Many New Yorkers have written off the city’s waterways. Most of our rivers and bays are not fit for fishing or swimming. For both sewage and toxic contaminants, pollution levels frequently exceed environmental and public health standards. And too often our waterways are serving simply as marine highways. Yet, public clamor over these remarkable facts has generally been muted, at least until recently. Even with increased political attention following highly publicized beach closings in the summer of 1988, few city residents expect much to change.

To be sure, news from the waterfront is not all bad. Sparked by congressional mandates and court orders, the city is nearing completion of a decades-long struggle to construct or rehabilitate more than a dozen sewage treatment plants that now ring the five boroughs. And city and state officials have begun what may prove to be an equally ambitious campaign aimed at curbing the flow of industrial and commercial toxins into New York’s waterways.

Does this mean that New Yorkers will soon be able to swim, boat, and fish in unpolluted waters? In a word, no. Existing laws and regulations leave major gaps in the control of sewage and toxic
contaminants. And funding for new pollution abatement and enforcement activities is unlikely to match future needs.

At the same time, new battle lines are being drawn over another long-ignored water resource—the city’s 578-mile coastline. Up and down Manhattan’s East and West Sides and in less publicized spots throughout the five boroughs, developers have begun to sketch out a new wave of residential and commercial projects that could permanently alter the city’s shoreline. But citizen and neighborhood groups are lining up against many of these proposals in what are already heated conflicts over coastal land use and the appropriate size and scale of waterfront development.

SEWAGE POLLUTION

Background

Sewage historically has been the city’s single largest source of water pollution. Through the turn of the twentieth century, virtually all of the city’s raw sewage was dumped directly into New York’s rivers and bays. By the 1920s, harbor surveys revealed water quality in decline as a result of this practice. And as New York’s population and industrial base grew, city planners recognized that remedial action would be necessary.

The city’s first systematic effort to reduce raw sewage flows came in 1935, with the construction of a sewage treatment plant on Brooklyn’s Coney Island shore. Over the next three decades, additional facilities were built in all five boroughs. And by the end of the 1960s, New York City sewage plants were providing some degree of treatment for up to 80 percent of the sewage wastes discharged during dry weather periods.1 Monies from the federal Water Pollution Control Act of 1972 spurred the upgrading of existing sewage treatment works and the construction of two additional plants.

Today, New York’s 14 sewage treatment plants can, during dry weather, handle virtually all of the city’s daily 1.7 or more billion gallons of raw waste. Not all of these facilities meet government requirements for treatment plant efficiency. Nevertheless, the two leading indicators of sewage pollution—bacteria counts and dissolved oxygen levels—have declined significantly since the early 1970s. For example, levels of dissolved oxygen in 11 sections of New York Harbor improved, increasing by 30 percent as measured by the city Department of Environmental Protection from 1972 to 1984.2

Despite all the hoopla over treatment plant construction, sewage pollution remains a serious problem for New York’s waterways. The main offender is often referred to as combined sewer overflow, or CSO. It occurs because a single network of piping in most parts of the city carries both sewage wastes and stormwater runoff. When it rains, the volume of combined sewage and rainwater can exceed the intake capacity at sewage treatment plants. As a result, large volumes of combined rainwater and sewage (along with assorted toxins) often bypass treatment plants and flow directly into New York’s rivers and bays. As construction and upgrading of the city’s sewage treatment plants progress, CSO has emerged as the single most important unresolved water pollution problem in New York.

Sewage Impacts

Wading into New York’s waters is easier said than done. New York City Health Department officials have permanently banned swimming in the Hudson River, Jamaica Bay, and along vast stretches of the waterfront, in part because of the presence of high levels of sewage-related bacteria. Similar concerns have prompted the department to designate other popular areas, including Graham Beach on Staten Island, as “not recommended” for swimming. Sewage pollution has not spared the city’s major beachfronts. The city Health Department has issued a standing warning against swimming for at least two days following heavy rains at the northernmost Staten Island beaches (including South and Midland), the southernmost Bronx beaches (including Locust Point and Little Neck Bay), and the westernmost Coney Island beaches (including Seagate and Coney Island). Combined sewer discharges following recent summer rainfalls raised water bacteria counts to unsanitary levels, in some cases as much as 500 percent or more above normal dry weather concentrations.3

Sewage has also had a dramatic impact on shellfishing. At the
operating throughout the five boroughs. Among them is the new $1.2 billion North River Water Pollution Control Plant on Manhattan's Upper West Side. It is designed to treat 170 million gallons a day of raw sewage, slightly more than the amount that had previously been dumped directly into the Hudson River.

While the city has made substantial progress in constructing sewage plants, levels of treatment vary considerably. During the first half of 1989, only four city plants were regularly meeting the Clean Water Act's 85 percent removal requirement for sewage pollutants. Three of the most troubled plants (Coney Island, Owls Head, and Newtown Creek) consistently failed to remove either 85 percent of suspended solids, 85 percent of oxygen-demanding matter, or both. Three other plants (Bowery Bay, Wards Island, and Jamaica) did not meet the 85 percent removal requirement in four or more months during that same period. Regarding the two newest plants, North River is removing only 20 to 70 percent of its sewage wastes, but under court order is expected to achieve the more advanced secondary treatment level of 85 percent by 1991. The Red Hook facility was projected to have reached secondary treatment as 1989 came to an end.7

What accounts for these performance problems? Like the city's bridges and its transit system, New York's sewage treatment plants have been beset by problems of age and deferred maintenance. The city reports, for example, that the Owls Head and Coney Island treatment plants have "severe structural and operational problems due to their age." And the Interstate Sanitation Commission, a tri-state environmental agency, in documenting treatment plant maintenance woes in 1986, found sewage pumps and other major equipment to be inoperative at a number of city facilities. On occasion, the equipment shutdowns had lasted for several years.8

The 1987 Clean Water Act amendments, passed over then-president Ronald Reagan's veto, offer a ray of hope. As much as $650 million in new federal grants will be available to New York City for sewage-related work over the next several years. More than $900 million in federal loans may also be forthcoming. The primary beneficiaries of this capital infusion include some of the city's oldest and least efficient sewage plants. Work is already underway at the ailing Coney Island and Owls Head facilities.

