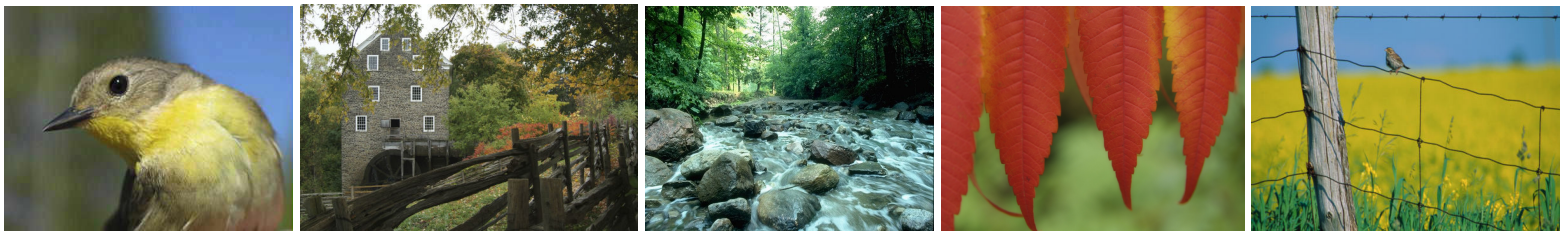


Humber River Watershed Plan

Implementation Guide

June 2008

Prepared by:

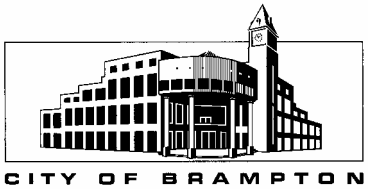
Toronto and Region Conservation Authority

Member of Conservation Ontario Natural Champions

Toronto and Region Conservation for The Living City

Humber River

We look forward to working with these and many other partners in implementation …



Page Break

Table of Contents

page

Executive Summary i

Introduction viii

1. Policy 1-1

2. Regeneration 2-24

3. Land Securement 3-42

4. Stewardship and Education 4-45

5. Operations and Maintenance 5-60

6. Enforcement 6-65

7. Monitoring 7-67

List of Tables

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed 1-3
Table 1.2 Policy Initiatives and Special Studies 1-10
Table 2.1 Regeneration Project Priorities 2-34
Table 3.1 Land Securement Projects 3-43
Table 4.1 Stewardship and Education Projects 4-46
Table 5.1 Operations and Maintenance Projects 5-61
Table 6.1 Enforcement Actions 6-66
Table 7.1 Evaluation of Innovative Technologies 7-68
Table 7.2 Ambient Watershed Conditions and Long-term Trends 7-70
Table 7.3 Adaptive Management 7-77

Page Break

List of Figures

Figure 1-1 Target Terrestrial Natural Heritage System 1-13
Figure 1-2 Groundwater Recharge 1-14
Figure 1-3 Potentially Significant Recharge Areas 1-15
Figure 1-4 Areas of Shallow Depth to Water Table 1-16
Figure 1-5 Nature-based Recreation Areas and Experiences 1-17
Figure 1-6 Inter-regional Trails Plan 1-18
Figure 1-7 Cultural Heritage Highlight Areas 1-19
Figure 1-8 Flood Vulnerable Areas and Roads 1-20
Figure 1-9 Special Land Use Policy Areas 1-21
Figure 1-10 Fish Management Zones and Target Species 1-22
Figure 1-11 Compliance Checklist for "Major Development" on ORM in Humber Watershed 1-23
Figure 2-1 Humber River Watershed Strategic Regeneration Themes 2-28
Figure 2-2 Main Humber Subwatershed Regeneration Plan 2-29
Figure 2-3 East Humber Subwatershed Regeneration Plan 2-30
Figure 2-4 West Humber Subwatershed Regeneration Plan 2-31
Figure 2-5 Black Creek Subwatershed Regeneration Plan 2-32
Figure 2-6 Lower Humber Subwatershed Regeneration Plan 2-33

List of Appendices

Appendix A: Legislative and Policy Context for Watershed Plans 7-79
Appendix B: Oak Ridges Moraine Conservation Plan Watershed Plan Requirements Conformity Assessment Report 7-84
Appendix C: List of Supporting Documents 7-95
Appendix D: List of Acronyms 7-96

Section Break (Next Page)

Executive Summary

Introduction

The *Humber River Watershed Plan – Pathways to a Healthy Humber (2008),* was prepared by the Toronto and Region Conservation Authority (TRCA), in partnership with municipal, provincial and federal government representatives and other stakeholders including the Humber Watershed Alliance. The Watershed Plan provides guidance to local, regional and provincial governments and TRCA as they update their policies and programs for environmental protection, conservation, and restoration within the contexts of land and water use, and the planning of future development. It also provides direction to local non-governmental organizations and private landowners with regard to best management practices and opportunities for environmental stewardship. The Watershed Plan is based on a strong understanding of current conditions developed through analysis of environmental monitoring information, combined with leading edge approaches to predicting potential future conditions that involved modelling and expert input. A series of management summit workshops were also held to develop recommendations that address key watershed management issues.

The Watershed Plan shows that a "business-as-usual" approach to future development will result in continued losses of environmental quality, biodiversity and cultural heritage, along with considerable costs to address the health, social and economic consequences of degraded environmental conditions and damaged infrastructure and property. A healthy, more resilient Humber watershed that supports a high quality of life for our communities is within reach only if opportunities to protect and restore healthy natural systems, build more sustainable communities, and enhance the regional open space system are acted upon.

Purpose of the Implementation Guide

The purpose of this guide is to facilitate implementation of the recommendations contained in the *Humber River Watershed Plan* by planners, consultants, managers, businesses, community groups, residents and other watershed stakeholders. The Guide organizes the Watershed Plan recommendations according to relevant implementation tools (Policy; Regeneration; Land Securement; Stewardship and Education; Operation and Maintenance; Enforcement; and Monitoring) and assembles additional information to inform initial action. The Guide outlines a 10 year work plan of implementation projects, within the context of existing programs and likely implementing partners. Like the Watershed Plan, the Implementation Guide is intended to guide on-going implementation and updating or development of programs and policies. The proposed projects contained in this Guide are meant to serve as a basis for discussion among implementing partners and as a source of ideas for further development of individual partners' own long term work plan and budget preparations.

Strategic Watershed Management Direction

The *Humber River Watershed Plan* concludes that the watershed is at a critical crossroads in that it continues to support many unique natural and cultural heritage values, and yet a number of present and anticipated stresses will challenge the ability to sustain present conditions. The Watershed Plan identifies three strategic management directions for the protection and enhancement of the watershed:

1. **Protect and expand terrestrial natural cover.**
   Protect, restore and enhance natural cover in a target terrestrial natural heritage system. This action is especially important in areas upstream of existing and future urban growth, from a water management and erosion control imperative, and for parts of the target system vulnerable to loss or impact from urban growth, from a habitat biodiversity standpoint. It will also contribute to serving the growing demand for nature-based recreation and provide greater resilience to climate change. Land use policy, regeneration and land securement projects are the primary implementation mechanisms to achieve this set of recommendations.

2. **Build more sustainable new communities and retrofit older ones to improve their sustainability** by improving water management and promoting more sustainable practices overall.

   a) *Improve Water Management*
   Manage for pre-development water balance (i.e. runoff volume control and maintenance of infiltration) by protecting natural heritage systems, naturalizing urban landscaping, using innovative lot level and conveyance stormwater management technologies, and rain harvesting. This set of actions is critical to water management and the associated health of the aquatic system.

   b) *Promote Sustainable Practices Overall*
   Facilitate the use of these innovative water management approaches by promoting improved urban form, green buildings and sustainable behaviour, and at the same time address a broad range of other objectives for the sustainable community. Of particular interest is the need to accelerate the shift to the adoption of more sustainable practices – through education/ awareness, testing, and demonstrating new technologies. A co-ordinated combination of new policies, "retrofit" type regeneration projects, improved operations and maintenance programs, stewardship, education, and monitoring initiatives will be necessary.

3. **Recognize the Humber's distinctive heritage through an enhanced regional open space system.**
   Further develop the regional open space system to support healthy communities and a growing population by securing additional lands for greenspace, expanding the trail network, and creating new opportunities for interpretation and celebration of natural and cultural heritage. Promote the distinctive experiences of the hills of the headwaters, kettle lakes and Humber valley wilderness as part of marketing campaigns for local businesses and attractions. Cultural heritage features and landscapes are increasingly playing a role in recreation (e.g. rural heritage settings, adaptive re-use of heritage buildings) and opportunities to integrate them with the regional open space system should be considered. Active and participatory education programs were identified as a strategic means of engaging the public and raising awareness of these issues and several regeneration capital works initiatives have been identified to address this set of recommendations.

Top Priority Implementation Projects

This Implementation Guide outlines a 10 year work plan of implementation projects addressing all recommendations of the Watershed Plan, and is organized according to primary implementation mechanisms:

Policy;
Regeneration;
Land Securement;
Stewardship and Education;
Operations and Maintenance;

Enforcement; and
Monitoring.

The following list of top priority implementation projects and actions has been selected with consideration for their collective ability to address the three strategic management directions noted above, in an expeditious and mutually supportive way. They are not listed in any particular order. The reference numbers in brackets (i.e. 1-8) are the respective project numbers, as listed in the implementation work plan tables within the Guide, where additional information is provided.

Policy and Related Special Studies

1. Municipalities and TRCA should work together to investigate ways to incorporate the following **new policy directions** into their planning documents (see **Table 1.1** for details and Table 1.2 - project 1-1):

   a) Identify a **target terrestrial natural heritage system** (TNHS) based on the system recommended in the *Humber River Watershed Plan* and adopt policies to protect and restore natural cover.

   b) Manage for pre-development **water balance** (i.e. reduce excess runoff volume, maintain or restore natural levels of infiltration and evaporation) with particular emphasis on areas confirmed as **significant recharge areas.**

   c) Develop strategies and policies to promote **sustainable urban form,** including sustainable infrastructure, transportation and resource use.

   d) Conduct **Master Environmental Servicing Plans** (MESPs) in a subwatershed context to establish the environmental features, functions and linkages as part of the growth planning process rather than limiting them to political or land ownership boundaries.

   e) Recognize, maintain and enhance a linked **regional open space system** that provides the basis for recreational experiences of the distinctive natural and cultural heritage of the watershed.

   f) Conduct **comprehensive flood risk assessment plans** where intensification is proposed in a flood vulnerable area or Special Policy Area.

   g) Support **stormwater retrofits** in existing developments and redevelopment projects (including road reconstruction).

   h) Adopt policy to implement the Greater Golden Horseshoe Area Conservation Authorities' ***Erosion and Sediment Control Guideline for Urban Construction*** and update municipal Erosion and Sediment Control by-laws and Fill by-laws as necessary.

   i) Adopt policy to recognize and implement the ***Humber River Fisheries Management Plan.***

   j) Support **updated and expanded monitoring** programs, including ambient monitoring, requirements for pre-development baseline monitoring, and the promotion and testing of new technologies and their cumulative effects.

2. ORM Municipalities – recognize the *Humber River Watershed Plan* in their official plans, as required by the ***Oak Ridges Moraine Conservation Plan*** (ORMCP) (1-7).

3. ORM municipalities and TRCA should prepare a **major development proposal review checklist** that specifies the information to be included in a development application and criteria to determine ORMCP conformity (1-8).

4. MPIR, MMAH, MOE, municipalities, TRCA, AMO, CO, BILD - Establish **development standards for sustainable community design** for application to new development proposals or urban expansions (1-3).

5. TRCA, municipalities and other approval agencies - Develop a strategy/procedure for **streamlining approvals for innovative designs** (1-4).

6. TRCA, BILD, municipality - Promote a **sustainable greenfield neighbourhood demonstration project** (1-5)**.**

7. TRCA – Undertake a continuous simulation and event-based hydrologic modelling study to determine the most conservative approach to sizing SWM ponds for flood control in future growth areas (1-11).

8. TRCA, municipalities – Undertake a scoped economic assessment of the implications of implementing the Watershed Plan integral recommendations, including valuation of ecosystem services, preparation of a methodology for applying the net gain approach, and development of recommendations for applying fairness and equity in implementation (1-18).

Regeneration

1. All partners – **Increase natural cover**: 1) in Oak Ridges Corridor Park, Nashville Resource Management Tract, Bolton Resource Management Tract and Claireville Conservation Area - implement existing restoration plans (2-1); 2) in Whitebelt - prepare restoration implementation plans for the natural heritage system identified in municipal plans and co-ordinate with developers (2-2); and 3) in Headwaters - prepare restoration implementation plans for targeted lands in priority areas and implement prior to urban development (2-3).

2. TRCA, municipalities – **Develop sustainable neighbourhood retrofit action plans** (2-8)

3. Toronto and Vaughan – **Undertake projects identified in stormwater retrofit plans** in Black Creek, Rainbow Creek, Lower Humber and West Humber subwatersheds. Projects in combined sewer areas should be undertaken first (2-9)

4. TRCA, NGOs - Continue restoration work in the **Humber Marshes and Humber Estuary** to increase wetland cover and improve aquatic habitat (2-11).

5. MNR, TRCA, Ontario Streams - **Further modify the eight (8) in-stream barriers** along the main channel between Bloor St. and Highway 401, to improve passage for jumping and non-jumping species, including repairing and improving the Raymore Park Fishway, upon completion of structural and fish passage assessments (2-12, 7-23).

6. Ministry of Culture and partners – **Establish a facility for archaeological artifact storage and document collections** that is accessible to researchers; secure funding for capital and operations (2-22).

7. TRCA, Ministry of Culture, Aboriginal groups - **Increase awareness of the Carrying Place Trail heritage** by creating educational resources (e.g. book, video, webpage) and interpretive signs on contemporary trails (2-23).

Land Securement

1. TRCA – **Update priority list for land securement** within the Humber watershed based on the Humber River Watershed Plan's recommended priorities within the TNHS and for further development of the system of inter-regional trails and public greenspace (3-1, 3-4).

2. TRCA and municipalities - Work with MPIR to investigate mechanisms, as may be necessary beyond planning measures, to **secure the target TNHS lands in potential urban growth areas** (i.e. "whitebelt") that do not have any legislated protection from urban development (estimated to be 446 hectares) (3-2).

3. TRCA, municipalities, NGOs – **Secure lands** to establish the missing link in the Humber Trail between Steeles Ave. and Hwy. 7 along the main branch (3-5).

4. TRCA, municipalities, NGOs – Undertake a **land securement strategy** for the proposed East Humber Trail (3-6).

5. TRCA, Municipalities, NGOs – Undertake a study to: confirm the location of the historic Carrying Place trail; **identify a conceptual route for the proposed contemporary Carrying Place Trail** that connects the proposed East Humber Trail to a proposed northern gateway to the Humber greenspace system near Hackett Lake; and develop a strategy for the associated land securement and trail implementation (3.7).

Stewardship and Education

1. TRCA and municipalities – Deliver **technology transfer workshops, seminars and materials** for sustainable technologies, innovative stormwater management, erosion and sediment control, and sustainable urban form (4-1, 4-2, 4-8, 4-9).

2. TRCA, municipalities and others – Develop a co-ordinated program to **accelerate implementation of lot level retrofits** (rain gardens, permeable paving, rain barrels/cisterns and native plant landscaping) in priority areas by the business and residential and institutional sectors including resources for promoting rain gardens (2-8, 4-12, 4-14, 4-21).

3. TRCA, MNR, municipalities, community groups – Co-ordinate the development of educational materials on **invasive species removal** techniques and engage volunteer groups to help in monitoring and removal (4-18)

4. Municipalities, utilities, TRCA – Develop an outreach program based on the results from the *Renewable Energy Road Map* to promote the **uptake of renewable energy technologies** (4-35)**.**

5. Ministry of Education, Boards of Education, School boards, TRCA – Encourage all Boards of Education in the Humber watershed to participate in the **Ontario Ecoschools Program** and schools to achieve certification (4-54).

6. TRCA, NGOs, municipalities - Organize **annual community festivals or events** and provide opportunities to learn about and celebrate the natural and cultural heritage of the Humber River watershed (4-38).

7. TRCA and others – Develop a pilot project for Ontario **history and archaeology seminars for adults**, featuring Humber sites. Special attention to reaching out to new Canadians and descendents of the watershed as target audience (4-42).

8. TRCA and others - Develop a **communications plan** in partnership with Aboriginal groups to identify key groups and contacts, protocols for consultation and opportunities for cultural heritage interpretation, education and awareness programs, storing and viewing of artifacts, and special events (4-51).

9. Municipalities, federal and provincial agencies, institutions and businesses - Adopt a local food procurement policy (4-59).

Operations and Maintenance

1. Municipalities, TRCA – Prepare or update comprehensive stormwater management master plans for enhanced controls and low impact development in existing urban areas and new developments (5-1).

2. Municipalities, TRCA – Develop guidelines for designing and establishing municipal **SWM facility maintenance programs,** including monitoring, rehabilitation and financing mechanisms (5-2, 5-3, 5-4).

3. Municipalities – Conduct assessments of **sediment accumulation in SWM ponds** and develop a prioritized list of clean out projects (5-4).

4. Toronto, Vaughan – Undertake **urban storm sewer outfall studies** to identify high priority sources of bacteria and phosphorus. Focus on Lower Humber and West Humber subwatersheds (5-5).

5. Municipalities – Undertake retrofits of conveyance and end-of-pipe stormwater measures as part of **road reconstruction projects** to provide improved water quantity and quality control (5-6).

6. TRCA – Update the **Claireville Dam operations manual** (5-22).

7. TRCA, municipalities – Undertake an annual proactive program of EA projects to **implement high priority flood risk remediation projects** identified through the TRCA *Flood Protection and Remedial Capital Works Prioritization Project* (5-23).

8. TRCA, municipalities – Prepare **flood emergency response plan** for Special Policy Areas and flood vulnerable areas, including an inventory of hazards, prioritization, and emergency response protocol (5-24).

9. TRCA – **Track advances in the prediction of regional and local climate change** and reassess local flood risks and water management programs (5-25).

Enforcement

1. Various agencies, municipalities - Develop **interjurisdictional compliance protocols** for poaching (wildlife), erosion and sediment control, tree cutting, topsoil and land disturbance, dumping, trespassing, and encroachment). Identify gaps in regulatory capability and capacity. Identify options for addressing gaps. Develop resources and implementation plan (6-2).

Monitoring

1. TRCA and partners - Identify technologies that show promise and monitor their performance using **Sustainable Technologies Evaluation Program (STEP)** – i.e. Rainwater collection and re-use, permeable pavement, groundwater and soil contamination risk with infiltration technologies, etc. and long term performance and maintenance costs of any green technology (7-1, 7-2).

2. TRCA and partners - Launch a **cumulative effects (i.e. effectiveness) monitoring program** to assess the effectiveness of innovative development design in mitigating predicted impacts (7-6).

3. TRCA, municipalities- Review recommendations for additional monitoring in the Humber watershed as part of the 5 year review and **update of the Regional Watershed Monitoring Program (RWMP)** (7-7, 7-11, 7-12, 7-14, 7-17, 7-19).

4. York, Peel, Durham and Toronto – Conduct new gravity survey of Laurentian bedrock channel between Weston Rd. and Jane St. in Vaughan through YPDT Groundwater Management Project (7-13).

5. MNR, volunteers, TRCA - Develop a **volunteer based detection and response program for aquatic invasive species** (i.e. round goby, rusty crayfish) (7-21).

6. MNR, TRCA – Evaluate the **effectiveness of in-stream barrier mitigation** and aquatic species partition barrier projects (7-22).

7. Municipalities – Develop and implement a program to **monitor trail use and participation rates** in other related recreational activities (7-25).

Tracking Progress

TRCA is proposing to convene an annual multi-stakeholder forum to report on progress at implementing the Watershed Plan and confirm priorities for the following year. Particular attention will be given to the status of top priority implementation projects recommended in this Implementation Guide. Other unanticipated opportunities will be considered as well, based on criteria such as partner contributions, expected outcomes and future benefits. Changes and trends in watershed conditions will be monitored through programs such as the Terrestrial Natural Heritage Program and Regional Watershed Monitoring Program. Results will be periodically reported by TRCA with the assistance of the Humber Watershed Alliance through the publication of progress reports, report cards and other appropriate media.

1. Policy

Land use planning policies are an important mechanism for the implementation of watershed plans. Therefore, at the outset of the Humber study, TRCA and its municipal partners expressed interest in ensuring that the *Humber River Watershed Plan* would provide adequate guidance for implementation of its main findings and recommendations through policy mechanisms.

Furthermore, under the *Oak Ridges Moraine Conservation Plan* (ORMCP) subsection 24(4), major development can only be approved in conformity with the objectives and requirements of the watershed plan. The ORMCP Technical Paper Series #9, *Watershed Plans*, provides direction for implementing the results of watershed plans for those portions of the watershed on the ORM. It states: "The objectives and requirements of watershed plans should be incorporated into both upper-tier and lower-tier municipal official plans (ORMCP s. 24(2)). The upper tier official plan should provide policy direction to the lower-tier municipalities with respect to incorporating the recommendations of the watershed plan into their official plans, secondary plans and zoning by-laws. The lower-tier plans and zoning by-laws should provide more detail." The *Humber River Watershed Plan* together with the Implementation Guide provide an understanding of the overall health of the watershed and strategies to maintain or improve its ecological and hydrological integrity. These strategies will help guide the development of municipal official plan policy so that the ORMCP conformity requirements for major development are clearly linked to municipal official plans and the land use planning process.

Technical paper series #9 references the guidance document *Watershed Planning – From Recommendations to Municipal Policies*, prepared for the York Peel Durham Toronto (YPDT) Groundwater Study and the Conservation Authorities Moraine Coalition (CAMC), as a framework for translating watershed plan recommendations into municipal official plan policies. The YPDT/CAMC guidance document was crafted through a series of facilitated workshops to address municipal and conservation authority staff questions about how to incorporate watershed plan recommendations into municipal policies. The workshops were attended by a broad spectrum of environmental professionals from both upper and lower tier municipalities and conservation authorities, including planners, ecologists, hydrogeologists and water resource engineers. Model policies were developed for four topic areas – Ground and Surface Water Resources, Natural Heritage, Landform Conservation and Infrastructure. While the project was originally undertaken to address ORM requirements, the project participants felt that the policies had a broader application to the entire Greater Toronto Area.

Policy recommendations of the *Humber River Watershed Plan* fall into two groups:

i. New Policy Directions; and
ii. Special Policy-Related Studies.

New Policy Directions

Table 1.1 summarizes the Watershed Plan's recommendations for new policy directions that should be considered through the municipal land use planning process, including official plans, secondary plans, plans of subdivision and site plans. Municipalities can use this Table in two ways: 1) to review and update their own Official Plan policies and schedules; and 2) as a checklist in the review of development applications (e.g. to determine study requirements and establish conditions of approval).

The policy recommendations contained in **Table 1.1** build on the model policies from the YPDT/CAMC guidance document, by incorporating the science from the *Humber River Watershed Plan* and the issues specific to the Humber watershed. The policy recommendations are not written to be directly incorporated into municipal official plans. Rather, their intent is to provide a broader policy direction that municipal planners can consider when developing policies tailored to their local circumstances and official plan formats. It is recognized that existing municipal official plans already contain many good environmental policies. The policy recommendations in this Implementation Guide may be used to strengthen these existing policies or provide policy direction for new/emerging topic areas. They will be particularly useful to inform further official plan policy discussions as they relate to growth planning issues.

Special Policy-related Initiatives

Table 1.2 includes recommendations for special policy-related initiatives or studies, often associated with the new policy directions. These recommendations are to be implemented through provincial legislation and plans for the Oak Ridges Moraine, Greenbelt, Growth Management and Source Water Protection, municipal by-laws, and special studies.

One of these recommendations pertains to the need for municipalities to address the Watershed Plan recommendations in their official plans, as per requirements of the ORMCP. Under section 24(4) of the ORMCP, major development on the Oak Ridges Moraine can only be approved in conformity with the watershed plan. As watershed plans will be used to help guide development of municipal official plan policy, municipal official plans will provide the policy-related conformity requirements for the ORMCP. **Figure 1.9** illustrates the portions of the Humber watershed where land use policies of the ORMCP apply. **Figure 1.11** is a compliance checklist for the review of "major development" on the Oak Ridges Moraine in the Humber River watershed. This checklist has been assembled to facilitate that review by municipal planners.

Appendix B contains an assessment of how the *Humber River Watershed Plan* conforms to the watershed planning requirements of the *Oak Ridges Moraine Conservation Plan*.

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

1. Target Terrestrial Natural Heritage System	
Overall Policy Direction	▶ Identify a target terrestrial natural heritage system based on the system recommended in the Watershed Plan (**Figure 1.1**) and adopt policies to protect and restore natural cover in the Humber watershed from 32% to at least 39% of the watershed area.
Policy Rationale	▶ Natural cover provides multiple benefits such as: reducing storm runoff volumes, mitigating climate change, enhancing urban aesthetics and increasing property values, recreational opportunities, increasing biodiversity and improving air quality.
Policy Recommendations **Secure the targeted system Rec. 60-62** **Restore and enhance natural cover Rec. 63-68** **Manage the matrix Rec. 69-72** **Implement sustainable urban form Rec. 116-120**	▶ Identify a target terrestrial natural heritage system in official plans and adopt policies to protect and restore natural cover. ▶ Apply the principle of "net gain" to provide compensatory habitats to replace features and habitats within the NHS that cannot be retained during private development, infrastructure and other public sector projects. ▶ Manage the interface of development with the natural heritage system in new and re-developments and infrastructure to enhance natural heritage through completion of Naturalization, Restoration and/or Edge Management Plans. ▶ Consider integrating into the Target Terrestrial Natural Heritage System (TNHS) the Potentially Significant Recharge Areas, where they are shown to make an important contribution to the ecological integrity of the TNHS, where possible (i.e. give protection to lands that provide multiple functions). ▶ Stormwater management facilities may be permitted in the "potential natural cover" portion of the target Natural Heritage System provided that the Master Environmental and Servicing Plan (MESP) or Environmental Impact Statement demonstrate no adverse effects to the ecological integrity of the TNHS and the facility is naturalized to the extent possible. ▶ All lands deemed to be part of the Target Terrestrial Natural Heritage System should be dedicated into public ownership through any subsequent applications for development or land use change.
Best Practices for Implementation	▶ Incorporate design elements into urban developments, including buffers, barrier plantings and trails, which improve the interface of the urban fabric with existing natural areas. ▶ Require the use of native species in site restoration planting plans and a sign-off by a qualified professional on an "as installed" basis.
2. Water Balance, Volume Control & Significant Recharge Areas	
Overall Policy Direction	▶ All development should aim to manage for water balance on the development site to maintain pre-development volumes of infiltration (recharge), evapotranspiration and surface runoff, with particular emphasis on areas confirmed as significant recharge areas.
Policy Rationale	▶ Current stormwater management practice is to manage for "peak flows". However, downstream erosion impacts continue to degrade aquatic habitats and alter natural stream-form processes which can put stream-side infrastructure at risk, leading to increased maintenance and repair costs and in some cases, premature failure or replacement. To minimize these risks stormwater management for new development needs to be undertaken on a "volume control" basis that maintains pre-development recharge rates (e.g. **Figure 1.2**), flow paths and water quality as much as possible, in addition to peak flow control. Maintaining pre-development recharge rates is particularly important in areas confirmed as being significant for their contribution to sustaining local stream baseflow or aquifer water levels (e.g. **Figure 1.3**).
Policy Recommendations **Protect recharge and discharge Rec. 1-2** **Improve sustainability of development design Rec. 5-13**	▶ Eliminate or minimize increases to runoff volume from new development to avoid erosion impacts to downstream watercourses. ▶ When establishing land use designations for planned urban boundary expansions direct natural heritage system, open space or other compatible land uses (i.e. low imperviousness) into areas identified as potentially significant recharge areas (**Figure 1.3**), where possible. ▶ Undertake hydrogeological and hydrological studies and modelling as part of environmental planning associated with large scale development proposals (e.g. through MESP studies for secondary plans or block plans) to confirm or refine recharge rates (**Figure 1.2**) and groundwater flow directions and the significance of their functions in sustaining aquifer water levels, groundwater flow patterns, aquatic habitat (where target species rely on groundwater discharge) and natural heritage systems and features.

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

Implement sustainable urban form Rec. 116-120 **Implement sustainable infrastructure Rec.121-123**	▶ Require site-specific hydrogeological studies and modelling for major development (i.e. subdivisions, major infrastructure) proposed in areas confirmed through the MESP as significant recharge areas in order to define the local pre-development water balance, establish site-specific water balance criteria that maintain ecological functions and demonstrate how the appropriate proportion of infiltration and evaporation/reuse measures for stormwater management will achieve the water balance objectives established through the MESP studies. ▶ Protect the functions of confirmed significant recharge areas for those stream reaches that are heavily reliant on local sources of groundwater discharge (Centreville Creek, Cold Creek, upper East Humber).
Best Practices for Implementation	▶ Where significant recharge areas are not present and site conditions do not permit infiltration, alternate measures should be provided to evaporate, transpire or reuse a volume of runoff equivalent to pre-development infiltration plus such additional volume as is required to prevent watercourse impacts. ▶ Following construction, require replacement of an optimum depth of topsoil in pervious areas (e.g. parks, open spaces, yards, etc.), that has been amended with compost, to maintain or increase pre-development soil moisture storage and infiltration capacity and to provide a suitable environment for restoring vegetation, based on stormwater management and vegetation cover targets. ▶ Incorporate a treatment train hierarchy for stormwater management with increased emphasis on lot level/source and conveyance methods, in addition to traditional end-of-pipe methods, to meet watershed or local objectives for water quality, erosion control, flood control, and water balance. ▶ Minimize the amount of impervious surfaces that drain directly to storm sewers. ▶ In planning and design of subsurface infrastructure (e.g. sewers and watermains) avoid areas where the water table is predicted to be shallow (less than 2 metre depth below surface, **Figure 1.4**). Where construction below the water table is necessary, mitigate impacts on groundwater flow and discharge. ▶ In developments where water table is shallow (less than 2 metres depth below surface, **Figure 1.4**) convey cool, clean groundwater collected by foundation drains directly to watercourses or wetlands rather than stormwater management ponds, where possible, to avoid contamination and increases in temperature.
3. Sustainable Urban Form	
Overall Policy Direction	▶ Develop strategies and policies to promote sustainable urban form, including sustainable infrastructure, transportation and energy and resource conservation.
Policy Rationale	▶ To create compact and healthy communities that maximize the efficient use of resources while minimizing the negative community, personal health and environmental effects of energy-intensive sprawling land use patterns.
Policy Recommendations **Implement sustainable urban form Rec. 116-120** **Implement sustainable infrastructure Rec. 121-123** **Implement sustainable transportation Rec.124**	▶ Promote and provide incentives to encourage compact, transit-supportive developments that use energy efficiently and integrate the site's environmental attributes into the site design (e.g. development charge rebates). ▶ Adopt policies to encourage rain harvesting and use within buildings for non-potable uses. ▶ Develop partnerships between utilities and municipalities to facilitate the use of district energy schemes and renewable energy sources as part of the community design. ▶ Promote residential and industrial grid-tied energy generation capacity using renewable energy sources, with surplus energy purchased by the utility at the market rate. ▶ Implement Regional and City transportation strategies and master plans by undertaking strategic transportation corridor and network planning studies at the MESP stage in order to reduce the number of crossings of streams and other natural heritage corridors, before environmental assessments are undertaken for specific projects.
Best Practices for Implementation	▶ Incorporate green building design such as green roofs and solar panels ▶ Orient buildings to maximize sunlight, passive solar energy, wind shelter and natural ventilation ▶ Incorporate landscaping to help mitigate urban heat island effect and reduce energy needs.

