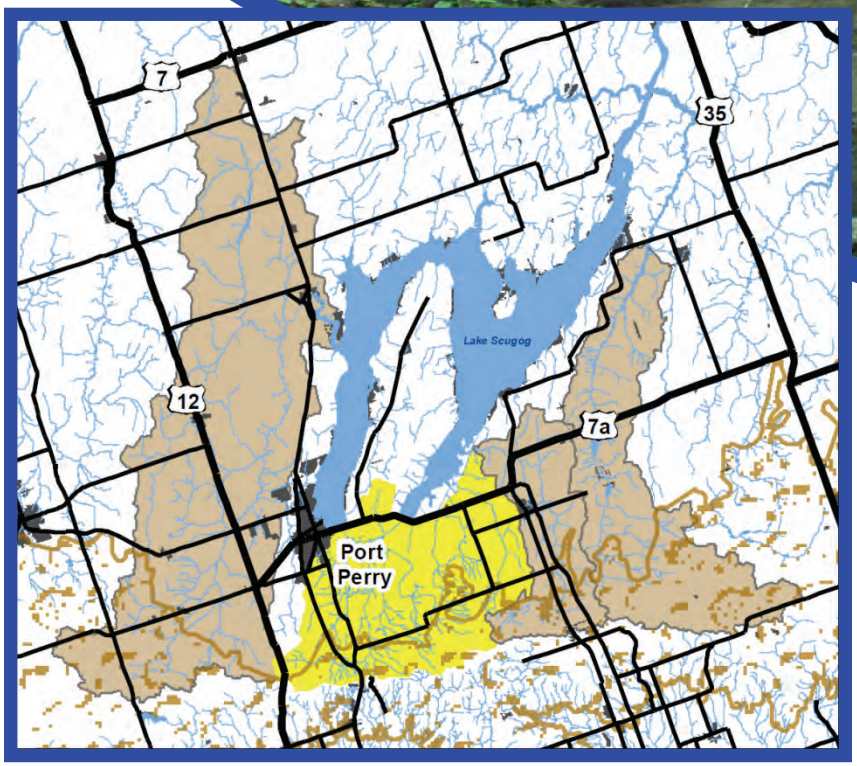
Southern Lake Scugog Tributaries Watershed Management Plan

2012



DURHAM REGION

KAWARTHA CONSERVATION

French Planning Services Inc.

A cknowledgements

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Kawartha Conservation would like to thank staff from the following partner organizations on the Technical Review Committee for their valued and thoughtful input throughout the plan development process:

- City of Kawartha Lakes
- Fisheries and Oceans Canada
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- Ontario Ministry of Municipal Affairs and Housing
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Ministry of the Environment
- Parks Canada (Trent-Severn Waterway)
- Regional Municipality of Durham
- Township of Scugog

We would also like to extend our thanks to individuals that live within the watershed community and other stakeholders who provided input into this plan, as well as landowners who provided sampling access for the background characterization phase of this project.

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About Kawartha Conservation

A plentiful supply of clean water is a key component of our natural infrastructure. Our surface and groundwater resources supply our drinking water, maintain property values, sustain an agricultural industry and support tourism.

Kawartha Conservation is the local environmental agency through which we can protect our water and other natural resources. Our mandate is to ensure the conservation, restoration and responsible management of water, land and natural habitats through programs and services that balance human, environmental and economic needs.

We are a non-profit environmental organization, established in 1979 under the Ontario Conservation Authorities Act (1946). We are governed by the six municipalities that overlap the natural boundaries of our watershed and voted to form the Kawartha Region Conservation Authority. These municipalities include the City of Kawartha Lakes, Township of Scugog (Region of Durham), Township of Brock (Region of Durham), the Municipality of Clarington (Region of Durham), Cavan Monaghan, and Galway-Cavendish & Harvey.

Kawartha Conservation

T: 705.328.2271

F: 705.328.2286

277 Kenrei Road, Lindsay ON K9V 4R1

geninfo@kawarthaconservation.com

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1.0 Executive Summary

The Southern Lake Scugog Tributaries Watershed consists of seven small watercourses and associated land that drain north into Lake Scugog and is one of four watersheds draining north from the Oak Ridges Moraine into the broader Lake Scugog watershed. These four watersheds, East Cross Creek, Nonquon River, Blackstock Creek, and the Southern Lake Scugog Tributaries, have concurrently undergone the same watershed planning process, resulting in the production of four watershed plans. These plans have been prepared in response the Oak Ridges Moraine Conservation Plan (ORMCP), which requires municipalities to prepare watershed plans that outline a strategy to protect and restore the health of the watershed. In preparing these four plans, the Oak Ridges Moraine will be provided with additional protection as will other parts of the broader Lake Scugog watershed. The Regional Municipality of Durham is the responsible municipality, and Kawartha Conservation has been the key planning coordinator and technical advisor.

The Planning Area - Southern Lake Scugog Tributaries Watershed drains 81.6 km^2 of predominantly agricultural land and is relatively sparsely populated, with scattered rural and farm lots (4.4% of the watershed), and a portion of the Town of Port Perry in the northwest corner, comprising 1.6% of the watershed. Population projections indicate that this is not likely to change over the next 25 years.

Twenty-four percent of the total planning area is within the boundaries of the Oak Ridges Moraine Conservation Plan and the watershed is located within the jurisdiction of four municipalities: Regional Municipality of Durham, including Scugog Township and small portions of Municipality of Clarington and City of Oshawa (**Map 1**).

Since the Southern Lake Scugog Tributaries comprise a large drainage area flowing into Lake Scugog, maintaining a healthy watershed is important for maintaining the ecological health of the larger Lake Scugog watershed. Lake Scugog is an extremely significant resource within the area in terms of its natural values (e.g., important habitat for wildlife), social values (e.g., vibrant history), and economic values (e.g., tourism).

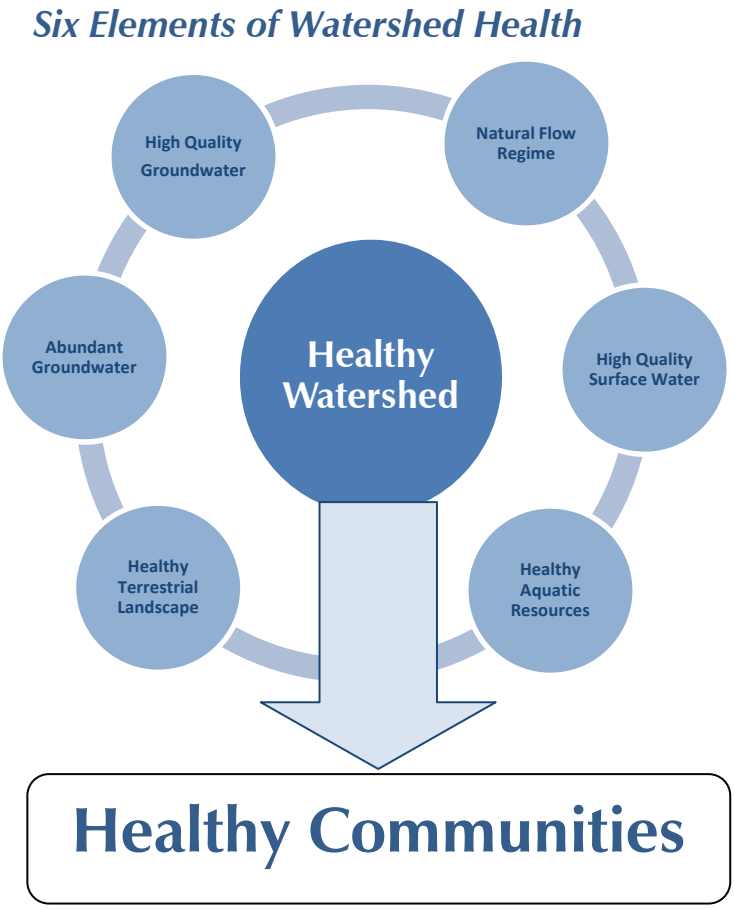
For the most part, the results of information gathering and public consultation suggest that the watershed is generally in a good "state of health". Groundwater is plentiful and of high quality, which is very important to a population that rely on wells for their potable water supply and to the people of Port Perry whose municipal water comes from wells in the watershed. Currently there is an ongoing Class Environmental Assessment process underway that will examine alternatives and devise options to provide additional water capacity for Port Perry.

Surface water flow (creeks and streams) is considered to exhibit a "natural flow regime" and there are no reported flood-prone areas.

A significant part of the watershed (47%) is in some form of natural cover (forest, plantations, wetlands, meadows), and includes large provincially significant wetland complexes including the Osler Marsh. The percentage of total natural cover and wetlands exceed the minimum standards established at the provincial or federal level, as do the amounts of interior forests. However, the total forest cover fall short of recommended targets. Also, forest conditions and the health and diversity of forest cover are not at their best due to the effects of numerous exotic and invasive species.

Fish populations are diverse and dominated by native species. Brook Trout, a sensitive coldwater species, is found in parts of the watershed, but are likely being limited by elevated water temperatures and lack of suitable habitat. One serious concern in the watershed is the elevated level of phosphorous in most of the watershed's surface waters, and elevated nitrate levels in some locations. These are considered to be the result of human activities in the watershed (agricultural and residential runoff primarily).

Plan Direction – Sections 2 and 3 of the plan provide a summary of past and current scientific information on the state of the watershed, drawn primarily from the Southern Lake Scugog Tributaries Watershed Characterization Report. This information, coupled with identified issues, is presented under six elements of watershed health: groundwater quantity; groundwater quality; surface water quantity; surface water quality; aquatic resources; and terrestrial resources. The Plan establishes goals, objectives and targets for the six elements of the watershed, and includes a summary of key issues identified in the characterization report and by the public during public consultation events. Associated with each of the objectives is a description of the general implementation approach to be taken protect, enhance and restore the watershed.



Public Consultation - Consultation with the public was an important part of preparing the four watershed plans. Public consultation occurred simultaneously for the four watershed plans, in two stages. The first stage, in July, 2011 consisted of two open houses, where the public could view, and

discuss with Kawartha Conservation staff, the four watershed plans in progress. These took place July 20th in Nestleton, and July 21st in Greenbank. The second stage took place in the fall of 2011. This consisted of targeted consultation sessions with key stakeholders (e.g., agricultural, environmental, agency, and other), as well as broader public consultation sessions through two additional public information sessions in Nestleton (November 3rd), and Greenbank (November 2nd). Throughout the planning process, a Technical Review Committee has been involved in the review of each draft version of the plan. Futhermore, this plan was presented and subsequently endorsed by Kawartha Conservation's Board of Directors (February 2012) as well as by Durham Region Planning Committee (March 2012).

Plan Implementation – Section 4 of the Plan includes a detailed listing of management actions (Tables 3 through 7) for each of the watershed elements, categorized by:

1. Policy, Practice and Regulations
2. Stewardship Activities
3. Education. Awareness and Outreach
4. Monitoring and Research
5. Other Management Activities

As well, the tables identify priority levels for each management action, and the lead and supporting agencies, partners or participants needed to undertake the action. The successful implementation of the Southern Lake Scugog Tributaries Watershed Management Plan will depend on the ongoing collaboration between agencies, community groups and landowners.

The key management approaches recommended to address each of the plan's goals and objectives are:

GOAL - Abundant Groundwater

- *that provides a continuous supply of baseflow to streams; and,*
- *that provides sustainable commercial and residential use opportunities.*

To effectively address this objective, it will be important to improve the existing information base related to groundwater, including better information on existing water usage (private wells, and water taking without permits). The effects on the groundwater system from the current and future municipal wells must be carefully assessed to assure minimal negative impacts on groundwater discharge to streams, wetlands, and Lake Scugog. Official Plan policies should be updated to protect significant recharge areas from new development, and there should be continued support for the work of Durham Region and its general education and awareness program for property owners throughout the watershed (agricultural, commercial, residential and new home owners).

GOAL - High Quality Groundwater

- *that provides safe drinking water; and,*
- *that provides clean water to streams to maintain ecological functions.*

A priority will be to continue to monitor water quality in groundwater monitoring and municipal wells to build a more reliable database over time. There should be a general education and awareness program for property owners throughout the watershed (agricultural, commercial, residential and new home owners) about well and septic system care and

maintenance. The education and awareness program should include specific information on abandoned wells, their role as pathways for contamination, and what to do if you have one.

GOAL - A Natural Flow Regime

- *that supports healthy aquatic resources;*
- *that reduces risk to human life and property; and,*
- *that provides sustainable commercial, residential and recreational use opportunities.*

Continued monitoring of gauge stations and establishing additional stations where possible, will, over time, build a more reliable data set. Floodplain mapping should be prepared in priority areas across the watershed. Education and awareness programs should be developed that address best management practices related to residential and agricultural runoff and erosion prevention to lessen the impact of phosphorous, nitrates, and sediments on surface waters.

GOAL - High Quality Surface Water

- *that supports healthy aquatic resources;*
- *that provides sustainable commercial, residential and recreational use opportunities; and,*
- *that contributes to the health of Lake Scugog.*

Continued analysis of water quality at the existing locations, with the addition of winter sampling will, over time, provide an improved level of data on water quality. Strategies dealing with care and maintenance of septic systems, and best management practices for agriculture are needed to reduce inputs of phosphorous and nitrates. Improved erosion control in the watershed may help to reduce the levels of aluminum and iron.

Approvals of future development in the Southern Lake Scugog Tributaries watershed should take into consideration the need for and appropriateness of stormwater management. Further monitoring and analysis of the phosphorous conditions should be undertaken to determine causal factors, and appropriate remedial action should be undertaken. There should be continued monitoring of chloride and metal concentrations in the watershed, and if there are increases from present levels, appropriate remedial action should be taken. Strategies dealing with care and maintenance of septic systems, and best management practices for agriculture are needed to reduce inputs of phosphorous and nitrates.

GOAL - Healthy Aquatic Resources

- *that support productive aquatic habitats, species and communities; and,*
- *that provide sustainable commercial and recreational opportunities.*

Continue to monitor habitat conditions for Brook Trout, other native aquatic species, and invasive species, and work with landowners to improve these conditions (e.g., increase stream shading). Establish a stewardship program that will encourage and assist landowners and others to remove instream barriers and to establish additional riparian cover where needed, notably in the smaller headwaters streams.

GOAL Healthy Terrestrial Landscape

- *that contributes to a functioning natural heritage system; and,*

- *that provides sustainable commercial, residential and recreational use opportunities.*

Continue monitoring the levels of forest cover, interior forest habitat, connectivity of natural cover, and wetland cover to assess whether these features and associated functions are being maintained. Undertake an inventory project to establish lists of flora and fauna, including species at risk. Undertake stewardship and education initiatives to work with property owners to improve forest health. Conduct inventories to identify terrestrial invasive species and continue to monitor the health and diversity of the forests and wetlands of the watershed. Support the development and implementation of the Durham Climate Change Plan.

Plan Monitoring - Section 4 describes a means to measure and report on the health of the six watershed elements and the implementation and achievement of the goals and objectives for the Southern Lake Scugog Tributaries Watershed. The Monitoring Plan contains three components, monitoring environmental health, measuring plan progress and effectiveness and providing a means to report progress to stakeholders and the public. A list of indicators are provided in **Table 8** to provide measures that will help to assess the health of the six watershed elements and the progress of plan implementation.

Conclusion - Completion of the four watershed plans, East Cross Creek, Nonquon River, Blackstock Creek, and the South Lake Scugog Tributaries, will satisfy an important requirement of the Oak Ridges Moraine Plan. Implementation of the Southern Lake Scugog Tributaries Watershed Management Plan simultaneously with the implementation of the three plans for adjacent watersheds will provide protection and enhancement of the ecological and community health of this part of the Oak Ridges Moraine, as well as of the associated watershed areas downstream from the moraine. Management actions across the four watersheds will be coordinated to promote efficiency and consistency. For Southern Lake Scugog Tributaries watershed, coordination with the Lake Scugog Environmental Management Plan will also be an important part of plan implementation.

2.0 Introduction

2.1 Purpose of Watershed Plan

To address the watershed plan requirements of the Oak Ridges Moraine Conservation Plan (ORMCP), Kawartha Conservation and the Regional Municipality of Durham initiated a watershed planning process in 2007. The process involves preparation of watershed plans for four watersheds on the Oak Ridges Moraine, one of which is the Southern Lake Scugog Tributaries Watershed .

The primary intent of the South Lake Scugog Tributaries Watershed Plan is to implement the objectives of the Oak Ridges Moraine Conservation Plan, namely: to maintain, improve and restore all the elements that contribute to the ecological and hydrological integrity of the Oak Ridges Moraine.

The specific requirement for a watershed plan is based on the importance of the ecosystems of the Oak Ridges Moraine. The Oak Ridges Moraine has a unique concentration of environmental, geological and hydrological features that make its ecosystem vital to south-central Ontario, including: clean and abundance water resources; healthy and diverse plant and animal habitat; an attractive and distinct landscape; prime agricultural areas; and, sand and gravel resources.

A watershed plan allows for a management plan to be prepared based on natural, ecologically relevant boundaries, namely a watershed or drainage area. A watershed plan examines both the land and water of the planning area and because of these boundaries this type of plan can manage effectively, and on an ecosystem basis, the hydrologic features (streams, wetlands, groundwater) and their interconnectedness to the land, land uses, and human activities.

The health of our water supplies, aquatic and terrestrial resources is significantly influenced by the health of our rivers and streams and by our activities. As communities continue to grow so do the pressures placed on the natural and physical environment. Watershed management planning is widely accepted as an appropriate process for managing human activities within the area defined by watershed boundaries.

2.2 Planning Area

Southern Lake Scugog Tributaries Watershed is one of four watersheds partly located on the Oak Ridges Moraine for which Kawartha Conservation is preparing watershed plans. The watershed drains 81.6 km^2 of land through the various tributaries and outlets into the southern end of Lake Scugog, which in turn flows north through the Scugog River and into the chain of lakes known as the Kawartha Lakes (**Map 1**). Although only a portion of the total watershed (23.7%) is subject to the requirements of the Oak Ridges Moraine Conservation Plan, the Regional Municipality of Durham and Kawartha Conservation have agreed that the entire Southern Lake Scugog Tributaries watershed be included in the planning area. By doing so, the plan can be based on a solid ecological boundary.

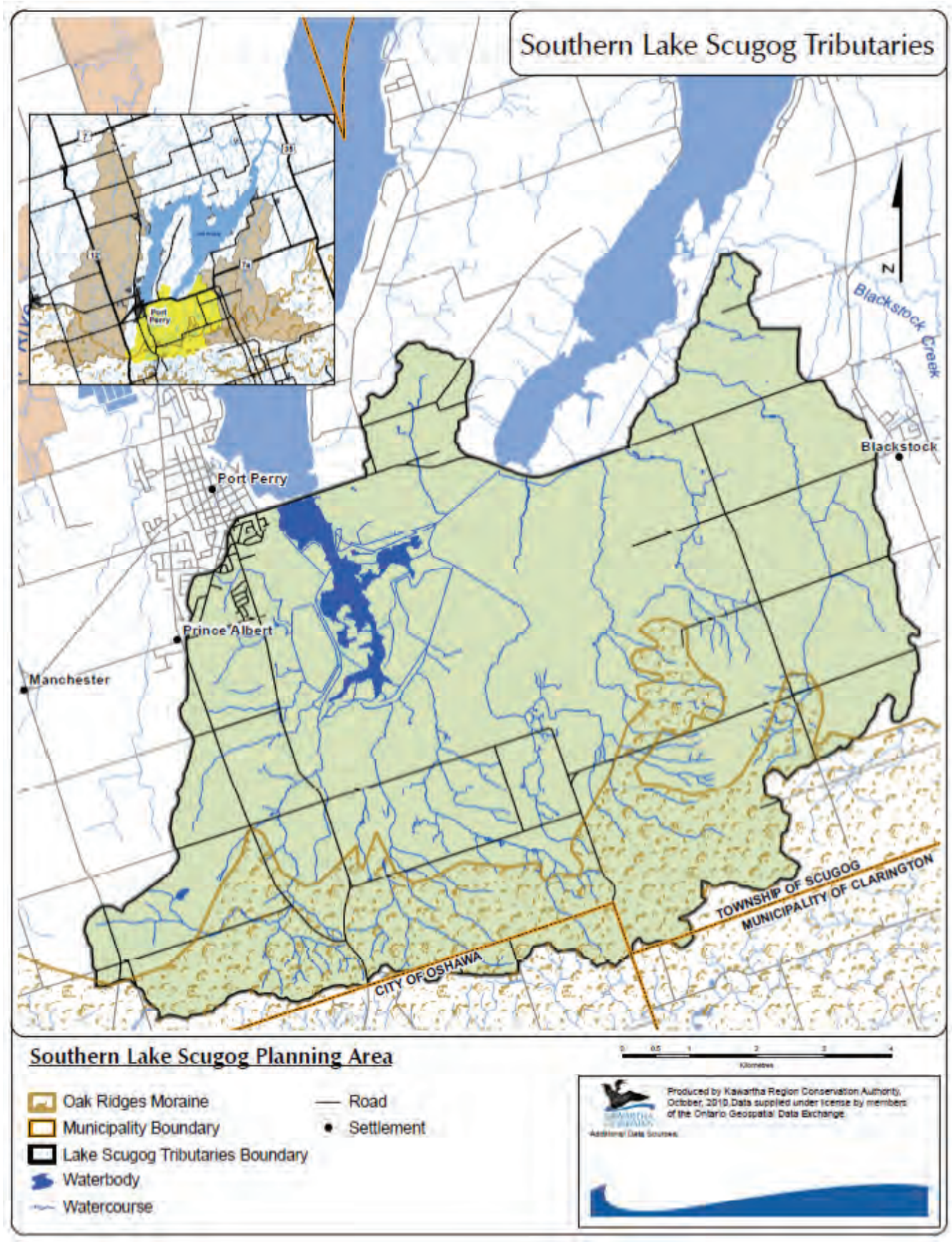
For the purpose of this watershed plan, the “watershed” is considered to be all the land and small watercourses that drain into Lake Scugog between the Nonquon watershed to the west and the Blackstock Creek watershed to the east. Since the Southern Lake Scugog Tributaries comprise a large drainage area flowing into Lake Scugog, maintaining a healthy watershed is important for maintaining the ecological health of the larger Lake Scugog watershed. Lake Scugog is an extremely significant

resource within the area in terms of its natural values (e.g., important habitat for wildlife), social values (e.g., vibrant history), and economic values (e.g., tourism).

The watershed is located within the jurisdiction of four municipalities: the Regional Municipality of Durham, Scugog Township, City of Oshawa, and the Municipality of Clarington (**Map 1**). Scugog Township comprises by far the largest municipal jurisdiction, with the City of Oshawa and Municipality of Clarington covering a very small portion at the southern extremity of the watershed.

The southern portion of the watershed lies within the Oak Ridges Moraine Conservation Plan planning boundary (24% of total watershed area), and within the Greenbelt Plan planning boundary (76% of total watershed area).

Osler Marsh, photo by Lou Wise



Map 1 – Southern Lake Scugog Tributaries Watershed Study Area

2.3 General Description of Watershed

The overall character of the Southern Lake Scugog Tributaries watershed is defined by the dominant land use (agriculture) and large areas of natural cover on the Oak Ridges Moraine and across the extensive wetlands of the watershed.

Intensive agriculture (crops) takes place on 44% of the land base, and non-intensive agriculture (pasture) occurs on 2.7%. The settlement patterns reflect the agrarian history of the watershed, with scattered rural and farm lots across the area (4.4% of the watershed) and a portion of the Town of Port Perry located in the northwest corner of the watershed, encompassing 1.6% of the total watershed area. While agriculture is a significant land use, there is a larger portion of the watershed, 46.8%, still in natural cover. Dominating this natural cover is the large Provincially Significant Wetland, the Osler Marsh, covering 25.6 km^2, or 31% of the total watershed. In the foreseeable future, land use within the Southern Lake Scugog Tributaries watershed is expected to stay rural and agriculture-based. Low growth rates are expected in the area, most of which will be in the Town of Port Perry. At present, further developments in Port Perry are limited by the treatment capacity of the Nonquon River Water Pollution Control Plant (Port Perry lagoons).

In the Southern Lake Scugog Tributaries watershed, the land slopes generally from south to north, toward Lake Scugog, and off the Oak Ridges Moraine (**Map 3**). The highest elevations in the watershed occur in the south-eastern section, as a result of the Oak Ridges Moraine. Most of the watershed, the central portions, is low lying with shallow slopes, and much of that area is associated with the extensive Osler Marsh. Slopes are significantly higher along the southern and eastern flanks of the watershed, with the average slope across the watershed approximately 4.4%.

A significant element of the landscape, 23.7% of the overall watershed, is the Oak Ridges Moraine, located in the southern portion of the Southern Lake Scugog Tributaries Watershed and a part of a continuous range of rolling hills extending from the Niagara Escarpment to Trenton. The Oak Ridges Moraine consists mainly of permeable sands and gravels which tend to retain and store precipitation, which is slowly released as cold, flowing surface waters into the southern parts of the Southern Lake Scugog Tributaries watershed. Within this part of the watershed, there tends to be fewer streams because the permeable sand and gravel of the moraine allows water to drain vertically into the ground, rather than along the surface. As water moves into the ground, it will reach less permeable layers, and it is along these layers where springs and headwaters for many of the watersheds flowing off the moraine can be found.

