



## Cobourg Creek Watershed Plan 2008



Township of Hamilton

*GRCA Approval, March 19, 2009  
Resolution Number FA 12/09*



The Cobourg Creek Watershed Plan was written to provide guidance and recommendations for the protection, enhancement and sustainable management of the Cobourg Creek watershed and its resources. Recommended management actions are based on scientific data presented in the *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features*, as well as municipal, stakeholder and public input.

The Cobourg Creek Watershed Plan was written by Pam Lancaster, B.Sc. with support from Brian Morrison, B.Sc., Mark Peacock, P. Eng., Ken Towle, M.E.S. and Magdi Widaatalla P.Geo, M.Sc., staff of the Ganaraska Region Conservation Authority (GRCA). Maps were created by the GRCA GIS Department: Steve Nowak, B.A. and Jeff Moxley. This document was created for the residents, communities, municipalities and stakeholders of the Cobourg Creek watershed. This watershed plan represents the first of its kind for the Cobourg Creek watershed. Review and input into this document by the Technical Review Committee, Community Advisory Committee, stakeholders and residents occurred through the watershed planning process.

Financial support for the Cobourg Creek Watershed Plan was provided by the Town of Cobourg and the Township of Hamilton.

Correct citation for this document:

Ganaraska Region Conservation Authority. 2008. Cobourg Creek Watershed Plan. Ganaraska Region Conservation Authority. Port Hope, Ontario.

The Cobourg Creek Watershed Plan was written with review and input from members of the Technical Review Committee and Community Advisory Committee.

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## The Cobourg Creek Watershed Plan Executive Summary

The Cobourg Creek watershed is recognized for its fisheries, aquatic habitat, terrestrial natural heritage and recreational opportunities. The aim of the Cobourg Creek Watershed Plan is to protect, enhance and manage the watershed and its resources for current and future generations. The purpose of the Cobourg Creek Watershed Plan includes the following.

- Fulfill the watershed planning requirements of the *Oak Ridges Moraine Conservation Plan* (Appendix B).
- Create community awareness and ownership of the Cobourg Creek watershed and its plan.
- Protect the ecological and hydrological integrity of the watershed.
- Ensure that land and resource uses that maintain, improve or restore the ecological and hydrological functions of the watershed are permitted.
- Maintain, improve or restore the elements that contribute to the ecological and hydrological functions of the watershed, including the quality and quantity of water and other resources.

Written for the municipalities, communities, residents and resource users of the watershed, this watershed plan outlines recommended management actions required to protect this valuable resource for current and future generations. Recommended actions have been derived from scientific data outlined in the *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features* (Ganaraska Region Conservation Authority 2008), local knowledge, municipal and agency input and review, and public consultation. Formal processes were carried out with direct review and input from the Cobourg Creek Technical Review Committee and the Community Advisory Committee.

As a result of a year long initiative, management actions, targets, monitoring and reporting activities have been formulated. The foundation of management actions are based on the goal and objectives of each watershed component/science. Each objective addresses multiple issues or opportunities in the Cobourg Creek watershed. Management actions have been defined in terms of regulation and planning, stewardship, education and awareness, and land acquisition. A summary of goals, objectives and management actions are found below.

Approval, adoption and implementation of the Cobourg Creek Watershed Plan are the most important steps in this initiative. Participation and co-operation by the Ganaraska Region Conservation Authority (GRCA), the Town of Cobourg, the Township of Hamilton and the Township of Alnwick/Haldimand is needed to ensure adoption of the Cobourg Creek Watershed Plan. In addition participation by residents, businesses and stakeholders of the Cobourg Creek watershed is required to see the desired outcomes and successes of the Cobourg Creek Watershed Plan.

## Summary of Goals, Objectives and Management Actions

**Groundwater Quantity Goal 1.0:** protect and enhance groundwater quantity for human use and ecological functions

**Objective 1.1:** maintain or enhance groundwater recharge and discharge for human use and ecological functions

### Regulations and Planning

Recommended policies:

- Map groundwater features
- Identify groundwater features not yet known
- Restrict development within and in proximity to groundwater features
- Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

Support for:

- Current plan review mechanisms

### Stewardship

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Increase natural cover in and adjacent to groundwater features
- Achieve the natural heritage system as the primary means of protecting groundwater features
- Enhance and protect groundwater features through best management practices
- Encourage the adoption of urban land use practices that increase groundwater recharge

**Education and awareness** initiatives to provide information pertaining to groundwater quantity.

### Land Acquisition

Recommended policy: protect groundwater features through land acquisition

**Objective 1.2:** manage and avoid actions that negatively affect aquifers (artesian, shallow and deep) and changes in groundwater flow

### Regulations and Planning

Recommended policies:

- Minimize groundwater flow alteration
- Minimize and manage artesian and flowing wells

**Education and awareness** initiatives to provide information pertaining to aquifers and groundwater quantity

**Objective 1.3:** ensure sustainable rates of groundwater use

### Regulations and Planning

Recommended policies:

- Restrict development needing a Permit to Take Water in wellhead protection areas

- Restrict development needing a Permit to Take Water in groundwater features
- Restrict consumptive water takings

Support for:

- Existing review mechanisms and by-laws
- Water conservation plan creation

### **Stewardship**

- Provide technical assistance to the Permit to Take Water process
- Provide implementation assistance for a water conservation plan through the GRCA Clean Water – Healthy Land Stewardship Program

**Education and awareness** initiatives to provide information regarding water takings.

**Surface Water Quantity Goal 2.0:** maintain and improve the hydrologic function of the watershed

**Objective 2.1:** maintain and enhance the water balance and baseflow of the Cobourg Creek watershed

### **Regulations and Planning**

Recommended policies:

- Map features contributing to natural flows of Cobourg Creek
- Identify features contributing to natural flows of Cobourg Creek not yet known
- Restrict development within and in proximity to features contributing to natural stream flows
- Limit cumulative hard surfaces within the Cobourg Creek watershed
- Development setbacks from Cobourg Creek
- Restrict development needing a Permit to Take Water in contributing features to natural flows within Cobourg Creek
- Restrict consumptive water takings
- Require urban stormwater best management practices
- Limit online ponds and impoundment structures
- Limit site alterations

Support for:

- Existing legislation
- Review mechanisms
- Existing program implementation

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Increase natural vegetation using the natural heritage system throughout the watershed, in groundwater recharge areas and to compensate for changes in imperviousness of the watershed
- Increase riparian buffers to reduce variability of overland runoff
- Increase water infiltration, storage and use on individual lots
- Restore, enhance and protect wetlands
- Carry out an urban stewardship program to address altered flows caused from stormwater management

- Increase channel stability using bioengineering in urbanized areas to mitigate erosion caused from altered flows

**Education and awareness** initiatives to provide information regarding surface water quantity and the protection and enhancement of the form and function of streams

**Objective 2.2:** maintain and improve the level of protection of residents, existing and proposed development from flooding hazards

### **Regulations and Planning**

Recommended policies:

- Limit cumulative hard surfaces within the Cobourg Creek watershed
- Limit online ponds and impoundment structures
- Stormwater quantity control

Support for existing policies and programs

Recommended for a flood recovery program

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Manage or decommission online ponds to ensure they do not pose a flood hazard risk
- Implement re-vegetation to attenuate flood flows (e.g., riparian plantings, grass swales and waterways)

**Education and awareness** initiatives to provide information regarding flood forecasting and warning and emergency response

### **Land Acquisition**

Recommended policy: protect floodplains through land acquisition

**Groundwater Quality Goal 3.0:** protect groundwater quality to ensure safe drinking water supplies and to protect ecological functions

**Objective 3.1:** protect and enhance the quality of groundwater by addressing existing pathways and contaminant sources

### **Regulations and Planning**

Policy investigation and creation:

- Ensure wells or boreholes are properly abandoned or maintained
- Require private sewage system upgrades during redevelopment

Recommended program: Septic re-inspection program

Recommended policy: implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Upgrade or decommission wells and boreholes
- Repair septic systems and provide for septic inspections

- Upgrade or newly construct fuel and chemical storage facilities
- Support septic re-inspection program when/if developed

**Education and awareness** initiatives to provide information regarding groundwater quality and drinking water protection

**Objective 3.2:** manage the quality of groundwater through the implementation of best management practices throughout the watershed

### **Regulations and Planning**

Recommended policies:

- Map highly vulnerable aquifers and wellhead protection areas
- Identify vulnerable areas to groundwater contamination not yet known
- Restrict development in highly vulnerable aquifers
- Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

Support for existing legislation

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs encourage and provide incentives for best management practices within the wellhead protection areas, highly vulnerable aquifers and significant groundwater recharge areas

**Education and awareness** initiatives to provide information regarding groundwater quality and best land use practices

### **Land Acquisition**

Recommended policy: protect vulnerable groundwater features through land acquisition

**Surface Water Quality Goal 4.0:** protect and improve surface water quality of Cobourg Creek

**Objective 4.1:** manage and enhance rural water quality

### **Regulations and Planning**

Recommended policies:

- Set development back from Cobourg Creek
- “Enhanced” level stormwater quality controls
- Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act, 2006*

Support for:

- Existing legislation
- Existing and new programs

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Decrease and mitigate non-point pollution sources (e.g., overland runoff)
- Enhance, restore and properly manage riparian areas to buffer overland runoff
- Promote and encourage best management practices to protect water quality

- Increase natural cover as recommended by the natural heritage system

**Education and awareness** initiatives to provide information regarding rural surface water quality

#### **Objective 4.2: manage and enhance urban water quality**

##### **Regulations and Planning**

Recommended policies:

- Set development back from Cobourg Creek
- “Enhanced” level stormwater quality controls
- Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act, 2006*

Support for:

- Existing legislation
- Existing and new programs

##### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Ensure public space management practices do not negatively impact surface water quality
- Ensure all public spaces management practices have a set back distance from the stream edge (e.g., a natural riparian area)
- Create and implement an urban stream restoration and stewardship program that will benefit surface water quality

**Education and awareness** initiatives to provide information regarding urban surface water quality

##### **Land Acquisition**

Recommended policy: protect surface water quality through land acquisition

#### **Objective 4.3: create a spills action plan**

##### **Regulations and Planning**

Plan creation: spills action plan

#### **Aquatic Habitat and Species Goal 5.0: protect aquatic habitat and species**

#### **Objective 5.1: protect and restore existing and native aquatic species and communities**

##### **Regulations and Planning**

- Recommended policy: adopt the Cobourg Creek Fisheries Management Plan
- Support for existing review mechanisms and programs

##### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Removal of instream barriers
- Removal of online ponds

**Education and awareness** initiatives to provide information regarding aquatic species

**Objective 5.2:** protect and enhance the form and function of instream habitat and riparian areas

### **Regulations and Planning**

Recommended policies:

- Map aquatic habitats within the Cobourg Creek watershed
- Identify aquatic habitats within the Cobourg Creek watershed not yet known
- Restrict development within and in proximity to aquatic habitats
- Adopt the Cobourg Creek Fisheries Management Plan

Support for:

- New programs
- Existing review mechanisms and policies

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Instream habitat creation
- Erosion control projects
- Increase natural vegetation in riparian areas

**Education and awareness** initiatives to provide information regarding aquatic habitat

**Terrestrial Natural Heritage Goal 6.0:** maintain the native biodiversity and ecological function of the landscape within the watershed

**Objective 6.1:** reduce habitat fragmentation and promote connectivity

### **Regulations and Planning**

Recommended policies:

- Map terrestrial features within the Cobourg Creek watershed
- Identify terrestrial features within the Cobourg Creek watershed not yet known
- Reduce the impact of development on the natural heritage system and significant features
- Net gains within the natural heritage system

Recommended planning strategy:

- Create a regional Terrestrial Natural Heritage System and Strategy
- Support for existing plan review mechanisms

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Increase a diversity of natural cover within the Cobourg Creek watershed using the natural heritage system
- Increase natural cover throughout the watershed
- Increase and encourage sustainable land uses
- Increase tallgrass prairie habitats

**Education and awareness** initiatives to provide information regarding terrestrial natural heritage

### **Land Acquisition**

Recommended policy: protect natural heritage features through land acquisition

**Objective 6.2:** maintain, enhance and restore the natural diversity of vegetation communities within the watershed

### **Regulations and Planning**

Recommended policies:

- Adopt the County Forest Management Plan
- Net gains within the natural heritage system

Support for existing by-laws

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Increase a diversity of natural cover within the Cobourg Creek watershed using the natural heritage system
- Increase natural cover throughout the watershed
- Increase and encourage sustainable land uses
- Increase tallgrass prairie habitats

**Education and awareness** initiatives to provide information regarding vegetation communities

### **Land Acquisition**

Recommended policy: protect vegetation communities through land acquisition

**Objective 6.3:** maintain, enhance and restore the diversity of native species in the watershed

### **Regulations and Planning**

Recommended policy: net gains within the natural heritage system

Support for existing legislation

### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following:

- Increase the diversity of natural cover within the natural heritage system
- Increase natural cover throughout the watershed with a focus on interior habitat
- Enhance and increase specific habitat types such as wetlands, vernal pools and tallgrass prairie

**Education and awareness** initiatives to provide information regarding native species and threats to these species

### **Land Acquisition**

Recommended policy: protect species habitats through land acquisition

#### **Objective 6.4: mitigate and reduce negative impacts of urban and rural land use**

##### **Regulations and Planning**

Recommended policy: net gains within the natural heritage system

Plan creation: urban natural heritage system

**Education and awareness** initiatives to provide information regarding native species and threats to these species

#### **Public Health and Wellbeing Goal 7.0: promote healthy communities in relation to the environment**

#### **Objective 7.1: manage and improve the environmental quantity, quality and social benefits of existing and future public spaces**

##### **Regulations and Planning**

Recommended policies:

- Increasing public spaces associated with new development
- Adopt the County Forest Management Plan

Support existing initiatives

##### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs accomplish the following in public spaces

- Increase natural, native vegetation
- Increase healthy lifestyle infrastructure
- Increase educational aspects of the public space

**Education and awareness** initiatives to provide information regarding public spaces

#### **Objective 7.2: encourage sustainable living and development, and local businesses**

##### **Regulations and Planning**

Recommended policy: increase in public transportation

Support existing initiatives

##### **Stewardship**

Through the GRCA Clean Water – Healthy Land Stewardship and partner programs increase actions around sustainable living

**Education and awareness** initiatives to provide information regarding sustainable living and development, and local businesses

#### **Community Heritage Goal 8.0: preserve and interpret our community heritage**

#### **Objective 8.1: increase awareness and appreciation of our community heritage**

**Education and awareness** initiatives to provide information regarding cultural heritage with partner programs

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# 1.0 Introduction

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Throughout the Province of Ontario there is a need to manage and plan for the appropriate use of the natural environment and its resources. As development continues across the landscape, sustainable management and appropriate planning is required to ensure that current and future actions do not degrade, alter or destroy the natural environment. A watershed plan is an important tool used to ensure that current and future generations are able to progress while acknowledging and addressing changes to the local ecosystem.

The planning boundary of a watershed plan is a watershed; an area of land that drains into a lake or river. Defined by topographical boundaries, watersheds may cross many political jurisdictions. The Cobourg Creek watershed within the Ganaraska Region Conservation Authority (GRCA) drains to Lake Ontario (Figure 1.0) as it passes through the Township of Alnwick/Haldimand, the Township of Hamilton and the Town of Cobourg (Figure 1.1). The watershed is a dynamic and unique place of complex webs of natural features, functions and interactions between the soil, water, air, plants and animals. These features and functions within a watershed need to be protected for the benefit of the local environment, watershed and community.

Partnerships and public input is integral to the creation, adoption and implementation of a watershed plan. The watershed plan process is open and transparent, allowing public and local opinions, interests and concerns to shape the understanding and management actions of the watershed. The public, landowners, farmers, resource users, naturalists as well as municipalities, government agencies, health units and utilities are crucial partners in this watershed planning process. In the end, a watershed plan is created for the protection and sustainable management of the local watershed by the community and current generation for the future community and generations.

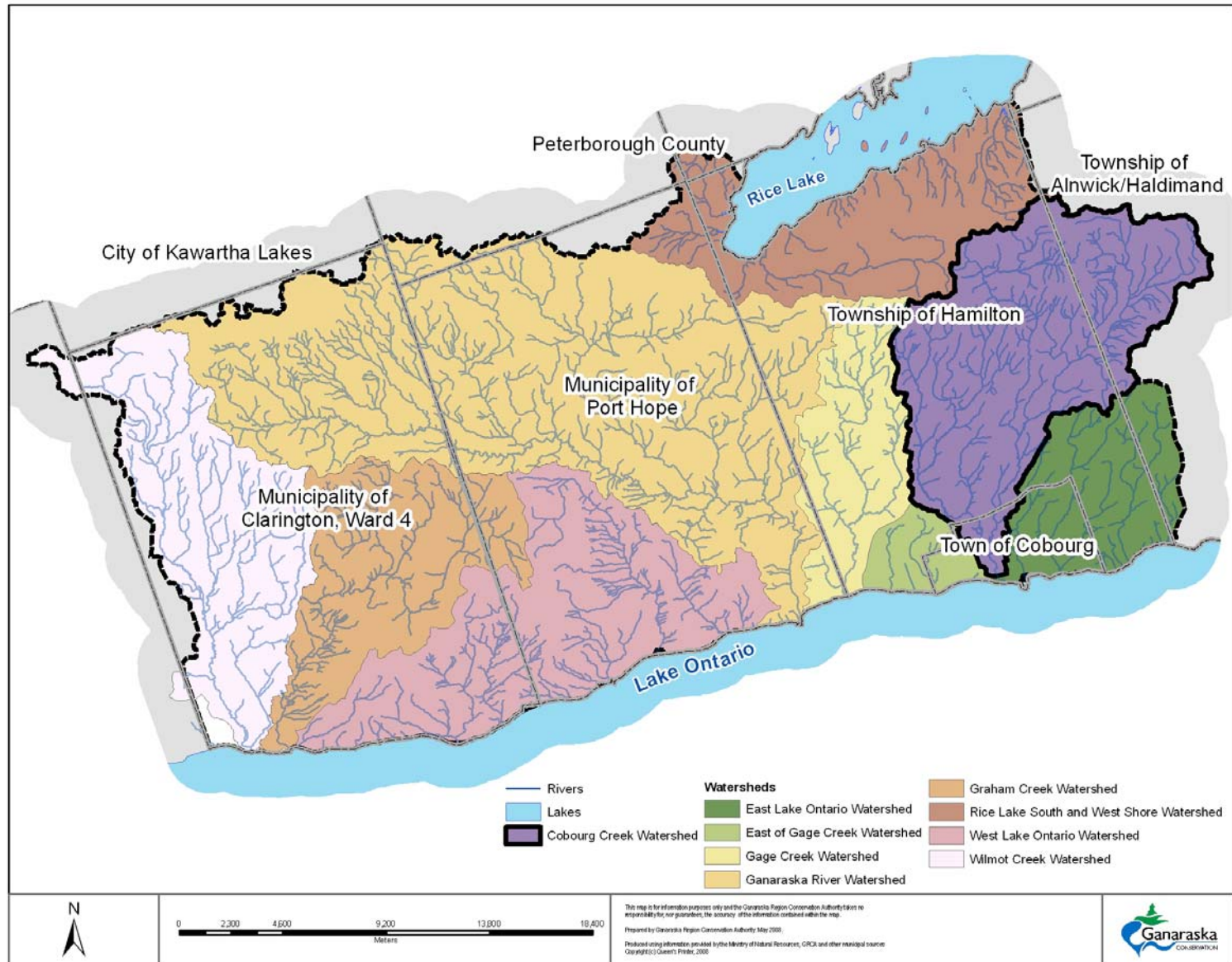


Figure 1.1: Cobourg Creek watershed within the Ganaraska Region Conservation Authority

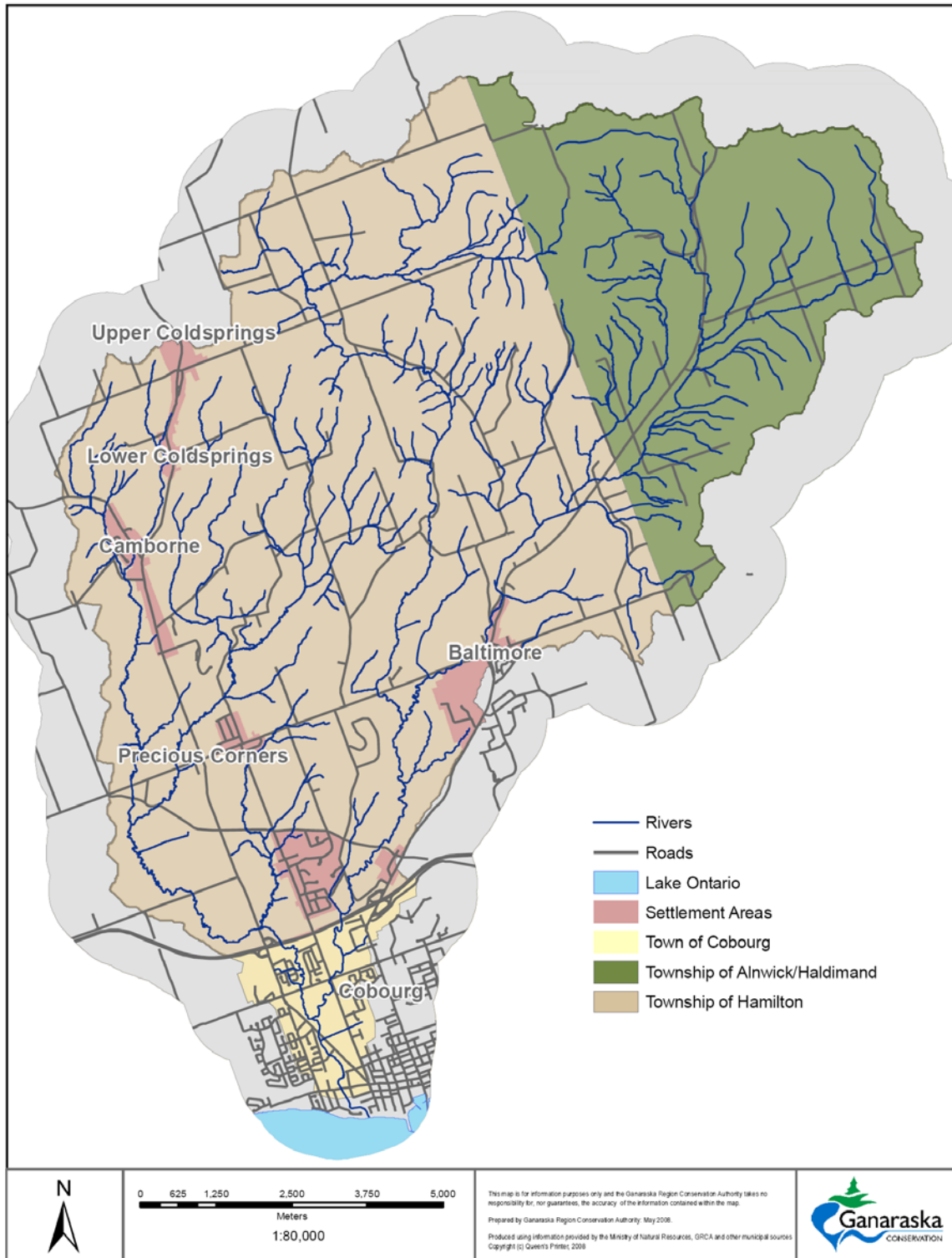


Figure 1.2: Cobourg Creek watershed

## 1.1 Local History of Watershed Planning and Management



A. H. Richardson

The conservation movement in Ontario dates back to 1936 with the formation of the Ontario Conservation and Reforestation Association (Richardson 1974). During its existence the association progressed conservation in Ontario through the creation of a soils department at the Ontario Agricultural College, establishment of a Conservation Branch within the Department of Planning and Development, the creation of two tree nurseries, plus the establishment of district foresters throughout Ontario (Richardson 1974). However, the most instrumental addition to the conservation movement and watershed planning was the passing of the *Conservation Authorities Act* in 1946.

The *Conservation Authorities Act* was driven to legislation by a group of conversationalists named the Guelph Conference. This group was formed out of a conference in 1941, organized by the Ontario Conservation and Reforestation Association, and the Federation of Ontario Naturalists (Shrubsole 1989). In order to build a case for conservation in Ontario, the Guelph Conference decided that a pilot survey should be carried out and funded by the provincial and federal governments (Richardson 1974). The selected survey site was the Ganaraska River watershed, with the survey being conducted from 1942 to 1943 (Richardson 1944). The Ganaraska River watershed survey, the work carried out by the founding conservation associations and the *Conservation Authorities Act* paved the way for the creation of the 36 conservation authorities that exist today.

The resulting report from the pilot study entitled “*Ganaraska Watershed: A study in land use with recommendations for the rehabilitation of the area in the post war period*” by A.H. Richardson, provided the necessary plan for managing local watersheds. Under the *Conservation Authorities Act*, the Ganaraska River Conservation Authority was formed on October 8, 1946 (Richardson 1974). While other conservation authorities were awaiting a conservation report from the Conservation Branch, the Ganaraska River Conservation Authority began implementing the recommendations from the survey report (Shrubsole 1989).

In 1962 with the addition of Wilmot Creek, Graham Creek and smaller streams flowing to Lake Ontario in the west and again in 1970 with the addition of Gage Creek, Cobourg Creek and streams flowing to Lake Ontario and Rice Lake in the east, the Ganaraska River Conservation Authority was enlarged and renamed the Ganaraska Region Conservation Authority (GRCA) (Richardson 1974). Through the next 60 years, the GRCA has managed its watersheds under the direction of the *Conservation Authorities Act*, relevant acts (Appendix A), historic

management documents (Richardson 1944; Department of Energy and Resources Management 1966; and Ontario Ministry of Natural Resources 1976) and municipal and community direction and input.

## **1.2 Watershed Planning under the *Oak Ridges Moraine Conservation Act***

In 2001 the Province of Ontario enacted the *Oak Ridges Moraine Conservation Act*, which established Regulation 140/02, the *Oak Ridges Moraine Conservation Plan* in 2002. The purpose of the *Oak Ridges Moraine Conservation Plan* is to provide land use and resource management planning direction to provincial ministers, ministries, agencies, municipalities, municipal planning authorities, landowners and other stakeholders on how to protect the Moraine's ecological and hydrological features and functions (Ontario Ministry of Municipal Affairs and Housing 2002). Under Section 24 the *Oak Ridges Moraine Conservation Plan* (Ontario Ministry of Municipal Affairs and Housing 2002) requirements are given for watershed plans.

*(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.*

*(3) A watershed plan shall include, as a minimum,*  
*(a) a water budget and conservation plan as set out in section 25;*  
*(b) land and water and management strategies;*  
*(c) a framework for implementation, which may include more detailed implementation plans for smaller geographic areas, such as subwatershed plans, or for specific matter, such as environmental damage;*  
*(d) an environmental monitoring plan;*  
*(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*  
*(f) criteria for evaluating the protection of water quality and quantity, hydrological features and hydrological functions.*

As a result of the legislative requirements, the Township of Alnwick/Haldimand and the Township of Hamilton are required to create a watershed plan for the Cobourg Creek watershed, which originates on the oak ridges moraine (Figure 1.3). The Town of Cobourg, although not under legislative requirements, require a watershed plan for sound environmental management practices. The role of the Ganaraska Region Conservation Authority is to carry out the watershed plan process in partnership with the municipalities.

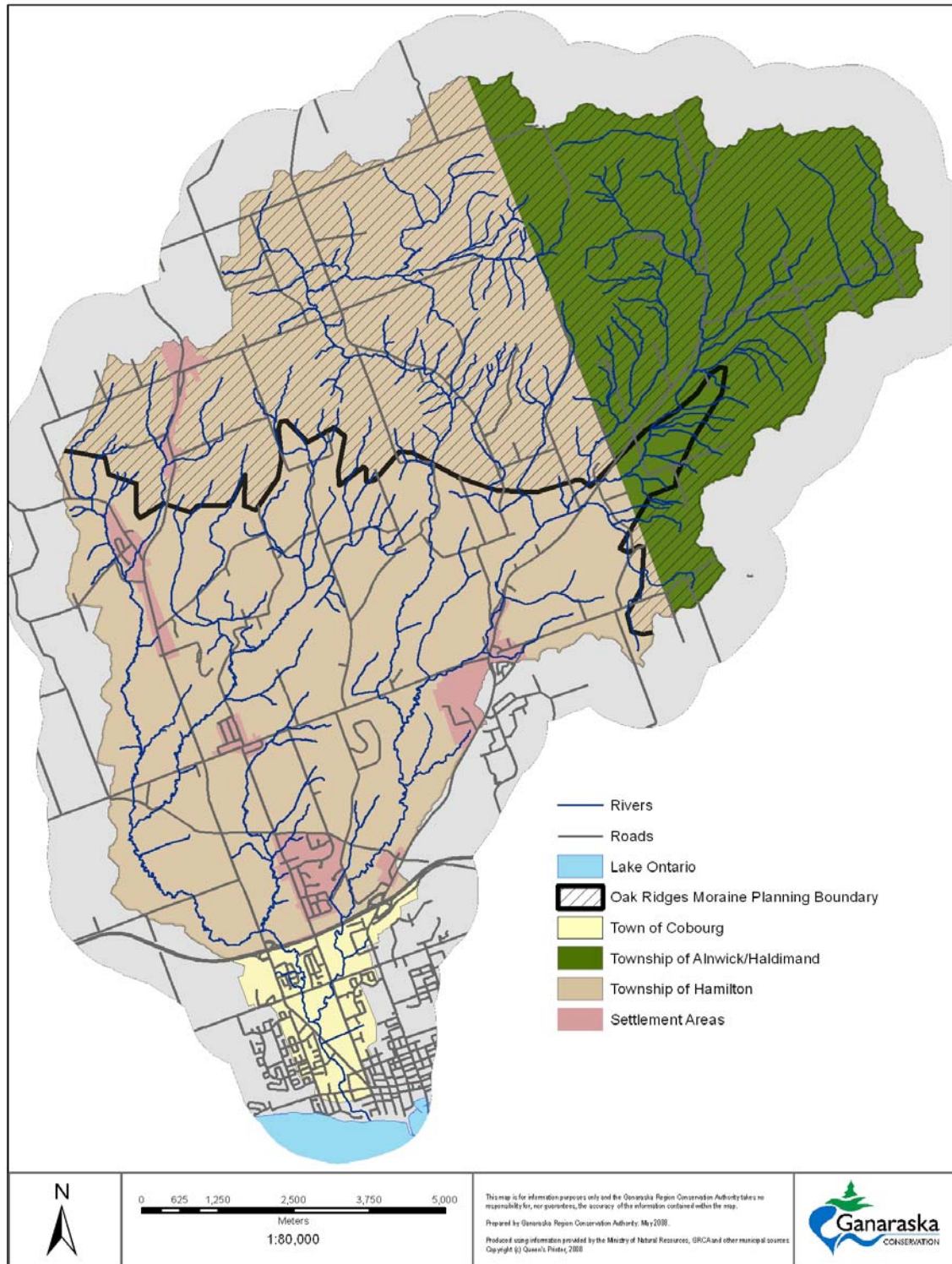


Figure 1.3: Oak Ridges Moraine planning boundary within the Cobourg Creek watershed



## 2.0 Watershed Plan Process

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The watershed plan process is one step in the ongoing process of watershed management. The basic principles of watershed management have changed little since formally described in 1993 (Ontario Ministry of Environment and Energy and Ministry of Natural Resources 1993). As illustrated in Figure 2.0, the process of watershed management has four phases (Conservation Ontario 2003). Conservation authorities in Ontario commonly follow these processes, although adaptations may occur to suite local watershed needs.