The Law: Sewage

As far-fetched as it now sounds, Congress sought in 1972 to curb the flow of sewage and other pollutants into the nation's waters by the mid-1980s. One of the primary goals of the 1972 Federal Water Pollution Control Act (later renamed the Clean Water Act) was the restoration of waters to fishable and swimmable quality. For sewage pollution, the act established a two-pronged approach. First, it required all localities to upgrade existing municipal sewage plants to secondary treatment by 1977. (Secondary treatment is defined primarily as the removal of 85 percent of sewage pollutants.) Congress later extended this deadline for certain municipalities, including New York City, until 1988. Second, it directed the states to classify their water bodies based upon existing or anticipated uses and to reduce pollution discharges so that the waters would be safe for each of these uses.6

Sewage Treatment Plants: Government Action

New York produces more raw sewage than any other city in the nation. Not surprisingly, it also has the largest number of municipal treatment plants. After years of delay, 14 such facilities are now
Environmental Conservation to lock in even these dates. Maintenance cutbacks at sewage plants have also jeopardized the city's ability to comply with secondary treatment requirements. City Hall's fiscal 1987 budget, for example, shaved 90 employees and over $2.5 million from the Department of Environmental Protection's plant maintenance program. By the city's own forecast, these reductions "will result in an increased backlog of corrective maintenance projects and a reduced level of preventive maintenance work at the plants." Budget changes in the years since then have hardly turned this situation around. 9

Are 14 treatment plants enough to handle New York City's daily sewage load? Some evidence suggests that the answer is no. During the first 6 months of 1989, 5 of the city's 14 plants were operating at least half of the time at or over their design capacity. The most glaring example is the Wards Island treatment facility, which serves households and businesses on Manhattan's Upper East Side and portions of the Bronx. During some months of 1989, it was receiving daily sewage flows that averaged more than 145 percent over its existing design capacity. 10 These overloads will likely take their toll on the durability and efficiency of the city's expensive treatment plant equipment. And the issue is sure to heat up as plans for new commercial and residential development threaten to add additional millions of gallons of sewage to already overburdened treatment works. (In fact, the city is now talking about expansions of the Newtown Creek and Wards Island plants.)

Combined Sewer Overflow

Decisions made a century ago by city sanitation planners continue to haunt ongoing sewage cleanup efforts. In the late 1800s, engineers began constructing a citywide network of pipes to carry most of New York's household wastewater and stormwater runoff in a combined system. These planners could not foresee that mixing wastewater and stormwater in a single pipe would substantially complicate pollution abatement in decades to come.

Today, when it rains or snows, stormwater rushes through the city's combined sewers at volumes 2 to 20 or more times the dry weather flow of household wastewater alone. These larger volumes,
if not diverted, would overwhelm treatment plants that were primarily designed to handle sewage wastes. A system of bypass valves diverts the excess stormwater-sewage mixture away from treatment plants to avoid flooding those facilities. But as a result, untreated sewage (along with stormwater runoff) pours directly into the city’s waterways from nearly 500 open drainpipes and outfalls. This phenomenon, often referred to as combined sewer overflow (CSO), is the city’s number-one sewage problem today.11

Heavy rains and snow are not the only culprits. The bypass valves that divert wastewater and stormwater during wet weather sometimes malfunction. As a result, raw sewage is often, although inadvertently, channeled into city waterways even during dry weather. Additionally, periodic mechanical problems at intermediate pumping stations and other sewer works also send raw wastewaters gushing from time to time.

Looking for big numbers? During an average seven-hour rainstorm, as many as 560 million gallons of combined sewage and stormwater are diverted directly into the city’s waterways. And even after light rains that do not overwhelm treatment plant capacity, valve malfunctions in combined sewers funnel an additional 35 million gallons of wastewaters (over seven hours) into New York’s rivers and bays. Among the areas most affected are city beachfronts, as well as tributaries and small inlets such as Flushing Bay in Queens and Brooklyn’s Gowanus Canal and Newtown Creek. The city’s Department of Environmental Protection has concluded that combined sewer overflow is “the major source of contamination in New York City’s waters.”12

It takes more than technical know-how to solve most environmental problems. Legislative mandates and statutory deadlines are usually necessary. CSO is a case in point. More than 20 years ago, environmental engineers drafted a citywide strategy to confront the CSO issue head-on. At the heart of this plan was the construction of large holding tanks to capture and store sewer overflows and send these wastes to nearby treatment plants after stormwater volumes had subsided. In the late 1960s, one such facility was opened at Brooklyn’s Spring Creek, on the north shore of Jamaica Bay. Despite that plant’s apparent success, only one other similar facility—another pilot project at Fresh Creek on Jamaica Bay—has ever materialized. Funding priorities and statutory deadlines that favored the upgrading of sewage treatment plants over CSO abatement help explain why.13

Until now, CSO pollution control in New York City has slid through the cracks. City efforts have primarily been confined to monitoring and data gathering. Only recently has the Department of Environmental Protection begun to zero in on the problem in three of the most affected water bodies. Dredging of sewage sediments and repair or replacement of faulty sewage valves have commenced at Flushing Bay. And plans for the installation of a 40-million-gallon sewage holding tank for the Flushing area are now
FLUSHING BAY: LIVING UP TO ITS NAME

Have newly constructed treatment plants solved the city's sewage problem? Just ask the residents of Flushing, Queens. In their neighborhood lies Flushing Bay, one of the borough's most valuable natural resources. It is also one of the most polluted.

