

LAND: BACKGROUND REPORT

**City of Toronto's Environmental Plan
"Clean, Green and Healthy"**



City of Toronto

FEBRUARY 2000

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1.0 Background

"Land: Background Report for the City of Toronto's Environmental Plan" and "Land: Strategic Directions" are part of a series of background and strategic documents on Water, Land and Air. These reports were prepared by the Environmental Impact Assessment & Policy Development Unit of Works & Emergency Services in collaboration with Environmental Task Force members and staff, Toronto Public Health, Urban Planning & Development Services, the Healthy City Office and Corporate Services. Participants involved in this process are listed in Appendix A.

These reports were developed to provide background information and analysis for the Environmental Plan and reflect the results of a review of environmental initiatives current as of November/December 1999. The Environmental Plan was endorsed by the Environmental Task Force in February, 2000 and the reports have been revised to consider comments received during this process. These reports also serve to provide part of the foundation for an integrated environmental policy framework that is currently being developed by the Environment Impact Assessment & Policy Development Unit.

2.0 Introduction

The City of Toronto includes a physical area of approximately 630 square kilometres and is bounded by Lake Ontario to the south, Etobicoke Creek and Highway #427 to the west, Steeles Avenue to the north and the Rouge River to the east. The Greater Toronto Area (GTA) defines the urban agglomeration extending from the City boundaries and includes the regional municipalities of Halton, Peel, York and Durham. Both the City and the GTA are part of a larger, natural ecosystem known as the Greater Toronto Bioregion. This ecosystem is bounded by Lake Ontario, the Niagara Escarpment, the Oak Ridges Moraine, and includes several watersheds that drain into Lake Ontario.

Development and urban growth within the City of Toronto and surrounding regions over the past 200 years have resulted in very intense pressures on the ecosystem and the alteration of the natural environment. The current state of the land environment is described in this report and some of the key environmental pressures caused by human activities are highlighted. This report explores some of the major issues relating to the terrestrial conditions of Toronto.

The report also identifies some of the strategies and actions undertaken in the City of Toronto, and to some degree other levels of government. This report is not a detailed evaluation, but is intended to indicate the range of strategies/actions being executed to address land-related issues.

3.0 Current State of the Environment

3.1 *Natural Heritage*

3.1.1 *Natural Infrastructure*

Amid Toronto's built-up infrastructure, the City possesses many natural areas and a strong natural heritage that includes natural landform and water features, terrestrial and aquatic ecosystems and plant and wildlife communities. These geologic and biologic features and systems provide important ecological services, wildlife habitat and recreational opportunities for the citizens of the City of Toronto. Toronto is well known for this green fabric of river valleys, parks and waterfront that link diverse neighbourhoods and the downtown core.

Human impact as a result of human consumption and modification of the natural resources has affected the terrestrial conditions in Toronto. Decades of human activities such as the removal of forests and wetlands, paving over natural ground cover, the construction of buildings, and soil and groundwater pollution have altered the City's natural resources and interfered with natural ecosystem processes. Although most natural areas have been impacted to some degree by urban land uses, some have more

successfully withstood these pressures. Gaining a full understanding of the current conditions of the terrestrial environment that have resulted from human stresses can be difficult, as available information regarding the City of Toronto's natural resource system is often diverse and dispersed.

Natural areas are the City's "green infrastructure", and are as vital to the sustainability of Toronto, and the health of the citizens and ecosystems, as our road and sewage systems. The valley and stream corridors and the waterfront are the backbone of the City's natural resources, supporting the region's most important ecosystems. These corridors are continuing to become more fragmented, and if this trend continues, the risk of ecosystem collapse is possible. These systems are the healthiest when they remain interconnected.

The valley corridors in the City of Toronto include the six watercourse systems (Etobicoke Creek, Mimico Creek, Don River, Humber River, Highland Creek and the Rouge River) and their associated lands and tributaries. These natural water systems are important drainage systems conveying storm and snow melt waters from and through the City. Their waters provide aquatic habitat for a variety of wildlife species. Flood plains, woodlands, wetlands, and riparian vegetation within the corridors provide important habitat.

Natural areas along the City's waterfront are limited to the Scarborough bluffs area, the Toronto Islands and High Park. Lakefill projects including Colonel Sam Smith Park, Humber Bay, Tommy Thompson Park, Ashbridge's Bay and Bluffers Park are emerging as key waterfront natural and habitat areas after being re-naturalized over the past decade. Near-shore lake waters, sheltered bays beaches, bluffs, wetland and wooded areas associated with the waterfront provide important terrestrial and aquatic habitats.

3.1.2 Parks and the Urban Forest

Toronto's greenspace system - the ravines, rivers, creeks, bluffs, water's edge, parks, forests and other connecting open spaces – constitutes over 8,000 hectares of the land area of the City and is an integral component of the physical structure and the identity of the City. This represents approximately 12.7% of our total land area and is approximately 3.3 hectares per 1000 people (EDC&T's Website, 1999). The parks and greenspaces that the City uses for recreation also perform many important other social and ecological functions. The health and diversity of these green spaces and urban forests are also crucial to the survival of the wildlife populations that inhabit the forests and fields throughout the system. Along with providing a diversity of habitats for animals and aquatic species, greenspaces retain stormwater, prevent erosion, filter out pollutants from the air and water, and provide oxygen to the air.

