

Balsam Lake and Cameron Lake Management Plan

2015



**KAWARTHA
CONSERVATION**

Discover • Protect • Restore

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 that helps 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 who 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), Municipality of Clarington (Region of Durham), Township of Cavan Monaghan, and Municipality of Trent Lakes.

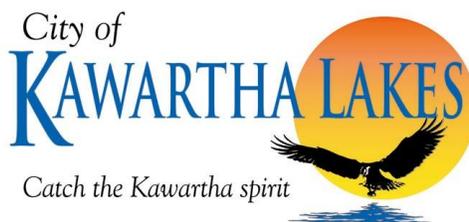
Cover photo: Cameron Lake, from Bill Moss.

Acknowledgements

This plan was written by Kawartha Conservation and developed with significant input from local community stakeholders including:

Balsam Lake Association (including Indian Point and Killarney Bay Cedar Point Associations)
Cameron Lake Moorings Association
City of Kawartha Lakes, Agricultural Development Advisory Board
City of Kawartha Lakes, Environmental Advisory Committee
City of Kawartha Lakes, Councillors from local Wards
City of Kawartha Lakes, Planning and Development Services Department
City of Kawartha Lakes, Public Works Department
Federation of Ontario Cottagers' Associations
Fleming College
Haliburton, Kawartha, Pine Ridge District Health Unit
Kawartha Conservation
Kawartha Lake Stewards Association
Kawartha Land Trust
North Pigeon Lake Ratepayers Association
Ontario Federation of Anglers and Hunters
Ontario Ministry of Agriculture, Food and Rural Affairs
Ontario Ministry of Natural Resources and Forestry
Ontario Ministry of the Environment and Climate Change
Parks Canada, Ontario Waterways
Sturgeon Point Association
Trent University

Funding for this project was provided by the municipality of the City of Kawartha Lakes.



Executive Summary

Balsam Lake and Cameron Lake are central, summit lakes of the Trent-Severn Waterway and are highly valued for providing significant economic, social, and ecological benefits to those who live, work, and recreate in the Kawartha Lakes region. The *Balsam Lake and Cameron Lake Management Plan* is a community-driven endeavour, stemming from a common resolve to maintain a healthy lake environment in light of pressures that threaten its long-term sustainability.

What constitutes a healthy lake? How do we know we are sustaining lake resources? To help steer us, a vision statement has been developed as the guiding principle for the plan:

“Ensure the long-term sustainability of a Balsam Lake and Cameron Lake ecosystem that provides a high-quality destination for living and working, boating, swimming, fishing, tourism, and access to water for household uses.”

The lake ecosystem is complex, with many interrelated components. The lake ecosystem changes through time, mirroring changes in land use practices and naturally occurring processes in its drainage basin and in the Kawartha Lakes system as a whole. Balsam Lake and Cameron Lake have traditionally been characterized as two of the healthiest lakes in the Kawartha Lakes. However, the lakes continue to experience the cumulative effects of pressures such as shoreline and urban development, agriculture, climate change, invasive species, and other impacts.

The intent of the *Balsam Lake and Cameron Lake Management Plan* is to provide a solid framework for a collaborative approach to achieving the vision statement. It is the culmination of a four-year planning project, supported by the City of Kawartha Lakes and developed with significant input from local stakeholders. The first three years of the project were dedicated to science-based assessments of the current state of the lakes and their watersheds, as well as capturing the key values and concerns of community stakeholders. Year four focused on crafting the management plan. Members of the Community Advisory Panel, the Science and Technical Committee, and local lake-stakeholders were instrumental in providing guidance and review of the *Balsam Lake and Cameron Lake Management Plan* and associated materials.

Goals:

To ensure the *Balsam Lake and Cameron Lake Management Plan* addresses land use pressures and other community-based concerns, the following strategic goals were developed at the project onset:

- **Maintain excellent water quality in the lakes and their tributaries for human use and ecological needs.**
- **Promote sustainable human and natural resources management activities that protect and enhance overall watershed and lake health.**
- **Use science-based findings to guide *City of Kawartha Lakes Official Plan* policies, by-laws, and other strategic planning documents to ensure a supportive planning policy framework with a primary goal of protecting the lakes and their watersheds.**

Objectives:

The project management team further defined our management approach through seven objectives. These were formed by considering all of the science-based and lake stakeholder-based issues facing the lakes and reorganizing them in a positive form to assist with framing management actions.