1. *Plan*: develop watershed, subwatershed or other watershed based environmental plans.
2. *Implement*: apply programs, policies or projects that arise from the plan.
3. *Monitor and report*: assess whether goals, objectives and targets are met and communicate the results to decision makers and the public.
4. *Review, evaluate and update*: regularly review the watershed plan and assess if changes are needed to occur within the plan.

Watershed plans are usually prepared in response to a trigger, such as public concerns about environmental conditions, a municipal official plan requirement, or as in this case, the requirements set out by the *Oak Ridges Moraine Conservation Plan*. Watershed plans also complement and take into consideration other government acts, regulations and policies (Appendix A). Not only is watershed management and planning an environmental protection process it is also a social process. To be relevant, watershed management must be based on solid science and acknowledge and reflect the preferences of the people living in the watershed (Conservation Ontario 2003).

The “plan” phase can be described according to eight steps as shown in Figure 2.0. The specific Ganaraska Region Conservation Authority planning process is shown in Figure 2.1. The key to success is public, community and stakeholder input into all planning steps. Steps one and two were completed prior to the creation of this watershed plan. Scoping requires choosing a study area, creating a terms of reference (Ganaraska Region Conservation Authority 2004, updated in 2008) and managing data.

Characterization of the watershed is required to present the historical and current conditions of the study area. The *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features* (Ganaraska Region Conservation Authority 2008) contain the necessary scientific and local knowledge need to assist in the creation of the *Cobourg Creek Watershed Plan*. It contains information needed to make informed management decisions regarding the protection and environmentally sound management, of the Cobourg Creek watershed.

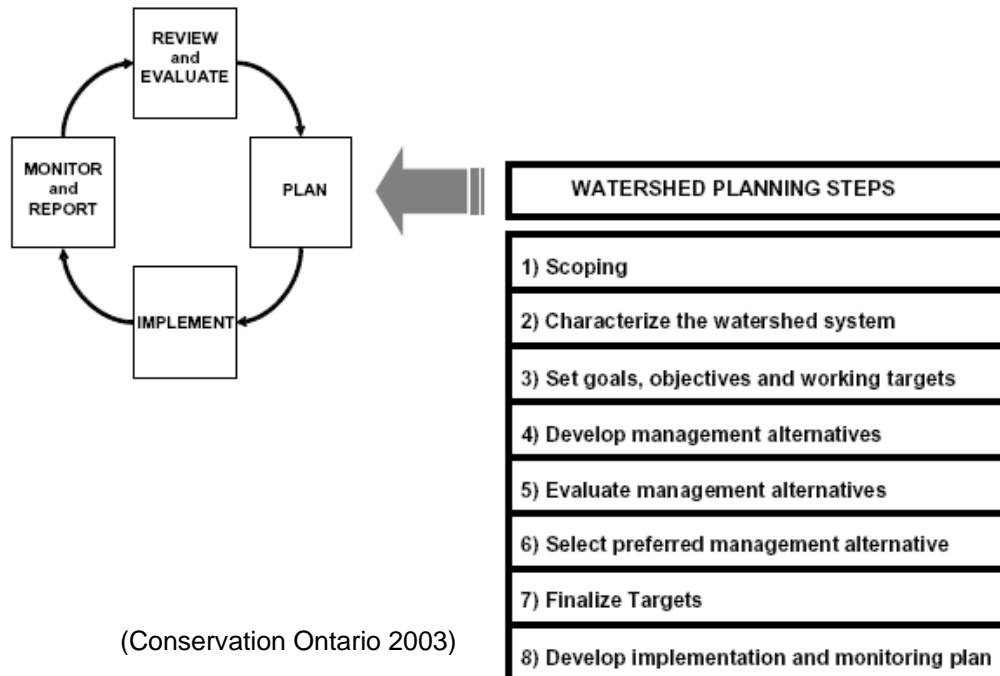


Figure 2.0: Watershed management phases and watershed planning steps

The *Cobourg Creek Watershed Plan* will address steps three to eight using information presented in the background report and computer modelling results, which will be used to evaluate changes in the watershed in response to alternative land use. Figure 2.2 lists the types of questions to be answered through the watershed plan process (Conservation Ontario 2003). Current information and model results will be used to develop the plan which will contain issues and opportunities, goals, objectives, targets, management actions, and monitoring and reporting recommendations. The plan will also address requirements of the *Oak Ridges Moraine Conservation Act* and Plan.

Many benefits result from watershed planning and management. Summarized by Conservation Ontario (2003) benefits include the following.

- Protection and management of natural resources, including their functions and linkages, for current and future generations.
- Reflection of the local environmental and community.
- Use of an integrated interdisciplinary approach.
- Consideration of the environment, economy and communities.
- Use of a partnership approach to planning and management.
- Use of adaptive environmental management approaches that aim for continuous improvement.



# The Watershed Planning Process

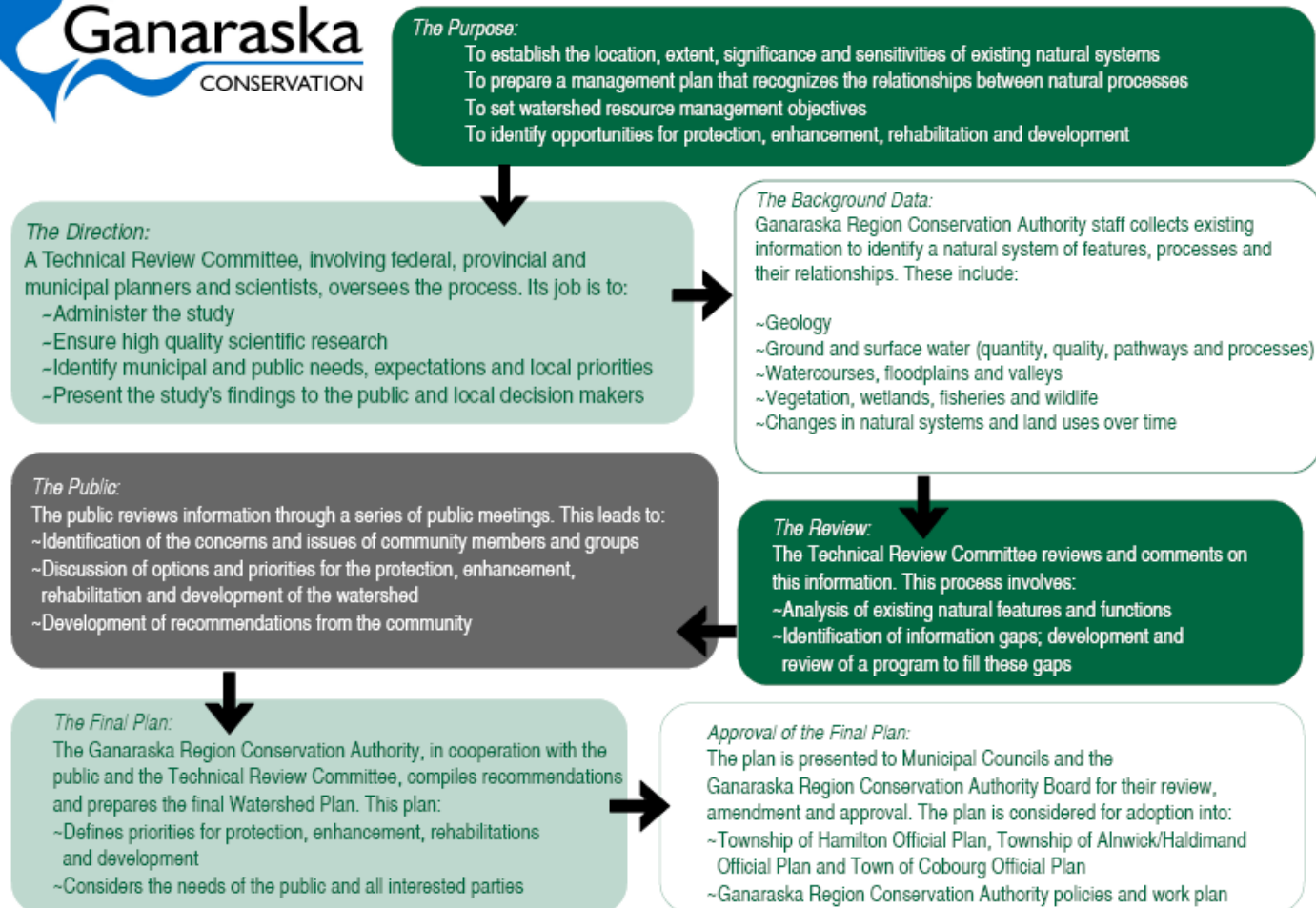


Figure 2.1: Ganaraska Region Conservation Authority defined watershed plan process

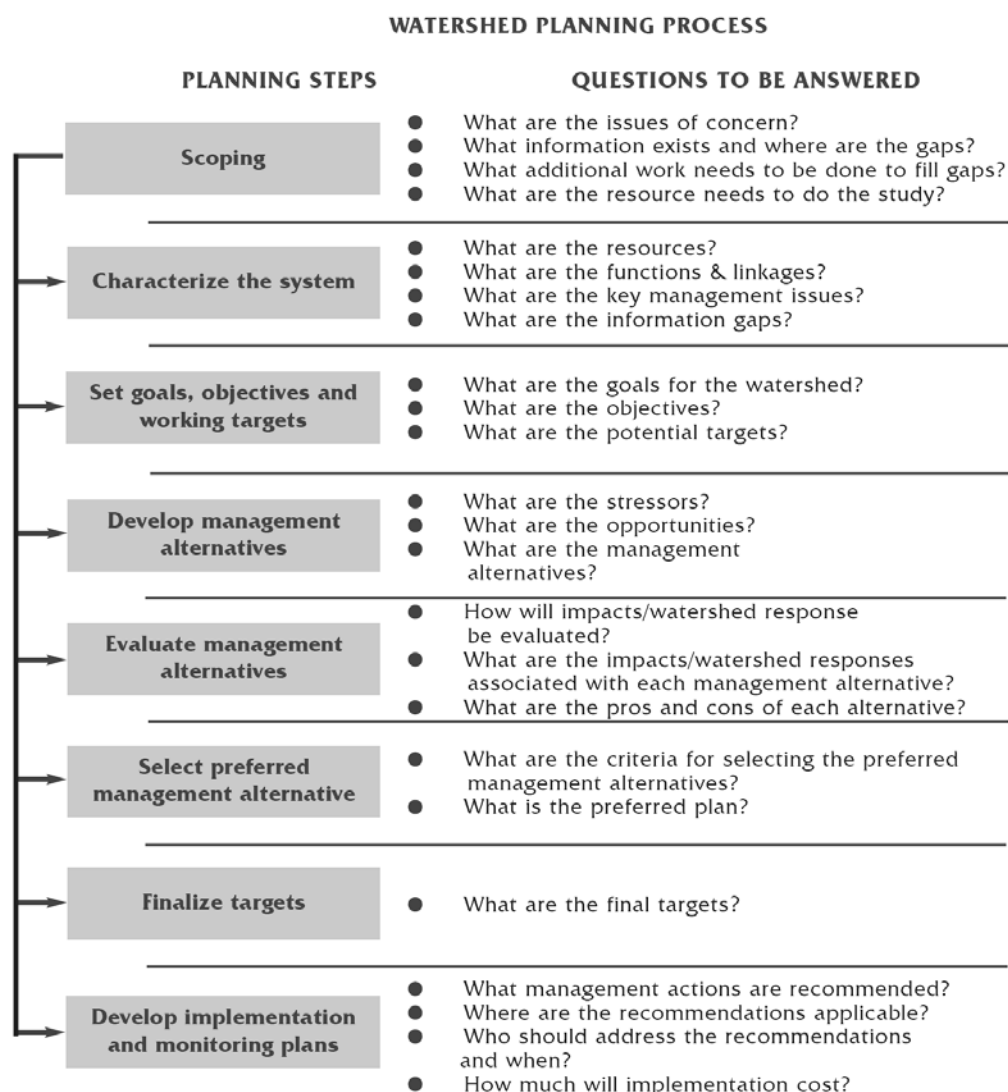


Figure 2.2: Questions to be answered in the planning process

## 2.1 Watershed Management Philosophy

The management of watersheds within the Ganaraska Region Conservation Authority is rooted in the vision and mission of the authority. The GRCA vision involves “working together for responsible stewardship of the ecosystem”. The GRCA mission is to “protect and enhance our watershed’s ecosystem” (Ganaraska Region Conservation Authority 1999). The Cobourg Creek Watershed Plan complements the vision and mission by providing an environmentally focused, science based and locally developed document to guide decision makers on balancing diverse interest while providing for the sustainable management and use of this important watershed.

The watershed management philosophy for the Cobourg Creek watershed promotes five components.

- *Net gain*: decisions and actions will build and improve upon existing watershed features and functions.
- *Environmental first*: management of the watershed will occur based on environmental features and functions, with the environment as the first step in a hierarchy of management decisions. Emphasizing prevention over environmental rehabilitation or remediation will occur.
- *Balanced land use*: acknowledgment of diverse land uses within the watershed will occur, while ensuring a balance between community and environmental needs.
- *Human wellbeing*: recognizing links between human health and the environment will occur, with attempts made to minimize risk to human health and safety.
- *Community ownership*: demonstrations of sustainable living and community growth will occur while promoting the health of the watershed through community action and partnerships.

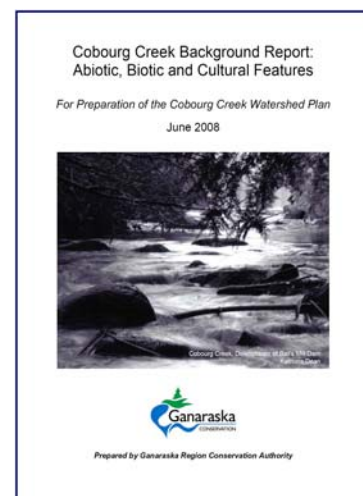
The aim of the Cobourg Creek Watershed Plan is to protect, enhance and manage the watershed and its resources for current and future generations. The purpose of the Cobourg Creek Watershed Plan includes the following.

- Fulfill the watershed planning requirements of the *Oak Ridges Moraine Conservation Plan* (Appendix B).
- Create community awareness and ownership of the Cobourg Creek watershed and its plan.
- Protect the ecological and hydrological integrity of the watershed.
- Ensure that land and resource uses that maintain, improve or restore the ecological and hydrological functions of the watershed are permitted.
- Maintain, improve or restore the elements that contribute to the ecological and hydrological functions of the watershed, including the quality and quantity of water and other resources.

## 2.2 Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features

In order to develop a watershed plan for Cobourg Creek, scientific information and local knowledge was compiled into the *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features*. Staff at the Ganaraska Region Conservation Authority examined the abiotic, biotic and cultural features of the Cobourg Creek watershed using locally collected data. The background report forms the foundation of recommended management actions.

The *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features* reports on many aspects of the watershed.



- History of the Cobourg Creek watershed
- Regional climate
- Geologic characteristics
- Groundwater systems
- Groundwater and surface water interactions
- Wellhead protection areas
- Surface water hydrology
- Natural hazards
- Water budget and stress assessment
- Duration of flows
- Groundwater quality
- Surface water quality
- Fisheries
- Instream habitat
- Surface water temperature
- Benthic macroinvertebrates
- Riparian areas
- Terrestrial natural heritage
- Species of concern
- Invasive species
- Culture characteristics
- Potential climate change effects
- Drinking water source protection
- Lake Ontario connection

### **2.3 Consultation and Public Involvement**

Watershed planning and management require partnerships between conservation authorities, municipalities, agencies and local communities. Conservation authorities coordinate plan development, by bringing together various interests and ensuring appropriate opportunities for input. Experience has shown that partners who have been involved in the development of the plan are more likely to participate in implementation. Therefore, effective involvement of all partners throughout the process is vital for success.

A Technical Review Committee was created to assist in the watershed plan process. Membership of the committee is as follows.

- Fisheries and Oceans Canada (informally)
- Ganaraska Region Conservation Authority
- Haliburton, Kawartha, Pine Ridge District Health Unit
- Lakefront Utilities Services Inc.
- Lake Ontario Management Unit (MNR)
- Lower Trent Conservation
- Northumberland County
- Ontario Federation of Anglers and Hunters
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Ministry of the Environment
- Ontario Ministry of Natural Resources
- Township of Alnwick/Haldimand (informally)
- Township of Hamilton
- Town of Cobourg

The role of the committee was to review and provide input into the background report, identify issues and opportunities within the Cobourg Creek watershed,

develop and review management actions, participate in the development and review of the watershed plan, ensure *Oak Ridges Moraine Conservation Plan* legislative requirements were met and provide watershed plan endorsements. In the future members may choose to participate in or lead aspects of implementation.

A Community Advisory Committee was also formed, comprised of interested members from the community. The role of this committee was to promote awareness of the planning process and solicit input from broader constituency group. In addition, members provided input and advice on watershed issues, goals, objectives and management actions contained in the watershed plan.

In order to create the Cobourg Creek Watershed Plan numerous opportunities for public and stakeholder input occurred throughout 2008. Key milestones were presented at public open houses which occurred in Baltimore on July 9 and in Town of Cobourg on November 18. At these meetings feedback was received regarding the results from the Cobourg Creek Background Report, watershed issues, goals, objectives and proposed management actions.

In addition to media correspondence and hosting public meetings, the GRCA pursued meetings with local institutions, organizations and agencies. These groups included the Cobourg Environmental Advisory Committee and St. Josephs Villa. Staff of the GRCA also kept municipal councils and the Ganaraska Region Conservation Authority Board informed on activities and milestones associated with the Cobourg Creek Watershed Plan.

On Saturday, July 19, 2008, the Ganaraska Region Conservation Authority and Citizens Environment Watch hosted the annual Check Your Watershed Day in Cobourg Creek. This allowed residents to learn more about Cobourg Creek while collecting stream baseflow information. An educational component was

developed in relation to watershed planning to allow youth to assist in the planning process. The classes of Mr. Mack at Cobourg District Collegiate Institute West and Mr. Geens at Notre Dame Catholic Elementary School provided many informative suggestions for the management of the Cobourg Creek watershed.





## 3.0 Cobourg Creek Fisheries Management Plan

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While the Cobourg Creek Watershed Plan is being created, a Cobourg Creek Fisheries Management Plan is being developed. In the past, fisheries management in the Cobourg Creek watershed was guided by the Lindsay District Fisheries Management Plan. In 2000 the Plan expired and the agencies responsible for fish and fish habitat management created a partnership to direct the development of a new plan. These agencies include the Ontario Ministry of Natural Resources, Fisheries and Oceans Canada and the Ganaraska Region Conservation Authority.

The Cobourg Creek Fisheries Management Plan mission is:

*"Effectively coordinate the efforts of all stakeholders through a flexible planning process in order to enhance quality of life that results from the protection and enhancement of native coldwater fish communities"*

The Cobourg Creek Fisheries Management Plan, the Cobourg Creek Watershed Plan and respective background documents have been created through parallel process. This will ensure results and information presented in the documents will complement each other and avoid unnecessary duplication. In addition to ensure that public and stakeholder consultation and involvement is effective, public meetings and consultation of both background documents and plans have occurred together when possible. The end result of both plans will be the protection, enhancement and proper management of the Cobourg Creek watershed and its resources, with an emphasis and focus of the fisheries occurring through the Fisheries Management Plan.



## 4.0 The Cobourg Creek Watershed Study Area

*This section is a summary from the Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features (Ganaraska Region Conservation Authority 2008). Please refer to this document for additional information.*

The Cobourg Creek watershed is located within the Township of Alnwick/Haldimand, the Township of Hamilton and the Town of Cobourg (Figure 4.0), all within the County of Northumberland. Historic events have shaped the watershed to its present day condition. Most notable is the influence of dams, settlement patterns and transportation corridors. Today, the Cobourg Creek watershed supports a population of approximately 9,400 people, a diverse industrial and commercial sector, a productive agriculture community and a mix of natural resources and recreational uses. In addition, residents depend on water from the Cobourg Creek watershed for domestic and economic use, although the Town of Cobourg itself relies on Lake Ontario for its source of water. Future pressures from growth, road upgrades and construction and associated impacts are anticipated over the next 20 years (Table 4.0; Figure 4.1).

Table 4.0: Municipal population projection

Municipality	Population*	Population Projections			
	2006	2011	2016	2021	2025
Township of Alnwick/Haldimand <sup>A</sup>	6,435				7,935
Town of Cobourg <sup>B</sup>	18,377	20,312	22,350	24,532	
Township of Hamilton <sup>C</sup>	11,878	12,639	13,390	14,712	

<sup>A</sup> Peter A. Joseph and Associates 2007, <sup>B</sup> Town of Cobourg Personal Communications 2007,

<sup>C</sup> Township of Hamilton Personal Communications 2007, \* 2006 Census

Cobourg Creek was shaped thousands of years ago by glacial activity and lies on Palaeozoic bedrock. From its headwaters on the Oak Ridges Moraine, Cobourg Creek weaves its way over the South Slope and continues south across the Lake Iroquois Plain, where it empties into Lake Ontario through the Town of Cobourg (Figure 4.2). Surficial geology and soils help dictate groundwater flows, aquifer locations and groundwater recharged and discharged (Figure 4.3 and 4.4). Groundwater models provide a better understanding of groundwater resources.

Surface water quantity and drainage characteristics of Cobourg Creek have been well studied. Four main tributaries exist within the watershed; Main Branch, West Branch, Central Branch and Baltimore Creek (Figure 4.5). Cobourg Creek is also referred to as Cobourg Brook. Locally Factory Creek represents the area within the Town of Cobourg. From its headwaters near Coldsprings, downstream to Lake Ontario, the Cobourg Creek watershed is 18 kilometres long and as wide as seven kilometres. Flows are generally resilient to stresses such as drought and water use, and adequately provide for aquatic habitat and human use.