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

	▶ Integrate dual plumbing to use rain water for toilet flushing or irrigation, especially where abstraction is desirable to meet water balance objectives. ▶ Promote green development standards or green building certification programs such as LEED for neighbourhoods or Green Globes. ▶ Make multiple uses of public lands for infiltration and stormwater management to complement lot level practices (e.g. along road rights of way, along trails, in parks and open space, on municipal properties). ▶ Require use of water conservation practices (e.g. ultra low flush toilets, low flow shower heads, rain sensor switches for automated irrigation systems). ▶ Require new homes to, at minimum, meet standards such as EnergyStar or an EnerGuide rating greater than 80. ▶ Require Environmental Management Plans for major infrastructure at the detailed design stage to serve as a due diligence and adaptive management tool for mitigation measures during construction based on observed vs. predicted impacts. ▶ Minimize the amount of impervious surface area including reduced street widths in low-traffic areas, innovative road network designs, shared and underground parking, etc. ▶ Make provisions for near urban agriculture (e.g. community gardens, community supported agriculture, farmers markets).
4. Master Environmental Servicing Plans (MESP)	
Overall Policy Direction	▶ Require MESPs to be undertaken, in conjunction with planning for major urban development such as secondary plans or block plans, on a subwatershed or tributary basis, as appropriate. The minimum study area for MESPs should be the subwatershed scale and these studies should consider cumulative impacts downstream and upstream of the development.
Policy Rationale	▶ Sustainable community planning and development requires that the environmental systems framework and functional relationships and interdependencies between the water resource system and natural heritage system be scientifically understood and commitments made to restore, maintain or enhance the systems before development proceeds. The subwatershed, and in some cases the watershed, represents the appropriate scale for investigating these relationships and the potential effects of the proposed development. As the key tool for determining development form in relation to the natural system and environmental servicing infrastructure, MESPs identify features, functions and linkages and define protection and mitigation measures to address watershed policy recommendations such as those listed in other sections of this table.
Policy Recommendations	▶ Major urban development will only be approved upon satisfactory completion of an MESP based upon a study terms of reference pre-approved by the municipality and TRCA. ▶ The minimum study area for an MESP should be the subwatershed scale. ▶ The MESP will generally include water resource system studies to address and confirm the following topic areas and define protection and impact mitigation measures: ● groundwater recharge and discharge areas, flow rates and flow paths; ● aquifer vulnerability; ● water balance; ● floodplain and flood flows; ● geomorphology including condition and function of watercourses and headwater drainage features; ● a conceptual water management strategy describing the stormwater drainage design including source, conveyance and end-of-pipe measures to be utilized in proposed developments including approximate locations and preliminary sizing. ▶ The MESP will generally include terrestrial natural heritage system studies to address and confirm: ● extent and composition of the existing natural heritage system; ● refinement and implementation of the target terrestrial natural heritage system for the watershed, based on local opportunities and most recent field data;

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

	● functional relationships and interdependencies between the water resources system and the natural heritage system. ▶ The MESP should also address at the appropriate level of detail: ● A conceptual water management strategy describing stormwater management design including the type, appropriate location and preliminary sizing of source, conveyance and end-of-pipe measures proposed. ● Delineation of natural hazards including floodplain and the long-term stable slope top-of-bank. ● Implementation of transportation strategies and servicing master plans relative to minimizing the number of crossings of the natural heritage system and stream corridors, minimizing interference with significant recharge areas and selection of the least sensitive locations for crossings; ● Conceptual trail routes; ● Establishment of the pre-development baseline monitoring program; and ● Cultural heritage and archaeological investigations and consultation requirements.
Best Practices for Implementation	▶ Confirm sensitive or significant areas where further detailed study is required in order to establish criteria for development and a suite of potential mitigation measures. ▶ Establish criteria and targets for urban stormwater management including recommendations for measures needed to achieve water balance objectives. ▶ Establish a monitoring program to inform future adaptive management needs. ▶ Identify significant stream corridors where natural heritage objectives require optimum design and opening size of crossings to minimize impacts to terrestrial, aquatic or geomorphic function.
5. Regional Open Space System	
Overall Policy Direction	▶ Recognize and enhance the linked regional open space system that provides the basis for nature-based recreation and experiences of the distinctive natural and cultural heritage of the watershed (**Figures 1.5, 1.6 and 1.7**).
Policy Rationale	▶ The Humber watershed contains a variety of cultural sites and natural heritage areas that should be linked into a co-ordinated network of landscape-based experiential and accessible recreational opportunities that provide compatible employment opportunities for home-based businesses and local residents.
Policy Recommendations **Investigate and conserve cultural heritage prior to land use change Rec. 73** **Recognize and enhance the regional system Rec. 89-91** **Protect the unique experiences of the greenspace system Rec. 103-105** **Develop plans to balance public access and resource protection Rec. 106, 107**	▶ Recognize heritage conservation districts and cultural heritage landscapes (e.g. countryside roads, agricultural communities, clusters of century homes and 20th century ethnic architecture) (e.g. **Figure 1.7**) in municipal official plans. ▶ Adopt standards of practice for public use operators, such as environmental management systems for public agencies, Audubon Program or equivalent for golf courses, and Environmental Farm Plans for agri-tourism businesses where these uses are adjacent to the Natural Heritage System in order to maintain or enhance the NHS. ▶ Prepare archaeological master plans identifying lands with high potential for archaeological significance. ▶ Investigate and conserve cultural heritage through an MESP process prior to changes in land use, including development, trail creation and reforestation, in accordance with the requirements of the Ontario Heritage Act (2005) and designate as appropriate in official plans.

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

Best Practices for Implementation	▶ Consider the compatibility of proposed land uses adjacent to the Humber Valley Heritage Trail with wilderness-themed recreational experiences (**Figure 1.5**). ▶ Dedicate lands for public trail purposes through the planning process (e.g. **Figure 1.6**). ▶ Incorporate heritage buildings and their contextual surroundings (i.e. an appropriate buffer) into proposed developments ▶ Employ avoidance or mitigation measures for the protection of cultural heritage resources, including: - Isolating development and site alteration from significant built and natural features and vistas - Design guidelines that harmonize mass, setback, setting and materials - Allowing only compatible in-fill and additions - Reversible alterations - Buffer zones, site plan control, etc. (See Ministry of Culture. 2005. *Heritage Resources in the Land Use Planning Process*) ▶ Protect First Nations archaeological sites as green spaces with limited investigative excavations. ▶ Provide adequate space for sports fields and other municipal recreation facilities outside of valley lands.
6. Comprehensive Flood Risk Assessment Plans	
Overall Policy Direction	▶ Conduct comprehensive flood risk assessment plans where intensification is proposed in a flood vulnerable area (**Figure 1.8**) or Special Policy Area (**Figure 1.9**).
Policy Rationale	▶ To maintain or decrease the existing level of risk where intensification is proposed in flood vulnerable areas (FVAs) or Special Policy Areas (SPAs). Notwithstanding provincial direction for SPAs in the *Provincial Policy Statement*, 2005, there is still pressure for new development in FVAs and SPAs and this is expected to continue with implementation of the *Growth Plan for the Greater Golden Horseshoe,* 2006.
Policy Recommendations **Manage flood risks Rec. 30, 31**	▶ Where a change in land use is proposed in a flood vulnerable area (**Figure 1.8**) or Special Policy Area (**Figure 1.9**) that would lead to intensification, the municipality should work with the proponent, TRCA, MNR and MMAH (where applicable) to conduct a comprehensive flood risk assessment plan that would maintain or decrease the existing level of risk and detail flood remediation, flood proofing, flood warning, and emergency response measures. ▶ Prior to secondary plan approval, undertake as part of an MESP, an updated hydrologic study at the subwatershed scale to evaluate the effects on potential future flooding and to confirm the level of stormwater management control required.
Best Practices for Implementation	▶ Use a treatment train hierarchy for stormwater management practices to ensure no increase in pre-development peak flows, based on the most recent hydrologic and hydraulic studies. ▶ Also see Section 5 (Operations and Maintenance).
7. Stormwater Retrofits in Existing Developments and Redevelopment Projects	
Overall Policy Direction	▶ Support retrofits of source, conveyance and end-of-pipe stormwater management measures in existing developments and redevelopment projects on a comprehensive basis.
Policy Rationale	▶ To develop and implement co-ordinated plans to improve stormwater quality and manage quantity on a “volume control” basis in urban areas where controls are either absent or do not meet current standards.
Policy Recommendations **Improve sustainability of development design Rec. 5-12** **Implement stormwater retrofits Rec. 22-24**	▶ When planning for major redevelopment within the built boundary to meet provincial intensification targets (including road reconstruction projects), stormwater management plans should be prepared and retrofits designed in an integrated and comprehensive manner. ▶ Existing developments with outdated or absent stormwater controls should be retrofitted to the degree possible, to incorporate a treatment train hierarchy with source, conveyance and end-of-pipe measures to provide water quality treatment, erosion control, flood control and address water balance objectives.

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

Best Practices for Implementation	▶ Stormwater management plans for redevelopment projects should be undertaken in consultation with TRCA. ▶ Incorporate stormwater management measures that meet multiple objectives (e.g. water quality, erosion control, etc.) and require minimal land area. ▶ Untreated stormwater run-off from external existing developments should be treated, to the extent possible, in redevelopment projects. ▶ Where infiltration opportunities are limited, stormwater management plans for redevelopment projects should include other practices to address water balance objectives for reduction of runoff volume including replacement of an optimum depth of topsoil for water storage, naturalization of landscaped areas, rain gardens, rain harvesting and green roofs.
8. Erosion Prevention & Sediment Control	
Overall Policy Direction	▶ Adopt the Greater Golden Horseshoe Area Conservation Authorities' *Erosion & Sediment Control Guideline for Urban Construction* and update municipal Erosion and Sediment Control by-laws and Fill by-laws as necessary.
Policy Rationale	▶ Current guidelines and enforcement have not been adequate to prevent degradation of watercourses and fish habitat from sedimentation from construction sites.
Policy Recommendations **Improve erosion and sediment control and site restoration Rec. 14-21**	▶ Require adherence to the Greater Golden Horseshoe Area Conservation Authorities' *Erosion & Sediment Control Guideline for Urban Construction*, as amended from time to time. ▶ Update municipal Erosion and Sediment Control by-laws and Fill by-laws to current standards. ▶ Restrict topsoil stripping until draft plan approval, phase topsoil stripping to smaller geographic areas and require site stabilization/re-vegetation as soon as possible.
Best Practices for Implementation	▶ Ensure appropriate erosion prevention and sediment controls are in place prior to topsoil stripping. ▶ Improve construction management practices by developers by adopting a "M.O.R.E." approach to erosion prevention and sediment control – Multi-barrier; Ongoing process; Regular inspection; Education. ▶ Also see Section 6 (Enforcement).
9. Fisheries Management Plan	
Overall Policy Direction	▶ Adopt policy to recognize and implement the *Humber River Fisheries Management Plan*.
Policy Rationale	▶ To ensure the protection, maintenance or enhancement of the fish and aquatic resources of the Humber River watershed (**Figure 1.6**)
Policy Recommendations **Maintain natural stream flow patterns and protect aquatic habitats Rec. 45-47, 52**	▶ In areas identified in the *Humber River Fisheries Management Plan* as habitat for the fish species redside dace, adherence to the recommendations listed for minimum riparian buffer width in the Redside Dace Recovery Strategy (MNR, Draft 2005) should be upheld. The highest level of protection between the two "plans" (Fisheries Management Plan or Redside Dace Recovery Strategy) should be applied.
Best Practices for Implementation	▶ Increase and improve natural cover along stream corridors (restoration of riparian areas) and on tableland as identified in the target terrestrial natural heritage system (**Figure 1.1**). ▶ Apply recommendations of the *Humber River Fisheries Management Plan* at the Fish Management Zone scale (**Figure 1.6**). ▶ Protect the conveyance and habitat functions of headwater drainage features by maintaining and managing for: ● Landform and topographical characteristics, ● existing surface flow regimes and their seasonal distribution, ● the amount and pattern of groundwater contributions (**Figure 1.2**), and ● in-stream habitat structure (e.g. pool/riffle sequences, under cut banks, woody material).

Table 1.1 Top 10 New Policy Recommendations for the Humber Watershed

10. Monitoring & Adaptive Management	
Overall Policy Direction	▶ Support updated and expanded monitoring programs, including ambient monitoring, requirements for pre-development baseline monitoring, cumulative effects monitoring and the monitoring of new technologies to assess their contributions to watershed improvements.
Policy Rationale	▶ Long term, watershed-wide and shorter term site-specific monitoring data are needed to establish baseline conditions, measure impacts from development, assess new technologies and practices and to inform any necessary remedial actions.
Policy Recommendations **Monitor, evaluate and adjust** **Rec. 38-40 and sect. 6.7**	▶ Maintain long-term municipal support for ongoing monitoring of ambient conditions as part of the Regional Watershed Monitoring Program and provide additional support for monitoring evaporation, stream flow, channel form, groundwater levels, water quality and terrestrial communities and species in the Humber watershed to provide baseline data needed to facilitate an adaptive management approach. ▶ As part of the planning process to designate "Whitebelt" lands for urban development, require a minimum of 3 years of monitoring data prior to beginning construction and site alteration in order to establish baseline parameters for ground and surface water, natural heritage, fluvial geomorphology and aquatic systems. ▶ Require monitoring of the effects of new and retrofitted urban development and stormwater management practices on receiving watercourses and the hydrologic water balance in order to apply adaptive management measures as necessary to adjust the balance of infiltration/evaporation/reuse stormwater management technologies needed to maintain water balance. ▶ Phase urban developments across the watershed to assess cumulative effects based on pre and post development monitoring and adjust practices in subsequent development phases based on monitoring results. ▶ Also see Section 7 (Monitoring).
Best Practices for Implementation	▶ Arrange for third-party verification of technology performance when using new or untested technologies. ▶ Require developers to provide "as-built" certification to ensure stormwater facilities are constructed properly. ▶ Require developers to undertake or contribute to compliance monitoring to ensure stormwater management facility performance targets are met. ▶ Require the preparation of conceptual post-development monitoring plans as a condition of draft plan of subdivision approval to inform adaptive management.

Table 1.2 Policy Initiatives and Special Studies

Note: 1-1* = top priority projects

Theme	Humber River Watershed Plan Recommendation	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Sustainable Urban Design	Rec. 115 – Apply sustainability principles and measures to urban form at all scale – watershed, community and building site Rec. 117 – At the community scale, implement innovative design to achieve pedestrian oriented, transit supportive, ecologically sustainable, mixed use communities Rec. 118 – At the scale of individual building site, minimize resource use, maintain pre-development water budget and improve environmental quality Sect. 6.1 - Ministry of Public Infrastructure and Renewal and all relevant agencies should address the *Humber River Watershed Plan* recommendations through Implementation Analysis & Sub-Area Assessment (s.5.3/p. 35 of *Growth Plan for the Greater Golden Horseshoe*)	**1-1*** **Municipalities** - Work with TRCA to investigate ways to incorporate the new policy directions into their planning documents (see **Table 1.1** of this Implementation Guide for details on the policy directions)	✓	
		1-2 **MPIR** - Initiate discussions with municipalities regarding Growth Plan Sub-Area Assessment.	✓	
		1-3* **MPIR**, MMAH, MOE, municipalities, AMO, CO, BILD - Establish development standards for sustainable community design for application in new developments or urban expansions.	✓	
		1-4* **TRCA**, municipalities and other approval agencies - Develop a strategy/procedure for streamlining approvals for innovative designs.	✓	
		1-5* **Municipality**, TRCA, BILD **-** Promote a sustainable greenfield neighbourhood demonstration project.	✓	
		1-6 **TRCA** should develop guidelines for implementing water balance policy directions	**On-going**	
Oak Ridges Moraine	Sect. 6.1 - Recognize and act on the *Humber River Watershed Plan* recommendations as per section 24 of the *Oak Ridges Moraine Conservation Plan*.	**1-7*** Each **ORM municipality** - Recognize the *Humber River Watershed Plan* in its official plan, as required by the Oak Ridges Moraine Conservation Plan (ORMCP). See also **Figure 1.11**, a compliance review checklist for major development on the ORM.	✓	
		1-8* ORM municipalities and TRCA should prepare a major development proposal review checklist that specifies the information to be included in a development application and criteria to determine ORMCP conformity.	✓	
Provincial Initiatives	Sect. 6.1 - Use the Watershed Plan to support and provide more specific guidance to implement Provincial initiatives.	1-9 **Provincial ministries** - Use the Watershed Plan to inform future reviews of relevant legislation and plans such as those for the Oak Ridges Moraine, Greenbelt, Growth Plan and the Provincial Policy Statement.		✓
Source Water Protection	Sect. 6.1 - Address the *Humber River Watershed Plan* recommendations in the fulfillment of source water protection planning requirements of the Clean Water Act.	1-10 **TRCA**, Municipalities - Address the Watershed Plan's recommendations during source protection planning	**On-going**	

Table 1.2 Policy Initiatives and Special Studies

Note: 1-1* = top priority projects

Theme	Humber River Watershed Plan Recommendation	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Flood Control	Rec. 32 - Undertake an updated hydrologic study to evaluate the effects on flooding of proposed new developments and to confirm the level of stormwater management control required to prevent downstream impacts before expanding urban settlement boundaries beyond those reflected in the existing Official Plans.	**1-11* TRCA,** York, Vaughan, Peel and Caledon - Undertake a study to apply continuous simulation and event-based hydrologic modelling to determine the most conservative criteria for sizing SWM ponds for flood control and protection of SPAs and other downstream FVAs once the expected distribution of land uses beyond existing Official Plan boundaries, including redevelopment or intensification of existing urban areas, is understood. Based on the results of this study, reassess and adapt where necessary, flood control criteria.	✓	
		1-12 **TRCA**, York, Vaughan, Peel and Caledon - Update the Humber River Watershed hydrology model once the expected distribution of land uses beyond Official Plan boundaries is understood, to determine the effects of the proposed development on the Regional Flood Event flows and the resulting effect on the Regulatory Flood Plain downstream and confirm the level of control.	✓	
Pollution Prevention	Rec. 27 - Develop guidelines for inland fill operations to ensure acceptable fill quality and location. Rec. 27 - Adopt ecological policy, criteria and guidelines that address water temperatures and chloride. Rec. 28 – Ensure that sewer use by-laws are up-to-date including application to storm sewers and regional roads, requirements for pollution prevention plans and provisions for establishment of inspection programs. Rec. 28 - Adopt by-laws limiting the cosmetic use of pesticides (Toronto and Caledon have already done this).	1-13 **MOE**, partner ministries **-** Develop guidelines for inland fill operations to ensure acceptable fill quality (chemical and physical parameters) and location.	✓	
		1-14 **MOE**, MNR - Develop SWM guidelines for the protection of aquatic systems from changes in water temperature and chloride concentrations.	✓	
		1-15 **Municipalities** - Adopt by-laws limiting the cosmetic use of pesticides	✓	
		1-16 **Municipalities** – Update sewer use by-laws to include application to storm sewers and regional roads, requirements for pollution prevention plans and provisions for establishing inspection programs.	✓	
Public Access	Rec.105 – Develop plans for public access Rec. 106 – Undertake studies to define thresholds for public access in order to protect sensitive ecological or cultural areas.	1-17 **TRCA**, Municipalities - Establish criteria for triggering development or review of management plans for public greenspace and trails (e.g. criteria for unacceptable impacts on natural or cultural heritage resources or visitor experiences).		✓

Table 1.2 Policy Initiatives and Special Studies

Note: 1-1* = top priority projects

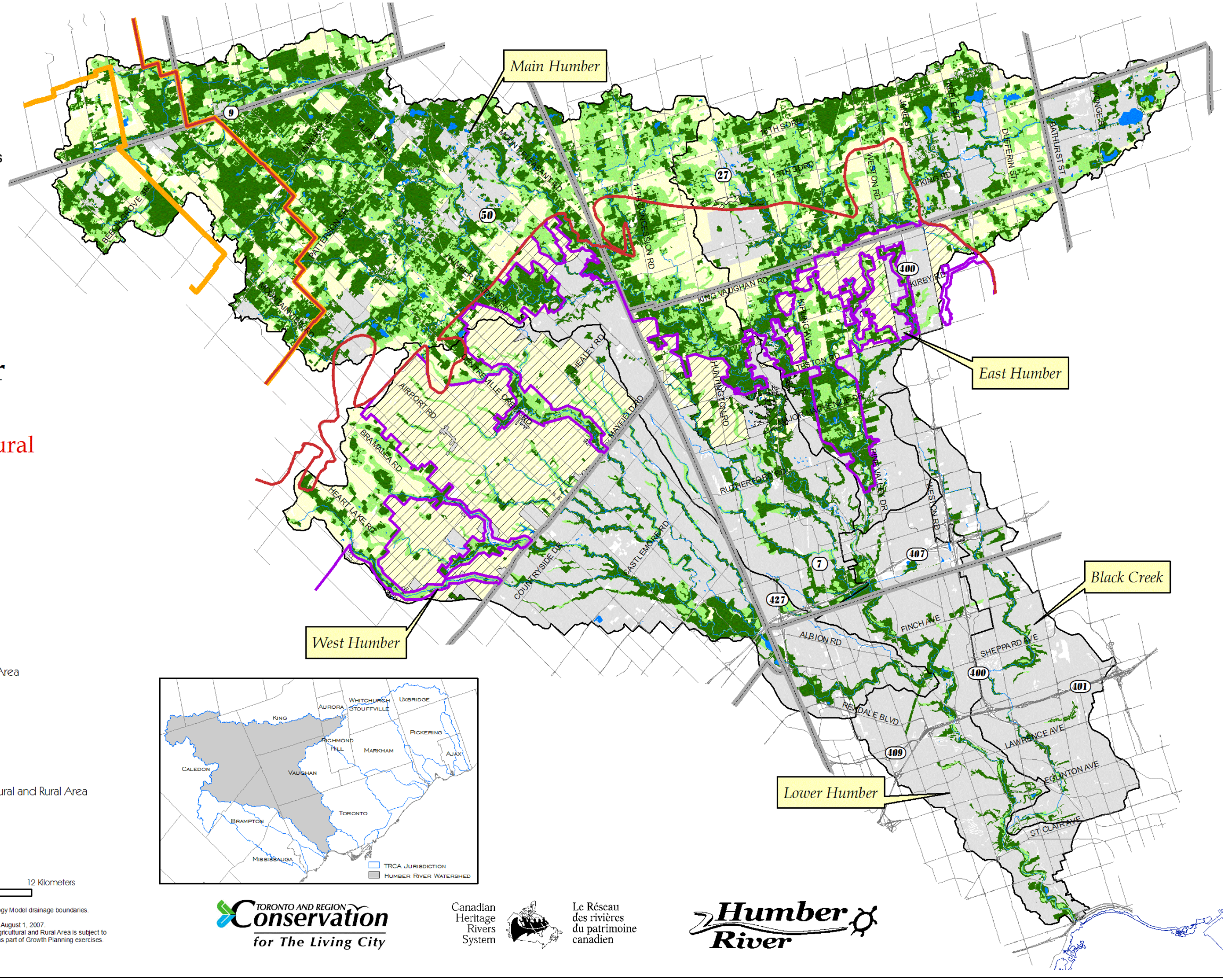
Theme	Humber River Watershed Plan Recommendation	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Economics		1-18* TRCA, municipalities – Undertake a scoped economic assessment of the implications of implementing the Watershed Plan integral recommendations, including: - valuation of ecosystem services; - preparation of a methodology for applying the net gain approach; and - development of recommendations for applying fairness and equity in implementation.	✓	

Figure 1-1 Target Terrestrial Natural Heritage System

This figure is Figure 5-2 in the Humber River Watershed Plan. This figure is to be used to guide the identification of a target terrestrial natural heritage system and associated land use policies, and to guide natural heritage restoration and stewardship initiatives and programs. The target terrestrial natural heritage system, as recommended in the Watershed Plan, is subject to further analysis and refinement as part of planning and implementation initiatives at more detailed scales.

Humber River Watershed

Target Terrestrial Natural Heritage System



Legend

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Pond & Lake
- Watercourse**
- Oak Ridges Moraine Conservation Plan Area
- Greenbelt Protected Countryside
- Niagara Escarpment Plan Area
- Urban and Urbanizing Area***
- Rural Area***
- Growth Plan lands identified as Agricultural and Rural Area

Target Terrestrial Natural Heritage System****

- Existing Natural Cover
- Potential Natural Cover

0 2 4 8 12 Kilometers

*Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Watercourse has been generalized for mapping purposes.
***Based on consolidation of municipal official plan land use schedules approved as of August 1, 2007.
****Target Terrestrial Natural Heritage System within Growth Plan lands identified as Agricultural and Rural Area is subject to further analysis and refinement to integrate with other community planning objectives as part of Growth Planning exercises.
Roads, ORM, NEC, and Greenbelt boundary © Queen's Printer for Ontario, 2008.

Date: March, 2008
Information Services/Technology Group

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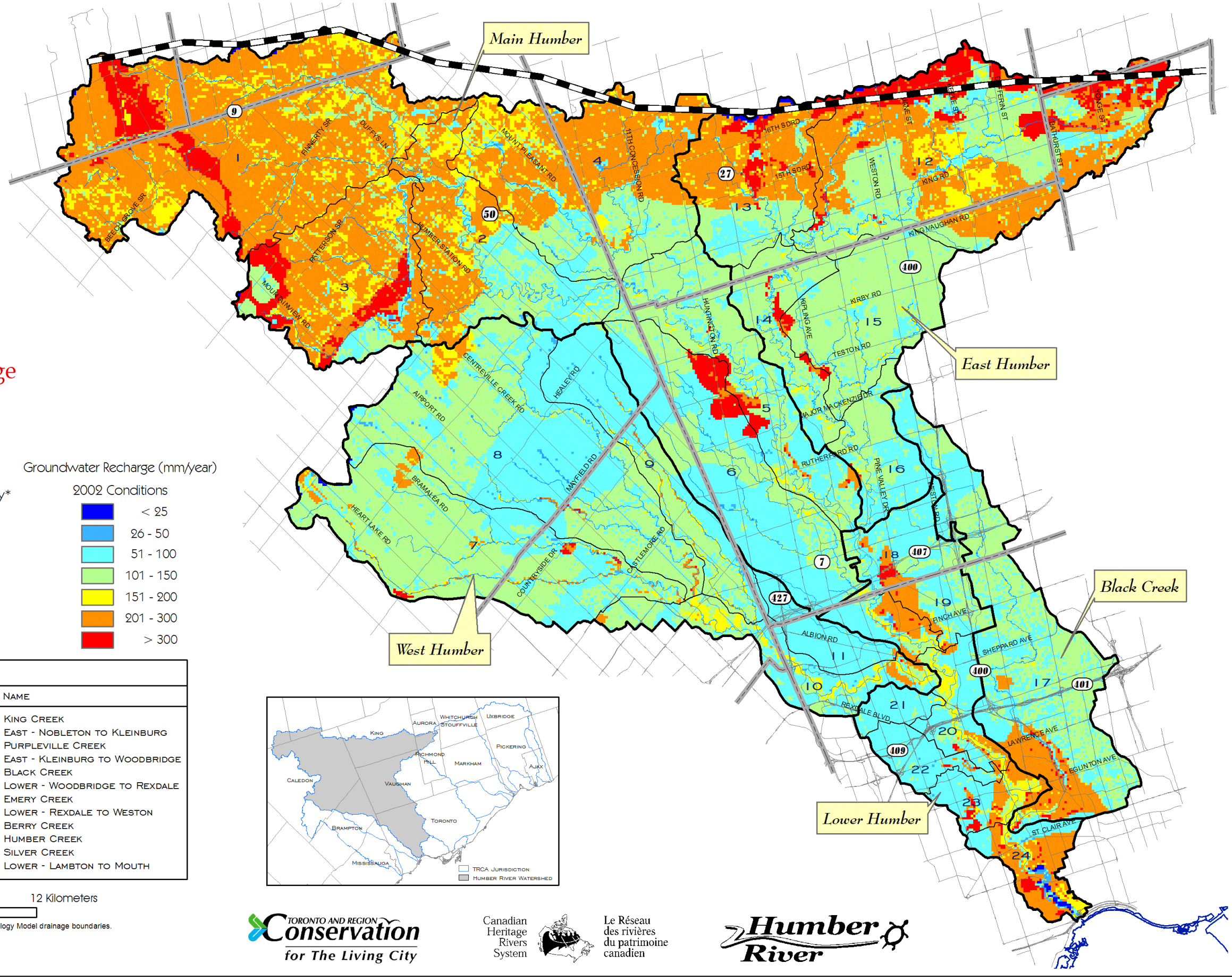
Humber River

Figure 1-2 Groundwater Recharge

This figure is Figure 3-5 in the Humber River Watershed Plan. The information illustrated in this figure is to be used as a basis for studies of water budget at more detailed scales as part of environmental planning studies for proposed new developments (e.g., Master Environmental and Servicing Plans, etc.). These more detailed studies of water budget will be needed to design stormwater management measures that address the water balance objective to maintain or enhance pre-development infiltration volume.

Humber River Watershed

Groundwater Recharge



Legend

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Watercourse**
- Shoreline
- Groundwater Divide

Groundwater Recharge (mm/year)

2002 Conditions

	< 25
	26 - 50
	51 - 100
	101 - 150
	151 - 200
	201 - 300
	> 300

Secondary Subwatershed Units*			
#	Name	#	Name
1	Main - Upper	13	King Creek
2	Main - Palgrave to Bolton	14	East - Nobleton to Kleinburg
3	Centreville Creek	15	Purpleville Creek
4	Cold Creek	16	East - Kleinburg to Woodbridge
5	Main - Bolton to Woodbridge	17	Black Creek
6	Rainbow Creek	18	Lower - Woodbridge to Rexdale
7	West - West Branch	19	Emery Creek
8	West - Main Branch	20	Lower - Rexdale to Weston
9	West - East Branch	21	Berry Creek
10	West - Lower Branch	22	Humber Creek
11	Albion Creek	23	Silver Creek
12	East - Upper Branch	24	Lower - Lambton to Mouth

0 2 4 8 12 Kilometers

*Watershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Watercourse has been generalized for mapping purposes.
EarthFx, 2008

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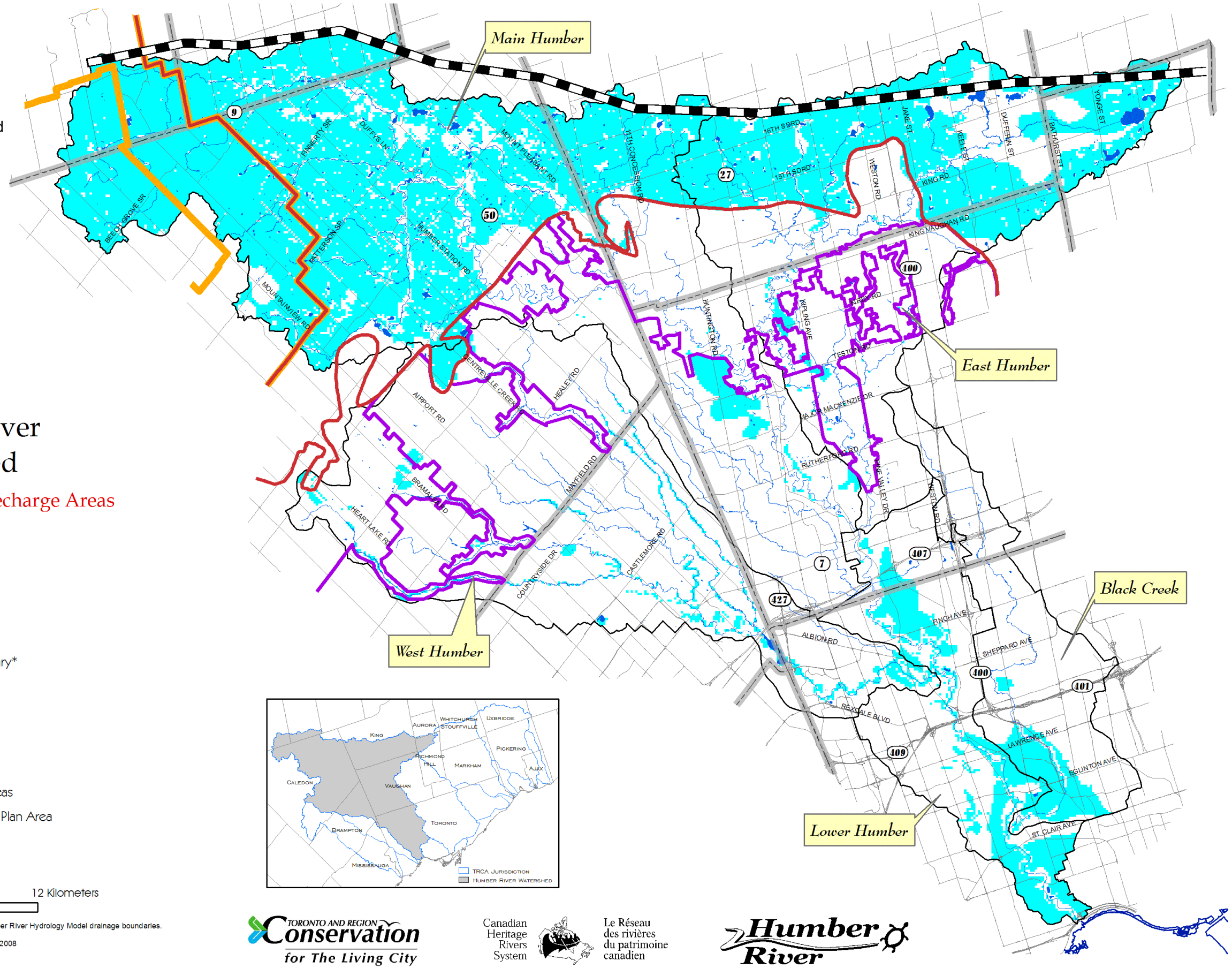
Humber River

Figure 1-3 Potentially Significant Recharge Areas

This figure identifies groundwater recharge areas that are predicted to be significant for their contribution to maintaining aquifer water levels, groundwater flow directions or aquatic habitats where target species rely on groundwater discharge. This figure is to be used as a guide in setting terms of reference for broad scale growth planning initiatives and environmental planning studies for proposed new developments and infrastructure such that the extent of these areas and the significance of their functions are confirmed or refined, consideration is given to the compatibility of proposed land uses, and management measures to maintain these functions are recommended.



