



CHAPTER 4: SHORELINE

In the past decade, there has been increased concern about the nature and extent of lakefilling, measures used to control shoreline erosion, and other shoreline modifications in the Greater Toronto bioregion. Reports prepared for the Ministry of the Environment (MOE) during the 1980s revealed the existence of extensive heavy metal and organic contamination in some soils used for lakefill. The Royal Commission's first interim report (1989) described other concerns as well:

The [Ministry of the Environment] analyses clearly revealed that, while lakefilling operations have had little or no short-term impact on surface-water quality, they do contribute to general sediment contamination, with potentially damaging effects on the biological food chain.

... extensive modifications of the Lake Ontario shoreline have altered natural coastal processes, causing contaminants to accumulate in sediments; in the past, such pollutants would have been transported offshore.

There has been no comprehensive assessment of the cumulative

impact of lakefilling on Toronto's waterfront.

While understanding that lakefilling and other forms of shoreline modification can have beneficial effects, the Commission reiterated its concern about these practices in *Watershed*, its 1990 interim report. In that document, the Commission confirmed that it believed the situation was serious enough to require a moratorium on new lakefill projects, pending further study. The Commission recommended that the Province bring forward comprehensive lakefill policies for public review as soon as possible.

The provincial response was prompt: as a first step, in December 1990 the Minister of the Environment told the Legislature that she had asked the Royal Commission to address "... policies, practices, technology, and methods available to regenerate the shoreline areas".

The minister's choice of the phrase "regenerate the shoreline" was regarded as significant. Clearly, she wanted something much broader than a study of lakefill: the word "regeneration" suggested a desire to establish a shoreline that was healthier and more beneficial to the surrounding

community. Lakefill would be a significant consideration in the study, but would be placed in the context of the broader issues of a sustainable environment, economy, and society.

The Commission created the Shoreline Regeneration Work Group, nine people with diverse backgrounds and expertise, who were asked to investigate issues and options. The Work Group first met in February 1991, and its report, *Shoreline Regeneration for the Greater Toronto Bioregion*, was released the following September. The report, combined with submissions at earlier public hearings and with other presentations, gave the Commission broad information about the problems and opportunities posed by shoreline regeneration.

HISTORY OF SHORELINE MODIFICATION

It is important to recognize that the shoreline of Lake Ontario has evolved since the retreat of the glaciers about 15,000 years ago. We can neither return the lakeshore to "the way it used to be" nor hold it in its current state: forces beyond human control ensure that it constantly changes.

Until the 18th century and the arrival of European settlers, human inhabitants of areas around Lake Ontario adapted themselves rather than attempt to change the waterfront. The forces of wind, water, frost, and ice sculpted the shore: frost shifted the ground, cracked the rocks, and hastened erosion of river, stream, and lake banks. Wind gave the waves energy. The waves pounded relentlessly against the shores, dislodging rocks and soil. Sand eroded from the shore was augmented by sediment discharged from the mouths of rivers and

streams; this gritty material tumbled in the shallow nearshore waters and eroded the lake bottom and shore.

While sediment was the grindstone, ice propelled by waves was the battering ram: ice and wave-borne sediment attacked the shores and peninsulas, which retreated gradually. In sheltered areas, as waves and currents lost their ability to carry sediment, they deposited sand, which created and nourished beaches, bars, peninsulas, and islands. Erosion from what we now know as the Scarborough Bluffs, augmented by discharge from the Don River, created a peninsula and, later, the Toronto Islands.

Littoral sediments constantly replenished the bars that provided the essential barrier for many river and stream mouth marshes; these protected the marshes from invasion by icy water from Lake Ontario's depths. The warm waters of the marshes provided a rich nursery for all kinds of aquatic plants, fish, birds, and animals.

Eighteenth-century European explorers and traders found native inhabitants, and a lush and vibrant natural community around the mouth of each river and stream. Protected by spits or gravel bars, a wide variety of fish fed and multiplied. Large quantities of wildfowl inhabited the marshes found at the mouths of tributaries, like Bronte and Sixteen Mile creeks, and rivers such as the Credit, Humber, and Don.

The beaches, woods, marshes, and islands provided rich and varied habitat for deer, lynx, beaver, black bear, and many other species of flora and fauna. More than 50 species of fish, 270 types of birds, and countless animals inhabited the region. Abundant shelter and food provided attractive incentives for European settlement. Then, as now, humans attempted to change



The stone hookers' last stand at Port Credit

the shore, and to bend it to their needs. The first modifications, primitive piers, were constructed to allow deep draft sailing vessels to load and discharge directly on the shore.

Sailing ships required ballast, and buildings needed stone for foundations and walls. Loose rock from beaches and shallow waters was easily gathered and delivered to shipping and construction companies; soon a thriving fleet of "stone hookers" was at work along the shore, their crews using devices like pitch forks with the tines bent at right angles. These tools were employed to loosen and lift stone from the bottom. In the 1830s, the stone hookers removed as much as 43,000 tonnes (47,000 tons) of stone annually.

Unfortunately, the full value of these nearshore stones to the lake was unrecognized at the time: they served as armour for

the lake bottom and shore and, once they were removed, erosion of the lakeshore banks accelerated. Farmers, alarmed by the loss of their shorefront property and pasture, successfully urged the Legislature to pass the so-called Three-Rod Law, in 1857. The law, which prohibited stone hookers from operating within three rods (15 metres) of the shore, came too late, after much of the damage had been done. Fish habitat was destroyed, shoreline facilities and farming land were damaged or lost.

It was a pattern often repeated to the present day: those involved in a worthy enterprise (such as gathering stone, an essential foundation for development) failed to consider the consequences for the natural environment. Nor did they fully consider the damage to the shoreline economy (farming and fishing). The activity was unregulated at first; only when the damage

Table 4.1 Major lakefill projects in the Greater Toronto bioregion

Project	Area	
	(hectares)	(acres)
J.C. Saddington Park	10	24
Lakefront Promenade Park	30	74
Colonel Samuel Smith		
Waterfront Area	28.5	70
Humber Bay Park — East and West	40	99
Ontario Place	38	94
Tommy Thompson Park		
(land and water)	470	1,161
Ashbridge's Bay	17	42
Bluffer's Park	42	104

Source: Reid, R., R. Lockhart, and B. Woodburn. 1990. *A green strategy for the Greater Toronto waterfront*. Publication no. 8. Toronto: Royal Commission on the Future of the Toronto Waterfront.

became serious were limits set, a reaction that effectively “closed the door after the horse had escaped”.

In the next 130 years, shoreline modifications of increasing magnitude dramatically changed the shape of the Greater Toronto bioregion's shore. The largest of these initiatives, filling the Ashbridge's Bay Marsh to create 428 hectares (1,057 acres) of land for industrial and recreational use, emerged from the 1912 Waterfront Plan of the Board of Toronto Harbour Commissioners (THC). Most of the fill material was sediment dredged from the Inner Harbour, but included construction debris, excavated soil, sewage sludge, incinerator refuse, and municipal garbage.

More recently, the 1967 Waterfront Plan for the Metropolitan Toronto Planning Area proposed massive lakefilling, chains of artificial islands, public open space, and marinas with a combined capacity of 5,000 boats (Metropolitan Toronto). The 1967 plan inspired a series of artificial

headlands configured to protect boat clubs and marinas. Since the 1950s, 676 hectares (1,668 acres) of land have been created through lakefill, and plans exist for many more. In *Pathways* and in *Shoreline Regeneration*, Royal Commission publications 11 (Barrett and Kidd 1991) and 13, lakefill projects and the associated decline in water quality are described in more detail.

Many projects and modifications have taken place on the shore of the Greater Toronto bioregion, and the nature of change varies. *Shoreline Regeneration* includes the following description of the Greater Toronto bioregion waterfront.

A BIRD'S-EYE VIEW OF THE SHORE TODAY

Flying over the western shoreline of Lake Ontario, one is struck by the intensity of development: from the sand beach of the Burlington Bar to Oakville, much of the shoreline is protected with hard coverings (revetments) of concrete, rubble, and large quarried stone (armourstone), as well as with short groynes jutting into the lake. Occasional narrow cobblestone or gravel beaches remain, but the evidence of change is everywhere.

At the harbour entrance to Oakville Creek, the lack of beach at either side of the groynes suggests that littoral transport is not great. To the east, the St. Lawrence Cement Co. and Gulf Oil Co. concrete piers stretch offshore to navigable water. Residential development surrounds one of the few remaining wetlands, the Rattray Marsh, which is protected from the lake by the barrier formed by its tree-covered bar. Even further east, as the shale subsides below lake level, a different shore forms — one that is low and sandy, created from fine glacial material near Lorne Park, west of Port Credit.