Toronto has over 3,000,000 trees that contribute greatly to the quality of life in our City (EDC&T's Website, 1999). Tree lined streets provide shelter, soften the hard lines of urban architecture, and their canopies provide shade and visual linkages and continuity between the green space of our parks. Planting trees has helped to improve the environmental conditions. Each tree contributes by filtering pollutants out of the air, lowering energy costs by shading buildings, protecting of our soil and water supplies by reducing soil erosion, reducing noise levels by harboring the sound, as well as helping to beautify the community in which to live.

3.1.3 Significant Natural Areas

There exists no comprehensive inventory or evaluation of the City's remaining natural areas of importance and their status. However, a list has been developed by various groups and agencies that identifies a number of significant natural areas. The Ministry of Natural Resources has identified several Areas of Natural and Scientific Interest (ANSIs) and wetlands of regional and provincial significance in the City of Toronto. There are currently 12 ANSIs in Toronto. Five ANSIs are classified as Earth Science ANSIs (4 are provincially significant – Little Rouge Creek, Rouge River Section, Rouge Rivermouth Beach and the Don Valley Brickyards, and 1 is regionally significant – Georgian Bay Formation). Seven are classified as Life Science ANSIs (3 are provincially significant -- Lower Rouge Marshes, High Park Oak Woodlands and the Scarborough Bluffs and 4 are regionally significant – East Branch of the Don River, East Point, Highland Creek Swamp, and Toronto Islands). The Toronto and Region Conservation Authority (TRCA)

has identified 51 regionally significant Environmentally Significant Areas (ESAs) within its jurisdiction such as the Little Rouge Forest in Scarborough, Taylor Creek in East York, and High Park in Toronto (City of Toronto, SOER Update, 1999).

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. The four types of wetlands: swamps, marshes, bogs and fens, provide valuable ecosystem services such as regulating stream flow, filtering out contaminants from the water, and providing a habitat for numerous species of plants and wildlife. It is estimated that Toronto has lost over 90% of its historical wetland areas to urban development but does have eight wetlands (6 are provincially significant and 2 are locally significant). Over 120 hectares of provincially significant wetlands, and almost 47 hectares of additional wetlands have been re-evaluated recently by the TRCA. Besides the more formally recognized significant natural areas, 42 other natural areas of local and possibly regional significance have been identified by other agencies and groups and the former municipalities (City of Toronto, SOER Update, 1999).

3.1.4 Vegetation and Wildlife

Healthy natural areas capable of supporting a diversity of plant and animal communities, depend on a continuous and connected system of natural areas. The loss of these natural areas and their links reduces the amount of suitable plant and animal habitat, placing pressure on species populations and biodiversity. Other stresses include the presence of toxic contaminants and the introduction of exotic species, which can also affect habitat, species' health and biodiversity. It is very difficult to measure the net impacts of urbanization on Toronto's original plant and wildlife communities.

While urbanization of the region has removed vast amounts of Toronto's indigenous natural vegetative cover, significant amounts remain in natural and semi-natural conditions. In fact, over 1,200 different types of plants have been found in Toronto (City of Toronto, SOER Update, 1999). In addition, planted vegetation including native and non-native species contribute to Toronto's plant diversity. Toronto's vegetative communities are important to the ecosystem as they cleanse the air, contribute to important microclimate functions and provide habitat for other wildlife species.

A variety of different animals can be found in Toronto including 249 bird species, 40 mammals, 11 reptiles, 11 amphibians, 73 fish, 156 butterflies and moths and 178 other invertebrates (City of Toronto, SOER Update, 1999). However, many habitats for animals have been converted to a heavily built-up area of buildings, paved surfaces and cultivated spaces. The tree and lawn landscapes of downtown parks offer little in the way of food, shelter or breeding places.

3.2 Soil and Groundwater Quality

3.2.1 Soil and Groundwater Contamination

The City of Toronto has substantial information describing the conditions of its soil and groundwater quality. However, opportunities exist to improve the coordination and accessibility of this information. Sources that do contain detailed information, include consultant reports, historical land use and soil and groundwater records, sewer and road construction plans, maps showing previous land uses and physical geography, records from the Toronto Transit Commission and the Toronto Harbour Commissioners, and the Ontario Geologic Survey. This information and data is site-specific in nature and does not typify area-wide conditions. A more comprehensive and integrated soil and groundwater information system, that inventories all the information available on the land environment would be a useful tool and aid decision-making about proposed changes to current activities that may have an adverse effect on the terrestrial system.

Soil and groundwater conditions can vary considerably from site to site, based on past and present land uses, activities, and housekeeping practices. Since contaminated soils can render lands unfit for human use and development, organized and detailed information would aid in identifying areas within the City that

require remediation. Pollution can migrate through soils to groundwater and surface water ecosystems and pose potential health concerns due to possible human exposure.

Soil contamination can be attributed to a number of factors such as land and lakefilling, spills to the environment, pesticide use and PCB's. Historical land use is also commonly associated with soil contamination and include activities such as battery recycling, electroplating, waste storage, gas stations, petroleum refining, smelters, foundries, power plants, railway depots, electrical equipment manufacturing, tanneries and landfill sites.