Humber River Watershed

Potentially Significant Recharge Areas

Legend

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Watercourse**
- Pond & Lake
- Groundwater Divide
- Potentially Significant Recharge Areas
- Oak Ridges Moraine Conservation Plan Area
- Greenbelt Protected Countryside
- Niagara Escarpment Plan Area

0 2 4 8 12 Kilometers

*Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Watercourse has been generalized for mapping purposes.
Roads, ORM and Greenbelt Boundary © Queen's Printer for Ontario, 2008
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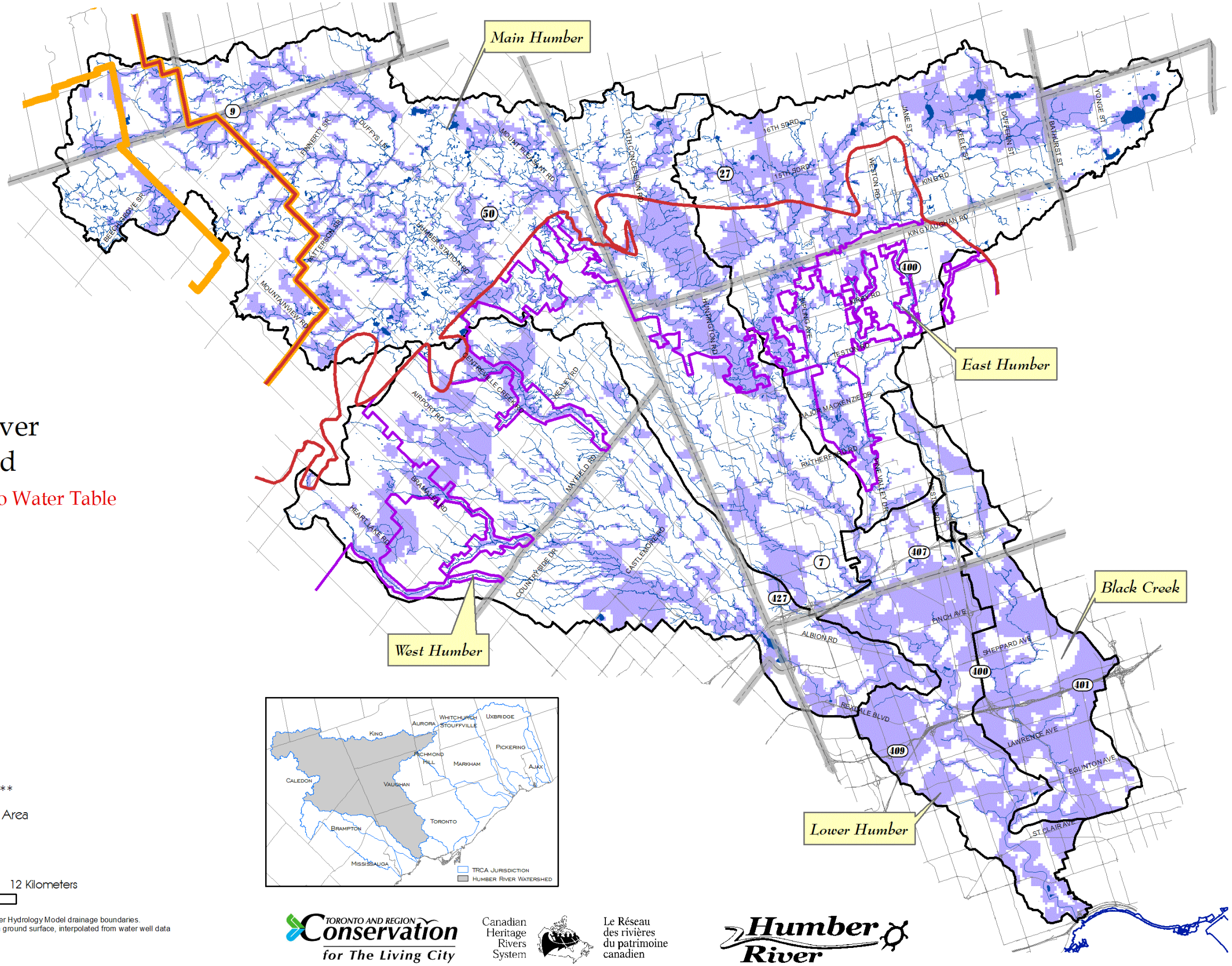
Humber River

Figure 1-4 Areas of Shallow Depth to Water Table

This figure identifies areas where the water table is predicted to be less than two (2) metres in depth below surface, based on interpolation of water well records. This figure should be used as a guide in setting terms of reference for environmental planning studies for proposed new developments and infrastructure and redevelopment projects (e.g., Master Environmental Servicing Plans, Environmental Assessments, etc.) such that these studies confirm water table depth in these areas and recommend management measures to mitigate impacts on groundwater flow and discharge.



Humber River Watershed

Areas of Shallow Depth to Water Table

LEGEND

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Watercourse
- Pond & Lake
- Areas of shallow depth to water table**
- Oak Ridges Moraine Conservation Plan Area
- Greenbelt Protected Countryside
- Niagara Escarpment Plan Area

0 2 4 8 12 Kilometers

*Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Areas where water table is predicted to be less than 2 metres in depth from ground surface, interpolated from water well data (Kassenaar and Wexler, 2006).

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Humber River

Figure 1-5 Nature-based Recreation Areas and Experiences

Humber River Watershed

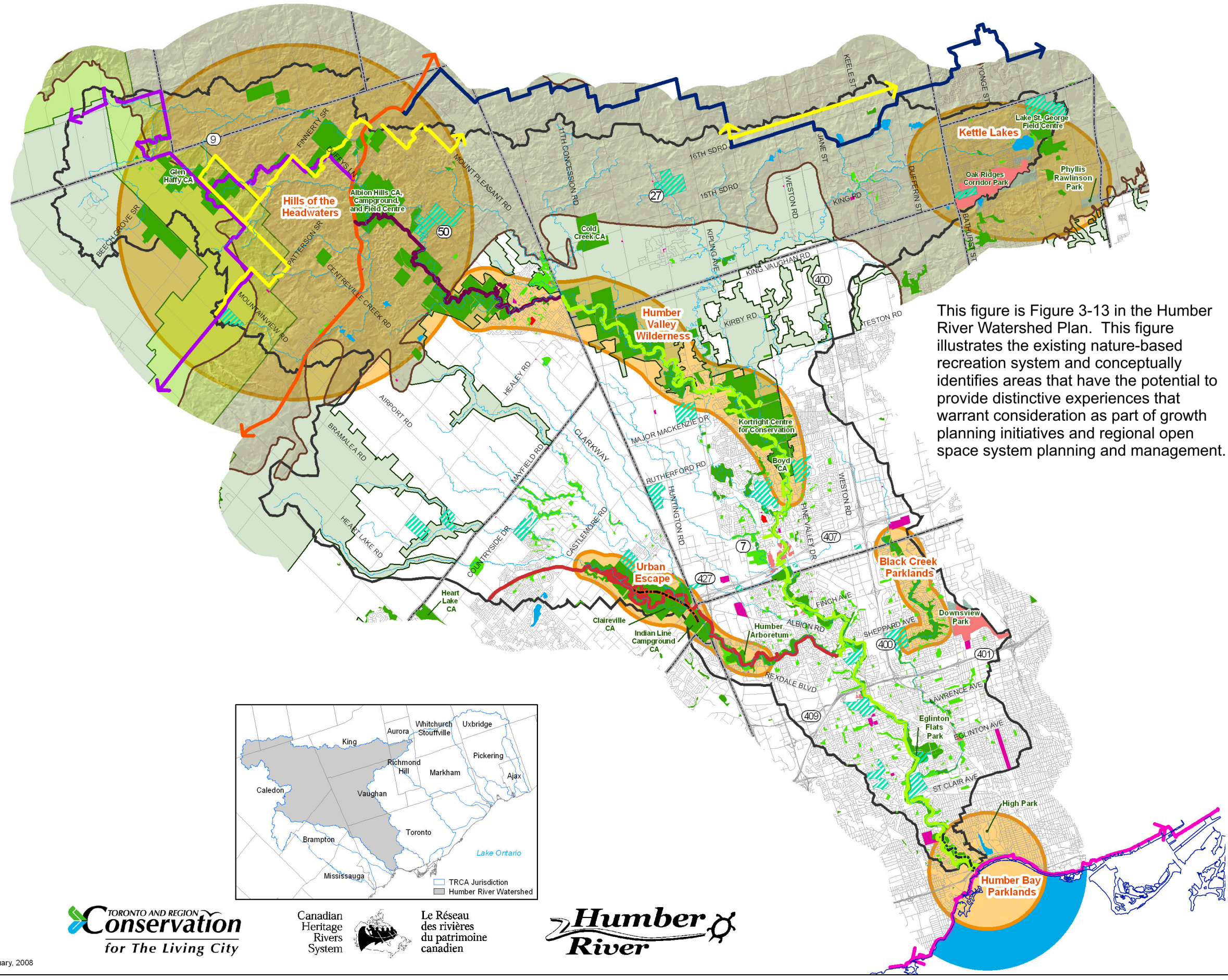
Nature Based Recreation Areas and Experiences

Legend

- Municipal Boundary
- Watercourse*
- Shoreline
- Pond & Lake
- Humber Watershed**
- Oak Ridges Moraine
- Designated Greenspace***
- TRCA Property
- Greenbelt Plan Boundary
- Niagara Escarpment
- Public Use Theme
- Bruce Trail
- Humber Trail
- Great Pine Ridge Trail
- Humber Valley Heritage Trail
- Oak Ridges Trail
- Trans Canada Trail
- West Humber Trail
- Waterfront Trail
- Claireville Canoe Route
- Humber Bay Canoe Route
- Golf Course
- Fairground
- Cemetary
- Provincial/Federal Property
- Municipally Owned Parks

0 1 2 4 6 8 10 Kilometers

* Watercourse has been generalized for mapping purposes.
**Watershed boundary delineated from 1:10,000 Ontario Base Mapping. Boundary not approved.
***Major tract of publically owned land designated as future greenspace
Produced by Toronto and Region Conservation Authority under Licence with the Ministry of Natural Resources © Queen's Printer for Ontario. January, 2008



This figure is Figure 3-13 in the Humber River Watershed Plan. This figure illustrates the existing nature-based recreation system and conceptually identifies areas that have the potential to provide distinctive experiences that warrant consideration as part of growth planning initiatives and regional open space system planning and management.

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Humber River

Figure 1-6 Inter-regional Trails Plan

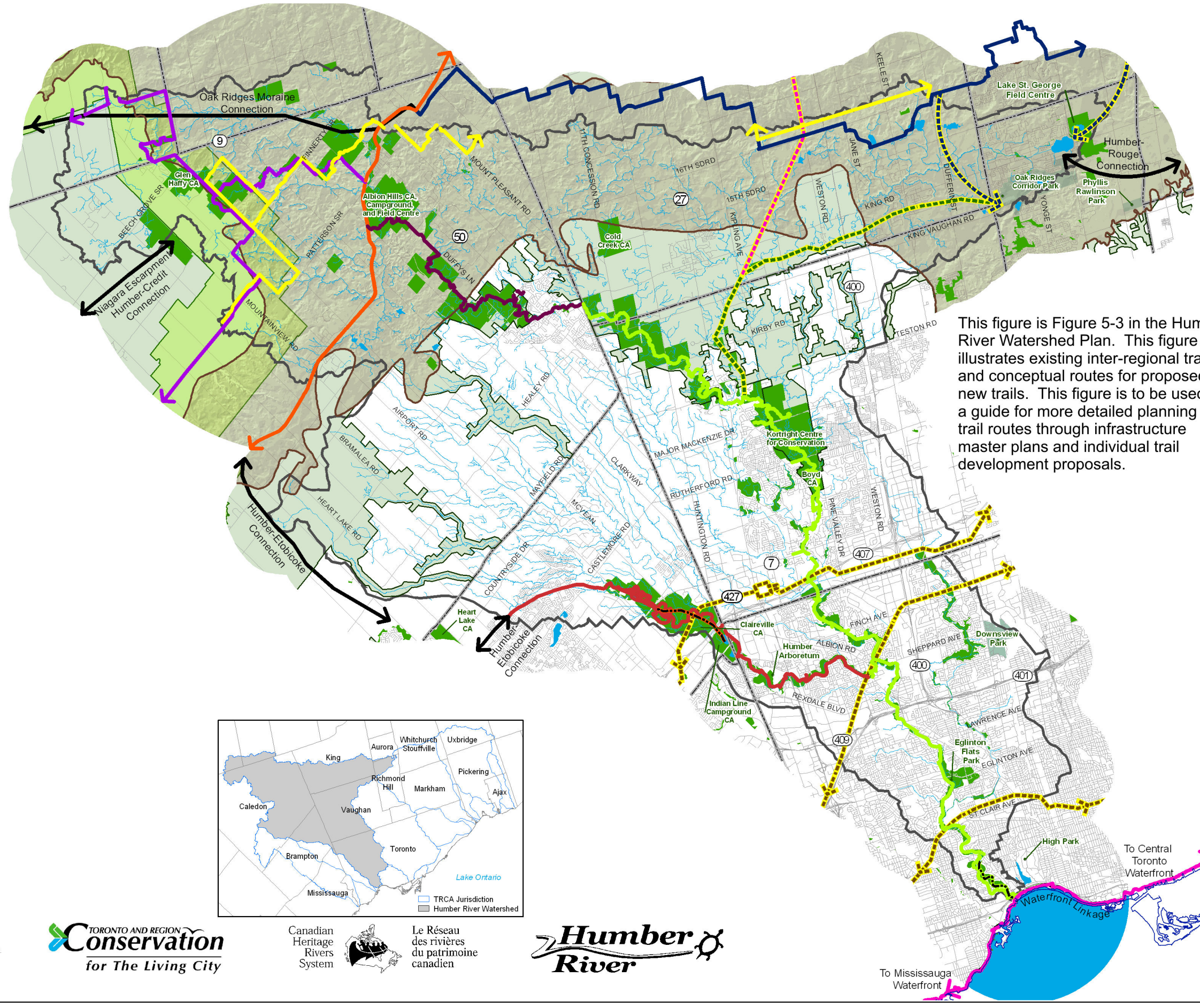
Humber River Watershed Trails Plan

Legend

- Municipal Boundary
- Watercourse*
- Shoreline
- Pond & Lake
- Humber Watershed**
- Oak Ridges Moraine
- Designated Greenspace***
- TRCA Property
- Greenbelt Plan Boundary
- Niagara Escarpment
- Potential Inter-regional Trail Connection
- Bruce Trail
- Humber Trail
- Great Pine Ridge Trail
- Humber Valley Heritage Trail
- Oak Ridges Trail
- Trans Canada Trail
- West Humber Trail
- Waterfront Trail
- Proposed Oak Ridges Trail****
- Proposed East Humber Trail****
- Proposed Hydro Corridor Trail****
- Proposed Carrying Place Trail****
- Claireville Canoe Route
- Humber Bay Canoe Route

0 1 2 4 6 8 10 Kilometers

*Watercourse has been generalized for mapping purposes.
**Watershed boundary delineated from 1:10,000 Ontario Base Mapping. Boundary not approved.
***Major tract of publically owned land designated as future greenspace.
****Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.



This figure is Figure 5-3 in the Humber River Watershed Plan. This figure illustrates existing inter-regional trail and conceptual routes for proposed new trails. This figure is to be used as a guide for more detailed planning of trail routes through infrastructure master plans and individual trail development proposals.

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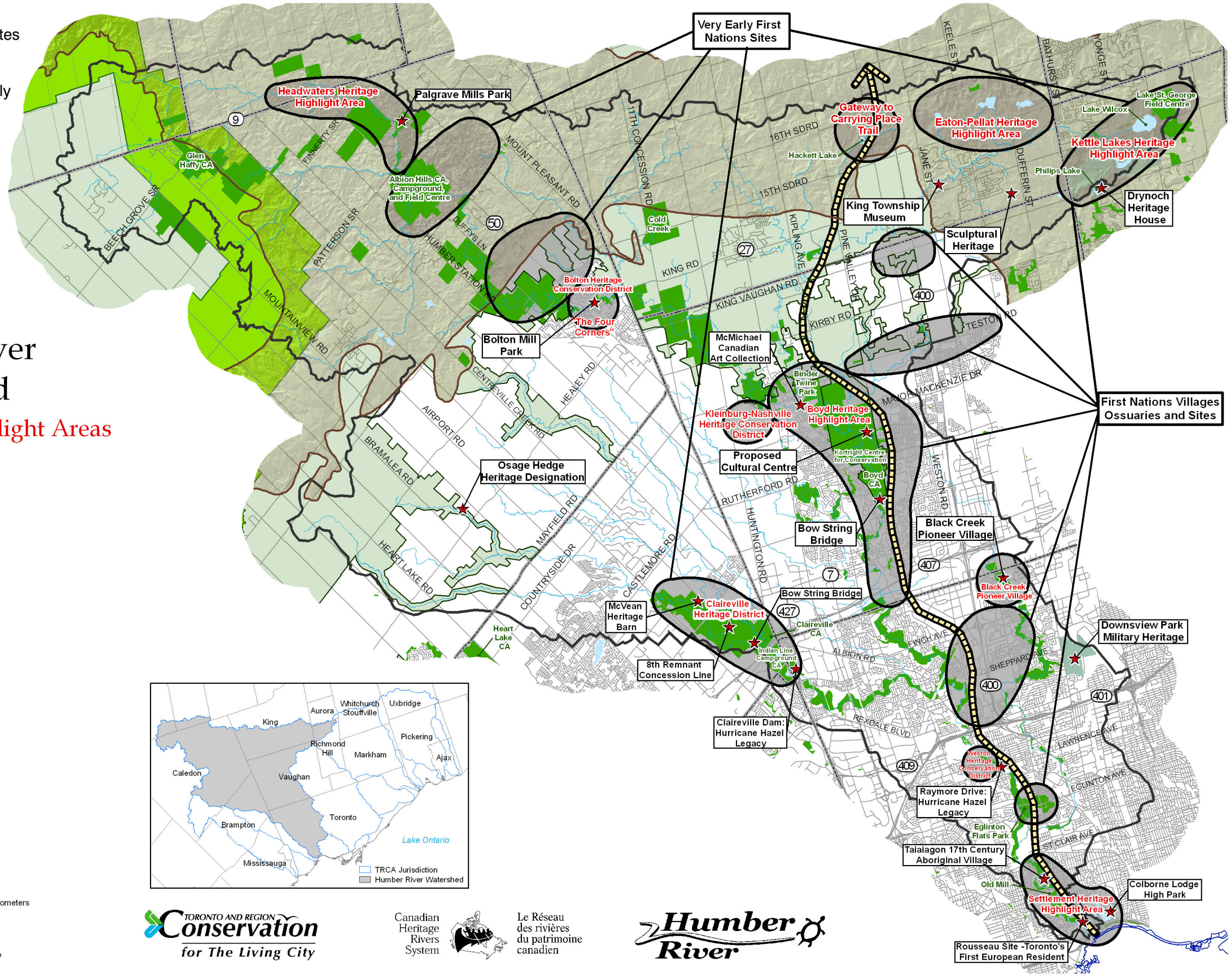
Humber River

Figure 1-7 Cultural Heritage Highlight Areas

This figure is Figure 3-12 in the Humber River Watershed Plan. This figure illustrates some, but not all, of the cultural heritage features in the watershed, areas where clusters of features exist, and conceptually identifies areas that have potential to provide distinctive experiences about the cultural heritage of the Humber River watershed.

Humber River Watershed

Cultural Heritage Highlight Areas



Legend

- Municipal Boundary
- Watercourse*
- Shoreline
- Pond & Lake
- Humber Watershed**
- Oak Ridges Moraine
- Designated Greenspace***
- TRCA Property
- Greenbelt Plan Boundary
- Niagara Escarpment
- Cultural Heritage Highlight Area
- Cultural Site
- Carrying Place Trail

0 1.25 2.5 5 7.5 10 Kilometers

* Watercourse has been generalized for mapping purposes.
**Watershed boundary delineated from 1:10,000 Ontario Base Mapping. Boundary not approved.
***Major tracts of publically owned land designated as future greenspace

Date: January, 2008

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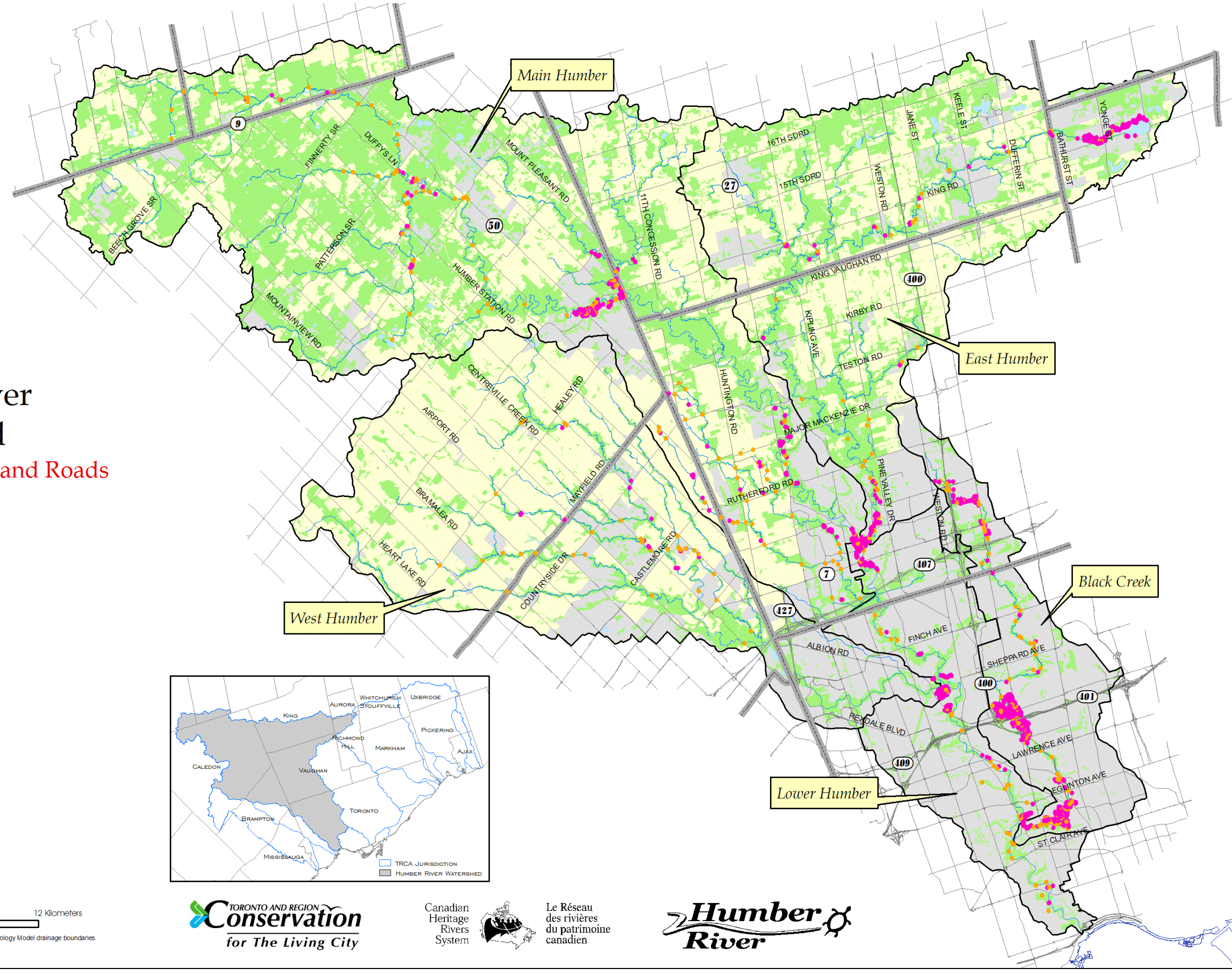
Humber River

Figure 1-8 Flood Vulnerable Areas and Roads

This figure is Figure 3-9 in the Humber River Watershed Plan. This figure identifies flood vulnerable areas, which are sites where a structure or building is located within the regulatory floodline, and flood vulnerable roads, which are sites where a road may be inundated with water under various storm events. Each site, depending on its location, is associated with varying degrees of flood risk (e.g., 2 year, 25 year or 100 year storm event). This figure is to be used as a guide in setting terms of reference for environmental planning studies for proposed new developments and redevelopment projects, including infrastructure, such that opportunities to reduce risk of flooding are considered.

Humber River Watershed

Flood Vulnerable Areas and Roads



LEGEND

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Pond & Lake
- Watercourse**
- Flood Vulnerable Area
- Flood Vulnerable Road
- Urban Area
- Natural Cover
- Rural Area

0 2 4 8 12 Kilometers

*Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Watercourse has been generalized for mapping purposes.

Date: March, 2006

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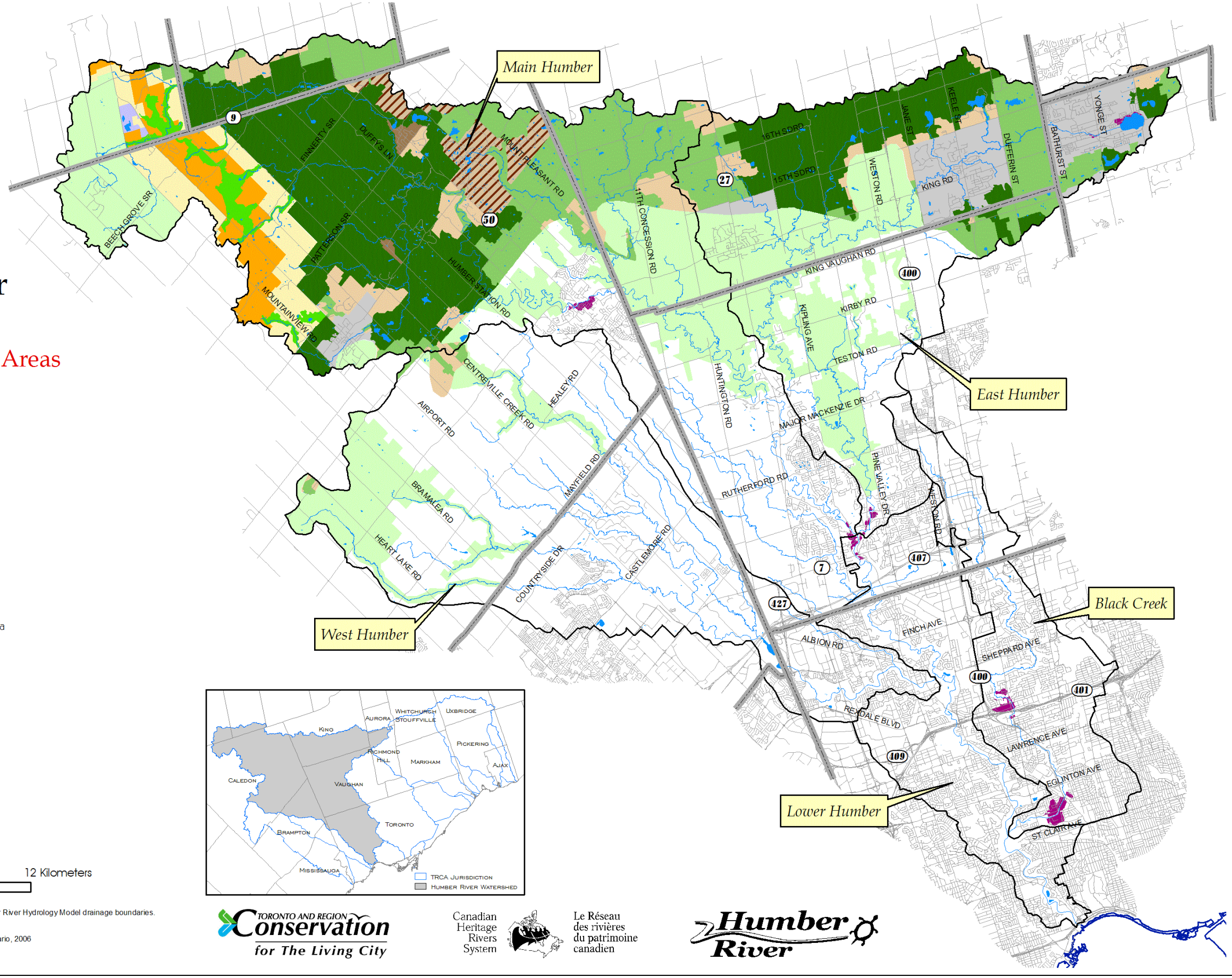
Humber River

Figure 1-9 Special Land Use Policy Areas

This figure is Figure 3-15 in the Humber River Watershed Plan. This figure illustrates the portions of the watershed where selected provincial land use plans or policies apply.

Humber River Watershed

Special Land Use Policy Areas



Legend

- Watershed/Subwatershed Boundary*
- Municipal Boundary
- Road
- Pond & Lake
- Watercourse**
- Special Policy Area***
- Greenbelt Plan Protected Countryside Area

Niagara Escarpment Plan

- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area
- Mineral Resource Extraction Area

Oak Ridges Moraine Conservation Plan

- Countryside Area
- Natural Core Area
- Natural Linkage Area
- Palgrave Estates Residential Community
- Rural Settlement
- Settlement Area

0 2 4 8 12 Kilometers

*Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
**Watercourse has been generalized for mapping purposes.
***Under section 3 of the Provincial Policy Statement.
Roads, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2006

Date: January, 2006

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Humber River

Figure 1-10 Fish Management Zones and Target Species

This figure is Figure 5-1 in the Humber River Watershed Plan. This figure identifies portions of the watershed where management practices should focus on protecting, maintaining and enhancing habitat for specific species of fish. This figure is to be used as a guide in setting terms of reference for environmental planning studies for proposed new developments and infrastructure or redevelopment projects such that fish species targets are considered in the design of management measures. This figure is also to be used to guide natural heritage restoration and stewardship initiatives and programs.

Humber River Watershed

Fish Management Zones

Legend

- Fish Management Zone
- Municipal Boundary
- Road
- Pond & Lake
- Watercourse
- Existing Urban (2002)

Fish Management Zones	
#	Name
1	Upper Humber
2	East Cold Creek
3	Upper East Humber
4	Purpleville Creek
5	Middle Humber
6	Rainbow Creek
7	West Humber
8	Upper West Humber
9	Cambell's Cross/Kilmanaugh Creek
10	Lower Humber
11	Black Creek
12	Humber Marshes

0 2 4 8 12 Kilometers

*Future recovery potential.