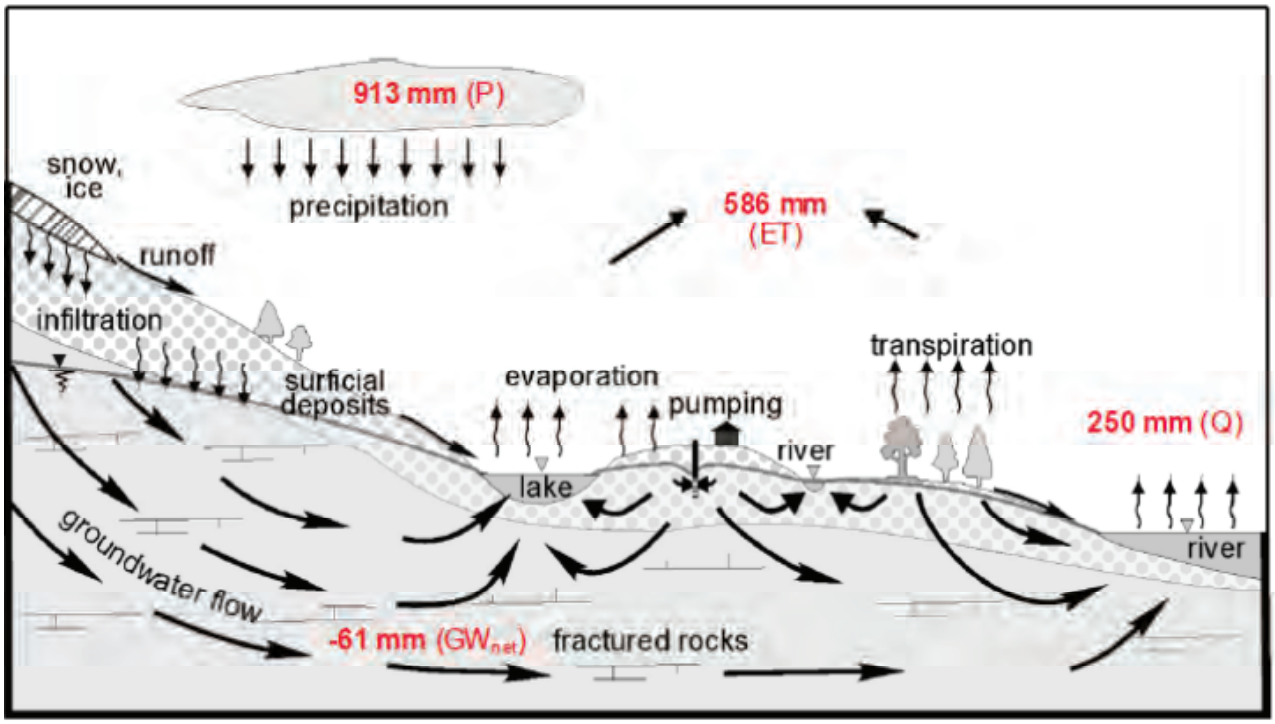
The quality and quantity of water coming from the moraine, combined with that coming from the upper reaches of the Southern Lake Scugog Tributaries are critically important to the overall health and vibrancy of the watershed's natural areas and human inhabitants. The residents of the watershed rely on wells for their domestic water, and the Town of Port Perry is serviced by a Municipal Drinking Water System that draws water from wells within the watershed. The agricultural community relies on a combination of wells and surface water, so maintenance of these water sources, and protection of ground and surface water in the rest of the watershed is an important theme throughout this plan.

Well-drained soils, or soils with a high infiltration rate (Group A) are most common in the southern portion of the Southern Lake Scugog Tributaries Watershed, especially on the Oak Ridges Moraine. Soils with moderate infiltration rates (Group B) occur throughout the majority of the watershed whereas only small pockets of soils with low infiltration rates (Group C) are evident. Soils with very low

infiltration rates (Group D) exist along the valleys and in the low-lying areas in the central portion of the watershed, associated with the Osler Marsh (**Map 3**). In addition to soil types, measuring the amount of "impervious surfaces" in the watershed (those areas covered by roads, driveways, or buildings) helps in understanding the overall infiltration capacity of the watershed. Total impervious surface cover in this watershed is 2.2% of the total watershed area, a relatively low level which exceeds the required 10% according to the Oak Ridges Moraine Conservation Plan.

Figure 1 illustrates the hydrological cycle, showing how water moves above, on, and below the Earth's surface. The cycle involves the movement of water through evapotranspiration (ET), precipitation (P), surface runoff (Q), subsurface flow and groundwater pathways (GW_{net}). Water is evaporated from the land, vegetation and bodies of water such as lakes and rivers to the atmosphere, using the radiant energy from the sun, and is returned back in the form of rain or snow. When precipitation falls to the ground surface, it can directly enter surface water or infiltrate into the ground to replenish soil moisture. Excess water percolates to groundwater aquifers or moves downward to sites of groundwater discharge. If the rate of precipitation exceeds the rate of infiltration the result is overland flow. Water reaching streams, both by surface runoff and groundwater discharge eventually moves to a larger body of water (lake, river) where it is again evaporated to perpetuate the hydrological cycle.

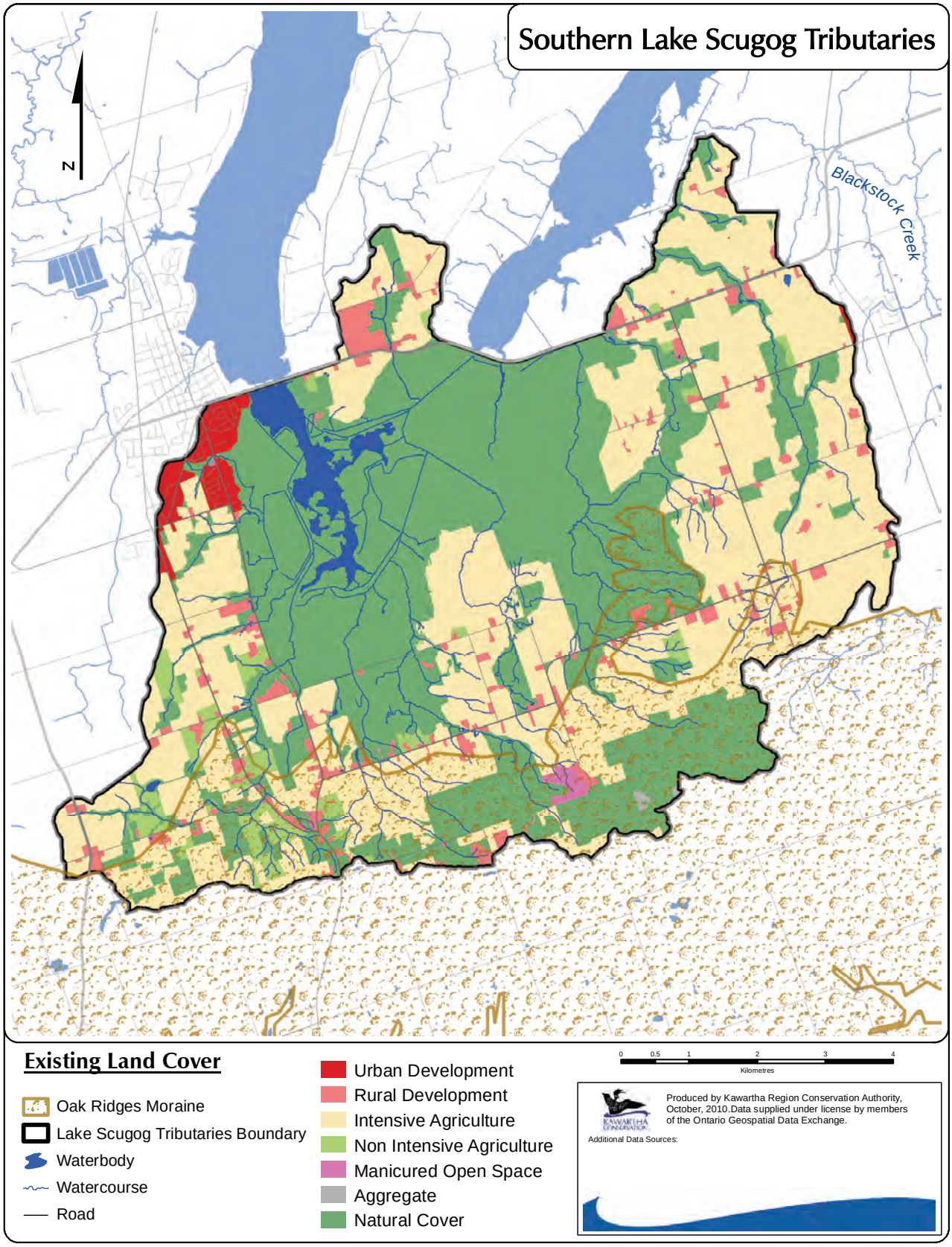
Figure 1 – Hydrological Cycle and Water Budget Components



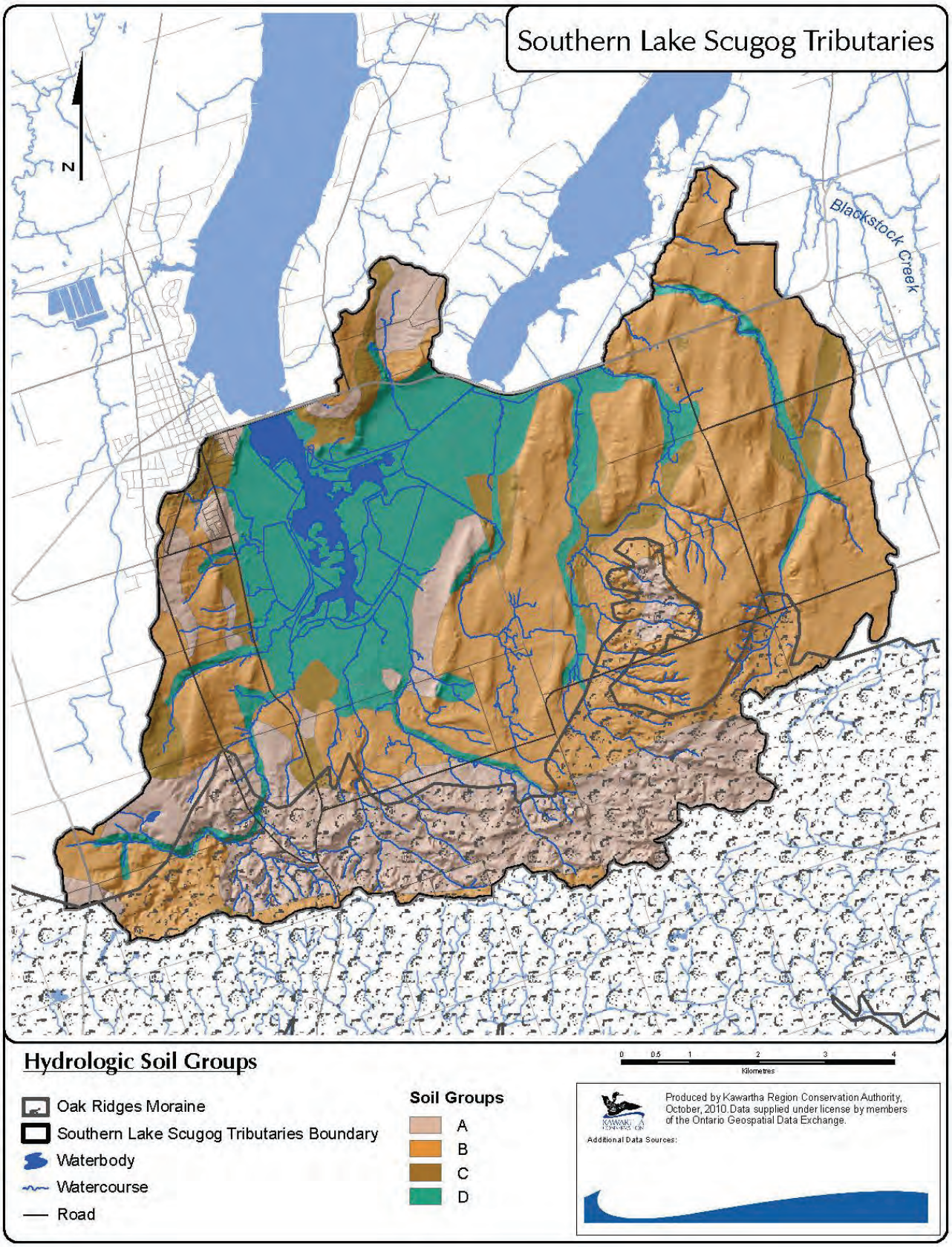
According to the water budget conducted for the Southern Lake Scugog Tributaries watershed as a part of the Characterization Report, on the average, the watershed receives 913 mm of precipitation (P). Of that total amount 586 millimeters (64%) is returned to the atmosphere through evaporation and evapotranspiration (ET), 250 millimeters (27%) leaves the watershed as stream flow (Q) and approximately 61 mm (7%) as groundwater (GW_{net}).

Today's climate in the watershed is influenced by Lake Ontario, but moderated by the presence of the Oak Ridges Moraine, a dominant feature of the topography. As a result, spring usually begins on average about one week later and fall usually begins about one week earlier within the watershed than along the shore of Lake Ontario. While this overall climate influence is not likely to change over time, climate change has the potential to broadly influence the overall picture. An unknown factor in the future condition and character of the watershed is the long term influence of climate change. Climate change is often referred to as a detectible shift in average weather conditions, as attributed to either natural or human factors. Along with increases in air temperature, climate change may also bring an increase in the frequency and variability of extreme weather events (e.g., droughts, floods, heat-waves).

Lake Scugog Tributary #4, east of Sandy Road



Map 2 - Existing Land Cover



Map 3 – Hydrologic Soil Groups

2.4 Guiding Direction and Other Initiatives

The following are the key documents that provide direction and background information for the preparation and implementation of this plan.

Oak Ridges Moraine Conservation Plan – The Oak Ridges Moraine Conservation Plan has established the requirement for this watershed plan. The purpose of the Oak Ridges Moraine Conservation Plan (ORMCP) is to provide land use and resource management direction on how to protect the Moraine's ecological and hydrological features and functions. The ORMCP requires the preparation of watershed plans along the moraine, provides direction on the content of these plans, and further requires the integration of watershed management planning and municipal land use planning.

> *24.(1) Every upper-tier municipality and single-tier municipality shall, on or before April 22, 2003, begin preparing a watershed plan, in accordance with subsection (3), for every watershed whose streams originate within the municipality's area of jurisdiction.*
> *(2) The objectives and requirements of each watershed plan shall be incorporated into the municipality's official plan.*
> *(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 use 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 subject matter, such as environmental management plans;*
> *(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 and water quality and quantity, hydrological features and hydrological functions.*

The *Oak Ridges Moraine Conservation Act* and subsequent Conservation Plan (OMMAH 2002) also direct land use within the Southern Lake Scugog Tributaries watershed (**Map 4**). The Act provides land use requirements based on four land designations and provides land use and resource management planning direction to protect the Moraine's ecological and hydrological features and functions.

Greenbelt Plan – The Greenbelt Plan, established under the *Greenbelt Act,* established a broad provincial level planning context to nearly half of the area of the Southern Lake Scugog Tributaries watershed. Similar to the Oak Ridges Moraine Conservation Plan, the *Greenbelt Act* and subsequent Plan provide more restrictive land use conditions within designated areas including Natural Heritage System, Protected Countryside and Settlement Areas (**Map 4**). The Greenbelt Planning area encompasses 62.3 km^2 (76.3%) of the entire watershed. Within the Greenbelt lands in the watershed, 36 km^2 is Natural Heritage System, and 26.3 km^2 is Protected Countryside.

Municipal Official Plans – There are four municipalities in the Southern Lake Scugog Tributaries watershed that have official plans. These include the Regional Municipality of Durham, Scugog Township, City of Oshawa, and the Municipality of Clarington. The upper tier Regional Municipality of Durham jurisdiction covers 81.6km^2 or 100% of the Southern Lake Scugog Tributaries watershed, which includes the lower tier municipalities of Township of Scugog (80.1km^2), City of Oshawa (1.4km^2) and the Municipality of Clarington (<0.1km^2). All official plans have some element that speaks to protecting natural environments and water related resources. Official plans will require review and revisions to incorporate the objectives and implement specific actions recommended by this watershed plan.

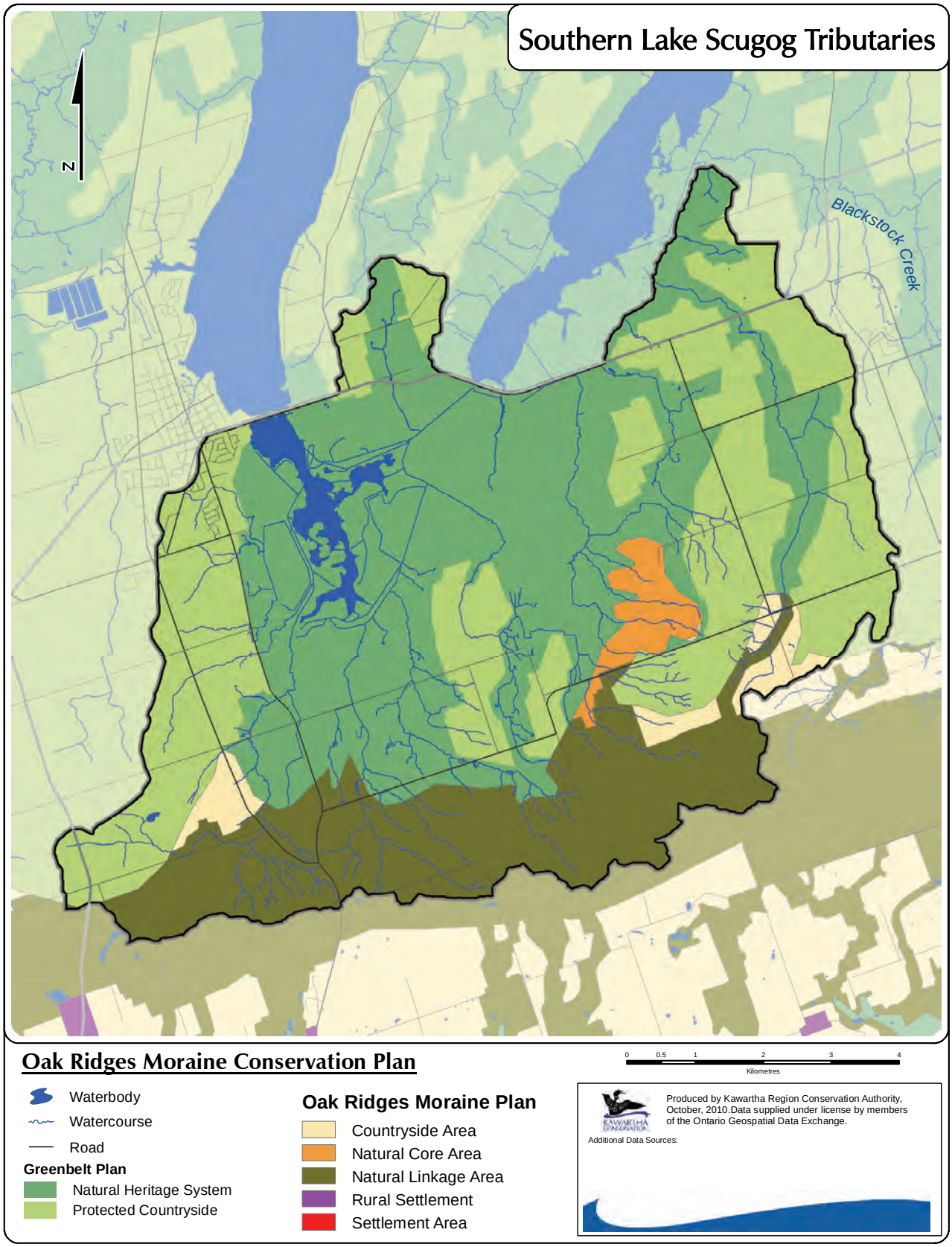
Southern Lake Scugog Tributaries Watershed Characterization Report presents current information with respect to watershed resources, functions and linkages, key management issues and information gaps (Kawartha Conservation 2011). In characterizing the Southern Lake Scugog Tributaries watershed, Kawartha Conservation has drawn upon all available data, studies and sampling results and combined this information into a report that can be reviewed and updated as required. This "background" information has helped to inform management decisions and recommendations that were developed through the planning process for the Southern Lake Scugog Tributaries Watershed Management Plan.

Lake Scugog Environmental Management Plan – The primary goal of the LSEMP is to ensure the long-term environmental and social sustainability of Lake Scugog and its resources by achieving the following objectives:

1. Protect and improve water quality in the lake and its tributaries.
2. Maintain healthy aquatic and terrestrial ecosystems within the watershed.
3. Improve the aesthetic values of the lake and enhance opportunities for public enjoyment within the lake's natural surroundings.
4. Foster community understanding of the lake and an appreciation of the lake's natural and historic heritage.
5. Promote environmentally sustainable use of the lake.
6. Maintain ongoing monitoring and research.

The Implementation Plan actions are designed to cover all aspects of human activities and are grouped under six strategies: Watershed Planning, Regulation and Enforcement Strategy, Communications and Education Strategy, Stewardship Strategy, Agricultural Land Use Strategy, Urban Land Use Strategy, and Monitoring and Scientific Studies Strategy (Kawartha Conservation 2010). These actions are guided by a steering committee comprised of provincial and federal governmental agencies, municipalities and representatives from local volunteer organizations, with a target of reducing phosphorus input by 25%.

Ontario Drinking Water Source Protection Planning – In 2005, the province of Ontario introduced the *Clean Water Act*. This purpose of this Act is to protect drinking water at the source, which typically includes surface water and groundwater municipal drinking water systems. A key component of this legislation is the requirement for the development of local and science-based Source Water Protection Plans. The Southern Lake Scugog Tributaries Watershed exists within the Kawartha-Haliburton Source Protection Area, which is part of the larger Trent Conservation Coalition Source Protection Region. Various studies and reports developed through this planning process provide background information on watershed resources, especially within the context of protecting water quality in municipal drinking water systems (in this watershed, the Port Perry municipal wells). These data are summarized in the Kawartha Conservation Watershed Characterization Report (Kawartha Conservation 2008) and the Proposed Assessment Report (TCCSPC 2010). Source Water Protection Plans are expected to be finalized in 2012.



Map 4 – Oak Ridges Moraine and Greenbelt Designations

2.5 Watershed Plan Development Process

Planning Steps and Process – The approach in preparing the Southern Lake Scugog Tributaries Watershed Management Plan is based on guidance provided in the Oak Ridges Moraine Conservation Plan Technical Paper 9 – Watershed Plans (Province of Ontario 2007). This approach is based on proven best management practices and lessons learned from similar watershed management projects in Ontario.

Figure 2 illustrates the four phases of watershed management, and the eight steps involved in watershed planning (Conservation Ontario 2003). The "trigger" for this plan is the Oak Ridges Moraine Conservation Plan, as explained previously in Chapter 2. In the case of this plan (and the three other watershed plans in preparation), the following planning steps were undertaken:

Steps 1 and 2 - "Scoping" and "Characterizing the System" were completed from 2007 through 2011, and documented in the Southern Lake Scugog Tributaries Watershed Characterization Report (Kawartha Conservation 2011 Draft).

The Southern Lake Scugog Tributaries Watershed Characterization Report presents current information with respect to watershed resources, functions and linkages, key management issues and information gaps. In characterizing the watershed, Kawartha Conservation has drawn upon all available data, studies and sampling results and combined this information into a report that can be reviewed and updated as required.

The purpose of this step was to identify, analyze, and evaluate all available and relevant information with respect to watershed resources, functions and linkages, key management issues and information gaps. This "background" information, compiled primarily by specialist staff of Kawartha Conservation, helped to inform management decisions and recommendations that were developed through the planning process.

Steps 3 and 4 - "Set Goals Objectives and Working Targets" and "Develop Management Alternatives" were initiated in December 2010, and were developed on the basis of the material collected in Step 2, through consultation with the general public, and detailed review and input from members of the Technical Review Committee (TRC). The preliminary draft of this material was presented in a draft Watershed Plan, which was subjected to further public and TRC review and comment before being finalized.

Steps 5, 6, and 7 - "Evaluate Management Alternatives" "Select Preferred Management Alternative" and "Finalize Targets" were completed during the summer of 2011.

Step 8 - "Develop Implementation and Monitoring Plans" sets out the actions deemed appropriate to meet the plan's goals and objectives, and to monitor the plan's effectiveness over time and are found in Chapters 4 and 5 of this plan.

Consultation Process – Public consultation on the watershed plan is taking place in two stages. The first stage, in July, 2011 consisted of two open houses, where the public could view, and discuss with Kawartha Conservation staff, the four watershed plans in progress. These took place July 20th in Nestleton, and July 21st in Greenbank. Summaries of these consultations can be found in **Appendix A.**

The second stage took place in the fall of 2011. This consisted of targeted consultation sessions with key stakeholders (e.g., agricultural, environmental, agency, and other), as well as broader public consultation sessions through two additional public information sessions in Nestleton (November 3rd), and Greenbank (November 2nd). Summaries of these consultations can be found in **Appendix B and C**.