Flushing Bay is located in northern Queens, flanked on one side by LaGuardia Airport and by the College Point neighborhood on the other. Jutting inland from the bay is the narrow Flushing Creek, sometimes called Flushing River; it connects the bay with Flushing Meadows—Corona Park, the borough's largest and most-visited public recreation area.

Raw sewage discharges are the bay's number-one environmental problem. Fourteen combined sewer outfalls drain into Flushing Bay and its adjacent creek, contributing 60 million gallons or more of sewage wastewaters during an average seven-hour rainstorm. The problem is not merely a wet weather phenomenon. Even during dry weather, faulty sewer regulators and other mechanical problems can channel several hundred thousand gallons a day of wastewaters, intended for nearby treatment plants, directly into the bay and creek.\(^\text{14}\)

Odor problems, aesthetic problems, water quality degradation—they can all be found in Flushing Bay. In fact, official monitoring reports reveal that the bay is consistently among the city's most severely affected water bodies when it comes to sewage-related pollutants. Bacteria counts and oxygen levels—two common measures of sewage pollution—frequently violate state water quality standards designed to protect public health and aquatic life. And the buildup of odor-producing sewage sediments near outfall pipes is a recurring problem for bay visitors and nearby residents.\(^\text{15}\)

Government plans to clean up the bay's sewage pollution are still largely on the drawing boards. The most ambitious project proposed by the city's Department of Environmental Protection calls for the building of a 40-million-gallon underground holding tank in Flushing Meadows Park. The tank would capture and store a portion of the wet weather sewage overflows until these wastewaters could be handled by nearby treatment plants. The department has also begun to dredge sections of the bay and creek to remove sewage sediments. For the residents of Queens, these projects can't come fast enough.
pending. So, too, are proposals for CSO control at Brooklyn's Gowanus Canal and Paerdegat Basin in Jamaica Bay.

Lack of progress in controlling CSO here has mirrored the low priority the issue has received in Washington, D.C. Although the Clean Water Act requires the control of CSO discharges, EPA has issued no clear regulations saying what those controls should be. As a result, state environmental officials have been left to devise their own control programs with little help from the federal government. In recent years, New York State has directed the city to get cracking on CSO abatement strategies. But it is unlikely that these general planning requirements and limited government funds will curb CSO pollution in New York's waterways anytime soon.

TOXIC WATER POLLUTION

Background

Fish don't vote. If they did, New York's rivers and bays would be a lot cleaner. Not only would there be less sewage, but fewer toxins as well.

As things stand now, however, toxic chemicals pour into New York's harbor every day. Some flow directly through drainpipes from major industrial plants. Others make their way into city waters after an indirect journey from businesses and homes through sewage treatment works. More than 60 different toxins are being discharged from these sources into New York Harbor, according to government estimates that are probably on the low side. Contaminants also run freely off city streets and municipal landfills into New York's waters.

This situation has not gone unnoticed. Government officials and environmental decision-makers have begun piecing together a strategy for ending the toxic onslaught. Many of the city's largest industrial dischargers, for example, have been brought under the regulatory umbrella of federal and state environmental laws passed over the last two decades.

But solving the toxic water pollution problem will be tough. Many toxins are extremely persistent and can pose long-term environmental and health risks for some time after their initial dis-

charge. Moreover, toxic pollutants make their way into New York Harbor not only from city sources but also from discharge pipes and runoff upstate and in New Jersey. And even fallout of airborne contaminants would have to be listed if you were preparing a toxic water pollution roster. Securing environmental change is difficult when the political constituency in favor of change is perceived as weak. This helps further explain why the last two decades have seen greater progress in controlling the more visible sewage problem than the insidious toxic threat to New York City's rivers and bays.

Toxic Water Pollution Impacts

Almost 20 years after passage of the Federal Water Pollution Control Act, toxic pollutants in New York City waterways are still contaminating local fish and shellfish populations. Polychlorinated biphenyls (PCBs) are among the chief villains. These potential human carcinogens were dumped for decades into the Hudson River, primarily from two General Electric industrial facilities near Albany. They are still being detected in fish, often at levels well in excess of federal guidelines. In response, state officials have taken extraordinary action. They have issued warnings against public consumption of striped bass, carp, bluefish, and other species taken from local waters. And they have banned the commercial taking of nine fish species from the Hudson River and throughout New York's coastal region. No wonder. Scientists now believe that ingestion of fish may be the primary nonoccupational source of exposure to PCBs and other toxic contaminants. Yet, many New Yorkers remain unaware of these dangers, and some recreational anglers are still consuming fish hooked from New York City's waters.

You might be surprised by some of the other substances turning up in fish these days. Cadmium, mercury, and other heavy metals are among the unwelcome toxins that have been found in fish and shellfish taken from nearby water bodies. So, too, have organic compounds such as dioxins. Still, environmental experts know relatively little about toxic water contamination in New York. No comprehensive analysis of the presence of toxins in the city's marine life has ever been completed. Nor has there been any full-scale
assessment of the impacts of toxic water pollution on New York’s environment or public health.

What is known about water-borne contaminants, however, is hardly reassuring. Concentrations of four toxic metals (lead, zinc, copper, and nickel) in New York City waterways consistently exceed state water quality standards designed to protect aquatic life. In total, six of nine metals monitored by the city’s Department of Environmental Protection are violating these standards. And, significantly, with the exception of lead, levels of heavy metals in local waters have not changed appreciably, if at all, since regular city monitoring for these toxins began in the early 1970s. Data on organic compounds are more skimpy; suffice it to say that such chemicals are regularly detected at surface water monitoring stations, sometimes in excess of state water quality limits.20

Still, evidence suggests that loadings of some toxic pollutants have declined. For example, discharges of several of the most notorious chemicals, including DDT, PCBs, and lead, have dropped from peak levels of earlier decades, due largely to government restrictions and changes in industrial processes. Because such toxins linger in harbor sediments, however, the impacts of past dumping will continue to be felt in New York City’s waters for years to come.21

How do New York’s waterways stack up against other areas in terms of toxic water contamination? Such comparisons are not easy. But at least one survey by the National Oceanic and Atmospheric Administration has concluded that levels of toxic contaminants in nearby Raritan Bay (which separates Staten Island from New Jersey) make it one of the most polluted harbors in the country.22

Who’s Polluting New York Harbor?

