For more information about the Toronto and Region Remedial Action Plan, contact the Waterfront Regeneration Trust or The Toronto and Region Conservation Authority

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1.1 Introduction

This report is about progress to protect and restore the waters and habitats of the Toronto and Region area. It summarizes a wide range of activities and associated environmental improvements or degradation. For a more detailed background on the environmental history of the area, refer to previous Remedial Action Plan documents such as Stage 1: Environmental Conditions and Problems (1989), Strategies for Restoring Our Waters (1991), and Clean Waters, Clear Choices: Recommendations for Action (1994).

In 1972, Canada and the United States signed the first Canada / U.S. Great Lakes Water Quality Agreement (GLWQA). A revised GLWQA was signed in 1978, with the stated purpose “to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem”. The International Joint Commission began to identify Areas of Concern (AoCs) or “hot spots” around the Great Lakes.

Canada, the United States, and the IJC identified 42 AoCs in 1987, including Toronto and Region (Figure 1). Since that time, one AoC in Ontario (Collingwood Harbour) has been successfully delisted, and one new AoC in the U.S. has been identified. In 1987, the IJC also recommended a process for the restoration of these AoCs, through development and implementation of Remedial Action Plans (RAPs). The process for restoring beneficial uses is summarized in Table 1.

![FIGURE 1: TORONTO AND REGION AOC](image)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Status in Toronto and Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Identify environmental conditions and the causes of the impairments</td>
<td>Stage 1 report completed in 1989</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 impairments noted as requiring further assessment (not done to date)</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Evaluate remedial measures, recommend additional measures if required, identify agencies responsible for implementation</td>
<td>Recommended strategies in Clean Waters, Clear Choices (1994)</td>
</tr>
<tr>
<td></td>
<td>Secure formal commitments for implementation (from the Federal and Provincial governments)</td>
<td>Partial commitments received for implementation</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Implementation</td>
<td>Underway</td>
</tr>
</tbody>
</table>
The Toronto and Region AoC is large, and the issues are complicated. Thus, while progress has been made, it has not resulted in any delisting, nor will it in the foreseeable future. However, if we analyze the AoC by watershed and subwatershed, and consider to which areas certain impaired uses are applicable, then a sense emerges that we can delist some areas and restore some impaired uses in the short term. Consultation on a monitoring framework to support delisting is currently underway, and recommendations will be made later this year about an appropriate approach to delisting.

1.2 Why is Toronto and Region an Area of Concern?
Most urban areas around the Great Lakes suffer from contaminated runoff, loss of habitat, and degradation of natural landscapes. As well, Lake Ontario is the last in the chain of the Great Lakes, and the Toronto waterfront is influenced by water from the Niagara River and elsewhere. It also receives direct atmospheric deposition to the nearshore and watercourses, as well as runoff contaminated with pollutants originating in the large airshed to which we belong. As the largest urban area on Lake Ontario and under heavy growth pressure, it is not surprising that Toronto was designated an Area of Concern. Table 2 describes specifically which uses are impaired in the Toronto and Region AoC.

<table>
<thead>
<tr>
<th>Impaired use</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction on fish and wildlife consumption</td>
<td>Impaired</td>
</tr>
<tr>
<td>Degradation of benthos</td>
<td>Impaired</td>
</tr>
<tr>
<td>Restriction on dredging activities</td>
<td>Impaired</td>
</tr>
<tr>
<td>Eutrophication with undesirable algae</td>
<td>Impaired</td>
</tr>
<tr>
<td>Beach closures</td>
<td>Impaired</td>
</tr>
<tr>
<td>Degradation of aesthetics</td>
<td>Impaired</td>
</tr>
<tr>
<td>Degradation of fish and wildlife populations</td>
<td>Impaired</td>
</tr>
<tr>
<td>Loss of fish and wildlife habitat</td>
<td>Impaired</td>
</tr>
<tr>
<td>Fish tumors or other deformities, reproduction problems</td>
<td>Requires further assessment</td>
</tr>
<tr>
<td>Bird or animal deformities, reproduction problems</td>
<td>Requires further assessment</td>
</tr>
<tr>
<td>Degradation of phytoplankton and zooplankton communities</td>
<td>Requires further assessment</td>
</tr>
<tr>
<td>Tainting of fish and wildlife flavour</td>
<td>Not impaired</td>
</tr>
<tr>
<td>Restriction on drinking water; taste and odour problems</td>
<td>Not impaired</td>
</tr>
<tr>
<td>Added costs to agriculture and industry</td>
<td>Not impaired</td>
</tr>
</tbody>
</table>

Downtown Toronto
1.3 Who is responsible for the Remedial Action Plan?

Under the Great Lakes Water Quality Agreement and the Canada-Ontario Agreement Respecting the Great Lakes, Environment Canada and the Ontario Ministry of Environment are responsible for ensuring progress in each AoC. In 1996, the two government agencies asked the Waterfront Regeneration Trust and The Toronto and Region Conservation Authority to act as the local coordinators of the Toronto and Region RAP.

A Memorandum of Understanding was signed in October 1997. Under this MoU, the WRT organizes and supports the RAP Coordinating Committee, produces the annual progress report, organizes the annual forum or summit, delivers RAP-wide communications/public liaison, and supports the Toronto Bay Initiative. The TRCA coordinates watershed activities such as the Don Council and Humber Alliance, and delivers and coordinates monitoring and other technical elements such as stormwater management as required.

Municipalities, other agencies, businesses, and citizens all have key roles in restoring our waterfront and watersheds. Municipalities are responsible for many aspects directly related to RAP goals: environmental health, stormwater management, contaminant source control, wastewater collection and treatment, and municipal planning. Businesses are often large consumers of water and wastewater services, and can make a substantial contribution by practicing water conservation, closed-loop manufacturing, recycling and proper disposal of chemicals, and other best management practices.

Much of our local pollution and loss of habitat results from daily urban activities, and can only be halted if we all take responsibility, through work, home, school, and play. For more information about how to get involved in a specific watershed group or program, contact the Waterfront Regeneration Trust or The Toronto and Region Conservation Authority.

1.4 Summary of progress for each impaired use

Progress towards restoration of the Toronto and Region waterfront and watersheds has been slow. While plans, policies, and programs increasingly recognize what needs to be done, implementation lags behind. This is generally attributed to the diverse and diffuse sources of pollution, the high costs associated with restoration, and the large number of jurisdictions in the RAP area. Further degradation in areas of new urban growth, and reduced funding for remediation projects as a result of restructuring and budget cuts at all levels of government, are also factors in our slow progress.

Table 3 provides a summary of how we are doing towards addressing each impaired use, relative to the initial 1989 Stage I analysis. See individual chapters on Water, Bottom Sediments, Benthic Invertebrates, Phytoplankton & Zooplankton, Habitats & Wildlife, and Community Involvement & Watershed Highlights, for details.
### TABLE 3: SUMMARY OF PROGRESS IN THE TORONTO AND REGION AoC

<table>
<thead>
<tr>
<th>Use impairment</th>
<th>1989 Stage 1 analysis (quoted from Stage 1 document)</th>
<th>Progress/Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td><strong>Restrictions on fish or wildlife consumption</strong></td>
<td>Levels for most organic chemicals declining, notably PCBs.</td>
</tr>
<tr>
<td></td>
<td>Human consumption advisories exist for the larger sizes of several species because of mercury, PCB, and Mirex levels. Evidence indicates that this is both a local and lake-wide problem.</td>
<td>Reduced fish consumption advisories for some smaller fish, although advisories still in place across the waterfront and watersheds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relative contribution from local versus lakewide sources still not clear.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumption of wildlife is not applicable in the Toronto and Region AoC.</td>
</tr>
<tr>
<td><strong>Beach closings</strong></td>
<td>Frequent beach postings as a result of stormwater and CSO contamination.</td>
<td>Eastern Beaches now open almost all the time, due to capture of stormwater and CSO in storage tanks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Island Beaches and Western Beaches still closed following rainfall events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction of Western Beaches tunnel underway. Expect to reduce closings by 75% (other 25% caused by Humber River sources).</td>
</tr>
<tr>
<td><strong>Eutrophication or undesirable algae</strong></td>
<td>Phosphorus often exceeds Provincial Water Quality Guideline of 20 µg/l across the waterfront. Algal and weed problems are restricted to the western shoreline because of a lack of suitable substrate and wave action in other areas.</td>
<td>Although trends suggest declining phosphorus levels, levels at Provincial Water Quality Monitoring Network stations continue to exceed the Provincial Water Quality Objective by several orders of magnitude.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highland Creek and the Rouge River show the lowest concentrations of phosphorus of monitored sites.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Algae and weeds still extensive along the Etobicoke waterfront, where there are appropriate substrate and climate conditions.</td>
</tr>
<tr>
<td><strong>Sediment &amp; Benthos</strong></td>
<td><strong>Restrictions on dredging activities</strong></td>
<td>Eastern Gap dredgeate meets open water disposal guidelines, and will be used to create a wetland at Tommy Thompson Park.</td>
</tr>
<tr>
<td></td>
<td>Sediments in most embayment areas exceed Ontario’s open water disposal guidelines. Dredging has been subject to Environmental Assessment in the past and is likely to continue to be in the future.</td>
<td>Dredgeate from the Keating Channel is disposed of in Confined Disposal Cells.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Successful remediation of approximately 250 cubic metres of sediment from the Parliament Street Slip took place on a demonstration basis in 1992 (demonstration technology).</td>
</tr>
</tbody>
</table>
**TABLE 3: SUMMARY OF PROGRESS IN THE TORONTO AND REGION AOC**