3.2.2 Land and Lakefilling

Landfill sites may pose possible soil contamination concerns because of the potential for contaminants from disposed waste materials to leach into surrounding soils, ground and surface water. In Toronto, many known sites are located within the stream and river valley corridors, characteristic of historical practices of landfilling ravines and valleys. Many streams in Toronto have been filled to make way for urban development (SOER, 1995).

Lakefilling has been occurring along the waterfront over the last 200 years. In earlier times, fill materials included garbage, ash, night soil, and incineration residue. In more recent times, urban debris, including earth from excavation sites and rubble from building and demolition projects account for much of the fill materials. The limited information on types of fill materials suggests that some of these lands may contain contaminated soils. Most of Toronto waterfront has been subjected to lakefilling at one time. Almost all the lands within the City of Toronto's central waterfront area south of Front Street were created from lakefill (SOER, 1995).

3.2.3 Industrial and Commercial Residue

Former land uses (such as industrial uses) and the activities of present uses (such as processes using hazardous material, transportation, and storage), present potential soil and groundwater contamination problems. Areas of particular concern include former coal gasification sites and related industries, as well as locations with private and retail fuel storage tanks. According to the Ministry of Environment's coal gasification study done in 1987, 10 coal gasification, and related industry sites have been identified. There are over 3,600 private and retail fuel tanks in the City (SOER, 1995). At such sites, heavy metals, organic compounds and petroleum products have been found in the soil and groundwater. Although each of the former municipalities maintained records dealing with historical land uses, there is no complete inventory or information system presently available that contains potentially contaminated lands for all of Toronto.

3.3 Urban Form

The Greater Toronto Area (GTA) remains one of the most dynamic regions in North America, and has grown to over 4.5 million people (Key Facts, 1995). According to the 1996 census the City of Toronto's population has reached almost 2.4 million people. Both Toronto and the GTA have continued to grow over the past five years, but at different rates. In fact, Toronto's share of the GTA population has decreased from 54% to 51.5% during the period from 1991 to 1996 (City of Toronto, SOER Update, 1999).

Population density is an inverse indicator of the consumption of land. In 1996, Toronto's average population density was 3,786 persons per square kilometre, compared to a combined average of 1,571 persons per square kilometre for the other regions in the GTA. Densities in Toronto's core reach up to 6,740 persons per square kilometre (City of Toronto, SOER Update, 1999).

Throughout the GTA, substantial lands have been transformed to urban and suburban environments. In fact, 33,000 hectares (more than half the size of Toronto) was converted in a 20-year period from 1966 to 1986 (SOER, 1995). As stated above, the shift of the population to the suburban and regional areas has placed a significant burden on all aspects of the environment. Urban sprawl is now widely recognized as an environmentally unsustainable urban form, not only because we lose valuable agricultural land and

destroy many natural habitats, but also because residents become more dependent on cars for transportation between work and home, and for other daily activities. In fact, the number of vehicles registered in Toronto and the GTA and the number of vehicles crossing the City boundary have both increased substantially over the past decade (City of Toronto, SOER Update, 1999). The amount of land needed to support automobile related activities has also increased (STWG, 1999).

The population of the GTA is expected to increase to 6.1 million by 2011, and with the "905 region" of the GTA growing faster than the City of Toronto, these trends are likely to rise exponentially (Key Facts, 1995). This will increase the dependence our region has on the automobile and exacerbate the environmental impacts of the motorized vehicles (e.g. increased air pollution). This will also decrease the regional population density and allow for more land to be converted from rural to urban.

Toronto's existing urban form is characterized by a central focus in the downtown, several nodes of employment activities, and a distinct separation of land uses. Almost all of Toronto's developable lands have been built on, at one time or another. Land use change is typified by changing one urban use to another through redevelopment. New housing completions within Toronto, have been primarily characterized by higher density units, with fewer "greenfield" sites left for single detached housing.

3.4 Waste Generation/Disposal and Hazardous Materials

3.4.1 Solid Waste

Canadians are one of the world's largest per-capita generators of non-hazardous waste. In 1986, 459 kilograms of residential waste was produced per capita, decreasing to 320 kilograms per capita in 1998 (Renee Dello, Works & Emergency Services Department, Solid Waste Management Services Division, pers. comm., 1999). Although a substantial amount of waste generated is being diverted, the current residential waste disposal rate is an indication of our society not using resources efficiently and effectively and is reflective of unsustainable behaviour.

In absolute terms, municipal solid waste has been increasing in the City as a result of population growth. The advent of many waste diversion initiatives in the mid-1980s has reduced the actual amounts of wastes being disposed. Per capita waste disposal in the City increased during the 1970s and early 1980s, but has decreased with the expansion of waste diversion measures. However, according to Solid Waste Environmental Assessment Plan (SWEAP) 1991, the municipal waste stream constitutes approximately one-sixth of the overall waste that is generated in the City, and more programs should be developed to reduce other waste streams (SWEAP, 1991).

The Province has set solid waste diversion targets for municipalities including a 25% by 1992, and 50% by 2000 measured on a per capita basis against a base year of 1987 (MOE's Website, 1999). Following from the provincial lead, the former Metropolitan Toronto established two targets of its own. By 1992, the City of Toronto diverted 24% of its generated municipal waste from disposal and achieved a 12% reduction from the 1988 levels (SOER, 1995). Public education efforts have been in place for well over a decade, causing many wastes to have been diverted because of source reduction or reuse initiatives by City residents.