DIRECT DISCHARGERS

When one thinks of water pollution, what comes to mind are open drainpipes from which wastewaters cascade into rivers and bays. The image may be dramatic, but New York has its share of these so-called direct dischargers. The New York State Department of

Environmental Conservation classifies 27 facilities here as “major” direct dischargers. Fourteen of these are the city’s sewage treatment works, ten are utility plants, and three are industrial firms. There are also roughly 90 other city sources that directly discharge lesser amounts of pollution into surrounding waters. Petroleum terminals and storage facilities are perhaps the single largest category in this grouping, with the exception of smaller sewage dischargers not presently hooked up to municipal treatment plants.23

Are these direct dischargers a major threat when it comes to toxic pollution? Limited data make assessments risky. Only a dozen or so New York City–based sources hold state permits to dump toxic contaminants. But that does not include the city’s sewage treatment plants, probably the largest local source of water-borne toxins. Nor does it encompass facilities releasing pollutants such as oils and grease. Nonetheless, while some direct dischargers may be responsible for localized problems, it is likely that these facilities collectively are not the primary source of toxic contamination in New York waterways.

INDIRECT DISCHARGERS

A roundup of the city’s toxic water polluters would have to include more than the usual suspects. The largest category of toxic dischargers in New York do not dump directly into the city’s waters. Instead, they pour their wastes into the sewer system. No precise head count of these seemingly clandestine dischargers exists. But city officials have so far identified just over 800 industrial and commercial firms that may be indirectly dumping toxic pollutants in this fashion. Of these, approximately 420 are electroplaters or metal finishers. Paint and ink formulators, metal molding and casting shops, pesticide makers and pharmaceutical manufacturers help fill out the list. The official figures probably underestimate the total number of indirect industrial and commercial toxic polluters.24

The situation would not be so bad if the city’s sewage network could adequately treat toxins streaming through the system. It can’t. In fact, every day more than 7,000 pounds of metals enter city sewage treatment plants. (This figure does not include metals that are carried directly into our waterways from street runoff.) The
particulate matter and street dirt, are being flushed into storm sewers. Or visit other observation posts, including airports, construction sites, and even residential lawns. They all are sources of toxic water pollution, when rain washes contaminants (oils and grease, pesticides, fertilizers) into rivers and bays in the phenomenon known as urban runoff.

Scientists only recently have begun to piece together an accounting of the pollution loads from urban runoff. Available information, admittedly sketchy, suggests that as much as 3,000 pounds a day of zinc, lead, copper, chromium, and other heavy metals are flushed directly into surface waters from city streets, stormwater and combined sewer pipes. Smaller amounts of organic chemicals, such as benzene, toluene, and PCBs, are also washed into surrounding water bodies.26

What distinguishes urban runoff from other sources of toxic water pollution is that it does not always flow from a single pipe or drain, or even from a particular geographic area of the city. A clearer example of uncontrolled pollution would be hard to find.

**The Law: Toxic Water Pollution**

The Clean Water Act spells out three separate programs for controlling toxic contaminants that pour into the nation’s waterways. The first applies to direct discharges. It requires these facilities to secure permits establishing allowable toxic flows. In theory, each permit is based upon the use of best available pollution control technology and the quality of surrounding waters.27

The second set of national rules applies to indirect dischargers—those disposing of toxic wastewaters via the sewer system. This category of polluters is subject to the act’s so-called pretreatment requirements. These rules are designed to safeguard the operation of sewage treatment plants, protect their workers, insure the quality of surface waters, and prevent contamination of sewage sludge. Under these provisions, major industries, such as electroplaters, must install technology-based pollution controls at their facilities to treat wastes on-site, before disposing of them in city sewers. Indus-

**Urban Runoff**

Want to observe toxic water pollution firsthand? Just wait until the next time it rains. Then head to the nearest street corner, where motor oils and fuel, identifiable by their iridescent sheen, as well as
trial and commercial dischargers in some municipalities must also meet locally adopted limits on toxic pollution. The third pool of toxic pollution is urban runoff. The Clean Water Act requires that every state identify waters poisoned by runoff and devise strategies to control the problem. But the 1987 amendments do not mandate immediate action on this admittedly thorny problem. Instead, they direct states to study localized runoff trends and to prepare four-year management plans. The new law also requires that New York City and other urban areas secure stormwater discharge permits by 1991. These permits must, among other things, set in motion local programs to reduce stormwater pollution to the maximum practicable extent.

**Government Action: Toxic Water Pollution**

Environmental statutes are big on lofty pronouncements. The Clean Water Act boldly proclaims that “the discharge of toxic pollutants in toxic amounts be prohibited.” But legislative intent is one thing; actual implementation is another.

Toxic water pollution in New York City exemplifies the problem. Despite the existence of sweeping legislative goals, cleanup efforts are nearing a stalemate. Government restrictions and regulatory programs have apparently blocked major new declines in regional water quality. But it is unlikely that existing initiatives alone will cleanse New York’s waterways of toxic pollutants as envisioned by Congress.

Take indirect dischargers. At first glance, it appears as if the city is on the road to satisfying the broad Clean Water Act goals. After years of delay by national and local regulators, a federally approved New York City pretreatment program is now in place governing major industrial and commercial firms that dump toxic wastes into city sewers. Peeling back the outer layer of the city’s pretreatment program, however, reveals a somewhat different picture. Of the more than 800 firms city officials have identified, they are only regulating about 275; they have plans to get to the others, but have assigned them a lower priority. In addition, they have yet to investigate as many as 2,000 other business establishments, some of which may also be improperly discharging wastes into the sewer network.