<table>
<thead>
<tr>
<th>Use impairment</th>
<th>1989 Stage 1 analysis (quoted from Stage 1 document)</th>
<th>Progress/Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sediment &amp; Benthos</strong></td>
<td>Degradation of benthos: Benthic communities in embayments and near river mouth are dominated by species indicative of organic enrichment. Densities are lower than in the past, suggesting some improvement. Benthos bioaccumulate metals and trace organics.</td>
<td>General improvement of sediment quality in parts of Toronto Bay and Humber Bay. Contaminants appear to stress populations but not at levels that would cause mortality. Not enough data to evaluate invertebrates in all tributaries, but recent studies show range from good in headwaters to degraded in lower urban reaches.</td>
</tr>
<tr>
<td><strong>Habitat &amp; wildlife</strong></td>
<td>Loss of fish and wildlife habitat: Historic loss of habitat. Loss of riverine habitat continues. Contamination of existing or newly created habitats is of concern.</td>
<td>Upstream riverine habitat quality continues to decline, due to urbanization. Lower reaches and waterfront undergoing extensive habitat restoration work (channel naturalization, wetland creation, and plantings), both terrestrial and aquatic. Progress will continue to be undermined by excessive flows, erosion, sedimentation and contamination, particularly in the vicinity of outfalls, until stormwater and CSO are addressed.</td>
</tr>
<tr>
<td>Degradation of fish and wildlife populations</td>
<td>Historic degradation and loss of species dating back to the 1800’s. Continued impact from urbanized area today.</td>
<td>Definitive assessment of fish communities completed in 1995, and to be repeated starting in year 2000. Fish and wildlife populations in general continue to decline as a result of impaired water quality in the watersheds. However, improvements are being made to increase access to good quality habitat through barrier mitigation and wetland rehabilitation/creation projects. Fish communities are responding to these efforts (e.g., increased pike populations in Toronto Bay). Expected frog species are present in many wetlands, but in low numbers.</td>
</tr>
<tr>
<td>Fish tumors or other deformities</td>
<td>Requires more assessment. Visual inspection of captured fish in recent studies has indicated no evidence of tumors. Tests of Main STP effluent have shown it to be non-mutagenic.</td>
<td>Definitive assessment has not been done. Informal accounts reveal no noticeable incidence of tumors.</td>
</tr>
</tbody>
</table>

*continued...*
### TABLE 3: SUMMARY OF PROGRESS IN THE TORONTO AND REGION AOC

<table>
<thead>
<tr>
<th>Use impairment</th>
<th>1989 Stage 1 analysis</th>
<th>Progress/Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Habitat &amp; wildlife</strong> (cont')</td>
<td>Requires more assessment. Current reproductive rates of herring gulls and other species are normal. Incidence of deformities has declined. Organochlorine residues in gull eggs have declined.</td>
<td>Definitive assessment has not been done. Organochlorine levels (dieldrin, oxy-chlorane) in Herring gull eggs have declined further since 1990.</td>
</tr>
<tr>
<td>Degradation of phytoplankton and zooplankton populations</td>
<td>Requires more assessment. Lake-wide factors, physical factors, and local pollution sources influence communities. Information is currently insufficient to determine relative significance of local sources.</td>
<td>Definitive assessment has not been done. Lower abundances have been recorded in Ashbridge’s Bay and Toronto Bay (relative to control site offshore).</td>
</tr>
</tbody>
</table>

| Human Use                                           | Aesthetic concerns relate primarily to debris and litter. Turbidity is also a concern near river mouths and in the vicinity of lakefilling operations. Weed growth is a concern along the western shoreline. | No formal visual assessment undertaken. Verbal reports suggest fewer complaints, likely due to increased clean up programs. Construction of the Western Beaches tunnel may reduce growth of weeds in that area. |

### 1.5 Fishable? Swimmable? Drinkable?

The general goals of the Toronto and Region RAP are a fishable, swimmable, drinkable waterfront and watersheds.

**Fishable?**

Fishing is a popular form of recreation in the Toronto area, but fish consumption is an impaired use throughout the waterfront and watersheds. Care must be taken to follow the Guide to Eating Ontario Sport Fish, produced by the Ministries of Environment and Natural Resources.

The Provincial government monitors and issues advisories primarily based on elevated levels of mercury, PCBs, mirex, and pesticides in the flesh of the fish samples. Other toxic pesticides and heavy metals have generally not been found in Toronto area sport fish at concentrations exceeding health guidelines. Contaminants in fish flesh have gone down slightly over the last ten years. However, restrictions still exist for some sizes of most fish, including brook trout, lake trout, largemouth bass, rock bass and white perch.
Changes in monitoring methods and guidelines make it difficult to make comparisons of advisories between years. Advisories in general apply only to older, larger, and bottom-dwelling fish. Since more contaminants are stored in organs and fat, it is recommended that one eat only the fillets, and drain the fat while cooking.

Swimmable?

Swimming is an impaired use when “waters commonly used for total-body contact or partial body-contact recreation exceed standards, objectives or guidelines for such use.”

Beaches are posted when water sampling indicates that Escherichia coli (E. coli) bacteria exceeds 100 per 100ml. Heavy rainfall and warm temperatures, combined with low water circulation, create the most favourable conditions for bacterial contamination.

In the Toronto and Region Area of Concern, waters commonly used for contact recreation are the Lake Ontario waterfront beaches (Western, Eastern, Toronto Islands, and the Etobicoke beaches, including Marie Curtis Park, Amos Waite Park, and Humber Bay Park East), and beaches at Heart Lake in the Etobicoke Creek watershed, Bruce’s Mills in the Rouge, and Lake Wilcox and Albion Hills in the Humber. Bruce’s Mills and Albion Hills use suspended curtains to segregate an area for chlorination to permit swimming.

Lake Wilcox and the Eastern waterfront beaches are the only places not regularly posted. The installation of two underground storage tanks to intercept and divert stormwater and CSO runoff from the Eastern Beaches resulted in three of the four beaches in that area having no posted days in 1997, and the fourth beach only being posted twice. Prior to the installation of the tanks, the beaches were automatically considered polluted and unfit for swimming for 48 hours after rainfall.

It is anticipated that the present construction of the Western Beaches Tunnel will reduce the number of days that area beaches will be posted by about 75%. On-going influences from the Humber River will have to be addressed to fully restore this beneficial use in the western part of the AoC.

Across the tributaries in the RAP area, reduced bacteria levels are a long term target, even where contact recreation is not currently practiced or considered. Bacteria levels in Etobicoke and Mimico Creeks are such that body contact recreation is unsafe over 70-80% of the time throughout both creeks, and almost all the time near the mouths. In Highland Creek, body contact is deemed unsafe over 98% of the time. In the Don, some tributaries contain E. coli counts as low as 20/100 ml in dry weather, but are regularly over 100,000 in wet weather.
Drinkable?

Drinking water is designated as an impaired use if it is not possible to treat it to current standards. This is not the case in the Toronto and Region Area of Concern. In 1990, a City of Toronto study of tap water, bottled water and water treated by point-of-use devices (water filters), concluded that tap water supplied to Toronto consumers was the best choice for drinking water in terms of overall health risks.

In Toronto, water filtration plants (WFPs) draw raw water from Lake Ontario from 1.6 to 3.2 kilometres offshore, where water and sediment quality are better than closer to shore. Bacterial contamination, the primary health concern, is addressed through the processes of filtration and chlorination. Toronto also supplies treated water to York Region (which supplements this with water from Lake Simcoe and groundwater sources).

Aluminum-based chemicals are used to remove suspended particulate. The average annual concentration of aluminum at the Toronto filtration plants is 70 µg/l, which is below the 100 µg/l drinking water guidelines presently used by many jurisdictions, but high enough to cause health concerns. Every effort should be made to lower aluminum concentrations.

Trihalomethanes (THMs) are a by-product of the chlorination process. The Canadian drinking water guideline for total THMs was recently reduced from a maximum acceptable concentration of 350 ppb (parts per billion) to an interim maximum of 100 ppb. Toronto drinking water average concentrations over the last ten years are 0.016 mg/l, or less than 20 ppb.

During the summer, warm calm weather can lead to algae growth which affects taste and odour of the water supply. This is not considered a health risk.

In the headwaters of some of the RAP watersheds, some communities use well water. See section 2.4 for a brief description of groundwater issues.

[Image of water treatment plant]
The Toronto waterfront receives pollutants from a range of sources: stormwater, combined sewer overflows, sewage treatment plants, water filtration plants, spills, illegal discharges, and some direct atmospheric deposition. Moreover, the seven tributary rivers (Section 2.2) also receive stormwater, some combined sewage (in the Don and the Humber), spills and illegal discharges, which are then discharged to the waterfront.

The most significant local and ongoing source of contaminants to the waterfront is stormwater, containing oil and grease residue from vehicles, road salt, pesticides, and other pollutants. Particularly bad are the older storm sewers which are combined with sanitary sewers and overflow raw sewage during heavy rainfalls (Section 2.1).

Some pollutants are also contributed by storm sewers during dry weather, due to illegal sanitary cross connections, excess surface watering (from car washing or lawns), and accidental or deliberate spills to roadside catchbasins. Thirty-one of 116 monitored sewer outfalls have been identified as discharging significant dry weather flow (0.1 to 4.0 million litres per day). Dry weather loadings, while small relative to wet weather loadings, contain such contaminants as bacteria, suspended solids, aluminum, barium, copper and dieldrin. Stricter sewer use by-laws and associated enforcement will assist in removing these sources.