All solid waste that is collected in the City of Toronto, and that cannot be recycled, is disposed of in landfills. The City of Toronto disposes solid waste in its landfill (i.e. Keele Valley in the City of Vaughn) and by exporting it to the United States (Renee Dello, Works & Emergency Services Department, Solid Waste Management Services Division, 1999). New disposal capacity is needed prior to the closure of Toronto's remaining in-service landfill, the Keele Valley Landfill Site, which has a projected closure date of late 2001.

3.4.2 Hazardous Waste

According to the Canadian Institute for Environmental Law and Policy (CIELAP), in a report entitled "Hazardous Waste Management in Ontario: A Report and Recommendations" (1998), an estimated 1.2 - 2.5 million tonnes of hazardous waste are generated in Ontario each year (Winfield, 1998). In 1993, the

City collected 143,000 tonnes of household hazardous waste through its programs. The total number of tonnes of household hazardous wastes consumed by City residents is not known (W&ES Fact Sheets, 1999). HHW, which includes corrosives (e.g. batteries, drain and oven cleaners, ammonia, etc.), explosives (e.g. aerosols, etc.), flammables (e.g. fuels, oils, paints and solvents, etc.), and poisons (e.g. pesticides, garden products), are toxic to our health and to the environment. Hazardous products can contaminate the soil, corrode plumbing, create toxic fumes, damage the sewer system and pollute the water supply.

3.4.3 *Pesticide Use*

Pesticides are one of the few toxic substances that we intentionally release into the environment. These chemical products are widely used to control pests that affect agricultural crops, homes, yards and gardens. Pesticides are classified into categories depending on the type of pests they control and include insecticides, fungicides, herbicides and rodenticides.

Environment Canada reports that 32,000 tonnes of active pesticide ingredient are used each year in Canada (Statistics Canada, 1999). Unfortunately, there are no data available on the use in Toronto although homeowners, businesses and government are large users. In 1998, the Corporation of the City of Toronto used approximately 1,900 litres of herbicides, 1,690 litres of glyphosate, 570 litres of fungicides, and about 60 kilograms of insecticides on parks, gardens, sports fields, road sides, golf courses, and trees (Siu Fong, Community & Neighbourhood Services Department, Toronto Public Health Division, 1999).

3.4.4 *Polychlorinated biphenyls (PCBs)*

PCBs were chemicals used in electrical and hydraulic equipment, lubricants and in many other fluids because they are stable and heat resistant. Due to their toxicity and persistence, the manufacture of these compounds was banned in North America in 1977. As a result, there has been a gradual phase-out of PCB-containing equipment, although they are still present in some electrical and mechanical equipment.

Once PCB-containing equipment is decommissioned, the waste must be managed. In Ontario, there are currently no facilities for the destruction of high-concentration PCBs in liquid or solid form. The Ministry of Environment does have in place regulations regarding their treatment, destruction, storage and waste export. Currently, PCB wastes are stored until they can be properly removed and/or destroyed, in accordance with regulations designed to minimize environmental and human health risks.

The Ministry monitors PCB waste storage locations throughout the province. Within the City there are 335 storage sites stocking PCBs until they are sent for their final disposal (UP&DS, SOER Update, 1999). The Province monitors generators, carriers and receivers of hazardous and liquid industrial waste under Regulation 347 of the Ontario Environmental Protection Act.

3.4.5 *Spills*

Spills can release harmful substances into the ecosystem. Spills are defined as releases of pollutants into the natural environment (land, air and water) originating from a structure, vehicle or other container. The majority of spills involve oils (light oil and gasoline), chemicals (solvents, pesticides, PCBs) and wastes (sewage, liquid industrial wastes). Between 1993 and 1997, there were approximately 2,300 spills, which is a substantial reduction in the number of releases to the environment from the previous reporting period (City of Toronto, SOER Update, 1999).

3.5 **Food**

Along with air, water, energy and shelter, food is a mandatory requirement for life. There are many issues involved in getting food from the "hinterland" into cities, including transportation, distribution, marketing, processing, health and waste management issues, all which have environmental consequences.

In 1991, approximately 50% of the GTA was classified as rural land (i.e. 5,600 km²). Most of this land is Class I, the best in Canada, and over 80% of it was capable of supporting agricultural activities (Sean Cosgrove, Community & Neighbourhood Department, The Food Policy Council, pers. comm., 1999). In addition, the climate of the GTA is among the best in Canada for agriculture. However, the GTA has lost over 60,000 hectares in farmland between 1976 and 1996 and another 40,000 hectares have been designated for development. Two-thirds of this loss has taken place in the more urbanized areas of the GTA. Agricultural lands "protected" in regional official plans account for 36% of the GTA (Sean Cosgrove, Community & Neighbourhood Department, The Food Policy Council, pers. comm., 1999).