Objectives	Issues Addressed
1. Maintain excellent water quality conditions	<ul style="list-style-type: none">• High concentration of pollution in surface water runoff from urban areas• Potential eutrophication through excessive nutrient and sediment inputs into the lakes• Potential contamination from other sources
2. Enhance swimming opportunities at public beaches	<ul style="list-style-type: none">• High <i>E. coli</i> at certain beaches, leading to beach postings• Safety concerns at Bond Street Beach
3. Maintain the biodiversity of the lake ecosystem	<ul style="list-style-type: none">• Proliferation of non-native invasive species• Loss and fragmentation of natural habitats• Wildlife species at risk
4. Enhance and maintain the natural integrity of the shoreline	<ul style="list-style-type: none">• Dense urban development along the lake shoreline• Loss of shoreline property from erosion
5. Maintain healthy and productive sport fish populations	<ul style="list-style-type: none">• Potential future decline in muskellunge due to northern pike range expansion• Loss and fragmentation of aquatic habitat along the shoreline and in small- to medium-sized tributaries
6. Ensure permit application process for works projects is transparent and efficient	<ul style="list-style-type: none">• Confusion and/or frustration from shoreline owners and contractors
7. Improve our understanding of how the lakes will respond to emerging pressures	<ul style="list-style-type: none">• Lack of coordination of research and monitoring initiatives, and information management

Targets:

All Areas

- Within a five-year period, achieve a target of increasing forest cover in the core Balsam Lake and Cameron Lake planning area by 1% (100 acres) of the current deficit per year by planting (50%) and natural regeneration (50%). This equates to planting approximately 30,000 to 35,000 trees and shrubs annually in targeted locations.
- Within a five-year period, achieve a target of increasing streamside vegetation in the core Balsam Lake and Cameron Lake planning area by 1% (1.2 acres) of the current deficit per year by planting (50%) and natural regeneration (50%). This equates to planting approximately 500 trees and shrubs annually along stream corridors in targeted locations.
- Maintain the existing wetland cover at 20% in the core Balsam Lake and Cameron Lake planning area.

- Over the long term, achieve a 13% reduction in existing phosphorus loadings from all manageable sources (i.e., urban areas, agricultural areas, and shoreline septic systems) from local subwatershed inputs into Balsam Lake, to achieve a loading target of approximately 1,027 kilograms (kg) per year.
- Over the long term, achieve an 11% reduction in existing phosphorus loadings from all manageable sources (i.e., urban areas, agricultural areas, and shoreline septic systems) from local subwatershed inputs into Cameron Lake, to achieve a loading target of approximately 776 kg per year.

Agricultural Areas

- Every year, conduct five to 10 agricultural improvement projects in priority subwatersheds, such as creating streamside vegetated buffers and improving manure storage and fertilizer application.
- Over the long term, maintain or lessen existing phosphorus loading from local agricultural sources to achieve a loading target of approximately 103 kg per year or less into Balsam Lake and 353 kg per year or less into Cameron Lake.

Urban Areas

- Within a five-year period, achieve a target of 50% of urban residential and commercial properties implementing lot-level measures such as capturing stormwater runoff, using low or no phosphorus fertilizer, and increasing infiltration.
- Over the long term, achieve a 50% reduction in existing phosphorus loading from local urban sources to achieve a loading target of approximately 111 kg per year into Balsam Lake and 76 kg per year into Cameron Lake.

Shoreline Areas

- Every year, decommission vertical retaining walls or repair severely ice-damaged shorelines on three to five properties.
- Within a five-year period, achieve a target of 50% of shoreline properties practising lot-level measures, such as minimizing development of structures (excluding erosion protection) to 25% along shorelines, reducing fertilizer use, and retaining fallen trees in the nearshore area.
- Within a five-year period, achieve a target of 50% of residences having greater than 25% of their shoreline naturalized to a minimum of three metres (10 feet) from the water's edge.
- Within a five-year period, achieve a target of 80% (53 postings) reduction in the amount of time that public beaches are posted as "unsafe for swimming."
- Over the long term, achieve a 4% reduction in existing phosphorus loading from shoreline septic systems to achieve a loading target of approximately 813 kg per year into Balsam Lake and 347 kg per year into Cameron Lake.

Management Actions:

Upon synthesizing and analysing all available science-based information, as well as through extensive stakeholder consultations, 30 "best bet" management actions were identified and grouped under five strategic themes:

- Stewardship,
- Strategic Planning,
- Urban and Rural Infrastructure,
- Research and Monitoring, and
- Communications and Outreach.

We have tried to develop actions as specific to Balsam Lake and Cameron Lake as possible by identifying priority areas for our management actions. Given the similar management pressures on lakes in the Kawarthas, most of these management actions are transferable to other lakes and will form the framework for all future lake management plans.

For each recommended action, these details are provided: level of urgency, rationale, priority areas, agent responsible for implementation, and deliverables. The following provides a summary of key actions contained in the plan.