Date: January, 2008

TARGET SPECIES
-brook trout
-redside dace
-rainbow darter
-Atlantic salmon*

TARGET SPECIES
-brook trout
-Atlantic salmon*

TARGET SPECIES
-redside dace
-rainbow darter

TARGET SPECIES
-brook trout
-redside dace
-rainbow trout

TARGET SPECIES
-redside dace
-rainbow darter

TARGET SPECIES
-redside dace
-rainbow darter
-blackside darter
-rainbow trout
-smallmouth bass

TARGET SPECIES
-brook trout
-redside dace
-rainbow darter

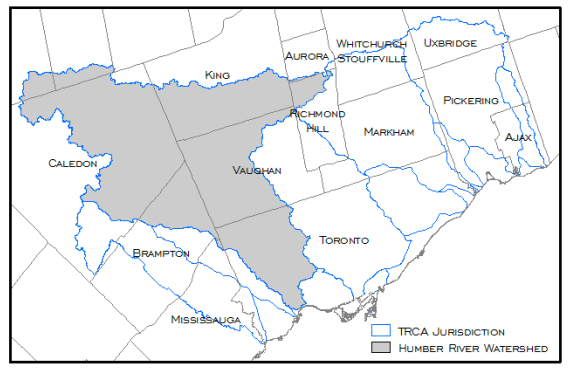
TARGET SPECIES
-Johnny darter

TARGET SPECIES
-redside dace
-rainbow darter
-smallmouth bass

TARGET SPECIES
-rainbow darter
-blackside darter
-redside dace*

TARGET SPECIES
-rainbow darter
-smallmouth bass
-largemouth bass (ponds)
-northern pike (marsh)

TARGET SPECIES
-rainbow darter
-blackside darter
-smallmouth bass
-largemouth bass
-northern pike



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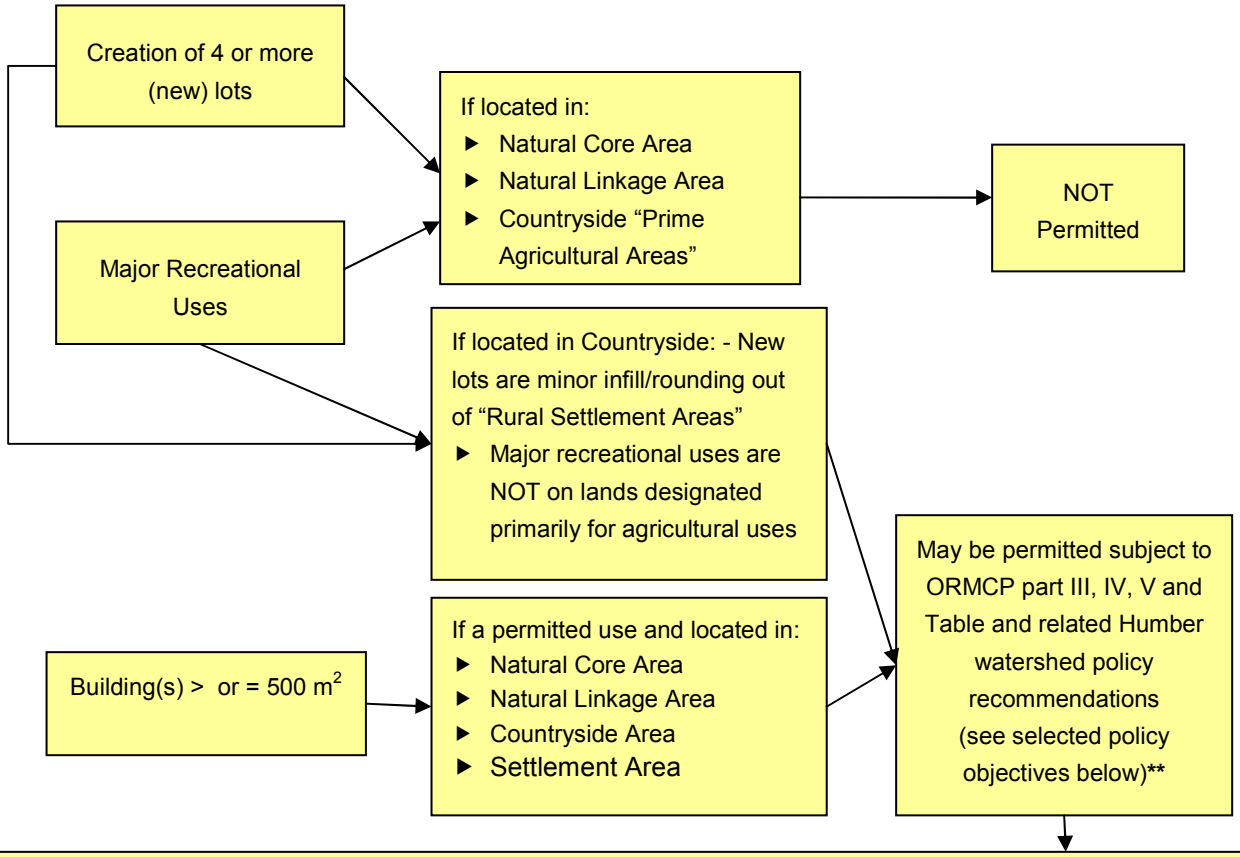
Humber River

Figure 1-11 Compliance Checklist for "Major Development" on ORM in Humber Watershed

Major Development definition (from ORMCP):

1. the creation of 4 or more (new) lots
2. the establishment of a major recreational use as described in section 38
3. the construction of a building or buildings with a ground floor area of 500 m^2 or more.



- Does the proposal respect and implement the Target Terrestrial Natural Heritage System? (**Figure 1.1; Table 1.1 #1 & 4**)
- Does the proposal address potentially significant recharge areas and manage for the pre-development water balance on the site as much as possible? (**Figures 1.2 & 1.3; Table 1.1 #1, 2 & 4**)
- If applicable, does the proposal address flood vulnerable sites? (**Figures 1.8 and 1.9; Table 1.1 #6 & 7**)
- Does the proposal maintain impervious surfaces, outside of Settlement Areas, to less than 10% of the sub-watershed?
- Does the proposal, outside of Settlement Areas, contain a Landform Conservation Plan? (**Figure 1.9; Table 1.1 #4, 5 & 8**)
- Does the proposal for a major recreational use contain a "Recreation plan" and "Vegetation Management plan" and does it demonstrate compatibility with the natural character of the surrounding area and adjacent land uses? (**Figures 1.1, 1.5, 1.6 & 1.7**)
- Does the proposal contain a "Sewage and Water System plan" ? (**Figures 1.2, 1.3 & 1.4; Table 1.1 #3**)
- Does the proposal contain a stormwater management plan? (**Table 1.1 #2, 3, 4 & 7**)
- **If the answer to any question above is "NO", then the proposal is NOT in conformity with the Oak Ridges Moraine Conservation Plan (ORMCP) or the Humber River Watershed Plan and should be deemed "incomplete" until the area(s) of non-conformity is/are addressed.**

*Figures referenced above are from the *Humber River Watershed Plan* and, together with associated policy recommendations (Table 1.1 – Top 10 New Policy Recommendations), will provide guidance in achieving conformity with the objectives and requirements of the *Humber River Watershed Plan*.

**Only selected policies from the ORMCP specifically related to major development and watershed plan requirements have been included in this checklist. The applicant is responsible for ensuring all relevant policies of the ORMCP have been conformed to.

2. Regeneration

Definition of Regeneration Projects

For the purposes of this Implementation Guide, regeneration comprises "in the ground" works, on either publicly owned or large tracts of privately owned land, that address the following objectives:

- Water quality and quantity management (e.g. SWM retrofit projects);
- Aquatic and terrestrial habitat enhancement (e.g. tree planting, wetland creation, fish barrier mitigation);
- Flood and erosion risk remediation (e.g. culvert enlargements, infrastructure protection);
- Trail development and infrastructure support for nature-based recreation; and
- Infrastructure support for achieving cultural heritage objectives.

Section 3 of this Implementation Guide addresses land securement activities and Section 4 provides complementary stewardship, education and awareness priorities

Regeneration Themes for the Humber River Watershed

Figure 2.1 illustrates three strategically important themes for regeneration across the Humber River watershed:

- Expand the terrestrial natural heritage system by creating and enhancing natural cover in the Target Terrestrial Natural Heritage System and riparian areas. Secure the 1.2% (approximately 446 ha) of the targeted system that is not yet protected by policy mechanisms and achieve an increase in natural cover of 500 ha or 1.7% over 2002 levels by 2012.
- Build sustainable communities by improving stormwater management, naturalizing landscapes , undertaking other projects to increase the urban tree canopy and providing space for urban agriculture.
- Recognize and enhance the regional open space system to provide for nature-based recreation by extending the inter-regional trail network and creating links to local trails, securing additional lands for greenspace and minimizing the impacts of public use on natural habitats and wildlife.
- Raise awareness of the cultural heritage of the Humber River watershed by integrating cultural heritage investigation and education initiatives with other regeneration projects (e.g. tree planting events, trail maintenance/development, etc.).

Subwatershed Regeneration Plans

Figures 2.2 to 2.6 illustrate regeneration plans for each primary subwatershed. They were developed by TRCA staff who 1) identified key subwatershed regeneration issues and challenges, based on the watershed planning study directions and multi-stakeholder input; 2) created a long list of candidate regeneration actions; and 3) evaluated and ranked candidate regeneration actions according to three criteria:

- *Urgency*: ..... consideration of current watershed and site conditions and thresholds; potential threats to human health, safety, and property; and the level of vulnerability to anticipated future stresses.
- *Scale*:..... consideration of the geographic extent (e.g. area or length of stream or trail) that would benefit from the action and the magnitude of anticipated improvement.
- *Multiplicity of Benefits*:.... consideration of the number of key subwatershed regeneration issues that the action would address and the number of watershed system components (e.g. groundwater, surface water, terrestrial and aquatic systems) that would benefit.

This method was based on a modification of a principles-based methodology for prioritizing actions developed for a neighbouring watershed[1,2]. The regeneration plans identified in these maps form the basis for developing an implementation work plan and budget for regeneration priorities arising from the *Humber River Watershed Plan*.

The key influences on the identification of regeneration priorities in each of the subwatersheds are:

- Main Humber:
  - High volume groundwater recharge area
  - Majority is protected from urban growth by provincial policies
  - Major urban growth in Rainbow Creek area; need innovative SWM, increase natural cover
  - "Hills of the Headwaters" and "Humber Valley Wilderness" recreational experiences
-
- East Humber:
  - High volume groundwater recharge area
  - Majority is protected from urban growth by provincial policies
  - Major urban growth in Upper and Purpleville Creek portions; need innovative SWM, increase natural cover
  - "Kettle Lakes" and "Carrying Place" recreational and cultural heritage experiences
- West Humber:
  - Long history of agricultural land use; highly fragmented natural heritage system; best management practices for agriculture
  - Rapid urban growth in middle reaches; need innovative SWM, increase natural cover
  - Majority is not protected from urban growth by provincial policies
  - "Urban Escape" recreational experiences at Claireville Conservation Area, Indian Line Campground, Humber Arboretum and along valleyland trails.
- Black Creek:
  - Mostly developed with no stormwater treatment: SWM retrofit needs

[1] Toronto and Region Conservation Authority, 2007. A Principles-based Methodology For Identifying Priority Watershed Regeneration Actions.

[2] Water's Edge Ltd. and Hugh Whiteley, 2006. A Principles-based Methodology For the Identification of Regeneration Priorities – Don River Watershed. Toronto and Region Conservation Authority.

- Combined sewers exist in parts of Toronto
- Problem erosion sites and channels in need of rehabilitation
- "Black Creek Parklands" recreational experiences along valleyland trails

- Lower Humber:
  - Mostly developed with no stormwater treatment: SWM retrofit needs
  - Combined sewers exist in parts of Toronto
  - In-stream barriers prevent fish from migrating from Lake Ontario to upstream habitats
  - Valleyland trail and Humber Marshes provide links to Lake Ontario waterfront

Figures 2.1 to 2.6 are intended for use by a range of stakeholders and for a variety of purposes, including:

- Practitioners and implementers – municipalities, NGOs, local interest groups, TRCA, other agencies, and individuals. The maps serve as a preliminary guide to regeneration opportunities across the watershed and at the local scale. The subwatershed-scale maps help to identify ways to integrate and coordinate local undertakings to ensure that regeneration activities are complementary and strategically located. Working from a common set of priorities will enhance the likelihood that multiple benefits will be achieved.
- Policy makers and planners - the maps provide guidance on approaches to achieve net gain when required for *Planning Act* applications, *Ontario Regulation 166/06* applications, *Fisheries Act* authorizations, or major infrastructure planning (e.g. EAs).

More detail on the regeneration actions identified on the maps can be found in the chart below, as well as separate watershed planning documents, including:

- *Humber River State of the Watershed Reports*[3] provides more information about current watershed functions and conditions.
- *Humber River Watershed Scenario Modelling and Analysis Report*[4] provides an assessment of the predicted watershed response to future management approaches and therefore provides guidance as to the relative sensitivity of different regions within the watershed to change and the relative effectiveness of management approaches.
- *Action Plan for Sustainable Practices – Implementation Strategies for the Residential and Business Sectors in the GTA*[5] provides guidance on social marketing considerations for implementing regeneration actions in partnership with business and residential sectors.
- *Humber River Watershed Habitat Implementation Plan – Phase 1*[6] contains habitat restoration site plans for high priority TRCA-owned properties.
- *Humber River Fisheries Management Plan*[7] contains a complete list of recommendations specific to fisheries management and regeneration of the aquatic habitat.

[3] Toronto and Region Conservation Authority. 2008. Humber River State of the Watershed Reports – Air Quality; Aquatic System; Cultural Heritage; Fluvial Geomorphology; Geology and Groundwater Resources; Land and Resource Use; Nature-based Recreation; Surface Water Quality; Surface Water Quantity; and Terrestrial System.

[4] Toronto and Region Conservation Authority. 2008. Humber River Watershed Scenario Modelling and Analysis Report.

[5] Freeman Associates, 2006. Action Plan for Sustainable Practices – Implementation Strategies for the Residential and Business Sectors in the Greater Toronto Area.

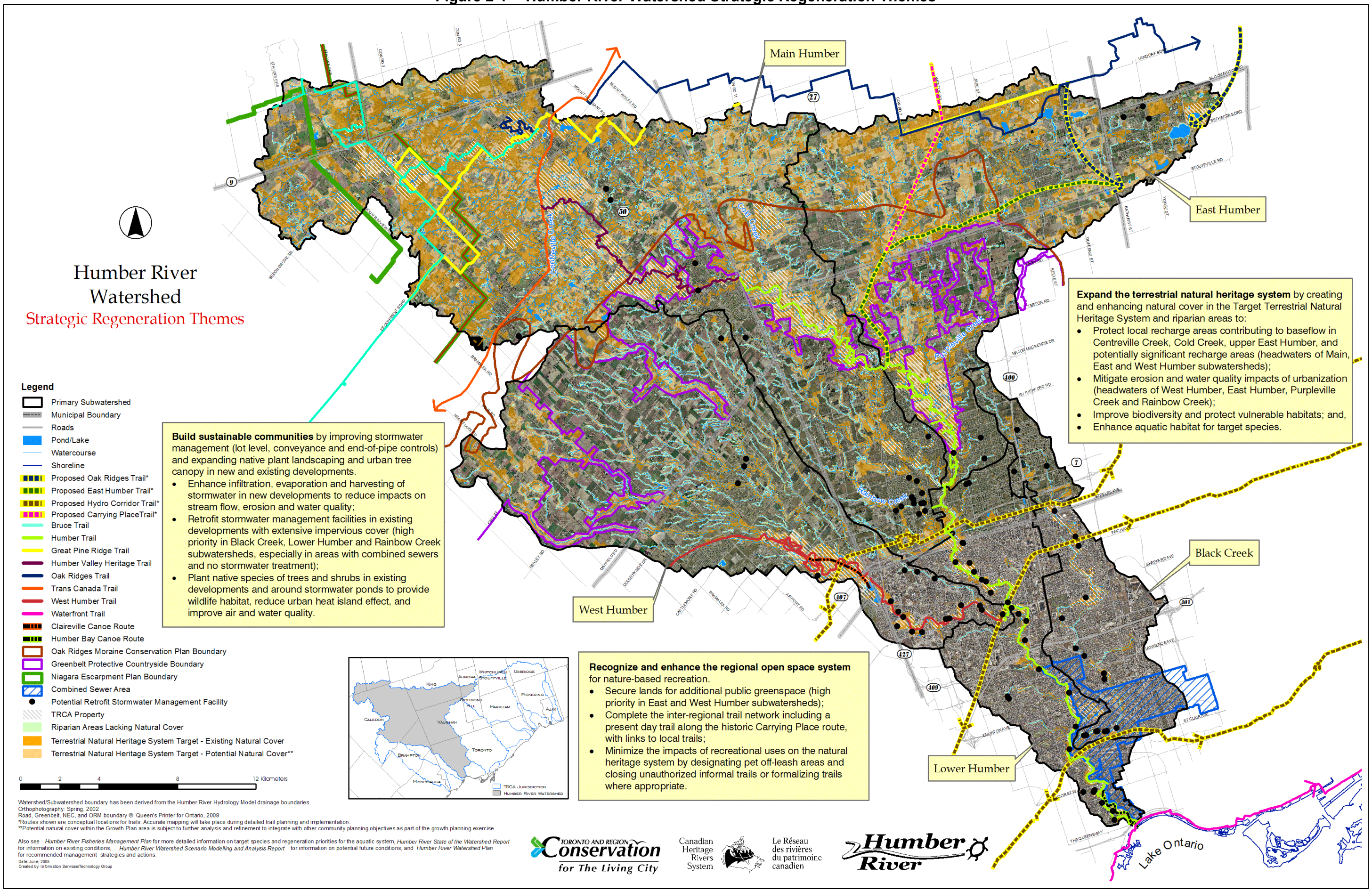
[6] Toronto and Region Conservation Authority. 2005. Humber River Watershed Habitat Implementation Plan – Phase 1.

[7] Ministry of Natural Resources, Toronto and Region Conservation Authority. Humber River Fisheries Management Plan, 2005.

- *Toronto Waterfront Aquatic Habitat Restoration Strategy*[8] contains aquatic habitat restoration site plans for the Toronto waterfront including the Humber Marshes and Humber Estuary.

[8] Toronto and Region Conservation Authority. 2003. Toronto Waterfront Aquatic Habitat Restoration Strategy.

Figure 2-1 Humber River Watershed Strategic Regeneration Themes



Build sustainable communities by improving stormwater management (lot level, conveyance and end-of-pipe controls) and expanding native plant landscaping and urban tree canopy in new and existing developments.

- Enhance infiltration, evaporation and harvesting of stormwater in new developments to reduce impacts on stream flow, erosion and water quality;
- Retrofit stormwater management facilities in existing developments with extensive impervious cover (high priority in Black Creek, Lower Humber and Rainbow Creek subwatersheds, especially in areas with combined sewers and no stormwater treatment);
- Plant native species of trees and shrubs in existing developments and around stormwater ponds to provide wildlife habitat, reduce urban heat island effect, and improve air and water quality.

Expand the terrestrial natural heritage system by creating and enhancing natural cover in the Target Terrestrial Natural Heritage System and riparian areas to:

- Protect local recharge areas contributing to baseflow in Centreville Creek, Cold Creek, upper East Humber, and potentially significant recharge areas (headwaters of Main, East and West Humber subwatersheds);
- Mitigate erosion and water quality impacts of urbanization (headwaters of West Humber, East Humber, Purpleville Creek and Rainbow Creek);
- Improve biodiversity and protect vulnerable habitats; and,
- Enhance aquatic habitat for target species.

Recognize and enhance the regional open space system for nature-based recreation.

- Secure lands for additional public greenspace (high priority in East and West Humber subwatersheds);
- Complete the inter-regional trail network including a present day trail along the historic Carrying Place route, with links to local trails;
- Minimize the impacts of recreational uses on the natural heritage system by designating pet off-leash areas and closing unauthorized informal trails or formalizing trails where appropriate.

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2008
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see *Humber River Fisheries Management Plan* for more detailed information on target species and regeneration priorities for the aquatic system, *Humber River State of the Watershed Report* for information on existing conditions, *Humber River Watershed Scenario Modelling and Analysis Report* for information on potential future conditions, and *Humber River Watershed Plan* for recommended management strategies and actions.

Date: June, 2008
Created by: Information Services/Technology Group

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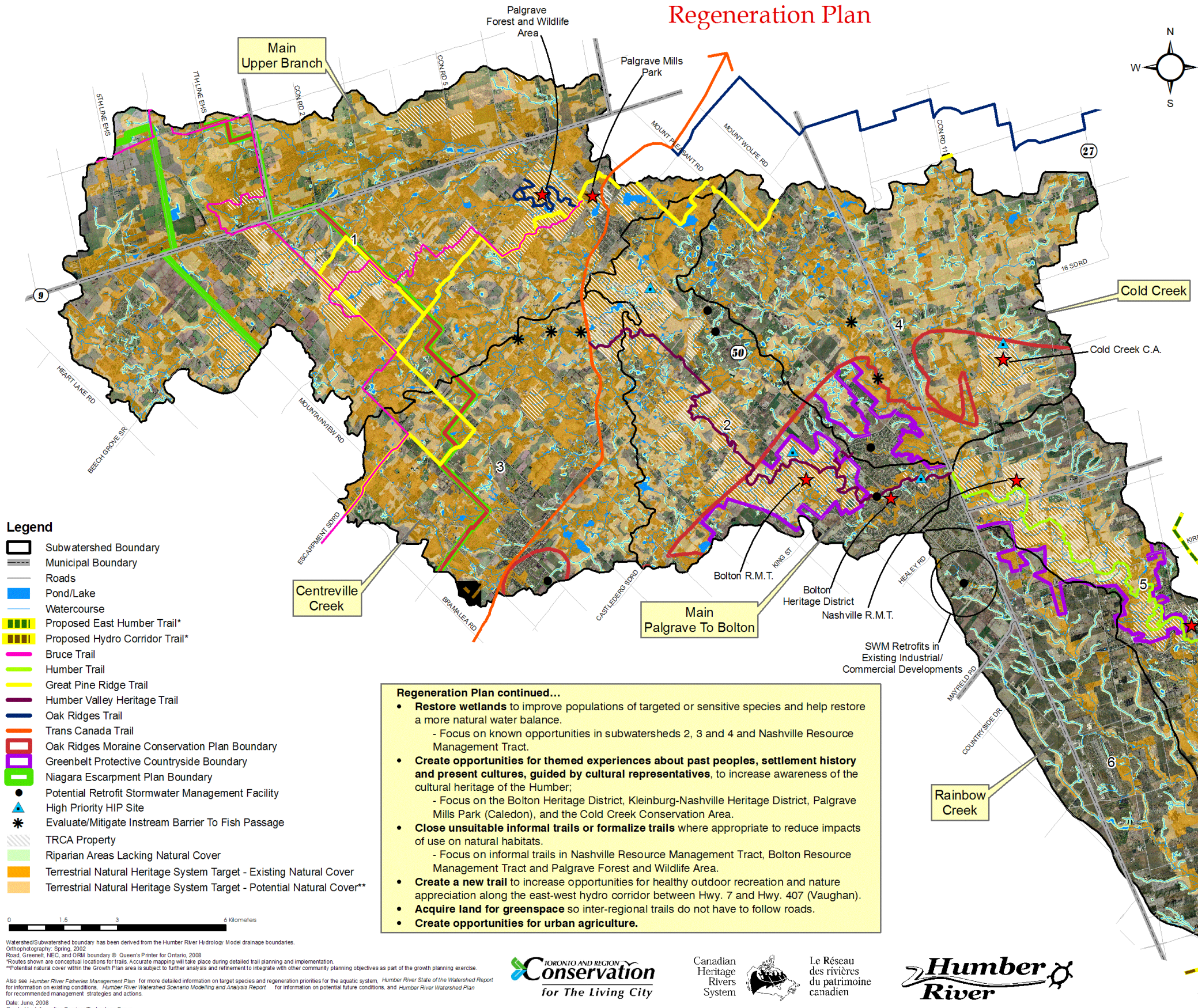
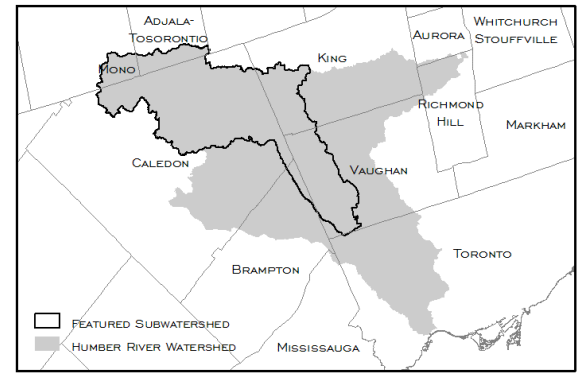
Humber River

Figure 2-2 Main Humber Subwatershed Regeneration Plan

Main Humber Subwatershed
Regeneration Plan





Regeneration Plan

- **Create and enhance natural cover in the Target Terrestrial Natural Heritage System** to improve biodiversity, strengthen the resilience of existing habitats and help restore a more natural water balance. Focus on:
  - Subwatersheds 2, 4, 5, and 6 where habitat patches are most in need of improvements to quality and connectivity;
  - Designated natural heritage system lands in existing developments and approved urban growth areas;
  - Lands in Greenbelt Protected Countryside areas;
  - Potentially significant recharge areas.
- **Enhance infiltration, evaporation and harvesting of stormwater in new and existing developments** to improve water quality and reduce erosion;
  - Especially in industrial/commercial developments in subwatershed 6 to help avoid erosion problems (Caledon, Brampton and Vaughan);
  - Focus on infiltration in subwatersheds 3 and 4 because aquatic communities depend on groundwater discharge from local recharge areas.
- **Create new end-of-pipe stormwater management facilities** to improve water quality and reduce erosion;
  - Focus on known opportunities in subwatershed 6 (Vaughan).
- **Plant trees and shrubs in riparian areas lacking natural cover** to help stabilize streambanks and improve aquatic habitat;
  - Focus on 1st and 2nd order tributaries and headwater drainage areas in subwatersheds 4 and 6 where greater than 40% of riparian areas lack natural cover.

Regeneration Plan continued…

- **Restore wetlands** to improve populations of targeted or sensitive species and help restore a more natural water balance.
  - Focus on known opportunities in subwatersheds 2, 3 and 4 and Nashville Resource Management Tract.
- **Create opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives**, to increase awareness of the cultural heritage of the Humber;
  - Focus on the Bolton Heritage District, Kleinburg-Nashville Heritage District, Palgrave Mills Park (Caledon), and the Cold Creek Conservation Area.
- **Close unsuitable informal trails or formalize trails** where appropriate to reduce impacts of use on natural habitats.
  - Focus on informal trails in Nashville Resource Management Tract, Bolton Resource Management Tract and Palgrave Forest and Wildlife Area.
- **Create a new trail** to increase opportunities for healthy outdoor recreation and nature appreciation along the east-west hydro corridor between Hwy. 7 and Hwy. 407 (Vaughan).
- **Acquire land for greenspace** so inter-regional trails do not have to follow roads.
- **Create opportunities for urban agriculture.**

Legend

- Subwatershed Boundary
- Municipal Boundary
- Roads
- Pond/Lake
- Watercourse
- Proposed East Humber Trail*
- Proposed Hydro Corridor Trail*
- Bruce Trail
- Humber Trail
- Great Pine Ridge Trail
- Humber Valley Heritage Trail
- Oak Ridges Trail
- Trans Canada Trail
- Oak Ridges Moraine Conservation Plan Boundary
- Greenbelt Protected Countryside Boundary
- Niagara Escarpment Plan Boundary
- Potential Retrofit Stormwater Management Facility
- High Priority HIP Site
- Evaluate/Mitigate Instream Barrier To Fish Passage
- TRCA Property
- Riparian Areas Lacking Natural Cover
- Terrestrial Natural Heritage System Target - Existing Natural Cover
- Terrestrial Natural Heritage System Target - Potential Natural Cover**

0 1.5 3 6 Kilometers

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2008
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see *Humber River Fisheries Management Plan* for more detailed information on target species and regeneration priorities for the aquatic system, *Humber River State of the Watershed Report* for information on existing conditions, *Humber River Watershed Scenario Modelling and Analysis Report* for information on potential future conditions, and *Humber River Watershed Plan* for recommended management strategies and actions.

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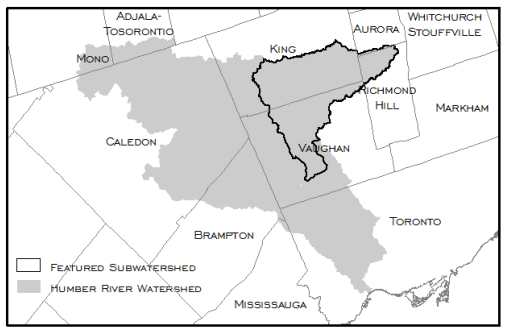
Humber River

Figure 2-3 East Humber Subwatershed Regeneration Plan

East Humber Subwatershed

Regeneration Plan



East Upper Branch
Seneca College
Vandorf SDRD
Bayview Ave
Bloomington Rd
Bethesda SDRD
Lake St. George Field Centre
Oak Ridges Corridor Park
Stouffville Rd
Yonge St
Bathurst St
Dufferin St
Kirby Rd
King Rd
King Creek
King-Vaughan Rd
Purpleville Creek
Teston Rd
Humber Trails Forest and Wildlife Area
Major Mackenzie Dr
East Nobleton To Kleinburg
Living City Campus at Kortright
Rutherford Rd
Langstaff Rd
Boyd Conservation Area
East Kleinburg To Woodbridge
Hackett Lake
Weston Rd
Jane St
Con Rd 7
Con Rd 10
27
400
7
12
13
14
15
16
N
W
E
S

Legend

- Subwatershed Boundary
- Municipal Boundary
- Roads
- Pond/Lake
- Watercourse
- Proposed Carrying Place Trail*
- Proposed Oak Ridges Trail*
- Proposed East Humber Trail*
- Humber Trail
- Great Pine Ridge Trail
- Oak Ridges Trail
- Oak Ridges Moraine Conservation Plan Boundary
- Greenbelt Protective Countryside Boundary
- Potential Retrofit Stormwater Management Facility
- High Priority HIP Site
- TRCA Property
- Riparian Areas Lacking Natural Cover
- Terrestrial Natural Heritage System Target - Existing Natural Cover
- Terrestrial Natural Heritage System Target - Potential Natural Cover**

0 0.5 1 2 3 4 5 Kilometers

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2008
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see *Humber River Fisheries Management Plan* for more detailed information on target species and regeneration priorities for the aquatic system, *Humber River State of the Watershed Report* for information on existing conditions, *Humber River Watershed Scenario Modelling and Analysis Report* for information on potential future conditions, and *Humber River Watershed Plan* for recommended management strategies and actions.