4.0 Getting to Green, Clean & Healthy

4.1 Framework for Action - Jurisdictional Responsibilities

4.1.1 Federal

The federal government has jurisdiction over certain land use activities under the Canadian Environmental Protection Act. The purpose of the Act is to protect the environment and all living organisms from the environmental effects of toxic substances. Other relevant legislation includes the Wild Animal and Plant Protection Act, the Fisheries Act, the Federal Environmental Assessment Review Process Guidelines Order, the Toronto Harbour Commissioners Act, the Environmental Contaminants Act, the Hazardous Products Act, the Pest Control Act and the Transportation of Dangerous Goods Act.

4.1.2 Provincial

Jurisdiction at the provincial level extends over many areas including environmental protection, land use and development and waste matters. Numerous ministries are responsible for land-related issues and implementing relevant legislation, regulations and guidelines. They include the Ministries of Municipal Affairs, Natural Resources, Environment, Agriculture and Food, Transportation. Provincial legislation includes the Planning Act, the Environmental Protection Act, Environmental Assessment Act, Conservation Authorities Act, Ontario Water Resources Act, Endangered Species Act, the Game and Fish Act, the Tree Act, the Ontario Heritage Act, Toronto Area Transit Operation Authority Act, Greater Toronto Services Board Act and the Better Local Government Act.

4.1.3 City of Toronto

The City of Toronto Act replaces the seven existing municipal governments of Metropolitan Toronto with a new single-tier City of Toronto and came into existence on January 1, 1998. At the moment there are Official Plans for the former Regional Municipality of Metropolitan Toronto and each of the former municipalities within Metro (Toronto, Etobicoke, York, North York, East York and Scarborough). Land-related issues covered under the Act include planning, public transportation, parks, transportation infrastructure, and solid waste disposal. Work is underway to replace the existing Official Plans with a new City of Toronto Official Plan that will contain a vision for the City including green space and natural areas.

In 1994, the former Metro Government's Official Plan had four main objectives to affect efficient land use:

- Protect and preserve natural resources:
 - An environmental standard that sustains the natural processes of the region's ecosystems and benefits the health of the current and future generations;
 - Range of opportunities for the human enjoyment of natural habitats, parks, and other land and water recreation facilities; and
 - Specifically the Plan called for 4 hectares of green space per 1000 people by 2011.
- Maintain healthy soil and groundwater conditions:
 - Plan states to improve Toronto's soil quality by protecting groundwater and soils from future toxic contaminants and instituting programs to remediate soils now contaminated.

- Promote compact urban form:
 - Urban form with people and activities concentrated at densities that can be efficiently served by public infrastructure: roads, transit, water supply, water pollution control, solid waste management, communication and power utilities; and
 - Population densities and between 4400 people per square kilometre.
- Reduce solid waste generation and disposal:
 - Conservation of non-renewable resources, the reuse of materials and recycling of waste;
 - Divert 25% of ICI and residential waste; and
 - Reducing production in ICI sectors -- in 2000, 50% from 1988 levels.

4.2 Natural Heritage

4.2.1 Waterfront Initiatives

In the City, a significant amount of tree planting and terrestrial waterfront restoration has taken place, primarily in new and existing parks. These naturalization initiatives have served to enhance habitat conditions for wildlife, improve water and local air quality, and augment the visual beauty of Toronto's parks, roadsides and other open spaces. The outcome has been good pockets of habitat at the Rouge River mouth, East Point Park, Highland Creek, Tommy Thompson Park, Toronto Islands, Humber Bay, Colonel Sam Smith Park (TRCA, 1999). However, outside these aforementioned areas tree cover is minimal. While central Toronto has an average of 20-35% tree canopy cover, the central waterfront averages only 3% (EDC&T Website, 1999).

In the past eight years, almost 20 hectares have been created along the Toronto waterfront and at river mouths. Habitat Projects undertaken from 1991-98 include:

- Bluffer's Park Wetland Creation Fish Reef (1992);
- Colonel Sam Smith Park Wetland Creation (1994-1996);
- Humber Bay Shores Wetland Creation Island Cobble Beaches (1997-1998);
- Mimico Creek Estuary Humber Bay Park Wetland Creation (1992-1993); and
- Ashbridge's Bay Park Fish Reef (1992).

The Toronto Waterfront Plan will work towards reconnecting the City with Lake Ontario and is intended to give Toronto 2,000 hectares of parkland and 100,000 new trees (TWRTF, 1999).

The integrity of the wetlands is threatened by erosion, degraded water quality partially due to high sediment loadings from storm sewers, the presence of invasive species, and the presence of carp. Some of the wetland rehabilitation projects have been sponsored by the Great Lakes Clean-up fund (TRCA, 1999).

4.2.2 Watershed, Parks and Urban Forest Initiatives

Responsibility for the protection, enhancement and remediation of the greenspace system is shared amongst the Parks and Recreation, City Planning and Works Divisions within the City, and the TRCA. This responsibility is supported by the active participation of a variety of other players, including numerous environmental and community groups and the Waterfront Regeneration Trust.

Many successful projects have been completed or are underway to protect, enhance and remediate the City's open space systems. Numerous naturalization initiatives, which not only improve wildlife habitat and air quality but add to the visual beauty of the city, of parks, roadsides and other open spaces have been undertaken by the City in partnership with the community. Examples include the creation of the Chester Springs Marsh on the Don River and the reconstructed stream at Terraview Heights in Scarborough.