Jamaica Bay is perhaps the most spectacular stretch of New York City’s 578-mile coastline. It is situated between Brooklyn’s south-eastern shore and the thin Rockaway peninsula. The bay’s shallow waters and low-lying island marshlands sprawl over nearly 13,000 acres, more than 15 times the size of Central Park.

Like other New York waterways, Jamaica Bay is an estuary—a coastal area where inland freshwater and ocean saltwater meet—providing an excellent habitat for fish, shellfish, and smaller marine organisms. The bay also offers sanctuary to amphibians, reptiles, mammals, and over 300 species of birds. In 1972, large portions of Jamaica Bay’s waters and shorelines were brought under the protective wing of the federal government, with their inclusion in the newly created Gateway National Recreation Area.

Jamaica Bay has struggled for decades against a long list of environmental pressures. Sewage pollution has been the most persistent enemy. The construction of four city-owned treatment plants has ended much dry weather discharge of raw sewage. But combined sewer overflow problems can funnel more than 100 million gallons of stormwaters and sewage into the bay area during an average seven-hour rainstorm.

Toxic water pollutants also find their way into this marine environment. Metals (such as copper, nickel, and zinc) and organic chemicals pass unfiltered into the bay every day, largely from industrial and residential sources dumping these wastes into city sewers. Leachate from several New York City landfill sites perched along Jamaica’s shore add PCBs, mercury, and other contaminants. And urban runoff from sources such as John F. Kennedy Airport on the bay’s northeast corner wash additional pollutants, including motor oil and grease, into the bay.

Sewage and toxic discharges have taken their toll on Jamaica Bay. High bacteria levels from raw sewage have contaminated shellfish beds. As a result, state officials have placed shellfish harvesting in the bay off limits. Heavy metals and organic pollutants such as PCBs have also been detected—in some cases at levels nearly 100 times state water quality standards. These contaminants frequently turn up in the bay’s fish and other marine species.
At the turn of the century, Jamaica Bay was nearly double its current size and surrounded by an outer ring of saltwater wetlands and salt flats. Over the years, most of these fragile parcels have disappeared. Government officials allowed solid waste, sewage sludge, and dredge to be deposited in these former wetland areas. The result: parts of Jamaica Bay were turned into municipal refuse dumps and new land for development projects. Floyd Bennett Field (the city's first municipal airport and now part of Gateway) and nearby Kennedy Airport are among the legacies of these bittersweet land use decisions. To make matters worse, encroaching development, such as the Kennedy Airport runway, has disrupted the bay's tidal flushing with ocean water. The eastern bay, in particular, is now a reservoir in which sewage and toxic pollutants are often trapped.

These development pressures have not yet abated. Although city officials hold title to virtually all of the bay's remaining unprotected wetland and upland areas, they have targeted crucial locations, such as Paerdegat Basin, Spring Creek, the eastern shore of Fresh Creek, and various parcels in the Rockaways, for new residential and commercial development. To safeguard the bay and begin its restoration, environmental advocates have urged that the city instead set aside as natural habitat roughly ten miles of shoreline and 700 acres of wetlands and other ecologically sensitive adjacent properties. The Parks Department and individual city officials have embraced this concept. And the Department's dedicated Natural Resources group has helped to acquire Dubos Point and Brant Point and to protect Floyd Bennett Field and several other parcels. But city development planners continue to resist movement in this direction.

Yet, what has surprised many observers is that despite these conditions, much of the bay's aquatic life continues to survive and adapt to its surrounding environment. More than 40 species of fish, ducks, shorebirds, and a rich diversity of smaller marine organisms inhabit this estuary. Even the endangered Ridley turtle has been seen paddling in the bay's troubled waters.

Jamaica Bay, then, is at a crossroads. The marine scientist and even the casual observer can find indications of unresolved environmental problems as well as signs of improving environmental health. Still unanswered is whether government officials will move to tip the balance in favor of preserving this unique urban sanctuary.
That’s not the only trouble spot in the city’s pretreatment program. City environmental officials have been hesitant to develop strict local limits on toxic pollutants that are dumped into city sewers. The federal Environmental Protection Agency has recently flagged the city’s position as a “problem area,” requiring “further action to bring the program into compliance with federal pretreatment regulations.”33

How about direct dischargers? For firms dumping wastes directly into rivers and bays, the state, not the city, is New York’s toxic gatekeeper. The state Department of Environmental Conservation (DEC) oversees the permitting of these toxic water dischargers. The program is known as the State Pollutant Discharge Elimination System, or SPDES.34 As noted earlier, direct discharges from industrial and commercial firms are not the primary source of toxic water pollution in the harbor. And DEC has reportedly issued permits to all direct dischargers as required by law.

But state officials have not yet turned the string of individual permit decisions into a tightening noose of toxic control. DEC’s water discharge permits are based solely on pollution control technology, and do not take into account pollution levels in the harbor, despite Clean Water Act language to the contrary.35 The city’s sewage treatment plants, surprisingly the largest source of toxic water pollution in New York, are a prime example. There is no presently available technology to control toxic pollutants at the plants themselves. But setting limits on toxic discharges from these facilities could prompt New York City to tighten requirements for industrial firms disposing of toxic wastes through the sewer system. Unfortunately, DEC’s current permits place no lid whatsoever on the amount of toxins that pour out of municipal sewage works.

THE COAST

Background

It’s open season on the city’s waterfront. At least, that’s the way some New Yorkers see it. They argue that unrestrained commercial and residential development is threatening irreplaceable shoreline parcels. Development serves no one, they add, if it means walling off the water’s edge, overloading existing city services, and threatening the marine environment.

Many developers and some government officials see things differently, noting that much of the city’s waterfront has fallen into decay and that the city needs the tax revenues and other economic benefits that would flow from new development. The real danger, they say, is overdevelopment, but government red tape and citizen opposition that make siting new waterfront projects far too complicated and time-consuming.