Sewage treatment plants and water filtration plants also discharge to the waterfront. With the exception of the North Toronto Sewage Treatment Plant on the Don River, and the Main STP overflow bypass, these facilities discharge offshore, where treated effluent is diluted and pollutants dispersed into open lake waters (Section 2.3). Figure 2 is a map of waterfront outfalls, STPs, and WFPs.

**WATER: SUMMARY OF PROGRESS/STATUS**

**ENVIRONMENTAL**
- Combined overflows likely down slightly overall as a result of improved lot level management; and down significantly in the Eastern Beaches as a result of storage tanks.
- PCBs and DDTs down in fish flesh (Young of the Year and Sport Fish).
- Traditional pollutants associated with urbanization (chloride, bacteria, and total suspended solids) increasing in the tributaries, as middle reaches and headwaters urbanize.
- Still regular exceedances of Provincial Water Quality Objectives for many contaminants from all sources.

**POLICY/ACTION/EDUCATION**
- Stormwater quality and quantity controls have been required of all new developments since 1991.
- Better understanding of contributions from storm sewers, CSO, tributaries, and STPs and WFPs.
- The City of Toronto has established the Stormwater Group to promote the adoption of source control and non-structural stormwater management.
- The City of Toronto is also making progress on the Wet Weather Flow Master Plan, which will establish policy and recommendations for projects according to a hierarchy of management priorities, starting with source control, conveyance, and end-of-pipe.
- Similar “retrofit plans” have been completed or are being prepared by Mississauga, Markham, and Richmond Hill.
2.1 Storm sewers and combined sewers

Wet weather

More than 2,600 storm sewers discharge stormwater into City of Toronto water courses and the lake. Thirty-four of these contain combined sewer overflow (CSO). Figure 2 shows the waterfront outfalls.

In areas of Toronto and in Peel and York Regions built after 1975, stormwater is often held back in stormwater ponds for flood control purposes, with indirect benefits to stormwater quality through some settling. Most recently developed areas further upstream provide both quantity and quality control, as well as erosion control, and in these areas, stormwater has the least impact on the receiving waters. Figure 3 is a map of stormwater ponds, showing the proliferation of ponds in the more recently developed headwaters.

Although a number of water conservation programs, downspout disconnect programs, and pilot project retrofits have been implemented in the last five years, there is insufficient baseline or follow-up data to isolate and assess the impact of any particular program on reducing CSO.

A 1989/1990 analysis of wet weather flow provided comprehensive data regarding storm sewer contributions, although there are no comparable historic data to determine trends. Across the waterfront, average event mean concentrations for phenolics, total phosphorus, total suspended solids, fecal coliforms, aluminum, cadmium, copper, iron, lead, silver, zinc, PCBs, and dieldrin are found generally in exceedance of Provincial Water Quality Objectives/Guidelines (PWQO/Gs) at storm outfalls during an average rainfall event. Other trace organic compounds for which there are PWQO/Gs are

ETOBICOKE STORMWATER EXFILTRATION SYSTEM

In 1993, the City of Etobicoke developed and constructed 2.1 km of the Etobicoke Stormwater Exfiltration System. The system was developed as a retrofit stormwater management technology, integrated within the design of a conventional storm sewer system, to provide stormwater quality treatment for fully developed municipalities, where a land base for end-of-pipe treatment is not available.

The system consists of two perforated pipes laid below a conventional storm sewer in a granular stone trench, and wrapped in filter fabric. Stormwater enters the two perforated pipes, where it drains or exfiltrates to the stone trench and into the surrounding soil. Particulate and debris carried by the stormwater is contained within the perforated pipes (to be cleaned out and disposed of). Since installation, the exfiltration capacity of the system has exceeded the design objectives. The City of Toronto-Etobicoke Office, in collaboration with the Ontario Ministry of Environment and Environment Canada are continuing to monitor the system performance and are preparing a design brief.
Some trace organics for which there are no PWQO/Gs are found at high frequencies of detection, and have been identified by MOE as candidate substances for bans or phaseouts (e.g. alpha-bhc, gamma-bhc [lindane], OP-DDT, PP-DDT, anthracene, Benzo [A] anthracene, Benzo [G,H,I] perylene, and phenanthrene).

CSO is found to contain significantly higher concentrations of total phosphorus, bacteria, most heavy metals, and of a few trace organic compounds such as PCBs, lindane, pp-DDD, benzo(b) fluoranthene, and chrysene, than regular stormwater.

**CITY OF TORONTO WET WEATHER FLOW MASTER PLAN**

Begun in 1997, this project is a collaborative undertaking for the prevention, control and reduction of wet weather related water pollution. The Master Plan is to consist of an integrated plan for initiatives to manage wet weather flows, caused by both rain storms and snow melt. In developing the plan, a hierarchy of maximum source control, then conveyance, and then end-of-pipe has been adopted, encompassing both natural and structural solutions.

While this initiative is within the City of Toronto, liaison will take place with municipalities up the watersheds to ensure a coordinated approach. Mississauga, Markham, and Richmond Hill have completed or are also preparing retrofit studies.

**DUNKERS FLOW BALANCING SYSTEM**

The Dunkers technology to reduce pollution from combined sewer overflows has been adapted to the Lake Ontario waterfront. It is an alternative end-of-pipe technology to the construction of large underground concrete storage tanks, and is located west of Bluffers Park along the base of the Scarborough Bluffs. An area has been curtained off to form a series of chambers, where the water is held and much of the contaminated suspended solids settle on the bottom, before the water exits at the other end. Periodic dredging will be required, but not for some time.

**STORMWATER GROUP PILOT PROJECTS**

The City of Toronto established the Non-structural working group (since renamed the Stormwater Group) in 1997, to investigate and promote non-structural means of managing stormwater, focusing on source control. This group has completed studies of three neighbourhoods in the City, to determine ways and means of optimizing non-structural treatment. Funding is now being sought to implement some of the projects.
generally lower than the O/Gs.

2.2 Tributaries

The drainage areas of the tributaries flowing into the Toronto waterfront range from 80 sq. km of the Mimico Creek, to 860 sq. km of the Humber River. Urbanization ranges from 15% in the Rouge watershed, to 77% in the Highland watershed, and 88% along the waterfront. Table 4 provides a summary of watershed size and urbanization.

River mouth

In the most recent comprehensive study, sampling was conducted at each river mouth between 1991 and 1992 by the Ministry of Environment. Differences between watershed contributions to Lake Ontario are difficult to isolate, since different pollutants appear worse in each watershed, depending on whether one uses mean or median concentrations, loadings, flow-weighted figures, or area-weighted figures. However, some general patterns are apparent.

The Don tends to have the highest wet weather median concentrations of most pollutants (although Etobicoke Creek has similar copper and lead). The Don also contributes the greatest unit area amount of bacteria and lindane, perhaps associated with having the greatest proportion of residential and commercial land use. Median PCB concentrations exceeded the PWQO at the Etobicoke, Mimico and the Don River mouths (i.e. the west and central waterfront). The west end (Etobicoke and Mimico Creeks) contributes a greater amount of PAH B[a]P (associated with transportation and industrial uses) per unit area. The greatest quantity of suspended solids and total phosphorus per unit area is contributed by the Humber and Rouge (i.e. the most rural watersheds).

Dieldrin, DDT, and PCBs have been detected in many of the tributaries, and often at concentrations exceeding PQWOs. The results are summarized in Table 5. Chlordane, HCB, Mercury and Mirex were detected to various degrees, but did not exceed the PWQO.

More recently, the Humber River mouth was sampled over the period July 1997 through March 1998 using large-volume samples (approximately 38 litres). Trace organic compounds

---

**TABLE 4: WATERSHED SIZE AND URBANIZATION**

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Hectares</th>
<th>% agricultural/rural/open space</th>
<th>% urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etobicoke</td>
<td>21,128</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Mimico</td>
<td>7,708</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>Humber</td>
<td>90,736</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>Don</td>
<td>36,042</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>Highland</td>
<td>10,157</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>Rouge</td>
<td>33,394</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Waterfront*</td>
<td>11,441</td>
<td>12</td>
<td>88</td>
</tr>
</tbody>
</table>

*the areas between the major watersheds, draining directly to Lake Ontario
cannot be compared quantitatively with the 1991/92 data since different analytical protocols were used, and a slightly longer list of PAHs was analysed for in 1997/98 than in 1991/92. Detection limits were slightly lower in 1997/98 than they were in 1991/92.

**TABLE 5: RESULTS OF TRIBUTARY SAMPLING 1991/92 PLUS HUMBER RIVER 1997/98 FOR SELECTED CONTAMINANTS FOUND IN EXCEEDANCE OF THE PWQOS**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Dieldrin (ng/l)</th>
<th>DDT (ng/l)</th>
<th>Total PCB (ng/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PW Q O : 60.0</td>
<td>PW Q O : 3.0</td>
<td>PW Q O : 1.0</td>
</tr>
<tr>
<td>% above detection limit</td>
<td>% exceed PW Q O</td>
<td>% above detection limit</td>
<td>% exceed PW Q O</td>
</tr>
<tr>
<td>Etobicoke Creek</td>
<td>90</td>
<td>3</td>
<td>62</td>
</tr>
<tr>
<td>Mimico Creek</td>
<td>88</td>
<td>3</td>
<td>70</td>
</tr>
<tr>
<td>Humber River</td>
<td>79</td>
<td>4</td>
<td>79</td>
</tr>
<tr>
<td>Humber River 1997/98</td>
<td>92</td>
<td>0</td>
<td>58</td>
</tr>
<tr>
<td>Don River</td>
<td>86</td>
<td>19</td>
<td>81</td>
</tr>
<tr>
<td>Highland Creek</td>
<td>88</td>
<td>8</td>
<td>60</td>
</tr>
<tr>
<td>Rouge River</td>
<td>70</td>
<td>0</td>
<td>73</td>
</tr>
</tbody>
</table>

These differences between watersheds indicate that local sources likely exist for these pollutants, and point to the need for tracing sources upstream.