Partnerships with community based and non-governmental organizations are integral to the protection, enhancement and remediation of the green space system, and the City and the TRCA have been instrumental in fostering these partnerships in the establishment of the Bring Back the Don Task Force, the Don Watershed Council, and the Humber Watershed Alliance. There are many successful examples of this collaboration. For example, in 1998, the City, in conjunction with the Rouge Park Alliance, completed the Rouge Park Trail Development and Management Plan and the Rouge Park Vegetation Management Study. City staff also collaborated with the City Cycling Committee to create an inventory of Cycling Trail opportunities in rail and hydro corridors.

Urban Forestry Section staff of Parks & Recreation Services are currently reviewing the tree planting programs of the former municipalities. Trees were planted under various programs that included residential and commercial street tree plantings, ravine and naturalization plantings, park and park development plantings and numerous tree replacement programs. A Tree Advocate Planting program is currently being developed by Parks and Recreation Services of Economic Development, Culture and Tourism, and the Technical Services and Transportation Services Divisions of Works and Emergency Services and has received initial Council support.

Protection is also achieved through a number of mechanisms, including parkland dedication by-laws and/or acquisition, as well as, through Official Plan policies, zoning by-laws, ravine control by-laws, storm water management and fill regulations. Generally, this regulatory framework restricts development in the sensitive natural open space areas (such as ravines, core habitats) and endeavors to ensure that certain ecological criteria be addressed when development is proposed in adjacent sites. Many of the by-laws developed by the former municipalities in the process of being reviewed.

The City has also committed its interests in participating with other municipalities within the GTA to develop and implement a long-term strategy to protect and enhance the ecological health of the Oak Ridges Moraine. The City of Toronto's quality of life and the health of its rivers is dependant upon the ecological health of the Oak Ridges Moraine headwater areas. Suburban sprawl, including that caused by large infrastructure projects on the Oak Ridges Moraine, increases the risk to the quality and quantity of water entering the Humber River, the Don River and the Rouge River.

4.2.3 Vegetation and Wildlife

The Toronto and Region Conservation Authority has completed a Conservation Priorities Database to rank species (plants and animals) and vegetation communities. The detailed application of the database offers a proactive and preventative methodology for developing natural heritage strategies. This information will also assist in the selection of indicators that will measure progress made at improving the environmental conditions of Toronto's six watersheds.

For the past three years, the TRCA and the community have conducted a frog-monitoring project on the Don River watershed. The program in the Humber River watershed started in 1998 and the Rouge River began its monitoring last summer. The TRCA will start a much broader monitoring program, including more species of plants and animals. The information collected will be used to measure progress towards maintaining ecological integrity and achieving the habitat and wildlife goals of the region's Remedial Action Plan.

4.3 Soil and Groundwater Quality

Toronto's actions to address soil quality issues have largely focussed on former landfill sites and on the development review process for potentially contaminated lands. Former landfill sites, owned by the City and managed by Works & Emergency Services, are regularly monitored for leachate and/or methane gas concerns. Works & Emergency Services, has compiled an interim list that identifies old landfill sites in the City, however, this must be verified and the ownership of these sited must be determined (Ted Bowering, Works & Emergency Services Department, Technical Services Division, pers. comm., 1999). The Ministry

of the Environment has not updated the 1991 Waste Disposal Site Inventory that included known closed waste disposal sites in the City of Toronto.

In 1993, the former City of Scarborough's City Council endorsed an eight-year capital program entitled "Old Landfill Survey & Remediation" to deal with the 27 known sites in this former municipality (John Minor, Works & Emergency Services Department, Technical Services, pers. comm., 1999). This initiative has studied and remediated the high risk sites and is now continuing to contend with the remaining sites. In August 1998, the new City Council adopted this report and extended its intent to cover the remainder of the amalgamated city. This expanded program is currently being administered jointly by the Soil and Water Quality Improvement Branch of Technical Services and the Solid Waste Management Services Division.

Through the development review process, the City of Toronto requires that developers remediate contaminated sites to meet current Ministry of the Environment guidelines. The MOE guideline entitled "Guideline for Use at Contaminated Sites in Ontario", provides advice and information to property owners and consultants to use when assessing the environmental condition of a property when determining the type of restoration is needed to allow continued use or reuse of the site. These guidelines also assist landowners in making decisions on soil and/or groundwater quality for new or existing uses.

The development review process for soil and groundwater was handled differently in the former Municipalities, ranging from a peer review of consultant's reports, to a City review of these reports. Future work requires the development of a unified process for the City of Toronto to deal with these types of developments.

The former City of Toronto developed an historical land use inventory as a tool to "flag" properties by municipal address that have the potential of residual soil and groundwater contamination because of past activities. Other former municipalities developed different versions of this type of tool to facilitate remediation of contaminated sites through the development review process. This database had various purposes including: facilitating the protection of community and environmental health with redevelopment, sharing information with the public and other governmental agencies, ensuring the proper remediation techniques, and maximizing the protection of the environment. The initiative can be further developed, by incorporating more sources to augment this soil and groundwater quality database and expand it across the entire City.