At Port Credit, commercial and industrial development mixes with public open space built on reclaimed land behind steep stone revetments. A major lakefill structure east of the Credit River provides marina facilities next to the heavily armoured shoreline of the Lakeview Generating Station and Lakeview Sewage Treatment Plant.

The dominant features on the Metro Toronto waterfront are lakefill structures: the Colonel Samuel Smith project at Kipling Avenue projects 700 metres (770 yards) from a low-density residential area. Four kilometres (2.6 miles) to the east are two adjacent lakefill headlands at the mouth of Mimico Creek that provide shelter for boats as well as parkland. A breakwall, constructed as part of the 1912 Toronto Harbour Commissioners' plan, protects low parkland that stretches east from the Humber River

to the lakefill structure that supports Ontario Place.

The west shore of the Toronto Islands offers one of the longest sand beaches remaining on the waterfront. The south shore has been fortified with a rubble mound breakwater, groynes, and a concrete seawall. Cut off from its sand supply by the Leslie Street Spit, the shore is being eroded more quickly. The Ward's Island beach, anchored by the new Eastern Gap entrance structure, has reoriented itself to face southwest. Nearly all the Inner Harbour shore is vertical concrete and steel; the Outer Harbour has been created by the Leslie Street Spit, a lakefill structure extending five kilometres (three miles) into 16 metres (52 feet) of water, protected by a veneer of eroding concrete, brick, and asphalt rubble.





Mouth of the Rouge River

Immediately next to the spit is the Ashbridge's Bay lakefill, where the east-facing embayment has filled with littoral sand. Beyond the groynes and breakwalls along the Eastern Beaches rise the Scarborough Bluffs, where the Metropolitan Toronto and Region Conservation Authority (MTRCA) is installing shore protection structures of fill and rubble. The sharp incline of the bluffs is caused by erosion, the result of wave action on their underwater base. Unprotected, they retreat at a rate averaging a third of a metre (one foot) per year. Bluffer's Park lakefill at the foot of Brimley Road occupies nearly two kilometres (1.2 miles) of shoreline and extends 600 metres (660 yards) offshore, intercepting all littoral drift from the east.

Residential development at the top of the bluffs near East Point gives way to open

space and scattered industrial use. Much of the shoreline is in a natural state, although occasional storm-sewer outfalls intrude.

Further east, Frenchman's Bay is separated from Lake Ontario by a natural sand bar broken by an entrance structure that permits navigation. Part of the Pickering Generating Station is built on reclaimed land with heavy armourstone revetments and cooling water intake groynes.

From Pickering to Whitby the shoreline is characterized by low bluffs two to seven metres (14 to 23 feet) high, with low-density residential or agricultural uses predominating. Various creeks have small estuarine wetlands behind gravelly beaches and bars; the estuary at Whitby has long been a commercial harbour with entrance groynes interrupting the sand and gravel bar. From Whitby to Oshawa, the shoreline varies from

seven-metre (23-foot) bluffs descending to stream estuaries, each fronted by a small beach. Much of the land is low-density residential or cottage-lined beaches.

On the east side of the Oshawa Harbour entrance groynes, reclaimed land has been created by construction of a confined dredge spoil disposal facility. The Oshawa Second Marsh is a large estuarine wetland next to the more exposed McLaughlin Bay. From Darlington Provincial Park, the shoreline rises to bluffs 12 metres (40 feet) high, which occasionally “slump” toward the lake. Darlington Generating Station, built partly on reclaimed land, employs massive armourstone revetments across its extensive shoreline.

At Raby Head, the bluffs are some 12 metres (40 feet) high, descending to a small coastal wetland just west of a large cement company dock, where a 32-hectare (79-acre) lakefill structure projects 675 metres (738 yards) into the lake.

Continuing east, the shoreline is a series of 10-metre (33-foot) bluffs, cut by creeks with small estuarine marshes behind sand and gravel baymouth bars. The estuaries at Port Darlington and Bond Head have been partially dredged for marinas and the baymouth bars are cut by entrance groynes. Still farther east, the pattern is repeated, with some bluffs reaching as high as 20 metres (66 feet); vegetation there suggests a lower rate of erosion. The area behind the bluffs is almost entirely agricultural.

SIGNIFICANCE OF SHORELINE MODIFICATION

The Commission's interim reports acknowledge that lakefilling and human alterations of the shore have provided

substantial benefits to the region: Ontario Place, Harbourfront, and Bluffers Marina, for example, were constructed on lakefill and have improved the social, cultural, and economic life of the community. These and other projects have expanded the land base; improved public access and amenities such as parks, beaches, and boat-mooring capacity; and/or increased fish and wildlife habitat.

Tommy Thompson Park, located on the five-kilometre (three-mile) spit at the foot of Leslie Street, demonstrates some of the benefits of lakefill, both planned and accidental. Planned benefits include extensive boat mooring capacity, and facilities for sailboards, dinghy sailing, rowing, and canoeing in the sheltered waters of the Outer Harbour, in the lee of the spit. The spontaneous emergence of grasses, herbs, shrubs, and trees provides exceptional habitat for a variety of birds and animals, an urban wilderness of amazing variety. The shallow, sheltered cells within the park provide fish with refuge from the periodic cold-water upwellings that occur, with deadly consequences, along much of the Lake Ontario shore. As a result, populations of perch, pumpkinseed, and pike have expanded rapidly.

Public access to the shoreline has been enhanced by the artificial headlands at Humber Bay East and Bluffer's Park, and elsewhere thousands enjoy picnicking, walking, and other types of recreation. Groynes and other forms of shoreline erosion control have created new beaches near Oakville and various other places where people can view the lake and enjoy the heat of the summer sun. Homes and properties along the Scarborough Bluffs, among other areas, were saved by measures to halt or

delay erosion. As well, commerce has benefited from lakefilling: thousands of new boat berths have supported the boat building and service industry. Sport fishing, mainly salmon charters and private boats from facilities at Port Credit, Bluffers, and other new marinas, brings millions of dollars in revenue to the region. Extensive condominium, tourism, and commercial facilities stand on land created by lakefilling.

There has been another benefit, particularly to the downtown waterfront area of Metro Toronto: the lake has been a convenient, inexpensive repository for large volumes of material excavated from downtown construction sites.

These benefits extract a price, however, as described in *Shoreline Regeneration*:

Much of the excavated material used for lakefill was contaminated with lead, other heavy metals, and organic materials that found their way

The lake has been a convenient, inexpensive repository for large volumes of material excavated from downtown construction sites.

into the lake sediments and the food chain. This [fill] material, combined with the much larger sources of pollution, the sewage treatment plants, storm sewers, and urban rivers, has degraded the water quality of the shore. The combined impact of urban development — filling wetlands and river estuaries, and armouring for erosion control, in addition to vast quantities of silt released from lakefill sites — has damaged much of the natural habitat both above and below the water line.

The Commission's Shoreline Regeneration Work Group found that the

environmental price was higher than necessary, and sometimes outweighed apparent benefits. In this respect, the Work Group agreed with the position taken by many critics of lakefill who made submissions to the Royal Commission during public hearings.

SHORELINE REGENERATION ISSUES

Concerns about the negative effects of shoreline modification give rise to several issues, including:

- the environmental effects of lakefill structures and erosion control measures, including cumulative effects of many activities, loss or damage to both aquatic and terrestrial habitat, obstruction of sand movement, elimination of traditional sources of sediment through shoreline armouring, and accelerated erosion in other places;
- the degree to which current guidelines and control procedures for materials for lakefilling ensure safety;
- lack of standards for lakefilling methods and structural designs;
- disposal of the waste materials from construction and excavation, including that judged not suitable for lakefill;
- changes in economic opportunities, and the wisdom of spending public money to protect private and public land through armouring — as opposed to acquiring — hazard lands;
- similarly, constructing artificial headlands for private boat clubs; and

- the impact of shoreline modification on aesthetics, access, vistas, and recreation.

These concerns should be considered in the context of general apprehension about the safety of Lake Ontario as a source of drinking and bathing water.

The preceding chapter of this report describes Lake Ontario's condition and the impact of pollution, even from sources far from the Greater Toronto bioregion's shoreline; it also examines efforts by the International Joint Commission, the Metro Toronto RAP, and other groups to address these problems.