Stewardship Strategy:

Actions tailored to rural, urban, and shoreline landowners, public land managers, and lake users for implementing best management practices on their properties for the benefit of all and the future health of the lakes

Actions	Urgency
A1: Implement lot-level measures such as reducing fertilizer use, increasing infiltration, capturing stormwater runoff, and other practices that conserve water and reduce pollution in targeted urban areas and waterfront communities.	High
A2: Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections.	High
A3: Implement measures such as boat and equipment sanitization to reduce the risk of transfer of invasive species between water bodies.	High
A4: Develop a reforestation program to re-establish and manage natural cover on marginal rural lands, particularly in subwatersheds that do not meet forest cover benchmarks.	Medium
A5: Reduce potential pollution from septic systems into the lakes by undertaking responsible management and maintenance.	Medium
A6: Implement measures such as vegetated buffer strips along streams, conservation tillage, and other practices that reduce nutrient and soil loss from farms with assistance from cost-share programs.	Medium
A7: Implement programs to educate lake users about proper boat maintenance, grey water disposal, and the locations of sensitive habitats to reduce the risk of pollution and lake ecosystem disturbance.	Medium

Strategic Planning Strategy:

Actions that focus on strengthening the land use planning and policy framework, with an emphasis on updating the municipal Official Plan

Actions	Urgency
B1: Amend and strengthen the <i>City of Kawartha Lakes Official Plan</i> (City of Kawartha Lakes, 2012) and Secondary Plans policy to require protection of the natural environment through specific measures such as development setbacks adjacent to shorelines or streams.	High
B2: Develop a Shoreline Secondary Plan that provides enhanced land use planning direction specific to shoreline areas around the lakes.	High
B3: Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality.	High
B4: Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines.	Medium
B5: Implement the following plans: <i>Trent Source Protection Plan</i> ; <i>Fisheries Management Plan for Fisheries Management Zone 17</i> ; <i>Kawarthas, Naturally Connected Natural Heritage Systems Strategy</i> ; <i>Our Kawartha Lakes Integrated Community Sustainability Plan</i> ; and <i>Balsam Lake and Indian Point Provincial Park Plans</i> .	Medium
B6: Initiate a trial one-window permit application process for shoreline works between Parks Canada and Kawartha Conservation.	Medium

Urban and Rural Infrastructure Strategy:

Actions that focus on maintaining sustainable operations for government infrastructure projects and other construction works including stormwater and wastewater network as well as shoreline public-access areas, other roads, agricultural drains, and all construction sites

Actions	Urgency
C1: Through stormwater management planning, improve the quality and control of stormwater in urban settlement areas of Fenelon Falls and Coboconk.	High
C2: Implement effective sediment and erosion control measures and other practices to prevent contaminants from reaching local watercourses during road work, agricultural drainage, and other construction projects.	High
C3: Increase community enjoyment of public beaches and parks by deterring geese, conducting regular maintenance, and increasing public access to shorelines.	Medium
C4: Operate Coboconk sewage treatment facility at maximum efficiency for pollutant removal and capacity.	Medium

Research and Monitoring Strategy:

Actions focused on addressing science-based information gaps to better understand the response of the lakes to emerging pressures, as well as tracking environmental health and plan effectiveness through time

Actions	Urgency
D1: Undertake pilot projects to test the effectiveness of innovative management approaches to nuisance aquatic plants and poor water quality in priority areas.	High
D2: Implement a coordinated lake monitoring program that regularly tracks key indicators of lake watershed health including nutrients, forest cover, fish communities, and oxygen levels.	Medium
D3: Conduct research to more accurately identify shoreline sources of nutrients, such as septic systems, and potential impacts to nearshore areas of the lakes.	Medium
D4: Conduct research to identify how the lake ecosystem responds to stressors such as cumulative development, climate change, and invasive species.	Low
D5: Determine the socio-economic value of Balsam Lake and Cameron Lake, with emphasis on the value of goods and services provided by natural resources.	Low

Communications and Outreach Strategy:

Actions that stimulate dialogue and information sharing among all stakeholders and promote sustainable practices to maintain a healthy lake environment

Actions	Urgency
E1: Communicate the science, issues, solutions, targets, and outcomes of plan implementation.	High
E2: Maintain the Community Advisory Panel to ensure effective communication, agency support, and collaboration among lake stakeholders during plan implementation.	High
E3: Maintain the Science and Technical Committee to ensure effective communication, support, and collaboration among monitoring and research-based organizations.	High
E4: Create opportunities for stakeholder input through plan implementation, and regularly assess stakeholder needs, concerns, barriers, and knowledge gaps.	High
E5: Profile the natural heritage features, social values, and economic values of Balsam Lake and Cameron Lake, including a long-term vision for the lakes and a shared sense of responsibility to protect them.	High
E6: Work collaboratively with people and projects that contribute to the objectives of the lake plan.	Medium
E7: Undertake Community Based Social Marketing to motivate lake and watershed friendly lifestyles.	Medium
E8: Engage school youth in environmental programming and volunteer opportunities.	Medium