Date: June, 2008
Created by Information Services/Technology Group

Regeneration Plan

- **Create and enhance natural cover in the Target Terrestrial Natural Heritage System** to improve biodiversity, strengthen the resilience of existing habitats and help restore a more natural water balance. Focus on:
  - Subwatersheds 12, 13 and 15 where habitat patches are most in need of improvements to quality and connectivity and urban growth is planned;
  - Designated natural heritage system lands in existing developments and approved urban growth areas;
  - Lands in Greenbelt Protected Countryside areas;
  - Potentially significant recharge areas.
- **Enhance infiltration, evaporation and harvesting of stormwater in new and existing developments** to improve water quality and reduce erosion;
  - Especially in new developments in subwatershed 15 to help avoid erosion problems.
  - Focus on infiltration in subwatershed 12 because aquatic communities depend on groundwater discharge from local recharge areas.
- **Demonstrate green building design** at the Living City Campus at Kortright.
- **Create new end-of-pipe stormwater management facilities** in subwatershed 16 (Vaughan) to improve water quality and reduce erosion.
- **Enhance aquatic habitat** for target species;
  - Brook trout and redside dace habitats in low order tributaries of subwatershed 15 that are not affected by urban growth;
  - Redside dace habitats in low order tributaries of subwatershed 12 that are not affected by urban growth, including mitigation of in-stream barriers.
- **Plant trees and shrubs in riparian areas lacking natural cover** to help stabilize streambanks and improve aquatic habitat;
  - Focus on low order tributaries and headwater drainage areas in subwatersheds 12, 13 and 15 where greater than 40% of riparian areas lack natural cover.
- **Restore wetlands** to improve populations of targeted or sensitive species and help restore a more natural water balance.
- **Create opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives**, to increase awareness of the cultural heritage of the Humber;
  - Experiences about Carrying Place heritage along the Humber Trail and at Humber Trails Forest and Wildlife Area;
  - Experiences about Aboriginal heritage at the Living City Campus at Kortright, Boyd Conservation Area, Lake St. George Education Centre, and Seneca College King Campus.
- **Close unsuitable informal trails or formalize trails** where appropriate to reduce impacts of use on natural habitats in greenspace north of the Living City Campus at Kortright.
- **Secure land for greenspace** to complete a trail along the historic Carrying Place route and to better meet future demand for nature-based recreation;
  - Between Humber Trails Forest and Wildlife Area and the Humber Trail;
  - Near Hackett Lake to create a northern "gateway" to the Humber greenspace system;
  - Between Humber Trails Forest and Wildlife Area and Hackett Lake area;
  - Between Humber Trails Forest and Wildlife Area and Oak Ridges Corridor Park.
- **Create new trails** to increase opportunities for healthy outdoor recreation and nature appreciation;
  - Between the Oak Ridges Trail and local trails in King City (King);
  - Between Humber Trails Forest and Wildlife Area and the Humber Trail.
- **Create opportunities for urban agriculture.**

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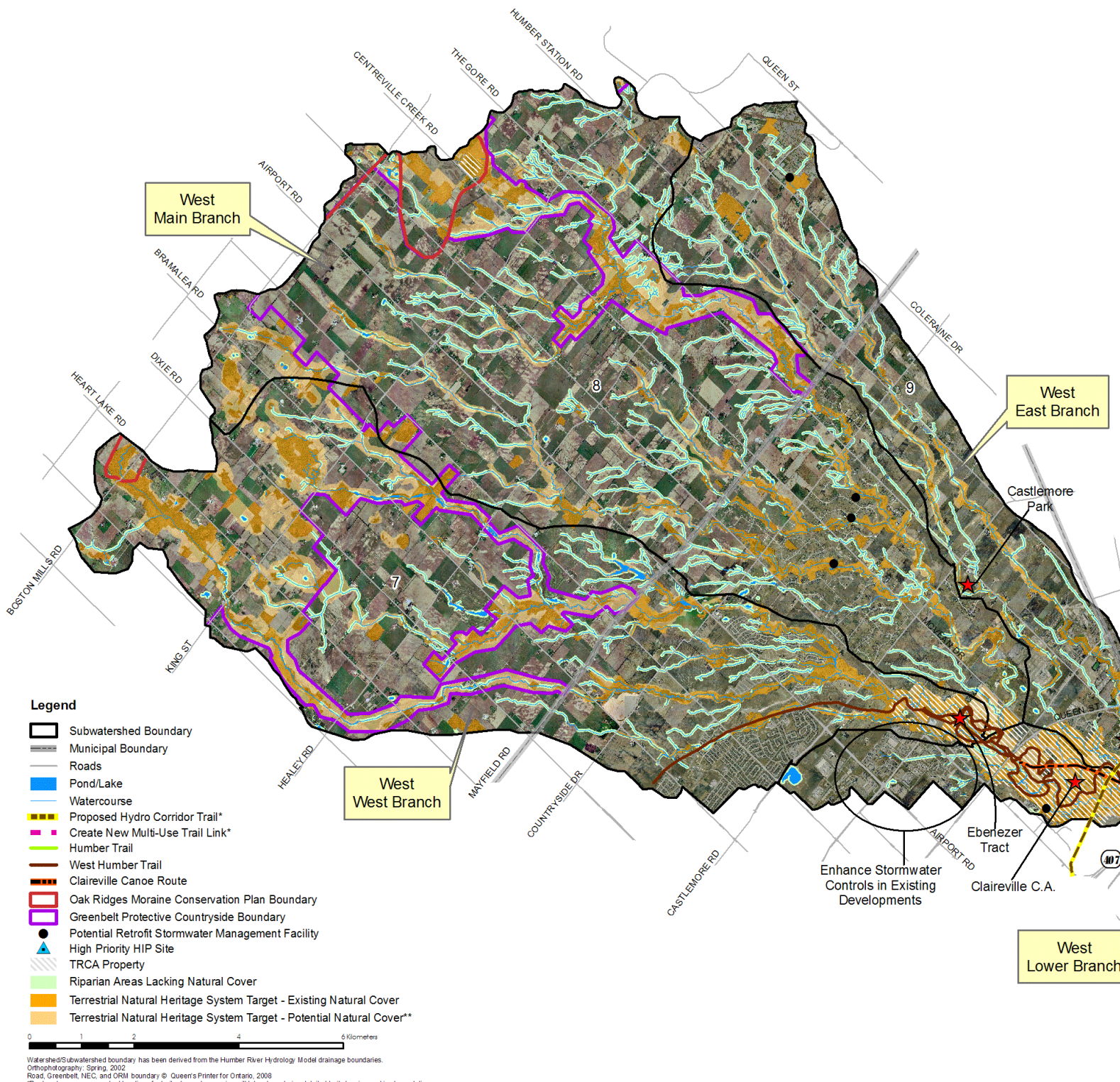
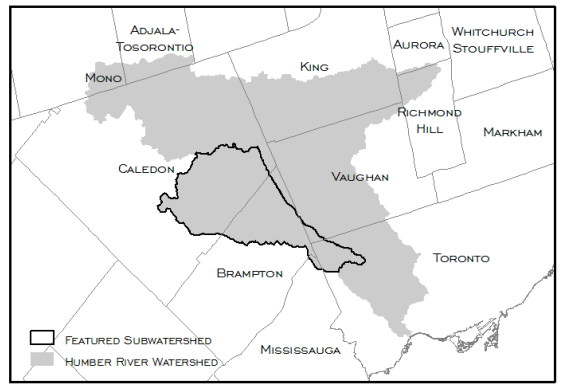
Humber River

Figure 2-4 West Humber Subwatershed Regeneration Plan

West Humber Subwatershed

Regeneration Plan





N
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Regeneration Plan

- **Create and enhance natural cover in the Target Terrestrial Natural Heritage System** to improve biodiversity, strengthen the resilience of existing habitats and help restore a more natural water balance. Focus on:
  - Subwatersheds 7, 8 and 9 where habitat patches are most in need of improvements to quality and connectivity and urban growth is planned;
  - Designated natural heritage system lands in existing developments and approved urban growth areas;
  - Lands in Greenbelt Protected Countryside and potentially significant recharge areas.
- **Enhance infiltration, evaporation and harvesting of stormwater in new and existing developments** to help alleviate existing erosion problems and improve water quality;
  - Especially in existing commercial and industrial areas with no stormwater treatment (subwatersheds 10 and 11), and in new developments in subwatersheds 7, 8 and 9 to help avoid erosion problems.
- **Demonstrate and test innovative stormwater infiltration technologies** in new developments on soils with low permeability.
- **Create new end-of-pipe stormwater management facilities** in Toronto portion of subwatersheds 10 and 11 to improve water quality and reduce erosion.
- **Enhance aquatic habitat** for target species;
  - Brook trout and redside dace habitats in low order tributaries of subwatershed 7 within the Greenbelt Protected Countryside Area (Caledon);
  - Potential redside dace habitats in low order tributaries of subwatershed 8 (Caledon).
- **Plant trees and shrubs in riparian areas lacking natural cover** to help stabilize streambanks and improve aquatic habitat;
  - Focus on permanently flowing tributaries and headwater drainage areas in subwatersheds 7, 8 and 9 where greater than 40% of riparian areas lack natural cover.
  - Reaches between McVean Dr., The Gore Rd., Castlemore Rd. and Queen St., and in Castlemore Park and Manswood Park (Brampton) to help stabilize streambanks;
  - Reaches in Watercliffe Park and Kipling Heights Park (Toronto).
- **Restore wetlands** at known opportunity sites in the Caledon portion of subwatersheds 7, 8 and 9 to improve populations of targeted or sensitive species and help restore a more natural water balance.
- **Secure land for greenspace** to link Brampton and Caledon trail systems and better meet future demand for nature-based recreation;
  - In Greenbelt Protected Countryside Areas in subwatersheds 7 and 8 (Caledon);
  - Target terrestrial natural heritage system and potentially significant recharge areas.
- **Create opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives** at Claireville Conservation Area to increase awareness of the cultural heritage of the Humber.
- **Close unsuitable informal trails or formalize trails** where appropriate at Claireville Conservation Area to reduce impacts of use on natural habitats.
- **Create new trails** to provide links to inter-regional trails and increase opportunities for healthy outdoor recreation and nature appreciation;
  - Complete missing link in West Humber Trail between Finch Ave. and Hwy. 407;
  - Along east-west hydro corridor between Hwy. 7 and Hwy. 407 (Vaughan).
- **Create opportunities for urban agriculture** on public lands and hydro corridors.
- **Remove invasive exotic species of plants** to improve habitat for native species;
  - Focus on Ebenezer tract in Claireville C.A. and around the Humber Arboretum.

Legend

- Subwatershed Boundary
- Municipal Boundary
- Roads
- Pond/Lake
- Watercourse
- Proposed Hydro Corridor Trail*
- Create New Multi-Use Trail Link*
- Humber Trail
- West Humber Trail
- Claireville Canoe Route
- Oak Ridges Moraine Conservation Plan Boundary
- Greenbelt Protected Countryside Boundary
- Potential Retrofit Stormwater Management Facility
- High Priority HIP Site
- TRCA Property
- Riparian Areas Lacking Natural Cover
- Terrestrial Natural Heritage System Target - Existing Natural Cover
- Terrestrial Natural Heritage System Target - Potential Natural Cover**

0 1 2 4 6 Kilometers

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2009
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see *Humber River Fisheries Management Plan* for more detailed information on target species and regeneration priorities for the aquatic system, *Humber River State of the Watershed Report* for information on existing conditions, *Humber River Watershed Scenario Modelling and Analysis Report* for information on potential future conditions, and *Humber River Watershed Plan* for recommended management strategies and actions.

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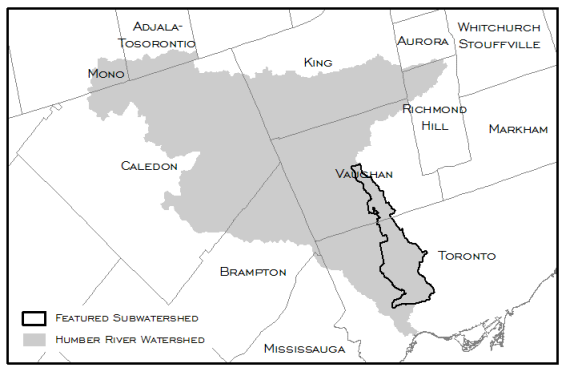
Humber River

Figure 2-5 Black Creek Subwatershed Regeneration Plan

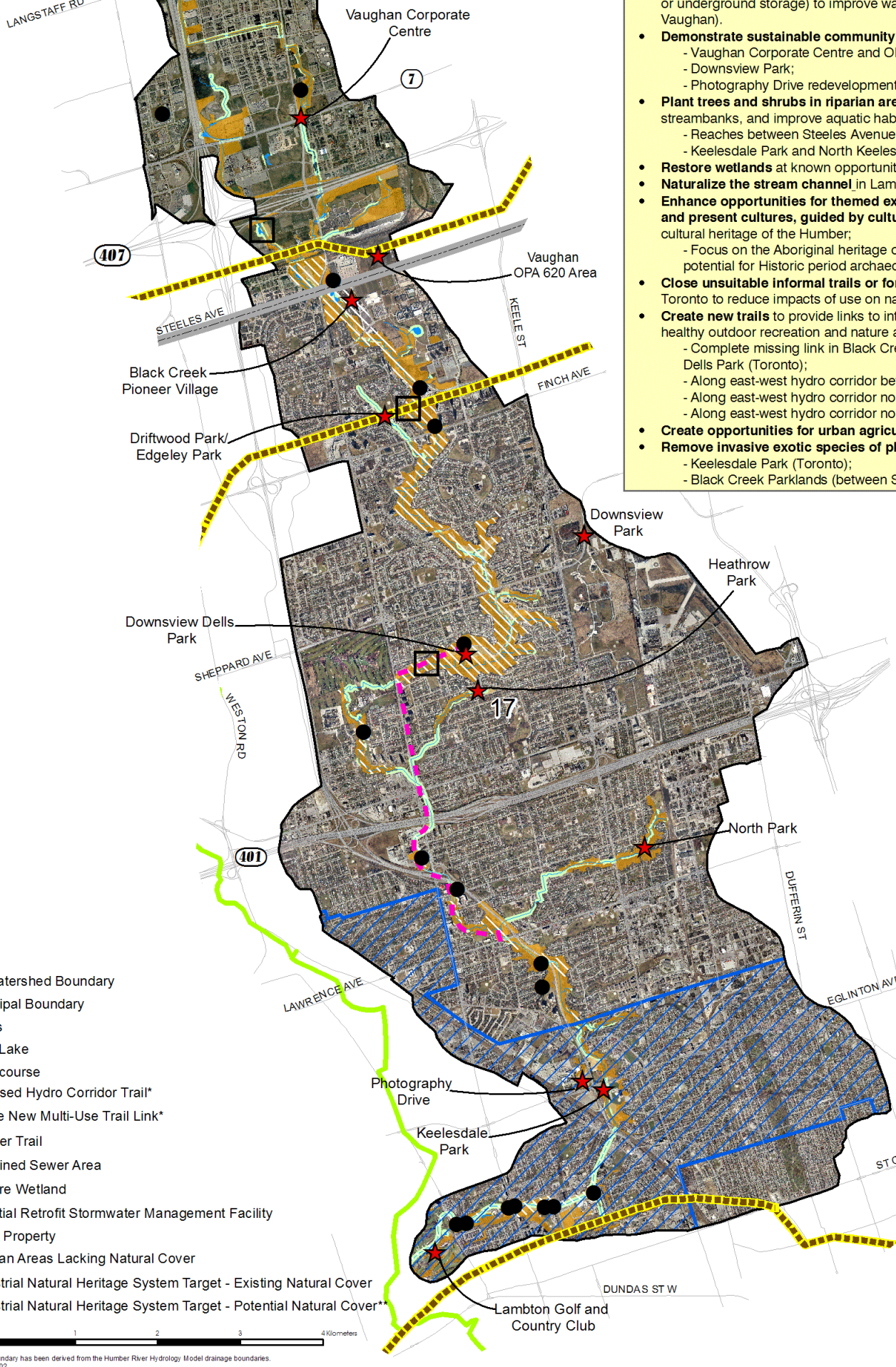
Black Creek Subwatershed

Regeneration Plan



Regeneration Plan

- **Continue combined sewer remedial works and sewer outfall investigations** to improve water quality (Toronto).
- **Create and enhance natural cover in the Target Terrestrial Natural Heritage System** to improve biodiversity, strengthen the resilience of existing habitats and help restore a more natural water balance;
  - Lands between Steeles Ave. and Hwy. 407 (Vaughan);
  - In Driftwood Park, Edgeley Park, Heathrow Park, and North Park (Toronto).
  - Lands in Asian Long-horned Beetle Regulated Area.
- **Develop habitat restoration site plan** for lands between Steeles Ave. and Hwy. 407.
- **Acquire land for new stormwater management facilities and natural land cover** through redevelopment initiatives.
- **Enhance infiltration, evaporation and harvesting of stormwater in new and existing developments** to alleviate existing erosion problems and improve water quality;
  - Especially in combined sewer areas and commercial and industrial areas with no stormwater treatment.
- **Create new or improve existing end-of-pipe stormwater management facilities** (pond or underground storage) to improve water quality and reduce erosion (Toronto and Vaughan).
- **Demonstrate sustainable community and green building design** in new developments:
  - Vaughan Corporate Centre and OPA 620 area;
  - Downsview Park;
  - Photography Drive redevelopment area (Toronto).
- **Plant trees and shrubs in riparian areas lacking natural cover** to help stabilize streambanks, and improve aquatic habitat;
  - Reaches between Steeles Avenue and Rutherford Road (Vaughan);
  - Keelesdale Park and North Keelesdale Park (Toronto).
- **Restore wetlands** at known opportunity sites to help restore a more natural water balance.
- **Naturalize the stream channel** in Lambton Golf and Country Club.
- **Enhance opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives,** to increase awareness of the cultural heritage of the Humber;
  - Focus on the Aboriginal heritage of the Black Creek Pioneer Village area and the potential for Historic period archaeological programming.
- **Close unsuitable informal trails or formalize trails** where appropriate in valleylands in Toronto to reduce impacts of use on natural habitats.
- **Create new trails** to provide links to inter-regional trails and increase opportunities for healthy outdoor recreation and nature appreciation;
  - Complete missing link in Black Creek Trail between Lawrence Ave. and Downsview Dells Park (Toronto);
  - Along east-west hydro corridor between Hwy. 407 and Steeles Ave. (Vaughan);
  - Along east-west hydro corridor north of Finch Ave. (Toronto);
  - Along east-west hydro corridor north of St. Clair Ave. (Toronto).
- **Create opportunities for urban agriculture** on public lands and hydro corridors.
- **Remove invasive exotic species of plants** to improve habitat for native species;
  - Keelesdale Park (Toronto);
  - Black Creek Parklands (between Steeles Ave. and Finch Ave., Toronto).



Legend

- Subwatershed Boundary
- Municipal Boundary
- Roads
- Pond/Lake
- Watercourse
- Proposed Hydro Corridor Trail*
- Create New Multi-Use Trail Link*
- Humber Trail
- Combined Sewer Area
- Restore Wetland
- Potential Retrofit Stormwater Management Facility
- TRCA Property
- Riparian Areas Lacking Natural Cover
- Terrestrial Natural Heritage System Target - Existing Natural Cover
- Terrestrial Natural Heritage System Target - Potential Natural Cover**

1 0.5 0 1 2 3 4 Kilometers

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2008
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see Humber River Fisheries Management Plan for more detailed information on target species and regeneration priorities for the aquatic system, Humber River State of the Watershed Report for information on existing conditions, Humber River Watershed Scenario Modelling and Analysis Report for information on potential future conditions, and Humber River Watershed Plan for recommended management strategies and actions.

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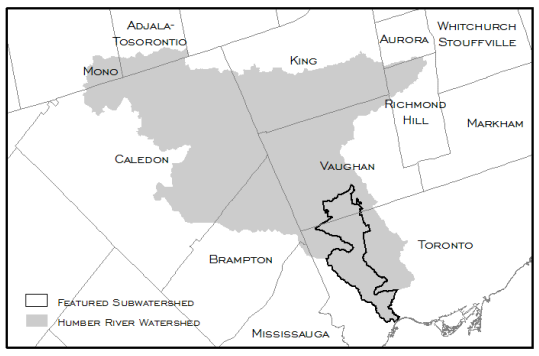
Humber River

Figure 2-6 Lower Humber Subwatershed Regeneration Plan

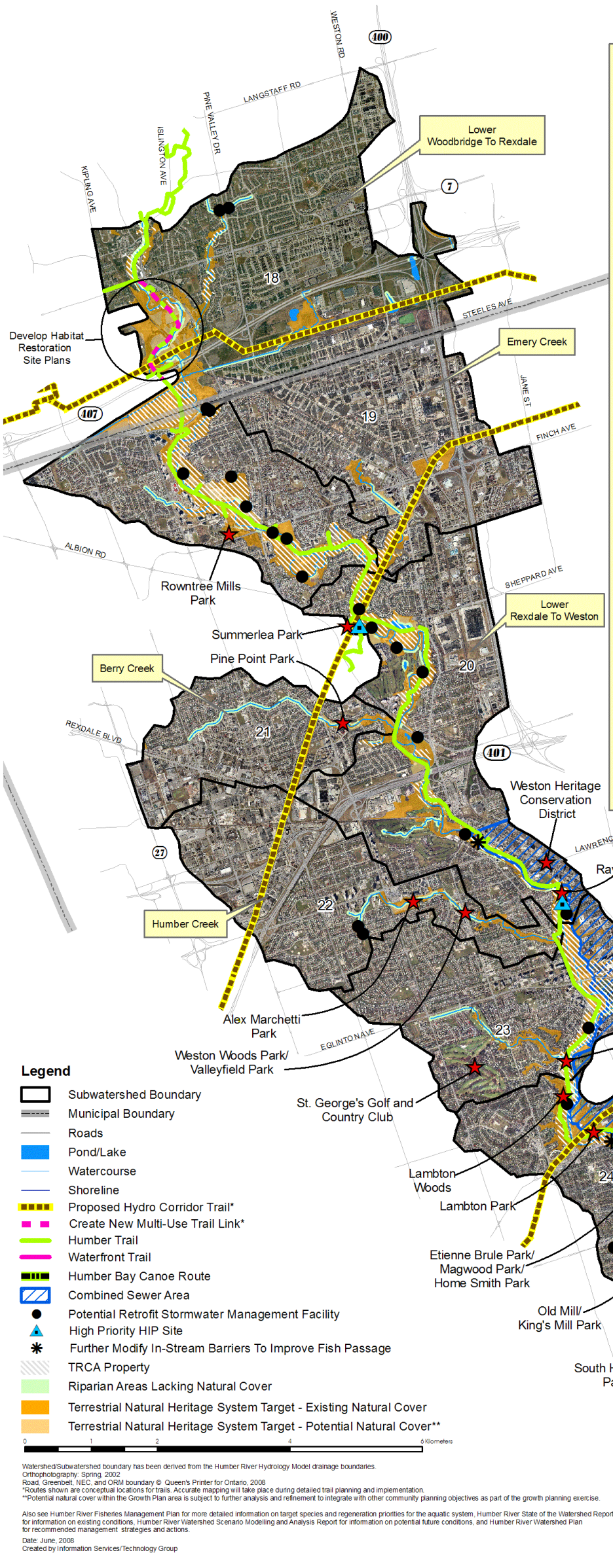
Lower Humber Subwatershed

Regeneration Plan



Regeneration Plan

- **Continue to undertake combined sewer remedial works** to improve water quality.
- **Create and enhance natural cover in the Target Terrestrial Natural Heritage System** to improve biodiversity, strengthen the resilience of existing habitats and help restore a more natural water balance;
  - King's Mill Park, Raymore Park, and Summerlea Park (Toronto);
  - Lands west of Islington Ave. between Hwy. 7 and Hwy. 407 (Vaughan);
  - Lands in Asian Long-horned Beetle Regulated Area.
- **Develop habitat restoration site plans** for lands west of Islington Ave. between Hwy. 407 and Hwy. 7 (Vaughan).
- **Acquire land for new stormwater management controls and to restore natural land cover** through redevelopment initiatives.
- **Enhance infiltration, evaporation and harvesting of stormwater in new and existing developments** to help alleviate existing erosion problems and improve water quality;
  - Especially in combined sewer areas and commercial and industrial areas with no stormwater treatment (subwatersheds 19, 20, 21 and 22).
- **Create new end-of-pipe stormwater management facilities** (pond or underground storage) in Toronto to improve water quality and reduce erosion.
- **Plant trees and shrubs in riparian areas lacking natural cover** to help stabilize streambanks and improve aquatic habitat;
  - Reaches in Étienne Brûlé Park, Magwood Park, Scarlett Mills Park, Weston Wood Park, Valleyfield Park, Alex Marchetti Park and Pine Point Park (Toronto).
- **Restore wetland vegetation** on exposed mudflats, islands and lagoons in Humber Marsh to improve habitat for wetland species.
- **Mitigate in-stream barriers to improve fish passage:**
  - Further modify the eight (8) barriers along the main channel between Bloor St. and Highway 401 to improve passage for jumping and non-jumping species, including repairs and improvements to the Raymore Park Fishway.
- **Create opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives,** to increase awareness of the cultural heritage of the Humber;
  - Focus on Old Mill area, Rousseau site, Baby Point area, Eglinton Flats area and Weston Heritage Conservation District.
- **Close unsuitable informal trails or formalize trails** where appropriate to reduce impacts of use on natural habitats, especially in Lambton Woods.
- **Create new trails** to provide links to inter-regional trails and increase opportunities for healthy outdoor recreation and nature appreciation;
  - Complete missing link in Humber Trail between Steeles Ave. and Hwy. 7;
  - Along hydro corridors in Vaughan and Toronto.
- **Create opportunities for urban agriculture** on public lands and hydro corridors.
- **Remove invasive exotic species of plants** to improve habitat for native species:
  - Lambton Park (Toronto) where prairie vegetation is at risk;
  - South Humber Park (Toronto) where oak savannah vegetation is at risk;
  - Lambton Woods (Toronto);
  - East bank of main channel of the Humber, north of Eglinton Ave. where black oak woodland is at risk (Toronto);
  - Rowntree Mills Park (Toronto);
  - St. George's Golf and Country Club where oak woodland is at risk (Toronto).



Legend

- Subwatershed Boundary
- Municipal Boundary
- Roads
- Pond/Lake
- Watercourse
- Shoreline
- Proposed Hydro Corridor Trail*
- Create New Multi-Use Trail Link*
- Humber Trail
- Waterfront Trail
- Humber Bay Canoe Route
- Combined Sewer Area
- Potential Retrofit Stormwater Management Facility
- High Priority HIP Site
- Further Modify In-Stream Barriers To Improve Fish Passage
- TRCA Property
- Riparian Areas Lacking Natural Cover
- Terrestrial Natural Heritage System Target - Existing Natural Cover
- Terrestrial Natural Heritage System Target - Potential Natural Cover**

0 1 2 4 6 Kilometers

Watershed/Subwatershed boundary has been derived from the Humber River Hydrology Model drainage boundaries.
Orthophotography: Spring, 2002
Road, Greenbelt, NEC, and ORM boundary © Queen's Printer for Ontario, 2008
*Routes shown are conceptual locations for trails. Accurate mapping will take place during detailed trail planning and implementation.
**Potential natural cover within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of the growth planning exercise.

Also see Humber River Fisheries Management Plan for more detailed information on target species and regeneration priorities for the aquatic system, Humber River State of the Watershed Report for information on existing conditions, Humber River Watershed Scenario Modelling and Analysis Report for information on potential future conditions, and Humber River Watershed Plan for recommended management strategies and actions.

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Humber River

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Natural Cover Restoration	Increase natural cover Rec. 4 Enhance natural vegetation sinks Rec. 43 Maintain natural stream flow patterns and protect aquatic habitats Rec. 45-47 Restore and enhance natural cover Rec. 63-68	TRCA has developed a Habitat Implementation Plan (HIP) for restoring natural cover and improving habitats on TRCA owned lands in the Humber watershed and implementation at high priority sites is on-going. Recovery planning for redside dace (MNR). Ecosystem recovery planning for the terrestrial system (TRCA) Town of Richmond Hill's Natural Heritage Strategy and Tree Preservation Strategy Programs that provide funding and other resources include Rural Clean Water Program, Canada-Ontario Environmental Farm Plan, Oak Ridges Moraine Environmental Enhancement Fund, Greenbelt Farm Stewardship Program, TRCA's Private Land Stewardship Programs and City of Toronto Climate Change Strategy. Other active programs include those of Humber Watershed Alliance, Ontario Streams, Trout Unlimited and Evergreen.	**Increase Natural Cover:** **2-1*** **TRCA**, Peel, York - Continue natural cover restoration work in Oak Ridges Corridor Park, Bolton Resource Management Tract, Nashville Resource Management Tract and Claireville Conservation Area.	✓	
			2-2* Whitebelt – **Brampton, Caledon, Vaughan**, TRCA Prepare restoration implementation plans (e.g. Habitat Improvement Plans or "HIP") for natural heritage system lands identified in municipal plans and coordinate with developers to enable implementation of natural cover in advance or concurrently with land development.	✓	
			2-3* Headwaters – **TRCA**, landowners, Peel, York, Caledon, King, Vaughan, Richmond Hill and NGOs - Prepare restoration implementation plans (e.g. HIPs) for targeted lands in priority areas to enable implementation of natural cover (and its hydrologic benefits) in advance of urban growth. Initial priorities are: ► Portions of the target terrestrial natural heritage system in subwatersheds 2 (Main – Palgrave to Bolton), 4 (Cold Creek) and 6 (Rainbow Creek) (**Figure 2.2**), 7 (West – West Branch) and 8 (West – East Branch) (**Figure 2.4**), and 15 (Purpleville Creek) (**Figure 2.3**) that are designated Protected Countryside by the Greenbelt Plan. ► Portions of the target terrestrial natural heritage system in subwatersheds 12 (East-Upper) and 13 (King Creek) that are designated Natural Core or Natural Linkage Area by the Oak Ridges Moraine Conservation Plan (**Figure 2.3**). ► Potentially significant recharge areas (**Figure 1.3**).	✓	✓

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Natural Cover Restoration *(continued)*			2-4 Existing urban areas - Municipalities, TRCA, NGOs – Plant trees and shrubs in portions of the target terrestrial natural heritage system in existing urban areas where opportunities exist: ▶ Toronto: Driftwood Park, Edgeley Park, Heathrow Park, North Park, Keelesdale Park, Watercliffe Park, Kipling Heights Park, King's Mill Park, Raymore Park, Summerlea Park, Étienne Brûlé Park, Magwood Park, Scarlett Mills Park, Weston Wood Park, Valleyfield Park, Alex Marchetti Park and Pine Point Park (**Figures 2.4, 2.5 and 2.6**) ▶ Brampton: municipal lands along main channels of the west and main branches of the West Humber, Castlemore Park and Manswood Park (**Figure 2.4**)	✓	
			2-5 **TRCA** - Develop GIS overlay maps in a convenient electronic format for use in refining terrestrial natural heritage implementation priorities and plans at the site scale using the following criteria: ▶ Lands within the target terrestrial natural heritage system (**Figure 1.1**). ▶ Stormwater management needs. ▶ Quantity of existing natural cover within catchments of headwater drainage features draining to brook trout and redside dace habitats ▶ Potentially significant recharge areas(**Figure 1.3**) ▶ Known opportunity sites for wetland restoration. ▶ Vulnerable habitat patches (those supporting species of conservation concern in urban or near-urban areas). ▶ Opportunities to "fill in" deficient patches with increased forest cover. ▶ Biodiversity criteria from TRCA Ecosystem Recovery Planning project.	✓	

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Natural Cover Restoration *(continued)*			2-6 **TRCA**, landowners, NGOs - Create and enhance riparian cover where lacking. Coordinate with restoration implementation plans noted above. Start with: ▶ Tree cover in brook trout habitat in subwatersheds 3 (Centreville Creek) and 4 (Cold Creek) (**Figure 2.2**), 7 (West- West Branch) (**Figure 2.4**), and 15 (Purpleville Creek) (**Figure 2.3**). ▶ Overhanging grassy meadow and shrub cover in redside dace habitat in subwatersheds 6 (Rainbow Creek) (**Figure 2.2**), 7 (West – West Branch) and 8 (West – Main Branch) (**Figure 2.4**), 12 (East – Upper), 13 (King Creek) and 15 (Purpleville Creek) (**Figure 2.3**).	✓	
			2-7 **TRCA**, landowners, NGOs - Restore wetland cover on marginal agricultural lands. Start with known opportunity sites in subwatersheds 2 (Main – Palgrave to Bolton) and 4 (Cold Creek) (**Figure 2.2**), 7 (West – West Branch) and 8 (West – Main Branch) (**Figure 2.4**), 12 (East – Upper) (**Figure 2.3**) and 17 (Black Creek) (**Figure 2.5**) where wetland aquatic species have been documented	✓	✓

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Sustainable Community Retrofits	Improve sustainability of development design Rec. 5,11 Implement stormwater retrofits Rec. 22-24 Prevent pollution Rec. 29 Enhance natural vegetation sinks Rec. 42-43 Maintain natural stream flow patterns and protect aquatic habitats Rec. 46-47 Manage the matrix Rec. 69 Develop active and participatory programs to raise awareness Rec. 78 Interpret natural and cultural heritage Rec. 108-109 Implement sustainable urban form Rec. 116, 118, 119 Increase water efficiency and conservation Rec. 141,142 Reduce energy use and increase non-fossil fuel alternatives Rec. 148,150 Monitor, evaluate and adjust Rec. 38, 40	City of Toronto's *Wet Weather Flow Management Plan* Implementation Stormwater retrofit studies of the City of Vaughan, Brampton, Town of Caledon and Richmond Hill City of Toronto's *Green Development Standard* York Region's Sustainability Strategy Peel Region's Liveable Peel Strategy Leadership in Energy and Environmental Design for Neighbourhood Development (LEED-ND) – *in pilot phase* Peel Region's Water Smart Peel Program York Region's Water For Tomorrow Program Toronto's Water Efficiency Program Living City Campus at Kortright	2-8* **TRCA,** Toronto, Brampton, Vaughan, Caledon and landowners - Develop sustainable neighbourhood retrofit action plans using an integrated approach including residential social marketing, naturalization, SWM, infiltration, energy and effectiveness monitoring. Start with neighbourhoods in: ▶ Subwatershed 6 (Rainbow Creek, **Figure 2.2**) ▶ Subwatershed 10 (West – Lower Branch, **Figure 2.4**) ▶ Subwatershed 17 (Black Creek, **Figure 2.5**) ▶ Subwatershed 19 (Emery Creek, **Figure 2.6**) ▶ Subwatershed 24 (Lower – Lambton to Mouth, **Figure 2.6**) See also Section 4 for lot level SW retrofit stewardship projects on residential, business, and institutional lands. See also Section 5 for SW infrastructure maintenance and financing actions.	✓	✓
			2-9* **Toronto and Vaughan** – Undertake projects identified in stormwater retrofit plans in Black Creek, Rainbow Creek, Lower Humber and West Humber subwatersheds. Projects in combined sewer areas should be undertaken first (**Figure 2.1**).	✓	✓
			2-10 **TRCA** – Demonstrate, monitor and evaluate green building designs and sustainable technologies at the Living City Campus at the Living City Campus at Kortright	**On-going**	✓
Aquatic Habitat	Optimize fish passage for native fish species Rec. 48-50 Support the Redside Dace Recovery Strategy Rec. 52 Improve recreational fishing	Centreville Creek Environmental Stewardship and Outreach Program. Taylor Pond in-stream barrier mitigation and channel naturalization. Humber Marshes habitat restoration	Partners: DFO, MNR, TRCA, Trout Unlimited, Ontario Streams, municipalities, NGOs, landowners In addition to projects 2-1, 2-5 and 2-6 noted above: 2-11* **TRCA**, NGOs - Continue restoration work in the Humber Marshes and Humber Estuary to increase wetland cover and improve aquatic habitat, as outlined in the TRCA	✓	