The contaminated sediments, overloaded sewage plant, or toxic pollutants from the Niagara River and elsewhere will take

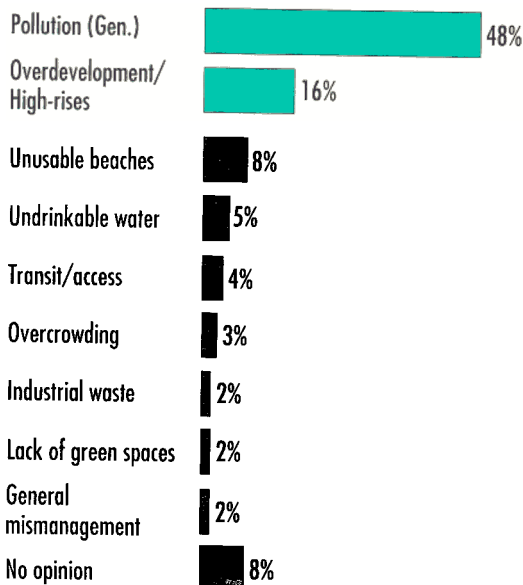
considerable time to correct. Lakefilling, however, is a discretionary activity and can be stopped as a pollution source tomorrow — if we choose to do so. There are choices of methods and materials, as well as of locations at which lakefilling would be allowed.

IMPACT OF LAKEFILL STRUCTURES AND EROSION CONTROL MEASURES

Artificial headlands — peninsulas created by lakefilling to shelter boat basins — have become common on the shore of the Greater Toronto bioregion. They have created negative impact on the environment in four ways:

- materials used for fill have contributed to contamination and turbidity of the water;
- structures have blocked the lake's ability to rinse its shoreline;

Major Waterfront Concern



Pollution is considered the waterfront's major issue by the respondents.

Source: Environics Poll. 1991.

We are a species that, through its intelligence, has exceeded its biological constraints but in the process lost its sense of place in the biosphere. Convinced of our knowledge and ability to control nature, we exploit the very life-support systems of the planet in the name of short-term comfort and economic profit. Wilderness is disappearing throughout the world so quickly that each remaining untouched area becomes that much more rare and precious.

Suzuki, D. 1989. *Carmenah: Artistic Visions of an ancient rainforest*. Vancouver: Western Canada Wilderness Committee.

- transport of sand along the waterfront has been limited; and
- aquatic habitat has been destroyed.

Loss of shallow lake bottom for breeding and feeding at the site reduces habitat, while large amounts of sediment — material that blocks the light and blankets the lake bed — is lost during construction, thus imposing further, indirect harm. In a deep, dark, silt-covered environment, few aquatic species flourish. Light is essential to the growth of some plant organisms that fuel the aquatic food chain. High turbidity results in altered and reduced biotic life and spawning capacity, in the zone that could be most productive.

Embayments and boat basins in artificial headlands, which provide shelter from cold-water upwelling in the exposed lake, can be a positive factor in aquatic habitat. Above the water line, the natural growth of plants, shrubs, and trees on lakefill and erosion control projects have provided new habitat for a wide variety of birds and animals. These benefits would be much more valuable, however, if this attractive environment were not so contaminated.

The new headlands, which have extended as far as five kilometres (3 miles) into the lake, are a significant barrier to longshore movement by waves and current. As a result, suspended and floating materials are trapped and deposited nearby, where they create various pollution problems.

Erosion control embraces a variety of materials applied to the shore to slow or stop the loss of land by wave action. They include vertical steel pilings, concrete walls, large quarry stones (armourstone), construction rubble, and old tires. MTRCA has undertaken massive erosion control

measures at the foot of the Scarborough Bluffs and erosion control efforts by individuals and agencies are estimated to cover as much as 70 per cent of the shore from Burlington to Scarborough.

In addition to habitat loss, erosion control impounds the sediment that would normally drift along the shore, renew beaches, and repair storm damage done to sand and gravel bars that are essential to protecting estuarine marshes. Further, the structures may change wave patterns and accelerate erosion elsewhere on the shoreline.

CUMULATIVE EFFECTS

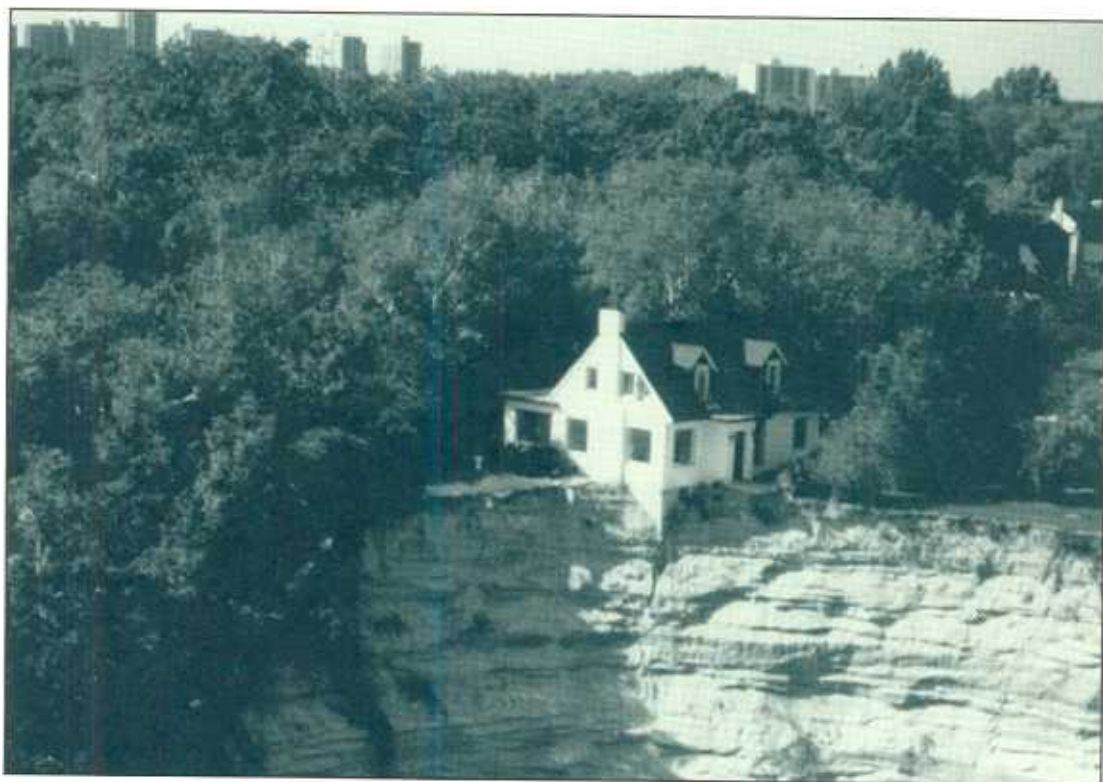
As the Shoreline Regeneration Work Group observed:

It became evident that many larger problems along the waterfront were not the result of one horrendous event but, rather, the cumulative effect of many acts or interventions. Treating each project in isolation from the rest of the shore was a common cause of significant degradation.

The tendency to treat lakefill and erosion control projects singly is understandable, when each is proposed at a different time, has a different set of characteristics and location, and is subject to decisions by different municipalities and agencies. Nonetheless, they are not independent, and their combined impact will, at some point, exceed the carrying capacity of the shore.

The impact of one artificial headland may be acceptable; but there are now eight new headlands, with many more planned. At some point, the shoreline circulation of water may be so impeded that it creates a regional cesspool.

Similarly, it would be hard to prove that 100 metres (110 yards) of armoured



House atop eroded Scarborough Bluffs

shore have starved any beaches or eliminated a significant amount of shallow-water aquatic habitat. However, 50,000 metres (31 miles) of armoured shore is another matter. It is estimated that 90 per cent of aquatic life depends on the shallow near-shore zone that is destroyed by many forms of erosion control. Losing such large areas leads to reduced food supply and spawning capacity. As discussed previously, shoreline modification damages habitat, but that is partially offset by some benefits. Clearly, the important issue is how to alter practices and technology so that they have a positive overall effect on habitat.

Loss of habitat, combined with other stresses such as contaminants and the presence of exotic species like the lamprey eel, has placed great stress on aquatic life forms. Along the Greater Toronto shore,

the number of types of fish, which are an indicator of the health of aquatic ecosystems, has already decreased from 50 to approximately 25 and, in some areas, is as low as 11.

Cumulative effects — the combination of various stresses over time — is a difficult but important issue in evaluating the present and future health of the region's aquatic ecosystem.