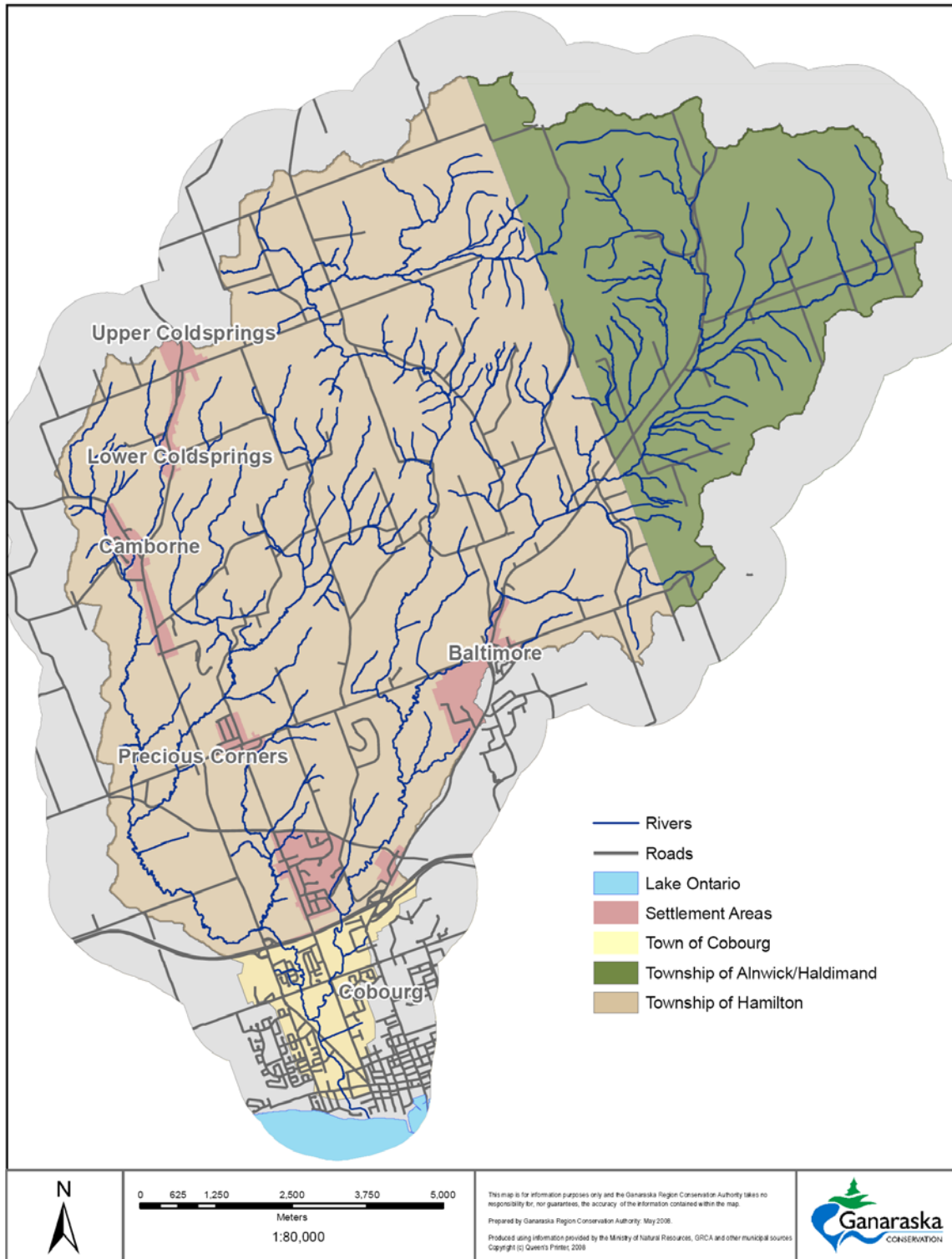


Figure 4.0: Cobourg Creek watershed

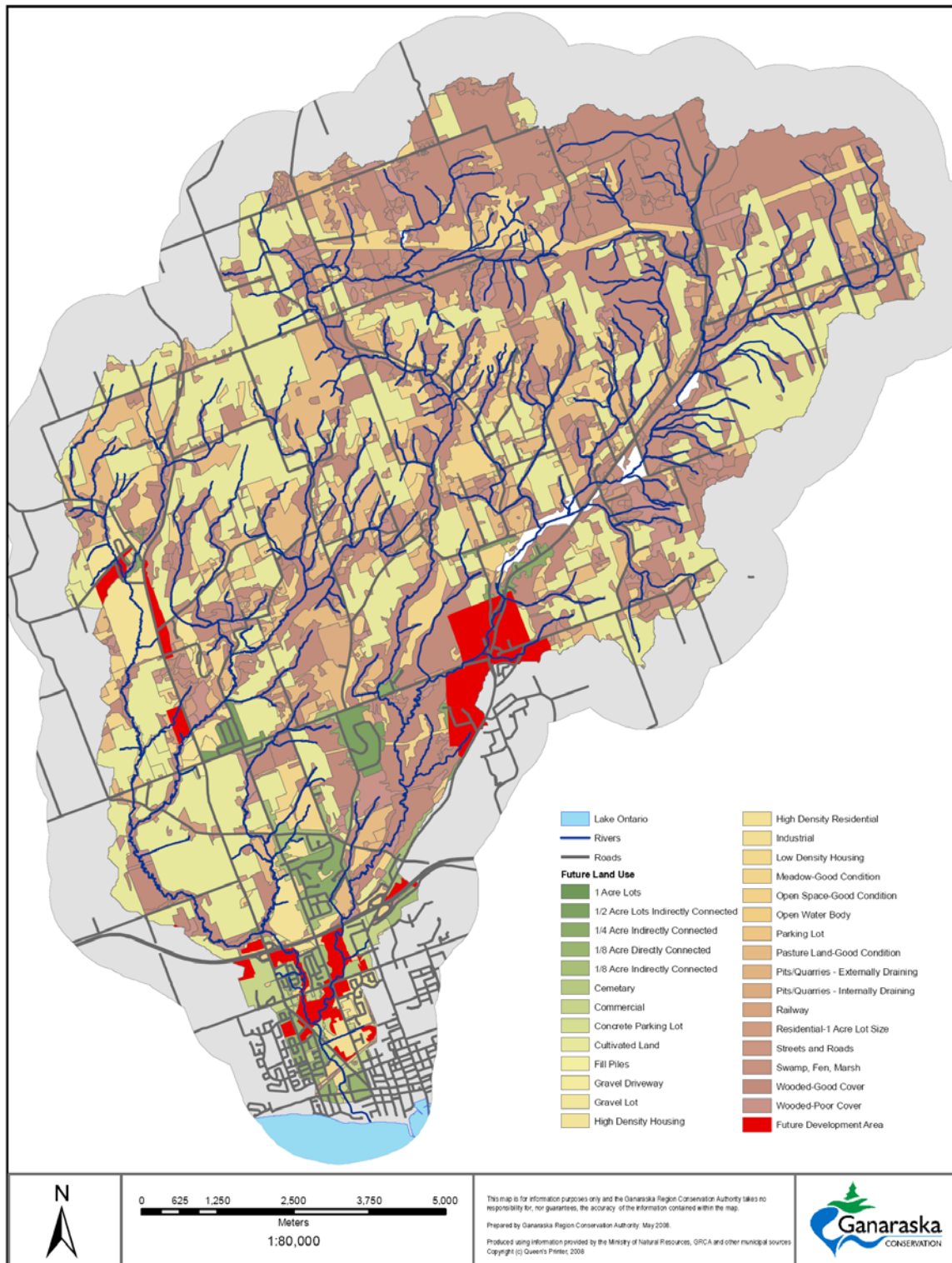


Figure 4.1: Future development areas within the Cobourg Creek watershed

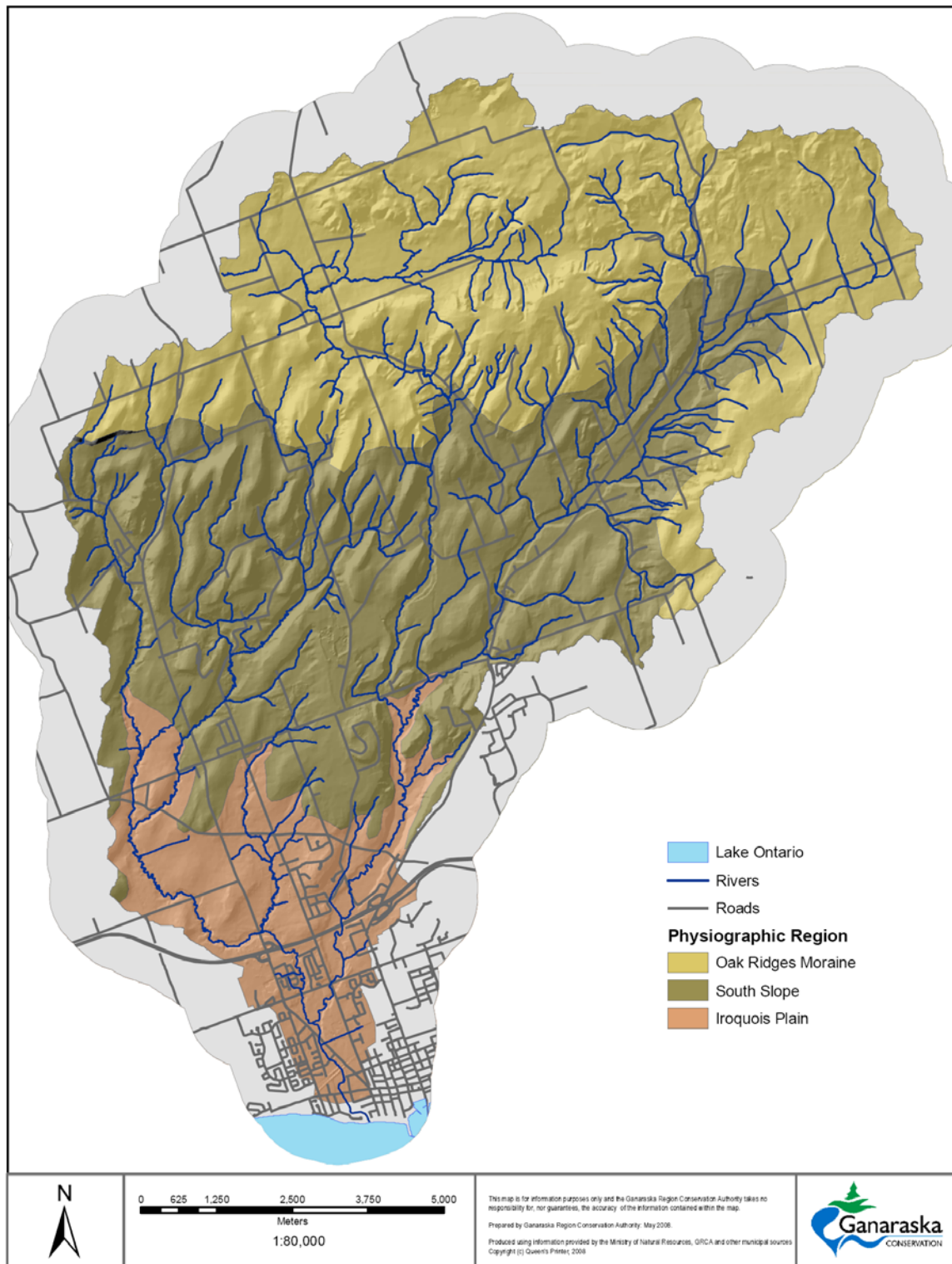


Figure 4.2: Physiographic regions

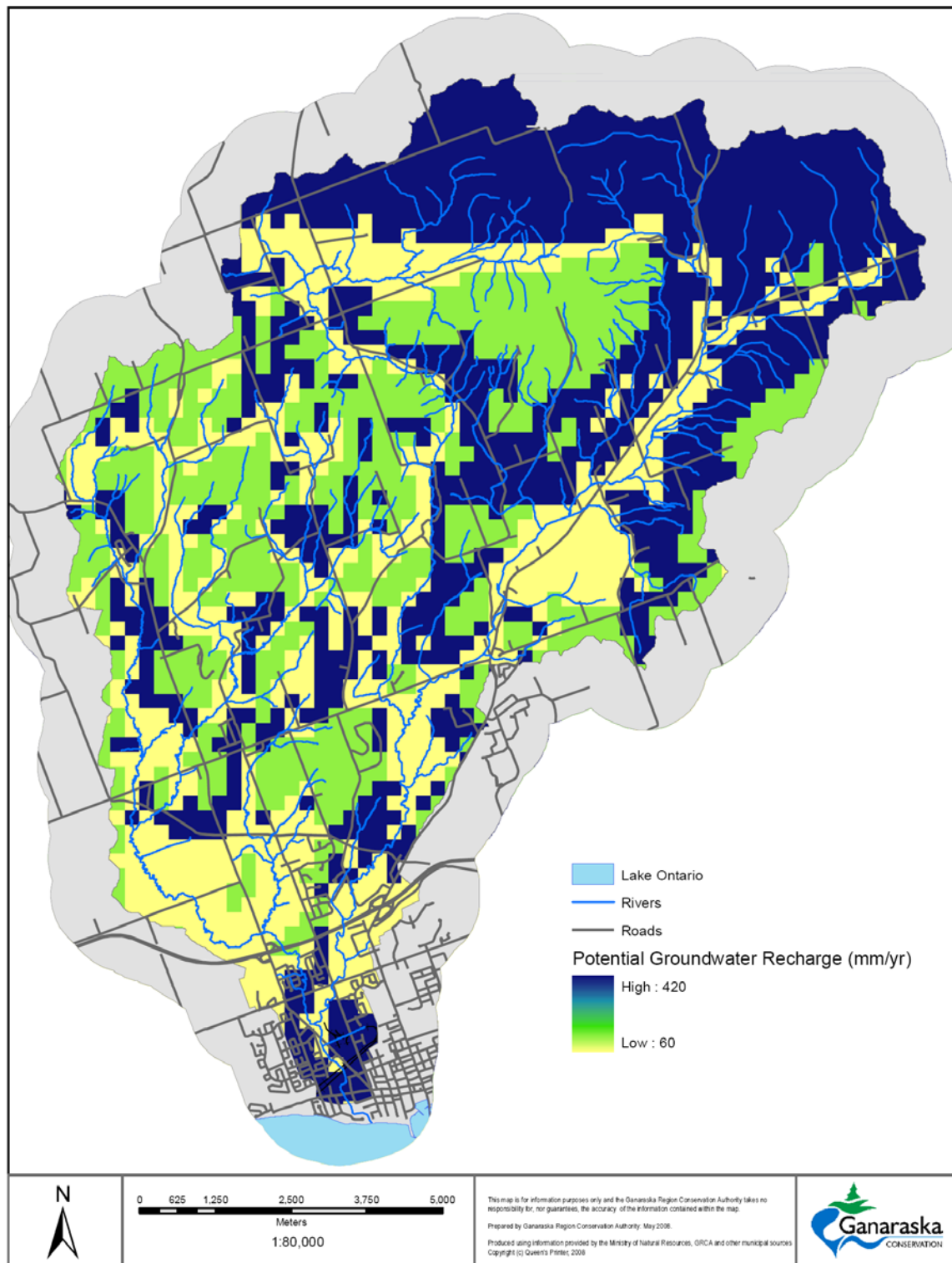


Figure 4.3: Potential groundwater recharge

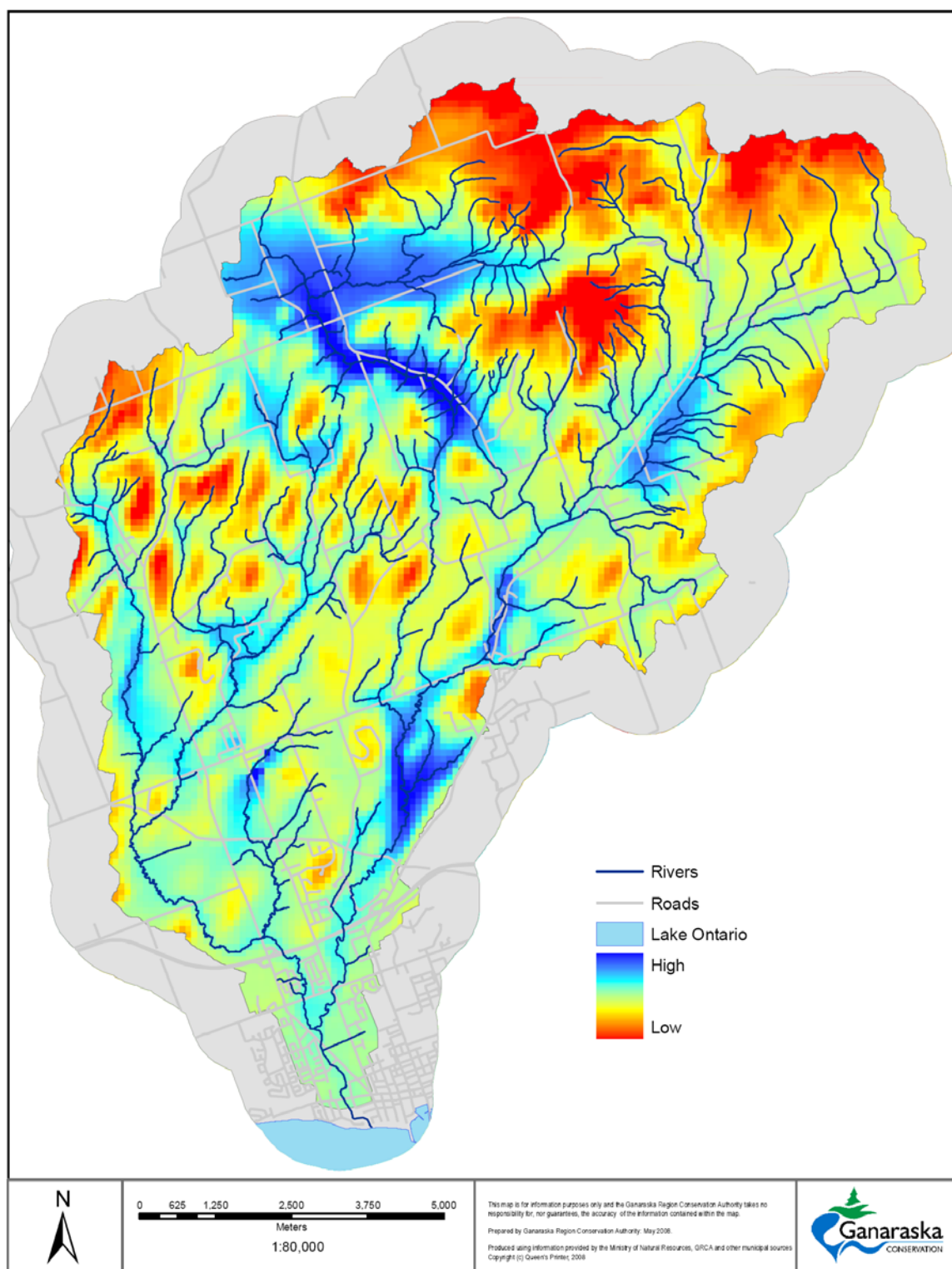


Figure 4.4: Potential groundwater discharge

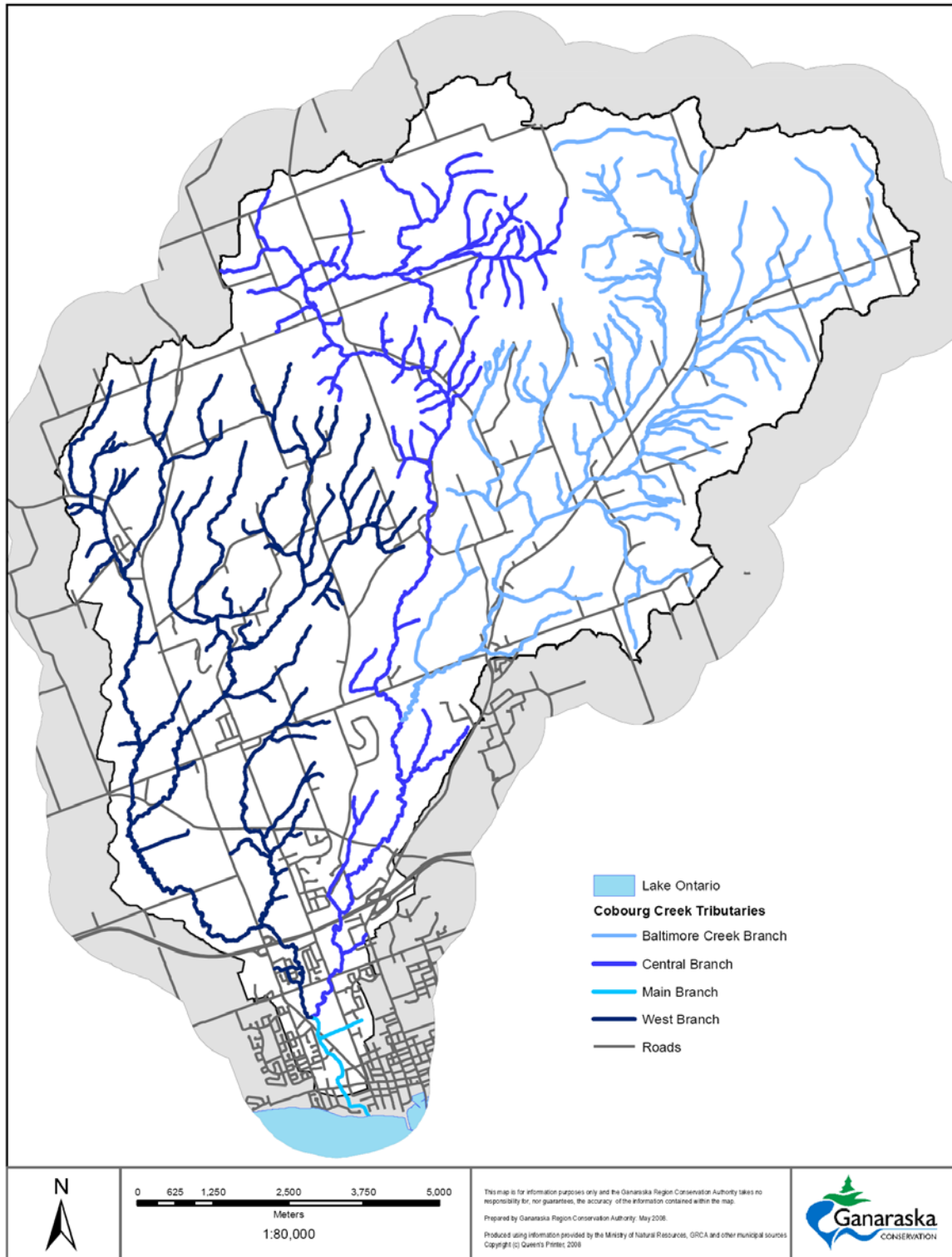


Figure 4.5: Cobourg Creek tributaries

Protection of Cobourg Creek has been enhanced by surface water studies such as floodplain mapping, hydraulic studies and regulated areas. Regulations associated with regulated areas (Figure 4.6) are also in place to protect people and property from flood waters, as well as to protect some of the natural features of the watershed such as wetlands.

Surface water quality in Cobourg Creek is generally good, with only localized problems. The physical parameters of Cobourg Creek (dissolved oxygen, pH, conductivity and alkalinity) indicate that surface water quality can be resilient to acidification, eutrophication and chemical additions. Chloride has been declining in the surface water since the 1960s.

Total phosphorus exceeds the Provincial Water Quality Objectives (PWQO) more often than any other nutrient, but never more than 32% of the time. Since 1964 total phosphorus has declined at the long-term Fourth Street/King Street station. Nitrate-N exceeded the Canadian Water Quality Guidelines (CWQG) only during baseflow water quality monitoring sampling (6% of the time). Nitrite-N rarely (4% of the sites) exceeds the CWQG during sampling (3% of the sites). At the Telephone Road monitoring station, nitrite-N concentrations have declined since 2002. Nutrients therefore can be considered the water quality parameter most capable of fluctuating beyond recommended guidelines; however exceedences are usually related to high runoff due to storm events, or site-specific land use.

Groundwater quality data is limited on a watershed scale. Information from water well records, municipal water systems and the Provincial Groundwater Monitoring Network indicate that there are naturally occurring groundwater quality parameters that can be aesthetically displeasing from a human consumption stand point. However the quality of surface water is also reflective of groundwater inputs, indicating the groundwater quality within the Cobourg Creek watershed is generally good.

Cobourg Creek supports a diverse biological community. The fisheries community is supported by a sustainable habitat of cold to cool water within the upper two-thirds of the watershed, with diverse communities in the lower main branch of the watershed (Figure 4.7). Riparian habitats provide a buffering capacity to human influences in many of the stream reaches. Cobourg Creek supports a fish community dominated by brook trout, brown trout, rainbow trout, scuplins, darters and cyprinids. Migratory Chinook salmon spawn in the lower reaches and Atlantic salmon are being stocked in Cobourg Creek as part of a provincial initiative to return these native top predatory fish to Lake Ontario.

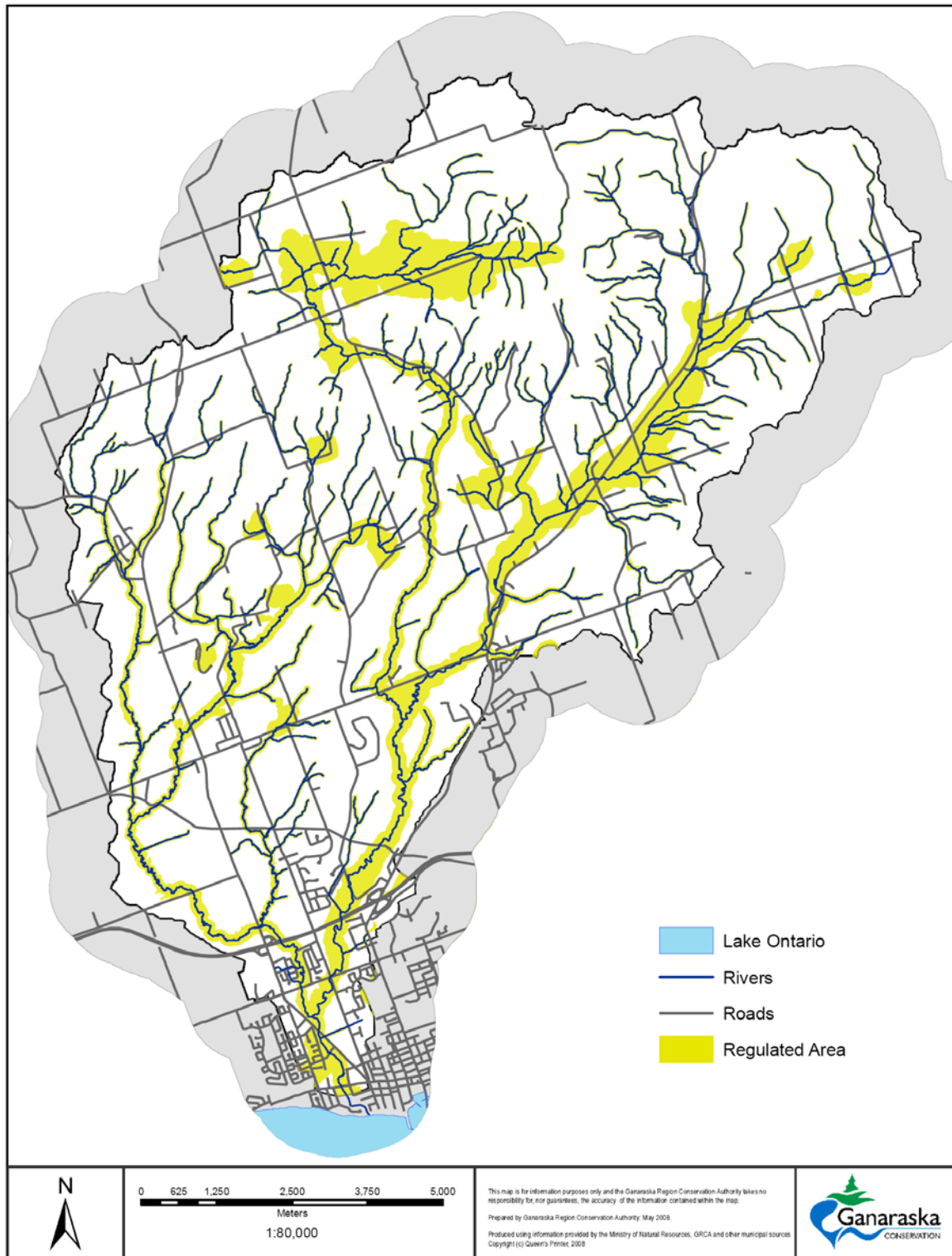


Figure 4.6: Regulated areas

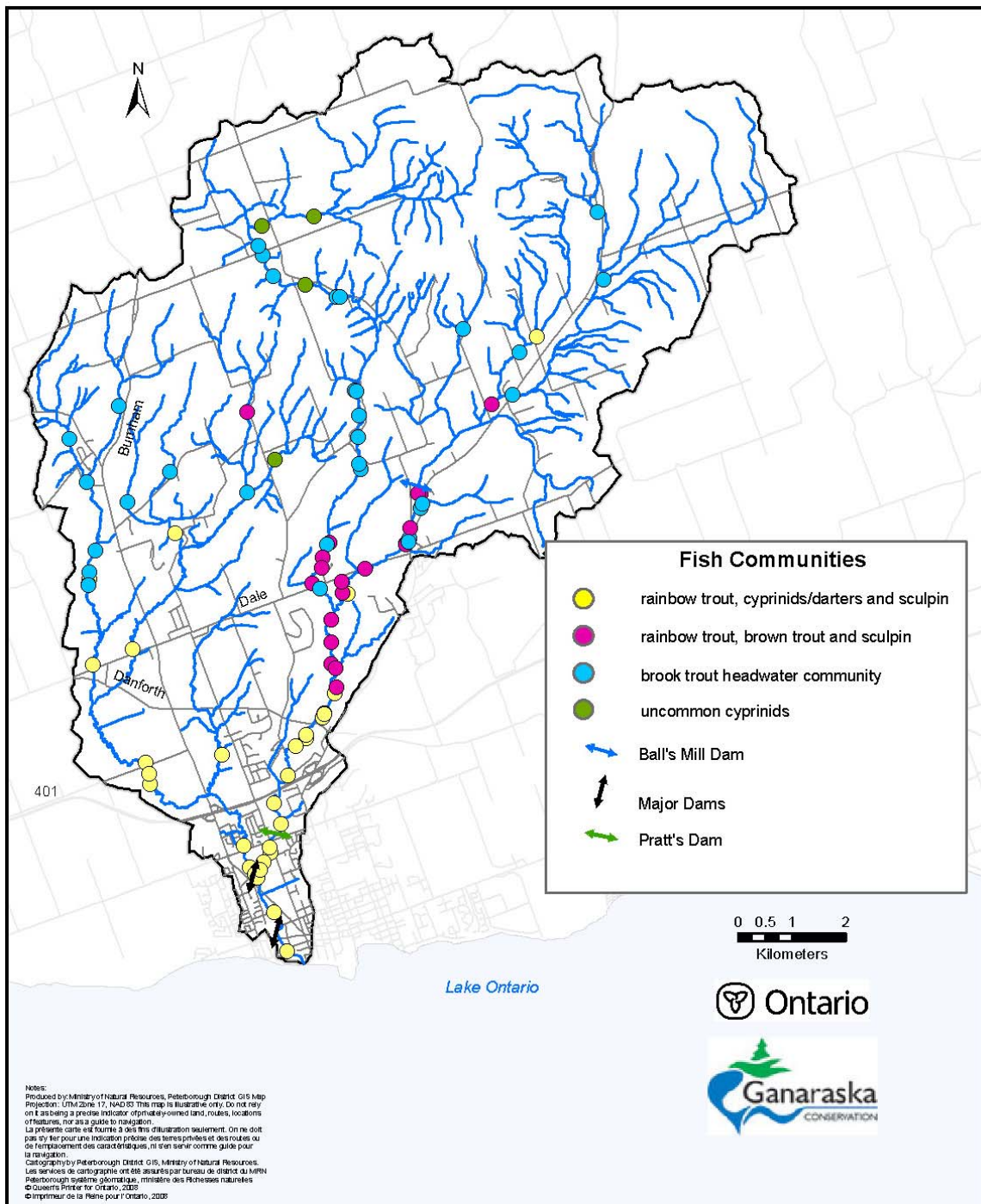


Figure 4.7: Fish communities within Cobourg Creek

The terrestrial natural habitat, defined through ecological land classification, within the Cobourg Creek watershed includes forest, meadows/grasslands and wetlands (Figure 4.8). At 34%, forest cover exceeds the commonly used federal guideline of 30%. However, higher quality interior forest habitat is found in only about 4% of the watershed, primarily in the rural landscape. The Northumberland County Forest is a particularly valuable natural heritage feature within the headwaters of the Central Branch and the Baltimore Creek. Indicator species such as birds and frogs can help to understand the health of forest and wetland habitats. Numerous species at risk may inhabit the Cobourg Creek watershed and therefore should be considered in management planning. Invasive species such as dog-strangling vine, European buckthorn and garlic mustard pose a threat to terrestrial habitat health.

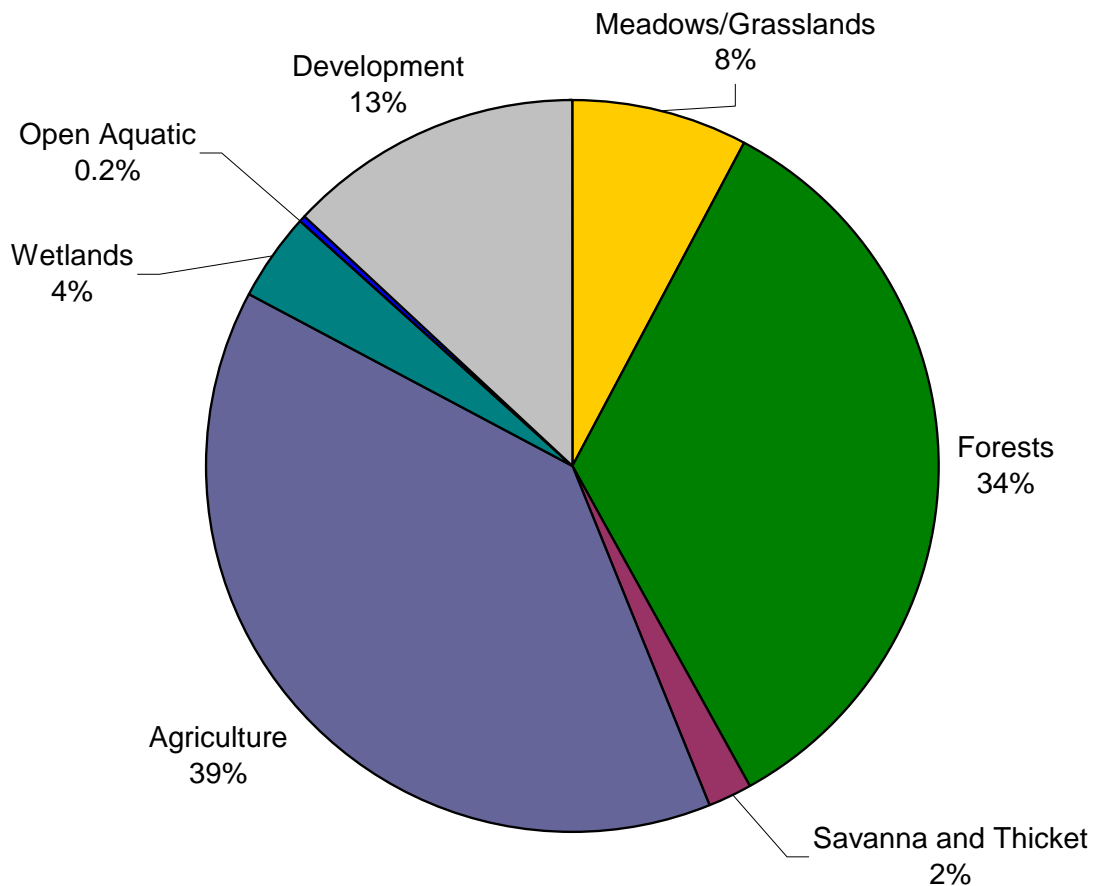


Figure 4.8: Land cover

The Cobourg Creek watershed is not only an important environmental feature to the communities of the Township of Alnwick/Haldimand, Township of Hamilton and Town of Cobourg; it plays an important role in a larger context. For example, Cobourg Creek contributes to the health and resources within Lake Ontario. In addition, Lake Ontario is a drinking water source for hundreds of thousands of Ontario residents. However, Cobourg Creek has the potential to be influenced by future stresses such as climate change.



## 5.0 Management Recommendations for the Cobourg Creek Watershed

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The Cobourg Creek watershed is currently in good condition, however a watershed and its functions is neither static nor isolated. Even with historic and current watershed management efforts, the watershed does have some identifiable issues and exhibit signs of stress in certain areas that can be attributed to current land use.

In order to anticipate changes to current watershed conditions, staff at the Ganaraska Region Conservation Authority have evaluated current and future land use scenarios. Future development areas have been identified through municipal official plans. These computer modelled scenarios provide an indication of watershed responses in relation to increased development. This evaluation has been conducted with surface water hydrology and water budgeting.

Natural heritage modeling has defined priority areas and targets for increasing terrestrial habitat and species (see Section 5.1). Coinciding with these modeling initiatives, the *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features* was created to document historic information and current conditions of the watershed. Results from the background report and modelling initiatives guide the recommended management actions for the watershed.

The watershed has been broken into components to facilitate the presentation of issues and opportunities related to current watershed conditions, goals, objectives, management actions, and monitoring and reporting recommendations (Sections 5.2 to 5.9). The watershed components include the following.

- Groundwater Quantity
- Surface Water Quantity
- Groundwater Quality
- Surface Water Quality
- Aquatic Habitat and Species
- Terrestrial Natural Heritage
- Public Health and Wellbeing
- Community Heritage

In order to better understand the recommended management actions, the following describes the identification process of issues and opportunities, goals, objectives, management actions and watershed integration related to each watershed component.

**Issues and opportunities:** issues are defined as current or future actions and situations that are or could negatively impact the Cobourg Creek watershed. These issues are either occurring currently or have the potential to occur.

Opportunities are current actions and situations that are positive that need to be protected or enhanced. Issues and opportunities were identified through the Cobourg Creek Background Report, Technical Review Committee and Community Advisory Committee input and review, and public input.

**Goal:** a goal statement has been created for each watershed component to identify a desired outcome to be achieved through the implementation of the Cobourg Creek Watershed Plan.

**Objective:** objectives were created for each goal statement in order to facilitate and achieve the desired watershed component goal. All issues and opportunities are addressed by the objective statements.

**Management actions:** activities that need to occur in order to achieve the goal of each watershed component are listed under the heading of management actions. For ease of reading and implementation, management actions have been defined in four categories: regulations and planning, stewardship, education and awareness, and land acquisition. Figure 5.0 describes these action types in more detail.

Recommended policies listed under “regulations and planning” are recommended by the watershed plan and are intended to be incorporated into municipal, conservation authority and other agency planning and regulation documents where most appropriate. The recommended management actions were created to be compatible with *the Provincial Policy Statement, 2005* (Appendix C) and the *Oak Ridges Moraine Conservation Plan*. **The term development used in the recommended policies is defined as the creation of a new lot, a change in land use, the construction of buildings and structures, and site alterations.** Further definitions of development will be defined and elaborated upon within the context of the specific planning or regulation document that the recommended policy is placed.

**Monitoring and reporting:** further information or regular monitoring of environmental conditions will need to occur prior to and after management actions occurring. Monitoring and the communication of results are required to ensure that the watershed plan and its implementation actions are achieving the desired outcome. Actions associated with implementation will need to be monitored and reported.

**Watershed integration:** a watershed is a dynamic and unique place of complex webs of ecological features and functions. As a result one action considered beneficial for a particular feature or function could potentially influence another feature or function (Figure 5.1). The integration of management actions will be identified to highlight the benefit of one recommended action on many of the functions and features of the watershed.

## Regulations and Planning

Actions that require legislation or regulations will be used. These actions would be carried out through municipal official plans, by-laws or policies; current and future provincial or federal acts and regulations; or regulations carried out by the Ganaraska Region Conservation Authority.

## Stewardship

Actions that require volunteer based stewardship actions will be used. Stewardship programs can provide technical assistance and/or financial assistance. An example program is the GRCA's Clean Water - Healthy Land Stewardship Program.