In addition, a Technical Review Committee (TRC) has been in place throughout the development of the Southern Lake Scugog Tributaries Watershed Management Plan. Ten agencies (municipal, provincial, and federal) have met on a regular basis to shape the overall content and direction of the plan, and to provide input and reviews of draft material as it was developed.

Futhermore, this plan was presented and subsequently endorsed by Kawartha Conservation's Board of Directors (February 2012) as well as by Durham Region Planning Committee (March 2012).

Southern Lake Scugog Tributary #6, south of Church Street

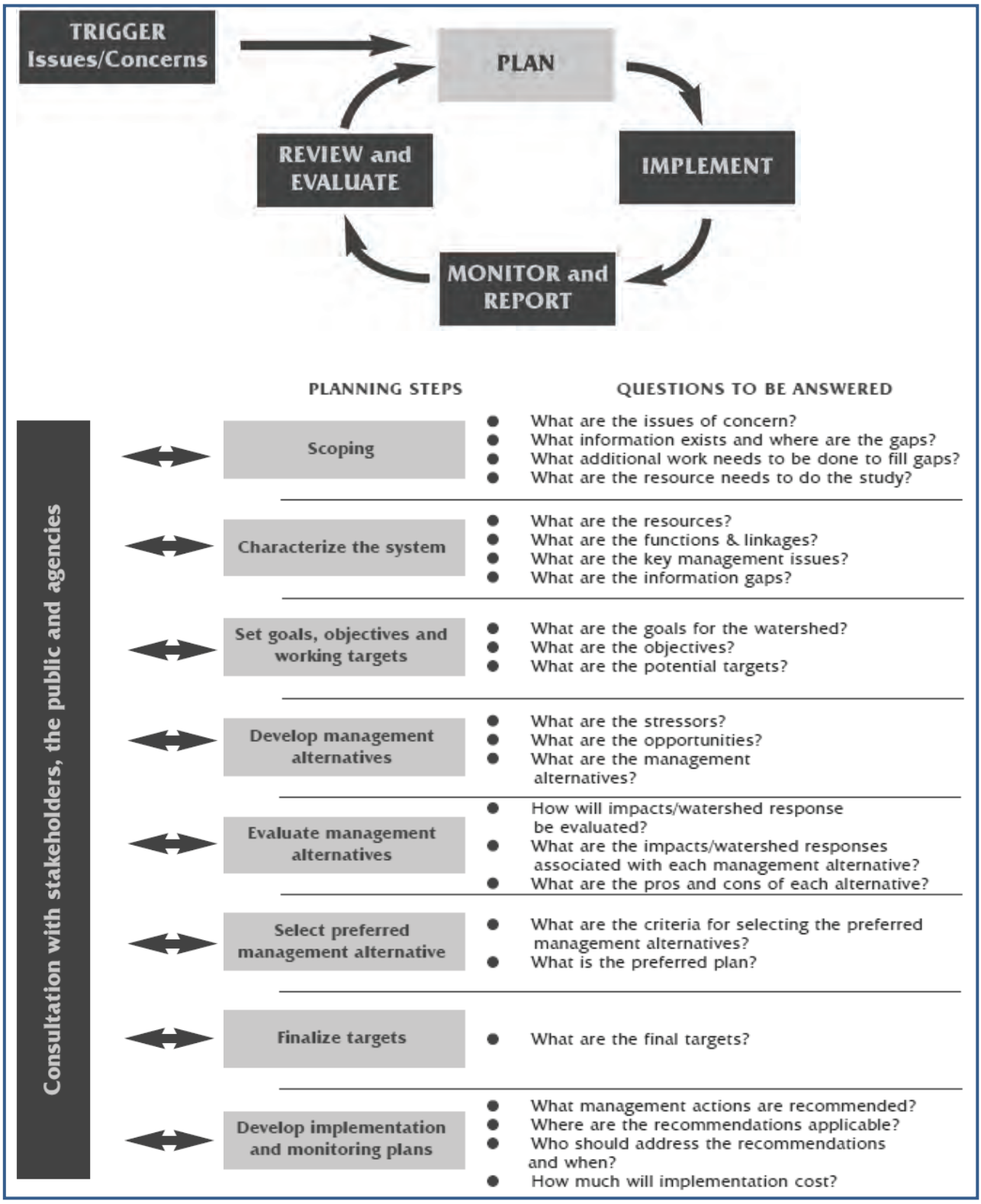


Figure 2 – Key Stages of the Watershed Planning Process

Source - Conservation Ontario (2003)

3.0 Management Goals, Objectives and Targets

The following vision statement describes a picture of what the watershed will be in the future and provides a focus for everyone on the purpose of the watershed plan. The vision is an inspirational statement that reflects the core values of everyone involved, aligns people, prioritizes our actions and helps to assess our progress.

Our vision for the Southern Lake Scugog Tributaries watershed is…

> *"A watershed where its water and associated natural and cultural features are of the highest quality to provide overall ecological integrity and to serve human use."*

The overall health of the Southern Lake Scugog Tributaries watershed is dependent on maintaining and restoring the health of the many natural elements that are found within the watershed. The natural elements include groundwater quantity and quality, surface water quantity and quality, aquatic and terrestrial resources. By ensuring the long term health of these six natural elements we are also ensuring that we have healthy communities.

The ecological condition of the watershed has an important influence on the health and well-being of the people who live, work, or play in the watershed. Communities and individuals will benefit from clean water, opportunities for outdoor recreation, and a better understanding of the heritage of their community or watershed. The Southern Lake Scugog Tributaries watershed is valued for outdoor recreation by those who live in and near the watershed. It also provides, in association with Lake Scugog, a strong tourism draw to the area, adding important benefits to the local economy.

In order to plan for the future and implement priority actions to protect and restore resources, a series of goals and objectives have been identified for each of the six key watershed elements. A goal is a generic statement that further defines a longer term end result and can be used to define the purpose of an objective or management action. An objective is a shorter term specific action of what we need to do to fulfill the goal. Combined, these statements provide direction that will help to focus our management actions in a direction that fulfills the vision.

The natural features and functions of these individual elements are often integrated and the health of one can be dependent on the health of others. For example, it is important to maintain the quality and quantity of ground water so that there is a continual supply of clean water to feed surface waters such as streams and rivers. Abundant and healthy water in our streams and rivers will ensure healthy aquatic resources, such as fish and benthic macroinvertebrates, and healthy terrestrial resources such as forests and wildlife. Healthy and abundant ground and surface water, and healthy aquatic and terrestrial resources will help to ensure that we have healthy communities. By protecting and restoring all of these individual elements the overall health of the entire watershed and the community will be ensured.

Table 1 provides a list of the goals and objectives for each of six watershed elements. The following subsections describe the general status of each element and the information gaps and issues that need to be addressed. Targets for each goal are provided to help measure and monitor the actions to be taken to fulfill the goals and objectives of each element (Chapter 5). When targets are not met, the

"review and evaluate" part of the planning process is applied (**Figure 2**), and alternative approaches may be chosen to ensure the vision and goal are attained (refer to the Southern Lake Scugog Tributaries Watershed Characterization Report for detailed descriptions of the watershed elements).

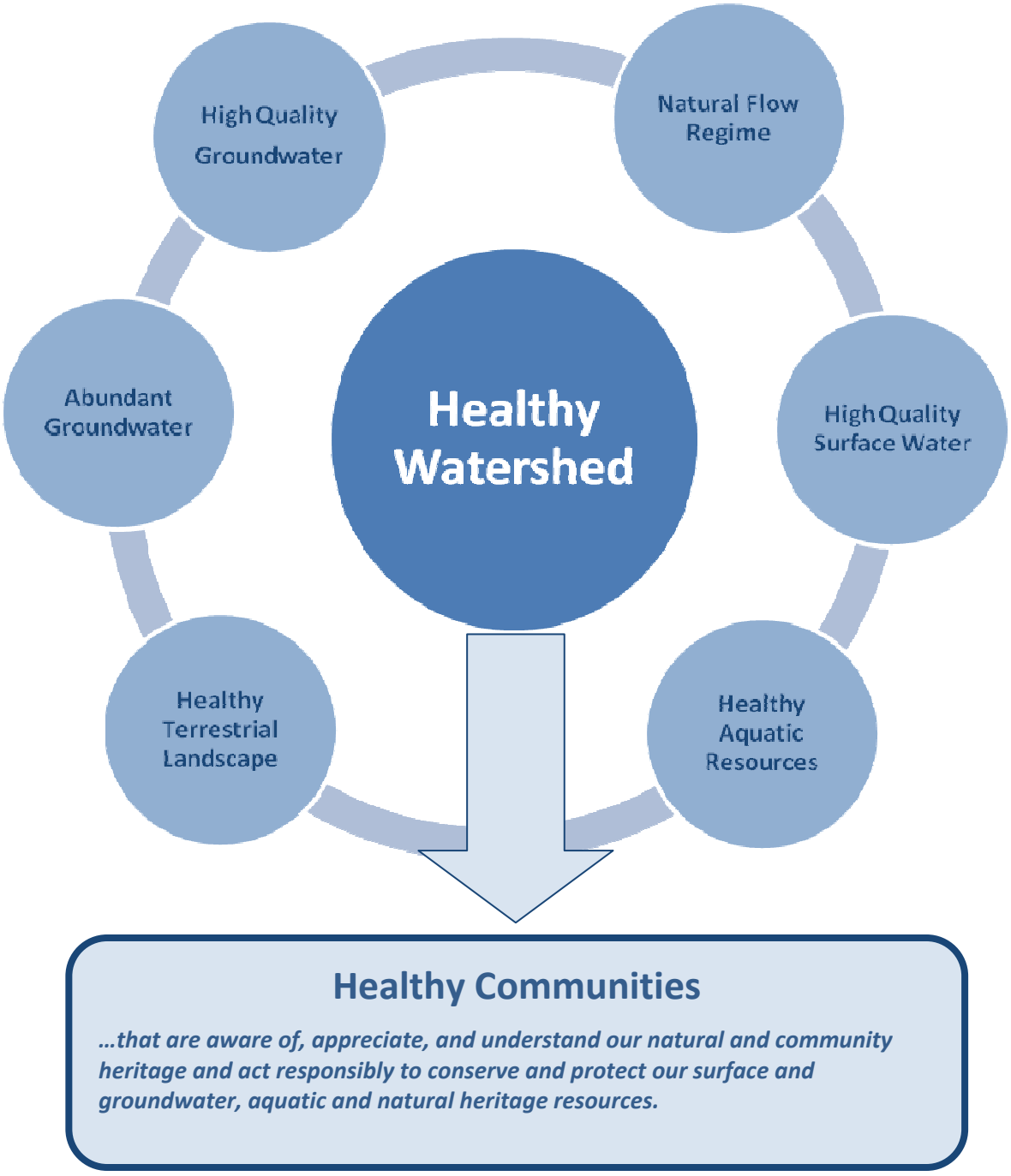


Figure 3 - Six Elements of Watershed Health

Table 1 - Watershed Goals and Objectives

Goals	Objectives
Abundant Groundwater (Quantity)	
▪ that provides a continuous supply of baseflow to streams; and, ▪ that provides sustainable commercial and residential use opportunities.	✓ Maintain natural groundwater flow conditions
High Quality Groundwater	
▪ that provides safe drinking water; and, ▪ that provides clean water to streams to maintain ecological functions.	✓ Protect groundwater from contamination
Natural Flow Regime (Surface Water Quantity)	
▪ that supports healthy aquatic resources; ▪ that reduces risk to human life and property; and, ▪ that provides sustainable commercial, residential and recreational use opportunities.	✓ Maintain surface water flow conditions ✓ Protect people from natural hazards
High Quality Surface Water	
▪ that supports healthy aquatic resources; ▪ that provides sustainable commercial, residential and recreational use opportunities; and, ▪ that contributes to the health of Lake Scugog.	✓ Protect surface waters from contamination ✓ Enhance the quality of urban runoff ✓ Enhance the quality of agricultural runoff
Healthy Aquatic Resources	
▪ that support productive aquatic habitats, species and communities; and, ▪ that provide sustainable commercial and recreational opportunities.	✓ Maintain native aquatic species and communities ✓ Enhance in-stream and riparian habitat conditions
Healthy Terrestrial Landscape	
▪ that contributes to a functioning natural heritage system; and, ▪ that provides sustainable commercial, residential and recreational use opportunities.	✓ Enhance and maintain natural cover across the landscape ✓ Maintain native species and communities

3.1 Groundwater Quantity

GOAL: Abundant Groundwater

- *that provides a continuous supply of baseflow to streams; and,*
- *that provides sustainable commercial and residential use opportunities.*

The health of our surface water, aquatic resources and of our communities are directly related to an abundant source of groundwater. The information presented in this section is taken from Chapter 6 of the Southern Lake Scugog Tributaries Watershed Characterization Report and the executive summary of a report prepared by GENIVAR (2011) which was completed for Kawartha Conservation to characterize groundwater resources within the Southern Lake Scugog Tributaries watershed, and three other watersheds that require watershed plans.

Groundwater is found in aquifers underground, and ensuring an adequate and sustained quantity of groundwater is especially important in the watershed. To ensure a reliable supply of groundwater, aquifers require regular "recharge" from precipitation which drains through overlying soils and rock. Accordingly, parts of the watershed, including the Oak Ridges Moraine, have been identified as "Significant Recharge Areas" which are areas where the soil layer allows water to infiltrate easily and replenish the aquifer (**Map 5**). These significant recharge areas require long term protection from land uses and activities that would remove natural cover, harden the ground surface (roads, buildings, and other paved surfaces such as parking lots), and reduce the potential for water to filter through to the groundwater below.

Groundwater is the dominant source of municipal and private water supply. The majority of residents within the watershed obtain their water from private, individual groundwater wells. There are approximately 275 wells within the watershed that extract an estimated total amount of 275,000 litres per day. The community of Port Perry (located mainly outside the watershed) is serviced by municipal groundwater wells within a subwatershed (Tributary 1) of the Southern Lake Scugog Tributaries watershed. The total amount of water permitted for extraction from these wells is 9,164,000 litres per day. Water withdrawn for the Port Perry water supply is removed from the watershed, since it is discharged to the Nonquon River after use and subsequent treatment. The Regional Municipality of Durham currently is pursuing options for additional water supply for future servicing of Port Perry. There is an ongoing Class Environmental Assessment process underway that will examine alternatives and devise options to provide additional water capacity for Port Perry.

In addition to its importance for residential, business and agricultural use, maintaining good quantities of groundwater flow (or groundwater discharge, via springs and seepage) provides an important ecological function by replenishing streams and rivers with high quality, cool water. The watershed does not contain significant areas of groundwater discharge. Dry reaches have been observed throughout the watershed, especially in its western portion, adjacent to the Osler Marsh.

There are 2 active Permits to Take Water (issued by the Ministry of the Environment) in the watershed. One of these is allocated for groundwater extraction (for the municipal water supply system) and the other is allocated for surface water extraction for commercial purposes.

Water withdrawals of less than 50,000 l/day and withdrawals for agricultural use are not required to be reported, and as such do not get considered in the calculation of overall water use in the watershed.

The total estimated water taking for the watershed is 2,942,000 litres per day. This estimate considers the Permitted Water Taking rate for Permits issued plus the estimated private well taking. The total permitted groundwater taking is approximately 27% of the estimated recharge to the groundwater. This groundwater withdrawn for the Port Perry water supply is removed from the watershed, as it is discharged to the Nonquon River after use and subsequent treatment. The groundwater withdrawn from private wells is low, estimated at 0.5% of total available groundwater resources. In addition, it is considered to be a non-consumptive use, as it will ultimately be returned to the surface/groundwater system. According to the water budget conducted for the Southern Lake Scugog Tributaries Watershed, there is a deficit in water budget during the months of March, April, June, July and August, and a surplus of water that accumulates in the watershed during other months of the year (**Figure 4**). The components of the water budget include: evapotranspiration (ET), precipitation (P), surface runoff (Q), subsurface flow and groundwater pathways (GW_{net}), and change in storage (ΔS).

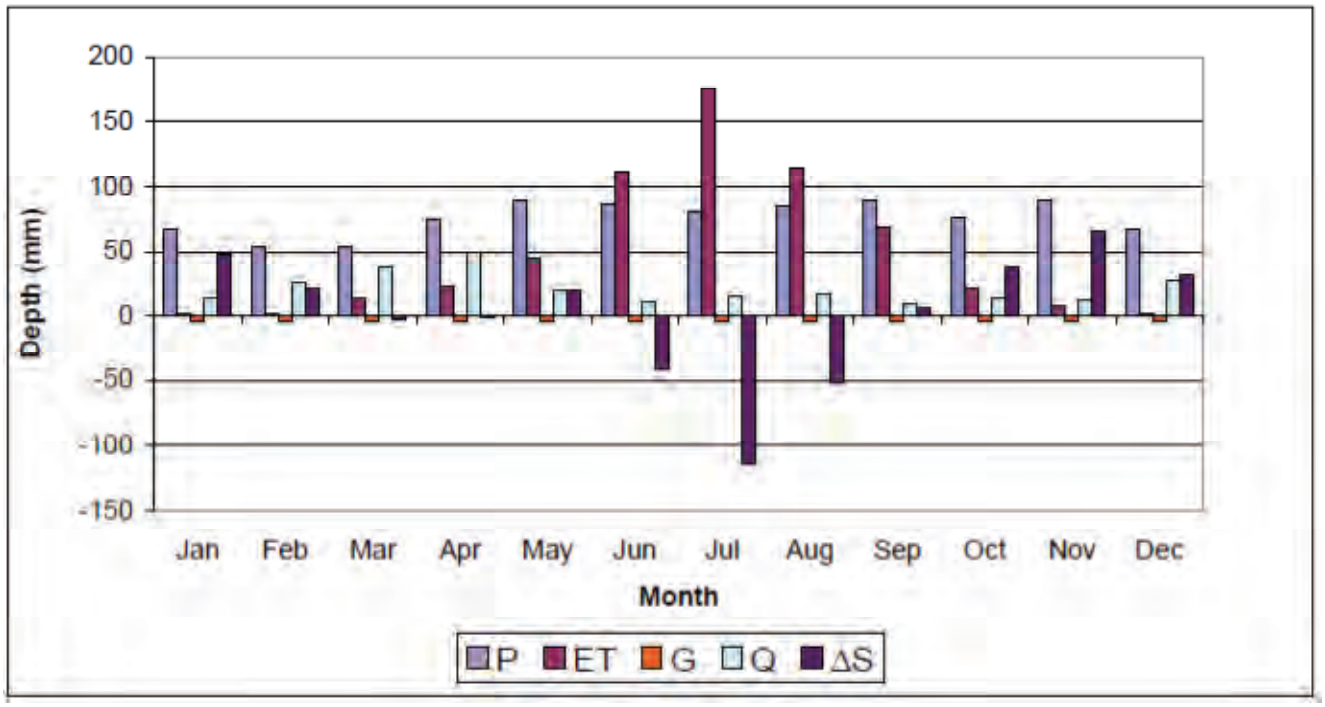


Figure 4 - Monthly Water Budget Components

OBJECTIVE: Maintain natural groundwater flow conditions

Targets:

i. *Protection of significant/sensitive groundwater recharge areas.*
ii. *Maintenance of groundwater discharge into surface waters.*
iii. *Maintenance of groundwater levels.*

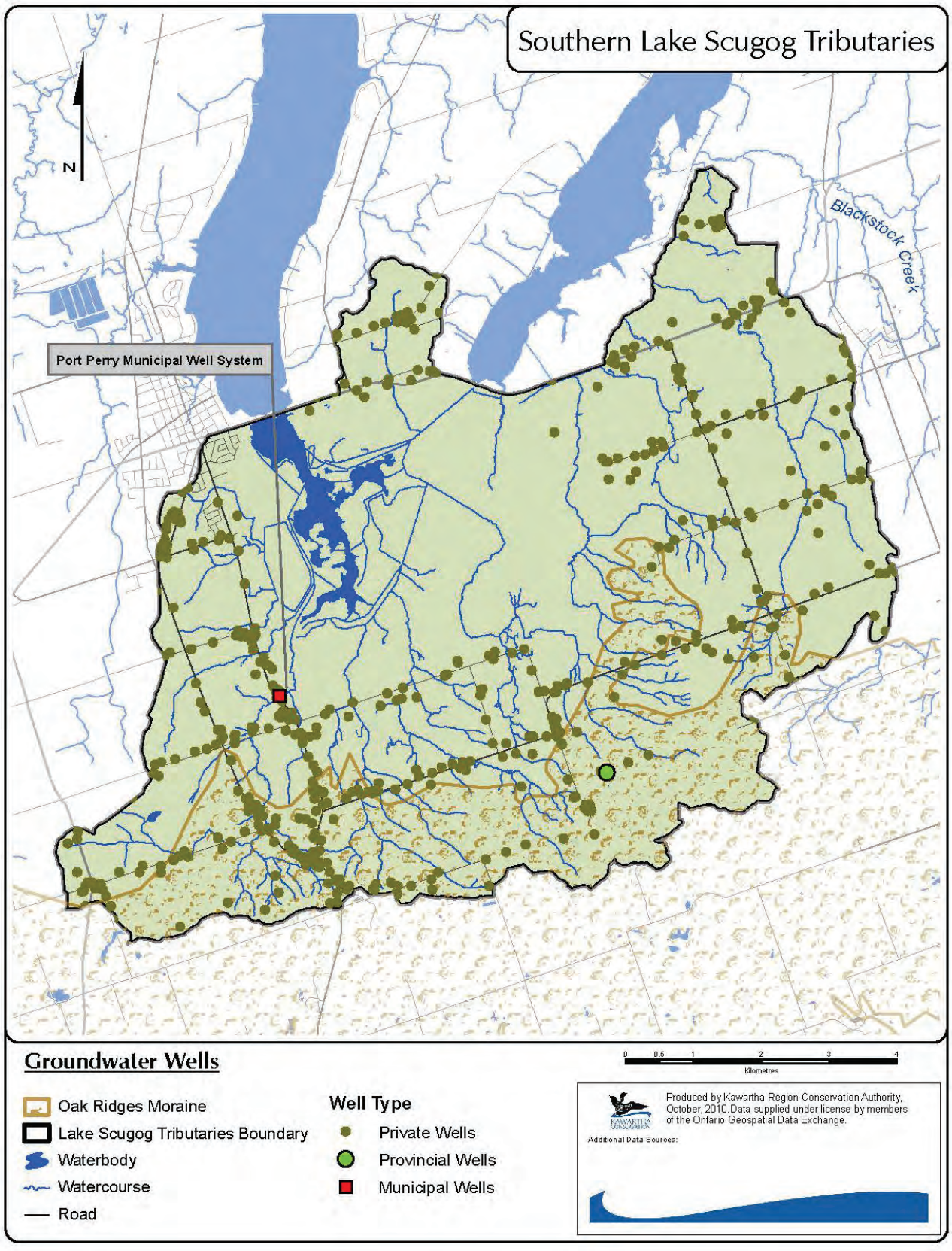
Issues:

- Significant recharge areas require long term protection from land uses and activities that would remove natural cover, harden the ground surface (roads, buildings, and other paved surfaces such as parking lots), and reduce the potential for water to filter through to the groundwater below.
- Information is limited or not complete in two key areas: the number and location of private wells; and the amount of water drawn that does not require reporting, namely for agricultural use and/or for withdrawals of less than 50,000 litres/day. It is difficult to precisely quantify the amount of water that is being withdrawn from groundwater and surface water sources other than those requiring reporting.
- The removal of water from aquifers, particularly for the Port Perry water supply, could result in a reduction to either the discharge to streams, wetlands, and Lake Scugog. Although it should be noted that the observed (actual) groundwater taking for the municipal water supply is around 8% of the estimated total groundwater recharge, compared to the 27% figure if the maximum permitted (by the Permit to Take Water) groundwater was withdrawn. There is also a potential new municipal well to be located within the watershed to service Port Perry's needs. The ongoing Environmental Assessment process will examine alternative approaches to servicing Port Perry while maintaining the hydrological integrity of the watershed.

Implementation Approaches:

To effectively address this objective, it will be important to improve the existing information base related to groundwater, including better information on existing water usage (private wells, and water taking without permits). The effects on the groundwater system from the current and future municipal wells must be carefully assessed to assure minimal negative impacts on groundwater discharge to streams, wetlands, and Lake Scugog. Official Plan policies should be updated to protect significant recharge areas from new development, and there should be continued support for the work of Durham Region and its general education and awareness program for property owners throughout the watershed (agricultural, commercial, residential and new home owners).

Map 5 – Significant Groundwater Recharge Areas



Map 6 – Groundwater Wells

3.2 Groundwater Quality

GOAL - High Quality Groundwater

- *that provides safe drinking water; and,*
- *that provides clean water to streams to maintain ecological functions.*

High quality groundwater is necessary to ensure safe drinking water and to provide clean water to aquatic and terrestrial resources for the maintenance of ecological functions. Groundwater quality assessment within the watershed is based on regular sampling from the Port Perry municipal wells and from the Provincial Groundwater Monitoring Network (PGMN) well W387 located east of Russell Road at Byers Road (**Map 6**). The information presented in this section is taken from Chapter 7 of the Southern Lake Scugog Tributaries Watershed Characterization Report.