Everyone agrees that the stakes are high. New York’s 578-mile shoreline is twice as large as the waterfronts of Baltimore, Boston, Oakland, Philadelphia, San Diego, San Francisco, and Toronto combined. Of course, the fate of much of the coast is set, at least for now—two major airports, circumferential highways, 16 miles of beachfront, and countless commercial and residential developments from Brooklyn’s River Café to Manhattan’s Battery Park City are among the many existing uses that now dot the coastal landscape. But extensive areas of undeveloped or underdeveloped land, as well as docks and piers, are still up for grabs in all five boroughs.

Both the developers and the citizen warriors have a point. On balance, though, the critics of existing developing trends advance a more compelling case. To be sure, this does not mean all new waterfront development is inappropriate. But city officials must first put in place regulatory mechanisms for balancing legitimate waterfront development objectives with equally important environmental, recreational, and quality-of-life concerns. Until this occurs, expect fierce battles to continue along the city’s coastal frontier.

Coastal Development: A Bird’s-Eye View

Big changes are in the works along New York City’s coast. In Manhattan alone, more than a dozen major waterfront development projects are now on the drawing boards. They include:

• Trump City. Located between 59th and 72nd streets on Manhattan’s West Side, this proposed project envisions 11
residential buildings (including eight 60-story towers), two office buildings, and a 150-story skyscraper, along with 1.5 million square feet of total retail space.

- **Hudson River Center.** A 25-acre site, located between 35th and 40th streets, along West Street (opposite the Javits Convention Center), is slated to become a major commercial and residential center, which is likely to include a hotel, marina, heliport, and a new car tow-away pound; it would be built mostly on platforms over the Hudson River.

- **East River Landing.** A seven-million-square-foot, 23-acre development project along the East River just south of the Manhattan Bridge would include a new office, commercial, residential, and hotel complex, erected largely on platforms covering the East River.

- **Riverwalk.** This proposed 27-acre residential and commercial development project (1,888 residential units, a 245-room hotel, 240,000 square feet of retail and office space), situated between 16th and 24th streets on Manhattan’s East Side, would entail the construction of 16 acres of platforms over what is now the East River.

Waterfront development on a scale now being contemplated in Manhattan poses problems that extend beyond the waterways themselves. The Trump City proposal offers a sobering glimpse of what coastal parcels might look like in an era of unbridled development. Hardly any of the city’s major environmental fronts would remain untouched.

Consider the following:

- Although it would not require landfilling or decking, Trump City would still tinker with the Hudson River ecosystem. The 33,000 new residents and employees (along with tens of thousands of shoppers and other visitors who would stream into the satellite city every day) would produce at least 2.3 million gallons of sewage daily, even as the nearby North River sewage treatment plant is already operating near or at its design capacity.

- Trump City’s 7,300-car parking facility (the largest in Manhattan), its distance from existing transit lines, and its giant enclosed shopping mall would attract 25,000 vehicles to the area every day. Traffic along already congested West Side thoroughfares would increase sharply. And the new travel would spew additional air contaminants into an area that already violates national health standards for carbon monoxide and ozone.

- Trump City is expected to generate more than 23,000 new subway trips every day, straining existing transit services. Local stations, including the one at Broadway and 72nd Street, already suffer from serious rush-hour pedestrian bottlenecks.

- And Trump City’s massive bulk (including eight 60-story residential towers and a 150-story skyscraper, the world’s largest) could become both a physical and psychological wall that separates New Yorkers from the river and deprives them of light and air. The proposed office tower would at times cast its shadow across the Hudson into New Jersey, as well as over portions of Riverside and Central parks.\textsuperscript{40}
Coastal controversies are not limited to Manhattan. Of course, coastal development issues in the other boroughs do not always involve the same questions of density and open space. Still, residents of Brooklyn’s Sheephead Bay, for example, are greeting development plans in their neighborhood with mixed emotions. Some welcome a proposed $17 million plan, which includes a floating restaurant, retail shops, and residential condominiums on the bay. Others, including charter boat operators and some small businesses, fear that the proposed changes and lack of parking could erode the economically precarious fishing trade that has defined the character of the neighborhood for decades.

The issues are even more starkly drawn when coastal development knocks at the door of urban parkland. Gateway National Recreation Area is one of the city’s coastal jewels. And plans to develop several sites in and around this area have not unexpectedly tripped the alarm among conservationists and concerned citizens.

Land use experts at the Trust for Public Land and the New York City Audubon Society have questioned the wisdom of city plans to develop critical sites buffering Jamaica Bay. Fourteen acres in Mill Basin, Brooklyn (adjacent to wetlands known locally as the Four Sparrow Marsh); 21 acres on Brooklyn’s Paerdegat Basin (which feeds directly into Jamaica Bay); and a 10-acre peninsula in Queens (poking into the bay and located between Vernam and Barbadoes Basins in the Rockaways)—these are among the properties that have been targeted for residential, commercial, or industrial projects by the Public Development Corporation, New York City’s lead agency for waterfront development. But conservationists argue that these and other city-owned sites should instead be designated as parkland to protect environmentally critical areas and the larger Jamaica Bay ecosystem.

A recent controversy erupted over the fate of a portion of Jacob Riis Park, a popular 400-acre shorefront unit of the Gateway Recreation Area. A proposed National Park Service plan would have allowed private developers to build a 15,000-seat amphitheater and a 25-acre amusement park, complete with aquatic rides, on a portion of this federal parkland. (In exchange, the developers were to provide financial assistance for park maintenance and rehabilita-
RISING SEAS IN NEW YORK CITY

Development is not, of course, the only issue facing the city’s coast. The greatest long-term concern is the worldwide problem of sea level rise. Government scientists now believe that carbon dioxide gases produced from the burning of coal, oil, and other fossil fuels are trapping heat that would otherwise escape from the earth’s surface and lower atmosphere. This is often referred to as the “greenhouse effect.”