The Waterfront Regeneration Trust (WRT) has been working with the City, Toronto Economic Development Corporation (TEDCO), Ministry of Environment (MOE), and private investors to help create the conditions for reinvestment in underdeveloped areas of the waterfront, focussing on the Port Lands and the West Don lands. The WRT managed the development of TEDCO's area-wide soil and groundwater management strategy and the development of a memorandum of understanding between TEDCO, the City and MOE to formalize the results of that work. Since 1992, TEDCO has remediated eight brownfield sites, comprising over 25 hectares of land (TEDCO's website, 1999). In 1997 the WRT published "Greening Toronto's Port Lands", establishing the concept of a regional green infrastructure system for the area. This document is a key component of the foundation for the City's current planning initiatives in the Port Lands.

4.4 Urban Form

The former Metro Official plan contained land use policies to create and maintain a structure of centres and corridors to use the land more efficiently. It included strategies and targets for employment, housing and reurbanization. It also identified Metropolitan and Local Corridor Reurbanization Areas, and Metropolitan Mainstreets which have the potential to accommodate redevelopment and intensification.

City Council has endorsed the preparation of a new Official Plan (TorontoPlan) to guide the City's future development. The City's Official Plan team is considering a new planning framework to deal with global economic competition, new municipal responsibilities, and the changing social fabric. TorontoPlan is intended to be both visionary and strategic - departing from the traditional land use approach, focusing on opportunities for renewal and reinvestment, and finding new concepts and ideas to guide the physical,

economic and social development of the city. Priority areas for the Plan include improvements to the transportation networks; linkages in the green space network; environmental remediation actions; and community improvement plans. Currently staff from the Environmental Task Force, and City staff from various departments are involved in the Official Plan process to voice and advocate environmental considerations.

4.5 Waste Generation/Disposal and Hazardous Materials

4.5.1 Solid Waste

In Toronto, municipal waste, which includes household and some small business waste, is typically collected and disposed by the City (except for the communities of Etobicoke and York where the waste is collected by a private hauler). Solid waste generated by the Industrial, Commercial and Institutional (IC&I) sector is typically collected by private waste management companies. The City does not dispose all the IC&I waste that is generated in Toronto, as some of the material is shipped elsewhere (e.g. the United States).

Programs to divert wastes from landfills were introduced in 1987. Since then, diverted waste has increased 1,040 per cent, from 21,553 tonnes to 245,905 tonnes in 1998 (Renee Dello, pers. comm., 1999). The most successful component of the waste diversion program is the blue/gray box, which was responsible for 53 per cent of all waste diversion in 1998 and is responsible for redirecting approximately 95 per cent of the material collected (UP&DS, SOER Update, 1999). However, the amount of material that finds its way into the blue/gray box represents only 40% of the total amount of recyclable material used. In other words, of the approximately 300,000 tonnes of recyclable materials used by Toronto residents, only an estimated 195,000 tonnes of recyclable materials were actually sent to landfill. Community recycling depots are also located throughout the City and accept the full range of recycling items.

Disposal alternatives are currently being considered for the long-term management of Toronto's waste through Toronto's Integrated Solid Waste Resource Management Process (TIRM) process. City Council adopted a new mission statement to guide TIRM process: "The City of Toronto's Integrated Solid Waste Resource Management Process will be designed to be flexible enough to incorporate new, environmentally sustainable technologies that will move the city towards the ultimate goal of "zero waste". That is, a strategy based on maximizing diversion."

For the past nine years, Works and Emergency Services has organized a series of Environment Day events. The events, hosted by Toronto Councillors, and held from April to October, are designed to promote waste reduction in the community. Centralized and backyard composting can reduce garbage by as much as 30% and in return produce an excellent additive for residential gardens (Carolyn McSkimming, Works & Emergency Services Department, Solid Waste Management Services Division, pers. comm., 1999). Citizens of the City of Toronto can purchase a home composter at a nominal price or take their compost to facilities designed to accept organic material.

4.5.2 Hazardous Waste

The City of Toronto's Household Hazardous Waste (HHW) program provides opportunities for residents to help divert hazardous waste materials from landfills for proper management. HHW is accepted at various waste transfer facilities and landfills. In addition, Works & Emergency Services operates the "Toxic Taxi" pick-up service, that picks-up HHW materials from the residential community. There are also HHW depots located at the community Environmental Days.

The City of Toronto has an public outreach program designed to raise awareness on the issue of household hazardous products and their wastes, the associated risks and impacts, and to educate the public on proper methods of use and disposal. Approaches to reducing the consumption of hazardous materials will decrease the environmental consequences of the wastes associated with their use. These include switching to alternative non-toxic products, limiting the use of any hazardous materials (if these

products are necessary), buying only as much as needed and using all the hazardous material purchased. The City should reinvestigate previous municipal programs to minimize hazardous waste and consider the development of a City-wide hazardous waste minimization program.

4.5.3 *Pesticide Use*

The Environmental Task Force encouraged City Council to support the banning of pesticides on all City-owned properties. The Board of Health also recommended a phase-out of City pesticide use and on December 17, 1998, City Council endorsed this in principle. Instead of an outright ban, City Council supported a plan that hopes to end the application of pesticides on public green spaces in 1999, except in emergency situations. The implementation plan outlines specific program areas and strategies to reduce pesticide usage. A comprehensive Integrated Health Care program was designed as a key method of sustaining healthy parks and greenspace by introducing new techniques and alternative maintenance practices to reduce the reliance on pesticides.

