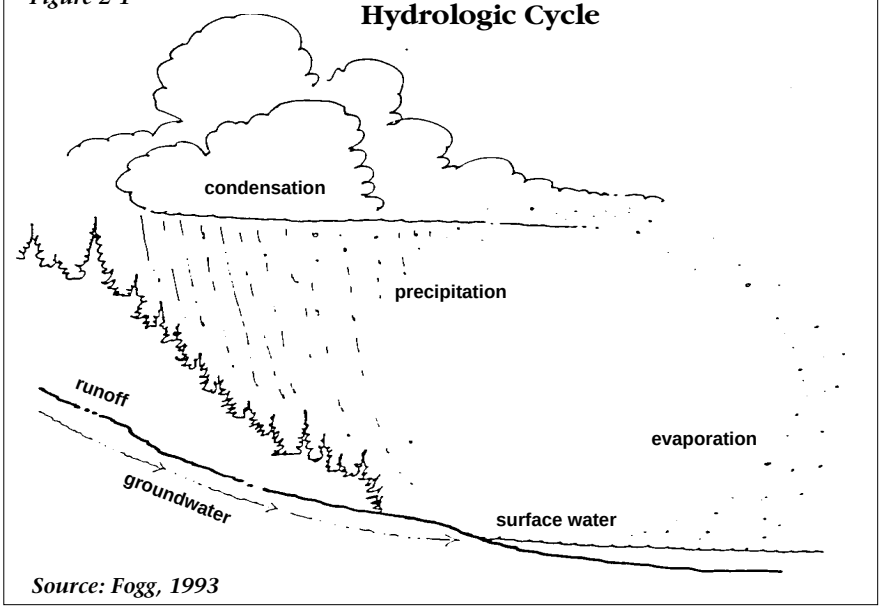
GOAL:
Minimize the loading of pathogens, toxics, nutrients, and sediments from stormwater and combined sewer overflows to Casco Bay.

OBJECTIVES:
- *Reduce loading from combined sewer overflows.*
- *Reduce loading from nonpoint sources of pollution.*

Introduction

Water is constantly cycling through nature — evaporating into clouds, dropping back as precipitation, and moving over and through the ground to streams and, eventually, to the sea.

Figure 2-1



Source: Fogg, 1993

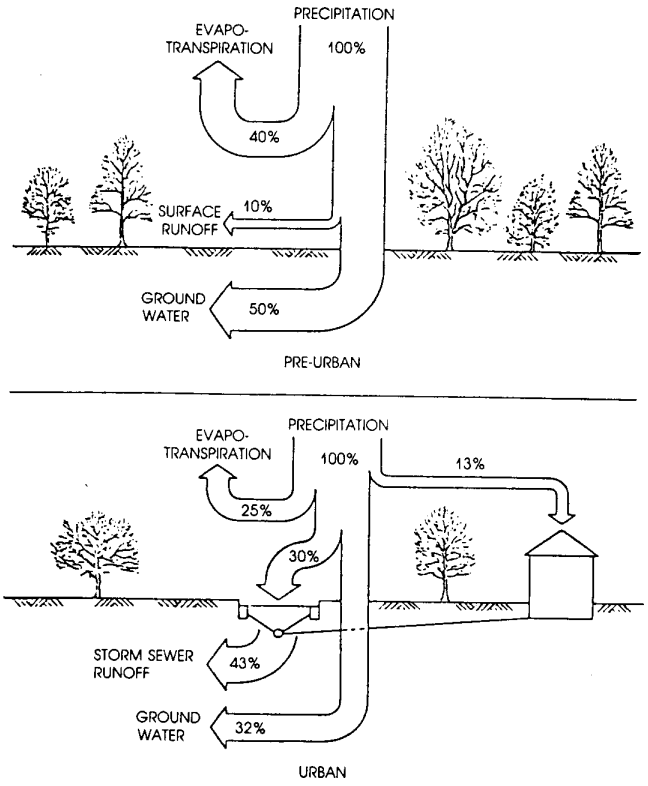
The water that runs along the ground after a rainfall (or during snowmelt) is known as stormwater. In an undisturbed natural setting, stormwater usually does not pose a problem because plants and soil absorb the water, slowing its flow. Soils usually filter and clean the percolating water before discharging it to streams, rivers, lakes, and the sea.

In built-up areas, stormwater causes three problems — erosion, flooding, and water pollution — because pavement, lawns, and hard surfaces slow water absorption into the ground, enabling it to flow rapidly across land surfaces. Stormwater flow may cause

flooding or severe erosion of surface soils, streambanks, and streambeds, particularly in many portions of the Casco Bay watershed where soils are highly erodible even when undisturbed.