Groundwater quality in the Southern Lake Scugog Tributaries Watershed are clean, pure and have a good to excellent water quality. All analyzed parameters are below the PWQO (Provincial Water Quality Objectives). Only one sample has indicated presence of E. coli from any well.

The Ontario Source Water Protection program is improving the overall information base for municipal water sources in the watershed, and a set of local policies to protect these water sources is being developed as a part of the Kawartha-Haliburton Source Water Protection Plan (to be completed 2012). This comprehensive planning work will assure a high level of vigilance and protection for the municipal water system that serves Port Perry.

To keep groundwater of high quality requires vigilance and good long term data. Potential contaminant sources (such as poor manure or chemical storage, leaching from landfill sites) must be kept to a minimum, and the pathways for contaminants to enter groundwater (such as abandoned wells) must be known and dealt with.

OBJECTIVE: Protect groundwater from contamination

Targets:

i. *Elimination of abandoned and poorly maintained wells.*
ii. *Protection of significant/sensitive groundwater recharge areas and highly vulnerable aquifers.*
iii. *Groundwater chemistry that meets Provincial Drinking Water Quality Standards.*
iv. *Reduction in nitrogen concentrations in shallow aquifers.*

Issues:

- Although the groundwater monitoring results show good water quality, it is important to recognize that sampled wells represent a limited number of aquifers in only two locations of the study area (the municipal wells and the provincial groundwater monitoring well). While there is no reason to believe there are any problems with the overall water quality from the private wells of the watershed, there is only limited information on which to draw that conclusion.

- Information on potential sources of contamination to the watershed's groundwater is also very limited. The location and number of abandoned or degraded wells (pathways for contamination) and faulty septic systems are not known.
- Concerns have been raised with the health of Oak Ridges Moraine resources stemming from a number of commercial fill operations, in relation to contamination and the need to protect surface and groundwater supplies. Currently, they are being dealt with on a case-by-case basis, led locally by municipalities in support of the Ontario Ministry of Environment. Concerns have been raised about the lack of a specific regulatory framework. While there are no specific issues in the watershed at this time, with the development being proposed in the Greater Toronto Area and the shortage of fill placement sites, this may be a watershed-based issues in the future.

Implementation Approaches:

Continue to monitor water quality in groundwater monitoring and municipal wells to build a more reliable database over time. There should be a general education and awareness program for property owners throughout the watershed (agricultural, commercial, residential and new home owners) about well and septic system care and maintenance. The education and awareness program should include specific information on abandoned wells, their role as pathways for contamination, and what to do if you have one.

3.3 Surface Water Quantity

GOAL: A Natural Flow Regime

- *that supports healthy aquatic resources;*
- *that reduces risk to human life and property; and,*
- *that provides sustainable commercial, residential and recreational use opportunities.*

Maintaining the natural flow regime in our streams and rivers will help to support healthy aquatic resources, reduce risk to human life and property and provide sustainable commercial, residential and recreational use opportunities. The South Lake Scugog Tributaries planning area is composed of subwatersheds of seven main tributaries, with a drainage area of 81.6km^2, and approximately 171km of watercourses. The tributaries' catchment areas are small, ranging from 4.53 to 12.47 km^2. Watercourses that drain them are short and steep, with the gradients of their main channels ranging from 7.4 to 15.7m/km.

The northern part of the watershed is a complex hydrological system that includes an artificial water divide in the form of a causeway, wetlands and wetland complexes, and a system of man-made drainage canals in addition to natural watercourses. Based on the existing data, the Southern Lake Scugog Tributaries watershed exhibits a relatively undisturbed, natural water flow regime, with well-defined seasonal flow patterns, and no recorded flooding. Current levels of human water use of surface water are considered not to be a threat in the overall water budget calculation. The information presented in this section is taken from Chapter 6 of the Southern Lake Scugog Tributaries Watershed Characterization Report.

The large wetland areas in the watershed, located at the downstream portion adjacent to Lake Scugog, provide significant benefits to the overall system by mitigating peak flow and providing flood storage as well as assisting in improving water quality by sediment trapping, nutrient retention and removal.

In addition to the inputs from precipitation, streams rely on the discharge of groundwater to replenish and "recharge" their waters. The watershed does not contain significant areas of groundwater discharge. The eastern portion supports medium rates of groundwater discharge, below 10L/sec/km^2 and the central portion is characterized by low volumes of baseflow, no more than 2L/sec/km^2 Dry reaches have been observed throughout the watershed, especially in its western portion, adjacent to the Osler Marsh. It indicates lack of baseflow (groundwater discharge) in the watercourses.

To this date there are no records of existing flood prone areas within the Southern Lake Scugog Tributaries watershed. However, several sites throughout the watershed may be considered potential locations for high water situations such as roads overtopping and erosion.

Water levels and flows are important determinants of the ecological viability and sustainable human use of the watershed. Without a consistent and reliable quantity of water flowing through the streams and wetlands of the watershed, all aquatic life and most terrestrial life would suffer. Regular monitoring is done through the use of a single monitoring gauge on Tributary 6 that continuously measure flows (**Map 7**). Changes in flow conditions may reflect changes in climate (precipitation, evapotranspiration), water removals, land use or natural cover. Water level monitoring data also provide information for flood forecasting and warning. In recent years, winter thaws that occur in December-February, accompanied

by abundant rain, are resulting in high water levels that are comparable to those of the spring freshet on a number of occasions (example, December 2007).

Climate change as it is forecasted has the potential to impact the flow regime of the Southern Lake Scugog Tributaries watershed and its tributaries, by reducing the duration and intensity of spring runoff and increasing potential for dry conditions and extreme high flow events during the summer. Careful long term monitoring is necessary to determine and apply appropriate mitigation as needed.

OBJECTIVE: Maintain surface water flow conditions

Target:

i. *Maintenance and enhancement of flow regime in watercourses.*

Issues

- Additional base flow studies are required to verify existing data and findings. Since the gauge station has a recording length of only three years, the conclusions derived from these data should be treated as strictly preliminary.
- There are no baseflow data for six of the seven tributaries; this is considered a significant information gap.
- Long-term weather data sets are required to enhance ability to forecast trends.

Implementation Approaches

Continued monitoring of gauge stations and establishing additional stations where possible, will, over time, build a more reliable data set.

OBJECTIVE: Protect people from natural hazards

Targets:

i. *Reduction in flooding risks.*
ii. *Reduction in erosion risks.*

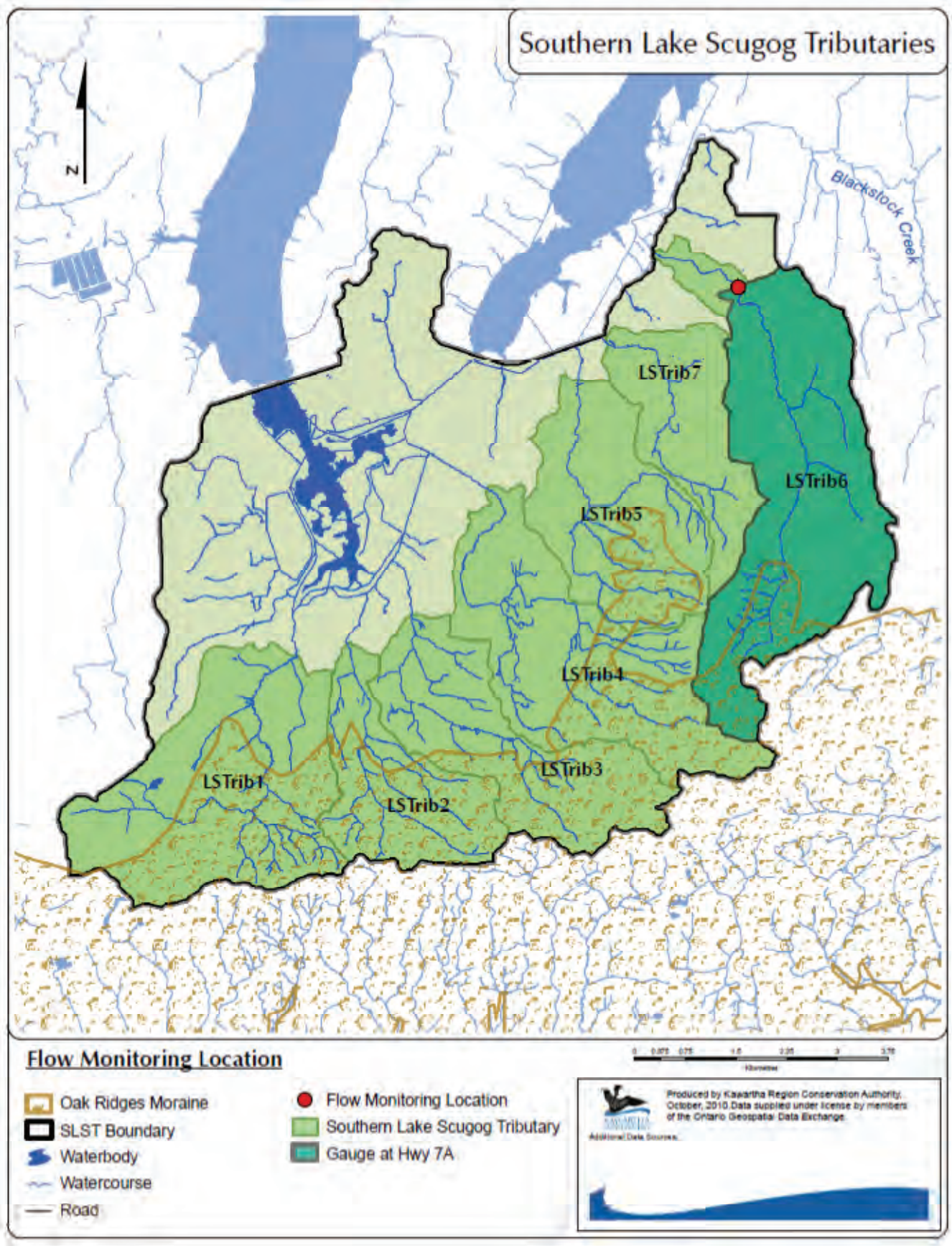
Issues:

- Some aspects of land use change, such as increasing of impervious surfaces, urban development and agricultural practices may influence the quantity of both surface and groundwater resources.
- Floodplain mapping is not available for the watershed.

Implementation Approaches:

Floodplain mapping should be prepared in priority areas across the watershed and official plans should be updated, if necessary. Education and awareness programs should be developed that address best management practices related to residential and agricultural runoff and erosion prevention.

Lake Scugog Tributary #1, north of Scugog Line 3



Map 7 – Surface Water Flow Monitoring Stations

3.4 Surface Water Quality

GOAL: High Quality Surface Water

- *that supports healthy aquatic resources;*
- *that provides sustainable commercial, residential and recreational use opportunities; and,*
- *that contributes to the health of Lake Scugog.*

High quality surface water (streams, rivers, ponds and lakes) supports healthy aquatic resources, provides sustainable commercial, residential and recreational use opportunities and, contributes to the health of the Lake Scugog watershed. Good water quality in the rivers and streams of the watershed is a key element in achieving the objectives of any watershed management plan, and clearly benefits human use and ecological function. The information presented in this section is taken from Chapter 7 of the Southern Lake Scugog Tributaries Watershed Characterization Report.

A considerable portion of the Southern Lake Scugog Tributaries study has elevated total phosphorous levels caused by human activities in the watershed. All but one of the five monitoring stations have recorded average total phosphorus concentrations well over the PWQO of 0.030 mg/L (**Map 8**) Only station SC6A, located in the headwater portion of Tributary #6, has average phosphorus concentrations that do not exceed 0.30 mg/L. Phosphorus levels almost doubled in water of this creek downstream at station #6A. As well, very high levels of nitrates have been detected at station SC6A, on the easternmost tributary #6. Other parameters showing levels of concern include aluminum and iron. All other parameters of interest, heavy metals in particular, have very low concentrations, far below the corresponding Provincial Water Quality Objectives (PWQOs) or Canadian Water quality Guidelines (CWQGs) and do not present any threat to aquatic life or human health.

Within the Southern Lake Scugog Tributaries watershed there are no point sources of contamination such as wastewater treatment plant effluents or industrial plant effluents. Only non-point sources exist in this watershed, so it can be concluded that the source of elevated phosphorous in the watershed can be attributed to runoff from agricultural operations and from the limited areas of urban development in the watershed. In the case of elevated nitrates, most of the nitrates are likely to originate from agricultural operations, by seeping into shallow aquifers, then being released to the streams via groundwater discharge. During the monitoring period chloride concentrations at all water quality monitoring stations in the Southern Lake Scugog Tributaries watershed were well below the recently developed CWQG for Chloride for the Protection of Aquatic Life.

Although samples taken in all the tributaries show elevated levels of phosphorous, when the water has moved through the Osler Marsh and is sampled at the marsh outlet at Hwy 7A, the levels of phosphorous have dropped significantly (by 75-80%). The Marsh acts as a natural biofilter.

To reliably assess water quality, sampling and analysis needs to take place over a long time period, and over a representative area of the watershed. As of 2010, this study area has five active monitoring stations (SC1, SC3, SC4, SC6 and SC6A) specifically established in 2006 for the purposes of the Oak Ridges Moraine Conservation Plan development (**Map 8**). Two of them are located on the same larger tributary (Tributary #6) west of Blackstock Creek. The other three monitoring stations are located on three small tributaries upstream of Osler Marsh (Tributaries 1, 3, and 4).

OBJECTIVE: Protect surface waters from contamination

Targets:

i. *Surface waters meet Federal and Provincial water quality guidelines and objectives.*
ii. *The risk of contamination from point-sources and hazardous spills is minimized.*

Issues:

- Water quality in a considerable portion of the Southern Lake Scugog Tributaries has elevated total phosphorous levels caused by human activities in the watershed.
- Elevated nitrate concentrations are a notable concern in the water of some creeks.
- The increased level of aluminum is a result of naturally-occurring materials being released into the water when soils have eroded into the streams. Elevated iron was found across the watershed, and is attributed to chemical interactions with stream sediments, which cause the release of iron from the sediment into the water.
- Sampling and analysis needs to take place over a long time period, and over a representative area of the watershed. In addition, there is minimal information on water quality during winter months.

Implementation Approaches:

Continued analysis of water quality at the existing locations, with the addition of winter sampling will, over time, provide an improved level of data on water quality. Strategies dealing with care and maintenance of septic systems, and best management practices for agriculture are needed to reduce inputs of phosphorous and nitrates. Improved erosion control in the watershed may help to reduce the levels of aluminum and iron.

OBJECTIVE: Enhance the quality of urban runoff

Targets:

i. *Phosphorus concentrations in urban stormwater runoff are reduced.*
ii. *Chloride and metal concentrations are kept at current levels or decreased.*

Issues:

- Runoff from the limited areas of development across the study area can bring with it elevated phosphorous in streams.

Implementation Approaches:

Approvals of future development in the Southern Lake Scugog Tributaries watershed should take into consideration the need for and appropriateness of stormwater management. Further monitoring and analysis of the phosphorous conditions should be undertaken to determine causal factors, and appropriate remedial action should be undertaken. There should be continued monitoring of chloride and metal concentrations in the watershed, and if there are increases from present levels, appropriate remedial action should be taken.

OBJECTIVE: Enhance the quality of agricultural runoff

Targets:

i. *Phosphorous concentrations are reduced to meet Provincial Water Quality Objectives (30 ug/L).*
ii. *Nitrogen concentrations are reduced as a result of watershed-wide implementation of Best Management Practices in agriculture.*

Issues:

- Water quality in a considerable portion of the study area has elevated total phosphorous levels caused by human activities in the watershed.
- Elevated nitrate concentrations are a notable concern in the eastern tributary (#6), especially in areas of groundwater discharge.

Implementation Approaches:

Strategies dealing with care and maintenance of septic systems, and best management practices for agriculture are needed to reduce inputs of phosphorous and nitrates.

Southern Lake Scugog Tributary #5, south of Highway 7A

Map 8 – Water Quality Monitoring Sites

3.5 Aquatic Resources

GOAL: Healthy Aquatic Resources

- *that support productive aquatic habitats, species and communities; and,*
- *that provide sustainable commercial and recreational opportunities.*

Healthy aquatic resources are dependent on the abundance and quality of ground and surface water and healthy terrestrial resources. The information presented in this section is taken from Chapter 8 of the Southern Lake Scugog Tributaries Watershed Characterization Report.

The Southern Lake Scugog Tributaries watershed supports diverse fish communities that are dominated by native species. Fish communities within the watershed are linked with Lake Scugog. The Osler Marsh is a significant spawning and nursery habitat for fish from Lake Scugog. A total of 17 fish species have been found in the watershed (**Table 2**). The distribution of warmwater fishes is widespread throughout the watershed, whereas coldwater fishes (Brook Trout and/or Mottled Sculpin) were only found in two subwatersheds within the eastern sections of the watershed. The substrates across the watershed are a mix of sand/silt and gravel.

Table 2 – List of Fish Species Caught (2007)

Rock Bass	Yellow Perch
White Sucker	Brook Trout
Brook Stickleback	Creek Chub
Brassy Minnow	Central Mudminnow
Pumpkinseed	Northern Redbelly Dace
Bluegill	Bluntnose Minnow
Northern Pearl Dace	Fathead Minnow
Largemouth Bass	Blacknose Dace
Mottled Sculpin	

No species of conservation concern (i.e., Species at Risk) or aquatic invasive species have been documented. Bluegill, although not native to the watershed, are widespread throughout the Kawartha Lakes and are now considered to be naturalized.

The diversity and natural health of fish and other aquatic species are influenced by:

- physical factors: the substrate (makeup of the stream bed), the condition of the shoreline, or riparian areas of the watercourses (**Map 9**), and barriers to the passage of fish caused by dams, weirs, perched culverts, and in-stream ponds (**Map 10**); and
- water quality, as discussed in Section 3.4: levels of nutrients, metals, chlorides, dissolved oxygen, and water temperature.

Generally, the watercourses within the Southern Lake Scugog Tributaries watershed do not meet the minimum recommended length of natural coverage of 75%. The higher order streams in the centre and northern parts of the watershed have extensive natural riparian cover, but the tributaries in the upper reaches (southern and southeastern parts of the watershed) are dominated by agricultural land, not natural cover. Riparian (shoreline) areas that are in a natural state provide multiple benefits to aquatic resources, including: stabilizing stream banks, reducing erosion, moderating water temperatures, filtering contaminants, providing cover and spawning habitat for fishes, and supplying nutrient and food sources into the watercourse.

In-stream barriers such as dams, weirs, or perched culverts (culverts that are elevated from the stream bed) often alter the natural flow regime, impede the natural movement of fish, and can, in the case of ponds, lead to higher water temperatures. **Map 10** shows the location of the 4 perched culverts and

117 potential in-stream ponds found across the Southern Lake Scugog Tributaries watershed. As well, climate change has the potential to exasperate the effects of stream temperature warming.

Water quality has already been discussed (Section 3.4) and improved water quality would be beneficial to aquatic resources, as would improvement to the temperature regimes across the watershed. Water temperature plays an important role in the overall health of aquatic ecosystems, and will determine what species exist, their rates of productivity, and their molting and movement. **Map 10** shows the locations where temperature is cold enough to support "cold water" fish, such as Brook Trout.

One of the yardsticks used to measure the ecological health of a stream is the type and amount of "benthic macroinvertebrates" present. These are the small, stream-dwelling organisms visible to the naked eye, such as crayfish, worms, spiders, beetles, mussels, snails, and fly larvae. The conditions in the Southern Lake Scugog Tributaries Watershed are less than ideal: the majority of the 13 sites examined (54%) were classified as having "fairly poor" water quality, no sites were found to have "excellent" or "very good" water quality. only 1 site was found to be "good" and the remainder of sites were classed as either "fair" (23%) or "poor" (15%). Community composition indicates that there is likely substantial organic pollution occurring throughout the watershed.

OBJECTIVE: Maintain native aquatic species and communities

Targets:

i. *Naturally-reproducing Brook Trout within coldwater-designated watercourses.*
ii. *Maintenance of native species biodiversity.*

Issues:

- Data on invasive species, species of conservation concern, and aquatic species such as amphibians and aquatic plants are limited, as is information on the location of specific spawning areas and spawning activity for key species (Brook Trout)
- Stream temperatures may be limiting coldwater fish habitat conditions.

Implementation Approaches:

Continue to monitor habitat conditions for brook trout, other fish species, and invasive species, and work with landowners to improve these conditions (e.g., removal of stream barriers).

OBJECTIVE: Enhance in-stream riparian habitat conditions

Targets:

i. *Increased aquatic habitat connectivity.*
ii. *Increase of natural riparian areas to 75% along watercourses.*
iii. *Increase in natural riparian areas along headwater streams.*
iv. *Decrease in water temperatures within coldwater-designated watercourses.*

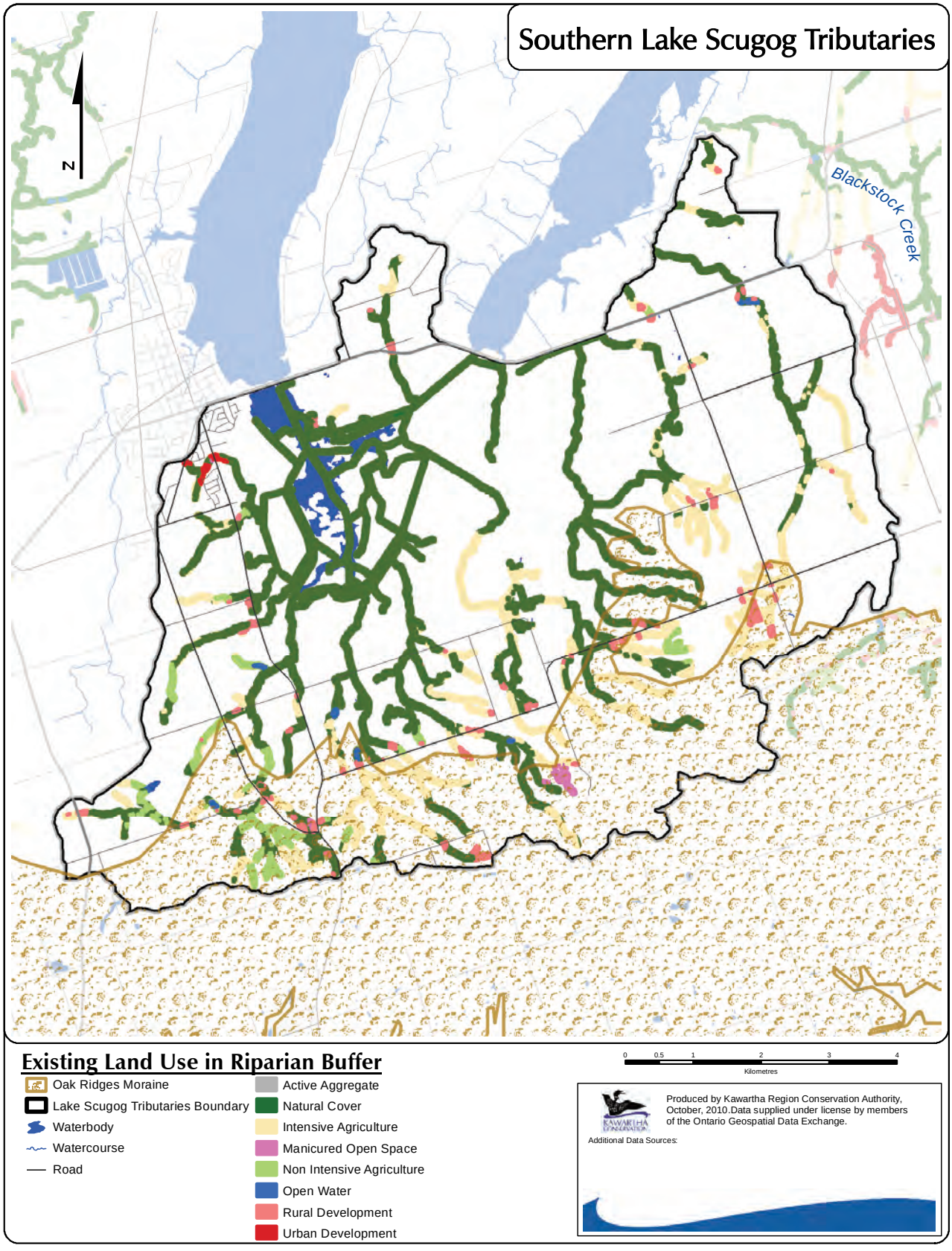
Issues:

- The fragmentation of aquatic habitat, caused by instream barriers (4 perched culverts and 117 potential ponds), has the potential for negative impact on the existing population of fishes.
- The quality of benthic macroinvertebrate communities suggests several parts of the watershed suffer from elevated organic pollution.
- Generally, the watercourses within the Southern Lake Scugog Tributaries watershed do not meet the minimum recommended length of natural coverage of 75%.