**Upstream**

Water quality in each stream generally improves in the headwaters and at recharge locations. In the Humber, the Upper Main and East Humber watersheds contain slightly lower suspended solids and other contaminants, due to the relatively stable land uses in the contributing drainage areas.

Traditional water chemistry parameters such as phosphorus, chloride, suspended solids, and bacteria have been monitored by MOE for many years, allowing for some trend analysis.

**Phosphorus** levels have remained fairly steady since a dramatic decline following the closure of many small tributary sewage treatment plants in the early 1960s and legislation in the 1970s which limited phosphorus use in detergents. However, phosphorus still fails to meet PWQO over 40% of the time in all watercourses except the headwaters of the Humber (20%). In the Don, the PWQO for phosphorus is exceeded 80-100% of the time.

**Chloride** concentrations in the rivers have been observed at levels which may have at least limited effects on aquatic life (>500 mg/l). The highest concentrations occur during the winter, in response to salt use on roads, driveways, and other paved surfaces. Figures 4 and 5 show the increase in average chloride levels across the watershed between the periods 1975-1990 and 1990-1998. At present, chloride concentrations exceed 500 mg/l 10-20% of the time south of Steeles Avenue (i.e. urbanized areas), except in the Rouge, where concentrations are lower.
Suspended solids have declined a bit in the Don and other watersheds which are now almost completely urbanized, indicating that construction sites in the remaining watersheds are still a major source of sediment, and better control of practices is required. Suspended sediment exceeds the typical background level of 25 mg/l 40-60% of the time in the lower Don and Humber, and 20% in all other watersheds, except in the headwaters of the Humber and Rouge, which meet this standard most of the time.

Bacteria levels exceed 100 organisms/100 ml over 40% of the time in all watercourses, except in the headwaters of the Humber and Rouge, where this level is exceeded only about 5-25% time. Swimming, or other body contact recreation, is unsafe 100% of the time in highly urbanized downstream sections.

Organic compounds are monitored in the water column and in fish tissue in the watersheds. Of young-of-the-year fish flesh samples from 25 sites in 1992, 92% had PCB in excess of the Great Lakes Water Quality Guideline of 100 ng/g. Total PCB and chlordane concentrations were generally lower than in fish collected in the 1980s.

2.3 Sewage Treatment Plants and Water Filtration Plants

The Toronto and Region sewage treatment plants (STPs) and water filtration plants (WFPs) discharge substantial loadings of contaminants. However, the majority of the outfalls are located offshore and pollutants are largely dispersed into deeper lake waters. Figure 2 (pg. 14), shows the location of STP and WFP outfalls/intakes.

Sewage Treatment Plants

The most significant contribution to the nearshore from wastewater facilities is the Main Water Pollution Control Plant or STP, when there is a bypass of primary effluent during excessive rainfall conditions. This bypass occurred 19 times in 1997, discharging an estimated total of 3,216 million litres. Like the combined sewer discharges, the bypass effluent has a higher concentration of nutrients, phenolics, and most heavy metals than stormwater.

STPs are traditionally heavy dischargers of phosphorus, and in 1997, the three large Toronto plants discharged 286 tonnes of phosphorus. Previous provincial studies have estimated that this source alone amounts to 50% of the total phosphorus input to the waterfront.

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CITY OF TORONTO SEWER USE BY-LAW

The City of Toronto has drafted a new sewer use by-law, which sets the toughest standards for sewer discharges in Canada. Fines for first offences and subsequent offences may reach $50,000 and $100,000 respectively. Industrial polluters will be required to establish pollution prevention plans. The by-law adds another 29 compounds to the list of chemicals banned from the city sewer system, including benzene, chloroform, dichlorobenzene, toluene, aldrin/dieldrin, DDT, PCBs, and chlordane. The City is planning to conduct workshops for affected companies, regarding implementation and preparation of pollution prevention plans.
Several years ago, it was estimated that the waterfront STPs are the sources of approximately 25% of all copper and lead loadings to the waterfront. Some metal concentrations in discharge effluent have been found to exceed the Provincial Water Quality Objectives/Guidelines. Generally, the levels of toxic organic pollutants which have been detected in the effluent are lower than PWQO/Gs, for those pollutants where objectives or guidelines exist. It was also estimated that STPs contribute 19% of dieldrin and 83% of lindane pollution from City of Toronto sources to the waterfront.

Water Filtration Plants
The four WFPs are the principal sources to the waterfront of aluminum and several chlorinated compounds created during the treatment process. The WFPs draw raw water from Lake Ontario, and use chlorine for disinfection and aluminum as a coagulant. During the water filtration process, plant filters accumulate solids, necessitating regular backwashing to clean the filters. Generally, backwash concentrations exceed PWQO/Gs for total phosphorous, aluminum, copper, iron and phenols. Partial retention and clarification of backwash water is currently undertaken, which reduces loadings to the lake somewhat.

2.4 Groundwater
The Oak Ridges Moraine stretches across the top of the RAP area, providing the source of the headwaters of our rivers, as well as a groundwater source for local residents.

The Humber River contains the largest portion of the Moraine in the RAP area. It covers approximately 27% of the Humber watershed and its aquifers feed 49% of the headwater tributaries of the Humber River. These unconfined aquifers are particularly vulnerable to contamination. In the Humber, the

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**BENEFICIAL USE OF BIOSOLIDS**

In 1989, Metro Toronto initiated an Environmental Assessment (EA) to address alternative ways to meet wastewater and combined sewer overflow treatment needs in the Main STP service area to the year 2011. In December 1997, the EA was submitted to the Ontario Minister of the Environment. During the EA process, pilot projects were initiated to test beneficial use of biosolids as an alternative to incineration, and ultraviolet treatment as an alternative to chlorination for disinfection.

The City is currently developing a Biosolids Beneficial Use Program, in conjunction with phasing out incineration of the biosolids at the Main STP. Uses for the biosolids will focus on agricultural land application and thermal drying (pelletization).

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**TORONTO WATERFRONT RECEIVING WATER MODEL DEVELOPMENT**

An integrated hydrodynamic/water quality/GIS model has been developed for the Toronto waterfront, in order to assess the relative impact of various waterfront discharges on the receiving water, the fate of the various contaminants and their relative distribution in water, sediment and biota, in addition to the effectiveness of various abatement options under dry and wet weather conditions.

The model was developed at McMaster University with MOE as the lead, and with support from the former Metro Toronto, former local waterfront municipalities, and the Great Lakes Cleanup Fund. Further fine-tuning and training is still required prior to using it as a city-wide operational tool.
communities of Bolton, Caledon, Centreville, Mono Mills, Palgrave, King City, Nobleton, Oak Ridges, and Kleinburg rely partially or entirely on groundwater supplies.

King City is the largest community in Ontario that is entirely serviced by individual septic systems, and a majority of them are approaching the end of their life span of 25 – 30 years. Contaminated groundwater plumes caused by septic system failure usually contain traces of chloride, nitrate and nitrogen. Organic compounds such as toluene, 1,4 dichlorobenzene, chlorothane, chloromethane and dichloromethane have also been found in groundwater. A Pesticides Monitoring Program (MOE, 1987) found the herbicides atrazine and d-ethyl atrazine in 50% of sampled wells.

A contaminant mass loading estimate suggests that road de-icing agents represent approximately 58% of the total mass loading of contaminants in the groundwater, landfill sites contribute 41%, and agriculture 1%. The model further suggests that approximately 41% of the total contaminant mass loading will discharge to Lake Ontario within 50 years of initial release. Considering that many of the contaminants were initially used 20 – 30 years ago, this mass poses an significant threat to the water quality of Lake Ontario in the next 20 – 30 years.

Overall, groundwater data are still sparse and inconsistent across the RAP jurisdiction. There is little or no readily available information on recharge areas, baseflow, or groundwater budget. This presents a serious challenge to land use planning to protect these functions.
3.1 Sediment contaminant concentrations

A certain amount of sediment is natural and healthy in the ecosystem. Sediment becomes a problem when there is an excessive amount, and when it is accompanied by an accumulation of contaminants. Contaminated sediment is usually greatest in calm, depositional areas such as embayments and harbours, where it is not dispersed.

Toronto Bay and Humber Bay

Routine sediment sampling has been undertaken since the mid-seventies, and steady improvements have been demonstrated. A 1996 survey indicated that PCB concentrations have declined in Humber Bay sediments in the past five years (MOE unpublished data). In Toronto Bay, bulk levels of most metals in sediments have declined (Table 6). Figures 6 and 7 show improvements between 1978 and 1995 in lead concentrations and average metals in relation to the Lowest Effect Level in Toronto Bay.