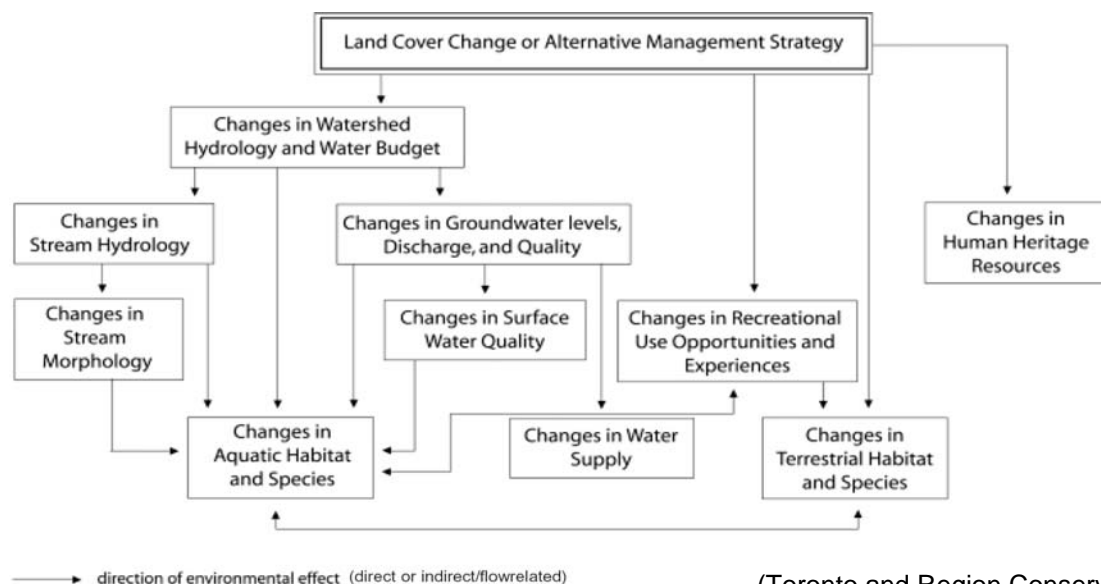
## Education and Awareness

Certain actions may best be addressed by increasing public and community knowledge and awareness. Workshops, seminars, presentations and use of the media can be used to facilitate change across the watershed.

## Land Acquisition

Actions may require the protection of land through restricted use. Land acquisition includes the acceptance of land donations, direct purchase, conservation easements, or land use covenants (i.e. restrictions through agreements). Land acquisition requires fair landowner compensation.

Figure 5.0: Management action types



(Toronto and Region Conservation 2003)

Figure 5.1: Potential watershed response to management actions

In order to achieve successes within the Cobourg Creek watershed, organizations, groups and programs must be utilized in partnership with the Ganaraska Region Conservation Authority and municipalities. Many of these partnerships and programs exist (defined below), however new opportunities may occur in the future. These organizations are identified in recommended management actions through the phrase “partner programs”. In addition many locally significant and important organizations exist that contribute valuable resources and volunteers to local watersheds.

**Ontario Federation of Anglers and Hunters (O.F.A.H):** is the oldest and largest non-profit, nongovernment fish and wildlife conservation organization in Canada. The O.F.A.H. represents thousands of members and hundreds of member clubs. Provincially and locally the O.F.A.H. delivers, manages and administers programs such as the Lake Ontario Atlantic Salmon Restoration Program Partnership, Community Stream Steward Program, Invasive Species Public Education and Outreach and the Tackle Share Program. These programs are carried out in partnership with the Ganaraska Region Conservation Authority, local agencies and organizations. For more information, please visit <http://www.ofah.org/>.

**Northumberland Stewardship Council (Ontario Stewardship):** the Ministry of Natural Resources’ Ontario Stewardship program is a community-based initiative that brings together landowners, associations, resource agencies and individuals who share an interest in responsible land care and sustainable resource use. The program advocates stewardship as a tool for land management. The Northumberland Stewardship Council has worked to improve and protect Northumberland County natural resources through the support of stream improvement projects, tree planting and related education for landowners and students. The Ganaraska Region Conservation Authority is an active member on the Northumberland Stewardship Council. For more information, please visit <http://www.ontariostewardship.org>.

**Oak Ridges Moraine Foundation:** is governed by a vision for the future of the moraine as a vibrant, healthy ecosystem that is widely acknowledged as a model for successful preservation, protection and restoration of landscapes; where land owners, users of the Moraine and all levels of government are actively engaged; where a scenic trail along the Moraine is secured; and where the Foundation is regarded as an essential partner. The Caring for the Moraine project has delivered the support of 30 conservation and environmental organizations to more than 80,000 landowners across the Oak Ridges Moraine, in a collaboration that aims to conserve the important and sensitive environmental features of the moraine. Locally the Cobourg Creek watershed is situated in the Ganaraska Hills and Rice Lake Plains Project Area. For more information please visit <http://www.moraineforall.org/>.

**Trees Ontario:** is a gathering of experts from science, forestry, government, community groups and the business world that plants trees and forests throughout Ontario. Trees Ontario works with local tree planting agencies in Ontario, including conservation authorities and Ontario Stewardship councils to implement its tree planting subsidy programs. Planting agencies then work directly with landowners to determine site eligibility, allocate funding and coordinate tree planting. To date funding has been received by landowners in the Cobourg Creek watershed and throughout the Ganaraska Region Conservation Authority to assist tree planting projects. For more information please visit <http://www.treesontario.on.ca/>.

**Nature Conservancy of Canada (NCC):** is Canada's leading national land conservation organization. NCC is a private, non-profit group that partners with corporate and individual landowners to achieve the direct protection of our most important natural treasures through property securement (donation, purchase, conservation agreement and the relinquishment of other legal interests in land) and long-term stewardship of NCC portfolio of properties. The NCC is an active partner in the Rice Lakes Plains initiative. For more information please visit <http://www.natureconservancy.ca>.

**Environmental Farm Plan (EFP):** is an assessments and voluntarily plan prepared by farm families to increase their environmental awareness in up to 23 different areas on their farm. Through the EFP local workshop process, farmers highlight their farm's environmental strengths identify areas of environmental concern and set realistic action plans with time tables to improve environmental conditions. Environmental cost-share programs are available to assist in implementing projects and are delivered through the Ontario Soil and Crop Improvement Association. A local Environmental Farm Plan representative assists farmers in the EFP process. For more information please visit <http://www.ontariosoilcrop.org/>.

**Ontario Drinking Water Stewardship Program:** funding is available through the Ganaraska Region Conservation Authority and the Environmental Farm Plan to carry out projects that benefit and protect municipal sources of drinking water. Created under the *Clean Water Act* this program is designed to fund landowners, businesses, farmers and residents who live within municipal wellhead protection areas and intake protection zones. Eligible projects include well and septic management and best management practices associated with land uses within the eligible project areas.

### **5.1 Cobourg Creek Natural Heritage System**

A natural heritage system is a network of natural features that traditionally has a series of large, high quality core areas connected by habitat corridors (Noss 1983, Noss and Cooperrider 1994). The goal of a natural heritage system is to ensure ecological function and the long-term representation and population viability of all species that are native to a given area.

A conceptual natural heritage system has been defined for the Cobourg Creek watershed (Figure 5.2) through a process separate to the watershed plan process. The purpose was to define priority areas and targets for terrestrial habitat and species. This is part of an effort by the Ganaraska Region Conservation Authority to define a “regional” natural heritage system for its entire jurisdiction, plus individual systems for each watershed, with the intent that the system can be implemented in part through watershed plans. In addition local municipalities, through official plans, acknowledge the need and support the creation of a natural heritage strategy in order to protect natural heritage features and functions.

The natural heritage system is defined based on updated Ecological Land Classification mapping for the Cobourg Creek watershed. Geographic Information Systems (GIS) software was used to evaluate habitat patch characteristics and a model applied to identify areas with high existing and potential ecological values. A summary of this detailed approach is available in a separate document (Ganaraska Region Conservation Authority 2009). Potential tallgrass prairie analysis is being finalized in early 2009 to strategically preserve and protect tallgrass prairie habitat. Further focus on tallgrass prairie restoration and protection will occur within the regional natural heritage system and strategy.

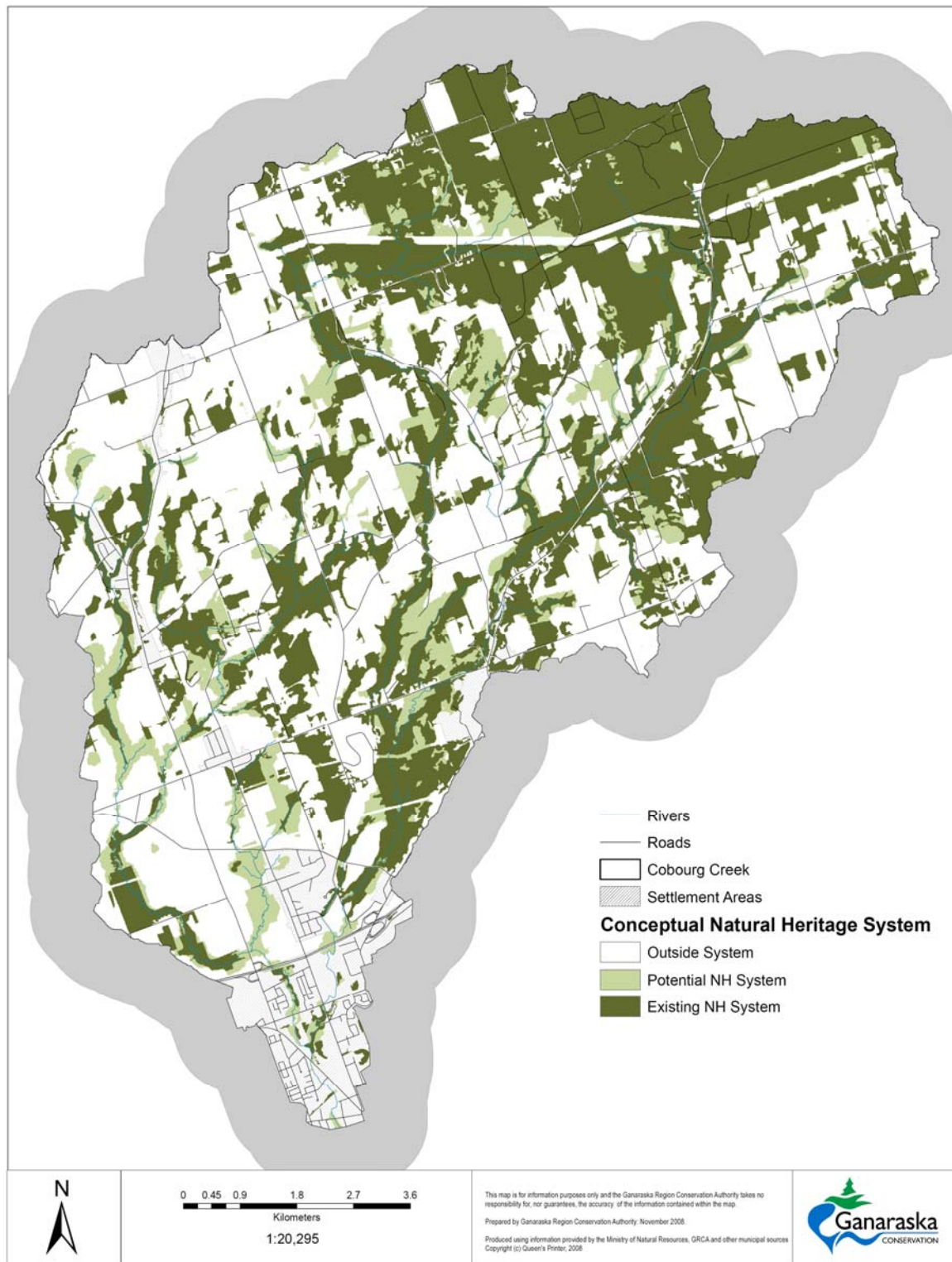


Figure 5.2: Cobourg Creek watershed conceptual natural heritage system

## **5.2 Groundwater Quantity**

The movement and location of groundwater within the subsurface is controlled by land cover, sediment types, geology and topography. Porous surficial materials generally comprise groundwater recharge areas within the northern part of the watershed. Rainfall and snowmelt percolates through these sediments and replenishes the aquifers that form important groundwater supplies for many watershed residents. Some aquifers within the watershed are under artesian conditions, meaning that pressure within the aquifer creates an upwards gradient or flowing condition.

Aquifers contribute water to Cobourg Creek through groundwater discharge. Groundwater discharge contribution during periods of time without precipitation and during critical summer low flow periods is essential in sustaining the ecosystem of the watershed. Areas of the watershed that lack porous surficial materials experience higher surface runoff than groundwater recharge.

The Cobourg Creek Background Report (Ganaraska Region Conservation Authority 2008) provided insight into the potential issues and opportunities related to groundwater quantity. The following will be the focus of current and future management actions.

- **Artesian aquifers and flowing artesian wells:** within the Cobourg Creek watershed there are known artesian aquifers and many wells under artesian or flowing artesian conditions. There is a high potential to encounter these conditions when drilling new wells, particularly in the central part of the watershed. Uncontrolled flowing artesian wells have the potential to create negative impacts to the surrounding environment such as significant drawdown in aquifers and increased erosion or sedimentation of receiving streams. Artesian aquifers in most cases prevent surface contaminants from reaching wells and deeper aquifers given the potential of upward gradients.
- **Groundwater recharge:** it is essential to manage groundwater recharge areas in order to maintain water for domestic water supplies and to sustain baseflow for aquatic resources in the watershed. Protecting all areas of recharge is important to ensure there are no declines in current water supply. It is also important to enhance recharge areas where possible.
- **Groundwater discharge:** locations of groundwater discharge, springs and seepage areas are important for human and ecological functions. Protection of baseflow and groundwater discharge to wetlands and streams is an important function of groundwater. Volumes, flow directions and distribution of groundwater are all critical for aquatic resources. Protecting areas of discharge is important to ensure declines in current ecological water use are prevented. It is also important to enhance discharge areas where possible.
- **Shallow and deep aquifers and aquitards:** shallow and deep aquifers are an important water supply source for many watershed residents.

Protecting and managing protective aquitards and the quantity of water in aquifers needs to occur.

- **Maintaining flow direction:** groundwater flows in aquifers has the potential to change direction or leave the Cobourg Creek watershed to neighbouring watersheds as a result of human actions. Flow directions can be altered by below water table aggregate extraction, interception or exposure of the water table and frequent removal of considerable amounts of groundwater.
- **Permits To Take Water and unregulated water takings:** within the Cobourg Creek watershed, groundwater can be considered as a sustainable water source for human use. When groundwater taking amounts exceed 50,000 litres per day, a Permit to Take Water must be acquired from the Ministry of the Environment. Current permitted groundwater takings and private residential water taking in the watershed have limited effects on groundwater quantity (analyzed through the water budget). Unregulated water takings (i.e., no permit required, or illegal takings) are unknown.

## **GOAL 1.0: PROTECT AND ENHANCE GROUNDWATER QUANTITY FOR HUMAN USES AND ECOLOGICAL FUNCTIONS**

### **Objective 1.1: maintain or enhance groundwater recharge and discharge for human needs and ecological functions**

#### ***Issues Addressed:***

- Groundwater recharge
- Groundwater discharge

#### ***Targets for Success:***

- Maintain or enhance significant groundwater recharge areas
- Maintain or enhance seasonal and annual groundwater discharge



## **Groundwater Quantity Objective 1.1 Management Actions**

### **Regulations and Planning**

#### Recommended Policy: Map groundwater features

- Groundwater features that contribute to groundwater quantity include the following, all of which should be mapped for the Cobourg Creek watershed.

- Significant groundwater recharge areas<sup>1</sup>
- Significant groundwater discharge areas
- Municipal wellhead protection areas analyzed for the Camborne Municipal Well and Creighton Heights/Baltimore Municipal Well through drinking water source protection
  - Zone A (100 m Pathogen Buffer)
  - Zone B (2 Year Time of Travel)
  - Zone C (5 Year Time of Travel)
  - Zone D (25 Year Time of Travel)
  - Zone E (Steady State)

*Rational and Integration:* This policy allows for the identification through mapping of groundwater features that contribute functionally to groundwater quantity. Once identified protection of these features can occur through regulations and planning. This policy also benefits surface water quantity, groundwater and surface water quality, and aquatic habitats and species.

Recommended Policy: Identify groundwater features not yet known

- Identify groundwater features that have not been mapped or identified within the Cobourg Creek watershed, but come to the attention of the Ganaraska Region Conservation Authority or the municipality through new information or correction of previous inaccurate or incomplete information.

*Rational and Integration:* This policy allows for the identification of groundwater features that are currently unknown and allows for the integration of new sciences and future research into regulation and planning.

Recommended Policy: Restrict development within and in proximity to groundwater features

- Existing policies specified by the *Oak Ridges Moraine Conservation Plan* currently within municipal official plans in relation to seepage areas and springs are supported (Appendix D).
- Development within and in proximity to groundwater features throughout the Cobourg Creek watershed is prohibited or restricted for the protection of groundwater quantity in accordance to the following.
  - All development with respect to land within a groundwater feature and a 30 meter vegetation protection zone is prohibited or restricted except for the following:
    - Forest, fish and wildlife management.
    - Conservation and flood or erosion control projects, but only if determined to be necessary in the public interest after all alternatives have been considered.

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<sup>1</sup> Groundwater recharge areas within urban areas need to be further defined from existing modeling initiatives to acknowledge impervious surfaces.

- Transportation, infrastructure and utilities as described in section 41 of the *Oak Ridges Moraine Conservation Plan*, but only if the need for the project has been demonstrated and there is no reasonable alternative.
- Low-intensity recreational uses as described in section 37 of the *Oak Ridges Moraine Conservation Plan*.
- Development related to existing urban, rural and agricultural uses, subject to area specific policies.
- An application for development with respect to land within the 120 meter area of influence to a significant groundwater discharge area shall be accompanied by a hydrologic evaluation as specified in the *Oak Ridges Moraine Conservation Plan*.
- An application for development with respect to land within a 120 meter area of influence to a significant groundwater recharge area shall be accompanied by a hydrologic evaluation to ensure that the development:
  - Maintains or enhances the volume and rate of recharge in the post development condition.
  - Does not limit the volume and rate of recharge in the post development condition.
  - Will not affect the discharge feature or the groundwater system providing water to that feature.
  - Considers best management practices with urban areas related to groundwater recharge.

*Rational and Integration:* This policy allows for the restriction of development within or adjacent to groundwater features that contribute functionally to groundwater quantity. This policy also benefits surface water quantity, groundwater and surface water quality, and aquatic habitats and species.

Recommended Policy: Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

- Implement future Source Protection Plan policies, if greater protection is recommended, for the protection of groundwater quantity within defined municipal wellhead protection areas, significant groundwater recharge areas and other areas defined in the Source Protection Plan.

*Rational and Integration:* This policy allows for the consideration of policies created through the source protection planning process, which is aimed at protecting municipal sources of drinking water.

Plan Review Mechanisms

The continual implementation of the GRCA, Township of Alnwick/Haldimand, Township of Hamilton and Town of Cobourg development plan review process to protect groundwater features and functions is supported.

## **Stewardship**

- Implementation of the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program throughout the Cobourg Creek watershed is recommended in order to assist residents and landowners in stewardship actions that benefit groundwater recharge and discharge.
  - Increase natural cover in and adjacent to groundwater features.
  - Achieve the natural heritage system as the primary means of protecting groundwater features and functions.
  - Enhance and protect groundwater features through best management practices conducted on the land.
  - Encourage the adoption of urban land use practices that increase groundwater recharge.
- Work with partnership programs to increase stewardship actions that protect and mitigate negative influences on groundwater recharge and discharge.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection and enhancement of groundwater quantity. These actions will also benefit surface water quantity, groundwater and surface water quality, aquatic habitat and species and terrestrial natural heritage.

## **Education and Awareness**

- Through GRCA and partner programs provide information and education through workshops and the media on the importance and local scientific knowledge of groundwater features, and wellhead protection areas.
- Create and make available print material on the science and local information regarding groundwater recharge and discharge, as well as actions people can take on their own property to improve and protect groundwater recharge and discharge.

## **Land Acquisition**

- Significant groundwater features and wellhead protection areas may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements
  - Land use covenants

### Recommended Policy: Protection of groundwater features through land acquisition

- The following groundwater features and wellhead protection areas are priority lands for acquisition by a public authority.
  - Significant groundwater features and functions, and wellhead protection areas that are under threat from proposed development.
  - Significant groundwater features and functions, and wellhead

protection areas that are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

### ***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program to achieve and report on the following.

- Groundwater quantity monitoring on a regional scale. Programs include the Provincial Groundwater Monitoring Network, piezometer monitoring and data sharing through the Ministry of the Environment Water Well Records Database.
- Baseflow monitoring to measure spatial and temporal changes in groundwater discharge and trends in discharge to Cobourg Creek.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing groundwater quantity.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

It is recommended that research on the following topics occur.

- The contribution of groundwater discharge into wetlands.
- The influence of geology on the distribution and occurrence of groundwater recharge and discharge in the watershed.
- The effects of field drainage on groundwater quantity.
- Spatial extent of aquifers.

## **Objective 1.2: manage and avoid actions that affect aquifers (artesian, shallow and deep) and changes in groundwater flow**

### ***Issues Addressed:***

- Artesian aquifers and flowing artesian wells
- Shallow and deep aquifers and aquitards
- Maintaining flow direction

### ***Targets for Success:***

- Establish and maintain baseline water table levels (shallow aquifer)
- Establish and maintain baseline piezometric level (deep aquifer)

## Groundwater Quantity Objective 1.2 Management Actions

### Regulations and Planning

#### Recommended Policy: Minimize groundwater flow alteration

- Development within groundwater features may be permitted only if the direct alteration of groundwater flows will be minimized, the feature will be protected and its related hydrological functions maintained.
  - Undertaking no construction at a depth greater than 1.5 meter above an identified high water table or at a depth that has been determined at a site specific level, or
  - Undertaking a hydrogeological and/or geotechnical study to the satisfaction of the municipality and GRCA, or
  - Fulfilling applicable approval requirements under the *Aggregate Resources Act*, *Environmental Assessment Act* and/or *Ontario Water Resources Act*.

*Rational and Integration:* This policy allows for the restriction of development within groundwater features and functions. This policy also benefits surface water quantity and aquatic habitats and species.

#### Recommended Policy: Minimize and manage artesian and flowing wells

- Development of wells in areas of known artesian and flowing well conditions is not recommended. If flowing well conditions are created the conditions must be managed in a way that fulfils requirements under the *Ontario Water Resources Act*.

*Rational and Integration:* This policy discourages development within artesian groundwater conditions. This policy also benefits surface water quantity and aquatic habitats and species.

### Education and Awareness

- Through GRCA and partner programs provide information and education through workshops, print material and the media on the importance and issues of artesian, shallow and deep aquifers, and appropriate regulations.

#### ***Monitoring and Reporting:***

- Create and implement a GRCA integrated watershed monitoring program to measure changes in groundwater quantity and flow direction.
- Review watershed plan implementation to understand and report on the uptake of recommended policies and effects and uptake of education and awareness activities.

### Objective 1.3: ensure sustainable rates of groundwater use

#### **Issues Addressed:**

- Permits to Take Water and unregulated takings

#### **Targets for Success:**

- Maintain sustainable rates of groundwater use in relationship to ecological needs

### Groundwater Quantity Objective 1.3 Management Actions

#### **Regulations and Planning**

##### Recommended Policy: Restrict development needing a Permit to Take Water in wellhead protection areas

- Development that would require a Permit to Take Water under the *Ontario Water Resources Act* may be permitted in a municipal wellhead protection area only if the water withdrawal in conjunction with previously approved or known unregulated withdrawal will not cumulatively alter the groundwater capture zone or reduce future taking from the well or well field.

##### Recommended Policy: Restrict development needing a Permit to Take Water in groundwater features

- Development that would require a Permit to Take Water under the *Ontario Water Resources Act* may be permitted in a groundwater feature only if the water withdrawal in conjunction with previously approved or known unregulated withdrawal will not cumulatively alter the groundwater feature or function.

##### Recommended Policy: Restrict consumptive water takings

- Development or land uses that do not require a groundwater Permit to Take Water under the *Ontario Water Resources Act* and are consumptive takings may be permitted only if the water withdrawal in conjunction with previously approved or known unregulated withdrawal will not cumulatively alter the groundwater feature or function.

*Rational and Integration:* These policies allow for development and land uses to occur with a restricted withdrawal of groundwater determined by ecological needs and cumulative water taking affects throughout the watershed. These policies also benefit surface water quantity and aquatic habitats and species.

##### Existing Review Mechanisms and By-Laws

- Continued implementation of the GRCA and municipal Permit to Take Water review process to protect groundwater features is supported, as is the required PTTW monitoring requirements.
- The watershed plan supports the Township of Hamilton *Water Conservation By-Law 2004-28 Restricting Outside Water Use*.

### Plan Creation: Water Conservation Plan

- Create a water conservation plan that addresses water takings less than 50,000 litres per day (refer to Section 7).

### **Stewardship**

- Provide technical assistance for the Permit to Take Water process.
- Provide implementation assistance for a water conservation plan through the Clean Water – Healthy Land Stewardship Program (refer to Section 7).

### **Education and Awareness**

- Through GRCA and partner programs provide information and education through workshops, print material and the media on the importance of properly managing permitted water takings and water taking less than 50,000 litres/day.
- Promote existing water conservation by-laws and a future water conservation plan (refer to Section 7).

### ***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program to monitor and report on the number and conditions of Permits To Take Water, changes in groundwater quantity in relation to water takings and the actual takings related to a permitted water taking.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Status of water conservation plan creation.
- Uptake and participation in stewardship projects aimed at assisting applicants in the Permit to Take Water process.
- The use of education and awareness initiatives and their effects.

Encourage research to establish the total amount of water takings, both regulated and non-regulated.

## 5.3 Surface Water Quantity

The Cobourg Creek watershed is a six order stream, consists of four main tributaries and drains an area of 123.2 km<sup>2</sup>. Originating in the Oak Ridges Moraine, Cobourg Creek is characteristic of a rural watershed with minimal imperviousness in the headwaters and mid-reaches of the watershed. As Cobourg Creek flows through Baltimore and south of Highway 401 impervious land cover increases, altering surface runoff pathways and rates. Along with changes in land cover, flows are manipulated and altered by water control structures. Thirty-two dams and water control structures have been identified in Cobourg Creek, of which Pratt's Dam and Ball's Mill Dam are the largest.

Analysis of surface water can be done from a flow and use perspective. Understanding the quantity, characteristics and effects of water flow and resources allows for protection of surface water features, people and property. Understanding the amount of flow generated by a particular storm aids in protecting people and property. Natural hazard mapping delineates areas where there is a concern for public health and safety associated with hazards such as flooding, erosion or instable organic soils. In order to determine sustainable surface water quantity, water budgets are used to evaluate how much water leaves and enters the system. Cobourg Creek has low stress to current and future water use based on predicted growth rates and provides necessary flows for ecosystem functions.

The Cobourg Creek Background Report (Ganaraska Region Conservation Authority 2008) provided insight into the potential issues and opportunities related to surface water quantity. The following will be the focus of current and future management actions.

- **Floodplain management:** in order to protect people and property, future development needs to be restricted from the floodplain. Current development areas within the floodplain need to be managed and enhanced to avoid flood impacts. Special Policy Areas need to be redefined in the Town of Cobourg through the official plan review.
- **Maintaining natural flow regime:** natural flow variations such as baseflow and high flows in Cobourg Creek needs to be better understood to be protected. Flow related impacts such as erosion need to be mitigated or avoided. There are limited erosion problems in Cobourg Creek.
- **Wetlands:** existing wetlands need to be protected and enhanced where appropriate to ensure the natural flow regime and water storage is addressed.
- **Permits To Take Water and unregulated water takings:** surface water can be extracted for human use. When extraction amounts exceed 50,000 litres per day a permit must be acquired. Current and future water takings can not negatively impact surface water quantity. Unregulated water takings such as takings that do not require a permit, or illegal takings are unknown.

- **Stormwater management (drains and ditches):** stormwater management infrastructure can cause extreme peak flows, which can result in flooding or unwanted changes in stream form. Rural ditch maintenance and urban stormwater development and design need to be managed accordingly.
- **Land cover and imperviousness:** impervious land cover, both natural and anthropogenic within the Cobourg Creek watershed increases peak flows and causes extreme flows. Impervious cover within the Oak Ridges Moraine and in the entire Cobourg Creek watershed is less than 5%. However, sub-catchments of Cobourg Creek do have impervious surfaces greater than 5%.
- **Water structures and ponds:** water or impoundment structures such as dams need to be addressed to ensure that the natural flow regime is not compromised. Construction of new online ponds needs to be avoided and current online ponds need to be taken offline where possible and appropriate.

## GOAL 2.0: MAINTAIN AND IMPROVE THE HYDROLOGIC FUNCTION OF THE WATERSHED

### Objective 2.1: maintain and enhance the water balance and baseflow of the Cobourg Creek watershed

#### *Issues Addressed:*

- Maintaining natural flow regime
- Land cover and imperviousness
- Wetlands
- Water structures and ponds
- Permits to Take Water and unregulated water takings
- Stormwater Management

#### *Targets for Success:*

- Total watershed imperviousness less than 10% and site specific reduction in imperviousness
- Reduction in peak flows
- Maintenance of baseflow
- Reduction in the number of online ponds and impoundment structures



## Surface Water Quantity Objective 2.1 Management Actions

### Regulation and Planning

Recommended Policy: Map features contributing to natural flows of Cobourg Creek

- Features contributing to natural flows include the following, all of which should be mapped for the Cobourg Creek watershed.

- Significant groundwater discharge areas
- Significant valleylands
- Watercourses including headwater, first order and intermittent streams
- Wetlands

*Rational and Integration:* This policy allows for the identification of features that contribute functionally to surface water quantity. Once identified protection of these features can occur through regulations and planning. This policy also benefits surface water quality and aquatic habitats and species.

Recommended Policy: Identify features contributing to natural flows of Cobourg Creek not yet known

- Identify features contributing to natural flows that have not been mapped or identified within the Cobourg Creek watershed, but come to the attention of the GRCA and municipalities through new information or correction of previous inaccurate or incomplete information.

*Rational and Integration:* This policy allows for the identification of features that contribute functionally to surface water quantity that are currently unknown and allows for the integration of new sciences and future research into regulation and planning.

Recommended Policy: Restrict development within and in proximity to features contributing to natural stream flows

- Existing policies specified by the *Oak Ridges Moraine Conservation Plan* currently within municipal official plans in relation to permanent and intermittent streams, significant valleylands, and seepage areas and springs are supported (Appendix D).
- Development within and in proximity to features contributing to natural flows throughout the Cobourg Creek watershed is prohibited or restricted for the protection of natural stream flows in accordance to the following.
  - Development with respect to land within a feature contributing to natural flows and the 30 meter vegetation protection zone as indicated in Appendix D is prohibited or restricted except for the following.
    - Forest, fish and wildlife management.
    - Conservation and flood or erosion control projects, but only if they are determined to be necessary in the public interest after all alternatives have been considered.
    - Transportation, infrastructure and utilities as described in section 41 of the *Oak Ridges Moraine Conservation Plan*, but only if the need for the project has been demonstrated and there is no reasonable alternative.
    - Low-intensity recreational uses as described in section 37 of the *Oak Ridges Moraine Conservation Plan*.

- Development related to existing urban, rural and agricultural uses, subject to area specific policies.
- An application for development on lands within the 120 meter area of influence of a feature contributing to natural flows as indicated in Appendix D shall be accompanied by a hydrologic evaluation as specified in the *Oak Ridges Moraine Conservation Plan*.

*Rational and Integration:* This policy allows for the restriction of development within or adjacent to features contributing to natural flows. This policy also benefits surface water quality and aquatic habitats and species.

Recommended Policy: Limit cumulative hard surfaces within the Cobourg Creek watershed

- Development may be permitted only if the development will not cause the total cumulative impervious surface area of the Cobourg Creek watershed to exceed 10% of the watershed area and that the total cumulative impervious surface area within the Cobourg Creek Oak Ridges Moraine planning boundary does not exceed 10%.
- Surface hardening associated with development is not permitted within a significant feature contributing to natural flows of Cobourg Creek if the development will significantly affect groundwater linkages to natural flows within Cobourg Creek.
- Where direct connection from an impervious surface to a watercourse currently exists all attempts shall be made to disconnect that connection through a pervious surface. New direct connections shall be discouraged.
- It is recommended that the GRCA and municipalities create subwatershed impervious surface limits.