SAFETY OF CURRENT GUIDELINES AND CONTROL

Materials for open water disposal — lakefilling — are controlled according to a system defined by the Ministry of the Environment, using maximum levels of contaminants set out as "Sediment Guidelines". In the Metro area, the control system is operated for MOE by the Metropolitan

Toronto and Region Conservation Authority. MTRCA samples soil in large construction sites, and accepts or rejects fill from them, based on the results of its tests of contents. In the past, trucks were sampled when they arrived at the lakefill site, but results were not available until days after the sampling. MTRCA records show that some material used in lakefill (25 per cent in 1989, 15 per cent in 1990) was contaminated beyond the levels suggested by the existing MOE sediment guidelines.

The Royal Commission was given persuasive evidence, based on MOE research, showing that toxic materials moved from contaminated sediments to nearby plants and fish. Aquatic life accumulates some of the contaminants and introduces them, in concentrated form, to the food chain. This pattern has raised public and regulatory concern.

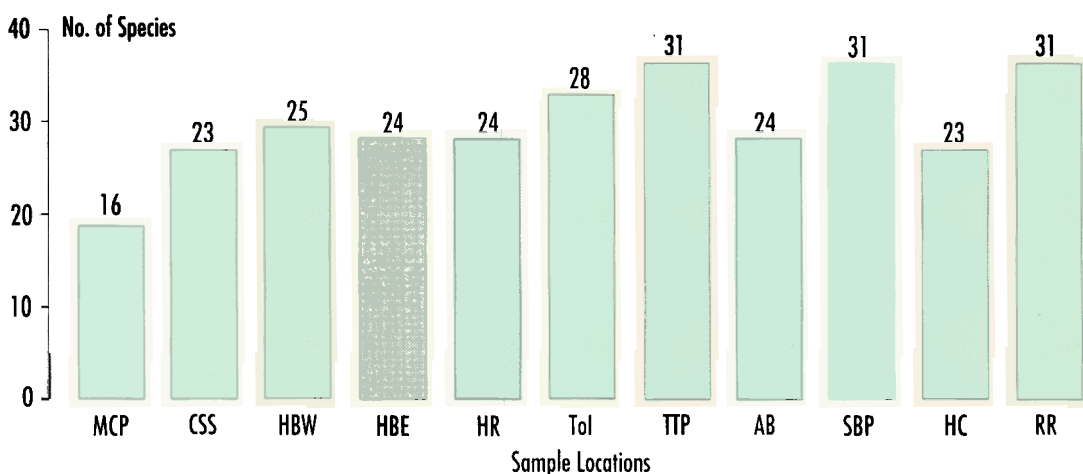
Established in 1976, current MOE sediment guidelines consider a very limited

range of toxic contaminants to establish nominally safe levels in materials for open water disposal. Many toxic substances are omitted. Recent work on contaminants in the 1976 list has shown that some are higher than the “no-effect level”, that is, the greatest concentration that showed no measurable effects when tested on indicator species. Considering this new information, the 1976 guidelines can no longer be relied on to define concentrations that are not harmful.

STANDARDS FOR MARINE CONSTRUCTION

There are no standards or codes to define what level of storms artificial headlands must be able to withstand, what water levels they must attain or even how fill must be controlled to avoid pollution and turbidity. Without such minimum standards, it is not surprising that minimum initial cost can

Figure 4.1 Number of fish species found — Toronto waterfront fish collections, 1989



Notes:

MCP: Marie Curtis Park
 CSS: Colonel Samuel Smith
 HBW: Humber Bay West

HBE: Humber Bay East
 HR: Humber River
 Tol: Toronto Islands

TTP: Tommy Thompson Park
 AB: Ashbridge's Bay
 SBP: Scarborough Bluffer's Park

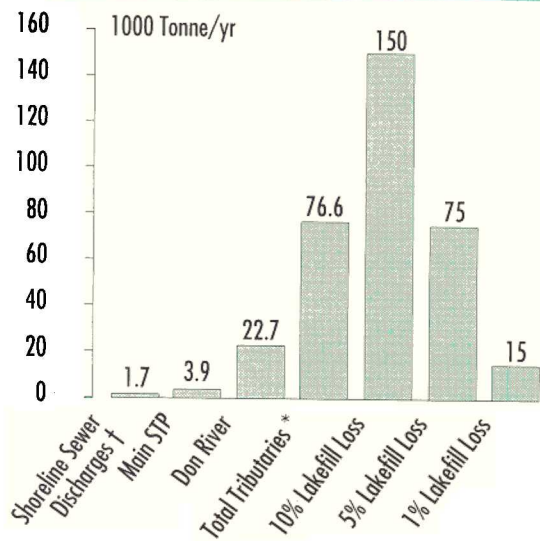
HC: Highland Creek
 RR: Rouge River

Source: Buchanan, I.D. 1991. *Presentation for the Royal Commission on the Future of the Toronto Waterfront*. Maple: Ontario. Ministry of Natural Resources.

become the governing factor on deciding how to construct these headlands. Operators may dump soft loose fill into open water,

Figure 4.2 Metropolitan Toronto waterfront pollution sources

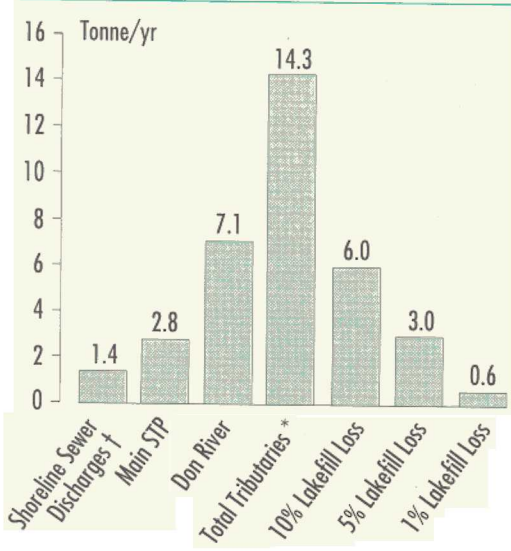
Suspended Solids



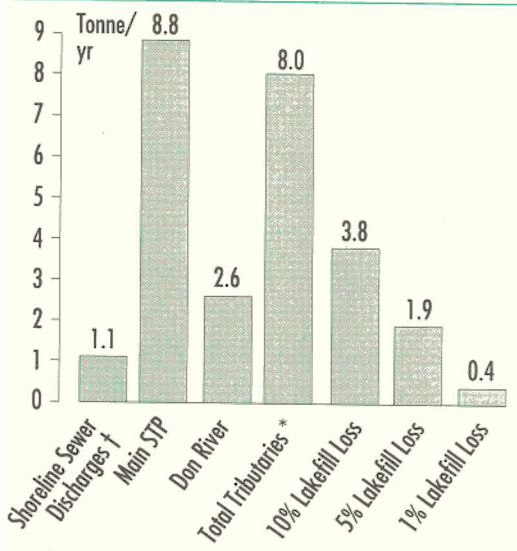
and leave such material exposed to waves and current. As a result, substantial quantities of fill escape, create turbidity, and mix with the water along the Greater Toronto shoreline.

Precisely how much material is lost during construction of lakefill projects is not known. However, the Shoreline Regeneration Work Group estimated that it is between one and ten per cent of material deposited annually. One per cent might be achieved with very tight control. Ten-per-cent fill loss could be expected with year-round filling at an unprotected site, plus additional loss due to a major storm. Current practice is believed to fall about mid-way between these extremes. Figure 4.2 compares suspended solids contributed by lakefill along the Metro waterfront during a typical year with the other major pollutant

Lead



Copper



Notes:
† Input from storm and combined sewers discharging on Lake Ontario shoreline.
* Tributaries include Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek, Rouge River.

Source: Metro Toronto Remedial Action Plan, 1988. *Environmental conditions and problem definition*. Toronto: Metro Toronto Remedial Action Plan.

MARCH OF THE MOTORIZED MASTODONS

Each morning, an elephantine procession emerges from the depths of downtown construction sites: a herd of dusty dump trucks struggles to the street level, then lumbers through the canyons between office towers toward the lakeshore. Brakes squealing, engines snorting, the vehicles rumble through intersections, harassed by taxis, cycle couriers, and pedestrians preoccupied with the day's work ahead. The trucks bear a massive burden of rubble and soil extracted from the foundations of large buildings, to make way for parking, passageways, and the subterranean shops of downtown Toronto. Their destination is the dusty peninsula near the mouth of the Don River.

South of the flaking concrete pillars that support the aging expressway, the loaded trucks gain speed and momentum, surging toward the open spit. There, freed of traffic, stoplights, and human obstacles, they stampede the length of the peninsula, a swirl of dust and gulls rising in the eddies behind their bulky frames. At the water's edge, they grind to a stop, turn, and await a turn to dump their burden of rock and soil. One by one, each struggles to the bank, arches its back, and relieves itself at the water's edge. Most of the material hangs on the banks or slides below the surface, while some dances away, suspended in the wavy turbulence, to be deposited far along the shore.