Figure 2-2

Comparison of Runoff Between Undeveloped and Developed Landscapes



Source: New York Department of Environmental Conservation, 1992

Stormwater picks up sediments, bacteria, nutrients, chemicals, and debris as it runs across lawns, roofs, driveways, parking lots, and residential, commercial, and industrial sites. Laden with a variety of pollutants, stormwater then flows into water bodies and storm sewers that drain into Casco Bay. Bacteria and pollutants carried in stormwater have caused periodic closure of productive shellfish flats and swimming beaches in Casco Bay. Stormwater runoff may be the single greatest contributor of contaminants to Casco Bay.

Stormwater can be a veritable witch's brew of bacteria and viruses, nutrients, heavy metals like lead and mercury, PCBs (polychlorinated biphenyls), PAHs (polynuclear aromatic hydrocarbons), oil and grease, and pesticides (U.S. Environmental Protection Agency, 1983). The quantity and type of pollutants distributed by stormwater depend on the nature of the storm and the surfaces over which water flows.

Much has been learned about stormwater in recent years, with new techniques developed for taming its content and flow. Regulatory requirements and governmental programs have offered incentives for states and municipalities to reduce stormwater runoff.

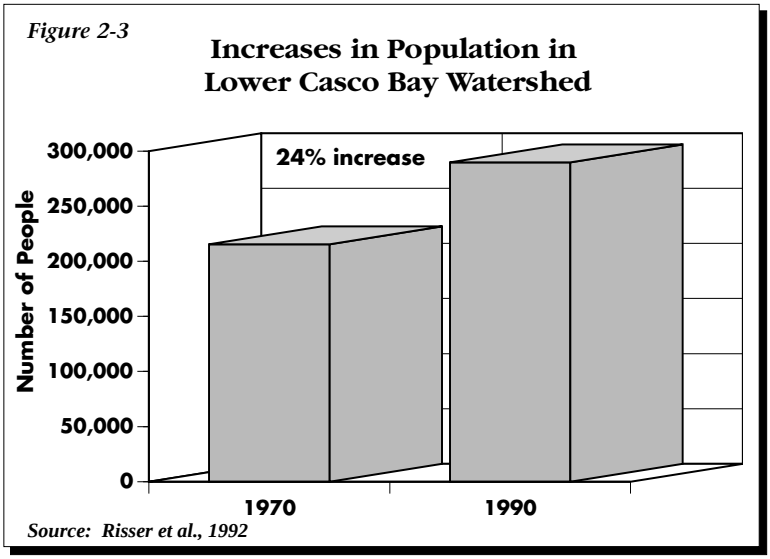
Stormwater runoff may be the single greatest contributor of contaminants to Casco Bay.

Water Quality Problems

Status and Trends

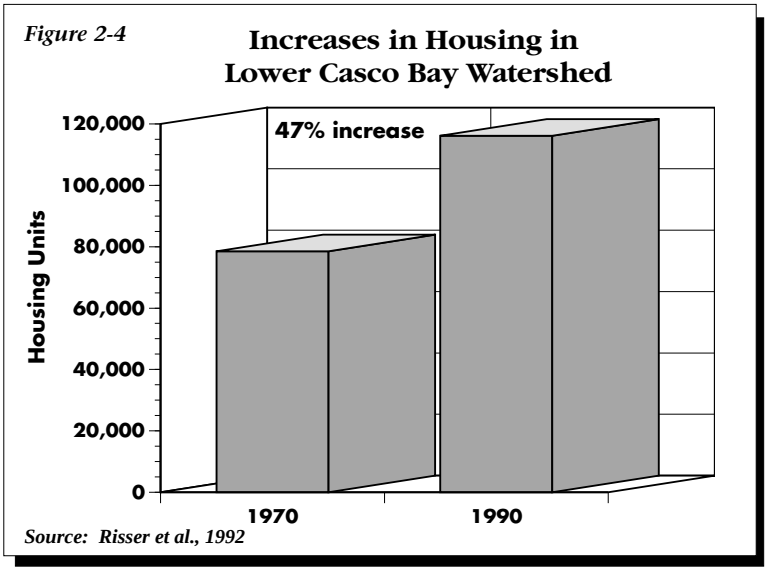
The water quality of Casco Bay has improved over the last 20 years due to construction of municipal sewage treatment plants, changes in manufacturing processes, and industrial treatment of wastewater prior to discharge. Despite these improvements, there is still a significant pollutant load reaching Casco Bay due to the increased number of vehicles, mileage driven, and development in the area. *During the last two decades, the number of housing units within the lower Casco Bay watershed almost doubled.* The 25 municipalities below Sebago Lake, which constitute the lower Casco Bay watershed, grew by 51,000 people (24 percent increase) and 37,000 housing units (47 percent increase) (Risser *et al.*, 1992).