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Acronyms and Unit Conversions

ug/L: Micrograms per litre

m: Metres (1 m = approx. 3.3 feet)

km: Kilometres (1 km = approx. 0.6 miles)

km²: Square kilometres (1 km² = approx. 0.386 miles² = 100 hectares = approx. 250 acres)

ha: Hectares (1 ha = 0.01 km² = approx. 2.47 acres)

kg: Kilograms (1 kg = approx. 2.2 pounds)

m³: Cubic metres (1 m³ = approx. 35 cubic feet)

1.0 Setting the Context



Official Launch of the Balsam Lake and Cameron Lake Management Plan at Canada's Freshwater Summit (Coboconk, June 2011)

1.1 Introduction

The *Balsam Lake and Cameron Lake Management Plan* is the culmination of a four-year study coordinated by Kawartha Conservation and funded by the municipality of the City of Kawartha Lakes. The Plan is a community-driven endeavour, providing a framework for the implementation of collaborative strategies for maintaining the health of Balsam Lake, Cameron Lake, and their watersheds for all uses.

Balsam Lake and Cameron Lake are located at the top end of a chain of lakes known as the Kawartha Lakes, which collectively form the central navigable route of the Trent-Severn Waterway system. Both lakes are situated entirely within the municipality of the City of Kawartha Lakes. Waters from Balsam Lake flow east into Cameron Lake, then into Sturgeon Lake, and continue southeast, eventually draining via the Trent River into the Bay of Quinte and out to Lake Ontario.

The overall drainage area into Balsam Lake and Cameron Lake is approximately 3,100 square kilometres (km²) and encompasses over one quarter of the entire Trent River basin (Figure 1.1). Most of this drainage area (89% of the total) comes from the Gull River and Burnt River watersheds from the north. The remaining lands (11%) drain directly into the lakes through relatively small rivers and streams. Balsam Lake's surface area, at approximately 48 km², is the largest lake entirely within the City of Kawartha Lakes, and it is the fourth largest lake of the 13 named largest Kawartha Lakes along the Trent-Severn Waterway route. Cameron Lake's surface area is approximately 15 km², making it the seventh largest of the Kawartha Lakes.

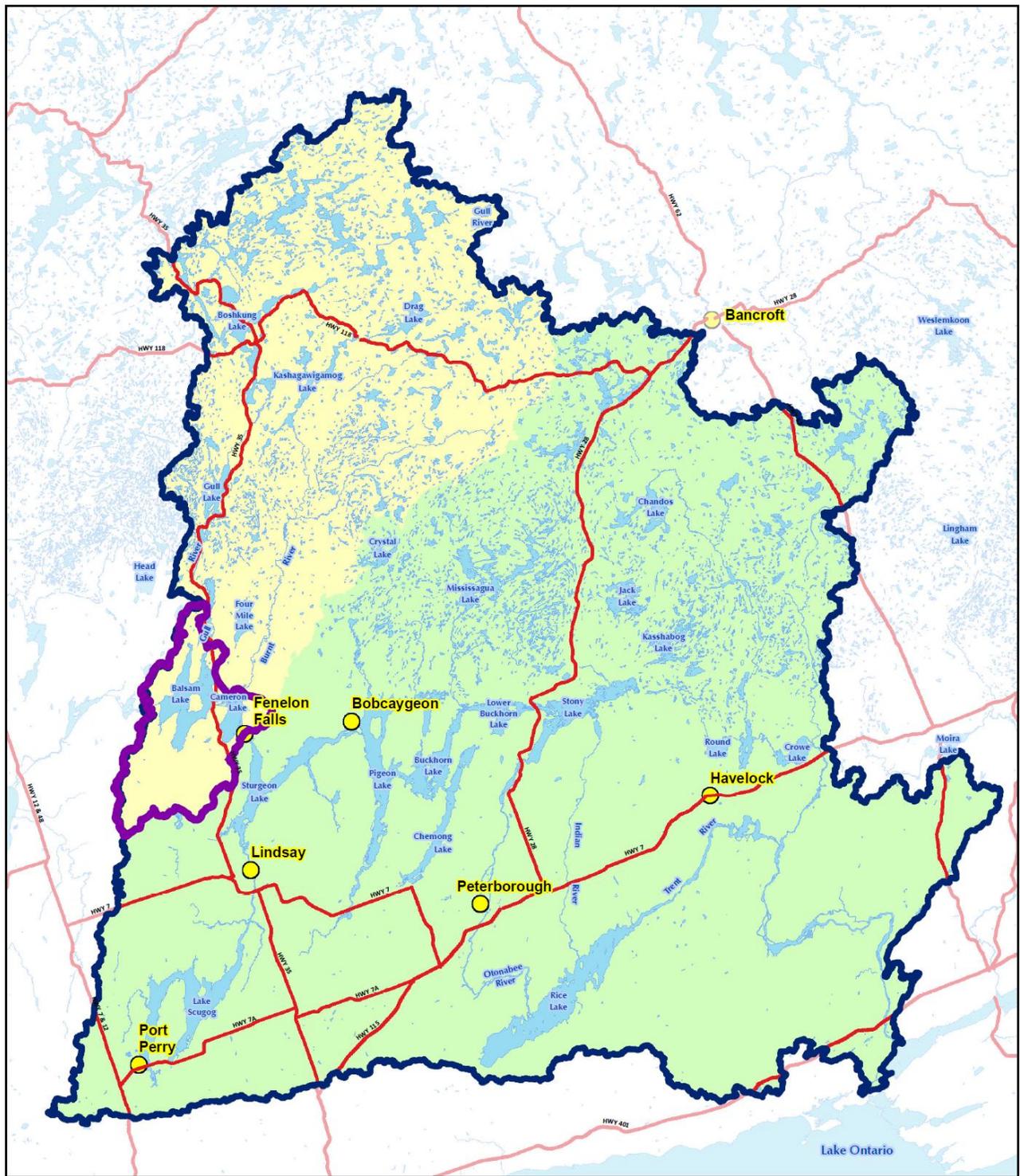
The core management planning area of the *Balsam Lake and Cameron Lake Management Plan*, including the lakes, is 336 km² (Figure 1.2). Therefore, management actions in this plan are focused on lands and waters that drain directly into Balsam Lake and Cameron Lake (including the lakes themselves), but exclude the watersheds of Gull River, Burnt River, and Corben Creek.