This pattern will be repeated more than a thousand times a week — nearly sixty thousand times a year. The land area expands and the water surface contracts in a ritual that has continued and accelerated for the last century.

sources, including tributaries and sewage treatment plants (STPs).

Not only is lakefilling a very significant contributor to suspended solids and water turbidity in the region, those effects are increased dramatically when construction practices allow a greater proportion of fill to escape.

Given that some lakefill is contaminated and that some of it escapes, fill contributes copper and lead contamination to water in the region. However, even at the highest percentage loss, lakefill ranks well behind other sources (see Figure 4.2).

To summarize, in light of new information, current guidelines for fill sediments are inadequate: the control system

allows some material exceeding guidelines to be deposited, and lack of codes permits construction methods which result in large amounts of fill mixing freely with water along the shore.

Furthermore, lakefill projects contribute indirectly to shore contamination. As a result of wave action, sediments and nearshore waters naturally progress along an exposed shore; unobstructed they disperse widely, taking with them any attached contaminants from partially treated sewage, storm water or other sources. At an artificial barrier like that at Humber Bay East (lakefill), sediment is trapped and deposited; the result is a contaminant sink, often accompanied by foul odours and floating debris.

DISPOSAL OF WASTE MATERIALS FROM CONSTRUCTION

Earlier it was mentioned that lakefill was considered an inexpensive and convenient waste disposal arrangement. The practice has been a particularly prevalent on the Metropolitan Toronto's downtown waterfront, where land values are extremely high. These high values preclude disposal on-site, and the need for large underground parking facilities dictates that a great deal of material must be excavated at each location.

While the average annual amount of fill is immense, it varies from year to year, depending on the amount of construction activity. Estimates of volume from 1984 to the year 2000 were prepared by Environmental Applications Limited for the Ministry of the Environment; they projected average annual volume of 1,050 tonnes (1,155 tons) — the contents of roughly 60,000 dump trucks per year.

But how will Toronto dispose of up to 60,000 dump-truck loads of waste if lakefill is banned, or restricted by tighter standards? While relatively low levels of contaminants in this material mean that it should not be mixed with water or otherwise introduced to the food chain, most of the fill does not require the control provided in sanitary landfill. The most critical issues for MOE and the construction industry are how to classify, and where to deposit, material unsuitable for lakefill.

ECONOMIC ISSUES

Everyone receives some form of personal benefit from the expenditure of public funds: motorists drive on public highways; pedestrians stroll in public parks. However, when shoreline modifications are carried

out with public funds, personal benefits at public expense can become an issue.

Constructing artificial headlands that protect and house private boat clubs is a case in point: the appropriateness of using public funds to build sheltered harbours for private clubs surrounded by chain link fences that deny public access is questionable. Although everyone may enter the public park, only a select group may enter the grounds of a private club.

Another issue arises from publicly funded erosion control measures undertaken to protect private property. Those who benefit from erosion control are easily identified, but the consequences of such activity are hard to predict: whose property



A downtown Toronto construction site

The Great Outdoors is still great. But we found that we are facing a deterioration of the natural resource base, and of the recreation infrastructure. Accelerating development of our remaining open spaces, wetlands, shorelines, historic sites, and countryside, and deferred maintenance and care of our existing resources, are robbing future generations of the heritage which is their birthright. We are selling the backyard to buy groceries. . . . Report of the President's Commission on Americans Outdoors.

Howe, L. 1987. *Keeping our garden state green: a local government guide for greenway and open space planning*. New Jersey: New Jersey Department of Environmental Protection.

will suffer from accelerated erosion as a consequence of the initial measures? Whose beach will no longer receive the sand that is the owner's riparian right? Having used public money to protect one property, how does the government refuse to safeguard another one, nearby, particularly if there is a link between one government erosion control structure and the subsequent complaint?

Alternatives to shoreline armoring include purchasing hazard lands, a strategy that may prove less costly and improve public access. In addition, expanded public ownership of nearshore hazard lands can increase opportunities for natural links between stream valleys.

There are many ways in which shoreline regeneration can contribute to the economic vigour of the waterfront: a waterfront free of debris and sewage is a more attractive place for tourism, conventions, and recreation. The more attractive the setting, the more tourist dollars available and the more sales of nearby commercial establishments.

Real estate and housing on a cleaner, greener waterfront could meet shelter needs while, at the same time, providing amenities that bring a higher return. Cleaner water, restored fish habitat, and boat-launching facilities built on lakefill may increase boat-chartering and related service industries. The point is that all these economic opportunities depend on the basic resource — healthy water and waterfront ecosystems. The question is how to expand and enhance these opportunities.

AESTHETICS, ACCESS, AND RECREATION

Some shoreline issues are difficult to express in economic terms; they are generally those that fall in the broad categories: aesthetic aspects, access, and recreation.

AESTHETICS

Aesthetic considerations include:

- variety in landscaping techniques for parks and public open space;
- protection of open-water views;
- incompatible development on or next to fill;
- odour and appearance problems arising from debris trapped in embayments;
- protection of natural shoreline features such as beaches and bluffs; and
- protection of built heritage and connections with the past.

Traditional management and landscaping of public lands limit habitats. Variety in landscaping, that is, providing areas with native wild grasses, flowering plants, shrubs, and trees, as well as formal park settings, will increase diversity of habitat and species.

Unobstructed open-water vistas are among the most valued amenities on the

waterfront. Proposals for lakefilling that would block those views, or that would support towering waterfront developments, represent a threat to those values and a challenge to planning waterfront areas. Protecting shoreline views involves paying attention to the height and location of buildings, and the design of programs for tree-planting on public land.

Incompatible developments — parking lots or busy marinas next to quiet residential areas, structures that trap debris or contaminated water — can degrade the value of both public and private waterfront land. Planning must consider adjacent land uses.

The variety of the bioregion’s shoreline is one of its important assets. Bluffs, such as those in Scarborough, depend on erosion of the base to maintain their steep face; therefore, erosion control at the base, and normal wearing away of the cap, will eventually eliminate the sharp slope that gives the area its character. As mentioned earlier, armoustone at the water’s edge impounds the sediment that would normally move downshore to renew the natural beaches that the public values highly. We cannot stop erosion and retain its benefits, any more than we can “eat our cake and have it too”.

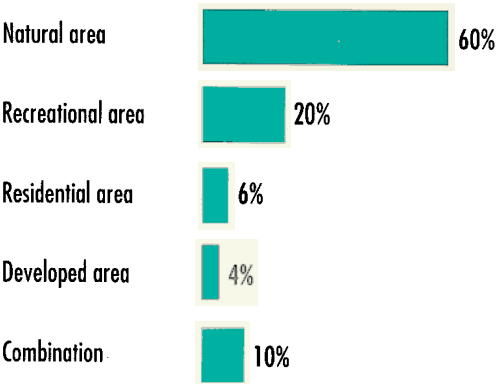
Certain shoreline modification activities may conflict with the public need to retain connections with the built heritage and the past. For example, lakefill has reduced the Harbour Commissioners’ building from being what it once was in Toronto — a striking waterfront welcome to the City — to just another inland office. Fort York, which once commanded the harbour, lies hidden behind approximately 800 metres (0.5 mile) of fill and structures, its role, purpose, and location equally obscured; the visitor may find it difficult to

comprehend that this fort was once central to the defense of Upper Canada. Achieving progress without compromising our connection to the past is another challenge for shoreline regeneration.

ACCESS

Accessibility is an important factor in enhancing the public value of the waterfront but must be achieved in a way that is fair to landowners and shows due consideration for the many other demands on the public purse. Some public utilities need special security and some other land should be set aside for use as sanctuary and natural areas. Transportation corridors parallel to the shore, such as the railways and expressways, provide barriers to recreational access. A lakeshore that is hidden behind a wall of industrial, public or private fences provides few public benefits. The issue is how to provide for a continuous waterfront trail at or near the shore, and access to the water at reasonable intervals, while achieving

Desired Waterfront Development Objectives



Nearly two-thirds of the respondents would like to have more natural areas on the waterfront.

Source: Environics Poll, 1991.

fairness to existing landowners, and costs that are affordable.