Figure 2-3



Source: Risser et al., 1992

Figure 2-4

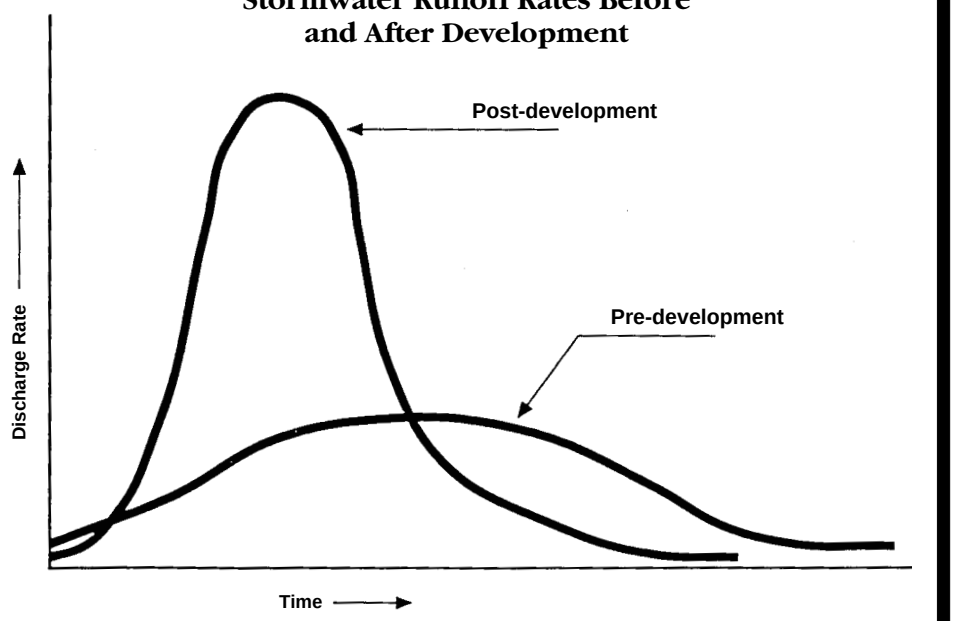


Source: Risser et al., 1992

There is abundant evidence of stormwater pollution throughout the bay watershed.

- Casco Bay waters in the Portland area fail to meet the state's minimum marine water quality standards during rainy weather, while meeting the same standards during dry weather (CH2M Hill and Dufresne-Henry, Inc., 1992).
- *Within the Casco Bay watershed, 56 miles of rivers and tributaries fail to meet water quality standards because of pollution from stormwater runoff due to urban or agricultural uses* (Maine Department of Environmental Protection, 1994). Even rivers that do meet their water quality standards can contribute significant pollution to Casco Bay during storm events because stormwater runoff carries pollutants from land surfaces into rivers, which then drain into Casco Bay. In addition, most water quality sampling is conducted during dry weather conditions (in summer), so pollutants discharged during wet weather go undetected.
- *The 1991 Sediment Contamination Study conducted for the Casco Bay Estuary Project shows high levels of toxics commonly associated with stormwater runoff*. Toxic pollutants such as oil and grease, heavy metals, and hydrocarbons are often attached to the sediment particles washed off by stormwater into streams and rivers. When polluted, sediment-laden fresh water enters marine waters, it reacts chemically with salt water to form larger particles that settle to the bottom, creating a contaminated sediment layer that may be distributed by currents, storms, and tides.
- *Thirty-seven percent of Casco Bay's shellfish flats were closed to harvesting as of May 1995 due to actual or potential contamination, based on analysis by the Casco Bay Estuary Project and Maine Department of Marine Resources*. To protect public health, the federal Food and Drug Administration and the state require that commercial shellfish be harvested only from shellfish flats where positive proof of clean water is available.
- A stormwater sampling study of the Maquoit Bay area (in Brunswick and Freeport) identified the relative contributions of nitrogen and bacteria from different land uses (including residential, agricultural, and forest lands). Assumptions include septic systems and agriculture as the primary contributors of both nitrogen and bacteria.
- Portland's Capisic Brook has experienced increased flooding due to stormwater runoff over the last 30 years as impervious surfaces in the area have replaced absorptive wetlands.
- *The Maine Department of Environmental Protection has found unnaturally high levels of lead and mercury in the tissue of blue mussels taken from inner Casco Bay, near the mouth of the Fore and Presumpscot rivers* (Sowles, 1993). These toxics were transported to the sediments of Casco Bay by stormwater runoff, combined sewer overflows, and other point sources. *(A further explanation of combined sewer overflows appears on page 26.)*

Figure 2-5



Source: U.S. Environmental Protection Agency, 1993c

- *The composition of the benthic animal community in the Fore River has been drastically altered by pollution, including that from combined sewer overflows and stormwater runoff.* Most of the expected members of this community, such as mollusks and crustaceans, were absent; the types of worms collected are those commonly found in polluted areas.
- Where current water quality standards are being met, there are warning signs of potential future problems (Presumpscot River Watch, 1991). Sampling at 20 sites along the Presumpscot River in 1990 found that the water met assigned standards at most locations, except those below the dam in Westbrook, where direct industrial discharges and municipal overflows elevated levels of bacteria (toxics and nitrogen were not measured). However, sampling of tributaries feeding the Presumpscot River showed higher levels of bacteria than water quality standards allow.

This data provides evidence of a growing problem. With continued development around greater Portland, the problem will grow unless appropriate stormwater controls are enacted.