Document Layout

Chapter 1 provides the foundation upon which the *Balsam Lake and Cameron Lake Management Plan* is developed and includes a summary of lake management drivers, stakeholder values and concerns, management vision and goals, and background characterization.

Chapter 2 provides a summary of management objectives. These include the aspirations of lake-based community stakeholders and ultimately provide the foundation for the Implementation Plan. Within each objective, a number of issues hindering their achievement have been presented.

Chapter 3 presents the preferred lake management actions that address the key points and issues identified in Chapter 2. These actions are categorized into five strategies focused on sector-based action items. The strategies include Stewardship, Strategic Planning, Urban and Rural Infrastructure, Research and Monitoring, and Communications and Outreach.



Trent River Watershed

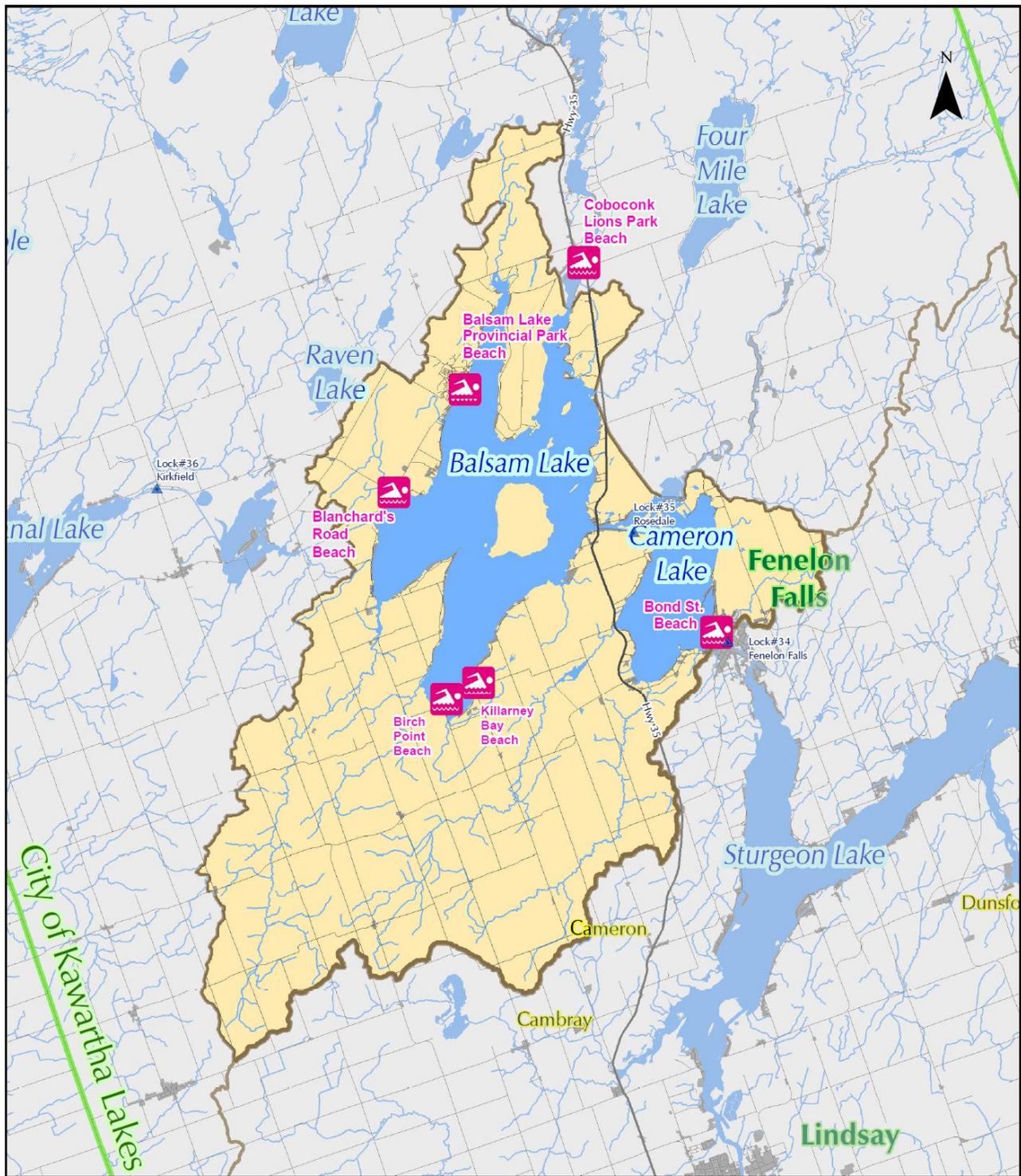
- Trent River Watershed
- Balsam Lake and Cameron Lake Watershed
- Core Balsam Lake and Cameron Lake Management Planning Area

0 5 10 20 30 40 Kilometres


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 Geospatial Data Exchange.
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 Additional Data Sources



Figure 1.1: Map showing the core Balsam Lake and Cameron Lake Management Planning area, in relation to its upstream catchments and the entire Trent River drainage basin



Index Map

- BCLMP Planning Area
- Waterbodies
- Municipalities
- Roads
- Locks
- Beach Sites

0 1.25 2.5 5 7.5 10 Kilometres

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 Additional Data Sources

Figure 1.2: Map showing the core Balsam & Cameron Lake Management Planning area

1.2 Lake Management Drivers, Values, and Concerns

Balsam Lake and Cameron Lake are water resources of the utmost value to the municipality of the City of Kawartha Lakes, shoreline residents, seasonal visitors, and local businesses. Surrounding communities benefit from their economic, environmental, and recreational enjoyment opportunities. For many people, these lakes are an integral part of their identity and livelihood.

The following reports, studies, and recent developments demonstrate the imperative for lake management plans for the Kawartha Lakes:

- In 2002, a report commissioned by the City of Kawartha Lakes, titled *Shoreline Environmental Studies in Support of Official Plan Policies for the City of Kawartha Lakes* (Gartner Lee and French Planning Services, 2002), recommended that the municipality encourage the development of individual lake management plans as a cooperative process among lake residents, the municipality, businesses, and provincial and federal agencies.