Dredgeate from the Eastern Gap is suitable for open water disposal under the Provincial Sediment Quality Guidelines, and has been deposited at Tommy Thompson Park, where it will be used to create a wetland.

| TABLE 6: MAXIMUM CONCENTRATIONS IN BULK SEDIMENT IN TORONTO BAY (µg/g) |
|-----------------------------|-----|-----|-----|-----|-----|
| Historic maximums           | 3.3 | 830 | 320 | 860 | 1600|
| 1995 MOE/TRCA data          | 0.41| 890 | 210 | 440 | 850 |

- Lowest Effect Level = the concentration at which there are likely to be adverse effects on 5% of benthic invertebrate species.
- Severe Effect Level = the concentration at which it is predicted that 95% of benthic species cannot tolerate the conditions.
FIGURE 6

6A 1978 Lead Concentrations (ug/g) in Toronto Harbour Sediment (SEL = 250 µg/g)

6A 1995 Lead Concentrations (ug/g) in Toronto Harbour Sediment (SEL = 250 µg/g)
FIGURE 7

7A 1978 Metals Index Results (average concentration of Cd, Cr, Cu, Pb, Ni, Zn relative to “LELs”)

7B 1995 Metals Index Results (average concentration of Cd, Cr, Cu, Pb, Ni, Zn relative to “LELs”)

[Map showing locations with different concentration levels indicated by colored circles]
3.2 Benthic invertebrates

Toronto Bay and Humber Bay

In association with decreasing contaminant levels, there has been a general improvement in benthic invertebrate communities evident in Toronto and Humber Bays, although nutrient enrichment at the mouth of the Don has limited recovery there. Elevated metals and/or PAHs appear to contribute to stress but not to mortality. Bioassays show no lethal effects, but do reveal a pattern of growth inhibition in test species in certain locations.

A 1995 benthic community assessment in Toronto Bay showed domination by oligocheates (indicative of degraded, organically rich conditions), similar to earlier studies. Very high densities were found in the Keating Channel and close to the mouth of the channel. (See Figure 8.) However, contaminant levels did not differ greatly between the Keating Channel and Bay. Therefore, the significantly higher density of oligocheates in the Keating does not appear to be related to contaminant levels. Bioassays did not find any toxicity associated with Keating sediments (Rein 1998).

Although overall quality is improving, Toronto Bay sediments still have most metals in excess of the provincial Lowest Effect Level. At some locations, concentrations approach or exceed the Severe Effect Level.

FIGURE 8: BENTHIC COMMUNITIES AT SELECTED STATIONS IN TORONTO BAY
In the Watersheds
Upstream, benthic invertebrate studies have been undertaken in some watersheds as a surrogate for water
and sediment quality. TRCA sampled 29 stations throughout the Etobicoke Creek watershed in 1997. The
Don was sampled at 50 locations in 1998, while 37 sites were sampled in the Highland Creek watershed.
Sampling in the Humber will take place in 1999. Analysis of these samples is in progress, and a framework
for reporting on condition/status will be available shortly.

3.3 Phytoplankton and Zooplankton
The status of this beneficial use (healthy phytoplankton and zooplankton communities) is currently
described as “requires further assessment” (see Table 3, Chapter 1). While no formal assessment has been
done for the entire AoC, data does exist upon which to base some preliminary conclusions.

Studies of the entire microbial loop, including bacteria, autotrophic picoplankton, heterotrophic
nanoflagellates, and ciliates, as well as higher trophic level phytoplankton and zooplankton, were
conducted in 1988, 1989, and 1991 across Lake Ontario and the Great Lakes, including sampling locations
in Toronto Bay and Ashbridge’s Bay.

The mean abundance of bacteria, autotrophic picoplankton, and heterotrophic picoplankton in
Ashbridge’s Bay was compared to an offshore Lake Ontario transect serving as a control. Autotrophic
picoplankton were significantly lower than the concentration observed at the offshore transect during the
summers of 1988 and 1989. This was again confirmed through sampling in 1991. The lower abundances
may be attributed to their sensitivity to contaminants.

Thus, there appears to be a general degradation associated with eutrophic conditions and contaminated
sediment, although the relative impact of nutrients and metals contamination has not been confirmed.
### HABITATS & WILDLIFE: SUMMARY OF PROGRESS/STATUS

#### ENVIRONMENTAL
- 123.78 hectares of provincially significant wetlands exist along the waterfront, including 46.9 hectares of additional wetlands which were recently identified through re-evaluation.
- Substantial habitat creation along the waterfront and at river mouths (almost 20 ha of wetland in the last 8 years).
- The breaching of old dams and mitigation of barriers on the Don, Humber and Rouge has resulted in fish access to almost 100 kilometres of good riverine habitat.
- Northern pike have been documented along the north shore of Toronto Bay, one of the most disturbed areas of the waterfront.
- Exponential growth of bird populations at Tommy Thompson Park, making it one of the most significant sites on Lake Ontario.

#### POLICY/ACTION
- The City of Vaughan has adopted an Official Plan Amendment (OPA 400) that designates key woodlots, allows collection of charges of $1000/household from developers, and designates the funds to secure significant woodlots at market value.
- Richmond Hill has assembled a progressive corridor study looking at ways to protect the east-west Oak Ridges Moraine linkage in the heavily urbanized Yonge Street corridor. Support for adoption and implementation of studies such as these is essential for protection of headwaters habitat.
- The TRCA has completed a Conservation Priorities database, to rank species (flora and fauna) and vegetation communities. The detailed application of the database offers a pro-active and preventative methodology for natural heritage strategies.
- The MNR has prepared an aquatic habitat rehabilitation plan, five year fish community synthesis, and coastal wetlands rehabilitation plan for the waterfront.

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### 4.1 Waterfront

#### Terrestrial habitat
In recent years, a significant amount of tree planting and terrestrial waterfront restoration has taken place, primarily in existing and new parks. The result is good pockets of habitat at the Rouge River mouth, East Point, Highland Creek, Tommy Thompson Park, Toronto Islands, Humber Bay, and Colonel Sam Smith Park. However, outside of those pockets, tree cover is minimal. While downtown Toronto has an average of 20-25% tree canopy cover, the central waterfront averages only 3%.

#### Aquatic habitat
Aquatic habitat along the waterfront includes wetlands, river mouths, sheltered embayments, and the open coast.

While the Toronto waterfront has substantially less wetland habitat than it did historically, some 120 hectares of provincially significant wetlands exist today along the waterfront, including 46.9 hectares of additional wetlands which were recently identified through re-evaluation. Almost 20 hectares of wetland have been created along the Toronto waterfront and at river mouths in the last eight years. Table 7 summarizes existing coastal wetland characteristics, and Figure 9 indicates the location of major habitat rehabilitation and creation projects along the waterfront between 1991-1998.

---

**RETURN OF THE BEACH PEA**
Beach Pea has returned, seemingly on its own, to one location on the Toronto waterfront after a long absence. This plant is very sensitive to trampling and is often at risk of being stepped on, since it lives on dynamic sandy beaches.
TABLE 7: CHARACTERISTICS OF EXISTING WATERFRONT WETLANDS

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Size (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATURAL</strong></td>
<td></td>
</tr>
<tr>
<td>Rouge River Marshes (Provincially Significant)</td>
<td>67.98</td>
</tr>
<tr>
<td>Highland Ck Wetland Complex (Provincially Significant)</td>
<td>7.63</td>
</tr>
<tr>
<td>Toronto Islands Wetland Complex (Provincially Significant)</td>
<td>21.9</td>
</tr>
<tr>
<td>Humber River Marshes (Provincially Significant)</td>
<td>26.2</td>
</tr>
<tr>
<td><strong>CREATED</strong></td>
<td></td>
</tr>
<tr>
<td>Colonel Sam Smith Park</td>
<td>habitat complex is 10 ha in total</td>
</tr>
<tr>
<td>Tommy Thompson Park (Triangle Pond and Embayment C)</td>
<td>5.9</td>
</tr>
<tr>
<td>Humber Bay Shores</td>
<td>2</td>
</tr>
<tr>
<td>Spadina Quay</td>
<td>.35</td>
</tr>
<tr>
<td>Mimico Creek Estuary</td>
<td>1.93</td>
</tr>
</tbody>
</table>

Natural **sheltered embayments** along the waterfront were historically located at the Toronto Islands/Toronto Bay, and at the **river mouths**. Today, lakefill and erosion treatment projects at Bluffers Park, Tommy Thompson Park, Humber Bay Shores, Humber Bay Park, Colonel Sam Smith Park, and elsewhere, also provide good sheltered habitat.

Assessing **open coast** habitat is difficult, as it is often undervalued when traditional measures such as productivity and biomass are used. However, it is recognized as very important for the Lake Ontario coldwater fishery. The healthiest open coast habitat occurs where the current is uninterrupted and the substrate is in its natural condition. This occurs along the Scarborough Bluffs mainly between Bluffers Park and eastward to East Point.

**Fish communities**

Historically, 50 native fish species were documented along the Toronto waterfront. In addition, eleven non-native species have been introduced. An Ontario Ministry of Natural Resources assessment of waterfront fish communities (1995) reported 41 native and 9 non-native. This assessment, using data from 1989-1993, rated fish communities in the following locations as:

<table>
<thead>
<tr>
<th>Location</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rouge River mouth</td>
<td>Intermediate/ Good</td>
</tr>
<tr>
<td>Tommy Thompson Park, Bluffer’s Park, Toronto Islands</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Colonel Sam Smith Park, Humber Bay, Ashbridge’s Bay, Etobicoke Creek mouth, Mimico Creek mouth, Humber River mouth</td>
<td>Poor</td>
</tr>
</tbody>
</table>
Since 1995 there has been a general improvement in the trophic composition and health of the waterfront fish community along those sections of the waterfront where significant habitat rehabilitation or creation has taken place. An increase in the biomass of resident piscivores has been noted, predominantly within the Toronto Bay. In 1998, Harbour Square Park and the Spadina Marina had the greatest number of pike in comparison to all of the other sampling stations along the waterfront.