*Rational and Integration:* This policy allows for the restriction of development that increases impervious surfaces within the watershed. This policy also benefits groundwater quantity, surface water quantity (Objective 2.1) surface water quality and aquatic habitats and species and terrestrial natural heritage.

Recommended Policy: Development setbacks from Cobourg Creek

- All new development will be setback from a watercourse to a minimum of 30 meters from the meander belt or a site-specific determined stream feature. Development related to existing urban, rural and agricultural uses may be restricted within the 30 meter setback, subject to area specific policies.
- Within the watercourse setback, lands must remain undisturbed except for the minimum area required for approved development or if the setbacks have been disturbed by past activities, restoration may be required. Restoration includes re-naturalization of the setback area and planting native vegetation.

*Rational and Integration:* This policy allows for the restriction of development in close proximity to a watercourse. This policy also benefits surface water quality and aquatic habitats and species.

Recommended Policy: Restrict development needing a Permit to Take Water in contributing features to natural flows within Cobourg Creek

- Development that would require a Permit to Take Water under the *Ontario Water Resources Act* may be permitted in a feature contributing to natural flows to Cobourg Creek only if the water withdrawal in conjunction with previously approved or known unregulated withdrawal will not cumulatively alter the natural stream flow or function.

Recommended Policy: Restrict consumptive water takings

- Development or land uses that do not require a surface water Permit to Take Water under the *Ontario Water Resources Act* may be permitted if the water withdrawal in conjunction with previously approved or known unregulated withdrawal will not cumulatively alter the natural stream flow or function.

*Rational and Integration:* These policies allow for development and land uses to occur with a restricted withdrawal of surface water determined by ecological needs and cumulative water taking affects throughout the watershed. These policies also benefit aquatic habitats and species.

Recommended Policy: Require urban stormwater best management practices

- All development will meet or exceed municipal and conservation authority development standards at the point of discharge in order to protect and enhance natural flows within Cobourg Creek. Alternative design standards and technologies will be researched and utilized, together with the use of stormwater management practices, in new and existing developments as a means of attenuating runoff volumes and peak flow rates, and maintaining infiltration to pre-development conditions or a natural state.

*Rational and Integration:* This policy allows for development and land uses to take place while using methods that reduced negative impacts and variability of surface water flows from stormwater management. This policy also benefits aquatic habitats and species.

Recommended Policy: Limit online ponds and impoundment structures

- The development and construction of online ponds or impoundment structures are prohibited except for the following.
  - Public forest, fish and wildlife management.
  - Conservation and flood or erosion control projects, only if determined necessary and in the public interest after all alternatives have been considered.

*Rational and Integration:* This policy allows for the restriction of online structures that have negative effects on instream form and function. This policy also benefits surface water quality and aquatic habitats and species.

#### Recommended Policy: Limiting site alterations

- Cut and fill operations are discouraged within or adjacent to features that contribute to natural flows within Cobourg Creek. Particularly where perched groundwater may contribute to a hydrologic function of a wetland or watercourse.

*Rational and Integration:* This policy limits the amount of site disturbance next to a surface water feature. This policy also benefits surface water quality and aquatic habitats and species.

#### Existing Legislation

- Implement policies where applicable from the *Drainage Act* to address surface water quantity issues associated with agricultural drainage.

#### Review Mechanisms

- The GRCA and municipal staff will continue to review development plans and request changes where necessary to ensure runoff volumes, peak flow rates and impervious surfaces are minimized. In addition groundwater recharge should be maintained within new development areas, thereby reducing surface runoff.
- The GRCA and municipal staff will continue to review Permit to Take Water applications to ensure water takings are done using local watershed based data and knowledge.

#### Existing Program Implementation

- The GRCA will continue to work with the Ganaraska Region Low Water Response Team to implement the Provincial Low Water Response procedures when required.
- The GRCA and municipalities will investigate and work towards implementation of low impact development practices.

#### **Stewardship**

- Implement the GRCA Clean Water – Health Land Stewardship Program and partner programs to assist landowners and resident in stewardship activities that accomplish the following.
  - Increase natural vegetation using the natural heritage system to compensate for changes in imperviousness of the watershed.
  - Increase riparian buffers to reduce variability of overland runoff.
  - Increase water infiltration, storage and use on individual lots (i.e., green roofs, rain barrels and cisterns and impermeable parking lots and driveways.
  - Restore, enhance and protect wetlands.
  - Carry out an urban stewardship program to address altered flows caused from stormwater management.
  - Increase channel stability using bioengineering in urbanized areas to mitigate erosion caused from altered flows.

- Assist in the implementation of a water conservation plan through the Clean Water – Healthy Land Stewardship Program (refer to Section 7).
- Work with partnership programs to increase stewardship actions that protect and enhance features that contribute to natural flows within Cobourg Creek.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection and enhancement of surface water quantity. These actions will also benefit groundwater quantity, surface water quality, aquatic habitat and species and terrestrial natural heritage.

### **Education and Awareness**

- Increase information and community involvement through workshops, volunteer opportunities, the media, print material and site visits regarding features that contribute to natural flows (headwater, first order, intermittent streams, wetlands and groundwater discharge areas).
- Provide education through GRCA and partner programs on reducing stormwater runoff and increasing natural infiltration in urban areas.
- Increase education and knowledge on the Permit to Take Water process and assist applicants through the process.

### **Monitoring and Reporting**

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Continue monitoring stream flow through the stream gauge network program.
- Regularly monitor baseflow within Cobourg Creek to understand changes within the watershed and over time.
- Monitor and study channel morphology.
- Continue to study and understand local impacts from climate change through computer modeling and climate change initiatives.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Status of water conservation plan creation.
- Uptake and participation in stewardship projects.
- The use of education and awareness initiatives and their results.

It is recommended that research on the following topics occur.

- Establish the total amount of water takings, both regulated and non-regulated.
- Understanding relationships between storm flows and urban watercourses, particularly in relation to bank erosion and changes in channel structure.
- Understand the quantity and location of tile drainage, which will assist in understanding changes in stream flows as a result of field drainage.
- Effects of climate change on surface water quantity.

**Objective 2.2: maintain and improve the level of protection of residents, existing and proposed development from flooding hazards**

***Issues Addressed:***

- Floodplain management
- Land cover and imperviousness
- Water structures and ponds
- Stormwater management

***Targets for Success:***

- Total watershed imperviousness less than 10%
- Reduction in peak flows
- Reduction in the number of online ponds and impoundment structures



**Surface Water Quantity Objective 2.2 Management Actions**

**Regulation and Planning**

Recommended Policy: Limit cumulative hard surfaces within the Cobourg Creek watershed

- Development may be permitted only if the development will not cause the total cumulative impervious surface area of the Cobourg Creek watershed to exceed 10% of the watershed area and that the total cumulative impervious surface area within the Cobourg Creek Oak Ridges Moraine planning boundary does not exceed 10%.
- Where direct connection from an impervious surface to a watercourse currently exists all attempts shall be made to disconnect that connection through a pervious surface. New direct connections shall be discouraged.
- It is recommended that the GRCA and municipalities create subwatershed impervious surface limits.

*Rational and Integration:* This policy allows for the restriction of development that increases impervious surfaces within the watershed for the reduction of flooding potential. This policy also benefits groundwater quantity, surface water quality (Objective 2.0) and aquatic habitats and species and terrestrial natural heritage.

Recommended Policy: Limit online ponds and impoundment structures

- The development and construction of online ponds or impoundment structures are prohibited except for the following.

- Public forest, fish and wildlife management.
- Conservation and flood or erosion control projects, but only if they are determined to be necessary in the public interest after all alternatives have been considered.

*Rational and Integration:* This policy allows for the restriction of online structures that have the potential to increase flooding potential through a failed structure. This policy also benefits surface water quality and aquatic habitats and species.

#### Recommended policy: Stormwater quantity control

- All new development, excluding minor development as defined by the GRCA and municipalities, must provide control of post development stormwater to pre-development levels for all storms up to and including the 100 year event.
- Assessment of outlet and channel constraints is required for areas draining through existing developed areas and through ill defined watercourse and depressions throughout the watershed.

*Rational and Integration:* This policy allows for the management and design of storm flows from impervious surfaces that have the potential to increase flooding. This policy also benefits aquatic habitats and species.

#### Existing Policies and Programs

- Continue to implement section 28 (Generic Regulations) of the *Conservation Authorities Act* to ensure that any development occurs only if it is not affected by a potential natural hazard.
- Continue to implement the GRCA flood monitoring and warning program to ensure that flood protection is provided to local communities.
- Update the Town of Cobourg Special Policy Areas within the Cobourg Creek watershed to address newly updated floodplain mapping and emerging floodplain planning requirements.

#### Recommended Plan: Flood Recovery Program

Create a plan that addresses public and private property recovery from floods. This program would outline services offered by the GRCA, municipalities, the Haliburton, Kawartha, Pine Ridge District Health Unit and others to those affected by floods.

#### **Stewardship**

- Implement the GRCA Clean Water – Health Land Stewardship Program and partner programs to assist landowners and resident in stewardship actions that accomplish the following.
  - Manage or decommission online ponds to ensure they do not pose a flood hazard.
  - Implement re-vegetation to attenuate flood flows (i.e., riparian plantings, grass swales and waterways).

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the reduction of natural hazards. These actions will also benefit surface water quantity (Objective 2.0), surface water quality, aquatic habitat and species and terrestrial natural heritage.

### **Education and Awareness**

- The GRCA will continue to deliver the Spring Water Awareness Program (SWAP) to educate grade four classes at local schools on the importance to use caution and avoid spring melt and stormwater flows.
- Increase education around GRCA programs aimed at flood warning and forecasting.
- Increase education around emergency response to floods.

### **Land Acquisition**

- Floodplains where existing hazards are deemed to be excessive may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements
  - Land use covenants

### **Recommended Policy: Protection of floodplains through land acquisition**

- Floodplains that pose a significant hazard to property and citizens, or properties that may limit the hazard are priority lands for acquisition by a public authority.

### ***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program that includes the maintenance of the stream flow gauging program to ensure calculated flood peaks match those being experienced in the watershed.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting people and property from natural hazards.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

## 5.4 Groundwater Quality

Groundwater quality varies naturally throughout a watershed. It is influenced by seasonal changes and local climate and by the types of geology water moves through. When rain or snowmelt moves over land and through the ground, the water dissolves minerals, percolates through organic material such as roots and leaves, and reacts with algae, bacteria and other microscopic organisms. Each of these natural processes changes groundwater quality. In addition, human influences such as contamination can alter the quality of groundwater. Quality groundwater is required by aquatic organisms, the environment and as a source of drinking water. Therefore it is important to reduce or eliminate risks to groundwater quality.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related to groundwater quantity. The following will be the focus of current and future management actions.

- **Unused, poorly maintained and abandoned wells:** the number of abandoned wells in the Cobourg Creek watershed is unknown. All abandoned, poorly maintained or unused wells need to be upgraded for use or decommissioned to protect groundwater quality and for human safety.
- **Unused and poorly maintained septic systems:** the number of septic systems and the state they are in are unknown. Septic systems in disrepair need to be fixed to avoid contamination to the groundwater system. Unused septic systems should be addressed.
- **Unused and poorly maintained fuel/chemical storage:** the number of facilities that store fuel or chemicals on private or commercial properties and the state that they are in are unknown. Storage facilities that are in disrepair need to be fixed to avoid contamination to groundwater systems. Unused storage facilities should be removed.
- **Maintaining groundwater quality in Municipal Well Supplies:** municipal water is supplied from local wells; therefore, groundwater quality and quantity protection is vital. Unmanaged land uses within municipal wellhead protection areas can pose a threat to groundwater supplies.
- **Spreading and storing of bio-solids, pesticides and other chemicals within high recharge areas:** contamination to groundwater system can occur from application and poorly managed bio-solids (manure and human sludge), pesticides, fertilizers and road salts. Prevention and proper management of these potential contaminants need to occur.
- **Highly Vulnerable Aquifers:** vulnerable aquifers to groundwater contamination need to be identified and properly managed.

## GOAL 3.0: PROTECT GROUNDWATER QUALITY TO ENSURE SAFE DRINKING WATER SUPPLIES AND PROTECT ECOLOGICAL FUNCTIONS

### Objective 3.1: protect and enhance the quality of groundwater by addressing existing pathways and contaminant sources

#### **Issues Addressed:**

- Unused, poorly maintained and abandoned wells
- Unused and poorly maintained septic systems
- Unused and poorly maintained fuel/chemical storage



#### **Targets for Success:**

- A reduction in abandoned and unmaintained wells
- A reduction of poorly maintained septic systems and an increase in septic inspections
- A reduction in poorly maintained fuel and chemical storage facilities
- Maintenance and enhancement of groundwater quality to Ontario Drinking Water Standards
- Maintenance of current quality of groundwater supplies
- Implementation of best management practices in the Cobourg Creek watershed

### Groundwater Quality Objective 3.1 Management Actions

#### **Regulation and Planning**

##### Policy Investigation and Creation: Ensure wells or boreholes are properly abandoned or maintained

- Investigate and create a policy that requires the proper abandonment or upgrade of water wells and boreholes.

##### Policy Investigation and Creation: Require private sewage system upgrades during redevelopment

- Investigate and create a policy that requires the proper abandonment or upgrade of onsite sewage systems.

*Rational and Integration:* These policies will allow for the reduction of groundwater contamination risks from abandoned, unmaintained wells and septic systems. This policy also benefits surface water quality.

##### Recommended Program: Septic re-inspection program

- Investigate and create a re-inspection program of onsite sewage systems.

Recommended Policy: Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

- Implement future Source Protection Plan policies, if greater protection is recommended, for the protection of groundwater quality.

*Rational and Integration:* This policy allows for the consideration of policies created through the source protection planning process, which is aimed at protecting municipal sources of drinking water.

**Stewardship**

- Implement the GRCA Clean Water – Health Land Stewardship Program and partner programs to assist landowners and residents in stewardship actions.
  - Upgrade or decommission wells and boreholes.
  - Repair septic systems and provide for septic inspections.
  - Upgrade or newly construct fuel and chemical storage facilities.
- Support the implementation of a volunteer septic system inspection program.
- Work with local partners and funding programs such as the Ontario Drinking Water Stewardship Program to increase stewardship actions that protect and mitigate negative effects on groundwater quality.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of groundwater quality. These actions will also benefit surface water quality and aquatic habitat and species.

**Education and Awareness**

- Host safe water seminars in partnership of the GRCA, the Haliburton Kawartha Pine Ridge District Health Unit, the Town of Cobourg and others.
- Promote private water well testing in partnership with the Haliburton Kawartha Pine Ridge District Health Unit.
- Use print material, the media and workshops to educate the public on the importance of groundwater contamination prevention.

***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Create a program that inventories well and boreholes through voluntary notification. Work with municipalities and the health unit to create an inventory of septic systems and storage facilities.
- Continue implementing Provincial Groundwater Monitoring Network on a regional scale to monitor groundwater quality.
- Continue data sharing with municipalities in relation to municipal well raw water supply and treated water quality.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting groundwater quality.
- The use of education and awareness initiatives and their effects.

It is recommended the quantity and condition of private water wells, boreholes and private septic systems within the Cobourg Creek watershed is researched.

### **Objective 3.2: manage the quality of groundwater through implementation of best management practices throughout the watershed**

#### ***Issues Addressed:***

- Maintaining groundwater quality in municipal well supplies
- Spreading and storing of bio-solids, pesticides and other chemicals within high recharge areas
- Highly vulnerable aquifers

#### ***Targets for Success:***

- Maintenance of groundwater quality of municipal groundwater supplies to Ontario Drinking Water Standards
- Identification of highly vulnerable aquifers
- Regulation and proper management of land application and storage activities within high recharge areas and vulnerable aquifers

## **Groundwater Quality Objective 3.2 Management Actions**

### **Regulation and Planning**

Recommended Policy: Map highly vulnerable aquifers and wellhead protection areas

- Highly vulnerable aquifers and wellhead protection areas should be mapped for the protection of groundwater quality.
  - Highly vulnerable aquifers (HVA)<sup>2</sup>
  - Municipal wellhead protection areas (WHPA) analyzed for the Camborne Municipal Well and Creighton Heights/Baltimore Municipal Well through drinking water source protection.
    - Zone A (100 m Pathogen Buffer)
    - Zone B (2 Year Time of Travel)
    - Zone C (5 Year Time of Travel)
    - Zone D (25 Year Time of Travel)
    - Zone E (Steady State)

*Rational and Integration:* This policy allows for the identification through mapping of features at risk from groundwater contamination. Once identified protection of

<sup>2</sup> Highly vulnerable aquifers within urban areas need to be further defined from existing modeling initiatives to acknowledge impervious surfaces.

these features can occur through regulations and planning. This policy also benefits surface water quality.

Recommended Policy: Identify vulnerable areas to groundwater contamination not yet known

- Identify vulnerable areas to groundwater contamination that have not been mapped or identified within the Cobourg Creek watershed, but come to the attention of the GRCA and municipalities through new information or correction of previous inaccurate or incomplete information.

*Rational and Integration:* This policy allows for the identification of features that are at risk from groundwater contamination that are currently unknown and allows for the integration of new sciences and future research into regulation and planning.

Recommended Policy: Restrict development in highly vulnerable aquifers

- Existing policies specified by the *Oak Ridges Moraine Conservation Plan* currently within municipal official plans in relation to development in highly vulnerable aquifers are supported (see below).
- Development within highly vulnerable aquifers throughout the watershed is prohibited if the land use is for the following:
  - Generation and storage of hazardous waste or liquid industrial waste.
  - Waste disposal sites and facilities, organic soil conditioning sites and snow storage and disposal facilities.
  - Underground and above-ground storage tanks that is not equipped with a required secondary containment device.
  - Storage of contaminant listed in Schedule 3 of *O. Reg. 217/08* of the *Environmental Protection Act*.

*Rational and Integration:* This policy allows for the protection of highly vulnerable aquifers from potential groundwater contamination associated with high risk land uses. This policy also benefits surface water quality.

Recommended Policy: Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act*

- Implement future Source Protection Plan policies, if greater protection is recommended, for the protection of groundwater quality within defined WHPA, HVA and other areas defined in the Source Protection Plan.

*Rational and Integration:* This policy allows for the consideration of policies created through the source protection planning process, which is aimed at protecting municipal sources of drinking water.

Existing Legislation

Implement policies and regulations under the *Nutrient Management Act*

associate with the protection of groundwater supplies from contamination associated with biosolids.

### **Stewardship**

- Implement the GRCA Clean Water – Health Land Stewardship Program and partner programs in order to encourage and provide incentive for best management practices within WHPA and HVA.
- Work with local partners and through other funding programs such as the Ontario Drinking Water Stewardship Program to increase stewardship actions that protect and mitigate negative effects on groundwater quality.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of groundwater quality. These actions will also benefit surface water quality and aquatic habitat and species.

### **Land Acquisition**

- Highly vulnerable aquifers and wellhead protection areas may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements
  - Land use covenants

### **Recommended Policy: Protection of vulnerable groundwater features through land acquisition**

- HVA and WHPA are priority lands for acquisition by a public authority when the following occurs.
  - HVA and WHPA are under threat from proposed development.
  - HVA and WHPA are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

### ***Monitoring and Reporting***

- Continue municipal groundwater supply monitoring and reporting as required by the Ministry of the Environment.
- Monitor the extent of biosolid applications and activities.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects.
- The use of education and awareness initiatives and their effects.

It is recommended that research occurs on the effects of field drainage on groundwater quality.

## 5.5 Surface Water Quality

Quality surface water is required for various water uses, including recreation, aquatic habitat, potable water supply and irrigation. The quality of surface water is influenced by the surrounding landscape and instream transformations. Non-point sources such as runoff that enter surface water contain components of the drainage area. Surrounding land use and cover therefore play an important role in the type and amount of nutrient, bacteria, chemical and metal input.

Land use and cover within Cobourg Creek not only influences the quality of surface water, but also the quality of Lake Ontario near shore area. Although no surface water drinking system exists in Cobourg Creek, water from the creek potentially influences the Lake Ontario based municipal water treatment system that services the Town of Cobourg. In addition, a number of water quality parameters such as phosphorus, suspended sediment and chloride affect aquatic species by impairing habitat or having toxic effects.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related to surface water quantity. The following will be the focus of current and future management actions.

- **Rural non-point pollution:** overland runoff to surface water poses a risk to water quality in the Cobourg Creek watershed. Nutrients that are synthetic and organic, sediments and chloride pathways and concentrations must be reduced and managed to avoid degraded surface water quality.
- **Urban point and non-point pollution:** stormwater entering Cobourg Creek causes increased concentrations of sediments, nutrients (fertilizers and pet waste) and chloride. Current stormwater management design does not manage dissolved particles. Urban land uses need to be managed to decrease variability in water quality. The Town of Cobourg Wastewater Treatment Plant #1 has the potential to elevate nutrient concentrations within Cobourg Creek.
- **Transportation corridors:** roads provide a pathway to surface water for litter, road salt, heavy metals and petroleum products.
- **Riparian buffers:** riparian buffers play an important role in mitigating surface runoff. Land use within riparian buffers need to be comprised of natural cover and their functions better understood. The urbanized sections of Cobourg Creek are lacking natural riparian areas and often have non-natural bank components. Uses of urban streams are often abused, acting as dumping grounds for organic and non-organic wastes.
- **Bacteria:** total coliform and *E. coli* are naturally occurring in the environment. Bacteria inputs from human waste management and livestock needs to be managed to avoid extreme concentrations of bacteria. Excess bacteria

causes negative impacts to water uses and on the recreational potential of Cobourg Creek and potentially Cobourg beaches.

- **Spills:** currently, information on spills into Cobourg Creek is unknown. In addition an emergency plan needs to be developed and carried out in order to reduce the effects of spills of any kind.

## GOAL 4.0: PROTECT AND IMPROVE SURFACE WATER QUALITY OF COBOURG CREEK

### Objective 4.1: manage and enhance rural water quality

#### *Issues Addressed*

- Rural non-point pollution
- Transportation corridors
- Riparian buffers
- Bacteria



#### *Targets for Success*

- Surface water quality parameter concentrations remain below Provincial Water Quality Objectives (PWQO) for aquatic life and swimming and body contact recreation during baseflow conditions
- Surface water quality after storm or runoff events should see minimal increases in concentrations
- Pesticides should not be detected in the surface water quality of Cobourg Creek
- Declines of nutrients or maintenance of a steady state at a level less than the PWQO over time should occur at the Provincial Water Quality Monitoring Network (PWQMN) sites and long term GRCA Monitoring sites (to be established through monitoring program)
- Continual declines in chloride should be observed at the PWQMN sites, and variability of chloride concentrations during winter months should be reduced

### Surface Water Quality Objective 4.1 Management Actions

#### **Regulations and Planning**

##### Recommended Policy: Development setback from Cobourg Creek

- All new development will be setback from a watercourse, to a minimum of 30 meters from the meander belt, or a site-specific determined stream feature. Development related to existing urban, rural and agricultural uses may be restricted within the 30 meter setback, subject to area specific policies.
- Within the watercourse setback, lands must remain undisturbed except for the

minimum required for approved development, or if the setbacks have been disturbed by past activities, restoration may be required. Restoration includes re-naturalization of the setback area and planting native vegetation.

*Rational and Integration:* This policy allows for the restriction of development in close proximity to a watercourse for the benefit of reducing negative effects on surface water quality. This policy also benefits surface water quantity and aquatic habitats and species.

Recommended Policy: “Enhanced” level stormwater quality controls

- All rural subdivision development will meet development standards at the point of discharge to protect and enhance surface water quality. Alternative design standards and water quality treatment technologies will be explored and utilized in conjunction with stormwater management, in new and existing developments as a means of improving or maintaining surface water quality including instream temperature to pre-development conditions or natural conditions.
- Stormwater management approaches should consider control and treatment on a hierarchical system. A: onsite control and treatment, B: conveyance control and treatment, C: end of pipe treatment and control.
- Where possible infiltration best management practices should be considered on all stormwater infiltrated. Water should be pre-treated to an extent feasible prior to groundwater infiltration. Attempts should be made to infiltrate runoff not contaminated by roads, parking lots and impervious surfaces.

*Rational and Integration:* This policy allows for the maintenance and enhancement of surface water quality by limiting the need for stormwater management facilities through alternative designs and treatment methods. This policy also benefits groundwater quantity.

Recommended Policy: Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act, 2006*

- Implement future Source Protection Plan policies, if greater protection is recommended, for the protection of surface water quality, municipal intake protection zones and other areas defined in the Source Protection Plan.

*Rational and Integration:* This policy allows for the consideration of policies created through the source protection planning process, which is aimed at protecting municipal sources of drinking water.

Existing Legislation

- Implement existing provincial acts and regulations to protect surface water quality. Such acts include the *Clean Water Act*, *Oak Ridges Moraine Act*, *Nutrient Management Act* and *Pesticide Act*.

### Existing and New Programs

- Carry out recommendations and best management practices contained within Municipal Salt Management Plans (Township of Hamilton and Northumberland County) to manage chloride use throughout the watershed.
- Encourage the Township of Hamilton, the Township of Alnwick/Haldimand and Northumberland County to create a best management practice plan for drainage ditch maintenance and construction.
- Implement and support municipal dumping by-laws and programs to discourage illegal dumping.

### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Township of Hamilton and the Township of Alnwick/Haldimand to assist landowners and resident in stewardship actions.
  - Decrease and mitigate non-point pollution sources.
  - Enhance and restore riparian areas to buffer against overland runoff and properly manage land use in the riparian area.
  - Promote and encourage best management practices for rural residential and agricultural land uses.
  - Increase natural cover as recommended by terrestrial natural heritage modeling.
- Work with local partners and through funding programs such as the Ontario Drinking Water Stewardship Program to increase stewardship actions that protect and mitigate negative effects on groundwater quality.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of surface water quality. These actions will also benefit aquatic habitat and species and terrestrial natural heritage.

### **Education and Awareness**

- Utilize GRCA programs in conjunction with municipalities, stewardship partners and provincial programs to increase education in relation to the protection of surface water quality and stream side littering.

### **Monitoring and Reporting**

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Continue implementing the GRCA/Municipal Salt Monitoring Program. This program measures chloride concentrations in surface water to understand concentrations of chloride in relation to road salt application and trends over time. This program is linked to municipal salt management planning.
- Continue partnering with the Ministry of the Environment to monitor surface water quality through the Provincial Water Quality Monitoring Network.
- Create dedicated surface water quality monitoring stations including a storm

(high flows) event sampling station within Cobourg Creek that will complement monitoring initiatives implemented by the GRCA.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing surface water quality.
- The use of education and awareness initiatives and their effects.

It is recommended that research occurs related to pharmaceuticals potential within surface water of Cobourg Creek.

#### Objective 4.2: Manage and enhance urban water quality

##### ***Issues Addressed:***

- Urban point and non-point pollution
- Transportation corridors
- Bacteria



##### ***Targets for Success:***

- Surface water quality parameter concentrations below Provincial Water Quality Objectives (PWQO) for aquatic life and swimming and body contact recreation during baseflow conditions
- Surface water quality after storm or runoff events should see only slight increases in concentrations
- Pesticides should not be detected in the surface water quality of Cobourg Creek
- Declines of nutrients or a steady state at a level less than the PWQO over time should occur at the Provincial Water Quality Monitoring Network (PWQMN) sites and long term GRCA Monitoring sites (to be established through monitoring program)
- Continual declines in chloride should be observed at the PWQMN sites, and variability of chloride concentrations during winter months should be reduced

#### Surface Water Quality Objective 4.2 Management Actions

##### **Regulations and Planning**

##### Recommended Policy: Development setbacks from Cobourg Creek

- All new development will be setback from a watercourse, to a minimum of 30 meters from the meander belt, or a site-specific determined stream feature. Development related to existing urban, rural and agricultural uses may be

- restricted within the 30 meter setback, subject to area specific policies.
- Within the watercourse setback, lands must remain undisturbed except for the minimum required for approved development, or if the setbacks have been disturbed by past activities, restoration may be required. Restoration includes re-naturalization of the setback area and planting native vegetation.

*Rational and Integration:* This policy allows for the restriction of development in close proximity to a watercourse for the benefit of reducing negative effects on surface water quality. This policy also benefits surface water quantity and aquatic habitats and species.

Recommended Policy: “Enhanced” level stormwater quality controls

- All subdivision development will meet development standards at the point of discharge to protect and enhance surface water quality Cobourg Creek. Alternative design standards and water quality treatment technologies will be explored and utilized in conjunction with stormwater management, in new and existing developments as a means of improving or maintaining surface water quality including instream temperature to pre-development conditions or natural conditions.
- Stormwater management approaches should consider control and treatment on a hierarchical system. A: onsite control and treatment, B: conveyance control and treatment, C: end of pipe treatment and control.
- Where possible infiltration best management practices should be considered on all stormwater infiltrated. Water should be pre-treated to an extent feasible prior to groundwater infiltration. Attempts should be made to infiltrate runoff not contaminated by roads, parking lots and impervious surfaces.

*Rational and Integration:* This policy allows for the maintenance and enhancement of surface water quality by limiting the need for stormwater management facilities through alternative designs and treatment methods. This policy also benefits groundwater quantity.

Recommended Policy: Implement future policies recommended within the Source Protection Plan created through the *Clean Water Act, 2006*

- Implement future Source Protection Plan policies, if greater protection is recommended, for the protection of surface water quality within defined municipal intake protection zones and other areas defined in the Source Protection Plan.

*Rational and Integration:* This policy allows for the consideration of policies created through the source protection planning process, which is aimed at protecting municipal sources of drinking water.

Existing Legislation

- Implement existing provincial acts and regulations to protect surface water quality associated with urban areas. Such acts include the *Clean Water Act*,

## *Nutrient Management Act and Pesticide Act.*

### Existing Programs

- The watershed plan supports the existing Town of Cobourg pesticide by-law and the future provincial *Cosmetic Pesticide Ban Act* to address cosmetic pesticide use in urban areas.
- The watershed plan supports the existing pool discharge by-law in the Town of Cobourg to mitigate negative impacts on pool water discharge.
- The watershed plan supports the existing sewer use by-law in the Town of Cobourg to mitigate negative impacts on sewer discharge to Cobourg Creek.
- Ensure that Ministry of Environment and municipal standards governing the protection of and discharge into surface water are being met in relation to municipal infrastructure and development.
- The watershed plan supports the upgrades occurring to the Wastewater Treatment Plant #1 in the Town of Cobourg.
- Carry out recommendations and best management practices from Municipal Salt Management Plans (Town of Cobourg and Northumberland County) to manage chloride use throughout the urban areas of the watershed.

### **Stewardship**

- Implement an urban GRCA Clean Water - Healthy Land Stewardship Program that addresses urban residential, industrial, commercial and institutional affects on surface water quality. This program would address protection of water quality both within buildings and on the property.
  - Work in public spaces to ensure management practices do not negatively impact surface water quality.
  - Ensure public space management practices have a set back distance from the stream edge to allow for a natural riparian area.
  - Encourage projects that deal with urban stream use and the negative effects that result from littering, organic waste inputs and water discharge to streams.
  - Implement projects aimed at limiting erosion in an urban stream setting for the benefit of surface water quality.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of surface water quality. These actions will also benefit aquatic habitat and species and terrestrial natural heritage.

### **Education and Awareness**

- Increase education on the connection of stormwater infrastructure to surface water quality. Programs to be implemented include the Yellow Fish Road program (partnership program with Trout Unlimited Canada and the GRCA) and education on pet waste management.