- In 2007, the *Discussion Paper #1: Natural Environment* tabled for the Panel on the Future of the Trent-Severn Waterway identified ongoing issues that threaten the sustainability of all the Trent-Severn Waterway lakes, including cumulative and ongoing waterfront development and shoreline hardening, wetland loss, upland habitat loss and fragmentation, eutrophication (nutrient enrichment of the lake), and invasive species.
- In 2008, a report by the Panel on the Future of the Trent-Severn Waterway, entitled *It's All About The Water: Report of the Panel on the Future of the Trent-Severn Waterway*, presented 26 recommendations to address issues and opportunities in sustaining the system. Of particular note are the findings from the Executive Summary: "...we have found that the economies of communities and the lives and lifestyles of millions of Canadians depend on effective management of that water and we are not certain that current management meets the standard that will most certainly be required in the future" and "...citizens perceive that water quality in this vast system is deteriorating."
- In 2008 and 2009, the City of Kawartha Lakes Environmental Advisory Committee hosted a series of Environmental Roundtables, inviting various community representatives to put forward initiatives to help realize their goals of protecting the environment. Twenty-two local associations and organizations with an interest or role in water quality participated. By a wide margin, lake management planning was selected as the number one priority.
- In 2009, a municipal staff report was presented to council, outlining support for lake management plans that aim to sustain healthy lakes. Council supported recommendations that lake management planning actions be coordinated by the local conservation authority. Two years later, following the commencement of the Sturgeon Lake Management Planning project, Kawartha Conservation entered into a four-year partnership with the City of Kawartha Lakes to lead the development of the *Balsam Lake and Cameron Lake Management Plan*. Plans for additional lakes were also considered at that time.
- In the summer of 2011, lake-water use restriction advisories were issued after widespread and potentially harmful blue-green algae outbreaks were confirmed in sections of nearby Sturgeon Lake and Pigeon Lake.
- In 2012, the City of Kawartha Lakes adopted a new Official Plan; the primary goal is to enhance and protect the quality of the natural environment within the municipality, with a particular emphasis on maintaining healthy water resources.
- In 2013, Parks Canada, the federal agency responsible for administering the Trent-Severn Waterway, announced funding cuts and operational restructuring. At present, details remain unclear regarding how these changes will impact the health of the system. Apparently, water levels and flow management will