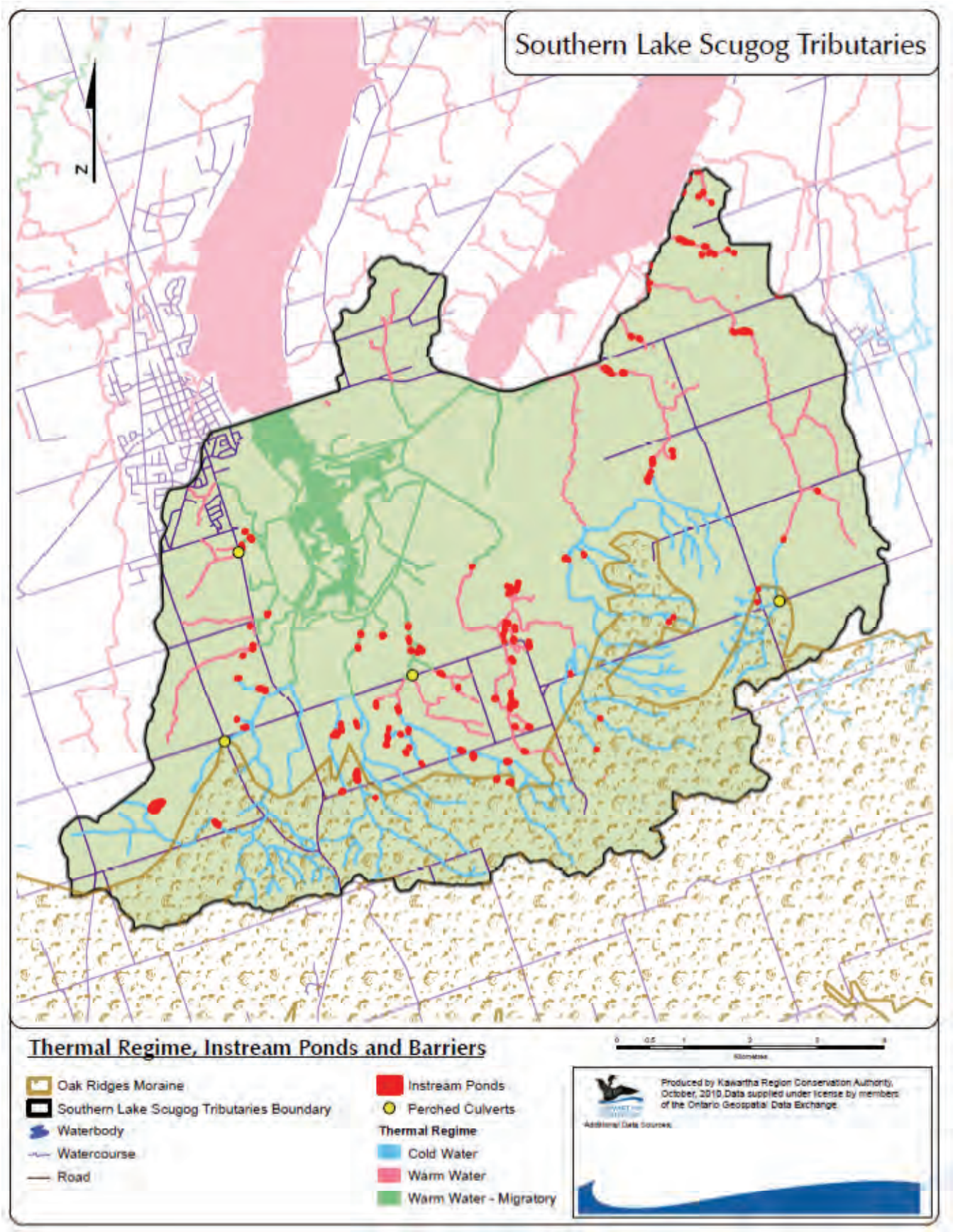
Implementation Approaches:

Establish a stewardship program that will encourage and assist landowners and others to remove instream barriers and to establish additional riparian cover where needed, notably in the smaller headwaters streams where more riparian cover is needed.

Southern Lake Scugog Tributary #1, south of Scugog Line 2



Map 9 – Existing Land Use in Riparian Buffer



Map 10 – Thermal Regime, Instream Ponds and Barriers

3.6 Terrestrial Resources

GOAL - Healthy Terrestrial Landscape

- *that contributes to a functioning natural heritage system; and,*
- *that provides sustainable commercial, residential and recreational use opportunities.*

A healthy terrestrial landscape contributes to a functioning natural heritage system and provides ecological and sustainable commercial, residential and recreational use opportunities. The Southern Lake Scugog Tributaries Watershed lies within the Great-Lakes St. Lawrence Forest Region, a part of Ontario that is well-settled, dominated by cleared agricultural land, and has retained only a few extensive forest tracts. The typical tree species in the Southern Lake Scugog Tributaries Watershed include Sugar Maple, American Beech, Basswood, Ash, Birch, Oak and occasionally Eastern Hemlock, White Pine and Balsam Fir. The Southern Lake Scugog Tributaries watershed contains extensive and diverse areas of natural cover. Total forest cover in the watershed is approximately 26% of the land mass, which is below the 30% recommended by the Regional Municipality of Durham (and others). Many of the existing woodlands are considered provincially significant. However, the watershed contains a large proportion of natural wetlands (25% of the total watershed area and well above the recommended target of 10%). The majority of the wetlands, approximately 93%, are considered Provincially Significant and include the large Osler Marsh.

The overall "natural cover" represented by forests, wetlands, and meadows combines to 47% of the total area of the watershed. Comparison of the amount of natural cover with target levels suggests that the Southern Lake Scugog Tributaries Watershed exceeds recommended target levels. (**Map 11**)

Environment Canada recommends that the proportion of the watershed that is forest cover 100 meters or further from the forest edge should be greater than 10%. The proportion of the watershed that is forest cover 200 meters or further from the forest edge should be greater than 5%. The Southern Lake Scugog Tributaries Watershed has 12% forest coverage that is >100 meter from edge and 7% forest coverage that is >200 meter from the edge. Therefore the Southern Lake Scugog Tributaries Watershed meet recommendations for interior forest and deep interior forest (**Map 12**).

The species compositions of the watershed forests are typical of this forest region, with primarily mixed forest, and some pockets of coniferous and deciduous forest.

Wetlands in these ecodistricts are primarily swamp with some marsh with small amounts of fen and bog. Significant remnants of globally rare vegetation communities including tallgrass prairie, savanna and alvar have been identified as high priority conservation targets for the area.

Complete lists of the flora and fauna of the watershed have not been compiled, so the biodiversity of the area can't be determined with any certainty. Of the 22 species at risk identified as conservation targets within this part of the province, none have been confirmed within the Southern Lake Scugog Tributaries watershed; however, 7 fauna and 2 flora species are recognized as having high potential to exist within the watershed, but have not been confirmed to exist.

The forests of the watershed, and forests across the province, have been subjected to threats to their health and their very existence from forest pests (insects and diseases) and invasive plants imported from other continents. These threats are current and are expected to continue or worsen in the future.

OBJECTIVE: Enhance and maintain natural cover across the landscape

Targets:

i. *Increase in forest cover to minimum of 30%.*
ii. *Maintenance or Increase in interior forest habitat.*
iii. *Increase in connectivity of natural cover.*
iv. *Maintenance or increase in wetland cover.*

Issues:

- The watershed falls short of targets for total forest cover.
- A complete list of flora and fauna (including information on species at risk) has not been compiled for the watershed.

Implementation Approaches

Continue monitoring the levels of forest cover, interior forest habitat, connectivity of natural cover, and wetland cover to assess changes in these levels in future. Undertake an inventory project to establish lists of flora and fauna, including species at risk. Undertake stewardship and education initiatives to work with property owners to improve the amount of forest cover in the watershed. Support the development of a coordinated Natural Heritage Systems strategy.

OBJECTIVE: Maintain native terrestrial species and communities

Targets:

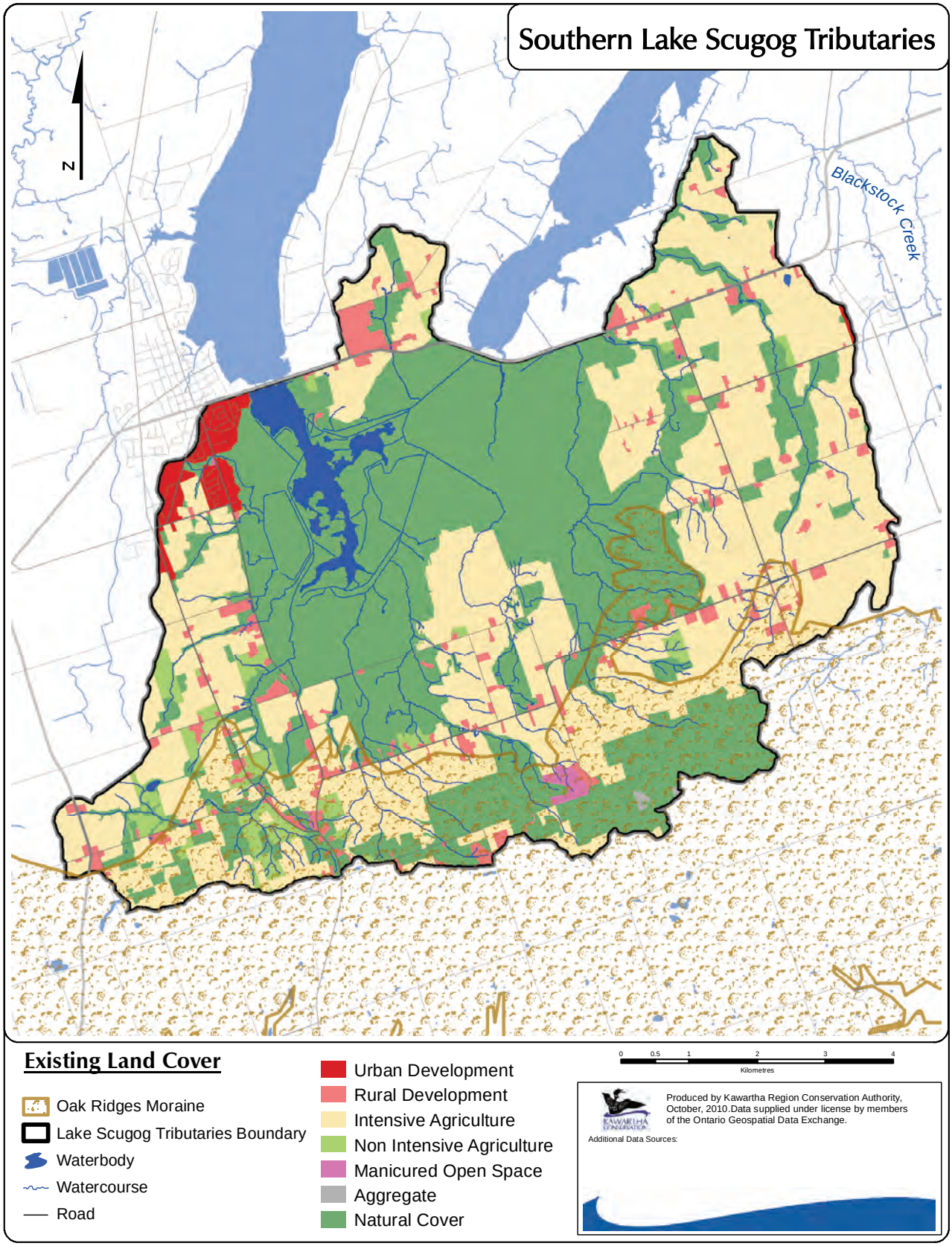
i. *Maintenance of native diversity.*
ii. *Protection of species at risk and their critical habitats.*

Issues:

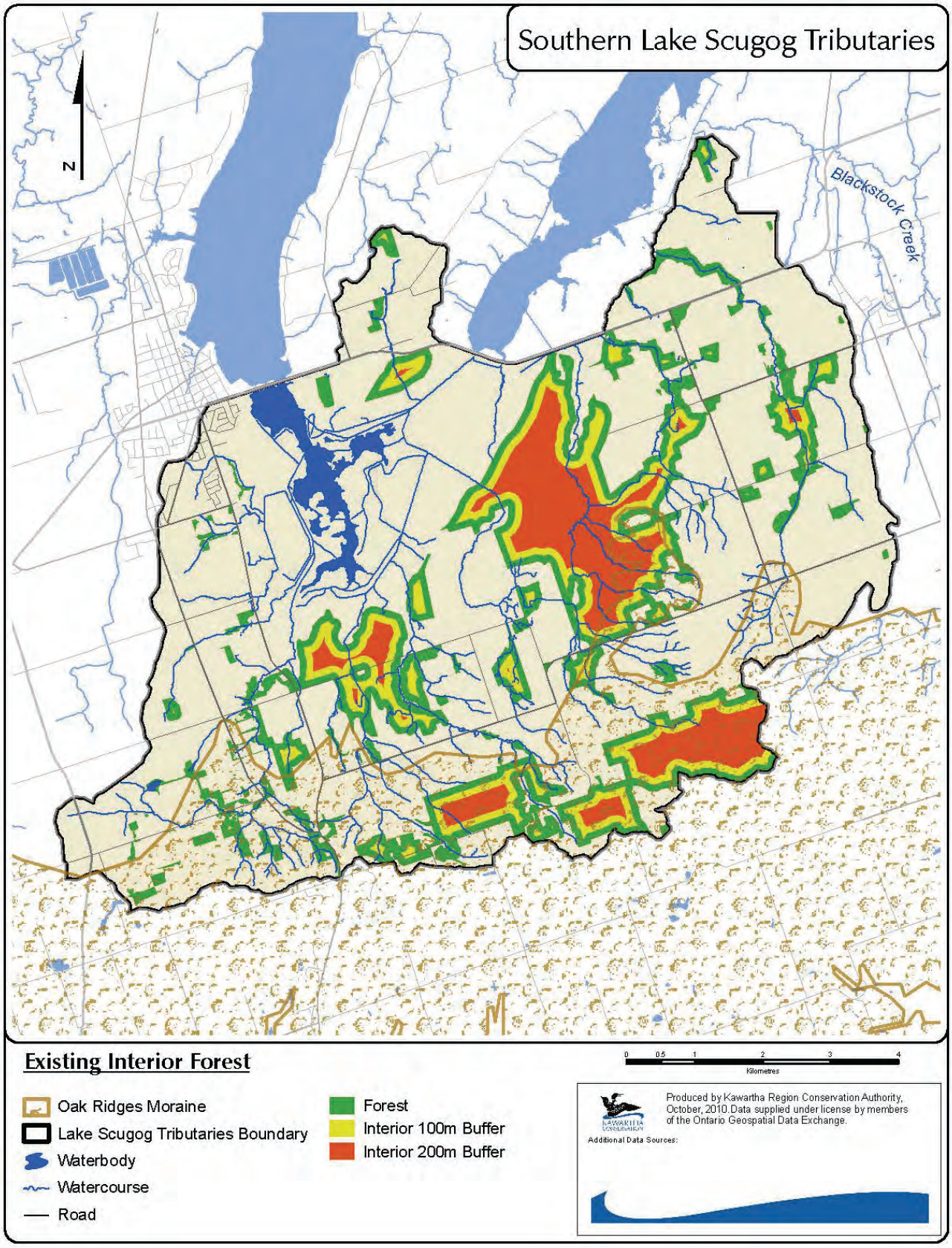
- Although the watershed has natural cover, forest cover, and wetlands that exceed current target levels, one major forest-related issue in the watershed is that the overall quality of the natural forests has been in decline as a result of exotic insects, diseases, and invasive plants.
- Invasive species including insects, diseases and plants, are considered one of the key threats to the health of existing natural areas, particularly in woodlands.
- Climate change has the potential to exasperate these negative effects.

Implementation Approaches:

Conduct inventories to identify terrestrial invasive species and continue to monitor the health and diversity of the forests and wetlands of the watershed. Support the development and implementation of the Durham Climate Change Plan.



Map 11 – Existing Natural Cover



Map 12 – Existing Interior Forest

4.0 Implementation Plan

Management actions were initially discussed and developed for each of the watershed elements and then synthesized into the following sections to reduce repetition and make them easier to understand and implement:

- Policy, Practice and Regulations
- Stewardship Activities
- Education. Awareness and Outreach
- Monitoring and Research
- Other Management Activities

The Southern Lake Scugog Tributaries Watershed Plan provides direction and support to many different agencies and organizations in the area. The following tables (3 to 7) provide a comprehensive list of management actions based on priority. Priorities of actions were assessed based on the criteria below.

High: *A management action that is crucial in order to support and achieve the goals and objectives of the Watershed Plan and that addresses a key issue or threat identified by the background studies.*

Medium: *A management action that is important in order to support and achieve the goals and objectives of the Watershed Plan and that addresses an issue or threat identified by the background studies.*

Low: *A management action that will contribute, but is not essential, to support and achieve the goals and objectives of the management plan.*

The management actions serve to address one or more of the watershed plan's goals, and this is noted as directly addresses (✓) or indirectly addresses (✓) in Tables 3 to 7. As well, the identification of lead and supporting agencies, partners or participants, as discussed and confirmed throughout the development of the Southern Lake Scugog Tributaries Watershed Plan, will help to initiate action and provide an understanding of their roles and responsibilities.

4.1 Policy, Practice and Regulations

The Southern Lake Scugog Tributaries Watershed Management Plan was prepared in response to the requirement of the Oak Ridges Moraine Conservation Plan and builds upon the provincial direction provided through the Greenbelt Plan and Provincial Policy Statement. In turn it identifies many management actions that can be addressed through the policies, practices and regulations of municipal, conservation authority, provincial and federal agencies. **Table 3** provides a summary of the management actions related to policy, practice and regulations.

Municipalities have a significant role in the implementation of the Southern Lake Scugog Tributaries Watershed Management Plan through the review, amendment and implementation of their policy documents (official plans, zoning and other municipal by-laws) and through the practices that they follow when reviewing development and site alteration applications, and through municipal works and

maintenance activities. As well Kawartha Conservation has a responsibility to review and update their policies and regulations, and to work together with provincial and federal agencies and other partners to implement them. While it is anticipated that most policies and regulations are current, **Table 3** provides a checklist of matters that all agencies must review and adopt.

4.2 Stewardship Activities

Stewardship activities include the programs and activities of many agencies, community groups and land owners that build community responsibility, change social behaviour and provide on the ground actions (e.g., tree planting, natural cover restoration) to protect and restore any combination of the six watershed elements. Many of these activities involve volunteers and the combined efforts of agencies and community groups to provide a programs, funding and support. Management actions related to stewardship activities are provided on **Table 4**. Similar to the Lake Scugog Environmental Management Plan, an important first step is for the potential partners to develop an integrated program to ensure the stewardship activities are coordinated and complement each other.

There are many partners already conducting excellent stewardship programs in the Southern Lake Scugog Tributaries Watershed, and the Plan provides a continued commitment to support and to improve these activities; an example is the Durham Region Water Conservation Plan. Where gaps in these activities have been identified, actions have been developed to address the issues specifically related to the protection and restoration of watershed elements.

Many of the ecological benefits of the stewardship activities overlap. Consideration should be given to combining the efforts and activities of partners and programs so that a more comprehensive approach could be developed and implemented.

Potential audiences include rural and urban property owners (residential, business, agricultural, and industrial), and potential partners include Kawartha Conservation, municipalities, the Ministry of the Environment, and local groups such as the Scugog Heritage Museum, and Community Living Groups in Durham North.

Existing stewardship programs to consider include the following:

Adopt-A-Stream: The Adopt-A-Stream program helps the public care for a local stream or river; encourages new community stewardship projects; facilitates communication between community groups and provides up to date information resources. More information is available at: http://www.ontariostreams.on.ca/adopt-a-stream.html

Community Stream Steward Program: This program is a multi-partner initiative that is focused on creating a sense of community and individual awareness of the need in restoring and preserving coldwater streams. More information is available at: http://www.ofah.org/Stream/

Conservation Easements: Under the *Conservation Lands Act* of Ontario, municipalities, conservation authorities and non-governmental not-for-profit natural heritage organizations are empowered to acquire and hold conservation easements that protect natural heritage sites. This is voluntary legal agreement with the property owner, an appraisal of the property is completed and a tax receipt is provided for the value of the donation.

Conservation Lands Tax Incentive Program (CLTIP): Lands identified by the Ministry of Natural Resources as Provincially Significant are eligible for this program. These are a small subset of lands found in a natural state in Ontario including provincially significant wetland; provincially significant area of natural and scientific interest (ANSI); habitat of endangered species; land designated as escarpment natural area in the Niagara Escarpment Plan; and, community conservation land. The conservation land must be at least 1/5 of a hectare (1/2 acre) in size. http://www.mnr.gov.on.ca/MNR/cltip/

Environmental Farm Plan: A voluntary program that aids farmers in assessing a variety of environmental concerns on their farm. The process supports individual farm planning and decision-making in the short and long term, and harmonizes productivity, business objectives and the environment. More information is available at: www.omafra.gov.on.ca/english/environment/efp/efp.hm

Managed Forest Tax Incentive Program (MFTIP): This program is designed to encourage landowner participation in natural resource stewardship on private forestland in Ontario. Eligibility requirements can be found online at: http://www.mnr.gov.on.ca/MNR/forests/mftip/pdf/MFTIP_Guide_06.pdf

Shoreline Naturalization Program: The Shoreline Naturalization Program is a program of Kawartha Conservation and is designed to encourage private and public land stewardship of our natural resources and provide educational opportunities across the watershed. The program has four components: shoreline consultations; private landowner implementation, demonstrations sites; and community workshops, conferences, and speaking engagements. More information is available at: http://www.kawarthaconservation.com/shoreline/

Blue Canoe: The Blue Canoe is a project run by Kawartha Conservation, designed to provide practical environmental information specific to homeowners and cottagers living along the shores of Lake Scugog. Blue Canoe crew members visit Lake Scugog residents via canoe and vehicle throughout the summer months. They distribute information on the Lake Scugog Environmental Management Plan, shoreline naturalization, septic systems, grant programs for landowners, and more information is available at: http://www.kawarthaconservation.com/bluecanoe/index.html

Kawartha Water Watch: Kawartha Water Watch (KWW) is a volunteer-based water quality program operated through Kawartha Conservation. It's designed to monitor and improve water conditions within the Kawartha watershed, which takes in over 2,563 square kilometres and includes Balsam, Cameron, Scugog, Sturgeon, and part of Pigeon Lake as well as many smaller lakes and streams. During the summer volunteers sample and test water monthly at their assigned sites. Through information gathered from KWW and other provincial agencies, KWW identifies good, satisfactory and poor water quality. Reports are produced and copies are distributed to participants and government agencies. More information is available at: http://www.kawarthaconservation.com/projects_services/watershed_monitoring/surface_water/kww.html

Ontario Wetland Care: The Ontario Wetland Care Program is a private land extension program launched by DUC in 2008 and is a long-term effort to increase wetland protection and restoration by landowners in southern Ontario through a network of conservation organizations and agencies.

Well Aware: Well Aware is a program of Green Communities Canada that encourages Ontario's residential well owners to protect their wells and groundwater supplies. Since 2001, they have helped more than 3,500 Ontarians to gain confidence in the management of their wells and to protect their family's drinking water. Well Aware provides a booklet, "A Guide to Caring for your Well" and conducts site assessments with property owners to help identify and address potential risks to well water. More information is available at: http://www.wellaware.ca/

Community Fisheries / Wildlife Improvement Program: The Community Fisheries and Wildlife Involvement Program (CFWIP) a land owner contact program of the Ministry of Natural Resources to promote hands-on fish and wildlife management and biodiversity conservation activities. Financial help, expertise, equipment and materials may be provided for volunteer projects that aid in fish and wildlife and improve opportunities for outdoor recreation. More information is available at: http://www.mnr.gov.on.ca/MNR/fishing/cfwip.html

Scugog WATER Fund: The goal of the Scugog WATER Fund is to address the major issues affecting Lake Scugog including: extensive erosion on lakeshores and stream banks, leaking septic systems around the lake, agricultural runoff, manure storage, milk house waste water, cropland erosion, extensive fertilizer and pesticide use and livestock access to watercourses. The program provides funding for landowner to mitigate the above-mentioned issues. More information is available at: http://www.kawarthaconservation.com

Trees Ontario: Trees Ontario Foundation has undertaken the task of revitalizing Ontario's tree-planting efforts on private land through the development of partnerships between all organizations with an interest in replenishing Ontario's private land forests. More information is available at: http://www.treesontario.on.ca

Yellow Fish Road: A nation-wide environmental education program designed and managed by Trout Unlimited Canada. The goal of the Yellow Fish Road program is to help Canadians understand that stormwater drains are the doorways to our rivers, lakes and streams. Preventing pollutants from entering our stormwater drains is critical to protecting and improving water quality and aquatic habitat. More information is available at: http://www.yellowfishroad.org/about.html

4.3 Education, Awareness and Outreach

Education, awareness and outreach include initiatives that promote a better understanding of the importance of, and connections between, the watershed elements and encourage the implementation of best management practices. Management actions related to education, awareness and outreach is provided on **Table 5**. An education and communication strategy should be developed involving the use of social marketing approaches, including public education and demonstration projects.

Potential audiences include urban and rural communities, property owners, agricultural community, teachers, students and the general public. Programs and educational opportunities should be provided at both the lot level and watershed wide, and utilize consistent messaging. Potential partners include agencies such as Kawartha Conservation, Region of Durham, Durham District School Board, educational operations such as the Nonquon Environmental Education Centre, and community groups such as Scugog Water fund and Durham Environmental Advisory Committee Environmental Achievement Awards program and farming organizations. Finding and working with new partners and developing new approaches is important and will help to expand programs, develop new ones, and

reach new audiences. Education and communication tools could include: websites, thematic brochures, flyers, regular publications in local newspapers and magazines, workshops and meetings.