## **Land Acquisition**

- Lands that are associated with protection of surface water quality may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements
  - Land use covenants

### Recommended Policy: Protection of surface water quality through land acquisition

- Lands that protect surface water quality can be obtained through acquisition by a public authority when the following occurs.
  - Land that protect surface water quality from contamination that is under threat from proposed development.
  - Land is required for treatment facilities such as wetlands.
  - Land that protect surface water quality contamination that are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

## ***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Continue implementing the GRCA/Municipal Salt Monitoring Program. This program is linked to municipal salt management planning.
- Continue partnering with the Ministry of the Environment to monitor surface water quality through the Provincial Water Quality Monitoring Network.
- Create dedicated surface water quality monitoring stations within Cobourg Creek that will complement previous monitoring initiatives implemented by the GRCA (i.e., Ganaraska Region Water Quality Monitoring Network, Baseflow Water Quality Monitoring and storm event sampling). Samples may be analyzed for nutrients, bacteria, sediments, metals, pesticides and physical parameters.
- Create a stormwater infrastructure (stormwater management ponds and stormwater drains) water quality monitoring program.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing surface water quality.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

It is recommended that research is conducted on the effectiveness and efficiency of stormwater management ponds for treating surface water.

### Objective 4.3: create a spills action plan

**Issues Addressed:**

- Spills

**Targets for Success:**

- The creation of a local spills action plan

### Surface Water Quality Objective 4.3 Management Actions

**Regulations and Planning****Plan Creation: Spills Action Plan**

- Create a local spills action plan that aims at mitigating negative effects from spills in surface water. These negative effects can also impact groundwater and drinking water sources in Lake Ontario. This plan is not intended to replace the spills action program through the Ministry of the Environment, but allow for a fast response from local emergency response agencies.

**Monitoring and Reporting**

- Implement when required a monitoring program that monitors the conditions of surface water quality after a spill.
- Create a yearly report on the number of spills that have occurred throughout the watershed and how they were addressed.

## 5.6 Aquatic Habitat and Species

Thirty-six fish species have been identified within Cobourg Creek. Of special mention is the restoration of the Lake Ontario population of Atlantic salmon, which are being stocked in the Main Branch and Baltimore Creek below Ball's Mill Dam. Generally, higher fish diversity is observed in the southern part of the watershed, while a lower diversity of fish species is observed in the northern part of the watershed. Brook trout are found in abundance within the upper reaches of Cobourg Creek where the habitat consists of cold water and gravel to cobble substrate. Rainbow trout are found throughout the watershed and are actively moved upstream of Pratt's Dam each year to spawn. Brown trout are predominantly found in the Central branch and Baltimore Creek. Migratory salmon and warm water species are found within the main branch. Cobourg Creek is considered a cold water system based on observed stream temperatures and fish species presence.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related to aquatic habitat and species. The following will be the focus of current and future management actions.

- **Instream connectivity:** dams, such as Pratt's Dam and Ball's Mill Dam, water structures and perched culverts prevent fish movement and disconnect upstream function, such as sediment and organic transport. Cobourg Creek is also disconnected in some areas from its floodplain, preventing necessary interactions with the terrestrial environment.
- **Invasive species and pathogens:** the round goby is known to be present below the lamprey barrier and Pratt's Dam. Zebra mussels, rusty crayfish and invasive aquatic vegetation also have the potential to be in Cobourg Creek. The Cobourg Creek watershed falls within Ontario's Viral Hemorrhagic Septicemia (VHS) Management Zone, which is an area established to slow the spread of this fish disease.
- **Species at Risk:** the Atlantic salmon is under review for listing under the *Species at Risk Act* (SARA) and is undergoing a reintroduction program.
- **Sensitive species:** many habitat specialist or sensitive species exist within Cobourg Creek. One such species is the brook trout.
- **Riparian area form and function:** riparian areas influence instream water temperature and contribute necessary organic matter, insects and woody debris to the stream. There is an important relationship between the stream and its floodplain which also benefits terrestrial organisms.
- **Stream Temperature:** maximum summer water temperatures in Cobourg Creek range from 14°C in the headwaters to 26°C near Lake Ontario. Reduction of temperature variability and warm extreme summer temperatures may be required.
- **Fisheries management:** current Atlantic salmon stocking has the potential to alter present and native fish communities.
- **Angling:** the ecological affects of angling on the Cobourg Creek watershed are unknown.
- **Ponds:** downstream temperatures can increase as a result of impounded water. Changes in genetic diversity may result from pond stocking of fish species. Sediment, organic matter and woody debris movement is altered, causing changes in the food web structure.
- **Lake Ontario:** the connection of Cobourg Creek to Lake Ontario provides a link for fish communities and aquatic species between the lake, creek and adjacent watersheds.
- **Urban influences:** urban landscapes can negatively impact instream habitat and fish communities through altered flow conditions, channelization and pollution.
- **Stream form and function:** more information is needed on the fluvial geomorphology of Cobourg Creek.
- **Headwater and intermittent streams:** the importance of headwater, intermittent and ephemeral streams is poorly understood by the community. These streams are often altered through development and land use changes.

## GOAL 5.0: PROTECT AQUATIC HABITAT AND SPECIES

### Objective 5.1: protect and restore existing and native aquatic species and communities

#### **Issues Addressed:**

- Invasive species and pathogens
- Species at Risk
- Sensitive species
- Angling
- Fisheries Management
- Lake Ontario

#### **Targets for Success:**

- Implementation of the Cobourg Creek Fisheries Management Plan



### Aquatic Habitat and Species Objective 5.1 Management Actions

#### **Regulation and Planning**

##### Recommended Policy: Adoption of the Cobourg Creek Fisheries Management Plan

- The recommendations of the Cobourg Creek Fisheries Management Plan should be implemented where opportunities exist to improve fish species and communities within Cobourg Creek.

##### Existing Review Mechanisms and Programs

- Continue the administration and regulation of works in and around fish habitat for the protection of habitat and species through provisions of the federal *Fisheries Act*.
- Enforce angling regulations through Ministry of Natural Resources programs.

#### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Township of Hamilton, the Township of Alnwick/Haldimand and the Town of Cobourg in order to assist landowners and residents in implementing projects that protect or enhance the health of the fishery.
  - Removal of instream barriers.
  - Removal of online ponds.
- Work with local partners and programs such as the Lake Ontario Atlantic Salmon Restoration Program and Oak Ridges Moraine Foundation to increase stewardship actions that protect fish and fish habitat.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of aquatic species. These actions will also improve surface water quality and aquatic habitat.

### **Education and Awareness**

- Increase education regarding local aquatic species and species at risk within the community, local fishing clubs and anglers who fish within the Cobourg Creek watershed.
- Implement the existing Ontario Federation of Anglers and Hunters Aquatic Invasive Species Program, with an emphasis on local aquatic invasive species.
- Increase angler education with respect to responsible resource use and the Atlantic salmon fisheries.
- Implement the Atlantic Salmon Classroom Hatchery program in partnership with the Ontario Federation of Anglers and Hunters.
- Increase community knowledge on the Lake Ontario Atlantic Salmon Restoration Program in partnership with the Ontario Federation of Anglers and Hunters. Education and information may be provided through workshops, print material and the media.
- Host quarterly or semi-annual partner workshops on habitat and species project updates.

### **Monitoring and Reporting**

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Monitor the success of Atlantic salmon stocking through smolt assessments, netting, electrofishing, adult assessments methods and spawning surveys.
- Conduct spawning habitat surveys.
- Inventory non-fish species and organisms within Cobourg Creek.
- Monitor invasive species movement.
- Create dedicated fish and aquatic organism (i.e., benthic macroinvertebrates and mussels) sampling sites to monitor trends over time.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at aquatic species.
- The use of education and awareness initiatives and their effects.

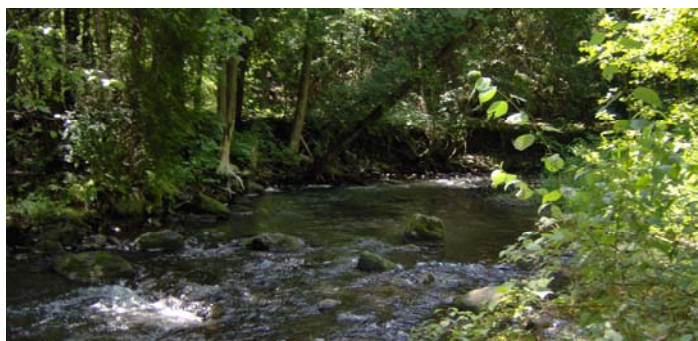
**Objective 5.2: protect and enhance the form and function of instream habitat and riparian areas.**

***Issues Addressed:***

- Instream connectivity
- Stream temperature
- Riparian areas
- Ponds
- Urban influences
- Stream form and function
- Headwaters and intermittent streams

***Targets for Success:***

- Increased instream connectivity
- Increased natural riparian areas
- Maintenance or shifts of stream water temperature to cold water
- Increased protection of headwater and intermittent streams



**Aquatic Habitat and Species Objective 5.2 Management Actions**

**Regulation and Planning**

Recommended Policy: Map aquatic habitats within the Cobourg Creek watershed

- Aquatic habitats include the following, all of which should be mapped for the entire Cobourg Creek watershed.
  - Habitat of endangered and threatened species
  - Habitat of species of special concern
  - Important fish habitat
  - Watercourses including headwater, intermittent and permanent streams
  - Wetlands

*Rational and Integration:* This policy allows for the identification of aquatic habitats. Once identified protection of these features can occur through regulations and planning. This policy also benefits surface water quantity and quality.

Recommended Policy: Identify aquatic habitats within the Cobourg Creek watershed not yet known

- Identify aquatic habitats within the Cobourg Creek watershed that have not been mapped or identified within the Cobourg Creek watershed, but come to the attention of the GRCA and municipalities through new information or correction of previous inaccurate or incomplete information.

*Rational and Integration:* This policy allows for the identification of aquatic habitats that are currently unknown and allows for the integration of new sciences and future research into regulation and planning.

Recommended Policy: Restrict development within and in proximity to aquatic habitats

- Existing policies specified by the *Oak Ridges Moraine Conservation Plan* currently within municipal official plans in relation to aquatic habitats are supported (Appendix D).
- Development within and in proximity to aquatic habitats is prohibited or restricted for the protection of aquatic habitat in accordance to the following.
  - All development with respect to land within aquatic habitats and the 30 meter vegetation protection zone as indicated in Appendix D is prohibited or restricted except for the following:
    - Forest, fish and wildlife management.
    - Conservation and flood or erosion control projects, but only if they are determined to be necessary in the public interest after all alternatives have been considered.
    - Transportation, infrastructure and utilities as described in section 41 of the *Oak Ridges Moraine Conservation Plan*, but only if the need for the project has been demonstrated and there is no reasonable alternative.
    - Low-intensity recreational uses as described in section 37 of the *Oak Ridges Moraine Conservation Plan*.
    - Development related to existing urban, rural and agricultural uses, subject to area specific policies.

*Rational and Integration:* This policy allows for the restriction of development within or adjacent to aquatic habitats. This policy also benefits groundwater and surface water quantity, and groundwater and surface water quality.

Recommended Policy: Adoption of the Cobourg Creek Fisheries Management Plan

- The recommendations of the Cobourg Creek Fisheries Management Plan should be implemented where opportunities exist to improve the health of fish and fish habitat within Cobourg Creek.

New Programs

- The Township of Hamilton, the Township of Alnwick/Haldimand and Northumberland County with assistance from the GRCA are encouraged to create a best management practice plan for ditch maintenance and construction.
- The Township of Hamilton, the Township of Alnwick/Haldimand, the Town of Cobourg and Northumberland County with assistance from the GRCA are encouraged to create a best management practice plan for addressing perched culverts.

### Existing Review Mechanisms and Policies

- Continue administration and regulation of works in and around fish habitat through provisions of the federal *Fisheries Act*.
- Continue implementing the Natural Heritage sections of the Township of Hamilton Official Plan and Township of Alnwick/Haldimand Official Plan.
- Continue implementing section 28 (Generic Regulations) of the *Conservation Authorities Act* and for the protection of riparian areas and instream habitat.

### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Township of Hamilton, the Township of Alnwick/Haldimand and the Town of Cobourg to assist residents in implementing projects that protect and enhance aquatic habitat.
  - Instream habitat creation.
  - Erosion control projects.
  - Increasing natural vegetation in riparian areas.
- Work with local partners and through other funding programs such as the Lake Ontario Atlantic Salmon Restoration Program and Oak Ridges Moraine Foundation to increase stewardship actions that protect and enhance instream habitat and riparian areas.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of aquatic habitats. These actions will also benefit surface water quality and quantity, aquatic species and terrestrial natural heritage.

### **Education and Awareness**

- Utilize GRCA and partner programs to increase awareness and education around instream habitat and riparian areas through workshops, volunteer opportunities, the media and print material.

### **Monitoring and Reporting**

Create and implement a GRCA integrated watershed monitoring program to monitor and inventory aquatic habitat conditions and changes over time.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing aquatic habitat.
- The use of education and awareness initiatives and their effects.

## 5.7 Terrestrial Natural Heritage

Terrestrial natural habitats of Cobourg Creek include forest, meadows/grasslands and wetlands. At 34% forest cover exceeds the commonly used guideline of 30% (Environment Canada 2005); however improvements can be made to the quality and quantity of habitat. Higher quality interior forest habitat is found in only about 4% of the watershed, primarily in the rural landscape. The Northumberland County Forest is a particularly valuable natural heritage feature within the headwaters of the Central Branch and the Baltimore Creek Branch.

Indicator species such as birds and frogs can aid in the understanding of the health of forest and wetlands. Numerous species at risk may inhabit the Cobourg Creek watershed and therefore should be considered in management planning. Invasive species such as dog-strangling vine, European buckthorn and garlic mustard pose a threat to terrestrial habitat health. Many actions related to the Cobourg Creek watershed needs to occur on a landscape scale, since many terrestrial issues affect more than just the Cobourg Creek watershed.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related to terrestrial natural heritage. The following will be the focus of current and future management actions.

- **Diversity of habitat types:** there is a good mix of natural habitats such as meadows/grasslands, forests and wetlands. Forest cover and interior forest habitat can be enhanced. Tallgrass prairie, a globally rare habitat type that occurs in the Cobourg Creek watershed, should be protected and restored.
- **Habitat connectivity and fragmentation:** although a third of Cobourg Creek watershed is forested, forest habitat could be better connected to reduce habitat fragmentation, promote species diversity and population viability and improve ecological function. This connectivity needs to occur between watersheds of the GRCA, not just within a particular watershed.
- **Invasive species:** invasive species such as dog strangling vine and garlic mustard pose one of the greatest threats to biodiversity. Priority invasive species and opportunities for management need to be identified.
- **Species at Risk:** the presence, distribution and habitat requirements of species at risk must be better understood and managed for.
- **Sensitive and uncommon species:** habitats required by sensitive species and those experiencing population declines across their range should be identified and protected.
- **Roads:** roads fragment habitats, create barriers to wildlife movement and contribute to wildlife mortality. The extent of this problem should be assessed and key crossing “hot spots” identified for possible mitigation measures.
- **Trails and recreation:** recreational trails have high social values yet can also

cause negative impacts to both habitat and species. These corridors also create pathways for invasive species. Improved public awareness of this problem is required and the impact of existing and planned trails should be assessed. Major trail systems are associated with the Oak Ridges Moraine Trail (currently not within the Cobourg Creek Watershed), Northumberland County Forest and Municipal trail systems. Rural trails can be an issue in relation to property rights and trespassing.

- **Urbanization and development:** changes in land use results in negative impacts and habitat loss. The role of the urban forest in enhancing natural heritage values should be evaluated, an Urban Forest Management Plan developed and environmentally friendly techniques promoted. Urban and rural roadside naturalization could benefit the Cobourg Creek watershed.
- **Pets and feral animals:** there is a general lack of community awareness on the negative effects of domestic pets on the health of the Cobourg Creek watershed (i.e., domestic cats, dogs, aquarium pets and their affects on natural populations).
- **Wetlands:** the extent of historical wetlands in the watershed should be evaluated and opportunities for restoration identified.
- **Ponds and vernal pools:** vital breeding habitats for a number of amphibians and other species exist in ponds and vernal pools. Improved mapping and protection of these habitats is needed.
- **Sustainable land use:** sustainable agriculture, land use alternatives and woodlot management should be promoted through education and awareness programs.

## GOAL 6.0: MAINTAIN THE NATIVE BIODIVERSITY AND ECOLOGICAL FUNCTION OF THE LANDSCAPE WITHIN THE COBOURG CREEK

### Objective 6.1: reduce habitat fragmentation and promote connectivity

#### **Issues Addressed:**

- Habitat Connectivity and Fragmentation
- Roads
- Sustainable land use

#### **Targets for Success:**

- Improved habitat patch size, shape and connectivity
- Adoption of sustainable land use practices in association with urban and agricultural land use and woodlot management



## Terrestrial Natural Heritage Objective 6.1 Management Actions

### Regulations and Planning

#### Recommended Policy: Map terrestrial features within the Cobourg Creek watershed

- Terrestrial features include the following, all of which should be mapped for the entire Cobourg Creek watershed, where data exists.
  - Conceptual natural heritage system (existing and proposed)
  - Significant wildlife habitat (includes species at risk habitat)
  - Significant woodlands
  - Savannas, tallgrass prairies and sand barrens
  - Wetlands (provincially significant and non-evaluated)
  - Locally rare species habitat

*Rational and Integration:* This policy allows for the identification of terrestrial features. Once identified protection of these features and associated functions can occur through regulations and planning. This policy also benefits groundwater and surface water quantity and quality, and aquatic habitats and species.

#### Recommended Policy: Identify terrestrial features within the Cobourg Creek watershed not yet known

- Identify terrestrial features within the Cobourg Creek watershed through continual data collection that have not been mapped or identified, but come to the attention of the GRCA and municipalities through new information or correction of previous inaccurate or incomplete information.

*Rational and Integration:* This policy allows for the identification of terrestrial features that are currently unknown and allows for the integration of new sciences and future research into regulation and planning.

#### Recommended Policy: Reduce the impact of development on the Terrestrial Natural Heritage System and significant features

- Existing policies specified by the *Oak Ridges Moraine Conservation Plan* currently within municipal official plans in relation to terrestrial features are supported (Appendix D).
- Development within and in proximity to terrestrial features throughout the Cobourg Creek watershed is prohibited or restricted for the protection of terrestrial habitat in accordance to the following.
  - All development with respect to land within terrestrial features and the 30 meter vegetation protection zone or as determined otherwise as indicated in Appendix D is prohibited or restricted except for the following.
    - Forest, fish and wildlife management.
    - Conservation and flood or erosion control projects, but only if

they are determined to be necessary in the public interest after all alternatives have been considered.

- Transportation, infrastructure and utilities as described in section 41 of the *Oak Ridges Moraine Conservation Plan*, but only if the need for the project has been demonstrated and there is no reasonable alternative.
- Low-intensity recreational uses as described in section 37 of the *Oak Ridges Moraine Conservation Plan*.
- Development related to existing urban, rural and agricultural uses, subject to area specific policies.
- Development practices should not impede the movement of flora and fauna within the natural heritage system.

*Rational and Integration:* This policy allows for the restriction of development within or adjacent to terrestrial features for the protection of the feature and its associated functions. This policy also benefits groundwater and surface water quantity, groundwater and surface water quality, and aquatic habitat and species.

#### Recommended Policy: Net gains within the Natural Heritage System

- Major development, as defined by the GRCA and municipalities, within the natural heritage system should not create net losses of terrestrial habitat within the Cobourg Creek watershed.

*Rational and Integration:* This policy allows for the restriction of development within the natural heritage system. It also mitigates cumulative net loss of forest and other natural habitats within the Cobourg Creek watershed. This policy also benefits groundwater and surface water quantity, groundwater and surface water quality, and aquatic habitat and species.

#### Recommended Planning Strategy: Creation of a regional Terrestrial Natural Heritage System and Strategy

- The GRCA and member municipalities will develop a regional Terrestrial Natural Heritage System and Strategy to provide a target for regional natural heritage activities and to create planning policies that will benefit terrestrial natural heritage on a landscape scale.

*Rational and Integration:* This planning tool allows for a landscape scale system analysis and strategy of terrestrial natural heritage. It is important to acknowledge terrestrial natural heritage components outside of a particular watershed. This policy satisfies requirements of municipal official plans and benefits groundwater and surface water quantity, groundwater and surface water quality, and aquatic habitat and species.

#### Plan Review Mechanisms

- Continual implementation of GRCA and municipal development plan review to protect terrestrial natural heritage features and functions is supported.

## **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Cobourg Creek watershed in order to assist landowners in implementing projects that protect and enhance terrestrial features and functions.
  - Increase the diversity of natural cover within the Cobourg Creek watershed using the conceptual natural heritage system.
  - Increase natural cover throughout the watershed.
  - Increase and encourage sustainable land uses.
  - Increase tallgrass prairie.
- Work with local partners and through other funding programs such as the Trees Ontario Foundation and Oak Ridges Moraine Foundation to increase stewardship actions that protect and enhance terrestrial features and functions within the conceptual natural heritage system.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of terrestrial natural habitat. These actions will also benefit groundwater and surface water quality and quantity, and aquatic habitat and species.

## **Education and Awareness**

- Utilize GRCA and partner programs to increase awareness and education around terrestrial functions and features through workshops, community involvement, print material and the media.
- Promote the natural heritage system for targeted stewardship and education.

## **Land Acquisition**

- Terrestrial features may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements
  - Land use covenants

### **Recommended Policy: Protection of natural heritage system features through land acquisition**

- Terrestrial features are priority lands for acquisition by a public authority.
  - Natural heritage system feature and functions are under threat from proposed development.
  - Natural heritage system areas and functions that are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

### ***Monitoring and Reporting:***

Create and implement a GRCA integrated watershed monitoring program to monitor and inventory terrestrial natural heritage features in relation to current conditions and trends over time.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing terrestrial natural heritage.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

### **Objective 6.2: maintain, enhance and restore the natural diversity of vegetation communities in the watershed**

#### ***Issues Addressed:***

- Diversity of habitat types
- Invasive species
- Trails and recreation
- Ponds and vernal pools
- Wetlands



#### ***Targets for Success:***

- An increase in appropriate and natural diversity of habitat types
- Control and reduction in current invasive species distribution and density and a reduction in potential introductions and vectors
- Trails and recreational facilities that complement natural areas and reduce negative effects
- Increase education and protect vernal pools and wetlands
- Protection of tallgrass and other rare communities

### **Terrestrial Natural Heritage Objective 6.2 Management Actions**

#### **Regulations and Planning**

##### Recommended Policy: Adoption of the County Forest Management Plan

- The watershed plan supports the implementation of the County Forest Management Plan where opportunities exist to improve vegetative communities within Cobourg Creek.

##### Recommended Policy: Net gains within the Natural Heritage System

- Development within the natural heritage system should not create net losses of vegetative communities within the Cobourg Creek watershed. Development applications should be accompanied by a natural heritage evaluation to ensure limited impacts occur to vegetative communities.

*Rational and Integration:* This policy allows for the restriction of development within vegetative communities. This policy also benefits groundwater and surface water quantity, groundwater and surface water quality, and aquatic habitat and species.

#### Existing By-laws

- The watershed plan supports municipal tree-cutting and preservation by-laws for the protection of vegetative communities within the Cobourg Creek watershed. It is recommended that removal of trees along transportation routes are done using sound forestry practices.

#### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Cobourg Creek watershed in order to assist landowners in implementing projects that protect and enhance vegetative communities.
  - Increase a diversity of natural cover within the natural heritage system through the use of native species and appropriate plant stock for plantings.
  - Increase natural cover throughout the watershed.
  - Increase and encourage sustainable land uses.
  - Increase tallgrass prairie.
- Work with local partners and through other funding programs such as the Trees Ontario Foundation and Oak Ridges Moraine Foundation to increase stewardship actions that protect and enhance vegetative communities.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program and partnership programs will aid in the protection of vegetative communities. These actions also benefit groundwater and surface water quality and quantity, aquatic habitat and species.

#### **Education and Awareness**

- Utilize GRCA and partner programs to increase awareness and education in regards to vegetative communities such as wetlands, forests, meadows/grasslands and tallgrass prairies.
- Promote the natural heritage system for targeted stewardship and education.
- Create a localized education program in relation to terrestrial invasive species. Material could include print material and signage.

#### **Land Acquisition**

- Vegetation communities may be acquired by a public authority for protection through the following methods.
  - Purchase of land
  - Donation of land
  - Land rental
  - Conservation easements

- Land use covenants

**Recommended Policy: Protection of vegetation communities through land acquisition**

- Vegetation communities are priority lands for acquisition by a public authority when the following occurs.
  - Vegetation communities and functions are under threat from proposed development.
  - Vegetation communities and functions that are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

***Monitoring and Reporting***

Create and implement a GRCA integrated watershed monitoring program in order to accomplish the following.

- Monitor specific vegetative community conditions and changes over time.
- Inventory significant invasive species infestation.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting and enhancing vegetation communities.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

**Objective 6.3: maintain, enhance and restore the diversity of native species in the watershed**

***Issues Addressed:***

- Invasive species
- Species at Risk
- Sensitive and uncommon species
- Trails and recreation
- Ponds and vernal pools



***Targets for Success:***

- An increase in sensitive species and uncommon species
- Control and reduction in current invasive species distribution and density and a reduction in potential introductions and vectors
- Trails and recreational facilities that complement species habitat and reduce negative effects
- Increase education, protection and abundance of species habitats including vernal pools and wetlands

## Terrestrial Natural Heritage Objective 6.3 Management Actions

### Regulations and Planning

#### Recommended Policy: Net gains within the Natural Heritage System

- Development within the natural heritage system should not create net losses of species habitat within the Cobourg Creek watershed. Development applications should be accompanied by a natural heritage evaluation to ensure limited impacts occur to species habitats and their functions.

*Rational and Integration:* This policy allows for the restriction of development within species habitats. This policy also benefits aquatic habitat and species.

#### Existing Legislation

- Implement the provincial *Endangered Species Act* and federal *Species at Risk Act* for the protection of identified species and their associated habitats.

### Stewardship

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Cobourg Creek watershed to assist landowners in implementing projects that protect and enhance habitats.
  - Increase the diversity of natural cover within the natural heritage system.
  - Increase natural cover throughout the watershed with a focus on interior habitat.
  - Enhance and increase specific habitat types such as wetlands, vernal pools and tallgrass prairie.
- Work with local partners and through other funding programs such as the Trees Ontario Foundation and Oak Ridges Moraine Foundation to increase stewardship actions that protect and enhance species habitat.

*Rational and Integration:* Implementation of the Clean Water – Healthy Land Stewardship and Financial Assistance Program along with partnership programs will aid in the protection of terrestrial natural habitat. These actions will also benefit groundwater and surface water quality and quantity, and aquatic habitat and species.

### Education and Awareness

- Continue implementing the Eastern hog-nosed snake program for identification of the habitats and locations of this endangered specie.
- Create a localized education program in relation to terrestrial invasive species. Material could include print material and signage.

### Land Acquisition

- Species habitat may be acquired by a public authority for protection through the following methods.

- Purchase of land
- Donation of land
- Land rental
- Conservation easements
- Land use covenants

**Recommended Policy: Protection of species habitat through land acquisition**

- Species habitat are priority lands for acquisition by a public authority if:
  - The identified species or associated habitats are under threat from proposed development.
  - The identified species or associated habitats are not or can not be adequately protected from the impacts of development by planning policy or stewardship agreements.

***Monitoring and Reporting:***

Create and implement a GRCA integrated watershed monitoring program to achieve the following.

- Monitor bird and amphibian communities.
- Monitor Eastern hog-nosed snake and other species at risk.
- Inventory locations of significant invasive species infestation.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at protecting native species.
- The use of education and awareness initiatives and their effects.
- Land acquisition activities.

**Objective 6.4: mitigate and reduce negative impacts of urban and rural land use**

***Issues Addressed:***

- Pets and feral animals
- Trails and recreation
- Urban growth and urbanization (links to population growth)
- Sustainable land use



***Targets for Success:***

- An increased awareness around the negative impacts of urban and rural use on terrestrial systems.
- Adoption of sustainable land use practices
- Trails and recreational facilities that complement natural areas and reduce negative effects.

## Terrestrial Natural Heritage Objective 6.4 Management Actions

### **Regulations and Planning**

#### Recommended Policy: Net gains within the Natural Heritage System

- Development within the natural heritage system should not create net losses of forest cover within the Cobourg Creek watershed. Development applications should be accompanied by a natural heritage evaluation to ensure limited impacts to terrestrial features and their functions.

*Rational and Integration:* This policy allows for the restriction of development within the natural heritage system in order to mitigate negative effects from development. This policy also benefits groundwater and surface water quantity, groundwater and surface water quality, and aquatic habitat and species.

#### Plan Creation: Urban Natural Heritage System

- Create an Urban Natural Heritage System and Strategy to protect and enhance terrestrial features and function within the Town of Cobourg.

### **Education and Awareness**

- Implement a school based adopt a public space to increase natural cover and decrease negative impacts within the respective public space.
- Work with municipal animal control officers, humane societies/animal shelters and pet stores to create material and provide information on feral animals and pets influences on the environment.
- Increase awareness on the negative affects associated with urban and rural residential land uses and growth on the terrestrial environment of the Cobourg Creek watershed.

### **Monitoring and Reporting**

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- The use of education and awareness initiatives and their effects.

## 5.8 Public Health and Wellbeing

The Cobourg Creek watershed and its resources have the ability to influence human health and wellbeing. The quality and quantity of resources such as water, air and food dictates the health of the community. Enjoyment and use of the watershed and its features not only provides for a healthy lifestyle but also contributes to personal wellbeing. Parks, greenspaces and natural areas all influence our social, mental, emotional and spiritual wellbeing.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related public health and wellbeing. The following will be the focus of current and future management actions.

- **Public spaces (water access, parks, trail systems, recreational and conservation areas):** these areas need to be managed and used to protect the natural environment and enhance public health and wellbeing through nature appreciation and outdoor recreation. Additional areas should be created in the Cobourg Creek watershed where appropriate.
- **Public transportation:** increased opportunities for public transportation need to be encouraged such as bike lanes, busses, car pooling etc.
- **Waste reduction, energy and water use:** the affects of energy and water use and waste production on the Cobourg Creek watershed needs to be communicated with the community. Ways to reduce waste and energy use needs to be a focus for appropriate authorities and community groups.
- **Agriculture and food production:** a connection between agriculture in Cobourg Creek and the community needs to be fostered and developed. The focus on local food and fibre production needs to be enhanced.

### GOAL 7.0: PROMOTE HEALTHY COMMUNITIES IN RELATION TO THE ENVIRONMENT

#### Objective 7.1: manage and improve the environmental quantity and quality and social benefits of existing and future public spaces


##### **Issues Addressed:**

- Public spaces

##### **Targets for Success:**

- Increased public spaces
- Improve environmental conditions of public spaces
- Increased social benefits





## Public Health and Wellbeing Objective 7.1 Management Actions

### **Regulations and Planning**

#### Recommended Policy: Increasing public spaces associated with new development

- New parks will be created when associated with a new major development. The park area will be a ratio of the size of the development area to a specific park size. These new parks will be created in a way to reduce environmental impacts from invasive species and other negative effects.

#### Recommended Policy: Adoption of the County Forest Management Plan

- The recommendations of the County Forest Management Plan should be implemented where opportunities exist to address public spaces.

#### Existing Initiatives

- Implement the Cobourg Conservation Area Master Plan (Franklin and Peacock 2002).
- Update the Ball's Mill Conservation Area Master Plan
- Assist in implementation of the Northumberland County Forest Management Plan with respect to public access.

### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Township of Hamilton and the Township of Alnwick/Haldimand and Town of Cobourg in order to enhance that natural features and social benefits of public spaces.
  - Increase natural, native vegetation.
  - Increase healthy lifestyle infrastructure.
  - Increase educational aspects of the public space.
- Work with local partners, municipalities and Haliburton Kawartha Pine Ridge District Health Unit to increase environmental and social characteristics of public spaces.

### **Education and Awareness**

- Increase awareness of public spaces through partnerships with the GRCA, municipalities and the Haliburton Kawartha Pine Ridge District Health Unit.
- Increase awareness programs to the threat and vectors of invasive species.
- Increase signage at public spaces showing the connection with the local watershed.

### **Monitoring and Reporting**

Monitor the environmental condition and use of public spaces.

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at improving public health and wellbeing.
- The use of education and awareness initiatives and their effects.

## Objective 7.2: encourage sustainable living and development, and local businesses

### ***Issues Addressed:***

- Public transportation
- Waste Reduction, Energy and Water Use
- Agriculture and Food Production

### ***Targets for Success:***

- Increased assessability and use of public transportation
- Behavioural changes in regards to increased uptake of waste reduction, and conservation of energy and water
- Increased purchasing of local products and programs dedicated to associated activities



## Public Health and Wellbeing Objective 7.2 Management Actions

### **Regulation and Planning**

#### Recommended Policy: Increase in public transportation

- Development of transportation infrastructure should occur with equal focus on public transportation infrastructure such as bike lanes, bus services and train services.

#### Existing Initiatives

- Support the protection of prime agricultural lands through municipal official plans and zoning by-laws.
- Support the implementation of agricultural programs including buy local initiatives developed through Northumberland County and agricultural organizations.

### **Stewardship**

- Implement the GRCA Clean Water – Healthy Land Stewardship and Financial Assistance Program within the Township of Hamilton, the Township of

Alnwick/Haldimand and Town of Cobourg in order to enhance the uptake of waste reduction and water and energy conservation measures.

- Partner with Lakefront Utilities Services Inc. to implement an urban stewardship program looking at in home and backyard incentive programs.
- Work with local partners, municipalities and Haliburton Kawartha Pine Ridge District Health Unit to increase environmental and social characteristics of public spaces.

### **Education and Awareness**

- Increase awareness of sustainable living and local businesses through partner programs and events.

### **Monitoring and Reporting**

Review watershed plan implementation to understand and report on the following.

- Adoption of policies into planning and regulation documents.
- Uptake and participation in stewardship projects aimed at increasing sustainable living and development.

## **5.9 Community Heritage**

Historic events have shaped the Cobourg Creek watershed to its present day condition. Most notable are influences on the watershed by dam construction and settlement patterns. Today the Cobourg Creek watershed supports a population of approximately 9,427 people, a diverse industrial and commercial sector, a productive agriculture community and a mix of natural resources and recreational uses. In addition, residents depend on water from the Cobourg Creek watershed for domestic and economic use, although the residents and businesses of the Town of Cobourg rely on Lake Ontario for its source of water.

The *Cobourg Creek Background Report* (Ganaraska Region Conservation Authority 2008) provides insight into the potential issues and opportunities related to community heritage. The following will be the focus of current and future management actions.

- **Lack of watershed knowledge:** there is a lack of community understanding of our natural history. As a result there is little understanding of what existed, what currently existed and what might not exist in light of watershed threats. New residents are not educated or informed on the watershed, local organizations and management requirements.
- **Lack of cultural history knowledge:** there is a lack of understanding of community history and heritage.

## GOAL 8.0: PRESERVE AND INTERPRET OUR COMMUNITY HERITAGE

### Objective 8.1: increase awareness and appreciation of our community heritage

#### ***Issues Addressed:***

- Lack of watershed knowledge
- Lack of cultural history knowledge

#### ***Targets for Success:***

- Increased awareness and education around the heritage of the Cobourg Creek watershed and its communities.



### Community Heritage Objective 8.1 Management Actions

#### **Education and Awareness**

- Provide education such as interpretive signs on the history of Atlantic salmon and brook trout in key public spaces.
- Increase local knowledge and action within the Cobourg Creek watershed through use of social based programs and partnerships.
- Create a self guided natural tour of the Cobourg Creek watershed through partnerships with heritage committees at the municipalities.
- Install signage on roads for identification of Cobourg Creek and its tributaries.

#### ***Monitoring and Reporting***

Review watershed plan implementation to understand and report on the use of education and awareness initiatives and their effects.



## 6.0 Watershed Plan Implementation

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Many specific management actions have been identified to achieve the goals and objectives of each component of the watershed plan. Implementation of the Cobourg Creek Watershed Plan is dependent on the adoption and facilitation of recommended actions relating to regulations and planning, stewardship, education and awareness and land acquisition. The Cobourg Creek Watershed Plan is intended to inform and guide municipalities, provincial and federal governments and the Ganaraska Region Conservation Authority in updating applicable policies and programs for protection, conservation and enhancement of the Cobourg Creek watershed.

The watershed plan provides direction to local organizations and residents of the watershed in regards to best management practices and suggested actions for watershed stewardship. Implementation of these stewardship actions will be effective if existing and future organizations coordinate efforts within the watershed. Finally monitoring and reporting of environmental conditions and implementation of the plan is needed to ensure that steps to reach the goals and objectives of the watershed components are occurring and are effective. The following sections outline the implementation mechanisms and time lines for each management action mechanism.

### **6.1 Regulations and Planning**

The Town of Cobourg, Township of Hamilton and Township of Alnwick/Haldimand, as well as provincial and federal ministries and departments will play a significant role in the implementation of the Cobourg Creek Watershed Plan. Many of these governmental agencies currently have applicable policies, by-laws and programs in place and the ability to implement management actions recommended in this watershed plan. It is suggested that recommended policies are considered for inclusion in municipal official plans, by-laws or specific programs over the next five years. However, given that the Town of Cobourg and Township of Hamilton are undergoing official plan reviews starting in 2009, it is practical to consider as many recommended policies as possible through these planning process. In addition, the Ganaraska Region Conservation Authority is committed to updating its policies in accordance to the Cobourg Creek Watershed Plan by 2010.

Many provincial initiatives provide a base for the protection and sustainable use of natural resources within the Cobourg Creek watershed. The Cobourg Creek Watershed Plan builds upon many of the development policies implemented at a provincial scale in order to make the policies place specific. These initiatives include the *Oak Ridges Moraine Conservation Plan*, *Growth Plan for the Greater*

*Golden Horseshoe, the Provincial Policy Statement and Drinking Water Source Protection.*

## **6.2 Stewardship**

Many recommended management actions can be achieved through voluntary actions by landowners, residents, rural agricultural and non-agricultural businesses and urban businesses. It is recommended that a coordinated approach with various partners be adopted to enhance the delivery of stewardship projects across the watershed. It is also recommended that the GRCA through the Clean Water – Healthy Land Stewardship Program facilitate and coordinate partner communication through regular meetings and updates.

Certain stewardship actions are encouraged and deemed a priority when the implementation of a project benefits many ecological functions. Table 6.0 addresses the priority stewardship actions that should be continuously encouraged over a long time frame as well as stewardship actions that may address site specific needs as they arise. It is recommended to implement the GRCA Clean Water-Healthy Land Financial Assistance Program within the Township of Hamilton and the Township of Alnwick-Haldimand to facilitate rural stewardship actions, as well as an urban based program within the Town of Cobourg in partnership with Lakefront Utilities Services Inc.

## **6.3 Education and Awareness**

In order to achieve the goals and objectives associated with each watershed component, education and awareness initiatives need to be initiated. In addition, communication in the form of education and awareness is required to see successful implementation of recommended regulation and planning, stewardship and land acquisition management actions. It is also recommended that partner activities be coordinated in consultation with the GRCA to ensure consistent messaging, avoid duplication and facilitate integration of funds and other resources.

Education and awareness initiatives will be delivered to a variety of audiences including urban and rural residents and landowners, agricultural community, business and industry, schools, community organizations and municipalities. Avenues for implementation of initiatives will include, but not be limited to workshops, seminars, watershed tours, the GRCA website, print material and the use of the media. Initiatives will be geared towards topics that help to achieve each watershed component goal and objective.

Table 6.0: Stewardship action implementation

<b>Priority and Timeline</b>	<b>Stewardship Action</b>	<b>Integrated Ecological Benefits</b>	<b>Delivery Agents*</b>	<b>Potential Funders*</b>
High, long term	Increase natural native cover within the natural heritage system	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial natural heritage</li> </ul>	GRCA NSC OFAH	CWHLFAP TOF ORMF EFP CFWIP COA
High, long term	Increase natural cover associated with groundwater features	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial natural heritage</li> </ul>	GRCA NSC OFAH	CWHLFAP TOF ORMF EFP CFWIP COA
High, long term	Increase natural cover in riparian areas	<ul style="list-style-type: none"> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial natural heritage</li> </ul>	GRCA NSC OFAH	CWHLFAP TOF ORMF EFP CFWIP COA
High, long term	Increase and enhance specific habitat types (wetlands, tallgrass prairie, interior forest)	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial natural heritage</li> </ul>	GRCA NCC	CWHLFAP TOF ORMF CFWIP COA
High, long term	Encourage and assist with rural best management practise associated with land uses (woodlot management, agricultural practices, rural residential practices)	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial natural heritage</li> </ul>	GRCA NSC OFAH	CWHLFAP ORMF EFP CFWIP COA ODWSP

<b>Priority and Timeline</b>	<b>Stewardship Action</b>	<b>Integrated Ecological Benefits</b>	<b>Delivery Agents*</b>	<b>Potential Funders*</b>
High, long term	Encourage and assist with urban best management practise associated with land uses (lot level water management, urban stream management, water and energy conservation)	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Public Health and Wellbeing</li> </ul>	GRCA LUSI	CWHLFAP ODWSP
High, long term	Encourage private well upgrades and decommission to protect groundwater quality and domestic drinking water supplies	<ul style="list-style-type: none"> <li>• Groundwater quality</li> <li>• Surface water quality</li> <li>• Aquatic habitats and species</li> </ul>	GRCA	CWHLFAP ODWSP
High, long term	Enhance environmental features in public spaces	<ul style="list-style-type: none"> <li>• Groundwater quantity and quality</li> <li>• Surface water quantity and quality</li> <li>• Aquatic habitats and species</li> <li>• Terrestrial Natural Heritage</li> <li>• Public Health and Wellbeing</li> </ul>	GRCA municipalities	CWHLFAP CFWIP
Medium, long term	Encourage private septic and chemical and fuel storage best management practices	<ul style="list-style-type: none"> <li>• Groundwater quality</li> <li>• Surface water quality</li> <li>• Aquatic habitats and species</li> </ul>	GRCA	CWHLFAP ODWSP
Medium, site or situation specific	Removal of online ponds and instream barriers	<ul style="list-style-type: none"> <li>• Surface water quality and quantity</li> <li>• Aquatic habitats and species</li> </ul>	GRCA	CWHLFAP COA
Medium, site or situation specific	Enhance or restore instream habitat including bank stabilization and erosion control	<ul style="list-style-type: none"> <li>• Aquatic habitats and species</li> </ul>	GRCA OFAH	CWHLFAP ORMF CFWIP COA
Medium, site or situation specific	Assist applicants with the Permit to Take Water Process	<ul style="list-style-type: none"> <li>• Groundwater and surface water quantity</li> <li>• Aquatic habitats and species</li> </ul>	GRCA	

GRCA – Ganaraska Region Conservation Authority  
NSC – Northumberland Stewardship Council  
OFAH – Ontario Federation of Anglers and Hunters  
NCC – Nature Conservancy of Canada  
LUSI – Lakefront Utilities Services Inc.  
CWHLFAP - Clean Water – Healthy Land Financial Assistance Program

TOF - Trees Ontario Foundation  
ORMF- Oak Ridges Moraine Foundation  
EFP - Environmental Farm Plan  
CFWIP - Community Fisheries and Wildlife Involvement Program  
COA - Canadian Ontario Agreement  
ODWSP – Ontario Drinking Water Stewardship Program

## **6.4 Land Acquisition**

Land acquisition management actions are an important means of protecting natural features that provide significant functions to the watershed. Land acquisition for the purpose of the watershed plan refers to acquiring the rights to manage lands for the protection of features and functions of the watershed. Land acquisition can be accomplished through a variety of methods.

- Purchase of land
- Donation of land
- Land rental
- Conservation easements (Managed Forest Tax Incentives Program, Conservation Land Tax Incentive Program etc.)
- Land use covenants

Historically acquisition of lands by a public authority was seen as a primary mechanism for protecting natural heritage features within a watershed (Richardson 1944, Department of Energy and Resources Management 1966). More recently however limited public funds or priority use of public funds has limited the financial capacity of public agencies to acquire land outright. A shift is also occurring that allows private ownership to remain accompanied by restrictive land use, but with incentives for doing so (i.e., tax incentives or capital gains). Land acquisition for the purpose of this plan is seen as a long term management action. Land acquisition will occur when funds are available or when opportunities arise that allow acquisition of management rights.

## **6.5 Monitoring and Reporting**

Cobourg Creek has been extensively studied over the years through programs administered by the Ganaraska Region Conservation Authority, federal and provincial governments, municipalities and local non-governmental agencies. In addition, future intensive monitoring may occur given the recent status of Cobourg Creek as a restocking Lake Ontario tributary for Atlantic salmon. Three aspects of monitoring and research will need to occur to ensure that the watershed plan is achieving stated goals and objectives related to each watershed component.

- The creation and implementation of a GRCA integrated watershed monitoring program is required to monitor and analyze conditions and trends throughout the watershed. Monitoring topics include groundwater quantity and quality (on a regional and site specific scale), surface water quantity and quality, aquatic organisms and habitat (includes stream temperature) and terrestrial natural heritage. This monitoring program will also evaluate the effectiveness of watershed and municipal planning actions in achieving respective plan objectives (i.e., effectiveness monitoring).
- The review of watershed implementation is required to understand the adoption and implementation of the watershed plan. Monitoring will

specifically address the actions undertaken to implement management actions as they relate to regulations and planning, stewardship, education and awareness, and land acquisition.

- Special research projects by the Ganaraska Region Conservation Authority and other agencies in partnership with academia, local schools, and local groups and agencies will be encouraged to study new initiatives (i.e., Atlantic salmon reintroduction) and to fill large scale knowledge gaps such as potential local effects of climate change, pharmaceuticals, location of wells, septs, fuel and chemical storage facilities, and water taking information.

Along with monitoring and research, the reporting of results to the public, partners, municipalities and stakeholders is a valuable tool to ensure that the watershed plan is being implemented and positive changes are being realized within the Cobourg Creek watershed. Reporting can occur in many formats including research papers and reports, annual monitoring reports and summaries, watershed report cards, newsletters and through the use of the media.

Reporting will be done in a way that focuses on the intended target audience and that provides recommended improvements for future monitoring and research programs, and the watershed plan. The use of monitoring and reporting will be necessary to allow for adaptive management. Where by changes are made during future updates to the Cobourg Creek Watershed Plan to allow for focused and improved implementation of techniques and programs.



## 7.0 Water Budget and Water Conservation Plan

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A water budget is a scientific modeling tool used to define the hydrologic system of a watershed. Results of a water budget provide an understanding of how water flows onto and on the surface, and through and below the ground. Water budgets expand beyond the quantification of components in the water balance equation (precipitation, evapotranspiration, groundwater and surface water flow), and include human and ecological water use.

Once a water budget is defined for a watershed, the amount of water needed for ecological functions and the amount that is remaining for human use is better understood. This information can then be used to create a water conservation plan. Water conservation plans aid in providing for a sustainable natural environment by recognizing water as a valuable, finite resource to be utilized efficiently and wisely.

As part of the Cobourg Creek Watershed Plan initiative, a water budget has been defined for the Cobourg Creek watershed (Ganaraska Region Conservation Authority 2008). Results indicate that given existing water takings and water uses, the Cobourg Creek watershed has low water use stress. Figure 7.0 indicates the lumped annual water inputs and outputs for existing land use conditions. Under a scenario of future conditions (increased development) with climate change effects, the Cobourg Creek watershed is expected to receive more precipitation, experience higher evapotranspiration rates and greater surface flows (due to increased precipitation). This analysis provides a basic glimpse of a future with climate change, with additional research and modeling required.

When examining stream flow durations, it was discovered that 86% of the time Baltimore Creek above the gauge station is experiencing flows which meet or exceed the minimum requirements of the aquatic ecology. 79% of the time, Cobourg Creek above the William Street gauge is experiencing flows which meet or exceed the minimum requirements of the aquatic ecology. Analysis on Cobourg Creek might indicate that there is more variance in flows, particularly low flows, and as such, the creek might have a harder time maintaining aquatic and ecological functions. However, studies reveal that aquatic ecological functions are generally not stressed. It is believed that flow duration issues demonstrated may be removed as more data becomes available from the gauging stations.

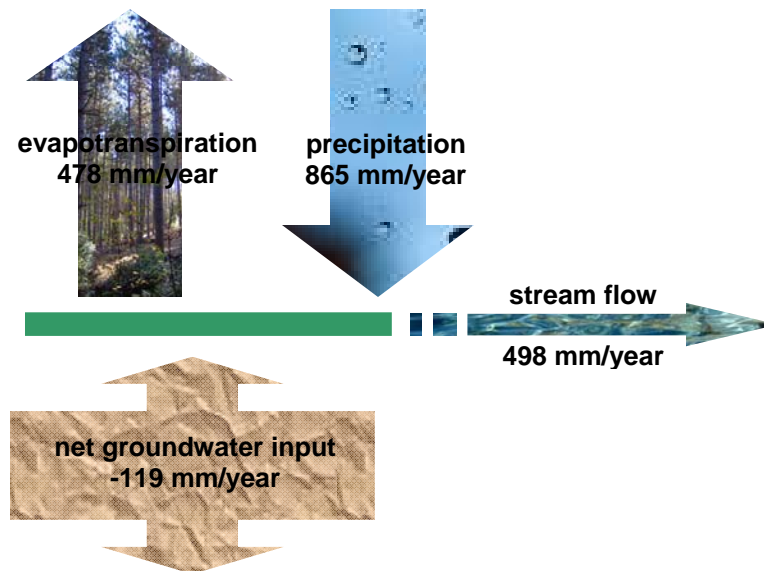


Figure 7.0: Cobourg Creek watershed existing condition water budget

Information gathered from the water budget and flow duration analysis indicates that Cobourg Creek has low water use stress and has ample water to sustain ecological functions. This conclusion is further supported with baseflow data and analysis, which indicates that the geological conditions allow for good movement of groundwater to surface water systems. Yet, it is still important to ensure wise use of our water resources, making a water conservation plan a necessary planning tool.

The Cobourg Creek watershed has a total population of 9,427 people. Of this 5,123 people receive municipal water from either Lake Ontario or municipal well supplies. The Camborne municipal wells service a population of 200 people, whereas the Creighton Heights municipal well services a population of 1,100 people, located within the Cobourg Creek watershed and Midtown Creek watershed. The population of Cobourg Creek that relies on private water wells for drinking water totals 4,304 people. Although generally there is an adequate groundwater supply, local issues and conditions do occur, causing water shortages in private wells during certain periods.

Many programs and initiatives are already in place to address water conservation and wise management. A water conservation plan will aim to build upon and strengthen these current initiatives.

- The Township of Hamilton *Water Conservation By-Law 2004-28 Restricting Outdoor Water Use* limits the amount of water used by those serviced by the two municipal wells during the months of June, July and August.
- The Town of Cobourg and Lakefront Utilities Services Inc. are involved in many initiatives to reduce water use from Lake Ontario.

- The Ganaraska Region Conservation Authority in partnership with member municipalities provides outreach and education on water conservation techniques and operates the Ontario Low Water Response Program, which responds to drought events.

## **7.1 Recommended Water Conservation Plan**

A water conservation plan is recommended in two phases for the Cobourg Creek watershed. As outlined in Section 5.0, many management actions are geared towards the conservation of ground and surface water for human and ecological uses. Many of these management actions are focused around stewardship, education and awareness. However, an in depth water conservation plan is recommended on a regional scale, addressing all watersheds, residents and municipalities within the Ganaraska Region Conservation Authority.

### **Phase 1 Water Conservation Plan**

The first phase of a watershed conservation plan for the Cobourg Creek watershed is focused on behaviour based actions promoted through stewardship, and community outreach and awareness. Given that phase 1 will be geared to water used from the Cobourg Creek watershed, areas that are serviced from Lake Ontario will not be the direct focus.

The GRCA Clean Water – Healthy Land Stewardship Program will be the primary mechanism for promoting water conservation behaviour based actions through education and awareness. The GRCA will partner with member municipalities to deliver messaging around methods to reduce water use. Delivery mechanisms to all watershed residents include mail outs in water bills, press releases and news articles, workshops and seminars, web based information and print material. Topics include technology based actions (i.e., low-flush toilets, water efficient appliances, water system maintenance) and behaviour based actions that promote the wise use of water.

### **Phase 2 Water Conservation Plan**

The second phase of a water conservation plan will be the creation of a GRCA water conservation plan. The focus of phase two will be based on partnership with member municipalities and water utilities to develop a regional water conservation plan. This regional plan would address large scale topics such as water takings less than 50,000 litres/day, Lake Ontario water takings and water efficiency measures. Water efficiency measures will be beneficial to municipalities, potentially enabling large capital costs of water and waste water services upgrades to be deferred given a shift in water use, thus reducing loadings to waste service systems. Creating a water conservation plan on a regional basis is needed to ensure initiatives are done consistently across the GRCA, while still having the ability to focus on local watershed scale issues and conditions.



## 8.0 Conclusions

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The need for a watershed plan for the Cobourg Creek watershed was recognized by local municipalities, the Ganaraska Region Conservation Authority and the community. Triggers that prompted the need for a watershed plan included the continual growth of Northumberland County and the use of current settlement areas within the watershed, the focus of forest management related to the Northumberland County Forest, the increase in awareness of natural resource and environmental issues by the community and the recent reintroduction efforts of Atlantic salmon. Along with the local needs for the Cobourg Creek Watershed Plan, a legislative requirement under the *Oak Ridges Moraine Conservation Plan* needed to be fulfilled.

After many years of intensive monitoring, data collection and research, the *Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features* was authored to aid in the understanding of the Cobourg Creek watershed. The data presented in the Background Report along with local knowledge and input allowed for the compilation of the Cobourg Creek Watershed Plan. An ambitious year long watershed plan planning process was initiated with the support and invaluable assistance and input from the Cobourg Creek Technical Review Committee and the Cobourg Creek Community Advisory Committee.

The process and techniques built upon historic watershed management processes and documents (Richardson 1944, Department of Energy and Resources Management 1966, Ontario Ministry of Natural Resources 1976), current watershed processes (Ontario Ministry of Environment and Energy and Ontario Ministry of Natural Resources 1993, Conservation Ontario 2003), legislative requirements (Ontario Ministry of Municipal Affairs and Housing 2002) and tested watershed policies (Ogilvie, Ogilvie and Company and Anthony Usher Planning Consultant 2005). More importantly, the process and end product are inline with the Ganaraska Region Conservation Authority vision and mission, and municipal and community needs and requests.

Each watershed component, also referred to as a watershed science, addresses numerous issues and opportunities within the Cobourg Creek watershed. A goal and objectives were created for each watershed component in order to organize methods to address these identified issues and opportunities. Using the objective statements, management actions were formulated in order to achieve the desired goal of each watershed component. Finally, in order to provide direction for the watershed plan, an implementation framework was provided to guide member municipalities, the Ganaraska Region Conservation Authority, partners and the public in actions that will benefit the Cobourg Creek watershed.

Many management actions have been recommended for adoption and implementation. However, it is necessary to put priority actions into context with the current condition of the watershed. Through this watershed planning processes it has been concluded that the Cobourg Creek watershed is a valuable resource to the local community, especially given its location in southern Ontario, the Lake Ontario basin and its proximity to the Greater Toronto Area. The watershed north of Dale Road is still relatively undeveloped with considerable natural cover and water abundance typical of a rural watershed. Groundwater and surface water quantity and quality provide adequate supplies and conditions of water for human and ecological use. Aquatic habitat and species are abundant and diverse including significant populations of native brook trout and reintroduced Atlantic salmon.

Protection of current natural features and functions is a priority, with many recommended management actions identifying this need. A key tool that requires implementation is the use of the conceptual natural heritage system, as well as the development of a regional natural heritage system and strategy. Although currently 34% forest cover exists within the Cobourg Creek watershed, the targeted natural heritage system aims for 40% cover for positive benefits to occur. The implementation of a conceptual natural heritage system benefits many watershed components such as groundwater quantity and quality, surface water quantity and quality, aquatic habitat and species and terrestrial natural heritage.

It has also been identified that existing urban and rural residential land uses along with future development can result in harmful changes to the water balance, water quality, natural cover, and aquatic and terrestrial communities. These changes can cause increased surface runoff, increased water pollution, extreme variability in stream flow, increased erosion and sedimentation, channel instability, reduced groundwater recharge and the loss of natural habitats. Policies implemented through regulation and planning processes and rehabilitation through stewardship will be needed to address these urban issues.

Growth, development and use of natural resources for human needs are inevitable within the Cobourg Creek watershed. Yet, these actions can occur in a sustainable and responsible manner. Actions can take place with focus on regulations and planning, stewardship, education and awareness and land acquisition that will aid in the protection, enhancement and sustainable use of the Cobourg Creek watershed. To accomplish the recommended management actions, collaboration among all who have a connection with the Cobourg Creek watershed needs to occur. Working together we can protect the Cobourg Creek watershed and its resources for generations to come.

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## Glossary

### A, B, C

**Acquisition:** any form of conveyance of title or interest in land. The right to the use or management of land.

**Anthropogenic:** human induced or caused.

**Aquifer:** a water bearing formation that is capable of transmitting water in sufficient quantities to serve as a source of water supply.

**Aquitard:** a low-permeability unit that contains water but does not readily yield water to pumping wells. Aquitards can restrict contaminant movement.

**Area of high aquifer vulnerability:** on the Oak Ridges Moraine, an area of high aquifer vulnerability is prescribed in the *Oak Ridges Moraine Conservation Plan*. Elsewhere, lands whose uppermost aquifer is most vulnerable to contamination as a result of surface activities or sources, due to the thickness and permeability of the rock and soil above the aquifer.

**Area of natural and scientific interest:** areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

**Artesian aquifer:** an aquifer that contains water under pressure resulting in a hydrostatic head above ground level.

**Baseflow:** streamflow that results from groundwater seeping into a stream. Baseflow represents the discharge of groundwater to streams, supports flow in dry weather. The flow of streams composed solely of groundwater discharge.

**Best management practice:** non-regulatory methods designed to minimize harm to the environment. Also referred to as beneficial management practice.

**Capture zone:** the area surrounding a well that will supply groundwater to that well when pumped at a specified rate for a specified period of time.

**Cold water species/habitat:** aquatic species with narrow thermal tolerance levels that are usually restricted to cold, highly oxygenated water. The temperature range for these species is from 10°C to 18°C.

**Connectivity:** the degree to which key natural heritage features are connected to one another by links such as plant and animal movement corridors, hydrological and nutrient cycling, genetic transfer and energy flows through food webs.

**Confined aquifer:** an aquifer that is bound above and below by deposits with significantly lower hydraulic conductivity.

### D, E, F

**Development:** for the purpose of this plan, the creation of a new lot, a change in land use, or the construction of buildings or structures and site alteration.

**Ecological features:** naturally occurring land, water and biotic features that contribute to ecological integrity.

**Ecological functions:** natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes, including hydrological functions and biological, physical, chemical and socio-economic interactions.

**Ecological integrity:** includes hydrological integrity, means the condition of ecosystems in which the structure, composition and function of the ecosystems are unimpaired by stresses from human activity, natural ecological processes are intact and self-sustaining and the ecosystems evolve naturally.

**Effectiveness monitoring:** watershed and municipal plans are put in place to limit future or address existing land use impacts responsible for impairment of watershed and municipal planning areas. Effectiveness monitoring is put in place to determine if implemented measures effectively limit or reduce these impairments.

**Endangered species:** species that is listed or categorized as an “Endangered Species” on the Ontario Ministry of Natural Resources’ official species at risk list, as updated and amended from time to time.

**Environmental impact study:** a study that demonstrates that there will be no negative impacts on a valued natural feature or related ecological functions and whose name and requirements are prescribed in an applicable official plan.

**Fish:** includes fish, shellfish, crustaceans and marine animals, at all stages of their life cycles.

**Fish habitat:** spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

**Flooding hazard:** the inundation, under the conditions specified below, of areas adjacent to a shoreline or a river or stream system and not ordinarily covered by water.

**Floodlines:** lines on a watershed map depicting regional flow conditions based on a specific historical event (i.e., Hurricane Hazel).

**Floodplain:** the area, usually low lands adjoining a watercourse, which has been or may be subject to flooding hazards.

## **G, H, I**

**Gauging station:** a site on a stream, lake or canal where surface water data is collected.

**GIS (Geographic Information System):** a map based database management system, which uses spatial reference system for analysis and mapping purposes.

**Groundwater:** water occurring in the zone of saturation in an aquifer or soil.

**Groundwater discharge:** the outflow from a groundwater reservoir.

**Groundwater flow:** the movement of water through the pore spaces of overburden material or through faults and fractures in bedrock.

**Groundwater model:** a computer model in which groundwater flow is characterized by numerical equations.

**Groundwater recharge:** the inflow to a groundwater reservoir.

**Groundwater reservoir:** an aquifer or aquifer system in which groundwater is stored.

**Headwaters:** the origins of streams and rivers.

**Hydrogeology:** the study of water below the ground surface.

**Hydrology:** the study of surface water flow systems.

**Impervious surface:** a human-made surface that does not permit the infiltration

of water, such as a rooftop, or a paved, non-permeable sidewalk, roadway, driveway, or parking lot.

**Hydrological evaluation:** a study that demonstrates that there will be no adverse effects on an important ground or surface water feature or related hydrological functions, and identifies planning, design and construction practices that will protect, and where possible enhance or restore, the health, diversity and size of the feature. Specific methods and requirements may be established in the watershed plan.

**Infrastructure:** physical facilities that form the foundation for development, consisting of the specific uses listed in Section 41(1) of the *Oak Ridges Moraine Conservation Plan*, but local roads or local sewage and water lines not subject to Municipal Class Environmental Assessment requirements.

**Infrastructure corridor:** an infrastructure facility, or components of that facility, that are by necessity linear and the right-of-way required for the facility. An infrastructure corridor includes facility components, such as interchanges and transit stations that may not themselves be linear but are required for the use and operation of the linear facility.

**Infiltration:** the flow of water from the land surface into the subsurface.

## J, K, L, M, N

**Low-intensity recreational uses:** recreational uses that have minimal impact on the natural environment and require very little terrain or vegetation modification, including but not limited to non-motorized trail uses, natural heritage appreciation and unserviced camping on public and institutional land; accessory uses; and accessory small-scale structures such as trails, boardwalks, footbridges, fences, docks and picnic facilities.

**Meander belt:** the land across which a stream shifts its channel from time to time.

**Municipal sewage services:** means a sewage works within the meaning of Section 1 of the *Ontario Water Resources Act* that is owned or operated by a municipality.

**Municipal water services:** means a municipal drinking-water system within the meaning of Section 2 of the *Safe Drinking Water Act*.

**Municipal wellhead protection area:** lands surrounding existing water well or well field, or a future well or well field site identified by the municipality, that supplies or will supply a municipal water service and the outer limit of which is the limit of the groundwater capture zone. These lands are divided into zones based on distance from the well or well field and groundwater travel time.

**Natural heritage system:** a system made up of natural features, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state.