remain a top priority. However, their natural heritage program has been cut dramatically. Reductions in resources typically result in less robust programs and services for promoting a healthy lake environment.

- In 2013, the Our Kawartha Lakes Integrated Community Sustainability Plan (City of Kawartha Lakes. Draft, 2013) identified numerous water sustainability goals, and the municipality now seeks to achieve many of these through a lake management planning process.
- In 2014, the *Sturgeon Lake Management Plan* (Kawartha Conservation, 2014) was published. This plan was well received by lake stakeholders and recognized as a professional template on which further lake management plans can be built.

Community-Based Values and Concerns

Throughout the development of the *Balsam Lake and Cameron Lake Management Plan*, significant effort was placed on gathering input from local community stakeholders. Particularly, guidance was received from the Community Advisory Panel, a group of committed individuals that met on a routine basis and provided invaluable project support and insight into "what the community wants for their lake."

The following provides a list of key values (Table 1.1) and concerns (Table 1.2) identified by lake stakeholders as priorities for lake management. These were obtained from consultations with public and lake-specific stakeholders, primarily through the Kawartha Conservation Blue Canoe shoreline communication program (summers of 2012 to 2014), three series of public open houses (fall of 2011 and summers of 2013 and 2014), and several Community Advisory Panel meetings and Science and Technical Committee meetings.

To ensure stakeholder values while addressing lake concerns, a coordinated management approach by all stakeholders (see Appendix A) is required. Open house events during August 2014 provided a clear indication that the lake community is well aware of the issues and will work together with partners who provide effective leadership and a sound action plan.

Table 1.1: Lake values identified by community stakeholders

Values	Details
Clean, Clear Water	Balsam Lake and Cameron Lake have both been historically renowned for their clean and clear waters. Being at the top end of the Kawartha Lakes system, they do not receive pollution from the historically degraded lakes such as Scugog and Sturgeon. Lake stakeholders have expressed a need to maintain these excellent water quality conditions. Cameron Lake provides residents of Fenelon Falls with municipal drinking water. Further, there are numerous private water intakes along the shoreline that provide water for domestic purposes.
Abundant Wildlife	Healthy fish and wildlife populations provide ample viewing, hunting, and fishing opportunities. These lakes are located in an ecologically significant area known as “The Land Between,” which supports high biodiversity.
Aesthetics and Scenery	Many individuals value the lakes as a place of clean water, relaxation, and beautiful scenery. Kawartha Lakes is a unique place, offering a natural setting within close proximity to urban and agricultural areas.
Recreational Opportunities	Both lakes are known for excellent boating, fishing, and swimming potential. Balsam Lake is the highest freshwater lake one may reach directly by boat from the Atlantic Ocean, and therefore, it has been named Canada's Freshwater Summit. Balsam Lake and Cameron Lake are large lakes of the Trent-Severn Waterway. There are two provincial parks located on Balsam Lake: Balsam Lake and Indian Point.
Vacation/Cottage/Retreat	The lakes present a unique opportunity, providing an affordable and accessible vacation and retirement destination from urban areas within the Greater Toronto Area and beyond.
Economic Driver	The lakes – and the Trent-Severn Waterway as a whole – are a significant tourist attraction that helps sustain local businesses, economies, and property values that rely on or are closely linked to healthy water conditions. The City of Kawartha Lakes reaps these benefits and, in particular, so do Coboconk, Kirkfield, Rosedale, and Fenelon Falls.