In addition, increased amounts of submerged aquatic vegetation (SAV), thought to be a response to improved water clarity created by the colonization and infestation of zebra mussels within the nearshore of the Toronto waterfront, have resulted in an improvement of structural habitat in some areas. As an example, the shoreline of Humber Bay Shores has experienced an increase from 0.32 hectares of SAV in 1995 to a current 1.35 hectares.

However, coastal wetlands continue to decline in health which notably impairs the waterfront and watershed fish communities overall. The Ministry of Natural Resources is scheduled to undertake a reassessment of the waterfront fish communities comparable to the 1995 assessment, beginning in the year 2000.

Birds

The Toronto waterfront supports a diversity of waterfowl, shorebirds, and marshbirds throughout the year, for breeding, spring and fall migratory stopover, and overwintering. It provides important habitat for colonial waterbird species, particularly gulls and terns, including Herring gulls (year-round residents) and ring-billed gulls (migratory). Black-crowned night herons are also present. The entire waterfront is important as a feeding area for these colonial birds, which disperse from the breeding colonies at Tommy Thompson Park (TTP) and feed along the shoreline, in the coastal marshes and upstream.

Tommy Thompson Park is a significant node on Lake Ontario. It is one of only four sites on the Lake with over 150,000 colonial waterbird nests. A number of species are added every year to the cumulative list of recorded birds at Tommy Thompson Park. In 1997 the first-ever Toronto record of a Black-necked Stilt was noted. The most recent update brought the total number of bird species recorded at TTP to 299.

The Common tern population peaked on Lake Ontario in the early 1960s, and then declined to approximately 108 pairs in 1989 at Tommy Thompson Park. As part of rehabilitation efforts, wooden rafts were constructed between 1990 and 1992 and colonized almost immediately by Common tern. In 1997, 550-600 pairs of Common terns were recorded nesting both on the nesting rafts (at TTP and the Toronto Islands) and on the headland at TTP in former colony locations.
The Rouge Marshes are another critical habitat on the waterfront. 123 species of breeding birds have been identified in the past within the Rouge River Marshes. Historic populations of black tern and least bittern have disappeared as a result of habitat degradation.

Efforts to reduce the burden of chemicals such as DDE, PCB, dieldrin, and other pesticides, has had a significant positive impact on many species. Levels of DDE in Herring gull eggs declined 91.6% between 1974 and 1997 at Toroto Harbour. Levels of PCBs are down 93.5% and 2,3,7,8-TCDD is down 80.2%.

The Double-crested cormorant, a species that was almost extirpated from the basin in the mid 1970s, has made a remarkable recovery, largely due to declining levels of DDE. In 1991, only 62 nests were recorded at Tommy Thompson Park. This jumped to 1598 nests in 1998.

As far as other birds are concerned, terrestrial habitat supporting migratory songbirds is good in general, and is not the focus of restoration efforts at this time. If loss of trees becomes too great at locations such as TTP due to burgeoning Cormorant populations for example, this may change. The combined weight of birds and nests can damage trees, and excrement kills ground vegetation, eventually killing the tree.

Reptiles and amphibians

Wildlife in the Toronto waterfront marshes are impaired, according to surveys using the Marsh Monitoring Program protocol between 1994 and 1996. Only American toad, Green frog and Northern leopard frog were reported at waterfront sites.

The only marshes which seem generally healthy are located upstream in the watersheds. Two sites were surveyed (Palgrave Marsh and Gibson Lake Marsh) and Bullfrog, Chorus frog, Gray treefrog, Wood frog, and Spring peeper were recorded in addition to the waterfront species.

Recent findings have reported the presence of the Map turtle in the Humber Marshes and the Blandings turtle, which are now rare in the Toronto areas. Survey information indicates that only adult specimens were observed which indicates nesting habitat and natural recruitment are degraded.
4.2 Watersheds

Terrestrial habitats and wildlife

The watersheds, like the waterfront, also have a long history of loss of terrestrial and riparian habitat to urban development. While restoration efforts are underway in the more degraded areas, and significant areas such as ESAs and ANSIs are somewhat protected where appropriate zoning is enforced, the watersheds continue to lose mature woodlands to urban expansion. York Region has set a target in its Official Plan of 25% forest cover. The current amount is estimated at 15-18% and declining. The Humber, one of the less developed watersheds, only has about 15 percent forest cover, and most of that is located in the headwaters of the Main Humber subwatershed, on the Oak Ridges Moraine and the Niagara Escarpment. See Table 8 for existing forest cover in the watersheds.

The Toronto and Region Conservation Authority has completed a Conservation Priorities Database to rank species (flora and fauna) and vegetation communities. The detailed application of the database offers a pro-active and preventative methodology for developing natural heritage strategies. It will also assist in the selection and use of watershed report card indicators.

The TRCA and community members have conducted two years of volunteer-based frog monitoring on the Don watershed, and one year on the Humber Watershed. Gray treefrog, and Chorus frog were found on one site in the urban setting on the Don. Wood frog may be found in the Humber Marshes. These populations are important as sources for repopulation to other areas. One more year of frog monitoring will be done in 1999 including the Rouge watershed. In 2000, TRCA will begin a broader monitoring program, using more species of fauna and flora. This information will feed into individual watershed report cards and future RAP progress reports.

Aquatic habitats

Wetlands have also disappeared from the watersheds. It is estimated that the Etobicoke Creek watershed once had wetlands covering more than 1500 hectares, compared to the mere 100 hectares estimated to exist today, much of which is located in the Upper Etobicoke Creek subwatershed.
Table 8 summarizes historic and current hectares of wetland for each watershed. Aquatic habitats in the watersheds are also influenced by riparian cover and the number of stream barriers to fish passage.

**TABLE 8: WATERSHED HABITAT CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Area (ha)</th>
<th>% urban</th>
<th>% rural/agricultural/open space</th>
<th>Current forest cover (ha)</th>
<th>% forest cover</th>
<th># stream barriers</th>
<th>Historic wetlands (ha)</th>
<th>Current wetlands (ha)</th>
<th>% stream length with woody/riparian vegetation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etobicoke Creek</td>
<td>21,128</td>
<td>60</td>
<td>40</td>
<td>905</td>
<td>4</td>
<td>61</td>
<td>1500</td>
<td>100</td>
<td>17</td>
</tr>
<tr>
<td>Mimico Creek</td>
<td>7,708</td>
<td>77</td>
<td>23</td>
<td>134</td>
<td>2</td>
<td>73</td>
<td>unkn.</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Humber River</td>
<td>90,736</td>
<td>17</td>
<td>67</td>
<td>13,610</td>
<td>15</td>
<td>110</td>
<td>3800</td>
<td>980</td>
<td>unkn.</td>
</tr>
<tr>
<td>Don River</td>
<td>36,042</td>
<td>71</td>
<td>24</td>
<td>2,916</td>
<td>8</td>
<td>68</td>
<td>unkn.</td>
<td>49.5</td>
<td>57</td>
</tr>
<tr>
<td>Highland Creek</td>
<td>10,157</td>
<td>77</td>
<td>23</td>
<td>625</td>
<td>6</td>
<td>102</td>
<td>149</td>
<td>23.5</td>
<td>32</td>
</tr>
<tr>
<td>Rouge River</td>
<td>33,394</td>
<td>19</td>
<td>77</td>
<td>3,811 (the Rouge Park south of Steeles averages 27%)</td>
<td>11</td>
<td>60 (30 targeted for removal)</td>
<td>1250</td>
<td>493</td>
<td>32</td>
</tr>
</tbody>
</table>

Fish communities

Fish communities in the watersheds have declined as their habitats and water quality have declined. Most tributaries have fewer species than in the past, and many of these are pollution-tolerant and non-native. Yet, dam failures and barrier mitigation projects provide increasing access for many species into good quality habitat. Table 9 summarizes the state of the watershed fish communities.

**TABLE 9: WATERSHED FISH COMMUNITIES**

<table>
<thead>
<tr>
<th>Watershed</th>
<th># historic species</th>
<th># current species</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etobicoke Creek</td>
<td>62 (8 introduced)</td>
<td>27 (3 introduced)</td>
<td>• Largemouth bass in Heart Lake</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Index of Biotic Integrity* using 1996/97 survey results rated most subwatershed fish communities poor or fair</td>
</tr>
<tr>
<td>Mimico Creek</td>
<td>33</td>
<td>14 (2 introduced)</td>
<td>• No fish in Emery Creek</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Index of Biotic Integrity using 1996/97 survey results rated most subwatershed fish communities poor</td>
</tr>
<tr>
<td>Humber River</td>
<td>74 (10 introduced)</td>
<td>64 (10 introduced)</td>
<td>• Lower Humber and Black Creek support only most pollution-tolerant species such as blacknose dace</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Redside dace, brook trout, and brown trout in the headwaters of the East Humber and Main Humber; some of the best habitat in the RAP area</td>
</tr>
<tr>
<td>Don River</td>
<td>33</td>
<td>21 (4 introduced)</td>
<td>• Mainly more pollution-tolerant species, although some sensitive species in the headwaters</td>
</tr>
<tr>
<td>Highland Creek</td>
<td>40 (6 introduced)</td>
<td>23 (4 introduced)</td>
<td>• Central stoneroller recorded at one station in Lower Highland in a 1996 survey</td>
</tr>
<tr>
<td>Rouge River</td>
<td>55 (possibly 60-70)</td>
<td>51 (9 introduced)</td>
<td>• Redside dace present</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Brook trout in the headwaters</td>
</tr>
</tbody>
</table>

*These results are based on TRCA surveys and analysis using a modified Index of Biotic Integrity tailored to Toronto area watershed conditions.
5.1 RAP-wide involvement

A Public Advisory Committee (PAC) was established early in the Toronto and Region RAP process to provide support and advice to the RAP Team and the Technical Committee. The PAC served an important function in defining the problems, and developing recommendations for restoration. By 1995, a number of local watershed groups had emerged. It became clear that mobilization of local residents was happening at the watershed and sub-watershed scale, and not at the AoC scale.