RECREATION

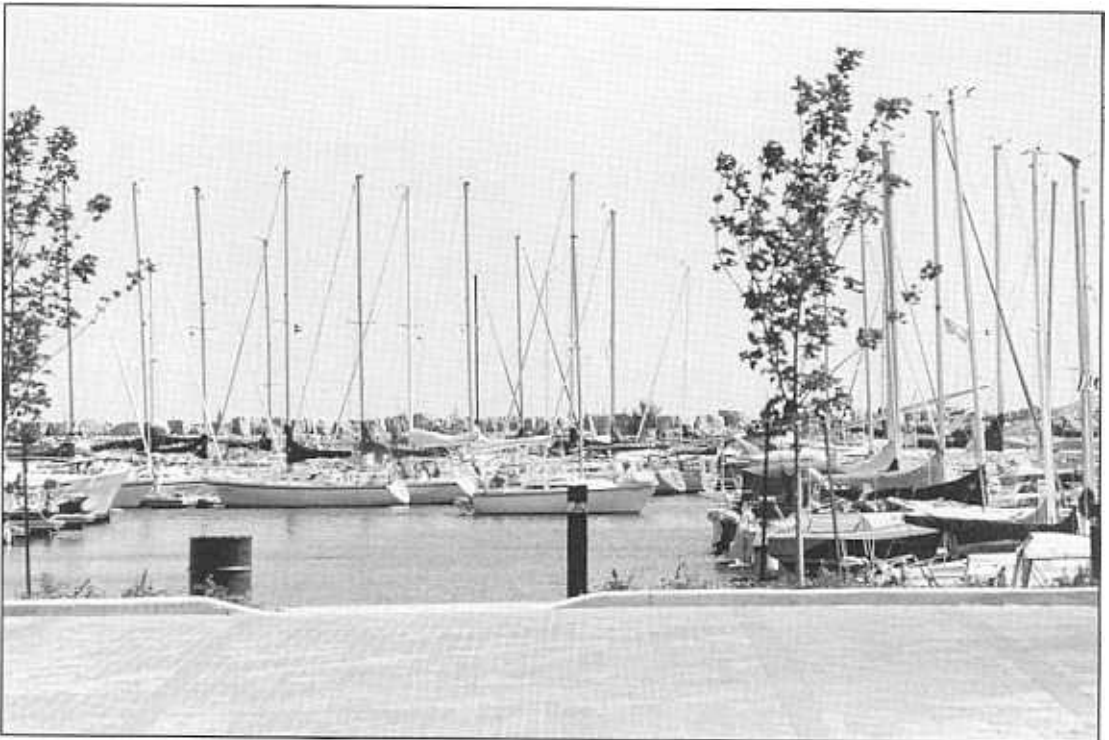
Many forms of recreation, both active and passive, can and should be enjoyed along the shore: active pursuits include cycling, running, fishing, power-boating, sailing, swimming, and rowing. Less vigorous activities include picnicking, walking, birdwatching, sunbathing, photographing, and simply observing the passing scene.

While these pastimes are among the most valuable to the community, they can create conflicts, both among activities and with other values on the shore. For example, some residents of the shore object to the traffic and noise created in their neighbourhoods by visitors to aquatic parks like Bluffer's; birdwatchers object to motorized invasion of natural areas.

Regenerating the shoreline with lake-fill can increase the types of recreational opportunities available, by creating new land at a cost of construction that is one-fifth to one-tenth that of acquisition. The environmental costs vary with the lakefill site and construction methods but must be added for fair comparison with acquisition of existing land. An ecosystem approach to land-use planning must balance and allocate the benefits, while minimizing the conflicts — a process that includes many issues that must be considered.

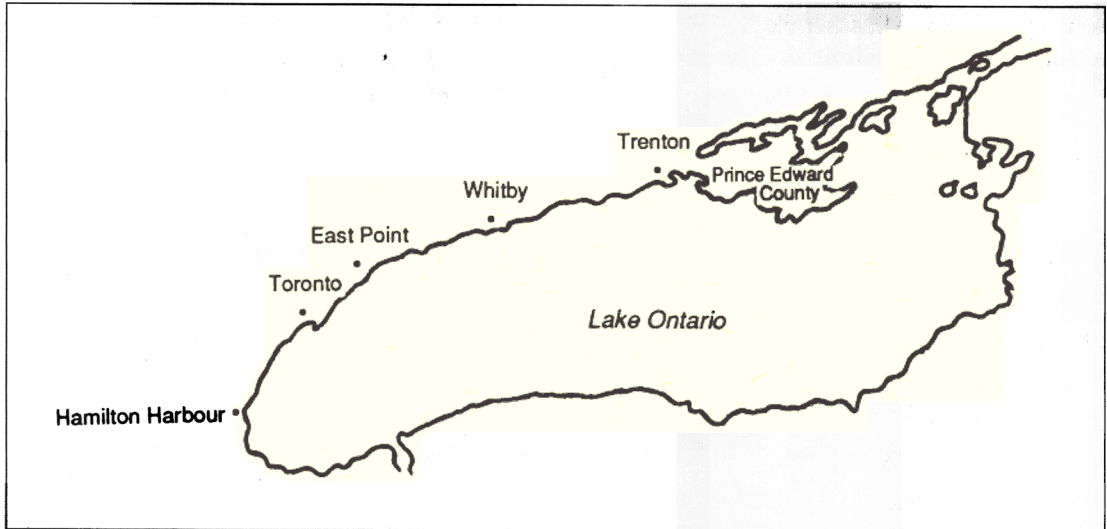
HOW HAS SHORELINE MODIFICATION CAUSED PROBLEMS?

The Royal Commission heard considerable testimony that shoreline modifications are part of the problem of shoreline degradation. There has been significant evidence



Lakefront Promenade Marina, Mississauga

Map 4.1: Lake Ontario northern shoreline



that they can also be part of the solution but, before that can happen, the root causes of past difficulties must be identified.

Collectively, we are fouling our own nest and acting against our own best interests. To the best of our knowledge, no person or group sets out to destroy natural habitat, drive away species, or close the beaches of the Greater Toronto bioregion. These consequences are the result of accident or neglect, the unplanned consequence of millions of independent actions, all focused on another goal — whether that goal is to protect property from erosion or to construct boat berths and parks for public use.

Damage occurs because of the way projects, including shoreline modification, are evaluated: each is considered individually by persons or agencies looking at one aspect, whether that is road connections or hazard land protection. They are sometimes considered solely on the basis of economic feasibility, and from a narrow local viewpoint, without much regard for other developments elsewhere. Given that the most

serious problem is the lack of broad responsibility, the Shoreline Regeneration Work Group attempted to establish who was in charge, and found that:

... the Lake Ontario shoreline in the GTB comes under the jurisdiction of 11 local municipalities, five conservation authorities, four regional governments, at least six federal and provincial ministries, several Crown corporations, and two harbour commissions.

As a result of the profusion of responsible agencies, governments, and boards, some projects — such as the construction of a dock projecting into the lake — receive detailed scrutiny from all three levels of government. Obviously the multijurisdictional approach results in a patchwork quilt of regulations rather than a comprehensive approach to setting and achieving goals for developing and protecting the shore.

With so many levels, departments, ministries, and special purpose bodies,

it is difficult to find one that is clearly in charge.

It is not surprising that, with no co-ordination, there is no ecosystem approach to the evaluation of various projects, or the whole shoreline of the Greater Toronto bioregion. Nor is it possible to evaluate cumulative or incremental effects of a project or series of projects, because there is no estimate of the carrying capacity of the shore. While there are plans for segments of the shore, there is little progress toward comprehensive ecosystem rehabilitation, and so the losses are legion and the gains are few.

Failure to consider coastal processes, that is, erosion and deposition of sediment as a result of the action of wind and waves, is another concern in lakeshore planning. The littoral cell, a section of shore where barriers restrict the longshore movement of sediment so that very little is gained or lost, provides a minimum physical unit. The barriers which limit movement may be natural, like the Toronto Islands, or artificial, like the Leslie Street Spit. Since a littoral cell contains the physical movement of sand, it can provide a basis for planning boundaries, although the exact cell boundary is sometimes difficult to determine, and subject to change due to new structures and physical changes on the shore.

A shoreline where the general movement of sediment is in one direction may consist of a chain of sub-cells. Within the Greater Toronto bioregion, longshore movement is westbound from East Point in Scarborough to the mouth of Hamilton

Harbour. Between East Point and Whitby, very little material is produced, and direction of movement varies. Sediment movement is generally eastward from Whitby to Prince Edward County.

Coastal processes cannot be considered properly when evaluated by a municipality or conservation authority whose view is limited to a segment of a littoral cell. For example, an artificial headland created in Mississauga can affect the Halton shore by

blocking the movement of littoral sand to the west. The same headland can impair the quality of water drawn into Mississauga because of obstruction of contaminants moving

east from the rivers and sewage treatment plants of Metropolitan Toronto.