Similar to Stewardship activities, there are many education programs and initiatives that are already being implemented in the Southern Lake Scugog Tributaries watershed. The Plan provides commitment and support to continue and expand these activities and recommends new actions to address significant watershed issues, where no activities were in place before.

4.4 Monitoring and Research

Monitoring and research is the corner stone to understanding the health of the watershed, the stressors that affect the natural features and functions and the effect of the management activities we undertake to protect and restore watershed elements. While there has been substantial information and data collected on the Southern Lake Scugog Tributaries watershed, the continuation and expansion of these programs is important to establish baselines to understand the future ecological state of the Southern Lake Scugog Tributaries watershed. As well, new monitoring and research programs should be created to address and fill information gaps. A summary of the management actions related to monitoring and research are provided on **Table 6** and a Monitoring Plan is provided in Chapter 4.

4.5 Other Management Activities

Other management actions include land acquisitions, implementing the policies of other management plans and improving the construction and maintenance practices related to roads and stormwater infrastructure. Management actions related to other management activities are provided on **Table 7**.

Table 3 ***Management Actions for*** **Policies, Practices and Regulations**	**ACTION Focus**	**Priority** ***High Medium Low***	**Watershed Plan Goals**						***LEAD/Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
1. Review and update official plan policies to address the following:	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*DURHAM REGION, AREA MUNICIPALITIES, Kawartha Conservation*
a. Identify the location of known (mapped) watershed resources: areas of groundwater features (e.g., high recharge, significant vulnerable aquifer, discharge areas); surface water features (e.g., streams, rivers, ponds, lakes, floodplains); aquatic habitat (e.g., cold and warm water streams, spawning areas); and terrestrial resources (e.g., wetlands, forests, habitat of Species at Risk);	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
b. Identify approaches to consider new information about watershed resources (e.g., new areas, boundary refinement) as it becomes available;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
c. Ensure that development and site alteration is prohibited or restricted within, and adjacent to, watershed resources consistent with the requirements of the Provincial Policy Statement, Greenbelt Plan and Oak Ridges Moraine Conservation Plan;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
d. Prohibit new in-stream structures (e.g., barriers/dams), unless they can be demonstrated to maintain existing watercourse flow regime and existing aquatic habitat characteristics and connectivity;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
e. Ensure that new development maximizes stormwater infiltration and ensure impervious surfaces do not exceed 10% of the total watershed;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*

Table 3 ***Management Actions for*** **Policies, Practices and Regulations**	**ACTION Focus**	**Priority** ***High Medium Low***	**Watershed Plan Goals**						***LEAD/Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
f. Work to achieve a target of 30% forest cover for the entire watershed as a long term objective;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
g. Require Stormwater Management Plans for new development to recommend conditions that mitigate sediment and nutrient loadings in watercourses;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1, above*
h. Establish 'minimum vegetation protection zone' policies and 30 metre development setbacks to protect and restore vegetation along watercourses;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
i. Work to achieve a target of 75% natural riparian cover for the entire watershed as a long term objective;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
j. Ensure that all new development addresses climate change adaptation and mitigation;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
k. Implement the policies developed through the Kawartha-Haliburton Source Protection Planning process (when completed), that contribute to the achievement of water quality and quantity targets;	Municipal Wellhead Protection Areas	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
l. Consider approaches to maintain the linkages between existing natural heritage areas and features until a Natural Heritage System is in place (see #3 below); and,	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*

Table 3 ***Management Actions for*** **Policies, Practices and Regulations**	**ACTION Focus**	**Priority** ***High Medium Low***	**Watershed Plan Goals**						***LEAD/Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
m. Identify appropriate tools to mitigate the impacts of development and site alteration on watershed resources (e.g., Tree Cutting By-law, Site Alteration By-law, Site Plan Control, Parkland Dedication). In particular, local authorities should review existing control mechanisms to manage the potential environmental impacts of large-scale fill placement.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Same as #1 above*
2. Ensure effective implementation and enforcement of:	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*See below.*
a. Regional and municipal official plans and zoning by-laws;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*DURHAM REGION, AREA MUNICIPALITIES*
b. Applicable federal and provincial legislation (e.g. *Clean Water Act, Fisheries Act, Species at Risk Act); and,*	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*ENVIRONMENT CANADA, ONTARIO MINISTRY OF THE ENVIRONMENT, ONTARIO MINISTRY OF NATURAL RESOURCES, FISHERIES AND OCEANS CANADA*
c. Section 28 Regulations of the *Conservation Authorities Act*.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION*
3. Encourage and contribute to an integrated cross regional Natural Heritage System that builds on the requirements of the Greenbelt Plan and the Oak Ridges Moraine Conservation Plan and maintains the linkages between natural heritage areas and features.	Watershed wide Natural Heritage Areas and Features	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, CONSERVATION AUTHORITIES MORAINE COALITION, Area Municipalities*

Table 3 ***Management Actions for*** **Policies, Practices and Regulations**	**ACTION Focus**	**Priority** ***High Medium Low***	**Watershed Plan Goals**						***LEAD/Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
4. Encourage the province to develop a comprehensive policy management framework to address existing gaps and ensure a consistent, integrated approach in the regulation of large-scale fill.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*DURHAM REGION, AREA MUNICIPALITIES, Kawartha Conservation*
5. Review and strengthen municipal by-laws to improve regulation of site alteration activities during land development and construction to mitigate impacts from vegetation removal and erosion on wetlands and watercourses.	Wetlands and Watercourses	MEDIUM	✓	✓	✓	✓	✓	✓	*AREA MUNICIPALITES, Durham Region*
6. Ensure all water takings over 50,000 litres per day are regulated and monitored under a Permit to Take Water to provide accurate data and ensure water taking is within the sustainable limits identified in the water budget.	Watershed Wide	MEDIUM	✓	✓	✓	✓	✓	✓	*ONTARIO MINISTRY OF THE ENVIRONMENT Kawartha Conservation, Durham Region*
7. Ensure permits and/or approvals related to works in-and-around water contain conditions that mitigate sediment and nutrient loadings in watercourses.	Wetlands and Watercourses	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, AREA MUNICIPALITIES*
8. Develop a program to inspect and provide financial assistance to upgrade septic systems to reduce nutrient loading into watercourses. Consider implementation requirements (e.g., mandatory vs. voluntary) for upgrading septic systems.	Areas near Wetlands and Watercourses	MEDIUM	✓	✓	✓	✓	✓	✓	*AREA MUNICIPALITIES, Durham Regional Health Department, Local Stewardship Groups*
9. Develop Flood Emergency Response Plans for high priority flood-prone areas.	High Priority Flood-Prone Areas	MEDIUM	-	-	✓	-	-	-	*KAWARTHA CONSERVATION, Durham Region, Area Municipalities*

Table 4 ***Management Actions for*** **Stewardship Activities**	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
1. Develop and implement a coordinated program of Stewardship activities in the watershed providing outreach and extension services to effectively engage property owners by addressing the following stewardship activities below.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, Agricultural Organizations (e.g., Ontario Soil and Crop Improvement Association), Environmental organizations, Property Owners*
2. Encourage increased nutrient and soil management activities on agricultural operations, through initiatives such as the Environmental Farm Plan to minimize impacts on wetlands and watercourses, including:	Farm Operations, Wetlands and Watercourses	HIGH	✓	✓	✓	✓	✓	✓	*Ontario Soil and Crop Improvement Association, Farm and property owners, Ontario Ministry of Agriculture, Food and Rural Affairs, Local stewardship and community groups, Business Operators, Kawartha Conservation*
a. Minimize erosion through activities such as conservation tillage, grassy waterways on erodible lands, riparian zone protection, and other soil management techniques; and,	Farm Operations, Wetlands and Watercourses	HIGH	✓	✓	✓	✓	✓	✓	*Same as #2*
b. Reduce nutrient loading (phosphorus in particular), by managing runoff from livestock yards, improving the effective application of fertilizer through the use of precision techniques restricting livestock access to watercourses, and the use of other applicable best management practices.	Farm Operations, Wetlands and Watercourses	HIGH	✓	✓	✓	✓	✓	✓	*Same as #2*

Table 4 ***Management Actions for*** **Stewardship Activities**	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
3. Undertake tree and natural vegetation planting projects to protect and restore riparian areas adjacent wetlands and watercourses to increase the natural cover in riparian areas to 75%.	Wetlands and Watercourses with focus on agricultural activities in headwater, erosion-prone areas and sensitive habitats	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, TREES ONTARIO DURHAM, All Municipalities, Local Stewardship and Community Groups, Property Owners*
4. Undertake tree and natural vegetation planting projects to restore natural cover, forest interior habitat and connectivity of natural habitats across the watershed.	Forests and their connecting linkages	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION TREES ONTARIO DURHAM, All Municipalities, Local Stewardship and Community Groups, Property Owners*
5. Develop a program, with financial incentives as appropriate, to assist in maintaining and repairing septic systems to reduce nutrient loading.	All properties Wetlands and Watercourses	MEDIUM	✓	✓	✓	✓	✓	✓	*Durham Region, Area Municipalities, Local Stewardship Groups, Property Owners*
6. Mitigate the negative impacts of dams and other in-stream impoundments (e.g., removal of structure, creating fish passage ways, pond shading or altering the draw of water) where such structures are identified as creating negative impact on aquatic cold water resources.	Cold Water Streams	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION Property Owners, Local Stewardship and Community Organizations, Community Stream Stewards Program*
7. Maintain programs/funds that subsidise well decommissioning and upgrades.	Rural Areas	MEDIUM	✓	✓	✓	✓	✓	✓	*DURHAM REGION, Well Aware, Kawartha Conservation*

Table 4 ***Management Actions for*** **Stewardship Activities**	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
8. Work with the owners of water access points to install signage or undertake other activities to prevent the spread of invasive aquatic species.	Water Access Points	MEDIUM	✓	✓	✓	✓	✓	✓	*ONTARIO FEDERATION OF ANGLERS AND HUNTERS, ONTARIO MINISTRY OF NATURAL RESOURCES, All Municipalities, Property Owners Kawartha Conservation*
9. Work with water users to undertake water conservation practices to reduce amount of water use.	Watershed Wide	MEDIUM	✓	✓	✓	✓	✓	✓	*DURHAM REGION Kawartha Conservation*
10. Improve fisheries habitat by completing restoration projects such as creating in-stream habitat, erosion control projects and naturalizing riparian areas.	All Watercourses	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, Durham Stewardship Council, Trees Ontario, Local Stewardship and Community Groups*
11. Enhance existing public use areas to create sustainable opportunities for fishing, canoeing, hiking, and nature appreciation (e.g., improve trails, canoe routes, water access areas).	Watershed Wide	LOW	-	-	-	-	✓	✓	*Kawartha Conservation, Area Municipalities, Local Stewardship and Community Groups*

Table 5 ***Management Actions for*** **Education, Awareness and Outreach**	**Action Focus**	***Priority*** ***High Medium Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
1. Develop and promote lot level programs to promote best management practices to specific audiences (developers, urban, rural, shoreline, agriculture, industrial and business property owners) to minimize sediment and nutrient loadings in wetlands and watercourses by addressing:	Lot level (i.e., property basis)	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, Area Municipalities, Durham Stewardship Council, Durham Sustain-ABILITY, Local Stewardship and Community Groups, Ontario Ministry of Agriculture, Food and Rural Affairs*
a. application of road salt, and nutrients in parks and along road allowances;	Municipalities	HIGH	✓	✓	✓	✓	✓	✓	*Area Municipalities*
b. protection and replanting of shoreline vegetation along watercourses;	Property Owners	HIGH	✓	✓	✓	✓	✓	✓	*Area Municipalities, Nonquon Environmental Education Centre, Ontario Ministry of Agriculture, Food and Rural Affairs, Durham Stewardship Council, Local Stewardship and Community Groups*
c. advanced techniques in agricultural nutrient management practices (conservation tillage, grassy waterways on erodible lands, soil management techniques, managing runoff from livestock yards, improved land application techniques, restricting livestock access to watercourses and installing pasture pumps for alternative watering systems); and,	Farm Operators	HIGH	✓	✓	✓	✓	✓	✓	*ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS, ONTARIO SOIL AND CROP IMPROVEMENT ASSOCIATION, Area Municipalities, Durham Stewardship Council, Local Stewardship and Community Groups*
d. emerging and new technology and standards.	Developers	LOW	✓	✓	✓	✓	✓	✓	*Area Municipalities, Real Estate and Development Industry*

Table 5 ***Management Actions for*** **Education, Awareness and Outreach**	**Action Focus**	***Priority*** ***High Medium Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
2. Develop general education programs for developers and rural and urban property owners (agricultural, commercial, residential, and new home owners) to increase awareness about:	Watershed Wide with focus on priority areas noted below	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, Local stewardship and Community Groups*
a. Ground water, surface water, aquatic, and terrestrial resources in the watershed;	Watershed wide, General Public	MEDIUM	✓	✓	✓	✓	✓	✓	*Kawartha Conservation, Area Municipalities, Durham Region, Well Aware, Durham Sustain ABILITY*
b. Healthy communities and cultural links to watershed resources;	Watershed wide, General Public	LOW	✓	✓	✓	✓	✓	✓	*Area Municipalities, Scugog Heritage Museum, Welcome Wagon, Community Groups, Durham Sustain ABILITY*
c. Low impact sustainable development to protect watershed resources;	New Development	MEDIUM	✓	✓	✓	✓	✓	✓	*Area Municipalities, Real Estate and Development Industry*
d. Emerging and new technology and standards (e.g., green energy, Leadership in Energy and Environmental Design (LEEDS)) to protect watershed resources;	New Development	LOW	✓	✓	✓	✓	✓	✓	*Area Municipalities, Real Estate and Development Industry*
e. Preventing the spread of invasive species to protect natural species and their habitat;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Ontario Ministry of Natural Resources, Ontario Federation of Anglers and Hunters, Kawartha Conservation*
f. Identifying and protecting Species at Risk and their critical habitat to conserve biodiversity;	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*Ontario Ministry of Natural Resources*
g. Well maintenance and decommissioning to protect ground water resources; and,	Rural Property Owners	MEDIUM	✓	✓	✓	✓	✓	✓	*Well Aware, Kawartha Conservation*
h. Stormwater management best management practices to minimize sediment and nutrient loadings in wetlands and watercourses.	Existing and New Development, with focus in Urban Areas	MEDIUM	✓	✓	✓	✓	✓	✓	*Area Municipalities*

Table 5 ***Management Actions for*** **Education, Awareness and Outreach**	**Action Focus**	***Priority*** ***High Medium Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
3. Promote the conservation of water resources through education and awareness	Watershed Wide	MEDIUM	✓	✓	✓	✓	✓	-	*DURHAM REGION, Durham Sustain ABILITY, Kawartha Conservation*
4. Establish and implement a program of education and incentives to remove in-stream impoundments and improve cold water habitats.	Cold Water Streams	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, ONTARIO MINISTRY OF NATURAL RESOURCES, Property Owners*
5. Increase in information available to the public regarding the use and regulation of biosolids on agricultural lands (Note – there appears to be wide-spread community anxiety about this practice; additional information may help to alleviate concerns).	Watershed Wide	MEDIUM	-	-	-	-	-	-	*ONTARIO MINISTRY OF ENVIRONMENT, ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS*
6. Work with the School Board(s) to establish curriculum based programs addressing water awareness and conservation (e.g., Peel Water Story, Durham Children's Groundwater Festival), and appreciation of natural and cultural heritage.	Schools	LOW	✓	✓	✓	✓	✓	✓	*School Groups, Durham Region, Kawartha Conservation, Nonquon Environmental Education Centre*
7. Celebrate and recognize sustainable practices through Recognition Awards for residents, business operators and other groups in order to promote awareness and achieve buy-in from others.	Watershed Wide	LOW	✓	✓	✓	✓	✓	✓	*All municipalities, Local stewardship and community groups*
8. Establish a program of public road and property signage that identifies key watershed features (e.g., stream names, watershed boundaries, provincially significant wetlands).	Watershed Wide	LOW	✓	✓	✓	✓	✓	✓	*Kawartha Conservation, Durham Region, Area Municipalities*
9. Continue to support community initiatives to remove litter from recreational areas, road-sides, public access points and promote awareness around the need to reduce litter.	Watershed Wide	LOW	-	✓	-	✓	✓	✓	*Area Municipalities, Durham Region, Kawartha Conservation, Ontario Ministry of Natural Resources, Community groups*

Table 6 ***Management Actions for*** ***Monitoring and Research***	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
Monitoring *(for more detail refer to Table 8 - Monitoring Indicators to Assess Environmental Health and Progress of Plan Implementation)*									
1. Environmental Monitoring									
a. Maintain existing monitoring programs and enhance, as necessary to address information gaps (see Table 8 column – Existing Monitoring Program Details) to detect changes in the indicators of watershed health; and,	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, ENVIRONMENT CANADA, ONTARIO MINISTRY OF THE ENVIRONMENT, DURHAM REGION, Ontario Ministry of Natural Resources, Conservation Authorities Moraine Coalition*
b. Encourage the development of a monitoring framework to evaluate watershed health consistently for all watersheds across the Oak Ridges Moraine.	Watershed Wide and watersheds across the Oak Ridges Moraine	MEDIUM	✓	✓	✓	✓	✓	✓	
2. Progress Monitoring – Track the progress of implementation action items (see Table 8 column – Progress), on an ongoing basis.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, Government and non-government organizations active on the Oak Ridges Moraine*
3. Reporting - Prepare a Monitoring Report, every five years, to synthesize the results of environmental monitoring (Section 4.1), and progress monitoring (Section 4.2) and make plan recommendations for the following 5 years.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION*
Research									
4. Enhance baseflow monitoring by incorporating areas of watershed not previously monitored.	Watershed Wide	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION*

Table 6 ***Management Actions for*** ***Monitoring and Research***	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	**High Quality Groundwater**	**Natural Flow Regime**	**High Quality Surface Water**	**Healthy Aquatic Resources**	**Healthy Terrestrial Resources**	
5. Inventory all in-stream impoundment structures and identify those with greatest potential that if mitigated, would improve water quantity or aquatic life.	Watercourses with focus on cold water streams	MEDIUM	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, ONTARIO MINISTRY OF NATURAL RECOURCES, DUCKS UNLIMITED, Community Stream Stewards Program*
6. Inventory the location of critical aquatic habitats (e.g., spawning sites for Brook Trout and Muskellunge) through habitat and spawning assessments.	Watercourses with focus on spawning sites	MEDIUM	✓	✓	✓	✓	✓	✓	*ONTARIO MINISTRY OF NATURAL RESOURCES, Kawartha Conservation, Local stewardship and community groups, Property owners*
7. Implement a program to assess and upgrade stormwater management infrastructure to minimize impacts to wetlands and watercourses.	Watershed Wide with focus on cold water streams	LOW	✓	✓	✓	✓	✓	✓	*DURHAM REGION, KAWARTHA CONSERVATION , AREA MUNICIPALITIES*
8. Identify high priority flood prone areas within the watershed and develop flood plain mapping in high priority areas	Watershed Wide	MEDIUM	-	-	✓	-	-	-	*KAWARTHA CONSERVATION Durham Region, Area municipalities*

Table 7 **Other Management Actions**	**Action Focus**	***Priority*** ***High*** ***Medium*** ***Low***	***Watershed Plan Goals***						***LEAD / Partners***
			Abundant Groundwater	High Quality Groundwater	Natural Flow Regime	High Quality Surface Water	Healthy Aquatic Resources	Healthy Terrestrial Resources	
1. Rehabilitate erosion prone areas along publically maintained ditches and roads to prevent sedimentation of watercourses.	Municipal water crossings with focus on cold water streams	HIGH	✓	✓	✓	✓	✓	✓	*ALL MUNICIPALITES, Kawartha Conservation*
2. Maintain and repair culverts and road crossings to ensure that existing infrastructure and the design of new water crossings does not impediment fish passage and water flow.	Municipal Water Crossings	MEDIUM	✓	✓	✓	✓	✓	✓	*ALL MUNICIPALITES, Kawartha Conservation*
3. Support the development and implementation of the Durham Climate Change Plan.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*DURHAM REGION, Kawartha Conservation, Local stewardship and community groups*
4. Inventory, maintain and repair storm water management infrastructure to improve mitigation of nutrient, sediment loading to watercourses.	Municipal Stormwater Infrastructure	LOW	✓	✓	✓	✓	✓	✓	*ALL MUNICIPALITES, Kawartha Conservation*
5. Encourage the implementation of the North Durham Integrated Community Sustainability Plan.	Watershed Wide	LOW	✓	✓	✓	✓	✓	✓	*AREA MUNICIPALITIES, Durham Region, Kawartha Conservation*
6. Support the implementation of the North Durham Integrated Community Sustainability Plan.	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*AREA MUNICIPALITIES, Durham Region, Kawartha Conservation*
7. Review existing funding programs, with a view of increasing incentive funding available through programs such as the Environmental Farm Plan that focus specifically on nutrient reduction (similar to enhanced funding initiatives to address phosphorus loading in Lake Simcoe Watershed).	Watershed Wide	HIGH	✓	✓	✓	✓	✓	✓	*ONTARIO SOIL AND CROP IMPROVEMENT ASSOCIATION, Ontario Ministry of Food, Agriculture and Rural Affairs; Local stewardship groups*
8. Develop/update a Land Acquisition Program to enable acquisition of significant open green space, and natural heritage and conservation areas, as opportunities arise.	Watershed Wide	LOW	✓	✓	✓	✓	✓	✓	*KAWARTHA CONSERVATION, DURHAM REGION, Area Municipalities, Land Trusts, Property owners*

5.0 Monitoring Plan

This chapter describes a means to measure and report on the health of the environment and the implementation and achievement of the goals and objectives of this plan.

Monitoring is essential to measure how well the management actions meet the goals and objectives so that, if necessary, we can adapt our approaches to improve our effectiveness and the health of the watershed. This approach is called adaptive management and it is a process of continually improving management actions, goals, objectives and targets. Adaptive management allows watershed managers to change their management actions when they see that environmental conditions are in decline or not improving. If it becomes clear that a target is not being met, then a change in management actions may be warranted, or a change in the target itself should be considered.

The Monitoring Plan contains three components: monitoring environmental health, measuring plan progress and effectiveness, and providing a means to report progress to stakeholders and the public.

5.1 Environmental Health

This component addresses the questions: "are the watershed elements in a healthy condition, and what are the trends in watershed health?

Table 8 provides an approach to monitor the watershed targets as identified in Chapter 3 - Management Goals, Objectives and Targets. For each target to be monitored a list of environmental and progress indicators have been provided in columns 1 and 2. Monitoring the list of environmental indicators in column 1 will help to provide a measure of the health of the six watershed elements (e.g., groundwater, surface water, aquatic and terrestrial resource).

Most of the environmental monitoring actions involve maintaining existing programs or establishing new ones to measure specific environmental indicators. By taking these measurements over time, managers can assess the health of the environment of the watershed and answer – is it improving, degrading, or maintaining its status? It is only through years of monitoring and assessing results that actual trends can emerge, and environmental health of the watershed can be better understood.

Working together on monitoring the health of the environment, if effectively coordinated and integrated, will benefit all partners involved. Expertise can be pooled among the implementation partners which may reduce the duplication of efforts. Data collection efforts can be standardized, and with efficiency and coordination, there is greater opportunity for buy-in from the community and the organizations/agencies involved.

The responsibility for monitoring is shared between many agencies and programs. **Table 8** provides a list of lead agencies and partners that are responsible for the following existing programs:

Provincial Groundwater Monitoring Network - The Ministry of the Environment and Kawartha Conservation partner to implement this program. The goal of this network is to determine where, how, and why the groundwater resource is changing across the province. Within the Southern Lake Scugog Tributaries Watershed, there is one groundwater monitoring well, which is currently

part of the Provincial Groundwater Monitoring Network (PGMN) (**Map 6**). These wells record water levels on a daily basis. Also, the standard set of water quality indicators monitored at each station includes chloride, nutrients, suspended solids, trace metals and other general chemistry parameters. Water chemistry is sampled once every year in the fall.

Kawartha Conservation Environmental Monitoring Program - Kawartha Conservation conducts regular monitoring within the Southern Lake Scugog Tributaries Watershed as part of their Watershed Monitoring Program. This program consists of a network of continuous flow monitoring sites (with one gauge on Tributary #6), and a series of water quality monitoring stations. As of 2010, the Southern Lake Scugog Tributaries had a total of five water quality monitoring stations (**Map 8**). Samples are taken 3-4 times per year, and analysed for a range of parameters, including nutrients, metals, ph, temperature. To examine the existing benthos community compositions within the Southern Lake Scugog Tributaries Watershed, Kawartha Conservation collected benthos at 13 sites, between 2006 and 2008. In addition, baseflow across the watershed was measured in a 2006 study that included a total of 10 sites.

Permit to Take Water Monitoring Program - As per the Ontario Water Resources Act, water users taking more than 50,000 litres per day are required to obtain a Permit to Take Water from the Ontario Ministry of the Environment. Starting in 2008, it became a legislative requirement for all Permit holders to report the total volume of water taken each calendar year. Water-taking permits apply to both surface and groundwater.

Certificate of Approval Monitoring - Any facility that discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval from the Ontario Ministry of the Environment. A condition within a Certificate of Approval often requires the owner of the operation to monitor the effluent of the system to ensure it meets water quality standards set out in each respective Certificate.