If global warming trends continue, water levels along the Atlantic coast may climb between two and seven feet during the next century. Even over the next several decades, the impacts of sea level rise on New York’s beaches, airports, and other low-lying areas could be considerable. Rising waters along New York’s coast could be particularly troubling in areas of the city already susceptible to erosion and flooding problems, such as Coney Island and the Rockaways. Sea level rise may also pose substantial risks to the region’s drinking water supply.

Of course, the heavy responsibility for reversing global warming trends remains primarily in the hands of decision makers in both national and international circles. But state and local governments can do a lot by themselves to encourage energy conservation and slow global warming. And they will also have to take sea level rise into account in coastal land-use decisions of the 1990s.

The Law: The Coast

The United States Congress has never been wild about land use planning. It has repeatedly rejected legislative attempts to involve the federal government in what it considers to be state and local prerogatives. But in the heyday of congressional activism on the environment in the early 1970s, a federal coastal land use statute was swept into place. The little-known Coastal Zone Management Act of 1972 offers funding to states that draft plans for the management and protection of their coastlines. The statute does not demand that coastal states adopt such plans. But to cash in on the federal largess, state coastal projects must, among other things, provide for the preservation of beaches, wetlands, barrier islands, and other natural resources, protect flood- and erosion-prone areas and assure recreational opportunities and public access to the coast.42 The Commerce Department’s National Oceanic and Atmospheric Administration administers this federal program.

With both coastal protection and federal dollars on its mind, New York passed enabling legislation that created a state coastal zone management program in the early 1980s. At the heart of New York’s federally approved plan are 44 broad policy objectives. Their purpose: to incorporate the federal coastal protection priorities into state decision-making. New York State invited local governments to share the federal proceeds. To secure this funding, municipalities were required to adopt their own coastal plans. New York City did just that, bolstering its coastal protection authority, at least in theory.43

Laws and regulations concerning coastal development turn up everywhere. Among other statutes, the Clean Water Act mandates that persons seeking to discharge dredged or fill material into navigable waterways secure a permit from the Army Corps of Engineers. And under the 1899 Rivers and Harbors Appropriations Act, permits from the Corps are also required for the placement of structures in navigable waterways. Both federal and state law direct the preparation of environmental impact statements in connection with major actions, including certain coastal development projects that could significantly impact environmental quality. And under the state law, agencies taking actions that have been the subject of an environmental impact statement must explicitly find that ad-
verse environmental impacts will be minimized to the maximum practicable extent.\textsuperscript{44}

Other little-known state laws come in handy when talk turns to coastal resources. One empowers the state to identify and map areas prone to coastal erosion and to require permits for construction-related activities in these regions. Two additional statutes set up a mapping and permitting process to help shield saltwater and freshwater wetlands from development pressures.\textsuperscript{45}

At the local level, it is the city's Zoning Resolution that calls the shots. This maze of rules is particularly complex, and even an incomplete summary could stretch on for pages. Briefly, the Zoning Resolution, in conjunction with the Building Code, regulates the construction and use of buildings throughout the city. Among many other things, it divides the city into districts, specifying permissible uses within those areas. And it imposes further controls on the size and, in some cases, the design of buildings. While a variety of zoning provisions covers properties located on the waterfront, the resolution itself contains no comprehensive set of requirements designed specifically to regulate development along the city's coast.

**Government Action: The Coast**

Will the real New York City coastal program please stand up? Is it a set of coastal priorities that protects natural resources, promotes water-dependent uses, increases waterfront public access and recreation, and advances only those development proposals that are compatible with these objectives? Or is it a policy that leaves the door open for waterside commercial and residential development on almost any scale, as typified by the colossal Trump City proposal?

Until now, the city has been sending mixed signals. For one thing, it has embraced the state's coastal zone management program. It has created within the city Planning Department a local unit to apply these coastal priorities to waterfront land use decisions. This operation is sometimes referred to as the Waterfront Revitalization Program.

At least on the margins, the city's presence is making a difference. Of the more than 1,100 projects that have come before the department between 1984 and 1988, roughly 30 percent were later modified to conform with coastal zone management objectives, planning officials report. For example, a proposal to locate a Manhattan community hospital on the Harlem River was altered to include a public walkway along the water's edge, following review by the Planning Department. And on at least one occasion, the department's intervention actually derailed a proposed waterfront project, which it found inconsistent with the coastal plan. That's why you won't find a dockside commercial car wash built on pilings in Brooklyn's Mill Basin.

But hold the champagne. New York's coastal zone management plan, as currently structured, has considerable limitations. Governmental reviews of proposed projects are hampered by the plan's broad and sometimes conflicting policy objectives. As two of the city's leading environmental lawyers, Stephen L. Kass and Michael B. Gerrard, have noted, the plan provides no formal mechanism for balancing competing coastal management goals (i.e., economic development versus protection of natural resources). Further, since the coastal management policies and standards are so numerous, projects can seldom move forward without compromising at least one plan objective or another.

Despite these shortcomings, the city Planning Department's Waterfront Revitalization unit has at least attempted to balance competing coastal interests. It would be hard to say the same for the city's Public Development Corporation (PDC). This quasi-governmental agency was tapped in 1985 to spearhead development projects along the coast. Its five-borough development wish list includes, among other things, proposals for platforming over segments of the city riverfront and effectively selling off portions of city parks. Economic factors, not protection of coastal resources, seem to dominate the PDC agenda. Indicative of the agency's apparent mind-set is its 52-page, 1986 blueprint that mentions the role of the city's federally approved coastal zone management program not even once.\textsuperscript{46}

The city's approach then remains somewhat schizophrenic. And by failing to speak with a single voice, it may be letting private interests set the city's agenda along the waterfront. As Robert A. Caro, an award-winning author and longtime commentator on urban planning in New York, has noted, "For the city to just react to a developer's plan is to abdicate its moral authority as government."
OCeAN DUMPING: QUESTIONS AND ANSWERS

Q. What is ocean dumping?

A. Ocean dumping is the disposal of treated or untreated waste products in coastal waters.

Q. Is garbage being dumped into the waters off New York City's coast?

A. No, at least not legally. Contrary to popular belief, ordinary household and commercial trash has not been lawfully dumped in New York's coastal waters for more than 50 years. It took the United States Supreme Court to close the door. In a landmark case, New Jersey v. City of New York, the High Court ruled that garbage cast into the ocean by New York City was washing onto New Jersey's shore and creating a public nuisance. It ordered a halt to the practice, which took effect in 1934.