Pollution Sources

There are two primary sources of contaminated stormwater. The first, known as point sources, conveys stormwater runoff into rivers and the bay through direct, identifiable conveyances such as pipes. The second, known as nonpoint sources, includes runoff from land, rain, or snowfall, or groundwater seepage

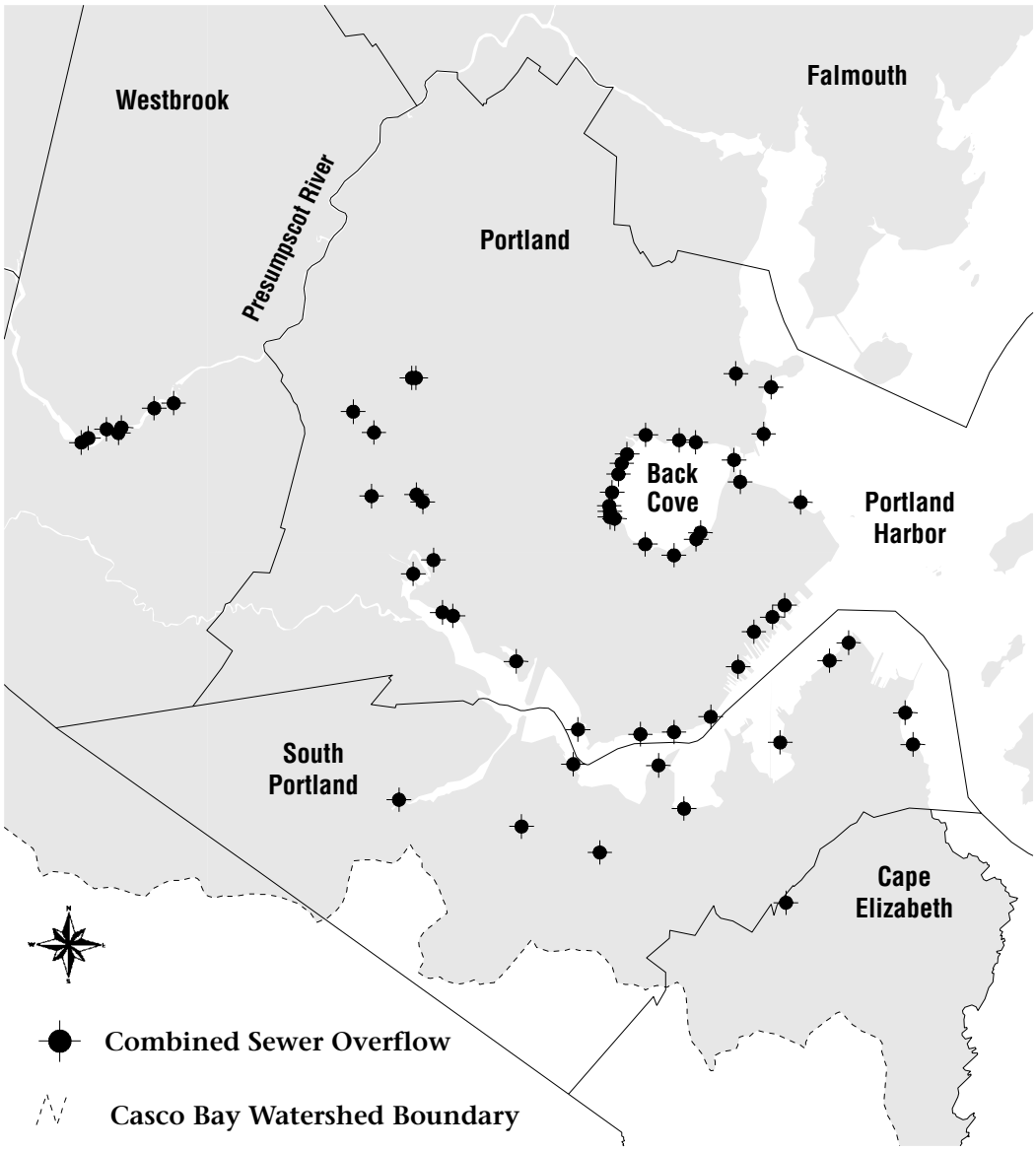
that enters rivers and the bay from diffuse locations such as malfunctioning septic systems, feed lots, and manure storage areas.

Point-Source Pollution

Point sources of stormwater include storm drains and combined sewer pipes (which collect stormwater from roadways, parking lots, and other built-up areas). Stormwater drainage systems may convey stormwater alone or stormwater mixed with sanitary wastes in combined sewers.

Figure 2-6

Locations of Combined Sewer Overflows in Casco Bay



Source: Casco Bay Estuary Project

Before sewage treatment plants were constructed, larger municipalities — Portland, South Portland, and Westbrook — collected both domestic and industrial sewage and stormwater in networks of underground pipes, and discharged the combined untreated wastes into area rivers and Casco Bay. When treatment plants were constructed in the 1970s, these sewer pipes were "intercepted" to direct wastes to the plants for treatment before discharge.