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Aquatic Habitat *(continued)*	opportunities Rec. 56-57	Rainbow trout and brown trout stocking program (MNR)	*Toronto Waterfront Aquatic Habitat Restoration Strategy*.		
		Lake Wilcox Shoreline Restoration Project	**2-12*** MNR, TRCA, Ontario Streams - Further modify the eight (8) in-stream barriers along the main channel between Bloor St. and Highway 401, to improve passage for jumping and non-jumping species, including repairing and improving the Raymore Park Fishway, upon completion of structural and fish passage assessments (Figure 2.6).	✓	
			2-13 **TRCA**, MNR, NGOs, volunteers - Conduct in-stream barrier surveys to further prioritize mitigation work that would support healthier, more abundant populations of target and recreational fishing species.	✓	✓
			2-14 **TRCA** - Undertake a study of Purpleville Creek to identify opportunities to improve habitat for use by brook trout, redside dace and rainbow trout.	✓	
			2-15 **TRCA** - Undertake a study of Rainbow Creek to identify opportunities to improve habitat for use by redside dace and/or rainbow darter	✓	
			2-16 **MNR** – Begin stocking the Humber River with Atlantic salmon to help re-establish the species in the watershed.		✓
Flood and Erosion Risks	Manage flood risks Rec. 30	Flood and erosion control programs (TRCA)	In addition to projects in Section 5 on Operations and Maintenance:		
			2-17 **Brampton, Toronto**, TRCA, landowners - Plant trees and shrubs in riparian areas lacking natural cover to help stabilize streambanks along reaches between McVean Dr., The Gore Rd., Castlemore Rd., and Queen St. (Brampton) and Watercliffe Park and Kipling Heights Park (Toronto) (**Figure 2.4**).	✓	

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Nature-based Recreation and Trails	Recognize and enhance the regional system for nature-based recreation Rec. 91 Complete the inter-regional trail network Rec. 92-100 Establish public access to a northern gateway to the Humber watershed greenspace system Rec. 101, 102 Form community partnerships for implementation Rec. 112, 113	TRCA Conservation Land Planning program Municipal trail plans *Oak Ridges Corridor Park Management Plan* *Palgrave Forest and Wildlife Area Trail Plan* *Boyd North and Glassco Park Management Plan* *Claireville Conservation Area Management Plan*	2-18 **TRCA, NGOs,** Toronto, York, Vaughan, King, Peel, Brampton, landowners - Create new trails to increase opportunities for healthy outdoor recreation and nature appreciation and sustainable modes of transportation (walk, bike): ▶ Complete missing link in West Humber Trail between Finch Ave. and Hwy. 407 (**Figure 2.4**). ▶ Complete missing link in Black Creek Trail between Lawrence Ave. and Downsview Dells Park (**Figure 2.5**). ▶ Complete missing link in Granger Greenway Trail between Steeles Ave. and Hwy. 7 (**Figure 2.6**). ▶ Between the Oak Ridges Trail and local trails in King City (**Figure 2.3**). ▶ Between Humber Trails Forest and Wildlife Area and Granger Greenway (proposed East Humber Trail, **Figure 2.3**). ▶ Between Humber Trails Forest and Wildlife Area and Oak Ridges Corridor Park (proposed East Humber Trail, **Figure 2.3**). ▶ Between Humber Trails Forest and Wildlife Area and Hackett Lake area (proposed Carrying Place Trail, **Figure 2.3**). ▶ Along east-west hydro corridor north of St. Clair Ave. (**Figure 2.1**). ▶ Along east-west hydro corridor north of Finch Ave. (**Figure 2.1**). ▶ Along east-west hydro corridor between Hwy. 7 and Hwy. 407 (**Figure 2.1**).	✓	✓

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Nature-based Recreation and Trails *(continued)*			2-19 **Businesses**, Caledon, Richmond Hill, Vaughan - Promote the distinctive nature-based recreation experiences of the "Hills of the Headwaters", "Kettle Lakes" and "Humber Valley Wilderness" as part of marketing campaigns for local tourism attractions and businesses in Palgrave, Mono Mills, Caledon East, Bolton, Oak Ridges, Kleinburg and Woodbridge (**Figure 1.5**).	✓	
			2-20 **TRCA, Toronto**, Vaughan, Brampton, Caledon - Close unauthorized informal trails or formalize trails where suitable. Start with informal trails in: ▶ Lambton Woods (Royal York Rd. and Dundas St. – Toronto). ▶ Claireville Conservation Area. ▶ Nashville Resource Management Tract. ▶ Bolton Resource Management Tract. ▶ Palgrave Forest and Wildlife Area.	✓	✓
Cultural Heritage	Fill gaps in archaeological knowledge Rec. 75, 76 Develop active and participatory programs to increase awareness Rec. 77, 78 Develop a living cultural heritage program Rec. 84	Black Creek Pioneer Village programs about pioneer life. Boyd Archaeological Field School Peel Heritage Complex King Township Museum Local Architectural Conservation Advisory Committees Municipal Heritage Boards	Partners: TRCA, Ministry of Culture, Aboriginal communities, municipalities, private and vocational archaeologists, Ontario Archaeological Society, Ontario Association of Professional Archaeologists, Ontario Heritage Trust		
			2-21 Conduct studies to improve our understanding of early human cultures and existing cultural heritage landscapes, including field investigations and local knowledge research, particularly in the Oak Ridges Moraine portions of the Town of Caledon and King Township.	✓	
			2-22* Establish a facility for archaeological artifact storage and document collections that is accessible to researchers (secure funding for capital and operations).	✓	

Table 2.1 Regeneration Project Priorities

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Implementation Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Cultural Heritage *(continued)*			2-23* Increase awareness of Carrying Place heritage by creating educational resources (e.g. book, video, webpage) and interpretive signs on public property along contemporary trails. Start along the Humber Trail, **Figure 2.1**, and Humber Trails Forest and Wildlife Area.	✓	
			2-24 Create new opportunities for themed experiences about past peoples, settlement history and present cultures, guided by cultural representatives, including educational resources about local cultural and natural heritage highlights for display at local festivals and events or permanent installation at suitable locations. Focus on Black Creek Pioneer Village, Living City Campus at Kortright, Old Mill and Palgrave areas, Oak Ridges Corridor Park, Seneca College King Campus, Bolton, Weston, Kleinburg-Nashville and Claireville Heritage Conservation Districts, Lake St. George Field Centre, and Conservation Areas.	✓	

3. Land Securement

In general terms, land securement refers to the act of bringing lands into public ownership or otherwise securing the assurance of their protection through private landowner agreements. Land securement tools include: planning/policy (e.g. *Planning Act, Conservation Authorities Act)*, stewardship (e.g. landowner agreements and education); and acquisition (i.e. securing land through title, easements and covenants on title).

The HWP recommends increasing natural cover from 32% to 39% of the watershed through implementation of the target terrestrial natural heritage system, as shown in **Figures 1.1 and 2.1**. The following priorities should be used to guide securement activities within the target terrestrial natural heritage system:

1. Locations in potential urban growth areas.
2. Locations in the Protected Countryside Areas of the *Greenbelt Plan* and *ORMCP* and Rural Areas of the *Niagara Escarpment Plan*.
3. Natural Core and Natural Linkage Areas designated in the *ORMCP*.
4. Areas of redevelopment in existing urban areas.

There are a number of groups active in land securement activities in the Humber watershed and there are further opportunities for partnerships among these groups. The securement groups should review their programs and consider ways to secure the 1.2% (446 ha) of the targeted terrestrial natural heritage system in the watershed that is currently not protected by policy mechanisms, within the next five years.

The HWP also recommends securement of lands, especially during redevelopment activities, to allow streams to evolve naturally. This will reduce the need for engineered methods to protect property and infrastructure from erosion and flooding. It also recommends lands be secured to enable expansion of the system of inter-regional trails, to create a northern gateway to the greenspace system of the Humber watershed via a proposed “Carrying Place Trail”, and to create additional public greenspace around growing communities.

See **Table 3.1** for a work plan of securement projects.

Table 3.1 Land Securement Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Securement of Terrestrial Natural Heritage	Secure the targeted system Rec. 60, 62 Investigate and conserve cultural heritage prior to land use change Rec. 73	Humber watershed securement initiatives of TRCA, municipalities, Nature Conservancy, ORM Land Trust, ORM Foundation, Ontario Heritage Trust	3-1* **TRCA** – Update the priority list for securement within the Humber watershed based on the HWP's recommended priorities within the TNHS (see above list).	✓	
			3-2* **Municipalities**, TRCA - Work with MPIR to investigate mechanisms, as may be necessary beyond planning measures, to secure the target TNHS lands in potential urban growth areas (aka, "whitebelt") that do not have legislated protection from urban development (estimated to be 446 ha).	✓	✓
			3-3 **Ontario Heritage Trust** - Consider securement of properties with cultural heritage value and those within high priority areas of the target terrestrial natural heritage system, through their Natural Spaces Land Acquisition and Stewardship Program.	✓	✓
Securement of Public Greenspace	Recognize and enhance the regional system for nature-based recreation Rec. 89, 90 Complete the inter-regional trail network Rec. 92-95 Establish public access to a northern gateway to the Humber greenspace system Rec. 101-102	Humber watershed securement initiatives of TRCA, municipalities, Nature Conservancy, ORM Land Trust, ORM Foundation, Ontario Heritage Trust	3-4* **TRCA** - Update the priority list for securement within the Humber watershed based on the HWP's recommended priorities for expanding the system of inter-regional trails and creating new public greenspace.	✓	
			3-5* **TRCA**, municipalities, NGOs – Secure lands to establish the missing link in the Humber Trail between Steeles Ave. and Hwy. 7 along the Main Humber	✓	
			3-6* **TRCA**, municipalities, NGOs – Undertake a land securement strategy for the proposed East Humber Trail.	✓	✓
			3-7* **TRCA**, Municipalities, NGOs – Undertake a study to: confirm the location of the historic Carrying Place trail; identify a conceptual route for the proposed contemporary Carrying Place Trail that connects the proposed East Humber Trail to a proposed northern gateway to the Humber greenspace system near Hackett Lake; and develop a strategy for the associated land securement and trail implementation.	✓	✓

Table 3.1 Land Securement Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Securement of Stream Corridors	Protect stream form Rec. 34	Secondary plans and plans of subdivision for redevelopment	3-8 **Municipalities**, TRCA - Seek opportunities to acquire lands in strategic locations to allow stream corridors to evolve naturally, without impacting property or infrastructure.	✓	✓

4. Stewardship and Education

A recurring theme in this plan is the need for initiatives to increase awareness and provide more information about ways that individuals, businesses and governments can contribute to a healthy, sustainable Humber watershed. The overall theme for stewardship and education programs is to encourage behavioural shifts to sustainable practices. This can include:

- energy conservation, water conservation and waste reduction
- organic lawn care
- landscaping with drought tolerant, native trees, shrubs & wildflowers
- lot level stormwater management (e.g. rain gardens, rain barrels, permeable pavements)
- pollution prevention
- spills prevention and management
- avoidance of practices that aggravate flood risk
- control of invasive alien species
- production and purchase of locally grown food
- stewardship of natural areas (including garbage clean up, community monitoring, bird boxes, tree tending, and addressing encroachment issues)
- awareness of cultural heritage (e.g. inter-relationships between the natural environment and past peoples' activities).
- erosion and sediment control and site restoration practices for construction sites
- integrated pest management for golf courses
- best management practices for farms and rural properties.

The Watershed Plan also highlighted the urgency of this shift to sustainable behaviour, not just to reduce our present impact on the watershed, but to create an accepting market for innovative community designs which will be the basis of long term growth planning and decision-making in the next five to ten years. These decisions will determine the watershed's long term health.

The *Action Plan for Sustainable Practices – for Residential and Business Sectors in the GTA (Freeman, 2006)* recommends a multi-pronged marketing campaign aimed at homeowners and builders in the GTA. For businesses, a package of measures is proposed, including stream-lined approvals, regulatory changes, financial incentives, information tools, awards and a corporate leaders program.

Table 4.1 lists stewardship and education projects and is divided into seven sections:

1. Technical knowledge transfer
2. Sustainable urban landscapes
3. Rural lands
4. Resource use
5. Heritage interpretation
6. Formal education
7. Recognition

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
4.1. Technical knowledge transfer: training workshops, seminars and materials						
Sustainable Technologies	Developers, consultants and builders	Implement sustainable urban form Rec. 120	Sustainable Technologies Evaluation Program (STEP) includes workshops and materials to disseminate information; led by TRCA; jurisdiction wide.	4-1* **TRCA** - Consider Watershed Plan priorities in preparation of annual training work plans. Deliver in partnership with academia, business, media, trade fairs.	✓	✓
Erosion and Sediment Control	Municipal and CA staff, consultants and contractors	Improve erosion and sediment control and site restoration Rec. 17	TRCA delivers annual technical workshops in different locations throughout the jurisdiction. e.g. As part of STEP, TRCA hosted a technical workshop on erosion and sediment control in March 2007.	4-2* **TRCA**, municipalities - Continue and expand existing training program on erosion and sediment control for urban construction.	✓	✓
Site Restoration and Planting	Municipal and CA staff, consultants and contractors, horticultural industry	Restore and enhance natural cover Rec. 65 Manage the matrix Rec. 69, 71, 72	TRCA maintains information about local suppliers of native plants (within 50 miles) TRCA's Nursery and Indigenous Plant Propagation Program supplies native trees, shrubs and aquatic vegetation to support Authority regeneration activities across the watersheds. TRCA's Valley & Stream Regeneration Program provides technical planning/design and regeneration implementation services through ongoing funding partnerships with member municipalities. Eligible projects include (but not limited to): ▶ tree and shrub planting for naturalization, ▶ erosion and sediment control, ▶ wetland habitat creation, and ▶ trails.	4-3 **TRCA** - Maintain current nursery propagation and production of native plants from locally collected seed sources to facilitate TRCA and other partner regeneration/planting initiatives throughout TRCA's jurisdiction.	✓	✓
				4-4 **TRCA** - Maintain and publish an inventory of native plant suppliers.	✓	✓
				4-5 **NGOs**, TRCA, - Outreach to encourage local growers and retailers to grow and stock more native plants.	✓	
Invasive Alien Species	Canadian Food Inspection Agency, MNR, TRCA,	Manage the matrix Rec. 71	CFIA has established a regulated area in parts of Toronto and Vaughan in the Humber watershed to prevent the spread of the Asian	4-6 **TRCA**, municipalities - Convene a forum for information sharing on invasive species management techniques and upcoming threats.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Invasive Alien Species *(continued)*	municipalities, garden and angling supply retailers, gardeners, anglers		Long-Horned Beetle. TRCA Stewardship staff provides hands on training and work days for volunteers interested in assisting with invasive species removal on public lands and is preparing an invasive species fact sheet targeted at homeowners City of Toronto Urban Forestry group has undertaken invasive alien species control projects (e.g. dog-strangling vine in South Humber Park and Lambton Park)	4.7 **CFIA, MNR, TRCA** - Provide educational materials about invasive alien species for distribution at gardening and angling supply retailers.	✓	
Sustainable Urban Form	Developers, consultants, builders	Implement sustainable urban form Rec. 118, 119, 120		**4-8* Green Building Councils**, TRCA, municipalities, BILD, Canadian Urban Institute, NGOs, media - Conduct seminars on green building and certification programs (e.g. LEED - Leadership in Energy and Environmental Design) for developers, builders and consultants	✓	
Sustainable Purchasing	Home buyers and media	Implement sustainable urban form Rec. 118, 119, 120		**4-9* Green Building Councils**, TRCA, municipalities, BILD, NGOs, media - Conduct seminars on green building and certification programs for the public and media	✓	
Spills Prevention	Municipal staff	Prevent pollution Rec. 29	Municipal Emergency Management Plans may incorporate spill management plans	4-10 **Municipalities** - Develop a public education strategy for spills prevention coupled with targeted outreach with industrial sectors (trucking, waste disposal, construction)	✓	✓
4.2. Sustainable urban landscapes						
Healthy Yards	Homeowners and renters, garden contractors	Improve sustainability of development design Rec. 12 Implement stormwater retrofits Rec. 22-24 Prevent pollution Rec. 29 Manage flood risks Rec.	TRCA's Healthy Yards Program includes a website, publications, garden makeover contests, information about local suppliers of native plants (within 50 miles), and workshops, available to all communities in the jurisdiction. Adapted from TRCA's program, Richmond Hill's Healthy Yards program offers subsidized native plan and organic lawn care kits to its residents.	4-11 Various partners - Continue existing programs	✓	✓
				4-12* TRCA, municipalities, NGOs – Develop a strategy for co-ordination of outreach programs and a lot level marketing campaign (with residential, business and institutional lands focus), as part of sustainable neighbourhood retrofit projects (see Section 2 Regeneration). Consider feasibility of expanding GTA wide.	✓	✓

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Healthy Yards *(continued)*		30 Manage the matrix Rec. 69-72	Toronto's Urban Forestry Program and Wet Weather Flow Stewardship and Outreach Program funds community projects including naturalization, stewardship, and public outreach.	4-13 **TRCA** - Continue to deliver and evolve the TRCA Healthy Yards Program based upon participant feedback forms and community-based social marketing research.	✓	
			Local Enhancement and Appreciation of Forests (LEAF) initiative offers native trees and shrubs for backyard plantings in the City of Toronto. Peel Green Home and Garden Expo provides information on how to become more efficient inside and outside your home by highlighting energy and water efficient products and practices, renewable energy, organic gardening products, etc.	**4-14*** **TRCA**, municipalities – Promote rain gardens and produce related resources and garden transformation stories on Healthy Yards web sites	✓	
			Peel Region offers Water-wise Gardening Workshops promoting landscaping with drought-tolerant native plants, effective watering practices, composting and pesticide awareness. York Region offers free water efficient landscaping audits and opportunities to learn about water wise gardening techniques through demonstrations at participating garden centres and conservation areas.	4-15 **TRCA, municipalities** - Host Organic Lawn Care workhops targeted at lawn care providers.	✓	
Public Greenspace	Homeowners, NGOs	Manage the matrix Rec. 69-72 Protect unique experiences of the greenspace system Rec. 103	TRCA has produced a fact sheet titled Natural Neighbours promoting good stewardship practices that is available for distribution to property owners adjacent to open space and natural areas. Town of Richmond Hill provides homeowners	4-16 **Municipalities** – Distribute educational materials discouraging inappropriate uses of public greenspace (i.e. encroachments) and promoting good stewardship practices and distribute to property owners adjacent to open space and natural areas.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Public Greenspace *(continued)*			with information and guidelines regarding inappropriate uses of public greenspace (i.e. encroachments) and good stewardship practices. Claireville Community Stewardship Project Centreville Creek Community Outreach and Environmental Stewardship Program Black Creek Project Humber Valley Heritage Trail Association TRCA's Multicultural Environmental Stewardship Program provides: - materials in multiple languages - displays at cultural events - subsidized New Canadian visits to Conservation Areas - research, reports and shared information regarding various religious practices including river offerings and their impact on natural systems.	4-17 **TRCA** - Continue existing stewardship groups and projects for public greenspace areas and trails and establish new ones (e.g. Oak Ridges Corridor Park).	✓	✓
Invasive Alien Species	Homeowners, volunteer groups, garden supply retailers, nurseries	Manage the matrix Rec. 71	City of Toronto Urban Forestry group has undertaken projects to control alien invasive species (e.g. dog-strangling vine in South Humber Park and Lambton Park)	**4-18* TRCA, municipalities, NGOs, CFIA** - Co-ordinate the development of educational materials on invasive species removal techniques and engage volunteer groups to help in monitoring and removal.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Invasive Alien Species *(continued)*				4-19 **Municipalities, TRCA, Landowners**, Volunteers, NGOs - Remove invasive alien species of plants to improve habitat for native species: ▶ TRCA: Ebenezer Tract in Claireville Conservation Area ▶ Toronto: Lambton Park, South Humber Park, Lambton Woods, Chapman Valley Park, east bank of main channel of the Humber north of Eglinton Ave., Rowntree Mills Park, St. George's Golf and Country Club, valleylands around Humber Arboretum, Keelesdale Park and Black Creek Parklands.	✓	
Pollution Prevention	Youth and adult groups, general public	Prevent pollution Rec. 29	TRCA Yellow Fish Road Storm Drain Marking Program teaches people that whatever goes down the street sewer ends up in rivers and lakes. Yellow fish symbol is applied beside the storm drain, door hanger literature distributed to the surrounding homes.	4-20 **TRCA, municipalities, school boards** - Continue existing program	✓	
Environmental Stewardship for Businesses and Institutions	Businesses & institutions	Improve sustainability of development design. Rec. 5, 11, 12 Implement sustainable urban Rec. 118-119	MOE has a Source Water Protection education and outreach program that is being implemented by TRCA staff to those property owners within 100 metres of a municipal well. The program offers a 100% grant for any small businesses within 100 m that would like a Pollution Prevention Review. TRCA is initiating an eco-industrial park project (Project Green) in partnership with the Freater Toronto Airport Authority in the Etobicoke and Mimico Creek watersheds OCETA –TRCA partnership for pollution prevention and energy conservation projects	**4-21*** **Municipalities**, TRCA - Implement demonstration projects for SWM retrofit, naturalization and other sustainable practices with the business and institutional landowners (See also sustainable neighbourhood retrofit project in Section 2 and healthy yards outreach programs and marketing campaign above).	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
4.3. Rural lands						
Water Quality and Terrestrial Habitat	Rural land-owners	Prevent pollution Rec. 28, 29 Restore and enhance natural cover Rec. 68 Provide services for local farm businesses Rec. 125-129	TRCA's Rural Water Quality Program and the seamless Peel Rural Water Quality Program delivered with CVC receives GLSF funding to work with farmers across the jurisdiction to provide financial and technical assistance to encourage and promote beneficial management practices on farms, including but not limited to fencing cattle out of streams and proper manure storage. Caring for the Moraine Landowner Contact Program implemented by TRCA with funding from ORMF: provides non-farm rural landowners with technical and financial assistance to implement woodlot, wetland and riparian projects on their private property. Priority areas include portions of Main Humber subwatershed. Managed Forest Tax Incentive Program, operated by the Ontario Ministry of Natural Resources for properties > 10 acres Rural Tree and Shrub Program operated by TRCA for rural landowners for properties > 2 acres York Natural Planting Partnership for Private Landowners provides site visitation and technical advisory services to assist landowners in achieving environmental objectives through plant material supply and installation. Program is open to qualifying private landowners within the Region of York/TRCA jurisdiction. Projects are accepted and ranked for funding support subject to established criteria.	Partners: **TRCA, York Region, Peel Region, City of Toronto**, MNR, Great Lakes Sustainability Fund, Oak Ridges Moraine Foundation, Friends of the Greenbelt Foundation		
				4-22 **TRCA**, municipalities – Continue to host workshops and deliver presentations for farm and non-farm rural audiences that provide hands on training, information and technical assistance.	✓	✓
				4-23 **TRCA**, MOE, municipalities – Continue to implement the Source Protection Program on behalf of the MOE to disperse information and funding to property owners within 100m of a municipal well.	✓	✓
				4-24 **TRCA**, municipalities – Continue to deliver the Rural Clean Water Program with a seamless delivery in York Region with LSRCA	✓	✓
				4-25 **TRCA**, municipalities – Develop and implement an Equestrian Stewardship Program in King Township	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Environmental Farm Plans	Farmers (landowners and tenants)	Prevent pollution Rec. 28, 29 Manage the matrix Rec. 68 Provide services for local farm businesses Rec. 125-129	TRCA Rural Water Quality Stewardship Program (see above) staff also visit TRCA owned agricultural lands, interview tenant farmers and prepare an Environmental Farm Plan (EFP) for each property. Healthy Futures for Ontario Program (OMAF)	4-26 **Ontario Ministry of Agriculture and Food, Ontario Soil and Crop Improvement Association, TRCA** - Continue existing programs, giving priority to farms on the clay soils of the South Slope and Peel Plain physiographic regions.	✓	
Agricultural Sustainability	Farmers (landowners and tenants), municipalities, TRCA	Provide services for local farm businesses Rec. 125-129	*GTA Agricultural Action Plan* implementation programs.	4-27 **GTA Agricultural Action Plan Implementation Committee**, NGOs (e.g. Friends of the Greenbelt Foundation), TRCA – Develop work plans to co-ordinate action on those GTA Agricultural Action Plan recommendations noted as having particular relevance in the Humber watershed. See also Section 5 Operations and Maintenance for publicly owned agricultural lands.	✓	
				4-28 **TRCA** - Acquire and provide collective access to agricultural equipment as shared resources and commit to supporting young farmers and New Canadians entering the agricultural industry.	✓	
				4-29 **TRCA** - Assess the total area of TRCA owned lands available for agricultural production and commit to preserving it.	✓	
Local Food First	Institutions, restaurants, businesses, news media and general public	Support local food and awareness of sustainable agriculture Rec. 130-134	Farmers' markets and food/tourism festivals Programs to increase public awareness of local, sustainable agriculture e.g. Foodland Ontario. City of Toronto Urban Farm at Jane St. and Steeles Ave. FarmStart Project at Claireville Conservation Area to help train new farmers. TRCA is introducing an urban agriculture program at the Living City Campus at Living City Campus at Kortright to raise public awareness of the benefits of local foods.	Partners: Municipalities, regional Federations of Agriculture, restaurant associations, TRCA, NGOs (e.g. Friends of the Greenbelt Foundation), GTA Agricultural Action Ctte. 4-30 - Support local food festivals through partnerships, e.g. Conservation Areas as venues, integrate with programs like Maple Syrup Festival.	✓	✓
				4-31 - Build partnerships with groups already in action promoting local food through the NGO "Friends of the Greenbelt Foundation".	✓	
				See also "Recognition" initiatives below.		

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
4.4. Resource use						
Water Supply and Conservation	All sectors	Increase water efficiency and conservation Rec. 141	York Region's Water for Tomorrow Program Peel Region's Water Smart Peel Program City of Toronto Water Efficiency Program	4-32 **Municipalities** - When water efficiency programs are updated, consider incorporating: ▶ rain-harvesting, ▶ water efficient landscaping, ▶ monitoring of water use rates, ▶ pricing incentives, ▶ recommendations from *Action Plan for Sustainable Practices* ▶ partnerships with schools and community groups. ▶ increased incentives for adopting water efficient technologies for residents serviced by groundwater	✓	✓
Energy and Waste	All sectors	Reduce energy use and increase non-fossil fuel alternatives Rec. 144-151 Reduce waste Rec. 152-157	Greater Golden Horseshoe Mayors' Megawatt Challenge TRCA's Sustainable House Demonstration (Living City Campus at Kortright) Municipal waste reduction and management programs Renewable Energy Road Map (Ontario wide) Project Green – GTA Eco-industrial Park	Partners: Municipalities, utilities, school boards, BILD, TRCA		
				4-33 - Continue with existing programs	✓	
				4-34 - Promote the development of Municipal Energy Management Plans and where appropriate District Energy Plans	✓	
				4-35* - Develop an outreach program based on the results from the Renewable Energy Road Map to promote the uptake of renewable energy technologies	✓	
				4-36 - Promote standards such as Energy Star and green building certification (e.g. LEED, Green Globes) for new buildings	✓	
4.5. Heritage interpretation						
Natural Heritage	Local residents, general public, school students, Park and Conservation	Support Redside Dace Recovery Strategy Rec. 55 Improve recreational fishing opportunities	Existing programs include: ▶ Living City Campus at Kortright – many interpretive events and materials ▶ Watershed on Wheels for school students Grades 1-6 provides in-class	Partners: TRCA, municipalities, school boards, MNR, Ontario Streams		
				4-37 - Continue existing programs. See also Section 7 for educational benefits of volunteer monitoring.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Natural Heritage *(continued)*	Area visitors	Rec. 58 Interpret natural and cultural heritage Rec. 108-110 Form community partnerships Rec. 112, 113 Increase water efficiency and conservation Rec. 141	curriculum-based programming, free of charge; booked to full capacity every school year ▶ Albion Hills Field Centre Environmental Education Programs ▶ Lake St. George Field Centre Environmental Education Programs ▶ York Children's Groundwater Festival ▶ Peel Children's Water Festival ▶ City of Toronto's Discovery Walks Program ▶ Town of Richmond Hill's Walks on the Wild Side Outdoor Recreation and Environmental Awareness Program ▶ Citizen Scientist group (volunteers collect fish and invertebrate data)	**4-38*** **TRCA, NGOs, municipalities** - Organize annual community festivals or events and provide opportunities to learn about and celebrate the natural and cultural heritage of the Humber River (e.g. Heritage Day – February; World Water Day – March; Earth Day – April; International Migratory Bird Day – May; Canadian Rivers Day – June; Canada Day – July; World Fisheries Day – November).	✓	
				4-39 Install educational signs about angling seasons, sport fish consumption, invasive species threats and how to avoid their spread at public access points to Humber Marshes, Étienne Brûlé Park (near Old Mill dam) and at existing fishways.	✓	
				4-40 Install educational signs about redside dace at Boyd Conservation Area and Living City Campus at Kortright and brook trout at Albion Hills Conservation Area.	✓	
				See also Section 2 on Regeneration		
Cultural Heritage	Local residents, general public, school students, Park and Conservation Area visitors, municipal heritage committees, Ministry of Culture	Interpret natural and cultural heritage Rec. 108-110 Develop active and participatory programs Rec. 77-83 Develop a living cultural heritage program Rec. 84	Existing programs include: ▶ Black Creek Pioneer Village – many interpretive events and materials ▶ Peel Heritage Complex ▶ King Township Museum ▶ TRCA Archaeological Field School ▶ Ontario Heritage Trust; provincial heritage plaque system ▶ Canadian Heritage site signs ▶ Municipal Heritage signage programs ▶ TRCA Multicultural Environmental Stewardship Program ▶ McMichael Canadian Art Collection ▶ Canadian Heritage Rivers System	Partners: TRCA, Municipalities, NGOs 4-41 Continue existing programs.	✓	
				4-42* Develop pilot project for Ontario history and archaeology seminars for adults, featuring Humber watershed sites. Special attention to reaching out to new Canadians and descendents of the watershed as target audience	✓	
				4-43 Build partnerships to provide learning opportunities and increase awareness of living culture, such as photography, drawing, painting and performance arts.	✓	
				4-44 **TRCA** - Add cultural heritage content to the Multicultural Environmental Stewardship Program	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Cultural Heritage *(continued)*				4-45 Identify candidate Heritage Conservation Districts and Cultural Heritage Landscapes for designation under the Ontario Heritage Act, in consultation with Municipal Heritage Boards.	✓	
				4-46 Provide expertise and resources to local ethnic groups to establish forms of public recognition of their culture (past and present) in the watershed, including First Nations groups as well as 19th - 21st century ethnic communities and influences.	✓	
				4-47 Develop a toolkit of interpretive materials (static and mobile signs or displays) that describe links between human and natural heritage (e.g. the influences of human activities on historic and current environments).		✓
				4-48 Develop and install signs for road and pedestrian bridges identifying the river's name, communities, streets and public buildings with historic names, trail guides/maps and public art.		✓
				4-49 Protect and interpret cultural features that also serve as wildlife habitat (e.g. barn owls shelter in active farm buildings, turkey vultures nest in old silos or barns).	✓	
				4-50 Build partnerships to enhance "living culture" interpretive and tourism opportunities in the Watershed (e.g. Identify architectural assets in need of restoration and look for opportunities to revitalize heritage properties by forming partnerships to increase revenue and find adaptive re-use, such as event facilities, restaurants, community centres, and art centres/performance spaces.)	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Aboriginal Heritage	Public, school students	Establish a communications plan with Aboriginal groups Rec. 74 Fill gaps in archaeological knowledge Rec. 75, 76	Ontario Association of Professional Archaeologists is leading an initiative to develop a communication plan. TRCA's Boyd Archaeological Field School Ontario Archaeological Society's First Nations Liason Committee	**4-51*** Develop a communications plan in partnership with Aboriginal groups including: ▶ Identification of key groups and contacts ▶ A protocol for consultation with recognized Aboriginal groups ▶ Partnership opportunities for interpretation and awareness programs, storing and viewing of artifacts, program development, education and events.	✓	
				4-52 Develop educational and interpretive resources (e.g. signs, a guide book) about heritage along inter-regional trails that follow the historic Carrying Place Trail route and hold themed events (e.g. interpretive hikes).		✓
				4-53 Determine appropriate teaching sites for public archaeology including field schools at a Pre-Contact site, with Aboriginal consultation and approval, and on a Post-Contact site, with community consultation and approval, partnered with the TRCA Archaeology Program, the Ontario Heritage Trust, the Ontario Archaeological Society, local school boards, and other stakeholder organizations.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
4.6 Formal education						
Curriculum & Program Development **Sustainable Practices** **Natural and Cultural Heritage**	Ministry of Education, Boards of Education, TRCA	Develop active and participatory programs Rec. 83 Interpret natural and cultural heritage Rec. 108-110	Ministry of Education's has released a new vision for environmental education in Ontario's education system, *Shaping Our Schools, Shaping Our Future*, to help prepare students to be environmentally responsible citizens. Ontario Ecoschools is a provincial program addressing climate change at a school and board level through programming that integrates what kids learn with how schools are run. Under the program, schools can achieve certification to recognize achievements in energy conservation, waste minimization, school grounds greening and ecological literacy. TRCA owns and operates five year-round educational facilities (four of which are located within the Humber watershed: • Albion Hills and Lake St. George - offering elementary and some secondary school students 2.5 or 5 day educational experiences covering environmental science, arts, leadership, and recreation programming and unique on-site stewardship programs. • Living City Campus at Kortright and Black Creek Pioneer Village – offering day use facilities	**4-54*** Encourage all Boards of Education in the Humber watershed to participate in the Ontario Ecoschools Program and schools to achieve certification.	✓	✓
				4-55 Identify additional opportunities for TRCA's Archaeological Field School to contribute to the Ontario school curriculum on Aboriginal and pioneer life and develop a sustainable funding plan.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Curriculum & Program Development **Sustainable Practices** **Natural and Cultural Heritage** *(continued)*			TRCA published *A Systems Thinking Curriculum for Learning in the Living City* (2006) to guide work in sustainablility and environmental education. TRCA Watershed on Wheels Program provides in-class programs to Grade 1 to 8 students TRCA Aquatic Plants Program provides supplies and materials to propagate aquatic plants in the classroom and engage students in plantings at designated community wetland rehabilitation sites across the GTA. Investigating The Living City Spaces Program (TRCA) provides seasonal programming at unique places and spaces. Peel Region offers guided tours of the Peel Integrated Waste Management Facility, Lakeview Water Treatment Facility and Community Recycling Centre. *Peel Water Story* Curriculum Resource provides a teacher-targeted resource in all Peel schools for presenting people's relationship to Peel's natural and human water systems, past and present including local water history and sustainable water practices. Peel EcoFair is an annual event showcasing environmental stewardship projects in Peel Schools.	4-56 Develop and deliver educational programs about First Nations heritage at Black Creek Pioneer Village and Living City Campus at Kortright, with involvement by cultural representatives, to assist schools with implementing the Ontario school curriculum	✓	
				4-57 TRCA, Ministry of Education, Boards of Education,– Re-introduce a High School environmental education credit course, which may include a watershed focus, to be taught at residential field centres.	✓	

Table 4.1 Stewardship and Education Projects

Note: 1-1* = top priority projects

Theme	Target Audience	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
4.7. Recognition programs						
Sustainable Practices	Residents, businesses, agencies and institutions	Implement sustainable urban form Rec. 120 Prevent pollution Rec. 29 Manage the matrix Rec. 72	Federation of Canadian Municipalities awards for municipalities	Partners: Everyone		
			"Conservation Partner" sign provided by TRCA to private rural landowners that participate in stewardship programs Environmental garden awards (Toronto) Canadian Institute of Planners Ontario Professional Planners Institute Communities in Bloom Green Building Council Landscape Ontario	4-58 Continue existing recognition programs and ensure that Humber watershed projects are profiled where appropriate. Consider establishing "leaders in sustainable practices" award in co-operation with high profile stakeholders and in co-ordination with a business leaders peer outreach program.	✓	✓
Local Food First	Institutions, restaurants and businesses, TRCA, federal and provincial agencies, GTA Agricultural Action Committee	Support local food and increase awareness of sustainable agriculture Rec. 132	TRCA has adopted a local food purchasing policy for its Food Services.	4-59* Adopt a local food procurement policy	✓	✓
Cultural Heritage	Public	Develop active and participatory programs Rec. 77-83	Ontario Archaeological Society Awards Governor General's Award for Excellence in Teaching Canadian History	4-60 **Ontario Archaeological Society** – Continue to provide profile for public cultural heritage programs and individuals who promote cultural heritage.	✓	✓

5. Operations and Maintenance

Property managers responsible for operations and maintenance of public property such as roads, parks and infrastructure, or private property such as golf courses, cemeteries or commercial/industrial lots, should consider ways they can incorporate the Watershed Plan's directions into their ongoing practices and programs. For example, naturalization schemes could be adopted as part of landscaping practices and thereby contribute to improved lot level water management and the achievement of our terrestrial natural heritage objectives.