Planning a shoreline embracing one or more complete littoral cells is consistent with an ecosystem approach, and is not a new idea. Recognizing the problems inherent in a piecemeal approach, the three conservation authorities with responsibility for the littoral cell in the eastern part of the Greater Toronto bioregion conducted a combined study. In 1990, Sandwell Swan Wooster Inc., consulting engineers, submitted a report titled *Lake Ontario Shoreline Management Plan* to the Central Lake Ontario, Ganaraska Region, and Lower Trent Region conservation authorities. This plan had a logical planning envelope, and a consistent approach to hazard land management and protection of environmentally sensitive areas. Many issues of concern in the Greater Toronto bioregion were raised, such as policies for shoreline erosion control and fill and construction guidelines.

Coastal processes cannot be considered properly when evaluated by a municipality or conservation authority whose view is limited to a segment of a littoral cell.

In summary, the damage to the shoreline environment is not deliberate, but happens as the unplanned consequence of pursuing other goals. The provincial ministries of the Environment and Natural Resources and the federal Department of Fisheries and Oceans have an interest in protecting the shore: they are trying to minimize the damage, but there is a lack of co-ordination, no overall plan, and no one agency or body with a mandate to improve the shoreline. No one has estimated the carrying capacity so that cumulative effects can be controlled or been given a mandate to establish or enforce codes or standards for marine construction. It is not surprising, therefore, that most incremental changes have degraded the natural environment and reduced its potential benefits for the residents and economy of the region.

WHY SHOULD WE BE CONCERNED?

A healthy shoreline is a priceless asset for the Greater Toronto bioregion: it offers drinkable water, recreation, rest, and solace at the doorstep of millions, and is an exciting stimulant for commerce, tourism, and the economy. It is worth defending, and it is not yet too late to do so.

Much of the shoreline east of Scarborough remains in a relatively healthy state, and adequately maintaining it will require wisdom and fortitude, but little money. The most significant parts of the remaining shoreline west of Scarborough can be protected or restored.

The Greater Toronto bioregion is expecting a large increase in population and density; people, industry, and other activity will substantially increase strains on the waterfront and its natural systems. Some

will collapse. This, given existing and persistent environmental degradation, suggests that positive measures must be taken soon to preserve the benefits we enjoy today.

WHAT IS THE PROBLEM?

While there is a great deal of planning along the waterfront of the Greater Toronto bioregion, there has been little progress toward effective shoreline regeneration.

One problem is the general lack of a co-ordinated, ecosystem approach to planning. Municipal waterfront plans are usually based on boundaries without an ecosystem rationale, leaving each municipality vulnerable to the actions of its neighbours. A related problem is the inability to consider cumulative environmental effects, because planning is done for a portion of a natural system.

Resolving intra-municipal planning issues is a responsibility of the provincial government. In some cases, federal agencies are involved as well. Many of these agencies have specialized interests such as "protect the environment", "expand the housing supply", and "enhance transportation" without much incentive to work together. Given the specialized viewpoints, complicated planning issues, and lack of agreed goals, objectives, and timetables, endless review and delay is the common result. The waterfront is plagued by jurisdictional gridlock.

WHAT CAN BE DONE?

Effective co-ordination is the missing element. A mechanism is needed to integrate special interests, establish goals and timetables, strike balanced decisions, negotiate compromises, and thereby break the gridlock. Based on a review of experience in

other jurisdictions, and the situation within the Greater Toronto bioregion, the Commission has concluded that a co-ordinated shoreline regeneration plan would provide the required mechanism.

If it is to bring about shoreline regeneration, this plan must contain three elements:

- a co-ordinating agency with the mandate, will, and skill to involve all responsible parties in planning and acting on shoreline regeneration;
- positive goals and objectives for protecting and regenerating the shore, as well as co-ordinated action to achieve those goals and objectives; and
- constraints on certain development activities in order to ensure a healthy, resilient, productive shoreline with increased aesthetic, social, and economic value to the community.

A co-ordinating agency with the mandate, will, and skills needed to improve the situation will be able to bring the interested municipalities and agencies together, and to facilitate agreement on goals, principles, and timetables for the plan area. In order to encourage integration of the various interests, the co-ordinating agency will need a mandate to act as the primary negotiator for the province in arbitrating disagreements.

The Greater Toronto bioregion has unique advantages, but is not alone in facing a maze of waterfront jurisdictions: in the United States, for example, the San Francisco Bay Conservation and Development Commission has 13 counties and cities working co-operatively to protect common resource. On a broader scale, the government of the United States, through

the Coastal Zone Management Act (CZMA), has applied constraints and incentives to create partnerships to protect the Great Lakes.

In Canada, the Fraser River Estuary Management Plan (FREMP) involves approximately 60 agencies, including six Native bands, two harbour commissions, the federal and provincial governments, and all area municipalities. In each case, a co-ordinating agency was created to bring them all together to protect and develop the waterfront resource.

The Greater Toronto bioregion's need for such a co-ordinating agency was recognized by the Shoreline Regeneration Work Group which, in its report to the Royal Commission, said that the Waterfront Regeneration Trust recommended in *Watershed* could be:

... a valuable vehicle for shoreline regeneration; it should pursue only those shoreline modifications that meet ecological criteria and ensure that newly created lands remain in public ownership for the benefit of future generations.

DESIRABLE CHARACTERISTICS OF A SHORELINE REGENERATION PLAN

Protecting and restoring the shoreline in keeping with the nine regeneration principles described in Chapter 1 will require some limitations on how and where development may proceed. Such constraints could be established using a readily understood control pattern — such as maps with “red” zones for the most restrictive natural or historical areas; “orange” zones for areas in which moderate constraints are necessary; and “green” zones to identify the most flexible

areas. Certain areas, in the “red” zones, will be too important to the goals of public access, habitat protection or enhancement to allow construction, erosion control or lakefilling.

The plan should emphasize such opportunities as initiatives that increase access, tourism, boating, walking, swimming, wildlife, fishing, trail hiking, and greenways. Increasing these opportunities can be an important tool in reducing conflicts between uses, as well as stresses on existing facilities.

The plan should not attempt to establish all social, commercial, transportation, and other goals and objectives for the shoreline: other plans and mechanisms, such as those being undertaken by regional and area municipalities, address such needs. However, the Shoreline Regeneration Plan will provide enhanced opportunities for social and commercial development, and should be integrated with those other plans.

There are other characteristics that would contribute substantially to a successful plan; they include:

- an overall “red” designation for the shoreline, until the plan identifies discrete areas, as an incentive for stakeholders to participate in, negotiate, and complete the plan;
- a clearly defined, efficient approval and control process (one-wicket application);
- a consultative approach to developing and administering the plan, including provision for regular public input and review;
- adequate resources for agencies responsible for developing and implementing the plan; and

- powers adequate for protecting natural areas and enforcing any restrictions required by the plan.

Defining the boundaries for the plan is important. An ecosystem approach suggests that the planning envelope should have a natural system rationale. On land, watersheds normally provide the logical dimensions. In the case of the waterfront, a large littoral cell or a combination of cells would provide a reasonable unit. There is some uncertainty as to the precise limits of these cells along the Greater Toronto waterfront and cell definition should be an early priority for planning. Population density and development pressure provides another basis for giving priority to certain areas. A plan for the shore between Burlington Bay and the Trent River would capture a substantial combination of littoral cells embracing the whole Greater Toronto bioregion, as well as an area under significant pressure for change.

IMPLEMENTING THE PLAN

The following recommendations are designed to implement a Shoreline

Whether they begin with the policies and programs of the state, in the head offices of large corporations, in the workplace, or at someone's kitchen table, the end result of sustainable development must be the creation of sustainable communities.

Wisner, S. 1990.: 8 "Assessing sustainable development in an urban context.". In *Ethical dimensions of sustainable development and urbanization: seminar papers*. Winnipeg: Institute of Urban Studies.

Regeneration Plan and to deal with existing or future problems that could affect the efficiency and effectiveness of that plan.

In order to implement the Shoreline Regeneration Plan, co-operation is needed from all levels of government. Such a partnership approach, which recognizes constraints and provides incentives but does not remove authority and responsibility, is the most effective approach to planning on the waterfront.

Success will depend on the incentives provided by a process that both safeguards environmental and public values, and streamlines the approvals required. The framework for ecosystem-based planning described in Chapter 2 should be examined as a possible model. Having satisfied themselves with the rigour of the ecosystem planning process, the federal and Ontario agencies responsible for approvals should be prepared to co-operate with timetables.

For example, proposals that conform to the plan could receive "credits" toward completion of any environmental assessment required.