Each sewage treatment plant is designed to handle a certain amount of flow. When flow increases dramatically during a storm, it can overload the plant. To avoid damage to the sewage treatment plant during heavy rains, a portion of the combined sewage (sewage and stormwater) that would enter the plant must be diverted without treatment through relief points known as combined sewer overflows.

Combined sewer overflows are a major problem in the Portland area, with 59 points that discharge into Casco Bay or its tributaries during storms. Forty of the combined sewer overflows in the City of Portland contribute an estimated 720 million gallons of sewage and stormwater each year (CH2M Hill and Dufresne-Henry, Inc., 1992). South Portland currently has 10 active combined sewer overflows with an estimated discharge volume of 100 million gallons per year. The State of Maine has two additional combined sewer overflows in South Portland that discharge from the Southern Maine Technical College and the Maine Youth Center. The City of Westbrook has seven combined sewer overflows that discharge into the Presumpscot River.

Nonpoint-Source Pollution

For the past 25 years, point sources have been the primary focus of water quality improvement efforts and dramatic reductions have been effected in sewage and industrial pollution. *However, national studies estimate that nonpoint sources of pollution now contribute up to 60 percent of the remaining pollutant load.*

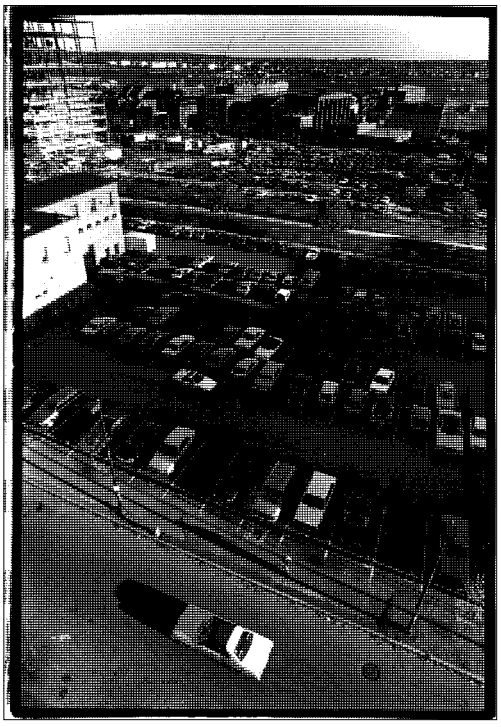


photo by Christopher Ayres

The Maine Department of Environmental Protection's *1994 Water Quality Assessment* reports that continued progress toward cleanup of point sources in Maine has been tempered by the discovery of significant nonpoint sources of pollution such as stormwater runoff. Significant portions of Casco Bay are impaired by pollution associated with stormwater runoff from construc-

tion sites, urbanized areas, highways, and agricultural areas. Common sources of stormwater runoff in the Casco Bay watershed include the following:

- ***Urban Development.*** Stormwater runoff from urban and suburban areas transports toxics, pathogens (bacteria and viruses), and nutrients (nitrogen and phosphorus) to coastal waters. Runoff from roadways, parking lots, and driveways contributes oil and grease and metals such as lead, zinc, copper, cadmium, and chromium (U.S. Environmental Protection Agency, 1983).

Table 2-1

Summary of Urban Runoff Pollutants

Category	Parameters	Possible Sources	Effects
Sediments	Total suspended solids Dissolved solids Combined sewer overflows	Construction sites Urban/agricultural runoff Landfills, septic fields	Turbidity Habitat alteration Recreational & aesthetic loss Contaminant transport Navigation/hydrology Bank erosion
Nutrients	Nitrogen Phosphorus	Urban/agricultural runoff Landfills, septic fields Atmospheric deposition Erosion	Surface waters Algal blooms Ammonia toxicity
Pathogens	Bacteria Viruses	Urban/agricultural runoff Septic systems Illicit sanitary connections Combined sewer overflows Boat discharges Domestic/wild animals	Ear/intestinal infections Shellfish bed closure Recreational/aesthetic loss
Toxic Pollutants	Toxic trace metals Toxic organics	Urban/agricultural runoff Pesticides/herbicides Underground storage tanks Hazardous waste sites Landfills Illegal oil disposal Industrial discharges Atmospheric deposition	Bioaccumulation in food-chain organisms and potential toxicity to humans and other organisms

Source: U.S. Environmental Protection Agency, 1993b

- ***Residential Development.*** Homes and apartments can add to stormwater bacteria and viruses due to failing septic systems; pet wastes; excess nutrients from septic systems, fertilizer, and eroding soil; misuse of toxics such as pesticides, paints, solvents, and household cleaners; and oil, grease, and metals from vehicles and home and garden equipment.
- ***Construction Activities.*** While construction is underway, water runoff across exposed soils can carry significant loads of sediment, nutrients, and toxic materials from the development site into nearby water bodies. When large areas of a construction site are left unprotected, sedimentation in nearby streams becomes a major problem.