With the signing of the four-party MoU to coordinate the RAP (see Chapter 1), public participation and involvement was officially recognized as occurring through the watershed groups. RAP-wide public participation takes place at the annual summit, and as required throughout the year. Many former PAC members have since joined various watershed groups. Some former PAC members continue to meet as a group to share information and ideas, and act as an independent watchdog for the RAP.

Strategies for Restoring Our Waters identified four river-based citizen groups in 1991: Black Creek Project, Save the Rouge Valley System, Task Force to Bring Back the Don, and Action to Restore a Clean Humber. Today, we can identify three times that number, as well as several watershed-wide multi-stakeholder alliances.

With the assistance of a grant from the Trillium Foundation, considerable outreach to new Canadians and visible minority communities in the Humber, Don, Highland and Rouge watersheds, has taken place in the last two years. Participation in restoration activities (plantings, clean-ups, interpretive walks) by the Somali, Sikh, Korean, Chinese, Latin American, and West African communities has increased as a result.

The diverse communities and issues among the watersheds have resulted in different community dynamics and watershed-specific restoration strategies and partnerships. Community involvement in each watershed is described in the next section.

5.2 Waterfront and watershed highlights

The Waterfront and Toronto Bay

Even before the official designation of Toronto and Region as an Area of Concern in 1987, the citizens of Toronto were calling for a remedial action plan. In 1985, the City of Toronto established the Waterfront Remedial Action Plan Committee (WRAP) as a subcommittee of the City of Toronto Neighbourhoods Committee. The WRAP, largely citizen-based, released a report and a list of recommendations to restore the waterfront in 1987.
Organized citizen involvement on the waterfront grew through the mid-1990s. Individual groups such as Citizens Concerned About the Future of the Etobicoke Waterfront, Citizens for a Lakeshore Greenway, Friends of the Spit, and the Safe Sewage Committee became well established.

In 1996, interest in the inner harbour resurfaced, and a process was initiated, led by waterfront Councillors and their staff with support from the Waterfront Regeneration Trust, to determine public support for establishing a Toronto Bay group. The Toronto Bay Initiative (TBI) was born. TBI has since organized an annual Splash! in the Bay, walks, boat tours, and plantings, and has participated in setting water and habitat related policy at the City of Toronto. TBI has since become an independent citizen group, housed at the Waterfront Regeneration Trust.

Community groups have also formed to promote awareness and where feasible, restoration, of some of the small, buried streams that once flowed directly into the Toronto Bay. The Garrison Creek Linkage Project, Taddle Creek Watershed Initiative, and Ashbridge’s Bay Watershed Group, are doing this, along with the North Toronto Green Community and its lost rivers project.

Waterfront projects and initiatives of note include:

- **Etobicoke Stormwater Management Facility:** The Etobicoke Stormwater Management Facility at Humber Bay Shores will provide stormwater treatment for the redevelopment of a 20-hectare area west of the Humber River. The facility provides spill and debris capture through a junction chamber located upstream of the storm sewer outlet to the facility, and provides greater retention time by directing the stormwater through four cells before it exits to Lake Ontario.

- **Integrated Shoreline Management Plan:** This plan, completed in 1996, covers 35 km along the eastern end of the RAP waterfront from Tommy Thompson Park to Frenchman’s Bay. It recommends terrestrial and aquatic habitat, erosion treatment, and recreation and access projects in appropriate locations.

- **Spadina Quay shoreline habitat enhancement:** This project involves converting a .35 ha parking lot into a wetland with terrestrial habitat, partial removal of existing dockwall, creation of pike habitat, and a viewing platform.

- **Colonel Sam Smith Park:** This 21.5 ha lakefill area includes several small wetlands, wet meadow, mud flats, and turtle nesting and snake hibernation structures.

- **Toronto Coastal Wetlands Rehabilitation Plan:** This plan, completed in 1998, addresses 123 hectares of remaining wetlands along the Toronto waterfront. It recommends wetland protection, rehabilitation opportunities, and stewardship through community action.
Etobicoke/Mimico Creeks

These are among the smallest watersheds in the RAP area, and have the largest amount of transportation and industrial use as a percentage of watershed area.

Local community involvement has been increasing in both watersheds. Citizens Concerned About the Future of the Etobicoke Waterfront (CCFEW), while focusing mainly on the waterfront, has often worked to promote improvements up the two watersheds. Friends of Mimico Creek was established in 1996. Schools groups have also been working to naturalize several reaches of the Mimico Creek. Dr. Anatoliy Fisenko has established a citizen organization called the Ontario Centre for Ecology, and has completed preliminary community monitoring and analysis of foam (froth) on Etobicoke Creek, in an effort to determine the contribution of pollutants from the foam. Alderwood Environmentalists are very involved with the lower reaches of the Etobicoke Creek.

The Toronto and Region Conservation Authority has completed a State of the Watershed report for both watersheds, and will establish a watershed task force later this year, to develop a strategy and to increase stakeholder awareness, involvement, and commitment.

Projects of note, to improve habitat, water quality, and/or public access, include:

- **Mimico Creek Estuary Wetland Creation Project and Pedestrian Bridge Project**: A project to create an estuary wetland at the mouth of Mimico Creek and construct a pedestrian bridge over the creek to connect the Waterfront Trail, this involved a partnership between the TRCA, the City of Toronto, Environment Canada, CCFEW, and Canada Trust/Friends of the Environment Foundation.
- **Montgomery Meadow Wildflower Project**: This is a joint project of the City of Toronto (Etobicoke district) and the Citizens Advisory Committee to naturalize the creek behind Montgomery's Inn, using locally appropriate native flowers and grasses, shrubs, and creating chipmunk and butterfly habitat.
- **Etobicoke Creek Project**: This is an initiative to naturalize the upper main branch of Etobicoke Creek with forest and meadow planting, aquatic habitat enhancement, and water quality monitoring (a joint project of the Turner Fenton Secondary School, Ontario Ministry of Natural Resources, Canada Trust, and Urban Forest Associates).
Humber River

Action to Restore a Clean Humber (ARCH) and the Black Creek Project have been working on restoration of the lower Humber and degraded Black Creek tributary for over ten years. Other groups such as Save the Oak Ridges Moraine (STORM), have been working to protect significant landforms and aquifers in the headwaters.

In 1994, the Toronto and Region Conservation Authority established the Humber Watershed Task Force, comprised of citizens, elected officials, agency and special interest group representatives. It produced Legacy and A Call to Action, a strategy to restore the Humber and an implementation plan, respectively. To implement Legacy and A Call to Action, TRCA established the 50-member Humber Watershed Alliance, now in its second year.

The Humber has the most documented heritage resources of the Toronto and Region RAP watersheds. In 1996, TRCA began the process of nominating the Humber as a Canadian Heritage River. This application has been approved at all stages thus far, and formal designation is expected to take place in the fall of 1999. Citizen involvement in heritage is strong in the Humber, as demonstrated by local groups such as the Humber Heritage Committee.

Projects and initiatives of note include:

- **Emery Creek**: Stormwater quality ponds have been constructed by the City of Toronto (in partnership with the MOE and TRCA) in this industrial area, and a municipal/industry partnership (Emery Creek Environmental Association) has been set up to promote pollution prevention and business outreach in the subwatershed.

- **Sun Row Park and Humber Creek Rehabilitation**: Works include erosion and habitat rehabilitation, including 1 km of terrestrial habitat around the perimeter of the park, establishment of a wildflower/butterfly meadow, and water quality, stream flow, fauna, and flora monitoring. Humber Creek flows through the park, and a thorough study of physical process has been completed, to determine the desired final stream configuration. A design has been selected, and construction has begun.

- **Nobleton Schoolyard Naturalization**: Recognized with a RAP Award of Excellence in 1998, the students and staff at Nobleton Senior School in King Township continue to restore their part of the Humber with plantings, outreach, and education.

- **East Humber River Rehabilitation Project**: Works include over 2 km of habitat rehabilitation, cattle fencing, tree planting, fish community monitoring, bioengineering, and introduction of large woody debris.

- **Palgrave Community Action Site**: This project involves in-stream barrier mitigation to restore migratory fishery, improve coldwater quality, and facilitate sediment transport.

- **Caledon East Community Action Site**: A wetland, including fish habitat improvements, riparian plantings, and a boardwalk, was created at this once barren site. Partners included TRCA, Town of Caledon, Region of Peel, MNR, and local groups.