Further, there must be rewards and incentives to negotiate the shoreline plan, and to support its implementation. The most important incentive for municipalities and conservation agencies would be breaking the jurisdictional "log-jam", and predictable, steady progress of plans and projects through provincial agencies, once those plans comply with the agreed plan.

RECOMMENDATION

- 25.** The Royal Commission recommends that the Province of Ontario ensure preparation of a Shoreline Regeneration Plan to protect and regenerate the shoreline of the Greater Toronto bioregion, employing an ecosystem



Fishing in the fog, Darlington

approach. This plan should be developed with the full participation of relevant departments of the governments of Canada and Ontario, as well as those of affected regions, area municipalities, conservation authorities, the private sector, non-governmental groups, and the public. It should emphasize:

- protection of remaining natural areas;
- rehabilitation of degraded areas;
- a mechanism for considering cumulative environmental effects; and
- improvement of access and recreational opportunities.

Any shoreline plan should have the benefit of expertise in the affected community; therefore, before a plan proceeds, interested groups and individuals should have the opportunity to comment on and improve the ideas advanced by the Royal Commission and its work groups. Such input would allow the shoreline planning process to proceed with the support of improved community confidence and focus.

RECOMMENDATION

26. The Royal Commission recommends that as early as possible in the process, the Province ensure public consultation, including public hearings, to permit interested parties and the public to respond to recommendations on shoreline regeneration, made in the Commission's *Watershed* and *Shoreline Regeneration* documents, as well as in this final report.

It is important to prevent construction of major new projects without the benefit of the shoreline plan, because these may create unnecessary harm and foreclose options for future benefits.

RECOMMENDATION

27. The Royal Commission recommends that the Province place a moratorium on approval of all major new lakefill and shoreline erosion control projects, pending approval of a Shoreline Regeneration Plan.

Notwithstanding the need for a moratorium, some small projects might have no material influence on the plan, or there might be demonstration projects that could provide valuable insights and other benefits without compromising the integrity of the plan. The criteria for "small" and "demonstration" should be determined very early, to avoid uncertainty.

RECOMMENDATION

28. The Royal Commission recommends that criteria, performance standards, and procedures be established for small or demonstration projects that

The old way of doing things has proven hollow and sometimes quite destructive, though we have not yet learned the rules for the new ways of doing things, so we are in the age of in-between.

Morris, D. 1990. "The ecological city as a self-reliant city." In *Green cities: ecologically-sound approaches to urban space*. Montreal: Black Rose Books.

The social, economic and ecological forces that shape the city are completely interlocked in the world that we experience. Neither our institutions nor the structure of our systems of governance reflect this reality, nor do they respect the logic of the interdependent systems that they represent.

Jacobs, P. 1991. *Sustainable urban development*. Montreal: Third Summit of the World's Cities.

could be undertaken without compromising the integrity of the Shoreline Regeneration Plan.

BEFORE THE SHORELINE REGENERATION PLAN IS COMPLETE

An effective shoreline plan, efficiently administered, is essential to the long-term health of the waterfront. While development and agreement on the plan may take several years, some matters merit immediate action. It is proposed that the Ministry of the Environment prepare up-to-date sediment standards for open-water disposal and construction standards for lakefilling, to be applied to completing current work as well as any small or demonstration projects. In addition, consideration can proceed on finding alternative means of dealing with materials produced by construction, as well as creation of greenways and the Waterfront Trail.

Lakefilling is discretionary activity. Given the link established between sediment contaminants and uptake by plants and fish in the aquatic food chain, it seems reasonable to avoid knowingly and voluntarily damaging aquatic ecosystems and the quality of our drinking and bathing water.

RECOMMENDATION

- 29.** The Royal Commission recommends that the Province adopt new sediment guidelines for open-water disposal; these should reflect the latest scientific studies, and should establish contaminant limits at levels that will protect aquatic ecosystems.

Appropriate sediment standards are one step in protecting the quality of water on the shore; applying such standards effectively, using a quality assurance system, is the important second step. This is essential, particularly in view of the Commission's information that, in the past, 15 to 25 per cent of material deposited at lakefill did not meet existing sediment standards.

RECOMMENDATION

- 30.** The Royal Commission recommends that the provincial Ministry of the Environment and the Metropolitan Toronto and Region Conservation Authority review the quality assurance system used to monitor and control the quality of materials accepted for lakefill and that all necessary improvements be made to improve its effectiveness.

There are several codes and standards governing house construction, but none for massive lakefill structures that may contain large quantities of contaminated sediments. Considering that some of Ontario's engineers and engineering firms are known and respected worldwide, it is clear that we have the expertise needed to set appropriate standards and practices that will ensure the safety of the public and the natural environment.

RECOMMENDATION

31. The Royal Commission recommends that the federal and provincial governments consult with marine construction engineers, academics, and experts with relevant information, regarding practical codes and standards applicable to lakefill and erosion control structures. Possible topics include standards related to the range of water levels, intensity of storms, allowable fill loss, turbidity, and any other issues connected to public safety, public property, and aquatic habitat.

As soon as new and tighter MOE draft sediment guidelines are applied, a great deal of slightly contaminated material would be rejected as lakefill. The precise volume is unknown, but is estimated to be at least half of all material currently being accepted. This means that, once construction activity recovers from the recession, as many as 1,000 truckloads per week would require new disposal sites. In the past, this material was accepted at the Leslie Street Spit for less than \$100 per load. Even at current rates (more than \$1,000 per load), this material would not be welcome at sanitary landfill sites, because capacity is limited. Furthermore, the degree of contamination on most loads is low enough that disposal in licensed sanitary fill sites is not necessary. Obviously, a practical alternative is needed.

RECOMMENDATION

32. The Royal Commission recommends that the Ministry of the Environment create a new “restricted fill” waste classification for excavated soil that is

unsuitable for open water disposal, but does not require the degree of control imposed for sanitary landfill. Moreover, the MOE should actively assist in identifying and licensing suitable sites.

The classic “3 Rs” approach to any waste problem — reduce, reuse, recycle — can be applied to construction excavation wastes.

Reducing the amount of excavate produced by deep excavations for parking lots can be achieved by building above-ground parking garages, reducing the number of parking spaces required below buildings, and increasing public transit capacity. This excavate is the material that is most often used in lakefill.

Other considerations such as aesthetics, safety, security, and the very high value of downtown land will dominate decisions about parking. But, because excavation is typically less than five per cent of a building’s cost, and the cost of new transit would dwarf even the recently inflated price of landfill disposal, the requirement for underground parking is unlikely to change quickly.

Recycling is a practical approach for some bricks and broken concrete, but these materials represent a small proportion of overall construction waste.

Reuse offers some very interesting options. If the material is regarded as a resource, rather than a problem, there are possibly some positive ways of employing it. For example, small amounts could be utilized to landscape nearby grounds, in order to provide contour and texture. Further away, they could be used in noise berms and toboggan or ski hills. On a still larger scale, millions of cubic metres could

raise the elevation of industrial lands currently under redevelopment in downtown Toronto, such as the Railway Lands, Port Industrial Area, Garrison Common, and Ataratiri.

The Commission has been advised that, assuming that contaminated soils below can be sealed properly, large amounts of material could be utilized in these ways. Benefits would include raising some lands above the floodplain of the Don River, achieving pleasing slopes and contours, “hiding” expressways and rail corridors in newly created ravines, and improving sound buffers and general drainage. It has been estimated that, in downtown Toronto, as much as 12 million cubic metres (15 cubic million yards) could be diverted from waste disposal sites — an amount that would exceed the projected production of excavated soils over the next decade.

RECOMMENDATION

- 33.** The Royal Commission recommends that the possibility of using excavated material be evaluated in the preparation of plans and proposals for redeveloping downtown Toronto sites, such as Garrison Common, the Railway Lands, the Port Industrial Area, and Ataratiri.

WATERFRONT GREENWAY AND TRAIL

Although a Waterfront Greenway and Trail should be part of the Shoreline Regeneration Plan, there is no need to wait for the plan before encouraging initiatives that will help regenerate the terrestrial edge of the shore and make it more accessible. Parts of the Waterfront Trail exist, and further development is under way. The greenway

concept can help create the natural network that will encourage more species at the waterfront. Greenways and shoreline regeneration initiatives are highly complementary. (See next chapter for an extensive examination of the greenway concept.)

RECOMMENDATION

- 34.** The Royal Commission recommends that the Waterfront Greenway and Trail be integrated into the proposed Shoreline Regeneration Plan for the Greater Toronto bioregion, and that work should proceed while the plan is being prepared, providing that it does not compromise the plan’s integrity.