- ***Air Deposition.*** Local and distant sources of air pollution may result in the deposition of toxic pollutants and nutrients in Casco Bay.
- ***Roadways.*** Stormwater runoff from roads and parking lots is a source of organic chemicals (*e.g.*, PAHs, oil and grease), sediments, and several toxic metals. Problems created by improper construction and maintenance of roadside ditches at stream crossings were documented in a 1991 survey by the Cumberland County Soil and Water Conservation District. *The survey of roadways in 17 Cumberland County municipalities found significant erosion problems or direct channeling of highway runoff into streams at 266 sites* (Cumberland County Soil and Water Conservation District, 1991).
- ***Industrial Sites.*** Ongoing industrial activities may result in nonpoint sources of pollution. Traffic-loading areas, leaky storage tanks, improperly disposed chemicals, and uncovered work areas can leach oil and other toxics into surface runoff and groundwater. *A "dirty history" report of the Portland area, conducted for the Casco Bay Estuary Project, identified more than 300 locations where toxic deposits may have been left by industries that occupied those sites 50 to 100 years ago.* Pollution can leach out of these sites through groundwater movement or through construction disturbance.
- ***Agriculture.*** Soil cultivation practices and application of fertilizers and pesticides can contribute significantly to stormwater runoff. Although the number of commercial farms has declined in Cumberland County over the last 50 years, the number of "hobby farms" has increased and agriculture remains a significant land use in the Casco Bay watershed. Agriculture may contribute nutrients and bacteria to stormwater through the improper land application of fertilizer, animal waste storage, and land-spreading practices. Toxics are generated in the application of pesticides and other chemicals and the use of farm equipment.

Economic Impacts

In the long term, preventing stormwater damage and accompanying water impacts is far less expensive than mitigation.

The economic impacts of stormwater are evident in the costs of repairing damage from erosion and flooding. In 1991, for example, Hurricane Bob created $2.3 million in damage to public property (including roads and bridges) in Cumberland County (Sidell, 1995). Even small storms can prove expensive for municipalities and private property owners. Inadequately controlled and poorly located stormwater outfalls cause erosion and other damage. For example, improper placement of a culvert under a new private road in Brunswick channeled stormwater to an adjacent home, resulting in $15,000 of foundation damage (Hanson, 1995).

Using Casco Bay Estuary Project funds, the Town of Falmouth high-

lighted the experience several residents had with stormwater damage to illustrate the costs of failing to address stormwater runoff in watershed management planning. Impacts included severe road washout, flooded basements, and the pollution of small streams with sediment, oil, and grease (Fogg, 1993).

In the long term, preventing stormwater damage and accompanying water impacts is far less expensive than mitigation. The Town of Poland, for example, was spending $2,000 annually to repair erosion damage to a section of gravel road on Thompson Lake. Finally, the town rebuilt the problem section for $20,000 (receiving Maine Department of Environmental Protection funds for 50 percent), using techniques to reduce or eliminate erosion damage in the future. Its annual savings on maintenance will enable it to "pay" for its investment in five years (Benson, 1995).

Cleaning up sources of contaminated stormwater is costly. The cities of Portland, South Portland, and Westbrook expect to spend $105 million over 15 years to construct facilities that will reduce the volume discharged by combined sewer overflows and provide treatment for stormwater before it enters Casco Bay (CH2M Hill and Dufresne-Henry, Inc., 1992; Portland Water District, 1993; City of South Portland, 1993).

Contaminated sediments from stormwater also increase the cost of dredging. As Maine's largest port, Portland depends on dredging to keep its facilities accessible. *Disposing of contaminated dredged materials from areas such as inner Portland Harbor can cost at least 10 times as much as disposal of clean materials.* Contaminated materials must be hauled by truck to approved on-land disposal sites rather than barged offshore for ocean dumping.

In 1994, the soft-shell clam resource in the open harvesting areas of Casco Bay provided an estimated income of $4.66 million to approximately 268 commercial diggers. The total economic activity generated by the soft-shell clam industry that stays within the local economy is estimated at $11.6 to $15.7 million for 1994. This represents income from roughly 63 percent of the clam flats in Casco Bay, since the remaining 37 percent (as of May 1995) is closed to harvesting, primarily due to contamination or threats from nonpoint stormwater runoff (Heinig *et al.*, 1995).

Regulatory Measures

Unlike some other states, Maine has no comprehensive stormwater management program (U.S. Environmental Protection Agency, 1993b). Most existing stormwater management requirements focus on flood control rather than water quality impacts, and are typically applied on a case-by-case basis when applicants seek state or local permits. *Except in special cases, there are currently no requirements to address stormwater management through a regional or watershed planning process.*

Stormwater is regulated at the federal, state, and local level under numerous different laws and regulations. While these requirements have led to improved water quality, there are gaps and duplications that allow contaminated stormwater to keep diminishing the quality of water resources.