5.2 Plan Progress

This monitoring component addresses the questions: "are the management actions being completed and are they effective?"

Table 8 (column 2) provides a list of the management actions that are related to the objectives and targets established in Chapter 3 for each watershed element. A complete description of management actions is provided in Chapter 4.

Every five years, Durham Region in collaboration with their partners will undertake a review to measure the implementation of the management actions and the success of the plan in order to address and report on 1) what was accomplished? 2) what was effective? and 3) what new management actions need to be taken for the next five year period?

5.3 Reporting

Every five years a Monitoring Report should be prepared to provide a synthesis of environmental monitoring results (Section 4.1), the plan progress (section 4.2) and if it is found that a particular action is not achieving its intended purpose, recommend changes to the targets, indicators, or management

actions. The five year review period should can be concurrent with the 5 year official plan review process required by the *Planning Act,* so that both processes may be better informed and linked.

A coordinated approach lead by Durham Region involving the Conservation Authorities Moraine Coalition and Kawartha Conservation would enable working with other Conservation Authorities to develop a system to monitor and understand ecosystem health across the entire Oak Ridges Moraine.

This reporting mechanism also provides a way to communicate results to stakeholders and the general public on a regular five year interval. The report would provide an opportunity to review the status of "Implementation of Management Strategies" and "Environmental Monitoring" programs and projects, and to:

- Assess how well implementation is taking place;
- Synthesize the data collected in environmental monitoring programs and projects, and identify trends that are emerging;
- Examine the results of research initiatives;
- Discuss management action changes or new approaches to improve achievement of targets; and,
- Communicate with partners, stakeholders, and the public at large, on environmental health, plan implementation progress and effectiveness.

Regular reporting will ensure that the watershed plan becomes a dynamic document.

TABLE 8 - Monitoring Indicators to Assess Environmental Health and Progress of Plan Implementation

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
GROUNDWATER QUANTITY				
Objective - Maintain natural groundwater flow conditions				
Targets				
✓ Protection of significant/sensitive groundwater recharge areas	• Groundwater recharge/infiltration amounts • Groundwater (water table) levels	Policies and Practices - 1a, b, c, e, g, j, k., l; 2a, b, c, 5; 6; 7 Stewardship – 1; 9 Education - 1a, c, 2 a, c, g. h; 5; 7	KAWARTHA CONSERVATION ONTARIO MINISTRY OF ENVIRONMENT *Conservation Authorities Moraine Coalition*	• Provincial Groundwater Monitoring Network • Kawartha Conservation Environmental Monitoring Program • Municipal Well Monitoring
✓ Maintenance of groundwater discharge into surface waters	• Stream baseflow discharge • Presence of stream flow and seepage areas	Policies and Practices – 1a, c, l Monitoring/Research - 1a, d; 3; 4	KAWARTHA CONSERVATION	• Kawartha Conservation Environmental Monitoring Program
✓ Maintenance of groundwater levels	• Groundwater (water table) levels • Stream baseflow discharge • Groundwater-taking amounts	Policies and Practices – 1e,l; 5; 8 Stewardship – 9 Education – 2a; 3; 5; 6 Monitoring – 1a, d; 2d Other – 5	KAWARTHA CONSERVATION ONTARIO MINISTRY OF ENVIRONMENT *Conservation Authorities Moraine Coalition* *Durham Region*	• Provincial Groundwater Monitoring Network • Kawartha Conservation Environmental Monitoring Program • Permit to Take Water Monitoring Program
GROUNDWATER QUALITY				
Objective - Protect groundwater from contamination				
Targets				
✓ Elimination of abandoned and poorly maintained wells	• Number of decommissioned wells • Number of upgraded wells	Policies and Practices - 7 Stewardship - 7 Monitoring -	KAWARTHA CONSERVATION WELL-AWARE ONTARIO SOIL AND CROP IMPROVEMENT ASSOCIATION	• Currently, no coordinated program is in place
✓ Protection of significant/sensitive groundwater recharge	• Water chemistry in stream baseflow	Policies and Practices – 1a,b,c; 7 Stewardship – 2, 5, 7	KAWARTHA CONSERVATION ONTARIO MINISTRY OF	• Currently, no coordinated program is in place for monitoring water chemistry

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
areas and highly vulnerable aquifers	• Water chemistry in wells	Education – 1c, d; 2a, g; 5 Monitoring – 1a, d; 2c	ENVIRONMENT *Durham Region Health Department* *Kawartha-Pine-Ridge District Health Unit*	in stream baseflow • Provincial Groundwater Monitoring Network • Kawartha Conservation Environmental Monitoring Program
✓ Groundwater chemistry that meets Provincial Drinking Water Quality Standards	• Water chemistry in wells	Policies and Practices – 1a,b; 7 Stewardship – 2, 5, 7 Education -1c, d; 2a, g Monitoring -1a, d; 2c	KAWARTHA CONSERVATION ONTARIO MINISTRY OF ENVIRONMENT *Durham Region*	• Provincial Groundwater Monitoring Network • Kawartha Conservation Environmental Monitoring Program
✓ Reduction in nitrogen concentrations in shallow aquifers	• Nitrogen concentrations in shallow wells • Nitrogen concentrations in stream baseflow	Education - 1c, d; 2a Monitoring – 2c	KAWARTHA CONSERVATION ONTARIO MINISTRY OF ENVIRONMENT *Durham Region Health Department* *Kawartha-Pine-Ridge District Health Unit*	• Currently, no coordinated program is in place for monitoring water chemistry in stream baseflow • Provincial Groundwater Monitoring Network • Kawartha Conservation Environmental Monitoring Program
SURFACE WATER QUANTITY				
Objective - Maintain surface water flow conditions				
Target				
✓ Maintenance and enhancement of flow regime in watercourses	• Surface water discharge • Surface water levels • Ecological flow requirements • Surface water-taking amounts	Policies and Practices – 1a,b, c, d, e, f, g, h, I, l; 2c; 4; 6 Stewardship – 3; 6; 10 Education – 1b, c, d; 2a, h; 4;6 Monitoring/Research – 1c, d; 2b; 4;6 Other – 2; 3	KAWARTHA CONSERVATION ENVIRONMENT CANADA *Ontario Ministry of Natural Resources* *Fisheries and Oceans Canada*	• Kawartha Conservation Environmental Monitoring Program • Permit to Take Water Monitoring Program
Objective - Protect people and property from natural hazards				
Target				
✓ Reduction in flooding	• Flood-prone areas	Policies and Practices – 1a, b, c, d, e,	KAWARTHA CONSERVATION	• Kawartha Conservation Environmental Monitoring

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
risks	• Surface water levels	f, g, h, I, l; 2c; 4; 6; 8 Stewardship – 3, 6 Education – 1b, c, d; 2a, h; 4 Monitoring/Research – 1c, d; 2b; 4; 6; 7 Other – 2; 3	*Durham Region* *Ontario Ministry of Natural Resources*	Program
✓ Reduction in erosion risks	• Erosion-prone areas	Policies and Practices – 1a, b c, d, e, f, g, h, I, l; 2c; 4; 6 Stewardship – 2a; 3; 6; 10 Education – 1b, c, d; 2a, h; 4;6 Monitoring/Research – 1c, d; 2b; 4; 6; 7 Other – 1; 2; 3	KAWARTHA CONSERVATION	• Currently no monitoring program exists
SURFACE WATER QUALITY				
Objective - Protect surface waters from contamination				
Target				
✓ Surface waters meets Federal and Provincial water quality guidelines and objectives	• Surface water chemistry	Policies and Practices – 1a, b, c, l; 2b; 4;6; 7 Stewardship – 1; 2a, b; 3; 5; Education – 1a,b,c,d; 2a, c, d, h; 5; 6 Monitoring/Research – 1b;2a, c; 6 Other – 1	KAWARTHA CONSERVATION ONTARIO MINISTRY OF ENVIRONMENT	• Provincial Water Quality Monitoring Network
✓ The risk of contamination from point-sources and hazardous spills is minimized		Policies and Practices – 1a, b; 2b	DURHAM REGION	
Objective - Enhance the quality of urban runoff				
Target				
✓ Phosphorus concentrations in	• Surface water chemistry	Policies and Practices – 1a, e, g, l; 2a,b; 4	KAWARTHA CONSERVATION *Ontario Ministry of*	• Currently no monitoring program exists

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
urban stormwater runoff are reduced		Stewardship – 1; 5 Education – 2a, c, h; 6 Monitoring/Research – 1b, d; 2a, c; 6 Other – 3	*Environment*	
✓ Chloride and metal concentrations are kept in current levels or decreased	• Surface water chemistry	Policies and Practices – 1a, c, e, g, l; 4; 6 Stewardship – 1a; 2a, h Education – Monitoring/Research – 1b, d; 2a, c; 6 Other – 1; 2	KAWARTHA CONSERVATION *Ontario Ministry of Environment*	• Provincial Water Quality Monitoring Network
Objective - Enhance the quality of agricultural runoff				
Target				
✓ Phosphorus concentrations are reduced to meet Provincial Water Quality Objectives (30mg/l)	• Surface water chemistry at watershed outlet • Surface water discharge at watershed outlet	Policies and Practices – 1h; 2b Stewardship – 1; 2a, b Education – 1b, c, d; 2a; 6 Monitoring – 1b; 2a, c	(Kawartha Conservation) Ontario Ministry of Environment	• Provincial Water Quality Monitoring Network • Kawartha Conservation Environmental Monitoring Program
✓ Nitrogen concentrations are reduced as a result of watershed-wide implementation of Best Management Practices in agriculture	• Surface water chemistry	Policies and Practices – 1h; 2b Stewardship – 2a, b Education – 1c, d; 2a; 6 Monitoring – 1a, d; 2c	(Kawartha Conservation) Ontario Ministry of Environment	• Provincial Water Quality Monitoring Network
AQUATIC RESOURCES				
Objective - Maintain native aquatic species and communities				
Target				
✓ Naturally-reproducing	• Presence of Brook Trout	Policies and Practices – 1a, b, c, d, e,	KAWARTHA CONSERVATION	• Currently no monitoring

Watershed Target	Indicator		Monitoring Responsibility	Existing Monitoring Program Details
	Environmental	*Progress*	*LEAD / Partners*	
Brook Trout within coldwater-designated watercourses	• Evidence of reproductive success	g, h, l; 2b; 4; 67 Stewardship – 1; 2; 3; 5; 6; 8; 10; 11 Education – 1; 2a, c, e, f, h; 4; 5; 6; Monitoring/Research – 1b, d;2a, b, c; 3; 4; 5; 6 Other – 1; 2; 3	ONTARIO MINISTRY OF NATURAL RESOURCES *Fisheries and Oceans Canada* *Ontario Federation of Anglers and Hunters*	program exists
✓ Maintenance of native species biodiversity	• Aquatic biodiversity • Presence of invasive species	Policies and Practices – 1a, b, c, d, e, g, h, l; 4;6; 7 Stewardship – 1; 2; 3; 5; 6; 8; 10; 11 Education – 1; 2a, c, e, f, h; 4; 5; 6 Monitoring/Research – 1b, d;2a, b, c; 3; 4; 5; 6 Other – 1; 2; 3	KAWARTHA CONSERVATION ONTARIO MINISTRY OF NATURAL RESOURCES ONTARIO FEDERATION OF ANGLERS AND HUNTER	• Currently no program exists for monitoring aquatic biodiversity • Invading Species Awareness Program
Objective - Enhance Instream and riparian habitat conditions				
Target				
✓ Increased aquatic habitat connectivity	• Degree of habitat fragmentation	Policies and Practices – 1a, b, d, h; 2b; 4; 6 Stewardship – 3; 6; 10 Education – 1b; 2a; 4; 5; 6 Monitoring/Research – 2a; 4; 5	KAWARTHA CONSERVATION	• Currently no monitoring program exists
✓ Increase of natural riparian areas to 75% along watercourses	• Riparian land use coverage along entire watercourse length	Policies and Practices – 1a, b, h; 4 Stewardship – 3; 6; 10 Education – 1b; 2a; 5; 6 Monitoring/Research – 5	KAWARTHA CONSERVATION	• Kawartha Conservation Environmental Monitoring Program
✓ Increase in natural riparian areas along headwater streams	• Riparian land use coverage along 1st, 2nd and 3rd order streams	Policies and Practices – 1a, b, h; 4 Stewardship – 3; 6; 10 Education – 1b; 2a; 5; 6 Monitoring/Research – 5	KAWARTHA CONSERVATION	• Kawartha Conservation Environmental Monitoring Program
✓ Decrease in water	• Summer maximum water	Policies and Practices – 1a, b, d, h;	KAWARTHA CONSERVATION	• Kawartha Conservation Environmental Monitoring

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
temperatures within coldwater-designated watercourses	temperatures • Thermal regime change	2b; 4; 6 Stewardship – 3; 6; 10 Education – 1b; 2a; 4; 5; 6 Monitoring/Research – 1a, b, c; 2a; 4; 5	*Ontario Ministry of Natural Resources* *Fisheries and Oceans Canada* *Ontario Federation of Anglers and Hunters*	Program
TERRESTRIAL RESOURCES				
Objective - Enhance and maintain natural cover across the landscape				
Target				
✓ Increase in forest cover to a minimum of 30%	• Forest cover	Policies and Practices – 1a, b, c, f; 3 Stewardship – 3; 4 Education – 2a, c;5; 6 Monitoring/Research – 5; 6 Other – 5; 6	KAWARTHA CONSERVATION *Ontario Ministry of Natural Resources*	• Kawartha Conservation Environmental Monitoring Program
✓ Maintenance or increase in interior forest habitat.	• Forest cover greater than 100-200 metres from edge	Policies and Practices – 1a, b, f; 3 Stewardship – 4 Education – 2a; 5; 6 Monitoring/Research – 5; 6 Other – 5; 6	KAWARTHA CONSERVATION *Ontario Ministry of Natural Resources*	• Kawartha Conservation Environmental Monitoring Program
✓ Increase in connectivity of natural cover	• Connectivity of forest, wetland, and meadow cover • Degree of fragmentation	Policies and Practices – 1a, b, c, e, f, k, l; 2a, b; 3; 4 Stewardship – 4 Education – 2a; 5; 6 Other – 5; 6	KAWARTHA CONSERVATION *Ontario Ministry of Natural Resources*	• Kawartha Conservation Environmental Monitoring Program
✓ Maintenance or increase in wetland cover	• Wetland cover	Policies and Practices – 1a, b, c, k, l;2a, b; 3; 4 Stewardship – 3 Education – 2a; 5; 6 Other – 5; 6	KAWARTHA CONSERVATION *Ontario Ministry of Natural Resources*	• Kawartha Conservation Environmental Monitoring Program
Objective - Maintain native terrestrial species and communities				
Target				
✓ Maintenance of native diversity	• Terrestrial biodiversity • Invasive species	Policies and Practices – 1a, b, c, f, h, l, k, l; 2a, b; 3 Stewardship – 3, 4; 8 Education – 2a, e, f; 5	KAWARTHA CONSERVATION ONTARIO MINISTRY OF NATURAL RESOURCES	• Currently no monitoring program exists • Invading Species Awareness

Watershed Target	Indicator *Environmental*	Indicator *Progress*	Monitoring Responsibility *LEAD / Partners*	Existing Monitoring Program Details
		Other – 5, 6	ONTARIO FEDERATION OF ANGLERS AND HUNTERS	Program
✓ Protection of species at risk and their critical habitats	• Terrestrial biodiversity	Policies and Practices – 1a; 2a, b; 3 Stewardship – 3; 4; 8 Education – 2a, e, f; 5 Other – 5, 6	ONTARIO MINISTRY OF NATURAL RESOURCES	• Currently no monitoring program exists

6.0 Conclusions

The Oak Ridges Moraine Conservation Plan sets the following vision for the Oak Ridges Moraine:

> *"a continuous band of green, rolling hills that provides form and structure to south-central Ontario, while protecting the ecological and hydrological features and functions that support the health and well-being of the region's residents and ecosystems."*

Completion of the four watershed plans, East Cross Creek, Nonquon River, Blackstock Creek, and the South Lake Scugog Tributaries, will satisfy an important requirement of the Oak Ridges Moraine Conservation Plan. Implementation of the Southern Lake Scugog Tributaries Watershed Management Plan simultaneously with the implementation of the three plans for adjacent watersheds will provide protection and enhancement of the ecological and community health of this part of the Oak Ridges Moraine, contributing to the overall vision for the moraine. In addition, these four plans will provide a similar level of protection and enhancement for the associated watershed areas downstream from the moraine.

The Southern Lake Scugog Tributaries and the three associated watersheds share a common vision:

> *"A watershed where its water and associated natural and cultural features are of the highest quality to provide overall ecological integrity and to serve human use".*

The process of developing and implementing this plan will achieve this vision, only through the cooperation and partnerships of municipalities, agencies, and non-government organizations, and most importantly, with a willing and involved community. The plan has been developed with the cooperation and active participation of a broad array of groups (see "Acknowledgments" at the front of the plan). All these groups and individuals, and more, will be needed to make the plan a success and achieve the vision. Implementation will begin immediately, in a measured way, over an extended period of time. Its success will rely upon the resources that all parties and individuals can bring to the table, guided by the priorities set in the Implementation Plan (Chapter 4).

The Southern Lake Scugog Tributaries watershed demonstrates, for the most part, a healthy and vibrant natural environment in a community that faces no significant threats or issues. The plan notes a number of cases where the existing data and information is weak or incomplete, and it will be important to rectify this through increased monitoring programs so the state of the watershed's resources can be confirmed for the future. There are two issues of some concern: first, the quality of the surface water across most of the watershed is not meeting PWQOs for phosphorus and nitrates; and second, the overall forest cover is not meeting recommended target levels. The strategies and actions related to "Education, Awareness, and Outreach" will be of a high priority as will a myriad of "Stewardship Activities."

The plan includes a long list of recommended management actions under the headings: Policies and Practices; Stewardship Activities; Education, Awareness, and Outreach; Monitoring and Research; and Other (Chapter 4). Their implementation will ensure that the Southern Lake Scugog Tributaries watershed maintains its health and vibrancy, improves those aspects identified as issues, and ultimately achieves the stated vision for the watershed.

Glossary of Terms

Adaptive management	A management plan that acknowledges the uncertainty of a managed system and therefore integrates design, management, and monitoring in order to allow managers to adapt and to learn.
Agricultural activities	Refers to any actions related to farm operations. This includes, but is not limited to, growing crops, raising livestock, spreading manure, irrigation and clearing fields.
Aquifer	Layer of permeable rocks or loose materials (gravel, sand) that is saturated with water and through which groundwater moves and can be extracted using a water well.
Baseflow	The portion of stream flow that is entirely attributed to groundwater inputs.
Benthic macroinvertebrates	The name used to describe stream dwelling organisms, with no backbones, living in the substrate. They are small in size but large enough to be seen by the unaided eye.
Best management practice (BMP):	A term used to describe the preferred method of management that has proven to reliably lead to a desired result. Usually associated with stormwater management or agricultural practices.
Biodiversity	The variability among living organisms and the ecological complexes of which they are part. A healthy ecosystem is traditionally one with a high level of biodiversity.
Climate	The average weather (usually taken over a 30-year time period) for a particular region and time period. Climatic elements include precipitation, temperature, humidity, sunshine and wind velocity and phenomena such as fog, frost, and hail storms.
Coldwater	A stream can be classified as cold water if its temperature is regularly < 18oC.
Coldwater fish	Fish species such as brook trout that prefer colder water temperatures (usually below 15°C).
Cultural	Refers to the aesthetic, historic, scientific or social value of items or places and are importance to past, present or future generations.
Development	Means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act (Ontario Provincial Policy Statement 2005).
Dissolved oxygen (DO):	The oxygen dissolved in water. Dissolved oxygen is necessary for the life of fish and other aquatic organisms.
Ecological functions	Means the 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	Which includes hydrological integrity, means the condition of ecosystems in which, (a) the structure, composition and function of the ecosystems are unimpaired by stresses from human activity, (b) natural ecological processes are intact and self-sustaining, and (c) the ecosystems evolve naturally.
Ecosystem	A recognizable ecological unit such as a group of plant and animal

species living together in a particular area.

Erosion The removal of soil sediment and rock in the natural environment. This may be as a result of natural processes such as weathering or through anthropogenic processes such as deforestation and poor farm management practices.

Fauna A synonym for animals.

Flora A synonym for plants.

Game fishes Also called "sport fishes." Species of fish sought by recreational fisherman (trout, bass, salmon, etc).

Groundwater Water located beneath the surface, usually in aquifers or other porous spaces.

Groundwater discharge An area where water leaves the underground, saturated zone and is exposed to the surface. The flow rate is usually expressed in cubic metres per second.

Habitat An ecological or environmental area that is inhabited by a particular organism and that influences or is utilized by that organism.

Headwaters Upper reaches of tributaries in a drainage basin.

Hydrological integrity Means the condition of ecosystems in which hydrological features and hydrological functions are unimpaired by stresses from human activity.

Infiltration Water entering the ground via pores in the earth's surface.

In-stream barriers: Any structure spanning the entire width of a watercourse that blocks upstream movement of fish species (e.g., dam or weir).

Invasive species A non-indigenous plant or animal, e.g., Eurasian milfoil (Also see: native species)

Native species A species that is indigenous to an ecosystem in that it occurs there naturally without any human intervention.

Nitrates The chemical form of nitrogen. A plant nutrient and inorganic fertilizer that enters water supply sources from septic systems, animal feed lots, agricultural fertilizers, manure, industrial waste waters, sanitary landfills and garbage dumps.

Nutrients In terms of water quality, this refers to the chemicals that aquatic vegetation requires for vital functions. Nutrients include phosphorus, nitrogen, potassium and some other chemical elements.

Non-point source Diffuse pollution sources (e.g. without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common nonpoint sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, and city streets.

Oak Ridges Moraine One of the most significant landforms in southern Ontario. It contains the headwaters of 65 river systems and has a wide diversity of streams, woodlands, wetlands, kettle lakes, kettle bogs and significant fauna and flora.

Off-line ponds Small, often man-made waterbodies that are not connected to a central watercourse (stream, river or lake).

On-line ponds Small, often man-made waterbodies that are connected to watercourses.

Perched culvert A culvert under a road crossing that is elevated considerably from the stream bed, blocking the passage of fish from one side of the crossing to the other.

Provincial Groundwater Monitoring Network A partnership program between the province of Ontario and conservation authorities to collect and manage ambient (baseline) groundwater level and quality information from key aquifers located across Ontario.

Provincial Water Quality Monitoring Network Ontario's provincial water quality monitoring network collects surface water quality information from streams at locations across Ontario in partnership with conservation authorities. The standard set of water quality indicators monitored at each station includes chloride, nutrients, suspended solids, trace metals and other general chemistry parameters. Other substances such as pesticides and other contaminants are monitored in detailed water quality surveys in priority watersheds.

Provincially significant wetland (PSW): Based on the guidelines for wetland management (MNR, 1984), these are wetlands classed as 1 through 3 in the wetlands policy (Section 3 of the Planning Act).

Recharge In regards to groundwater, recharge refers to water being added to a groundwater system such as an aquifer.

Restoration Returning an altered landscape back to its original form through physical restructuring and the reintroduction of native species. For example, shoreline restoration or naturalization refers to the removal of non-natural features such as lawns and break walls and the addition of native plant species.

Riparian (zone/area): The interface between land and a stream or lake.

Riparian vegetation Streamside vegetation that provides temperature control (shading), habitat diversity, bank stability, food and shelter to aquatic organisms and their habitats.

Runoff The portion of rainfall, melted snow or irrigation water that flows across the surface and eventually returns to streams. Runoff can pick up pollutants from the air or the land and carry them to the receiving waters.

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 (Ontario Provincial Policy Statement 2005). Note, this does no apply to existing agricultural uses, such as: conversion of pasture into cultivated lands.

Spawning habitat An area within a watercourse where deposition and fertilization of eggs takes place.

Stakeholder An individual or organization that has an interest in the outcome of a particular product, service or decision, or any individual or organization that is impacted by a decision.

Stewardship The integration and application of environmental values in order to improve quality of life and preserve valuable natural resources for present and future generations.

Stormwater A term used to describe water that originates during a precipitation event. Usually used to define water that flows through storm sewer systems in urban areas.

Substrate (1) The substance forming the bottom of the stream or lake bed; a

	general term for any benthic habitat. (2) The base on which an organism lives, or other solid surface to which animals or plants attach, or on which they move.
Subwatershed	A subsection of a watershed. (Also see: watershed)
Surface water	Precipitation that does not soak into the ground or return to the atmosphere but instead flows through streams, rivers, lakes and wetlands.
Sustainable development	A pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations.
Urban area	An area with an increased density of human-created structures and population when compared to surrounding areas. In Canada, an urban area is defined as having more than 400 people per square kilometre and has more than 1,000 people in total.
Tributary	A contributing stream or river; one that runs into another or into a lake.
Water balance	The concept of maintaining the various water budget components after urban development.
Water budget	A summary of the quantity of water in the atmosphere, ground and surface water systems within a watershed.
Water quality	An integrated index of chemical, physical and microbiological characteristics of natural water that determines suitability of water for the aquatic life and various human uses.
Water quantity	An amount of water (e.g. flow, velocity, discharge, water levels).
Watercourse	Means an identifiable depression in the ground in which a flow of water regularly or continuously occurs.
Watershed	The total area of land that drains to a river or other large body of water.
Wetland	Means 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. Periodically soaked or wet lands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition.
Woodland	Treed areas that provide environmental and economic benefits such as erosion prevention, water retention, provision of habitat, recreation and the sustainable harvest of woodland products.