The Pesticides Subcommittee of the Toronto Interdepartmental team on the Environment was convened in March 1999 to assist the Corporation of the City of Toronto to phase out its use of pesticides on public greenspaces in 1999 and beyond. The Subcommittee is comprised of representatives of business, labour, school and non-governmental environmental groups who have the ability and expertise to affect the City's phase-out goal. The Subcommittee is chaired by Toronto Public Health and Parks & Recreation and is supported by participating staff from Parks & Recreation, Public Health and Works & Emergency Services. In 1999, in the first year of the corporate pesticide phase-out, City pesticide use has decreased by over 96% for particular applications (e.g. general parklands, sports fields and roadsides) (Siu Fong, Community & Neighbourhood Services Department, Toronto Public Health Division, pers. comm., 1999).

4.5.4 *Spills*

All spills must be reported to the MOE Spills Action Centre that will investigate, determine the nature and extent of environmental damage, and ensure responsible parties comply with cleanup and disposal requirements and repair any damage to the environment. The petroleum, transportation, and municipal government sectors are the key sources for spills in Toronto. Each of the former municipalities had their own contingency plans for dealing with spill response and clean-up. Works & Emergency Services is currently working on the unification of a spill prevention and response plan to deal with these occurrences (Alex Marich, Works & Emergency Services, Water & Wastewater Services Division, pers. comm., 1999).

4.6 **Food**

The Toronto Food Policy Council (TPFC) was established in 1990 and operates as a sub-committee of the Toronto Board of Health. This initiative was inspired by the desire to develop a just, healthy, and environmentally sustainable food system for all Torontonians and end hunger in the City. To achieve this, the TPFC is working to change the way food is produced, distributed and processed. The TPFC advises the City on social, economic, health and environmental policy issues that affect the food system.

TFPC is to dedicated the preservation of prime Ontario agricultural land as a key issue to ensure Ontario's long-term food security. Environmental interests of the TFPC include promoting the virtuous cycle as a framework for promoting its activities. Elements of the virtuous cycle are:

- Urban organic agriculture as a carbon sink;
- Food import substitution cuts off greenhouse gas;
- Stop methane gas and toxic leachate release;
- Food waste composting; and
- Use the compost in the City.

The TPFC has also initiated the following items, which were adopted by the Environmental Task Force in February 1999:

- increasing the purchase of Canadian organic food by the City owned facilities;
- investigating the opportunities to establish rooftop and on-site community gardens on residential buildings owned by the Toronto Housing Company;
- preparing an action plan to increase the area of the City devoted to community gardening and the number of participants in community gardens; and
- examining the feasibility of using steam generated from burning methane gas at the Beare Road and Keele Valley Landfill sites to heat greenhouse operations.

4.7 Strategy for the Improving Terrestrial Conditions

The amalgamation redesign of the City of Toronto included administrative strategies such as the establishment of key offices to work together to improve the conditions of the terrestrial environment. The development of an effective overall strategy for improving the quality of land in the City that integrates and communicates all of the separate and joint initiatives will require contributions and expertise from many departments. These groups will include Works & Emergency Services (Solid Waste Management Services Division and Technical Services Divisions), Urban Planning & Development (City Planning Division), Economic Development, Culture & Tourism (Parks & Recreation Division), Community & Neighbourhood Services (Toronto Public Health Division), and the Chief Administrative Office, and will reflect the mandates and activities of these departments. The City is well positioned to collaborate with governmental agencies, such as the Toronto and Region Conservation Authority, the Waterfront Regeneration Trust, the Toronto Economic Development Corporation and the public to develop a comprehensive strategy that improves the terrestrial conditions of the City. This strategy will also require a comprehensive approach that reflects the growing awareness of groundwater concerns.

5.0 Conclusions

Improving the terrestrial conditions in the City of Toronto and working towards the sustainable use of land, will require strong commitments from the City government, the Toronto and Region Conservation Authority, the Ministry of Environment, the community as well as every citizen. The land has been impacted from years of human use. Reducing stress on the land system is vital to the overall health of the ecosystem, including our own.

The City of Toronto should continue to focus its efforts in using land more effectively and reducing stress on the land environment. The City must continue and become more active in promoting a more compact urban form to reduce urban sprawl, reduce our need for land-intensive infrastructure such as roads and conserve existing natural resources along with naturalization. Maintaining healthy soil conditions can provide opportunities for redevelopment as well as serve to promote a more compact urban form. Reducing waste generation and disposal can reduce the need for landfilling and thus reduce the potential soil impairments and consumption of land. Recognition that all of our activities place stress on the land will help us understand how to adapt to change while reducing our impact on the environment.

To improve the conditions, the City of Toronto needs a comprehensive strategy to improve terrestrial conditions and minimize human impact on the land environment. This will require contributions and expertise from the policy, technical and operational units created by amalgamation, other relevant departments and divisions, all governmental levels, and the public.

Public education and awareness facilitated by multi-stakeholder, integrative planning and management, and partnerships that include information and resource sharing, will be key strategies to building a healthier urban ecosystem. The impact on the land environment has implications for the entire ecosystem in which Toronto belongs, including the air and water resources and living organisms. Commitment is needed to reduce stress and regenerate impairments to sustaining an urban ecosystem capable of supporting the needs of its human inhabitants as well as its other ecological resources.

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Appendix A: Acknowledgements

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