Laws Governing Point-Source Pollution

Those who discharge wastewater within Maine must be permitted and licensed by both the U.S. Environmental Protection Agency, under the Clean Water Act, and the Maine Department of Environmental Protection, under the Maine Protection and Improvement of Waters Law.

In 1972, the Clean Water Act was enacted to set water quality goals nationwide and to provide mechanisms for reducing surface water pollution. Administered by the U.S. Environmental Protection Agency, the Act established two main goals: (1) fishable and swimmable waters wherever attainable by 1983; and (2) the elimination of pollutant discharges into navigable waters by 1985.

The Act established the National Pollutant Discharge Elimination System, which prohibits discharge of any pollutant from a point source into U.S. waters unless that discharge is authorized by a permit. Efforts to improve water quality under this system focused on municipal sewage treatment plants and industrial process wastewater, but neglected "point-source" discharges of stormwater.

The National Pollutant Discharge Elimination System program establishes discharge limits based on the pollutant control technology available at the time a permit is issued. Each time a permit is renewed, therefore, the discharge must meet stricter standards if improved technology is available. No permit is issued if the discharge could cause or contribute to a violation of water quality standards.

During the past 25 years, the Clean Water Act provided grants to help construct and expand wastewater treatment facilities in Portland, Peaks Island, South Portland, Westbrook, Gorham, Cape Elizabeth, Falmouth, Freeport, Yarmouth, and Brunswick, which have markedly improved water quality in Casco Bay over the past 20 years (Maine Department of Environmental Protection, 1992). It also requires certain types of industrial users of municipal sewage treatment plants to install pre-treatment facilities, which remove pollutants from their waste stream that could interfere with the treatment plant process (Maine Department of Environmental Protection, 1992).

In 1987, Congress amended the Clean Water Act to revise National Pollutant Discharge Elimination System requirements for stormwater discharges and target discharges associated with certain industrial activities and separate municipal storm sewer systems (located in municipalities with a population of 100,000 or more).

Stormwater discharges associated with industry include a wide range of activities such as manufacturing, major construction, landfills, and hazardous waste treatment, storage, or disposal. To minimize pollutant loading to stormwater runoff, the 1992 guidelines require each permittee to develop a detailed

Stormwater Pollution Prevention Plan, implement short-term measures for erosion and sedimentation control, and pursue long-term water quality protection measures such as best management practices (U.S. Environmental Protection Agency, 1992a and 1992b).

In Casco Bay, three municipalities with combined sewer overflow discharges that violate the Clean Water Act and state law have recently taken action to comply with regulatory requirements. As a result of consent decrees with the U.S. Environmental Protection Agency and the Maine Department of Environmental Protection, the cities of Portland, South Portland, and Westbrook have each completed combined sewer overflow abatement plans that outline long-term strategies for reducing their point-source discharges.

The Portland plan recommends $90 million of improvements to be made over a 15-year period, eliminating 32 of its 40 combined sewer overflow discharges and reducing the volume discharged by 76 percent, from 720 million to 176 million gallons (CH2M Hill and Dufresne-Henry, Inc., 1992). Recognizing that much of the stormwater removed from the combined sewer overflow system will become nonpoint-source stormwater runoff, the plan includes recommendations to control both the quantity and toxicity of the displaced flow.

South Portland has enlarged its sewage treatment plant to provide treatment for a higher volume of stormwater during wet weather. The city's goal is to reduce combined sewer overflow flows by 85 to 90 percent at an estimated cost of almost $14 million (City of South Portland, 1993). Westbrook's plan, which has not yet been approved by the U.S. Environmental Protection Agency or Maine Department of Environmental Protection, aims to reduce combined sewer overflow flows by replacing the combined sewer system with separate stormwater and sewage lines, at an estimated cost of $1 million (Portland Water District, 1993).

Laws Governing Nonpoint-Source Pollution

Despite improved water quality from treatment of point discharges, it became clear during the early 1980s that the goal of "no pollutant discharges by 1985" could not be achieved. The cost of eliminating discharges far exceeded the resources available. Studies by the U.S. Environmental Protection Agency also revealed that most of the remaining problem came from nonpoint sources of stormwater, which were not be-

photo by Christopher Ayres

ing adequately addressed (U.S. Environmental Protection Agency, 1983).

This recognition led to the formation in 1983 of the Nationwide Urban Runoff Program to study the characteristics and impacts of urban runoff pollution, and to determine the significance of nonpoint-source pollution (U.S. Environmental Protection Agency, 1983). In response to this and other studies, the Clean Water Act was amended in 1987, requiring each state to identify waters threatened by nonpoint sources and develop strategies to reduce those sources (U.S. Environmental Protection Agency, 1993b).

Efforts to reduce nonpoint-source pollution in coastal areas have been supported by funds provided under the federal Coastal Zone Management Act. *In 1990, this Act was amended to require participating states to establish enforceable policies and goals for reducing nonpoint pollution in the coastal area* (U.S. Environmental Protection Agency, 1993a). A draft *Maine Coastal Nonpoint-Source Control Program* was circulated for public comment in June 1995. The plan emphasizes use and evaluation of best management practices and consistent monitoring of ambient coastal water quality.