Q. What about the garbage and medical wastes that have washed ashore in New York and New Jersey in recent summers?

A. Government officials do not yet know the full story behind these incidents, which left highly publicized beach closings in their wake. It is likely that several different sources were responsible. Medical wastes and other debris flushed out of city sewers and refuse unintentionally spilled at the city's Fresh Kills landfill and trash transfer stations were among the most likely contributors. Compounding the problem is raw sewage washed into regional waters, particularly after heavy rainfalls.

Q. Do government officials permit any wastes to be jettisoned into New York's coastal waters?

A. Yes—three types:
   1. Sewage sludge. This consists of residues from New York City sewage treatment plants and eight other sewage authorities in the New York–New Jersey region. Sludge is composed of water, sewage solids, bacteria, heavy metals, organic chemicals, and other contaminants screened at sewage works. Nearly 3.9 million wet tons of sludge are being dumped by New York City alone into ocean waters every year. The eight other sewage authorities add about 4.6 million tons to the annual total.
   2. Dredge materials. To keep marine navigational channels and docking areas clear, mud, silt, and sediments are regularly scooped from the bottom of New York Harbor. These dredge spoils frequently contain heavy metals, organic compounds, and other contaminants that have accumulated along the sea floor. More than 8 million cubic yards a year of these wastes are barged to off-shore disposal grounds.
   3. Construction debris. Concrete, excavation dirt, rubble, and rock have been dumped, albeit in decreasing amounts, off New York's coast since 1940. No such material was disposed of in local waters during 1986 or 1987. But one company, the New Jersey–based Port Liberte Partners, holds an EPA permit to dump 400,000 cubic yards of excavation dirt; through April 1989, however, the firm had disposed of only 17,000 cubic yards of this material.

Q. Where is ocean dumping taking place?

A. Sewage sludge is released from barges at a deepwater (6,000 to 9,000 feet) site located roughly 138 miles southeast of New York Harbor. This site is often referred to as the 106-mile ocean dump site (as measured from New Jersey's shore). For years, sewage sludge had been dumped at a 12 mile offshore site; that practice ended in 1987 by order of the U.S. EPA.

Dredge materials from the harbor floor are dumped at a relatively shallow (50 to 80 feet) site, about five miles south of New York's Rockaway Peninsula.

And construction debris is tossed to sea at a site about seven miles off New Jersey's shore, just south of Sandy Hook.

Q. What are the impacts of ocean dumping?

A. Closure of shellfish beds due to high bacteria counts. Elevated levels of heavy metals and toxic organic compounds in bottom sediments and marine organisms. Smaller fish catches. Repro-
ducte difficulties and increased incidents of fin rot and other fish diseases. These and other adverse ecological effects have been observed in and around the so-called 12-Mile Sewage Sludge Dump Site, which was used for the disposal of municipal sludge until EPA ordered a halt to the practice there in 1987. At that time, EPA concluded that ocean dumping of municipal sludge was most likely the primary cause of such problems in this portion of New York’s coastal waters and was a contributing factor to the overall degradation of the larger New York Bight.

Dredge disposal has presented similar problems. One has been the closure of shellfish beds due to high bacteria counts and elevated levels of heavy metals and organic compounds. Unique to dredge disposal is the physical burial of bottom-dwelling marine organisms following each dumping. In total, sludge and dredge deposits have contributed as much as 50 percent or more of some heavy metals and PCBs to the New York Bight.

There is no consensus on the impacts of dumping at the recently established 106-mile ocean dump site. Some officials maintain that the environmental impacts are minimal due to dilution and dispersal of sludge in deeper waters, more active currents, and lower fish and shellfish populations. But fishermen claim that recent declines in lobster harvesting and increased incidents of burn-spot disease (a shell-destroying malady) are linked to sludge dumping at this deepwater location. A definitive analysis of the situation has not yet been completed, although the impacts of sludge dumping at the old 12-mile site certainly suggest troubling problems.

Little information is available concerning the ocean dumping of construction-related wastes.
Q. What law governs ocean dumping?
A. The Marine Protection, Research and Sanctuaries Act of 1972, often referred to as the Ocean Dumping Act, authorizes EPA to regulate the disposal of all types of materials into ocean waters and to strictly limit the dumping of any material that will adversely affect human health, welfare, or the marine environment. The act and its implementing rules also require EPA to designate approvable sites for ocean dumping. And the statute also charges the Army Corps of Engineers, subject to EPA review, with administering the issuance of permits for dredging and limiting the disposal of contaminated dredge spoils.

In the wake of the summer of 1988 beach washups, Congress amended the Ocean Dumping Act. The 1988 amendments are the latest congressional attempt to end sludge dumping once and for all in the coastal waters off New York. Under the statute, all municipalities must cease dumping operations by December 1991 or face escalating fines.\(^3\) (New York City and several communities north of the city and in New Jersey are the only municipalities in the nation that continue the ocean dumping of sewage sludge.)

New York City officials, faced with some difficult choices, have agreed (in what is probably not the last word on this issue) that the city will be out of the ocean by 1992. Composting, landfilling, and perhaps even incineration are the land-based alternatives that city officials will be pushing into the limelight in the mid-1990s. Regardless of the final disposal route selected, the most important next step is to reduce the heavy metal concentrations that now make sludge so unwelcome in all quarters.