Maintenance recommendations are noted within many of the strategies, however there are two significant recommendations for new formalized maintenance programs. First, our water strategies underscore the need for municipal operation and maintenance programs for stormwater management infrastructure, including the clean-out of accumulated sediment in ponds. Routine maintenance activities may present opportunities to optimize the performance of these stormwater management facilities through minor adjustments in operation, while larger maintenance projects may represent cost efficient opportunities to undertake major retrofit projects to improve facility performance.

The second new operations program being recommended relates to public lands in the Humber watershed. The nature-based recreation strategies identify the need for operational agreements for these lands, particularly with respect to responsibility and funding for operations, maintenance and enforcement.

Table 5.1 sets out implementation projects for these and other operations and maintenance issues.

Table 5.1 Operations and Maintenance Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Stormwater Infrastructure	Implement stormwater retrofits Rec. 22-24 Maintain stormwater infrastructure Rec. 25-27 Prevent pollution Rec. 29	Performance monitoring undertaken by Richmond Hill has identified SWM ponds in need of maintenance and "recommissioning opportunities" (i.e. opportunities to optimize performance of existing SWM ponds). Toronto is undertaking storm sewer outfall studies to identify sources of pollutants of bacteria and phosphorus in Black Creek subwatershed.	**5-1*** **Municipalities,** TRCA – Prepare or update comprehensive stormwater management master plans for enhanced controls and low impact development in existing urban areas and new developments.	✓	
			5-2* **Municipalities** - Formalize stormwater infrastructure maintenance programs to monitor the performance of existing stormwater management ponds, conduct maintenance and sediment clean-out when required, and undertake "recommissioning" through minor modifications to optimize performance with respect to water quality and erosion control.	✓	✓
			5-3* **Municipalities** – Investigate innovative financing mechanisms such as SWM fees (municipal water and sewer bill) and credits for property owners, to help fund SW maintenance programs and retrofit projects.	✓	
			5-4* **Municipalities**, in co-operation with TRCA should: ▶ Develop guidelines for monitoring, maintenance and recommissioning of municipal SWM facilities. ▶ Conduct assessments of sediment accumulation in SWM ponds and develop prioritized lists of clean-out projects. ▶ Undertake a study to investigate simpler techniques for carrying out pond clean outs, sediment disposal alternatives and develop cost estimates for overall SWM facility maintenance. ▶ Initiate a study that evaluates the benefits of biodegradable anionic polymers in reducing the cost of sediment removal from stormwater ponds and wetlands.	✓	
			5-5* **Toronto, Brampton** – Undertake urban storm sewer outfall studies to identify high priority sources of bacteria and phosphorus. Focus on: ▶ Lower Humber subwatershed ▶ West Humber subwatershed	✓	

Table 5.1 Operations and Maintenance Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Stormwater Infrastructure *(continued)*			5-6* **Municipalities** – Undertake retrofits of conveyance and end-of-pipe stormwater measures as part of road reconstruction projects to provide improved water quantity and quality control.	✓	✓
Nature-based Recreation Facilities and Lands	Recognize and enhance the regional system for nature-based recreation Rec. 89 Protect the unique experiences of the Humber greenspace system Rec. 103, 104 Develop plans to balance public access and resource protection Rec. 106, 107	There are many individual plans for nature-based recreation facilities e.g.: ▶ *Oak Ridges Corridor Park Management Plan* ▶ *Palgrave Forest and Wildlife Area Trail Plan* ▶ *Cold Creek Conservation Area Management Plan* ▶ *Boyd North and Glassco Park Management Plan* ▶ *Claireville Conservation Area Management Plan* A 213 km trail network has already been established by a variety of partners. Agreement between TRCA and City of Toronto for operation and maintenance of TRCA-owned valleylands in Toronto.	5-7 **TRCA**, municipalities - Establish a multi-partner program with long term funding commitments and a funding formula to support maintenance and reinvestment in existing properties as well as further expansion and development of the regional system for nature-based recreation.	✓	
			5-8 **TRCA** - Prepare management plans, including baseline studies of trail use, for: ▶ Bolton Resource Management Tract ▶ Nashville Resource Management Tract ▶ Albion Hills Conservation Area, Campground and Field Centre ▶ North Peel Lands ▶ Glen Haffy Conservation Area	✓	✓
			5-9 **Municipalities**, TRCA – Prepare management plans for public greenspace and natural areas being managed by municipalities.	✓	✓
			5-10 **TRCA, municipalities** – Review plans to ensure adequate management strategies to protect unique experiences of the Humber greenspace system, amend plans where necessary, and continue to implement existing plans for individual areas.		✓
Other Public & Institutional Properties	Increase natural cover Rec. 3, 4 Prevent pollution Rec. 29	Some municipalities have environmental management programs for their properties (e.g. City of	5-11 **TRCA** - Prepare a map showing locations of public and institutional properties in relation to the TNHS and stormwater management priorities.	✓	

Table 5.1 Operations and Maintenance Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
(e.g. parks, community centres, schools, churches, cemeteries, golf courses, hydro corridors)	Restore and enhance natural cover Rec. 63, 64, 67 Manage the matrix Rec. 71, 72 Develop plans to balance public access and resource protection Rec. 106, 107	Toronto's environmental code for parks and community centres, Richmond Hill's natural heritage strategy is in progress) Some golf courses are participating in the Audubon Program or similar programs to incorporate environmental considerations into management activities.	5-12 **TRCA** - Facilitate technical transfer among public and institutional landowners (e.g. regarding naturalization, invasive species, Canada geese, integrated pest management, stormwater management, pollution prevention etc).	✓	✓
Transportation and Roads	Prevent pollution Rec. 29 Manage the matrix Rec. 71, 72	Most municipalities and the MTO have snow disposal and road salt management plans.	5-13 **Municipalities, MTO** - Review and implement existing management and monitoring plans with consideration for new information arising from the *Humber River Watershed Plan* (e.g. groundwater recharge/discharge).	✓	
			5-14 **Municipalities, MTO** - Review and adapt operations to minimize the impacts of transportation on natural heritage lands in the watershed.	✓	✓
Publicly-owned Agricultural Lands	Provide GTA wide services for local farm businesses Rec. 125-129 Support local food and increase public awareness about sustainable agriculture Rec. 130-134 Implement policies to support agriculture Rec. 135-140	TRCA's new operating practice is to allow longer leases on its lands. An agricultural policy to foster sustainable farm operations is in preparation. Environmental Farm Plans are being developed and implemented for TRCA owned farm lands. TRCA has several projects underway in the Humber Watershed promoting urban agriculture and research into new crops for niche markets (e.g. Toronto Urban Farm, agreement with FarmStart for a training farm at Claireville CA, and an urban farm demonstration program at the Living City Campus at Kortright).	5-16 **TRCA** – Continue policy supporting longer farm leases. Seek opportunities to celebrate near urban agriculture as an expression of culture, in addition to their roles in food production and land/water stewardship.	✓	✓
			5-17 **Municipalities** - Other public landowners should recognize and support agriculture as a long term use (e.g. longer term leases) when leases come due.	✓	✓
			5-18 **TRCA** - Seek farm tenants who are willing to test new crops and grow food for local markets on TRCA land.	✓	✓
			5-19 **TRCA** - Co-ordinate farmland initiatives among public landowners in the GTA	✓	
Flood and Erosion Risks	Manage flood risks Rec. 30, 31	The GTA Flood Program provides services in four areas:	5-20 **TRCA** - Update the GTA Flood Program to achieve compliance with Provincial Guidelines (*Ontario Flood Forecasting and Warning Implementation Guidelines for Conservation Authorities and MNR*), when available.	✓	

Table 5.1 Operations and Maintenance Projects

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Flood and Erosion Risks *(continued)*		▶ Program delivery/administration ▶ Forecasting ▶ Communications ▶ Flood operations ▶ Flood and Erosion Control Programs (TRCA)	5-21 **TRCA** - Continue: ▶ Flood forecasting and warning program; ▶ Real time precipitation and stream gauge network; ▶ Flood vulnerable site database. ▶ Operate and maintain Claireville Dam for flood control.	✓	✓
			5-22* **TRCA** – Update the Claireville Dam operations manual	✓	
			5-23* **TRCA**, municipalities – Undertake an annual proactive program of EA projects to implement high priority flood risk remediation projects identified through the TRCA Flood Protection and Remedial Capital Works Prioritization Project.	✓	✓
			5-24* **Municipalities**, TRCA - Prepare flood emergency response plan for SPAs and flood vulnerable areas including an inventory of hazards, prioritization, and emergency response protocol.	✓	
			5-25* **TRCA** - Track advances in prediction of regional and local climate change and re-assess local flood risks and management measures.	✓	✓
			5-26 **TRCA, municipalities** – Establish and maintain an inventory of infrastructure "at risk" of damage from channel erosion and conduct regular monitoring. Identify a prioritized remediation plan.	✓	
Forest Fire Prevention and Emergency Response	Implementation actions for forest fire prevention and response arose during development of the Implementation Guide and are not included in the final draft Watershed Plan.	Municipal fire departments MNR fire response program	5-27 **TRCA, MNR, municipal fire departments** - Review existing municipal and MNR fire response programs and prepare updated, co-ordinated plan including: ▶ philosophy and principles ▶ prevention ▶ access ▶ responsibilities and resources ▶ emergency response protocol. ▶ staff training	✓	

6. Enforcement

Public education and awareness must be complemented by rigorous and co-ordinated enforcement. The *Humber River Watershed Plan* has identified that the enforcement capacities of the agencies (e.g. TRCA, municipalities, MNR, MOE, and DFO) are inadequate and should be increased. They should:

- identify and secure necessary resources;
- investigate means to improve partnering among relevant agencies;
- post signage using universal symbols and/or in multiple languages about permitted and non-permitted activities;
- promote public awareness of who to call and facilitate referrals of mis-directed calls; and
- adopt protocols for feedback to the public on actions taken.

Table 6.1 summarizes implementation actions for enforcement.

Table 6.1 Enforcement Actions

Note: 1-1* = top priority projects

Theme	Target Audience	Enforcement Responsibility (lead in bold)	Watershed Plan Recommendation	Existing Project or Program	Next Steps, Projects and Programs	Yrs 1 - 5	Yrs 6 - 10
Fish	Anglers Landowners	**DFO,** MNR, and other partners	Sect. 6.6 - Increase enforcement capacity	Inter-jurisdictional Compliance Protocol for Fish Habitat and Associated Water Quality (Ontario)	6-1 Continue existing program and identify plan for increasing enforcement capacity, as part of project 6-2.	✓	✓
Poaching (wildlife)	Hunters	**MNR**	Sect. 6.6 - Increase enforcement capacity	Report-A-Poacher telephone hotline	**6-2*** For each theme: ▶ Develop inter-jurisdictional compliance protocol ▶ Identify gaps in regulatory capability and capacity ▶ Identify options for addressing gaps ▶ Develop resources and implementation plan	✓	
Water Use	Water-takers	**MOE**	Increase water efficiency and conservation Rec. 141, 142	Permit To Take Water program		✓	
Section 28 of CA Act (regulating water use from natural waterbodies; interference with watercourses or wetlands)	Private land owners and municipalities	**TRCA**	Sect. 6.6 - Increase enforcement capacity	Inspection and compliance activities (TRCA)		✓	
Municipal by-laws and regulations including: erosion & sediment control, tree cutting, topsoil & land disturbance, dumping, trespassing, encroachment	Landowners Developers	**Municipalities, DFO**	Improve erosion & sediment control and site restoration Rec. 13-20 Sect. 6.6 - Increase enforcement capacity	Implementation of Greater Golden Horseshoe Area Conservation Authorities' *Erosion and Sediment Control Guidelines for Urban Construction*			✓
Property Signage	Public	TRCA and other public landowners, with NGOs	Sect. 6.6 - Increase enforcement capacity		6-3 Develop a co-ordinated program: ▶ NGO volunteers undertake an inventory of existing signage and identify gaps/deficiencies ▶ Landowners improve signage	✓	

7. Monitoring

Ongoing monitoring will be essential to identify whether the management strategies in this Watershed Plan are effective and adapt them if necessary. For example:

- Are the management measures performing as designed?
- How are environmental conditions responding?
- Do we need to change our strategies and if so, how?

Specific actions to improve monitoring programs are listed in the tables below, in three broad areas:

Evaluation of Innovative Technologies

Our strategies for water (*Humber River Watershed Plan*, Section 5.3.1) describe TRCA's Sustainable Technologies Evaluation Program (STEP) and recommend long-term support to ensure that it continues to provide a valuable forum for co-ordinated technology performance monitoring and evaluation among a number of agencies and private partners (**Table 7.1**).

Ambient watershed conditions and long-term trends

The Regional Watershed Monitoring Program (RWMP), led by TRCA in partnership with its member municipalities and other monitoring groups, provided a substantial information base for this Watershed Plan. The RWMP was developed based on regional and watershed scales and to the extent possible at the subwatershed scale. During the preparation of this Plan, it was found that additional information is needed at both the watershed and subwatershed scales to fully understand systems in the Humber watershed (**Table 7.2**).

Adaptive Management

The *Humber River Watershed Plan* recommends an adaptive management program that will use feedback from monitoring activities to make adjustments to policies, plans and programs to ensure that our goals, objectives and targets are met (**Table 7.3**).

Table 7.1 Evaluation of Innovative Technologies

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Sustainable Technologies Evaluation Program	Rec. 40 - Test evaluate and promote innovative technologies using the Sustainable Technologies Evaluation Program (STEP)	**7-1*** **TRCA** - Identify technologies that show promise and monitor their performance using STEP, e.g. ▶ rainwater collection and re-use ▶ permeable pavement ▶ groundwater and soil contamination risk with infiltration technologies ▶ solar, wind and geothermal energy ▶ long term performance and maintenance costs of any green technology	✓	✓
		7-2* **TRCA** - Assess life cycle costs relative to conventional alternatives using the Athena Sustainable Materials Institute life cycle costing tool. (This is becoming a standard part of STEP evaluations because it is usually very difficult to promote new technologies without analysis of costs and savings).	✓	✓
		7-3 **TRCA** - Develop checklists of considerations for the siting and review of wind and solar farms, and closed loop geothermal systems.	✓	
Sustainable Community Design Effectiveness	Rec. 38 - Monitor the effects of new and retrofitted urban development design and stormwater management practices and implement adaptive management where necessary	7-4 **TRCA, municipalities**, MPIR, BILD - Convene discussions with MPIR and determine mechanisms for requiring developers in the Growth Plan area to monitor sustainable technologies and other innovative design features to ensure targets are met.	✓	
		7-5 **TRCA, MOE**, municipalities, BILD - Develop compliance monitoring protocols for SWM and other sustainable technologies.	✓	
		7-6* **TRCA,** municipalities – Launch a cumulative effects (i.e. effectiveness) monitoring program for innovative development design: ▶ Review suitability of candidate subwatersheds or reaches: Centreville Creek, Purpleville Creek, West – Main Branch (i.e. availability of baseline info, stage of development, suite of innovative practices). ▶ Define research questions ▶ Ensure adequate baseline monitoring and establish ongoing monitoring network	✓	✓

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Regional Watershed Monitoring Program (RWMP)	Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-7*** **TRCA** - Review recommendations for additional RWMP sites in the Humber watershed, as noted below, as part of the 5 year review and update. Priorities are also noted below.	TRCA should continue to implement the RWMP in order to provide data on ambient conditions and long term trends. Specific program improvements are outlined below.	✓	
Climate Change	Rec. 30 TRCA should: ► Track advances in the prediction of regional and local climate change and reassess flood risks Rec. 39 - Continue the RWMP with enhancements Section 6.7	7-8 **Environment Canada, TRCA** - Continue to collect data in the Humber watershed to track changes resulting from global climate change (i.e. climate, stream flow, groundwater level). See also Section 5 on Operations, Management and Maintenance (Flood Control Program study recommendations)	Uncertainty associated with the likely degree and timing of changes to climate within the Humber watershed creates challenges for developing comprehensive strategies that will help watershed communities adapt.	✓	✓
Air Quality	Undertake a vegetation impacts study Rec. 44	7-9 **Universities**, MOE, TRCA - Initiate a GTA-wide study to determine the economic and ecological impacts of poor air quality on local agricultural crops, urban forest and natural heritage. This will require the installation of more ozone monitors in each watershed.	A better understanding of the economic and ecological impacts of poor air quality on agriculture, urban forests and natural heritage would provide a strong rationale for governments and citizens to take further actions to reduce air pollution.	✓	✓
Precipitation	Rec. 39 - Continue the RWMP with enhancements Section 6.7	7-10 **TRCA** - Upgrade existing precipitation gauge at the Claireville Flood Control Dam in Brampton to a four season weigh gauge	Existing precipitation gauges in the GTA do not measure snowfall as accurately as can be achieved with a four season weigh gauge. More accurate snowfall information would help to confirm or refine water budget and hydrologic models used to design stormwater controls in new developments. The Claireville Dam location would provide more accurate snowfall information for urban climate conditions in the region.	✓	
Evaporation	Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-11*** Environment Canada, TRCA - Establish evaporation monitoring stations in Greater Toronto Area (rural and urban locations).	Long-term measured evaporation data is currently unavailable for locations in the Greater Toronto Area (nearest station is in Hamilton). Measured evaporation information would help to confirm or refine water budget and hydrologic models used to design stormwater controls in new developments.	✓	

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Groundwater	Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-12*** **TRCA** - Seek additional funding partnerships to install nests of groundwater monitoring (water level and groundwater quality) wells at three (3) additional sites in the watershed to improve spatial coverage and at various depths to improve knowledge of each of the three major aquifers. Potential locations include: ▶ Existing York Region well on TRCA property south of Living City Campus at Kortright (Vaughan) ▶ Location to be identified through new gravity surveys (see project 7-13) or other approaches	There are currently ten (10) Provincial Groundwater Monitoring Network (PGMN) wells installed in the Humber watershed. These wells provide a good spatial distribution over the watershed but there is no well monitoring the water level in the Oak Ridges Aquifer Complex in the East Humber (King, Vaughan, Richmond Hill). It is recommended to monitor at least one well in each aquifer unit existing in each primary subwatershed. This would require adding six (6) new monitoring wells to the network. Therefore, we recommend adding three new locations with 2-3 wells at each location. These new wells should be located to assess water level changes in aquifers that discharge at surface water flow gauge locations as well as to facilitate the assessment of both regional and local effects of urban development and land conservation. It may be possible to either assume responsibility for or obtain data from existing monitoring wells installed by others, and the exact locations can be flexible, as long as they provide reasonable geographic coverage of the watershed. Without such coverage, TRCA will not be able to evaluate groundwater flow patterns and gradients in the Humber watershed, and information will not be available to further calibrate the groundwater model. The priority for these new wells is considered to be high, since it is not possible to accurately validate the groundwater flow model or assess hydrogeologic conditions without field observations. Wells in other watersheds, particularly in the Credit River, Nottawasaga River and Lake Simcoe watersheds, could be used to assist in assessing groundwater flow patterns, but this does not eliminate the need for adequate geographic coverage of the Humber watershed.	✓	

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Groundwater *(continued)*		**7-13* York, Peel, Durham and Toronto** – Conduct new gravity survey of Laurentian bedrock channel between Weston Rd. and Jane St. in Vaughan through YPDT Groundwater Management Project.	Current understanding of groundwater flow and levels along the southern portion of the underground bedrock channel where the East Humber subwatershed and Don River watersheds meet is limited. A new gravity survey of this area would help to find a suitable location for new monitoring wells (see project 7-12).	✓	
Surface Water	Rec. 30 TRCA should - Continue to develop and enhance the real time precipitation and stream gauge network for use in the TRCA Flood Warning Program Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-14*** TRCA - New permanent stream flow gauges with telemetry equipment to allow real-time access should be installed on: ▶ main channel of the Humber River between Hwy. 7 and Steeles Ave. in Vaughan. ▶ Black Creek (main channel) at Hwy. 401 in Toronto. ▶ main channel of Humber River around Queen St. and King St. in Bolton. ▶ Black Creek at Steeles Avenue in Toronto.	Additional and upgraded stream flow gauges are recommended to provide information needed to further calibrate hydrologic models and increase TRCA capacity for flood forecasting and warning in flood vulnerable areas.	✓	

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Surface Water *(continued)*		7-15 TRCA – Upgrade existing stream flow gauges with telemetry equipment to allow real-time access: ▶ East Humber at Pine Grove in Vaughan (TRCA# 25, WSC# 02HC0009) ▶ Black Creek at Weston Road in Toronto (TRCA# 9, WSC# 02HC027) ▶ Lower Humber at Weston Road south of Lawrence Avenue in Toronto (TRCA# 8, WSC# 02HC003).		✓	
		7-16 **TRCA** – Identify indicators, establish baselines and set targets for a natural range of variation of stream flow. Establish baselines for these indicators using available RWMP stream gauge data and evaluate progress towards targets through Report Cards	Maintaining a natural range of variation of stream flow will help to achieve stream form and aquatic system objectives of the Watershed Plan. Indicators and targets have not yet been defined for a natural range of variation of stream flow. Indicators, information on baseline conditions and targets will be needed to evaluate the effectiveness of innovative stormwater technologies and community designs through the proposed effectiveness monitoring program (Project 7-6, **Table 7.1**).	✓	

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Stream Form	Rec. 39 - Continue the RWMP with enhancements Section 6.7	7-17* **TRCA** - Establish additional fluvial geomorphology monitoring sites immediately downstream of areas of future urban expansion. They should be established as soon as possible to determine an existing conditions baseline and should be monitored annually, probably for at least 20 years: ▶ Purpleville Creek at Major Mackenzie Drive in Vaughan ▶ King Creek around Woodhill Avenue south of King Road in Nobleton ▶ Centreville Creek just upstream of Scott Lake, west of Innis Lake Road in Caledon East	The additional sites are needed to establish baseline stream form and rates of change to evaluate the effectiveness of innovative stormwater technologies and community designs through the proposed effectiveness monitoring program (Project 7-6, **Table 7.1**).	✓	
		7-18 **TRCA** - Enhance the current monitoring protocols at the established fluvial geomorphic monitoring sites (i.e. additional cross-sectional surveys, greater frequency)	Enhanced monitoring at existing stations, which currently do not generate enough data to reliably track some aspects of channel change, will provide benefits for future watershed and subwatershed studies in the Humber watershed.	✓	
Water Quality	Rec. 39 - Continue the RWMP with enhancements Section 6.7	7-19* TRCA - Establish new RWMP surface water quality sampling stations on: ▶ East Humber River at stream gauge near Mill Road south of King Road in King Township. ▶ Purpleville Creek at stream gauge near Major Mackenzie Drive in Vaughan.	Understanding of ambient surface water quality conditions is lacking in the headwaters of the East Humber River. Information from additional RWMP sampling stations would be used in flow integrated water quality analyses to better predict how pollutant levels are affected by changes in stream flow and would contribute to evaluating the effectiveness of innovative stormwater technologies and community designs through the proposed effectiveness monitoring program (Project 7-6, **Table 7.1**).	✓	

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Water Quality *(continued)*		7-20 **Municipalities, TRCA -** Conduct monitoring studies on a project basis to answer specific questions, e.g.: ▶ effectiveness of road salt management plans; ▶ bacteria source monitoring – pending the outcome of the Environment Canada source tracking study; and ▶ short term (2-3 year) wet weather monitoring at RWMP station #83103 on West Humber River.	In order to more accurately identify sources of pollutants of concern and to evaluate the effectiveness of management actions, special water quality monitoring studies are needed.		
Aquatic System	Rec. 49 Conduct formalized in-stream barrier surveys to further prioritize mitigation work Rec. 53 – Monitor populations of redside dace in collaboration with the Redside Dace Recovery Team Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-21*** **TRCA**, MNR, NGOs, anglers, volunteers - Develop a volunteer-based detection program for aquatic invasive species (i.e. Round goby, rusty crayfish); focus on Lake Wilcox, Lower Humber and Purpleville Creek.	Aquatic habitats in parts of the Humber watershed are at risk of invasion by alien aquatic species that could negatively impact habitat quality and communities of native species. Establishing a formal program for reporting observations of alien aquatic species would help trigger preventative and corrective management actions.	✓	
		7-22* **MNR, TRCA** – Evaluate the effectiveness of in-stream barrier mitigation and aquatic species partition barrier projects, as recommended in the *Humber River Fisheries Management Plan*	Limited information is available on the effectiveness of projects that have been completed in the Humber watershed to mitigate in-stream barriers to fish movement and aquatic species partition barriers. Evaluations of completed projects should be done and used to inform future projects.	✓	
Terrestrial System	Rec. 39 - Continue the RWMP with enhancements Section 6.7	**7-23*** **TRCA**, municipalities, NGOs, volunteers – Establish fixed plots throughout the TRCA jurisdiction and monitor vegetation communities and flora and fauna species regularly.	In order to detect trends in terrestrial ecosystem health and species populations over time, sampling of fixed plots on a more frequent basis than is done through the RWMP is necessary.	✓	
		7-24 **TRCA, MNR** - Identify indicators, develop monitoring protocols, establish baselines and set targets for biodiversity. Evaluate progress towards targets through Report Cards	Maintaining and improving regional biodiversity is an objective of the TRCA and of the Watershed Plan. A full suite of indicators, monitoring protocols and targets have not yet been defined for biodiversity. This information is needed to evaluate effectiveness of management strategies and programs.	✓	✓

Table 7.2 Ambient Watershed Conditions and Long-term Trends

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs	Justification	Yrs 1 - 5	Yrs 6 - 10
Nature-based Recreation	Rec. 106 Develop plans for public access Rec. 107 Undertake studies to define thresholds for public access in order to protect sensitive ecological or cultural areas	**7-25* TRCA,** Municipalities - Develop and implement a program to monitor trail use and participation rates in other related recreational activities.	The lack of data on use of nature-based recreational opportunities in the watershed limits our full understanding of issues and ability to balance public access and resource protection.	✓	

Table 7.3 Adaptive Management

Note: 1-1* = top priority projects

Theme	Watershed Plan Recommendation	Next Steps, Projects and Programs (lead partner in bold)	Yrs 1 - 5	Yrs 6 - 10
Monitoring and Adjustments	Section 6.7 Develop an adaptive management program	7-26 **TRCA**, municipalities – Develop an adaptive management program ▶ Review the adequacy of existing monitoring mechanisms, including additions noted in **Table 7.2** (e.g. RWMP and requirements for compliance and cumulative effects monitoring). ▶ Identify any necessary modifications to existing analytical, assessment and reporting protocols. ▶ Define triggers for initiating adjustments to policies, plans, implementation and management. ▶ Identify the mechanisms and procedures for engaging watershed partners in a process for amending the Watershed Plan and relevant policies and programs. ▶ Secure commitment to implement the program.	✓	✓

Section 8 – Tracking Progress

TRCA is proposing to convene an annual multi-stakeholder forum to report on progress at implementing the Watershed Plan and confirm priorities for the following year. Particular attention will be given to the status of top priority implementation projects recommended in this Implementation Guide. Other unanticipated opportunities will be considered as well based on criteria such as partner contributions, expected outcomes and future benefits. Changes and trends in watershed conditions will be monitored through programs such as the Terrestrial Natural Heritage Program and Regional Watershed Monitoring Program. Results will be periodically reported by TRCA with the assistance of the Humber Watershed Alliance through the publication of progress reports, report cards and other appropriate media.

Appendix A: Legislative and Policy Context for Watershed Plans

Role of the Watershed Plan

The Watershed Plan sets out long term strategic recommendations for the management of the Humber River watershed, based on an integrated understanding of watershed systems and technical analysis of issues, opportunities and their predicted effects on watershed health. Implementation of the Watershed Plan will rely on the adoption of supportive policies, programs and practices by the various partners. Specifically, the Watershed Plan is intended to inform and guide municipalities, provincial and federal governments and the Toronto and Region Conservation Authority as they update their policies and programs for environmental protection, conservation and restoration within the contexts of land and water use, and the planning of future development. The plan provides direction to local non-governmental organizations and private landowners with regard to best management practices and opportunities for environmental stewardship.