- **Lake Wilcox Community Action Site**: Rehabilitation of this kettle lake on the Oak Ridges Moraine in the Town of Richmond Hill involved water quality improvements (clarity and oxygen levels), aquatic and terrestrial habitat, water and fish monitoring, interpretive paths, and signage.
One of the original citizen groups documented in Strategies (1991) is the City of Toronto Task Force to Bring Back the Don, which is celebrating its 10th anniversary this year. With the support of the City of Toronto, and many other agencies, interest groups and the private sector, Bring Back the Don has planted over 35,000 trees and created many hectares of wetland in the urban core.

Other groups in the Don include Friends of the Don East, which focuses on the Don in the areas of East York and Scarborough, and Friends of the Valley, an informal group instrumental in bringing the protection of the Don Valley Brick Works into public profile in the 1980s, and one which continues to advocate for the Brick Works today.

Bring Back the Don’s organizational structure involving majority citizen membership plus elected officials, has proved tremendously successful, and was used as a basis to establish the first watershed-wide stakeholder group, the Don Watershed Task Force, in 1992. Coordinated by the TRCA, the Don Watershed Task Force produced Forty Steps to a New Don. The Don Watershed Council was set up in 1995 to implement Forty Steps.

The Don Council has also produced Turning the Corner (1997) the Don Watershed report card, which sets out indicators of watershed progress, and targets for the years 2000, 2010, and 2030. These indicators and targets have been used to set the Council’s workplan, to help focus monitoring efforts in the watershed, and will be used to develop a delisting process for the watershed with respect to the 14 impaired uses.

Projects and initiatives of note include:

• Don Valley Brick Works: The Brick Works, a site of significance for its geological record as well as its industrial heritage, opened in 1997, following creation of a large wetland, restoration of several buildings, and the daylighting of the once-buried Mud Creek.

• Rupert's Pond: This regeneration site in Vaughan includes over 200 m of naturalized stream channel, and riparian plantings. Community outreach and monitoring are ongoing to maintain support and evaluate the benefits of the project.

• Todmorden Oxbow Restoration: This is a citizen led project to create a wetland and plantings at an old oxbow in the lower Don, at the Todmorden Mills site.

• Langstaff EcoPark and Keffer Marsh: Located in an industrial neighbourhood in the City of Vaughan, along the Bartley Smith Greenway, this site includes a stormwater pond and small swamp. It has been created in partnership with local businesses.
• **Watershed Infrastructure and Ecology Project:** WIEP was an innovative door-to-door water quality canvass that took place in the lower Don between 1996-1997. Homeowners were visited, and encouraged to disconnect downspouts, plant trees, and other activities to reduce lot level contributions to stormwater problems. Public support and uptake were very high, with almost 20% of 6000 households expressing an interest in doing something for the Don. 300 agreements for downspout disconnection were signed. At this time, insufficient data exist to assess impact on water quality or number of CSOs.

• **Harding Park:** Located in the headwaters of German Mills Creek in Richmond Hill, this formerly manicured park has been transformed through wetland and terrestrial plantings, and the construction of a settling pond to help remove contaminants from stormwater before the water is released to the Don.

**Highland Creek**
The Highland Creek watershed is another of the smaller watersheds in the Toronto and Region RAP area. While always known to local residents for its habitats and wildlife, including a small deer population, the Highland has received increased profile recently with a new trail down the valley linked to the waterfront. The recently established Friends of Highland Creek group has undertaken a number of restoration projects in partnership with the City of Toronto and TRCA.

The Toronto and Region Conservation Authority, with a multi-stakeholder technical steering committee, has prepared a State of the Watershed Report. The establishment of a Highland Creek Task Force is planned in the next year or so.

Projects and initiatives of note include:

• **Markham Branch Restoration Project:** Undertaken by the City of Toronto (Scarborough) with assistance from Friends of Highland Creek, this extensive project involved naturalization of the channel with a pool-riffle sequence, redesigned stormwater outfalls for partial treatment, and terrestrial plantings.

• **Centennial Creek Restoration:** Following the completion of a detailed subwatershed study, the City of Toronto (Scarborough) removed fish barriers and excess fill from an area south of Lawrence Avenue in 1997. In 1998, the Willowlea, Ellesmere, and Meadowvale wetlands were created and enhanced for storage and habitat. Plans are underway to name the area the William Dempsey EcoPark.

**Rouge River**
The Rouge Watershed contains the Rouge Park, the largest park within an urban area in North America. Eventually, it will comprise more than 4,700 hectares of woodlands, wetlands, valleys, meadows and farmland, representing 7% of the watershed.

The Province of Ontario first announced its intention to establish the Rouge Park in 1990. In 1995, the Rouge Park Alliance was formed to provide leadership and coordination to park partners and to act as an advocate for the Park. The Alliance includes representatives of the municipalities of Toronto.
(Scarborough), Durham, Markham, Pickering, Richmond Hill and Whitchurch-Stouffville; the Toronto Zoo, Save the Rouge Valley System Inc. and the Toronto and Region Conservation Authority. The Rouge Park has received significant commitments of funds from the federal and provincial governments, to acquire more land and maintain the park in perpetuity.

Save the Rouge Valley System, Friends of the Rouge Watershed, the Rouge Valley Foundation and 10,000 Trees for the Rouge Valley have an extensive history of plantings and local mobilization to protect the river and watershed. More recently, a partnership project called the Little Rouge Restoration Project has been working with private landowners to restore specific reaches of the Little Rouge tributary. A community monitoring program is getting underway, coordinated by the Rouge Park Alliance and the TRCA. The Rouge Park Alliance has also developed a workplan for a landowner stewardship program, recognizing that much of the park and adjacent lands are private property and long term protection of the park will depend on support and participation of landowners.

Projects and initiatives of note include:

- Little Rouge Restoration Project: Funded by Action 21, this partnership with Save the Rouge Valley removed two low head dams on the Little Rouge, making it the only tributary in the RAP area where a fish can swim from Lake Ontario to the headwaters unimpeded by barriers.
- Toogood Pond: At the confluence of Bruce and Berczy Creeks in Markham, this 1998 regeneration project included a fish bypass channel and 1 km of riparian naturalization.
- Morningside Creek: The Ministry of Natural Resources, in partnership with Toronto Zoo, Metro East Anglers, Rouge Park Alliance, and Ontario Streams, have rehabilitated over 1.5 kilometres of stream corridor through soil bioengineering, introduction of large woody debris, tree plantings, bird boxes, and brush shelters.
- Rouge River Headwaters Rehabilitation Project: MNR, in association with local schools, the Rouge Park Alliance, Ontario Streams, and the Town of Richmond Hill, have rehabilitated over 4 kilometres of fish habitat for redside dace, brook trout, Atlantic salmon, and rainbow trout.
- Markham BMP Project: Using Best Management Practices and innovative retrofit techniques, the Town of Markham, in partnership with the Great Lakes 2000 Cleanup Fund and the Ministry of Environment, has improved stormwater management in this part of the Rouge, and continues to monitor for effectiveness.
Over the last ten years, since the publication of the Stage 1 report, obvious progress has been made, but there is still a long way to go before beneficial uses will be restored and the Toronto region will be delisted. With the large strides we have made in reducing use of the most harmful chemicals, and the exponential growth in public awareness and participation in environmental restoration activities, progress is expected to continue.

Future efforts need to continue to focus on pollution prevention and eliminating the production and use of harmful substances – keeping contaminants out of the ecosystem altogether. Management and treatment of runoff are priorities to prevent further contamination of receiving waters, using a range of non-structural and structural techniques. Moreover, every step forward requires continual efforts to maintain and support progress, to avoid slipping backwards.

The Waterfront Regeneration Trust, Toronto and Region Conservation Authority, Environment Canada, and Ministry of Environment, will continue to promote the implementation of the RAP. As this report goes to print, we are working on a monitoring framework for the RAP area, to coordinate the various existing monitoring programs, and ensure that any monitoring required for delisting is undertaken. We continue to work with the City of Toronto initiatives of great significance to the RAP, including the Wet Weather Flow Master Plan, Biosolids Beneficial Reuse Program, Water Efficiency Program, etc. We also continue to assist the municipalities outside Toronto, to protect the headwaters of our rivers, and to ensure state-of-the-art stormwater management where ever possible.

Some items on the 1999/2000 workplan, include completion of the monitoring framework, a second Clean Waters Summit in the fall of 1999, regular fact sheets or updates on activities in the RAP, a sediment awareness campaign, RAP on Wheels education program, and a variety of watershed-specific projects.
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The Metropolitan Toronto and Region Conservation Authority, and Ontario Ministry of Natural Resources. August 1997. Don Watershed Fish Community and Habitat Management Plan. DRAFT.


The Toronto and Region Conservation Authority. May 1998. Evaluating the condition of fish communities in the Mimico Creek watershed. DRAFT.

The Toronto and Region Conservation Authority. May 1998. Evaluating the condition of fish communities in the Etobicoke Creek watershed. DRAFT.
The Toronto and Region waterfront and watersheds were identified as an Area of Concern in the Great Lakes in 1987. An Action Plan Clean Waters, Clear Choices was released in 1994. Since that time, significant investment has been made by all levels of government, the private sector, and citizens, to restore the water quality and habitats of the Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek, Rouge River, Toronto Bay, and waterfront of the Toronto area.

Some progress has been made, but we still have a long way to go. This report summarizes progress in the areas of water quality, bottom sediments, benthic invertebrates, aquatic and terrestrial habitats, wildlife, and community involvement across the entire Toronto region. A separate chapter addresses some of the unique initiatives in each watershed.