## O, P, Q, R

**Oak Ridges Moraine:** a knobby ridge of sand deposited at the edge of a glacier

by escaping meltwater; the Oak Ridges Moraine was formed by the Simcoe and Lake Ontario Ice Lobes meeting.

**Ontario Drinking Water Objectives (ODWO):** a set of regulations and guidelines developed by the Ontario government to help protect drinking water sources.

**Provincial Groundwater Monitoring Network (PGMN):** a groundwater monitoring program operated with the Ministry of the Environment to record groundwater level changes over time, record groundwater quality and quantifies groundwater-surface water interactions.

**Provincial Water Quality Monitoring Program (PWQMN):** a water chemistry monitoring program operated by the Ministry of the Environment in cooperation with municipal governments and agencies.

**Provincial Water Quality Objectives (PWQO):** numerical criteria that act as chemical and physical indicators for a satisfactory level of surface water quality to protect all forms of aquatic life.

**Prime agricultural land:** land that includes specialty crop areas and/or Canada Land Inventory Classes 1, 2 and 3 soils, in this order of priority for protection.

**Private communal sewage services:** a sewage works within the meaning of Section 1 of the *Ontario Water Resources Act* that serves six or more lots or private residences and is not owned by a municipality.

**Private communal water services:** a non-municipal drinking-water system within the meaning of Section 2 of the *Safe Drinking Water Act* that serves six or more lots or private residences.

**Rare species:** a native species that is not currently at risk of becoming threatened but, because of its limited distribution, small population or specialized habitat needs, could be put at risk of becoming threatened through all or part of its Ontario range by changes in land use or increases in certain types of human activity.

**Recharge area:** areas where the water is absorbed into the ground and added to the zone of saturation.

**Recreation:** leisure time activity undertaken in built or natural settings for purposes of physical activity, health benefits, sport participation and skill development, personal enjoyment, positive social interaction and the achievement of human potential.

**Riparian area:** the land adjacent to a watercourse that is not normally submerged, which provides an area for vegetation to grow as a buffer to the land use alongside to the stream. It acts as a transitional area between aquatic and terrestrial environments and is directly affected by that body of water.

**Runoff:** water that reaches surface watercourses via overland flow.

## **S, T, U**

**Settlement Areas:** urban areas and rural settlement areas within municipalities (such as cities, towns villages and hamlets) where development is concentrated and a mix of land uses are present and have been designated in an official plan for development. Where there are no lands that have been designated, the

settlement areas may be no larger than the area where the development is concentrated.

**Streamflow:** the surface water discharge that occurs in a natural channel.

**Subwatershed:** a geographical area defining a single drainage zone within the watershed.

**Surface runoff:** water flowing over the land surface in streams, ponds or wetlands.

**Surface water:** includes water bodies (lakes, wetlands, ponds, etc.), watercourses (rivers and streams), infiltration trenches and temporary ponds.

**Significant discharge area:** lands of particular importance for the natural replenishment of surface water by groundwater. These may be identified either through watershed-wide studies or site-specific study, using methods established by the conservation authority.

**Significant recharge area:** lands of particular importance for the natural replenishment of groundwater. These may be identified either through watershed-wide studies or site-specific study, using methods established by the conservation authority.

**Site alteration:** means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

**Site restoration plan:** a plan that provides for restoration and enhancement of valued features and functions at an altered or disturbed site as nearly as possible to natural conditions, while recognizing what is achievable and appropriate in the context of existing and approved development on the site. Specific methods and requirements may be established in the watershed plan.

**Species of special concern:** a species so designated by the Ministry of Natural Resources.

**Stream:** a permanent or intermittent stream, river, or other watercourse that has a measurable or predictable response to a single runoff event.

**Stream corridor:** a stream plus all lands adjacent to it.

**Tallgrass prairie:** a globally rare habitat that is comprised of non-woody vegetation that is maintained by seasonal drought and disturbances such as fire.

**Threatened species:** a species that is listed or categorized as a "Threatened Species" on the Ontario Ministry of Natural Resources' official species at risk list, as updated and amended from time to time.

**Time of Travel:** the length of time it takes groundwater to travel a specified horizontal distance.

**Unconfined aquifer:** an aquifer whose upper boundary is the water table.

## **V, W, X, Y, Z**

**Valley corridor:** a stream, plus all lands adjacent to it as far as the stable top of bank, delineated using methods established by the conservation authority.

**Warm water species/habitat:** aquatic warm water habitat is classified as waters with temperatures above 25°C. Warm water species are tolerant to these water conditions.

**Water budget:** a summation of input, output and net changes to a particular

water resources system over a fixed period of time.

**Watercourse:** an identifiable depression in the ground in which a flow of water regularly or continuously occurs.

**Water table:** the top of the saturated zone in an unconfined aquifer.

**Watershed:** the land within the confines of drainage divides.

**Watershed Plan:** a framework in the form of a planning document for how, where and when management tools will be applied for the protection and enhancement of a watershed.

**Wellfield:** an area containing more than one pumping well that provides water to a public water supply system or single owner (i.e., a municipality).

**Wellhead protection area:** the area surrounding a well through which contaminants are reasonably likely to move toward and eventually reach the water well.

**Wetlands:** lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.

**Wildlife habitat:** areas where plants, animals and other organisms live and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.

## **Appendix A: Influential federal, provincial and municipal legislation**

### **Federal – Fisheries and Oceans Canada**

Fisheries and Oceans Canada (DFO) has ultimate responsibility for the management of fisheries resources in Canada. In Ontario there exists a unique multi-agency approach in delivery of the provisions of the *Fisheries Act*. Conservation Authorities, the Ontario Ministry of Natural Resources and Parks Canada all assist DFO with the proactive delivery of the fish habitat management program in Ontario. DFO's Conservation and Protection Branch provides the lead response to potential *Fisheries Act* violations relating to physical fish habitat changes while Environment Canada maintains its national role in enforcing the pollution prevention provisions in the *Fisheries Act*. Other regulatory functions related to the management of fish populations (such as setting angling limits, fishing seasons and fish stocking) are administered through the Ontario Ministry of Natural Resources.

In addition to the above functions, DFO has been given the responsibility for the administration of the federal *Species at Risk Act* (SARA), as it relates to aquatic species. Section 32 of SARA protects the habitat and individuals that are extirpated, endangered or threatened species from negative impacts resulting from human activities or works.

### **Federal – Transport Canada, Navigable Waters Protection Program**

Transport Canada is responsible for administration of the federal *Navigable Waters Protection Act*. The Act is designed to protect the public right of navigation by prohibiting the construction or placement of any work in navigable water without the approval of the Minister.

### **Federal – Environment Canada**

Environment Canada (EC) has responsibility for the enforcement of the pollution prevention provisions of the *Fisheries Act* (i.e., protection against discharges that could be deleterious to fish). Although the Ontario Ministry of the Environment will often provide the first response and background data collection for spills that may represent violations under the *Fisheries Act*, responsibility for the actual prosecution of such potential *Fisheries Act* violations remains with Environment Canada. In Ontario and in cases where a spill is due to a sediment discharge rather than a chemical spill, DFO may take back the lead role of investigating and/or prosecuting such violations, especially if there may be other violations under the habitat protection provisions in the *Fisheries Act*.

### **Provincial – Ontario Ministry of Natural Resources**

The Ontario Ministry of Natural Resources (MNR) is the provincial agency responsible for the protection and management of Ontario's natural resources. The MNR has primary administration and enforcement responsibilities for a considerable number of provincial statutes. The *Lakes and Rivers Improvement*

*Act* plays a specific role in contributing to the protection of fish habitat. Other legislation that considers the protection of habitats includes the *Public Lands Act* and the *Aggregate Resources Act*.

The *Fish and Wildlife Conservation Act* enables the MNR to provide sound management to fish and wildlife. Further to this, the *Endangered Species Act* ensures the conservation, protection, restoration or propagation of flora and fauna species that are threatened with extinction in Ontario.

### **Provincial - Ontario Ministry of the Environment**

The Ontario Ministry of the Environment (MOE) is the provincial agency responsible for enforcing the *Environmental Protection Act*, *Environmental Assessment Act*, *Nutrient Management Act*, *Pesticide Act*, *Ontario Water Resources Act* and the *Clean Water Act*.

The *Environmental Protection Act* prohibits the discharge of anything that causes or has the potential to cause an adverse environmental effect. The *Environmental Assessment Act* provides for the protection, conservation and best management of the environment. The *Nutrient Management Act* provides for the management of nutrients applied to agricultural lands and requires compliance with nutrient management strategies and plans.

The *Pesticides Act* and its regulations provide the regulatory framework for pesticide management to protect human health and the natural environment. The MOE, through the legislation, regulates the sale, use, transportation, storage and disposal of pesticides. The *Ontario Water Resources Act* prohibits the discharge of any substance that may impair the quality of any water. Section 34 of the same Act requires a person to obtain a water taking permit if they are taking more than 50,000 litres of water per day from any watercourse.

The *Clean Water Act* was created to protect municipal drinking water sources (surface water and groundwater) from contamination and overuse for now and for the future. It was also ensured through the Act that communities are able to identify potential risks to their supply of drinking water and take action to reduce or eliminate these risks on a local scale.

Municipalities, conservation authorities, landowners, farmers, industry, community groups and the public will all work together to meet common goals to protect municipal sources of drinking water. Locally, the Ganaraska Region Source Protection Area and Authority is the planning area for the *Clean Water Act*, within the Trent Conservation Source Protection Region.

### **Provincial - Ontario Ministry of Agriculture, Food and Rural Affairs**

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) works closely with agricultural producers and other agencies to enhance the protection of aquatic and terrestrial environments. Many best management practices have

been developed to assist farmers in the protection of habitats and water quality and quantity. OMAFRA has legislative responsibilities for the protection of the environment within the *Drainage Act* and the *Nutrient Management Act*.

The *Drainage Act* is a legislative tool that allows landowners to petition their municipalities to resolve drainage problems. The municipality administers the legislative process used to develop drainage works and assesses project cost to landowners within the drainage system watershed. The process ensures public involvement through consultative meetings and appeal procedures.

The *Nutrient Management Act* was developed by MOE and OMAFRA, as part of the provincial Clean Water Program. The Act provides a framework for setting clear, consistent standards and environmental protection guidelines for nutrient management on farms, by municipalities and other generators of materials containing nutrients. It builds on the existing system by giving current best management practices the force of law and creating comprehensive, enforceable, province-wide standards to regulate the management of all land-applied materials containing nutrients. When first introduced, affected operations were required to conform to the Act and currently, the *Nutrient Management Act* Regulations are limited to new farms and farms that are expanding to become large operations (over 300 nutrient units).

### **Provincial - Ontario Ministry of Municipal Affairs and Housing**

The Ontario Ministry of Municipal Affairs and Housing (MMAH) identifies and protects provincial interests and promotes sound infrastructure planning, environmental protection, economic development and safe communities. To achieve this MMAH is responsible for several statutes which legislates acceptable land use direction in Ontario including the *Planning Act*, *Green Belt Act* and the *Oak Ridges Moraine Conservation Act*.

The *Planning Act* establishes the foundation for land use planning in Ontario and describes how land uses may be controlled and by whom. To promote provincial interests, such as protecting farmland, natural resources and the environment, the provincial government has released a *Provincial Policy Statement* under the authority of Section 3 of the *Planning Act*. It provides direction on matters of provincial interest related to land use planning and development and promotes the provincial “policy-led” planning system.

The new *Provincial Policy Statement* came into effect on March 1, 2005. This coincides with the effective date of Section 2 of the *Strong Communities (Planning Amendment) Act, 2004*, which requires that planning decisions on applications that are subject to the new Provincial Policy Statement “shall be consistent with” the new policies.

The *Greenbelt Act* came into effect on February 24, 2005. It enables the Lieutenant Governor in Council to make a regulation creating a Greenbelt Area in

the Golden Horseshoe area and to establish a Greenbelt Plan by Order in Council, which contains land use designations and policies to govern the lands within the Greenbelt Area. The purpose of the Greenbelt is to protect key environmentally sensitive land and farmlands from urban development and sprawl.

The *Oak Ridges Moraine Conservation Plan* governs specific land uses to protect the ecological and hydrological integrity of the Oak Ridges Moraine and to ensure a continuous natural environment for future generations, while providing compatible social and economic opportunities. *The Oak Ridges Moraine Conservation Act* directs municipalities to bring their official plans into conformity with the Plan and to ensure that the decisions they make on development applications conform to the Plan. As such, the Plan will be implemented mainly at the municipal level. However, where municipal official plans or zoning by-laws conflict with the provincial policy, the provincial policy will prevail.

### **Provincial - Ontario Ministry of Public Infrastructure Renewal**

The Ontario Ministry of Public Infrastructure Renewal (MPIR) is responsible for providing a broad framework for planning and coordinating the government's investments in public infrastructure and for growth planning in the province. MPIR has the overall responsibility for fostering and implementing the government's long-term plan for growth.

The *Places to Grow Act* provides a legal framework necessary for the government to designate any geographic area of the province as a growth area and develop a growth plan in collaboration with local officials and stakeholders to meet specific needs across the province. The *Places to Grow Act* enables the government to plan for population growth, economic expansion and the protection of the environment, agricultural lands and other valuable resources in a co-ordinated and strategic way. The legislation is provincial in scope and allows for growth plans in any part of Ontario.

A regulation was also passed identifying the Greater Golden Horseshoe as the first area in the province for which a growth plan would be prepared under the *Places to Grow Act*. The growth plan for the Greater Golden Horseshoe was finalized and released in June of 2006.

### **Conservation Authorities**

Ontario's conservation authorities are empowered by the *Conservation Authorities Act* to undertake programs to further the conservation, restoration, development and management of natural resources on a watershed basis. The *Conservation Authorities Act* allows for regulations that address the following.

- [Actions that] Pertain to the use of water
- Prohibit or require permission to interfere in any way with the existing channel of a watercourse or wetland

- Prohibit or require a permit to undertake development (construction, structural alterations, grading, filling) in areas where the control of flooding, erosion, dynamic beaches, pollution or the conservation of lands may be affected

Conservation authorities have indirect responsibility to participate in aquatic habitat management through the *Conservation Authorities Act*, particularly Section 28. This regulation requires a permit from the conservation authority prior to various works taking place (e.g., altering a watercourse, constructing any building in the floodplain or placing fill in a regulated area). Conservation authorities are also responsible for watershed planning, stewardship and play an important role by providing “first on the scene” support and by referring potential occurrences to primary agencies.

### **Municipalities**

At the municipal level watersheds receives protection through Official Plan designations and policies, zoning by-laws, stormwater management, site plan and subdivision approval, and through development reviews and requirements. Municipalities work closely with local conservation authorities, through watershed planning, the development of watershed level fisheries management plans, the plan review process and through support of Authority policies and programs.

The Township of Alnwick/Haldimand, Township of Hamilton and Town of Cobourg Official Plans regulate land use in the Cobourg Creek watershed under the authority of the *Planning Act*. An official plan sets out local or regional council's policies on how land in a community should be used and developed. It is prepared with input from citizens and helps to ensure that future planning and development will meet the specific needs of the community. The *Provincial Policy Statement* requires that planning decisions (official plans) be consistent with the provincial directives.

## Appendix B: *Oak Ridges Moraine Conservation Plan* watershed plan requirements conformity assessment

This report documents how requirements of sections 24 and 25 of the *Oak Ridges Moraine Conservation Plan* (Ontario Ministry of Municipal Affairs and Housing 2002) have been satisfied for the portions of the **Cobourg Creek Watershed** located in the Oak Ridges Moraine planning boundary, based on direction provided by the provincial technical guidance documents (Ministry of the Environment 2007)<sup>1</sup>.

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.	<p>Watershed planning and ongoing watershed management have been activities the Ganaraska Region Conservation Authority (GRCA) has carried out in partnership with member municipalities for a number of years. Therefore a watershed plan was deemed to have been initiated prior to April 22, 2003, although study components required updates to varying degrees.</p> <p>Approval of the <i>Cobourg Creek Watershed Plan</i> by the GRCA Board occurred on March 19, 2009.</p> <p>The <i>Cobourg Creek Watershed Plan</i> was submitted to municipal councils for information and consideration. The Township of Hamilton and the Town of Cobourg passed resolutions to refer the <i>Cobourg Creek Watershed Plan</i> into their respective Official Plan five year updates.</p> <p>The Cobourg Creek Watershed Plan was presented to council and staff at the Township of Alnwick/Haldimand on March 25, 2009.</p>	<p>Refer to the <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i>.</p> <p>Approval of the <i>Cobourg Creek Watershed Plan</i> by the GRCA Board occurred on March 19, 2009. Resolution Number FA 12/09.</p> <p>Referral of the <i>Cobourg Creek Watershed Plan</i> by the Township of Hamilton to the Official Plan Review occurred on February 17, 2009. Resolution Number 2009-060.</p> <p>Referral of the <i>Cobourg Creek Watershed Plan</i> by the Town of Cobourg to the Official Plan Review occurred on February 2, 2009. Resolution Number 048-09.</p>

<b>Subsection</b>	<b>Requirement</b>	<b>Conformity Assessment</b>	<b>Document Reference</b>
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).
	(b) land and water use and management strategies;	The Cobourg Creek Watershed Plan describes recommended management actions regarding existing and future land and water use that will help to protect the ecological and hydrological features and functions of the watershed and the Oak Ridges Moraine.	Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed.
	(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 actions in the Cobourg Creek Watershed Plan.	Refer to Section 6.0 Watershed Plan Implementation.
	(d) an environmental monitoring plan;	The Cobourg Creek Watershed Plan includes recommendations regarding changes or enhancements to existing environmental monitoring programs and other area, site-or issue-specific monitoring requirements.	Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed and Section 6.0 Watershed Plan Implementation.
	(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 Cobourg Creek Watershed Plan includes recommendations regarding the use of environmental practices and programs.	Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed

<b>Subsection</b>	<b>Requirement</b>	<b>Conformity Assessment</b>	<b>Document Reference</b>
	(f) criteria for evaluating the protection of water quality and quantity, hydrological features and hydrological functions.	<p>The Cobourg Creek Watershed Plan includes watershed goals, objectives and targets.</p> <p>The Cobourg Creek Watershed Plan sets out recommended policies for the review of land use proposals to evaluate 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.</p>	Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed and Section 6.0 Watershed Plan Implementation.
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;	Not applicable	Not Applicable
	(b) the major development conforms with the watershed plan; and	See conformity assessment for section 24.(3)	See document references for section 24.(3)
	(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)

Subsection	Requirement	Conformity Assessment	Document Reference
	(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 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.	For any applications received prior to completion of watershed plans, in accordance with the ORMCP, conformity will have been reviewed and confirmed through applicant submitted studies.	Not applicable

Subsection	Requirement	Conformity Assessment	Document Reference
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.	<p>Data collection by the GRCA for water budget development was initiated in 2002 to complement historic data.</p> <p>A water budget study was initiated in 2005 by the Ganaraska Region Conservation Authority through source water protection initiatives, in partnership with municipalities of the Cobourg Creek Watershed.</p> <p>A water conservation plan was initiated during the development of the Cobourg Creek Watershed Plan and complements water conservation initiatives already in place.</p>	<p>Refer to <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i>.</p> <p>Refer to Section 7.0 Water Budget and Water Conservation Plan.</p> <p>Ganaraska Region Conservation Authority. 2007. Conceptual Understanding - Water Budget: Watersheds Draining to Lake Ontario, Final Draft Report Version 2.5, September 27, 2007.</p>
25.(2)	<p>A water budget and conservation plan shall, as a minimum,</p> <p>(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;</p>	<p>The Cobourg Creek 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.</p> <p>The water budget was developed based on land use characteristics, interception abstractions, vegetation, surficial soil characteristics and spatial variations in long term average precipitation, temperature and evaporation across the watershed using CANWET.</p>	<p>Refer to <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i>.</p> <p>Refer to Section 7.0 Water Budget and Water Conservation Plan.</p> <p>Refer to Ganaraska Region Conservation Authority. 2008. Tier 1 Water Budget and Stress Assessment. Version 1.0 Draft. Ganaraska Region Conservation Authority, Port Hope, Ontario.</p>

Subsection	Requirement	Conformity Assessment	Document Reference
	(b) characterize groundwater and surface water flow systems by means of modelling;	<p>The groundwater flow system of the Cobourg Creek watershed has been characterized by development and calibration of a groundwater flow model that utilizes MODFLOW software.</p> <p>Surface water flow systems of the Cobourg Creek watershed has been characterized by development and calibration of a hydrologic model based on Visual OTTHYMO software.</p>	<p>Refer to <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i> and Gananaska Region Conservation Authority. 2008. Tier 1 Water Budget and Stress Assessment. Version 1.0 Draft. Gananaska Region Conservation Authority, Port Hope, Ontario.</p>
	(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;	<p>The Cobourg Creek Watershed Plan includes management actions for the protection of groundwater and surface water quality and quantity, hydrological features and functions, terrestrial features and functions, and aquatic communities and habitat.</p> <p>A water conservation plan was initiated during the development of the Cobourg Creek Watershed Plan and complements water conservation initiatives already in place.</p>	<p>See 24(3)(f) above for targets.</p> <p>Refer to <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i> for a summary of the availability and quality of water sources.</p> <p>Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed and Section 7.0 Water Budget and Water Conservation Plan.</p>
	(d) develop a water-use profile and forecast;	Water budgeting initiative outlines water-use profiles and forecasts. Forecasts are based on current and future conditions and future development under climate change.	See the <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i> .

Subsection	Requirement	Conformity Assessment	Document Reference
	(e) evaluate plans for water facilities such as pumping stations and reservoirs;	A water conservation plan was initiated during the development of the Cobourg Creek Watershed Plan and complements water conservation initiatives already in place. This requirement will be completed as needed.	Refer to Section 7.0 Water Budget and Water Conservation Plan.
	(f) identify and evaluate, <ul style="list-style-type: none"> <li>(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,</li> <li>(ii) water conservation incentives such as full cost pricing, and</li> <li>(iii) ways of promoting water conservation measures and water conservation incentives;</li> </ul> (g) analyze the costs and benefits of the matters described in clause (f); (h) require the use of specified water conservation measures and incentives; (i) contain an implementation plan for those specified measures and incentives that reconciles the demand for water with the water supply; (j) provide for monitoring of the water budget and water conservation plan for effectiveness.	A water conservation plan was initiated during the development of the Cobourg Creek Watershed Plan and will address all necessary water conservation measures and initiatives.	Refer to Section 7.0 Water Budget and Water Conservation Plan.

Subsection	Requirement	Conformity Assessment	Document Reference
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 Cobourg Creek Hydrology 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 excludes Settlement Areas, utilizing subwatershed boundaries defined in draft Technical Paper #9). These estimates indicate that no Oak Ridges Moraine subwatersheds in the Cobourg Creek 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 2002.	See the <i>Cobourg Creek Background Report: Abiotic, Biotic and Cultural Features</i>  Ganaraska Region Conservation Authority. 2007. Cobourg Creek Hydrology Update Report: for Town of Cobourg Flood Line Mapping Update and Flood Damage Reduction Report. Final Report, March 2007.  Refer to Section 5.0 Management Recommendations for the Cobourg Creek Watershed.
	(b) any lower percentage specified in the applicable watershed plan.	No lower percentage is specified.	Not Applicable

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.

## Appendix C: *Provincial Policy Statement, 2005* conformity assessment

This report documents how requirements of sections 2.1 and 2.2 of the *Provincial Policy Statement* (Ontario Ministry of Municipal Affairs and Housing 2005) have been satisfied within the Cobourg Creek Watershed Plan.

Section	Requirement	Conformity Assessment
<b>2.1</b>	<b>Natural Heritage</b>	
2.1.1	Natural features and areas shall be protected for the long term.	The Cobourg Creek Watershed Plan and ongoing watershed management enables the long term protection of natural features through regulation and planning, stewardship, education and awareness and land acquisition initiatives.
2.1.2	The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.	Management actions associated with <i>objective 6.1: reduce habitat fragmentation and promote connectivity</i> relates to maintaining restoring and improving the diversity and connectivity of natural heritage features and ecological functions. All management actions are interrelated between ecological features have been created to be as integrated as possible for best results.
2.1.3	Development and site alteration shall not be permitted in: (g) significant habitat of endangered species and threatened species;	Management actions associated with <i>objective 6.1: reduce habitat fragmentation and promote connectivity</i> relates to development and site alterations associated with wildlife habitats.
	(h) significant wetlands in Ecoregions 5E, 6E and 7E; and	Not applicable
	(i) significant coastal wetlands.	There are no policies within the Cobourg Creek Watershed Plan that deals with the mouth of Cobourg Creek. A shoreline management plan is recommended to deal with the Lake Ontario Shoreline within the GRCA.
2.1.4	Development and site alterations shall not be permitted in: (d) significant wetlands in the Canadian Shield, north of Ecoregions 5E, 6E and 7E;	Not applicable
	(e) significant woodlands south and east of the Canadian Shield	Management actions associated with <i>objective 6.1: reduce habitat fragmentation and promote connectivity</i> relates to development and site alterations associated with significant woodlands.
	(f) significant valleylands south and east of the Canadian Shield	Management actions associated with <i>objective 2.1: Maintain and enhance the water balance and baseflow of the Cobourg Creek watershed</i> relates to development and site alterations associated with significant valleylands.
	(g) significant wildlife habitat; and	Management actions associated with <i>objective 6.1: reduce habitat fragmentation and promote connectivity</i> relates to development and site alterations associated with wildlife habitats.

Section	Requirement	Conformity Assessment
	(h) significant areas of natural and scientific interest.	There are no policies within the Cobourg Creek Watershed Plan that deals with areas of natural and scientific interest. These policies are already within municipal official plans.
	Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.	All recommended policies indicate that a hydrologic evaluation or natural heritage evaluation must be completed to ensure ecological features and functions are protected from development.
2.1.5	Development and site alteration shall be permitted in fish habitat except in accordance with provincial and federal requirements.	Management actions associated with <i>objective 5.2: Protect and enhance the form and function of instream habitat and riparian areas</i> acknowledges the legislative requirements of provincial and federal requirements.
2.1.6	Development and site alteration shall not be permitted on adjacent lands to the natural heritage feature and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.	All recommended policies indicate that a hydrologic evaluation or natural heritage evaluation must be completed to ensure ecological features and functions are protected from development. Consideration of adjacent lands is included.
2.1.7	Nothing in policy 2.1 is intended to limit the ability of existing agriculture uses to continue.	Policies that are associated with development permit work associated with existing urban, rural and agricultural uses.
<b>2.2</b>		<b>Water</b>
2.2.1	Planning authorities shall protect, improve or restore the quality and quantity of water by:	All surface water and ground water quantity and quality management actions have been created on a watershed scale.
	(k) using the watershed as the ecologically meaningful scale for planning;	
	(l) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;	The Cobourg Creek Watershed Plan recommends management actions regardless of political jurisdiction and acknowledges regional planning needs (i.e., groundwater quantity modeling).
	(m) 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;	Recommended management actions carried out with regulations and planning requires the identification of ecological features and functions. The identification of these features is a requirement of the Cobourg Creek Watershed Plan.
	(n) implementing necessary restrictions on development and site alteration to:	Recommended management actions under <i>objective 3.2: Manage the quality of groundwater through implementing best management practices throughout the watershed</i> address the protection of municipal groundwater drinking water supplies and highly vulnerable aquifers. Surface water quality objectives 4.1 and 4.2 identify the importance of drinking water source protection
	a. protect all municipal drinking water supplies and designated vulnerable areas; and	
	b. protect, improve or restore vulnerable surface and ground water, sensitive surface	

Section	Requirement	Conformity Assessment
	water features, and sensitive ground water features and their hydrologic functions;	work associated with municipal surface water intake protection zones. Management actions have also been recommended for the use of stewardship associated with protecting municipal sources of drinking water and vulnerable areas.
	(o) maintaining linkages and related functions among surface water features, ground water features, hydrologic functions and natural heritage features and areas;	All management actions have been created to be as integrated watershed management actions.
	(p) promoting efficient and sustainable use of water resources, including practices for water conservation and sustaining water quality; and	Management actions recommended under <i>objective 1.3: ensure sustainable rates of groundwater use</i> and <i>objective 2.1: maintain and enhance the water balance and baseflow of the Cobourg Creek watershed</i> relates to efficient and sustainable uses of water resources.
	(q) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.	Management actions recommended under <i>objective 2.1: maintain and enhance the water balance and baseflow of the Cobourg Creek watershed</i> , <i>objective 4.1: manage and enhance rural water quality</i> and <i>objective 4.2: manage and enhance urban water quality</i> relates to stormwater management volumes and contaminant loads.
2.2.2	Development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored.  Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.	Management actions recommended under <i>objective 1.1: maintain or enhance groundwater recharge and discharge for human needs and ecological functions</i> , <i>objective 1.2: manage and avoid actions that affect aquifers (artesian, shallow and deep) and changes in groundwater flow</i> and <i>objective 2.1: maintain and enhance the water balance and baseflow of the Cobourg Creek watershed</i> addresses development and site alterations near surface and ground water features for the protection of ecological functions.
<b>3.0</b>	<b><i>Protecting Public Health and Safety</i></b>	
3.1	Natural Hazards	All applicable natural hazard policies stated in section 3.1 are addressed through current floodplain planning and regulation processes at the GRCA and municipalities. New policies have been created and are listed under <i>objective 2.2: maintain and improve the level of protection of existing and proposed development and residents from flooding hazards</i> . The GRCA and the Town of Cobourg are proceeding with the update of the Special Policy Areas within the Cobourg Creek watershed.

## Appendix D: Oak Ridges Moraine minimum areas of influence and minimum vegetation protection zones

KEY NATURAL HERITAGE FEATURES, HYDROLOGICALLY SENSITIVE FEATURES AND AREAS OF NATURAL AND SCIENTIFIC INTEREST (EARTH SCIENCE): MINIMUM AREAS OF INFLUENCE AND MINIMUM VEGETATION PROTECTION ZONES

Column 1	Column 2	Column 3	Column 4
Item	Feature	Minimum Area of Influence (21)	Minimum Vegetation Protection Zone (21, 23, 26 (4), 30 (12))
1.	Wetlands	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (d) if a natural heritage evaluation is required
2.	Significant portions of habitat of endangered, rare and threatened species	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
3.	Fish habitat	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (1) (d) if a natural heritage evaluation is required
4.	Areas of natural and scientific interest (life science)	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
5.	Areas of natural and scientific interest (earth science)	All land within 50 metres of any part of feature	As determined by an earth science heritage evaluation carried out under subsection 30 (12)
6.	Significant valleylands	All land within 120 metres of stable top of bank	All land within 30 metres of stable top of bank, subject to clause 23 (1) (d) if a natural heritage evaluation is required

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Item</b>	<b>Feature</b>	<b>Minimum Area of Influence (21)</b>	<b>Minimum Vegetation Protection Zone (21, 23, 26 (4), 30 (12))</b>
7.	Significant woodlands	All land within 120 metres of any part of feature	All land within 30 metres of the base of outermost tree trunks within the woodland, subject to clause 23 (1) (d) if a natural heritage evaluation is required
8.	Significant wildlife habitat	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
9.	Sand barrens, savannahs and tallgrass prairies	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (1) (d) if a natural heritage evaluation is required
10.	Kettle lakes	All land within 120 metres of the surface catchment area	All land within the surface catchment area or within 30 metres of any part of feature, whichever is greater, subject to clause 26 (4) (c) if a hydrological evaluation is required
11.	Permanent and intermittent streams	All land within 120 metres of meander belt	All land within 30 metres of meander belt, subject to clause 26 (4) (c) and subsection 26 (5) if a hydrological evaluation is required
12.	Seepage areas and springs	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 26 (4) (c) and subsection 26 (5) if a hydrological evaluation is required

(Ontario Ministry of Municipal Affairs and Housing 2002)