Legislative and Policy Context

Endorsement for a watershed management approach is well established in legislation and local plans and policies, although it is only the *Oak Ridges Moraine Conservation Plan* (ORMCP) which requires municipalities to undertake watershed plans and incorporate their objectives and requirements into municipal official plans and ensure that major development on the Moraine conforms with the watershed plan (see Table A1). *The Humber River Watershed Plan* was prepared to address the requirements of the ORMCP through a larger watershed planning exercise developed for a broader range of management objectives than just conformity with the ORMCP. Thus, the resulting Watershed Plan serves a variety of purposes, and not strictly ORMCP conformity.

Table A1 – Legislative and Policy Documents Promoting Watershed Planning

Oak Ridges Moraine Conservation Plan (2002) **Watershed plans** **24.** (1) Every upper-tier municipality and single-tier municipality shall, on or before April 22, 2003, begin preparing a watershed plan, in accordance with subsection (3), for every watershed whose streams originate within the municipality's area of jurisdiction. (2) The objectives and requirements of each watershed plan shall be incorporated into the municipality's official plan.
Growth Plan for Greater Golden Horseshoe (2006) **3.2.5 Water and Wastewater Systems** 7. Municipalities, in conjunction with conservation authorities, are encouraged to prepare watershed plans and use such plans to guide development decisions and water and wastewater servicing decisions.
Greenbelt Plan (2005) **3.2.3 Water Resource System Policies** The following Water Resource System policies apply throughout the Protected Countryside: 2. Watersheds are the most meaningful scale for hydrological planning, and municipalities together with conservation authorities should ensure that watershed plans are completed and used to guide planning and development decisions within the Protected Countryside. 3. Cross-jurisdictional and cross-watershed impacts need to be considered in the development of watershed plans. The development of watershed plans and watershed management approaches in the Protected Countryside should be integrated with watershed planning and management in the NEP and the ORMCP areas and beyond the Greenbelt. **3.2.5 External Connections** To support the connections between the Greenbelt's Natural System and the local, regional and broader scale natural heritage systems of Southern Ontario,… the federal government, municipalities, conservation authorities, other agencies and stakeholders should: 3. Undertake watershed based planning, which integrates supporting ecological systems with those systems contained in this Plan.
Provincial Policy Statement (2005) **Water** **2.2.1** Planning authorities shall protect, improve or restore the quality and quantity of water by: a) using the watershed as the ecologically meaningful scale for planning; b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts; c) identifying surface water features, ground water features, hydrologic functions and natural heritage features and areas which are necessary for the ecological and hydrological integrity of the watershed
Clean Water Act (2006) **Assessment reports** **15.** (1) The source protection committee for a source protection area shall prepare an assessment report for the source protection area in accordance with the regulations, the rules and the terms of reference. 2006, c. 22, s. 15 (1). **Contents** (2) An assessment report shall, in accordance with the regulations, the rules and the

terms of reference,

(a) identify all the watersheds in the source protection area;

(b) characterize the quality and quantity of water in each watershed identified under clause (a);

(c) set out a water budget for each watershed identified under clause (a) that,

(i) identifies the different ways that water enters and leaves the watershed and quantifies the amount of water that enters or leaves in each way,

(ii) describes the groundwater and surface water flows in the watershed,

(iii) quantifies the existing and anticipated amounts of water taken from the watershed that require a permit under section 34 of the *Ontario Water Resources Act*,

(iv) quantifies the existing and anticipated amounts of water taken from the watershed that do not require a permit under section 34 of the *Ontario Water Resources Act*, and

(v) having regard to the information referred to in subclauses (i) to (iv), describes any existing or anticipated water shortages in the watershed

Conservation Authorities Act (2006)

Objects

20. (1) The objects of an authority are to establish and undertake, in the area over which it has jurisdiction, a program designed to further the conservation, restoration, development and management of natural resources other than gas, oil, coal and minerals.

Powers of authorities

21. (1) For the purposes of accomplishing its objects, an authority has power,

(a) to study and investigate the watershed and to determine a program whereby the natural resources of the watershed may be conserved, restored, developed and managed

Ontario Water Resources Act (2007)

Under the Water Taking and Transfer Regulation (O. Reg. 387/04) Permits to Take Water (PTTW) are issued by the Ministry of Environment. In accordance with the regulation, the Director issuing a PTTW shall consider a suite of environmental issues to the extent that information is available, and relevant to the application. These considerations include:

- The natural variability of water flow or water levels,
- minimum stream flow
- habitat that depends on water flow or water levels, and
- water balance and sustainable aquifer yield.

(While specific reference to watershed plans and associated technical reports is not made in the Regulation, such documents provide information and guidance regarding the considerations noted above)

Municipal Official Plans

York Region (2004)

2.3 Water

It is the policy of Council:

1. To cooperate with area municipalities, the conservation authorities and other agencies in the preparation of watershed planning initiatives to:

a) identify headwaters areas and better understand their function, linkages and sensitivities;
b) establish and achieve water quality objectives for the watershed;
c) address the long-term cumulative impact of development on the watershed;
d) create an inventory of existing geology, hydrology, hydrogeology, groundwater recharge areas, limnology, aquatic and terrestrial habitats and other environmental data;
e) recommend appropriate stormwater management techniques, including, but not limited to best management practices, the use of natural vegetative drainage corridors and the use

of permeable surfaces; and

f) identify the form and constraints under which development may be permitted and provide guidelines for development, design and construction.

Region of Peel (2001)

2.2.4 Watersheds

2.2.4.1 Policies

It is the policy of Regional Council to:

2.2.4.1.1 Promote and participate in watershed plans and subwatershed plans within Peel Region.

2.2.4.1.5 Work jointly with the conservation authorities, the area municipalities and, where applicable, the Niagara Escarpment Commission to integrate subwatershed planning and monitoring information on a regional and watershed basis, in order to assess the cumulative effects of land use changes and the implementation of subwatershed plans.

3.4.1 Water Resources

3.4.1.1 Policies

3.4.2.6 Direct the area municipalities to require appropriate hydrological and hydrogeological studies be undertaken, to the satisfaction of the Region, the area municipalities and the conservation authorities, for all planning initiatives that may have an immediate or cumulative impact on water resources and related natural systems. When possible these studies should be integrated with subwatershed plans.

7.6 Regional Planning Initiatives

7.6.2 Policies

It is the policy of Regional Council to:

7.6.2.2 Support the preparation and implementation of watershed management strategies.

7.9 Monitoring, Reviewing and Updating

7.9.2 Policies

It is the policy of Regional Council to:

7.9.2.5 Work jointly with the area municipalities, conservation authorities and other agencies to determine modifications needed to the official plans, policies and programs of the Region and the area municipalities which may be identified through watershed and subwatershed plans and other related studies.

City of Toronto (2002)

Chapter 2 – Shaping the City

The Official Plan makes reference to watershed plans in the context of managing stormwater. Official Plan policy states that the City will work with neighbouring municipalities and the Province to develop a framework for dealing with growth across the GTA which will, among other things "result in better water quality through water conservation and wastewater and stormwater management based on watershed principles".

Chapter 3 – Building a Successful City

The Official Plan indicates that private city-building activities and changes to the built environment, including public works, will "reduce the adverse effects of stormwater and snow melt based on hierarchy of watershed-based wet weather flow practices".

Restoration Plans

Toronto and Region Remedial Action Plan (1994)

Recommends a watershed-based approach to de-listing impaired beneficial uses of the Toronto waterfront and watersheds, and notes Action 41: Include Watershed Perspectives in Planning Process.

Toronto Wet Weather Flow Management Master Plan (2003)

The City of Toronto Wet Weather Flow Management Master Plan identified a specific need to undertake restoration to mitigate impacts of development in the 905 area and to complement actions being taken in the downstream portion of the watershed. A key guiding principle of the WWFMMP is wet weather flow will be managed on a watershed basis with a natural systems approach being applied to stormwater management as a priority.

Appendix B: Oak Ridges Moraine Conservation Plan Watershed Plan Requirements Conformity Assessment Report

This report documents how requirements of sections 24 and 25 of the *Oak Ridges Moraine Conservation Plan* (Ministry of Municipal Affairs and Housing, 2002) have been satisfied for the portions of the **Humber River watershed** located in the Oak Ridges Moraine Area, based on direction provided by the Province's technical guidance documents (Ministry of the Environment, 2007)[1]

Subsection	Requirement	Conformity Assessment	Document Reference
24.(1)	Every upper-tier municipality and single-tier municipality shall, on or before April 22, 2003, begin preparing a watershed plan, in accordance with subsection 24.(3), for every watershed whose streams originate within the municipality's area of jurisdiction.	Watershed planning and on-going watershed management have been activities the Toronto and Region Conservation Authority (TRCA) has carried out in partnership with its municipalities for a number of years. Therefore a watershed plan was deemed to have been initiated prior to April 22, 2003, acknowledging that some study components required updating to varying degrees. A watershed planning study was initiated by the TRCA, in partnership with the Region of York, Region of Peel, and City of Toronto and area municipalities for the Humber River watershed on June 25, 2004. A final draft of the *Humber River Watershed Plan* was completed on March 25, 2008. Approval of the final *Humber River Watershed Plan* by the Authority was granted at the June 27, 2008 meeting by resolution #A137/08.	A workplan to fulfill the watershed planning requirements of the ORMCP and direction to initiate the Humber River Watershed Planning Study according to the initial work program was approved by the Authority on Sept. 26, 2003 (Authority Res. #A196/03). A detailed workplan for the Humber River Watershed Planning Study was approved by the Authority on June 25, 2004 (Authority Res. #A191/04) Approval of the final *Humber River Watershed Plan* by the Authority was granted at the June 27, 2008 meeting by resolution #A137/08.
24.(3)	A watershed plan shall include, as a minimum, (a) a water budget and conservation plan as set out in section 25;	See conformity assessments for sections 25.(1) and 25.(2).	See document references for sections 25.(1) and 25.(2).
24.(3) cont'd	(b) land and water use and management strategies;	The *Humber River Watershed Plan* describes recommended management strategies regarding	See section 5 (Strategies) of the *Humber River Watershed Plan*.

Subsection	Requirement	Conformity Assessment	Document Reference
		existing and future land and water use that will help to protect the ecological and hydrological features and functions of the watershed, including the portions in the Oak Ridges Moraine Area. Key strategies include the need to protect and expand natural cover and build sustainable communities, particularly with an aim to maintain or restore pre-development water balance.	
24.(3) cont'd	(c) a framework for implementation, which may include more detailed implementation plans for smaller geographic areas, such as subwatershed plans, or for specific subject matter, such as environmental management plans;	Implementation direction and initial considerations for priority actions and areas accompany the management strategies in the *Humber River Watershed Plan*. The *Humber River Watershed Plan Implementation Guide* provides more detailed implementation direction for policy, regeneration projects, etc. including supportive maps and criteria.	See section 5 (Strategies) of the *Humber River Watershed Plan*. See *Humber River Watershed Plan Implementation Guide*
24.(3) cont'd	(d) an environmental monitoring plan;	The *Humber River Watershed Plan* includes recommendations regarding changes or enhancements to existing environmental monitoring programs and other area, site or issue-specific monitoring requirements.	See section 5.3.1 of the *Humber River Watershed Plan* and section 7 of the *Humber Watershed Plan Implementation Guide* for recommended enhancements to existing monitoring programs.
24.(3) cont'd	(e) provisions requiring the use of environmental management practices and programs, such as programs to prevent pollution, reduce the use of pesticides and manage the use of road salt; and,	The *Humber River Watershed Plan* includes recommendations regarding environmental practices and programs. The *Humber River Watershed Plan Implementation Guide* further identifies practices and policies applicable to the land use planning and development process. Many Humber watershed municipalities already require the use of environmental management practices (e.g. by-laws to control idling, dumping, filling, pesticide use, sewer use, and tree cutting, and salt management plans)	See section 5 (Strategies) of the *Humber River Watershed Plan*. See *Humber River Watershed Plan Implementation Guide* Also see endnotes for list of relevant municipal by-laws and salt management plans.[2]

Subsection	Requirement	Conformity Assessment	Document Reference
24.(3) cont'd	(f) criteria for evaluating the protection of water quality and quantity, hydrological features and hydrological functions.	The *Humber River Watershed Plan* includes a framework of watershed objectives, indicators and targets to be used to track or evaluate long term watershed health. The accompanying *Implementation Guide* sets out recommended policies for the review of land use proposals regarding protection of groundwater and surface water quality and quantity, hydrological features and functions, as well as terrestrial features and functions and aquatic communities and habitat.	See Appendix C of the *Humber River Watershed Plan* for a summary of watershed objectives, indicators and targets used to track or evaluate watershed health. See *Humber River Watershed Plan Implementation Guide* for a compilation of all policies and maps showing where the policy recommendations apply.
24.(4)	Major development is prohibited unless, (a) the watershed plan for the relevant watershed, prepared in accordance with subsection 24.(3), has been completed;	A final draft of the *Humber River Watershed Plan* was completed on March 25, 2008. Approval of the final *Humber River Watershed Plan* by the Authority was granted at the June 27, 2008 meeting by resolution #A137/08.	Approval of the final *Humber River Watershed Plan* by the Authority was granted at the June 27, 2008 meeting by resolution #A137/08.
24.(4) cont'd	(b) the major development conforms with the watershed plan; and	See conformity assessment for section 24.(3)	See document references for section 24.(3)
24.(4) cont'd	(c) a water budget and conservation plan, prepared in accordance with section 25 and demonstrating that the water supply required for the major development is sustainable, has been completed.	See conformity assessments for sections 25.(1) and 25.(2).	See document references for sections 25.(1) and 25.(2)
24.(8)	An application for major development to which this subsection applies shall not be approved unless, (a) the relevant municipality has complied with clause (c) of subsection 24.(4); or	See conformity assessment for section 24.(4)	See document references for section 24.(4)
24.(8) cont'd	(b) the applicant, (i) identifies any hydrologically sensitive features and related hydrological functions on the site and how they will be protected, (ii) demonstrates that an adequate	For any applications received prior to completion of watershed plans, in accordance with the *Oak Ridges Moraine Conservation Plan*, conformity will have been reviewed and confirmed through applicant submitted studies.	

Subsection	Requirement	Conformity Assessment	Document Reference
	water supply is available for the development without compromising the ecological integrity of the Plan Area, and (iii) provides, with respect to the site and such other land as the approval authority considers necessary, a water budget and water conservation plan that, (A) characterizes groundwater and surface water flow systems by means of modelling, (B) identifies the availability, quantity and quality of water sources, and (C) identifies water conservation measures.		
25.(1)	Every upper-tier municipality and single-tier municipality shall, on or before April 22, 2003, begin preparing a water budget and conservation plan, in accordance with subsection 25.(2), for every watershed whose streams originate within the municipality's area of jurisdiction.	A water budget study was initiated in January 2003 by the TRCA, in partnership with the Region of York, Region of Peel, and City of Toronto and area municipalities for the Humber River watershed in advance of the overall Humber River Watershed Planning Study. The Region of York's Water for Tomorrow program outlines specific goals for both education and water conservation measures as outlined in the initial scope of work. The Water Efficiency Master Plan Update recommends new and/or updated programs for public education and water conservation measures. New goals for education and water conservation measures will be set once the program implementation plan is completed and approved by council. The Region of Peel's Water Conservation Plan	See TRCA 2003 Capital Budget Workplan and Authority approval to hire consultants to undertake a study terms of reference. Approval to initiate the Humber River Watershed Planning Study according to a general workplan, including a water budget study component, was granted at the Sept. 26, 2003 meeting of the TRCA (Authority Res. #A196/03) and further approval of a detailed workplan was granted on June 25, 2004 (Authority Res. #A191/04). *York Region Water Efficiency Master Plan Update, 2007.* *Regional Municipality of Peel Water Efficiency Plan – Final Report, Region of Peel, 2004.*

Subsection	Requirement	Conformity Assessment	Document Reference
		was initiated in 2002 and completed in May 2004. The objectives of the plan are to reduce average annual day demand by 10 per cent, peak day demand by 10 per cent, and wastewater flows by 7 per cent, of projected 2015 levels. Key components of the Region's water efficiency efforts include public education through Water Smart Peel, rebate programs and other incentives. The programs are targeted to residents throughout the Region. The City of Toronto completed a water efficiency plan in 2002. The plan targets a reduction of peak day water demands by 275 ML/day or approximately 14% projected 2011 levels, and a reduction of wastewater flow by 86 ML/day, by 2011.	*Water Efficiency Plan, City of Toronto Works and Emergency Services, 2002.* Approval of the final *Humber River Watershed Plan* by the Authority was granted at the June 27, 2008 meeting by resolution #A137/08.
25.(2)	A water budget and conservation plan shall, as a minimum, (a) quantify the components of the water balance equation, including precipitation, evapotranspiration, groundwater inflow and outflow, surface water outflow, change in storage, water withdrawals and water returns;	The *Humber River Watershed Plan* includes a quantitative description of the major components of the water balance equation on an average annual basis over the watershed surface area. The water budget was developed based on available information regarding land use, vegetation, surficial soil characteristics, topography, stream flow at permanent stream gauges, permitted water withdrawals and spatial variations in long term average precipitation, temperature and evaporation across the watershed. It was developed using Precipitation Run-off Modelling System (PRMS) software. The PRMS model generated recharge estimates for input to the groundwater flow model (MODFLOW software), developed through the York- Peel-	Section 3.2.3 of the *Humber River Watershed Plan* describes the overall water budget for the watershed. The *Humber River Watershed Scenario Modelling and Analysis Report* provides a more detailed description of the existing water budget, including maps and tabular summaries, and the predicted effects of future land and water use and management scenarios on water budget components.

Subsection	Requirement	Conformity Assessment	Document Reference
		Durham-Toronto partnership (YPDT), which was used to estimate the groundwater component of the water budget.	
25.(2) cont'd	(b) characterize groundwater and surface water flow systems by means of modelling;	The groundwater flow system of the Humber River watershed has been characterized by development and calibration of a groundwater flow model that utilizes MODFLOW software, developed through the York-Peel-Durham-Toronto partnership (YPDT). The surface water flow system of the Humber River watershed has been characterized by development and calibration of a hydrologic model based on Hydrologic Simulation Program – Fortran (HSPF) software. This model was originally developed by the City of Toronto in support of work on the Toronto Wet Weather Flow Management Plan, and was refined for TRCA to support work on the *Humber River Watershed Plan.*	See section 3.2.3 of the *Humber River Watershed Plan* and section 4.0 of the *Humber River State of the Watershed Report – Geology and Groundwater Resources* for a characterization of the groundwater flow system. See section 3.2.4 of the *Humber River Watershed Plan* and section 5 of the *Humber River State of the Watershed Report – Surface Water Quantity* for a summary of the surface water flow system. The *Humber River Watershed Scenario Modelling and Analysis Report* provides more detailed descriptions of the existing surface and groundwater flow systems, including maps and tabular summaries, and the effects of future land and water use and management scenarios on these systems.
25.(2) cont'd	(c) identify, (i) targets to meet the water needs of the affected ecosystems, (ii) the availability, quantity and quality of water sources, and (iii) goals for public education and for water conservation;	The *Humber River Watershed Plan* includes criteria in the form of maps and targets (both quantitative and qualitative) for the protection of groundwater and surface water quality and quantity, hydrological features and functions, as well as terrestrial features and functions and aquatic communities and habitat. Water efficiency plans or programs of the Region of York, Region of Peel and City of Toronto have	See 24.(3)(f) above for watershed targets. See section 4 of the *Humber River State of the Watershed Report – Geology and Groundwater Resources* and section 5 of the *Humber River State of the Watershed Report – Surface Water Quantity* for summaries of information on the availability and quality of water sources.

Subsection	Requirement	Conformity Assessment	Document Reference
		set goals for water conservation and public education.	Section 5.5.3 of the *Humber River Watershed Plan* addresses water conservation and supports continuation of municipal water efficiency and public awareness programs. See York Region *Water Efficiency Master Plan Update* (2007) See section 2.0 of Peel Region's *Water Efficiency Plan* (2004) See section 1.0 of City of Toronto's *Water Efficiency Plan* (2002)
25.(2) cont'd	(d) develop a water-use profile and forecast;	The Region of York, Region of Peel and City of Toronto have developed water-use profiles and forecasts as part of studies to update their water master plans. The forecasts consider the effect of planned water conservation measures on future demand. Drawing on this information,a watershed-based water use profile and forecast was developed as part of preparing the *Humber River Watershed Plan*.	See section 4.0 of York Region's *Long Term Water Project Master Plan Update, April 2004* for water use forecast. See Peel Region's *Water Efficiency Plan* (2004) for water use forecast. See City of Toronto's *Water Efficiency Plan* (2002) for water use forecast. See section 5.3 of the *Humber River State of the Watershed Report – Surface Water Quantity* for the watershed-based water use profile. Also see section 5.3 of the *Humber River State of the Watershed Report – Geology and Groundwater Resources* for a summary of groundwater takings in the Humber River

Subsection	Requirement	Conformity Assessment	Document Reference
			watershed.
25.(2) cont'd	(e) evaluate plans for water facilities such as pumping stations and reservoirs;	A watershed-scale evaluation of the predicted effects of forecasted water and land use on groundwater levels was completed in support of the *Humber River Watershed Plan*. Based on this evaluation, appropriate land and water use management strategies have been provided in the watershed plan. Further plans for any such facilities are evaluated by municipalities as part of environmental assessment studies and/or updates to water supply master plans and will be reviewed in the context of watershed-based information from the *Humber River Watershed Plan*, supporting technical reports and available databases.	See section 5 (Strategies) of the *Humber River Watershed Plan* for management strategies. The *Humber River Watershed Scenario Modelling and Analysis Report* provides a summary of predicted effects of forecasted water and land use on groundwater levels. York Region's *Long Term Water Project Master Plan Update*, April 2004
25.(2) cont'd	(f) identify and evaluate, (i) water conservation measures such as public education, improved management practices, the use of flow restricting devices and other hardware, water reuse and recycling, and practices and technologies associated with water reuse and recycling, (ii) water conservation incentives such as full cost pricing, and (iii) ways of promoting water conservation measures and water conservation incentives;	All upper-tier and single-tier municipalities in the Humber River watershed have developed water efficiency plans and programs that identify and evaluate water conservation measures, incentives and ways of promoting water conservation measures and incentives. The *Humber River Watershed Plan* supports the recommendations of the municipal water efficiency plans and programs and describes management strategies that would further contribute to achieving the objectives and targets of these plans/programs.	See section 5.5.3 of the *Humber River Watershed Plan*. See sections 5.0 and 6.0 of York Region's *Water Efficiency Master Plan Update* (2007) for the identification, evaluation and recommendation of water conservation measures and education. See sections 6.0 and 9.0 of Peel Region's *Water Efficiency Plan* (2004). See sections 4.0 and 6.0 of City of Toronto's *Water Efficiency Plan* (2002).
25.(2) cont'd	(g) analyse the costs and benefits of the matters described in clause (f);	All upper-tier and single-tier municipalities in the Humber River watershed have developed water efficiency plans and programs that analyse the	See Section 5.2.3 of York Region's *Water Efficiency Master Plan Update(2007)* for the cost analysis of water conservation

Subsection	Requirement	Conformity Assessment	Document Reference
		costs and benefits of their recommended water conservation measures, incentives and promotion strategies.	measures See section 8.0 of Peel Region's *Water Efficiency Plan* (2004) See section 5.0 of City of Toronto's *Water Efficiency Plan* (2002)
25.(2) cont'd	(h) require the use of specified water conservation measures and incentives;	York Region's Water for Tomorrow program used specific water conservation measures and incentives as part of the original capital plan. The Water Efficiency Master Plan Update also recommends the use of specific water conservation measures and incentives. The Region of Peel and City of Toronto water efficiency plans also use specific water conservation measures and incentives such as system leak detection, computer controlled irrigation, watering restrictions, toilet replacement, clothes washer replacement, and indoor and outdoor water audits.	See section 6.0 of York Region's *Water Efficiency Master Plan Update* (2007) for the recommended program strategy. *See section 6.0 of Peel Region's Water Efficiency Plan (2004.)* *See section 4.0 of City of Toronto's Water Efficiency Plan (2002).*
25.(2) cont'd	(i) contain an implementation plan for those specified measures and incentives that reconciles the demand for water with the water supply;	York Region developed an implementation plan for the program as part of the scope of work in 1998. The Water Efficiency Master Plan Update has recommended an updated program strategy. An implementation plan for the updated program is being developed. The Peel Region and City of Toronto water efficiency plans include implementation schedules.	See Section 6.0 of York Region's *Water Efficiency Master Plan Update* (2007)for the recommended program strategy See section 9.0 of Peel Region's Water Efficiency Plan (2004). See section 6.0 of City of Toronto's Water Efficiency Plan (2002).
25.(2) cont'd	(j) provide for monitoring of the water budget and water conservation plan for effectiveness.	York Region's *Water Use Efficiency Master Plan Update*, Peel Region's *Water Efficiency Plan* and	See Section 9.0 of York Region's *Water Efficiency Master Plan Update(2007)*

Subsection	Requirement	Conformity Assessment	Document Reference
		City of Toronto's *Water Efficiency Plan* recommend monitoring and evaluation programs be implemented. The *Humber River Watershed Plan* includes recommendations regarding changes or enhancements to existing environmental monitoring programs and other area, site or issue-specific monitoring requirements that provide for, or improve capacity for monitoring of the water budget (e.g. additional climate stations, stream gauges, groundwater monitoring wells etc.).	See section 9.0 of Peel Region's Water Efficiency Plan (2004). See section 6.0 of City of Toronto's Water Efficiency Plan (2002). See section 5.3.1 of the *Humber River Watershed Plan* and section 7 of the *Humber Watershed Plan Implementation Guide* for recommended enhancements to existing monitoring programs.
27.(1)	Except with respect to land in Settlement Areas, all development and site alteration with respect to land in a subwatershed are prohibited if they would cause the total percentage of the area of the subwatershed that has impervious surfaces to exceed, (a) 10 per cent; or	The Humber River Watershed Planning Study assessed the current and projected future percent impervious cover for each Oak Ridges Moraine subwatershed (based on methods suggested in draft Technical Paper #13 which exclude Settlement Areas, utilizing subwatershed boundaries defined in draft Technical Paper #9). These estimates indicate that no Oak Ridges Moraine subwatersheds in the Humber River watershed exceed the 10% impervious cover criteria for current conditions (based on 2002 land use), nor will they exceed 10% upon build-out of municipal official plans approved as of January 2005.	See *Humber River Watershed Oak Ridges Moraine Subwatersheds Assessment Technical Brief*
27.(1) cont'd	(b) any lower percentage specified in the applicable watershed plan.	No lower percentage has been specified.	N/A

Endnotes:

1. - Ministry of the Environment (2007) Oak Ridges Moraine Conservation Plan – Watershed Plans, Technical Paper #9.
   - Ministry of the Environment (2007) Oak Ridges Moraine Conservation Plan – Water Budgets, Technical Paper #10.
   - Ministry of the Environment (2007) Oak Ridges Moraine Conservation Plan – Water Conservation Plans, Technical Paper #11.
   - Ministry of the Environment (2007) Oak Ridges Moraine Conservation Plan – Subwatersheds (Impervious Surfaces), Technical Paper #13.

2. - City of Brampton Fill By-law, By-law 143-95.
- City of Brampton Refuse By-law, By-law 381-2005.
- City of Brampton Sewage By-law, By-law 90-75.
- City of Brampton Salt Management Plan, 2005.
- City of Brampton Tree Preservation By-law, Bylaw 38-2006.
- City of Brampton Woodlot Conservation By-law, By-law 70-2001 as amended by By-law 402-2005.
- City of Toronto Municipal Code, Chapters 455 (Filling and Grading), 517 (Idling of Vehicles and Boats), 548 (Littering and Dumping of Refuse), 612 (Pesticides, Use of), 658 (Ravine Protection), 681 (Sewers), and 813 (Trees),
- City of Toronto Salt Management Plan, 2004.
- City of Vaughan Fill By-law, By-law 189-96 as amended by By-law 265-2006.
- City of Vaughan Idling of Vehicles By-law, By-law 170-2004.
- City of Vaughan Littering and Dumping By-law, By-law 3-2004.
- City of Vaughan Private Property Tree Protection By-law, By-law 185-2007 as amended by By-law 205-2007.
- City of Vaughan Sewer Use By-law, By-law 12-74.
- City of Vaughan Tree Protection By-law (Public Property), By-law 95-2005.
- Dufferin County Forest Conservation By-law, By-law 2006-15.
- Dufferin County Salt Management Plan, 2005.
- Region of Peel Salt Management Plan, 2007.
- Region of Peel Sewer Use By-law, By-law 90-90.
- Simcoe County Tree-cutting By-law, By-law 5289.
- Simcoe County Anti-dumping By-law, By-law 4805.
- Town of Caledon Dumping on Private or Municipal Property By-law, 87-100.
- Town of Caledon Fill By-law, By-law 2007-59.
- Town of Caledon Healthy Horticultural Landscapes By-law, By-law 2003-81 as amended by By-law 2005-82.
- Town of Caledon Salt Management Plan, 2005.
- Town of Caledon Woodlands Conservation By-law, By-law 2000-100.
- Town of Richmond Hill Salt Management Plan, 2005.
- Town of Richmond Hill Tree Preservation By-law (Private Property), By-law 41-07.
- Town of Richmond Hill Water Use Restrictions By-law, By-law 157-05.
- Township of King Water Restriction By-law, By-law 75-43.
- York Region Salt Management Plan, 2004.
- York Region Sewage By-law, By-law S-0064-2005-009.
- York Region Trees By-law, By-law TR-0004-2005-036.

Appendix C: List of Supporting Documents

Watershed Plan

Toronto and Region Conservation Authority. 2008. Humber River Watershed Plan.

Supporting Documents

Toronto and Region Conservation Authority. 2007. Listen to Your River – A Report Card on the Health of the Humber River Watershed, Prepared for the Humber Watershed Alliance.

Toronto and Region Conservation Authority. 2008. Humber River State of the Watershed Reports – Air Quality; Aquatic System; Cultural Heritage; Fluvial Geomorphology; Geology and Groundwater Resources; Land and Resource Use; Nature-based Recreation; Surface Water Quality; Surface Water Quantity; and Terrestrial System.

Toronto and Region Conservation Authority. 2008. Humber River Watershed Scenario Modelling and Analysis Report.

HCCL. 2008. Humber River Watershed HSP-F Update and Future Scenarios Modelling.

Toronto and Region Conservation Authority. 2007. Development of a Sustainable Community Scenario for the Rouge River Watershed.

Freeman Associates. 2006. Action Plan for Sustainable Practices – Implementation Strategies for the Residential and Business Sectors in the Greater Toronto Area. Toronto and Region Conservation Authority.

J.D. Power and Associates. 2006. 2006 New Home Builder Customer Satisfaction Study – TRCA Supplemental Study. Toronto and Region Conservation Authority.

Ontario Ministry of Natural Resources and Toronto and Region Conservation Authority. Humber River Fisheries Management Plan. Final Draft 2005.

Appendix D: List of Acronyms

AMO ..... Association of Municipalities of Ontario
BILD ..... Building Industry and Land Development Association
CAMC..... Conservation Authorities Moraine Coalition
CFIA ..... Canadian Food Inspection Agency
CO ..... Conservation Ontario
CVC……..Credit Valley Conservation Authority
DFO..... Department of Fisheries and Oceans
EA..... Environmental Assessment
EFP ..... Environmental Farm Plan
EIS ……..Environmental Impact Statement
FMZ..... Fish Management Zone
GLSF ..... Great Lakes Sustainability Fund
GTA..... Greater Toronto Area
HWP..... Humber River Watershed Plan
LEED ..... Leadership in Energy and Environmental Design
LSRCA…….Lake Simcoe Region Conservation Authority
MESP……..Master Environmental Servicing Plan
MMAH ..... Ministry of Municipal Affairs and Housing
MNR ..... Ministry of Natural Resources
MOE ..... Ministry of the Environment
MPIR ..... Ministry of Public Infrastructure and Renewal
NGO ..... Non-government organization
NVCA……..Nottawasaga Valley Conservation Authority
OCETA..... Ontario Centre for Environmental Technology Associations
ORC ..... Ontario Realty Corporation
ORM..... Oak Ridges Moraine
RWMP..... Regional Watershed Monitoring Program (TRCA)
STEP ..... Sustainable Technologies Evaluation Program (TRCA)
SW..... Stormwater
SWM..... Stormwater management
TNHS..... Terrestrial Natural Heritage System (TRCA)
TRCA..... Toronto and Region Conservation Authority
YPDT..... York Peel Durham Toronto Groundwater Program