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OMMAH (Ontario Ministry of Municipal Affairs and Housing). 2002. Oak Ridges Moraine Conservation Plan.

Province of Ontario. 2007. Oak Ridges Moraine Conservation Plan Technical Paper 9: Watershed Plans.

TCCSPC (Trent Conservation Coalition Source Protection Committee). 2010. Proposed Assessment Report.

Appendix - Summary of Public Consultation

Appendix A: Watershed Planning Public Information Sessions - July 2011

Nestleton - July 20, 2011 Attendance: 13 People

Greenbank - July 21, 2011 Attendance: 5 People

General Atmosphere:

- Information-session style approach (w/ presentation at Nestleton)
- Material included draft Management Goals, Objectives and Implementation Actions
- After the sessions, it was felt that holding the Open Houses during the summer, combined with the heat wave that occurred and the fact that there are limited "high profile" issues within these watersheds contributed to the limited attendance.

Community Comments:

- Potential contaminated fill - concerns with respect to the dumping of potentially contaminated fill and potential impacts to groundwater resources
- Bio-solid applications - concerns with potential for biosolid applications impacting surface and groundwater resources
- Renewable Energy Projects - concerns that wind turbines and large-scale solar-farms will have an impact on wildlife
- Cumulative Effects - concerns that impacts from multiple sources have the potential to "accumulate" and cause significant harm to natural environment
- Climate Change - concerns raised about the uncertainty associated with climate change
- Water Use and Supply (Port Perry) - questions asked with respect to the alternative sources for Port Perry's future water supply

Appendix B: Watershed Planning Public Information Sessions - November 2011

Greenbank - November 2, 2011 - Greenbank Community Hall

Attendance: approximately 15 people.

Format:

- Information-session style approach (w/ presentation)
- Display material included draft Goals, Objectives, Targets, Key Issues, Implementation Plan and Monitoring Plan

Community Comments:

- from 3 or 4 individuals in attendance: general concerns about application of biosolids in the watersheds and the potential for environmental and human health effects; also concerns about enforcement (i.e., who is policing the permits?) and jurisdiction (i.e., who's jurisdiction do they fall under?).
- general concern about commercial fill on Lake Ridge Road (Uxbridge)
- a few individuals expressed concerns about the effluent quality, and building footprint, of a large mushroom farm in Scugog Township
- individual identified a wetland that was drying up on his property, over the last 20 years, concerned about water table (speculated that water taking around the area could be the cause)
- concerns about the "accountability" framework (i.e., who does what, who is responsible, etc.) and the lack of accountability with respect to environmental protection
- questions directed at abandoned wells and decommissioning; who is responsible for these efforts/actions and are there incentive programs

Nestleton - November 3, 2011 - Nestleton Community Hall

Attendance: approximately 20 people.

Format:

- Information-session style approach (w/ presentation)
- Display material included draft Goals, Objectives, Targets, Key Issues, Implementation Plan and Monitoring Plan

Community Comments:

- a number of individuals expressed their concerns about not wanting more rules (in terms of land restriction) and the concern that the Oak Ridges Moraine planning area (and associated land use restrictions) will expand north to include the entire watersheds; questions raised with respect to the "mandatory requirements" of provisions in the Watershed Plans.
- a few individuals wanted watershed landowners to have a say in implementation efforts and should be plugged in
- discussion around Kawartha Conservation's regulation and which lands that it applies to and that KRCA is updating Planning and Regulations Policies.

Appendix C: Summary of Stakeholder Comments Received from October 2011 Draft Plans

Stakeholder/Date Received/Comment *(Note: abbreviated version of comments).*	Kawartha Conservation Response *Noted = no changes to Watershed Plans* *Changed = changes to Watershed Plans*
Agricultural Stakeholder Session (Nov 8, 2011)	
Section 3.4 (Surface Water Quality) - Wording used needs to be clearer, especially around phosphorus loadings, versus concentrations; an example is: perhaps express as kg/acre.	Noted. We agree with having specific and quantifiable watershed targets (expressed as kg/yr) that we are trying to achieve, and preferably by land use type. Changed. Added clearer terminology within Surface Water Quality section.
Implementation Plan - Clarify language with respect to: funding incentive programs.	Changed. Within Implementation Plan, added support for increased/sustained funding from programs such as Environmental Farm Plan and Scugog WATER Fund, specifically related to Phosphorus reduction.
Planning Action 1d - use clearer terminology; do we mean "dams" and "stormwater management facilities"?	Changed. Clarified intent/wording in Action Item, as it refers to instream dams/barriers.
Planning all Applicable Actions - clarify the term development and site alteration throughout the document, keep consistent use of terminology,,, what aspects of agriculture (e.g., tile drainage,, cultivation? etc.) are considered development?	Changed. Added definitions of Development and Site Alteration into Glossary, taken from Provincial Policy Statement 2005. Clarified that Site Alteration does not apply to existing agricultural land use such as cultivation and pasture.
Planning Action 1f - clarify target with respect to farmland property.	Noted. This Action Item applies to achieving Watershed-Wide targets of 30% forest cover, and does not apply to individual properties. This Action is consistent with policy direction in the Durham Official Plan.
Planning Action 1h - clarify language of watercourses and provide definition (e.g., perennial vs. seasonal, etc.).	Changed. Added definition of "watercourse" into Glossary, as per *Conservation Authorities Act* of Ontario.
Stewardship Action 1 - Ontario Soil and Crop Improvement Association, Grain Farmers of Ontario need to be listed as partners.	Changed. Specifically included agricultural community as partners in a coordinated approach to developing and implementing stewardship programs.
Stewardship Action 2 - support for programs such as Free Soil Testing Kits, GPS precision application equipment, consider wording: "precision application equipment".	Changed. Changed wording to incorporate support for reducing nutrient loading through the use of precision application techniques.
Municipal Stakeholder Session (Nov 7, 2011)	
Scugog Township would like to see a presentation to their Council, prior to Durham Region approval.	Noted. Kawartha Conservation to arrange with Scugog Township, an appropriate date/time/approach to

Stakeholder/Date Received/Comment *(Note: abbreviated version of comments).*	**Kawartha Conservation Response** *Noted = no changes to Watershed Plans* *Changed = changes to Watershed Plans*
	present Watershed Plans to Counsel; to take place after Kawartha Conservation Board of Directors endorsement (anticipated in Feb 1, 2012).
Groundwater Quality - "While there are no problems with the overall water quality from the municipal and private wells of the watershed, there is only limited information on which to draw that conclusion." - Change private to provincial.	Changed. Changed private wells to provincial wells.
Table 3, Action 1c - add Greenbelt Plan.	Changed. Added Greenbelt Plan.
Table 3, Action 1d - need clearer verbage; i.e., does this include culverts?	Changed. Clarified intent/wording in Action Item, as it refers to instream dams/barriers.
Table 3, Action 1i - change wording to climate change adaptation, not adoption.	Changed. Changed wording to adaptation.
Table 3, Action 1n - action not appropriate under the umbrella of Action 1, need to have this action as a separate item, and add "policy framework" in place of "fill management framework".	Changed. Changed wording and moved Action 1n to its own Action 4. Also, added Area Municipalities, CKL and Durham as co-leads and KRCA as partner.
Stewardship Action 1 - Kawartha Conservation should be the lead agency that coordinates stewardship activities.	Changed. Added Kawartha Conservation as Lead in implementation of coordinated delivery of stewardship programs.
Action 8 - Add Ontario Ministry of Natural Resources as a partner, under the Invading Species Awareness Program.	Changed. Added Ontario Ministry of Natural Resources as partner.
Individual Comment (Oct 27, 2011)	
"You're just after control of farm land. You have no common sense at all, just a bunch of idiots. And if a farmer complains you take action on them. Even townships can't stand Conservation Authorities."	Noted. Kawartha Conservation and partners to consider landowners sensitivity to land use restrictions, upon implementation of Watershed Plans.
Nonquon Environmental Education Centre (Nov 7, 2011)	
Concerned about the affect of hunting shells and shot left along the marshes, swamps and Nonquon River area due to hunting activities.	Noted. Note there are Federal government initiatives to eliminate lead ammunition. Discarded shells and shots relates to a general, larger litter-issue related to recreational use of resources. The Watershed Plan encourages the Province to update Management Plan for the Nonquon Provincial Wildlife Area. Changed. Added action item under Outreach, to promote reduction of litter.
Concerned about garbage being dumped in the Nonquon River, and on the roads along the wetlands near the river.	Changed. Added action item under Outreach, to promote reduction of litter.

Stakeholder/Date Received/Comment *(Note: abbreviated version of comments).*	**Kawartha Conservation Response** *Noted = no changes to Watershed Plans* *Changed = changes to Watershed Plans*
Individual Comment (Nov 11, 2011)	
Concerned about expansion of Oak Ridges Moraine Conservation Plan regulations to the entire watersheds.	Noted. No items in Watershed Plans to suggest that Oak Ridges Moraine Conservation Plan regulations be extended to include Watersheds in their entirety. ORMCP scheduled for provincial review in 2015, property owners can address this issue at that time.
Concern about Kawartha Conservation conducting fisheries work. Suggests that this is the sole responsibility of the Ontario Ministry of Natural Resources.	Noted. Kawartha Conservation does not undertake any fisheries work for the purpose of managing fisheries or fish populations. We sample fish populations only from the standpoint of understanding watershed health/condition, which is part of our broader environmental monitoring program.
Concern about the potential use of private well records to expand the database that provides information on groundwater quality in watersheds.	Noted. Other citizens have suggested that the use of private well information be considered as a way of expanding our groundwater quality monitoring capability. However, there are concerns about privacy considerations and what the information would be used for. Preliminary indication that these data would be limited. No action contemplated at this time; better understanding required of benefits vs. concerns.
Concerned over the spreading of biosolids and the potential environment impacts.	Noted. Our understanding from OMAFRA is that there is a regulatory process in place governing the application of biosolids. However, the public seems to be unaware of this process. Changed. Added Action item under Outreach to increase public awareness regarding biosolid practices and regulations.
Municipality of Clarington (Oct 31, 2011)	
Change Clarington Township to Municipality of Clarington in East Cross Creek Watershed Plan, remove Uxbridge from Blackstock Watershed Plan.	Changed. Changed wording in both plans.
Interested in a common Natural Heritage Systems approach among Conservation Authorities.	Noted. Kawartha Conservation to consider consistency of Natural Heritage Systems approach between neighbouring conservation authorities.
Lakeridge Citizens for Clean Water (Nov 11, 2011)	
Support the plans comments under Table 3, Section 1m and 1n, which address the need for local authorities to manage the potential impacts of large-	Noted. No further action necessary.

Stakeholder/Date Received/Comment *(Note: abbreviated version of comments).*	Kawartha Conservation Response *Noted = no changes to Watershed Plans* *Changed = changes to Watershed Plans*
scale fill operations and to appeal to the province to develop a comprehensive fill management network.	
There is a direct link between Action 1n, and achieving all 6 Watershed Goals.	Changed. Added direct links (large checkmarks) to each goal
Individual Comment (Nov 4, 2011)	
Groundwater and surface water has to be protected and managed with the least amount of intrusion and complication to landowners.	Noted. Kawartha Conservation and partners to consider landowners sensitivity to land use restrictions, upon implementation of Watershed Plans.
Concerned that the 4 watersheds, in their entirety, will become part of the Oak Ridges Moraine Conservation Plan. Suggestion that if this were to be the case, properties be exempted from regulations until such time as they are sold for another purpose or outside the family.	Noted. No items in Watershed Plans to suggest that Oak Ridges Moraine Conservation Plan regulations be extended to include Watersheds in their entirety. ORMCP scheduled for provincial review in 2015, property owners can address this issue at that time.
Would like to see a panel of landowners, municipal representatives along with environmental agencies to oversee the decision-making including if applicable permit review and permit granting, plan change approvals and areas variation approvals.	Noted. Watershed Plans do not set policy, but provide recommendations with respect to the need for additional policies and/or policy changes. The Plan(s) have no authority over ORMCP land use decisions and/or approval requirements of municipalities, and other agencies with respect to regulations and bylaws they administer.
Individual Comment (Nov 3, 2011)	
Would like to see Kawartha Conservation have access to private drinking water tests to fill in groundwater quality gaps.	Noted. Other citizens have suggested that the use of private well information not be considered as a way of expanding our groundwater quality monitoring capability. However, there are concerns about privacy considerations and what the information would be used for. Preliminary indication that these data would be limited. No action contemplated at this time; better understanding required of benefits vs. concerns.
Individual Comment (Nov 2, 2011)	
Plans need to address conflicts within the Greenbelt with compensation to land owners; Greenbelt legislation needs to be enforced.	Noted. Enforcement already addressed in Table 3, Action 2; no further action necessary.
Lack of strategies available for landowners to control purple loosestrife and dog strangling vine.	Noted. See Table 5, Education and Outreach, a high priority item is developing and distributing information related to proper invasive species management techniques.
Riparian health assessment and programs should be more available to farmers for riparian restoration.	Noted. See Table 4, Stewardship, includes actions that

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	encourage Environmental Farm Plan uptake, which includes riparian area management incentives.
Need to bring together small organizations into a larger "Scugog headwaters society" with monthly meetings and designated community representatives.	Noted. The newly formed Lake Scugog Implementation Committee has been set up to guide implementation of various recent planning initiatives in the Lake watershed (e.g., Nonquon River Fisheries Management Plan, Lake Scugog Environmental Management Plan, etc.).
Durham Region (Nov 21, 2011) - GENERAL COMMENTS for all 4 plans	
Table 3, Item 1c - please include a reference to the Greenbelt Plan.	Changed. Greenbelt Plan added.
Table 3, item 1d - please revise the wording to recognize that infrastructure (e.g., new bridges) would be exempt.	Changed. Clarified intent/wording in Action Item, as it refers to instream dams/barriers.
Table 3, item 1h - for clarity purposes, you may want to consider dividing this into two subsections (1) work towards a target of 75% natural cover in riparian areas; and (2) establish "minimum vegetation protection zone" policies and 30 metre development setbacks to protect and restore vegetation along watercourses.	Changed. Reworked action item into 2 separate action items under Action 1.
Table 3, item 1i - consider rewording as follows: "encourage new development to address climate change adaptation and mitigation strategies.	Changed. Changed wording to adaptation.
Table 3, item 7 - suggested that the Lead be changed from Regional Health Unit to the Area Municipalities.	Changed. Changed Lead to be Area Municipalities; Durham Regional Health Unit remained a partner.
Table 4, item 1 - suggested that a lead agency (i.e., Kawartha Conservation) be identified for this action.	Changed. Kawartha Conservation added to lead.
Table 4, item 5 - it is suggested that the wording of this Action be revised to recognize that a program should be created. Further, it is suggested that the property owners be added to list of partners.	Changed. Added Landowners as partner, changed wording to: "Develop a program, with financial incentives as appropriate, …"
Durham Region (Nov 21, 2011) - NONQUON RIVER WATERSHED PLAN	
Page vii, surface water - it should be noted that the Class EA for the Nonquon River Water Pollution Control Plant (NRWPCP) will examine stakeholder concerns	Noted. The executive summary of the Watershed Plan document does not provide enough/appropriate context/space for the reader to address this comment fully. This comment is addressed elsewhere in the document (i.e., on Page 30 - see comment below).
Page 14, watershed plan development, 1st bullet - it should be clarified that the NRWPCP does not have "inadequate capacity" or "overflowing".	Changed. Added "public perception" to clarify source of comment.
Page 30, surface water - it should be clarified that the	Changed.

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Class EA for the Nonquon WPCP will devise "options" that should address stakeholder concerns. Lake Scugog Environmental Management Plan was completed prior to EA and does not include any technical data to support the 150 kg/yr recommendation. It should be clarified that the EA will establish requirements based on technical studies.	Changed wording clarified to include more detail about the Environmental Assessment process and the associated outcomes with respect to facility performance requirements.
Page 31 - The NRWPCP does meet the Certificate of Approval (C of A) requirements. Suggested that this target be removed.	Noted. In the Watershed Plan, there is no mention of the NRWPCP with respect to meeting (or not) C of A requirements. The facilities capacity to meet C of A requirements (at present or in the future) will be an important target in reducing contaminant loading into the Nonquon River and Lake Scugog. Thus, Kawartha Conservation would like to see this target (i.e., "Nonquon River Water Pollution Control Plant effluent quality that meets Certificate of Approval criteria"), remain.
Page 31 - suggested that the 150 kg/yr of Phosphorus target be removed.	Changed. Target removed.
Page 32 - suggested that the reference to the NRWPCP not exceeding 150 kg/year of phosphorus be removed.	Noted. The Lake Scugog Environmental Management Plan clearly recommends that the facility does not exceed 150 kg/year of phosphorus. Thus, KRCA would like to see this "key issue" remain. As previously mentioned, the target of 150 kg/year has been removed, as the EA process will determine targets.
Table 7, item 6 - suggested that the Area Municipalities (Scugog, Brock, Uxbridge) and CKL be identified as Lead agencies in implementing the Community Sustainability Plans. Durham would be a partner.	Changed. Changed Area Municipalities and CKL to be leads, and Durham as partner
Page 70, table 8, surface water - the NRWPCP currently meets the C of A for ammonia. It is suggested that the target be revised to read: "effluent quality continues to meet Certificate of Approval criteria"	Changed. Changed indicator in Monitoring Plan Table 8, under the "Nonquon River Water Pollution Control Plant effluent quality meets Certificate of Approval criteria" target to "Surface water chemistry of treated effluent".
Page 71, Table 8, surface water - suggested that the reference to the NRWPCP not exceeding 150 kg/yr be removed.	Changed. Target removed.
Durham Region (Nov 21, 2011) - BLACKSTOCK CREEK WATERSHED PLAN	
Table 3, item 5 to 9 - there appears to be a formatting error in the table. The Lead/partners	Changed. Fixed formatting errors.

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identified in the table don't appear to match with Action Items.	
Table 7, item 5 - The Action Item solely references North Durham ICSP. This plan has been completed, please remove "development". Also remove CKL. Area Municipalities should be listed as Lead Agencies.	Changed. Removed "development" and added Area Municipalities as Leads in implementation.
Durham Region (Nov 21, 2011) - EAST CROSS CREEK SUBWATERSHED PLAN	
Table 1 - please note that Cadmus is not a hamlet in Regional Official Plan.	Changed. Cadmus removed from table.
Table 7, item 6 - suggested that Area Municipalities (Scugog, Brock, Uxbridge) and CKL be Lead agencies in Integrated Community Sustainability Plan. Durham as a partner.	Changed. Area Municipalities and CKL changed to Lead, Durham as partner.
Durham Region (Nov 21, 2011) - SOUTHERN LAKE SCUGOG TRIBS WATERSHED PLAN	
Page iv - the ongoing EA to provide additional water capacity for Port Perry will address any concerns regarding the Permit to Take Water withdrawal amounts. Also, the plan does not appear to present any technical data to substantiate a "concern" in this regard.	Changed. Removed reference to potential concern with respect to PTTW withdrawal amounts. Added the following in its place… "Currently there is an ongoing Class Environmental Assessment process underway that will examine alternatives and devise options to provide additional water capacity for Port Perry."
Page 18 - the 3rd paragraph states that groundwater is removed from the "watershed" since it is returned to Lake Scugog. Revise statement to read "subwatershed".	Changed. Changed wording to reflect that these wells are located in the subwatershed of "Tributary 1".
Page 19, groundwater - the 1st paragraph states that groundwater is removed from the "watershed" since it is returned to L Scugog. Revise statement to read "subwatershed". Also, the water budget does not appear to substantiate any concern regarding water withdrawals.	Changed. Changed watershed to subwatershed. Deleted phrase that expressed concern over water withdrawal sustainability and added phrase that speaks to Class EA underway to investigate options.
Page 20, groundwater - no technical argument/data has been presented to substantiate the statement that municipal water takings are not sustainable. it is suggested that this bullet be revised/removed.	Changed. Removed wording "… not expected to be sustained on a long-term basis". Added wording: "the ongoing Environmental Assessment process will examine alternative approaches to servicing Port Perry while maintaining the hydrological integrity of the subwatershed." All other information within the bullet remains.
Table 3 - formatting error in the numbering of action items.	Changed. Fixed formatting errors.
Table 7, item 2 and 3 - formatting error, as the lead/partners identified for each action item appears	Changed. Fixed formatting errors.

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to be reversed.	
Table 7, item 5 - action item solely references North Durham ISCP. this plan has been completed, so delete "development". Also, remove CKL. Area Municipalities should be listed as Lead Agencies.	Changed. Removed "development" and added Area Municipalities as Leads in implementation.
Table 7, item 6 - action item appears to be a repeat of item 2.	Changed. This item changed to Integrated Community Sustainability Plans.
Page 71, conclusions - water budget does not appear to substantiate any concern regarding groundwater quantity stress. Suggested that this paragraph be revised.	Changed. Removed "the groundwater quantity in the watershed could be placed under some stress if the total allowable water permitted was to be taken (for Port Perry's municipal water supply), and more so if another well were to be drilled" from Conclusion.
EcoSpark (Nov 23, 2011) - NONQUON RIVER WATERSHED PLAN	
There are some inconsistencies in the spacing between sentences, as well as whether a term is capitalized or not (e.g. Brook Trout or brook trout, and Moraine or moraine). There are also some typos and grammar errors.	Changed. Document has been professionally edited for spelling, grammar, and readability.
Terms/definitions should to be clearly and consistently defined, namely: How do you define "clean", "natural", "high quality", "healthy" in your goals. It is defined in the plan in some cases, e.g. provincial standards, but what those are should also be described.	Noted. The operational definition of these terms is reflected in the targets. The goal statements are meant to be general, qualitative statements that are easily understood by the reader as a general desired state for the particular watershed component.
Page 5 – the percentages don't add up to 100%: 64% ET, 31% Q 3% GWnet totals to 98%.	Noted. The percentages do not total 100% because this is a summary of monthly water budget components which are expressed in decimal form. Due to rounding these values, yearly water budget components do not equal 100%.
Section 2.4 – it doesn't really explain how these key documents related to one another, i.e. how will the 2012 Source water Protection Plan related to the Nonquon River Watershed Plan?	Noted. Where appropriate, we have tried to illustrate linkages (e.g., Nonquon River Fisheries Management Plan's emphasis on aquatic habitat complements Watershed Plans). However, some initiatives are very specific in nature, as in the case of Source Protection Plans and emphasis on municipal drinking water system management.
Figure 4 – the legend should be written out, e.g. what is delta S?	Changed. Added definitions of water budget components when introducing water budget in Figure 4.
Page 21 – Implementation Approach – what about ongoing participation in the YPDT-CAMC	Changed. Added …"contribute to ongoing groundwater

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Groundwater Management Program?	characterization and modelling initiatives undertaken by Conservation Authorities Moraine Coalition and Durham Region".
Page 24 – last paragraph – "Potential contaminant sources….must be kept at a minimum" – what is considered minimum and by whom?	Noted. The operational definition of these terms is reflected in the targets. The lead-in text are meant to be general statements that are easily understood by the reader to introduce the targets and associated implementation actions.
Page 25 – Issues, first paragraph – How many locations in the watersheds should be tested – do more testing sites need to be added in the implementation, and is it feasible?	Noted. This is a general statement regarding the facts. We did not suggest an appropriate number of samples to be taken and/or where from which they should be taken.
Page 25 – Implementation Approach – could there be plans to identify abandoned/degraded wells? There should be plans to identify and test commercial/landfill sites outside of a case-by-case basis.	Noted. See Monitoring Plan. Currently, no coordinated approach for tracking private well condition within the watershed, however, there is strong support to do so.
Page 32 – Implementation Program – Should be an Education and Awareness program around sources of pollution, feeding into public consultations around the NRWPCP upgrading.	Noted. Currently Education and Awareness with respect to the NRWPCP are being undertaken through the Class EA process. See Table 5, there are action items that speak to the need for outreach materials regarding nutrient enrichment of the watershed/lake watershed.
Page 33 - Implementation Program for both urban and ag. objectives – Should be an Education and Awareness program around sources of the metals and chemicals, e.g. participation in World Water Monitoring Day or Water Week, etc.	Noted. See Table 5, there are action items that speak to the need for outreach materials regarding issues facing the watershed/lake watershed. We have provided some examples of potential programs (e.g., Peel Water Story, Water Festivals, etc.).
What about incorporating an ongoing participation in SMART (Stream Monitoring and Assessment Team) to implementation of some of the objectives?	Noted. Kawartha Conservation is an active participant in the SOSMART group, and regularly liaises with partners to further science understanding.
Ontario Ministry of Natural Resources - Aurora (Nov 25, 2011)	
Watson Crown Land Area (61 acres) which occurs in the East Cross Creeks Subwatershed is not mentioned.	Noted. Determined Crown Land area to be a relatively small area of completely natural land. No actions items relate to this property, therefore no further action necessary in Watershed Plan documents. However, this information to be added to East Cross Creek Subwatershed Characterization Report.