Currently, nonpoint sources of stormwater pollution are addressed indirectly through state laws that protect natural resources from development and other types of land and resource use. Primary laws include the Site Location of Development Act (38 MRSA, section 481) and the Natural Resources Protection Act (38 MRSA, section 480A), both administered by the Maine Department of Environmental Protection; and the Mandatory Shoreland Zoning Act (38 MRSA, section 435), the Municipal Subdivision Law (30-A MRSA, section 4401), and the Comprehensive Planning and Land Use Regulation Act (30-A MRSA, section 4311), all of which are administered by municipalities.

Each law requires that stormwater impacts be considered; however, none provide specific performance standards for stormwater quality (Maine Department of Environmental Protection and Maine State Planning Office, 1994). Additionally, agency jurisdiction is often limited (*e.g.*, the Site Location of Development Act only pertains to large development projects).

To help address these deficiencies, the U.S. Environmental Protection Agency has provided the Maine Department of Environmental Protection with funding to develop and implement a Nonpoint-Source Pollution Management Plan, and to provide technical assistance and demonstration grants for regional organizations and municipalities to identify and address contaminated stormwater problems. The state has developed manuals on best management practices that outline techniques for reducing nonpoint-source impacts from construction, agriculture, and timber-harvesting activities. Manuals describing best management practices for stormwater and marinas were published by the Maine Department of Environmental Protection in 1995.

In the Casco Bay watershed, stormwater runoff is most frequently addressed by municipalities through local shoreland zoning, subdivision review, site plan review, and/or general zoning ordinances that require erosion control and

stormwater management. Some municipalities now require the use of best management practices for new development, although problems with existing development tend not to be addressed. *Currently, the Town of Brunswick is the only municipality that has enacted any comprehensive regulation of nonpoint sources*. The town's Coastal Protection Zone Ordinance, adopted in 1991, protects marine resources and reduces nutrient-loading into Maquoit and Middle bays (Marine Law Institute, 1992).

Although agricultural activities in Maine are generally not subject to local control, except under the Shoreland Zoning Act, many farmers are voluntarily implementing comprehensive resouce management plans with technical assistance from the federal Natural Resources Conservation Service (formerly the Soil Conservation Service).

Regulatory Limits

The overall regulatory picture can be summarized this way:

- Federal government provides laws, permits for point-source discharges, and planning funds. Funding support for needed capital improvements, such as sewage treatment plants, that once offered generous grants has been reduced to smaller loans.
- State government provides technical assistance (*e.g.,* best management practices), permits for point-source discharges, and an array of laws that relate to nonpoint sources of pollution, but not a comprehensive approach to regulate nonpoint sources of pollution.
- Local governments operate and manage sewage systems and treatment plants, and regulate varying aspects of land use — but they may or may not include stormwater runoff considerations.

These factors combine to highlight that:

- A consistent, comprehensive stormwater management system for the communities in the Casco Bay watershed is lacking.
- Grants for further capital improvements to reduce combined sewer overflows and contaminated stormwater discharges are insufficient.

Recommendations

The issue of stormwater pollution poses an unprecedented management challenge for the communities of the Casco Bay watershed. As this chapter illustrates, stormwater is a diffuse and insidious form of pollution that is not easily addressed through traditional regulatory approaches. Developing new methods for stormwater reduction will require innovative and collaborative strategies on the part of businesses, agencies, and individuals.

The following list of actions outlines some measures that will begin to address stormwater impacts on Casco Bay. The title of the action is listed below. Following the title is the action number. The actions are described more fully in Chapter 7. Actions that are designed to directly work to reduce stormwater pollution appear in bold typeface; other actions that support reduction of stormwater pollution appear in regular typeface.

■ Public Education

- Fund high school students' research. (#1)
- Focus post-secondary educational programs on Casco Bay. (#2)
- Conduct a comprehensive campaign to promote sound household practices. (#3)
- **Create an educational site demonstrating how vegetation reduces stormwater runoff. (#6)**
- Hold "State of the Bay" conferences. (#7)

■ Technical Assistance

- **Provide training in best management practices for contractors, public works crews, road commissioners, and municipal boards and staff. (#4)**
- Establish a reduction and management program for toxic pollutants in Casco Bay communities and small businesses. (#5)
- **Develop and implement action plans for sub-watershed areas.(#6)**
- Conduct pollution prevention audits for businesses/industries that currently affect Casco Bay. (#8)

■ Regulatory/Enforcement Plan

- Monitor enforcement of combined sewer overflow reduction plans in Portland, South Portland, and Westbrook. (#2)
- **Adopt minimum standards for stormwater quality in state and municipal regulatory programs. (#3)**

■ Planning and Assessment

- Research the contribution of deposition of pollutants from the air. (#10)