Table 1.2: Lake concerns identified by community stakeholders

Concerns	Details
Condition of Public Beaches	During summer periods, some public beaches are occasionally unfit for swimming as a result of contamination from <i>Escherichia coli</i> (<i>E. coli</i>) bacteria. Some individuals expressed safety concerns with respect to failing concrete structures that could injure swimmers at Bond Street Beach in Fenelon Falls.
Excessive Aquatic Plants	Aquatic vegetation is becoming more prolific in localized shallow, protected bays and shoreline areas.
Excessive Nutrient Inputs	There are concerns that excessive nutrients (e.g., nitrogen and phosphorus from lawn and crop fertilizers, animal wastes, and soil sediments) from runoff and human sources are causing contamination of the lakes.
Sedimentation	There are concerns that excessive sedimentation (e.g., soil carried to the lake in water) from runoff is contributing to decreasing water depth, smothering of fish habitat, and increasing productivity of aquatic vegetation.
Poorly Functioning Septic Systems	Concerns have been expressed regarding the potential for faulty or inadequate septic systems/tanks from aging shoreline dwellings, resulting in high nutrient inputs and/or contamination, especially in the nearshore zone.
Invasive Species	Non-native species (plants, fishes, and invertebrates) may be outcompeting or displacing native species, resulting in unbalanced ecosystems. Northern pike proliferation and their potential displacement of native muskellunge populations are of particular concern.
Water Level Management	High water levels can lead to (minor) flooding of properties and increased erosion. Historical high flows occurred in spring of 2013 and spring of 2014. Manipulation of water levels and flows through dams are potentially impacting fish populations and the lake ecosystem.
Geese Management	Many shorelines are frequented by Canada geese; geese droppings and grazing affect shorelines and public beach areas.
Youth Engagement	Some stakeholders have expressed concerns that the younger generation may not be as engaged and active in water quality and natural environment protection.

1.3 Management Vision and Goals

The *Balsam Lake and Cameron Lake Management Plan* seeks to solidify a common respect for the lakes, maintain a healthy resource for our current generation, and sustain healthy conditions for future generations. The issues facing the lakes will not be addressed overnight. As such, the plan should be considered a long-term endeavour, one that will be achieved only through ongoing collaboration.

The Vision of Balsam Lake and Cameron Lake is to

“Ensure the long-term sustainability of a Balsam Lake and Cameron Lake ecosystem that provides a high-quality destination for living and working, boating, swimming, fishing, tourism, and access to water for household uses.”

The Goals of the *Balsam Lake and Cameron Lake Management Plan* are as follows:

- Maintain excellent water quality in Balsam Lake, Cameron Lake, and their tributaries for human use and ecological needs.
- Promote sustainable human and natural resources management activities that protect and enhance overall watershed and lake health.
- Use science-based findings to guide *City of Kawartha Lakes Official Plan* policies, by-laws, and other strategic planning documents to ensure a supportive planning policy framework with a primary goal of protecting the lakes and their watersheds.

To ensure a common approach, management actions are guided by the following principles:

- Promote an ecological approach to the use of land and water as a fundamental perspective to healthy lakes and as the foundation for effective land use planning within the lakes’ watersheds.
- Recognize the links between human health and environmental health, while supporting a healthy economy.
- Maintain a watershed-scale perspective and consider the implications of cumulative actions on the lake basins as a whole.
- Recognize that management is a shared responsibility and requires a shared approach to coordination and implementation of actions.
- Use the management actions in the *Sturgeon Lake Management Plan* to guide the development of the *Balsam Lake and Cameron Lake Management Plan*.

1.4 Lake Background Characterization

To provide background information on the current environmental state of Balsam Lake, Cameron Lake, and their watersheds, a companion report was developed alongside the *Balsam Lake and Cameron Lake Management Plan* that characterizes current lake conditions. This report, the *Balsam Lake and Cameron Lake Watershed Characterization Report* (Kawartha Conservation, 2015), presents current information on lake resources (such as land use trends, water quality trends, etc.) as well as their functions, linkages, key issues, and information gaps.

In characterizing Balsam Lake and Cameron Lake, Kawartha Conservation has drawn upon all available data, studies, and sampling results and combined this information into a report for review and update as required. This background information, compiled primarily by specialist staff of Kawartha Conservation and vetted through science-minded peers, helped to inform management decisions and actions developed through the planning process.

The following is a summary of the report findings, presented in five key themes: Land and Lake Use, Water Levels and Flows, Water Quality, Aquatic Ecosystems, and Terrestrial Natural Heritage.

Land and Lake Use

Historical Context

The region around Balsam Lake and Cameron Lake was historically occupied by First Nations peoples, who likely had little or short-term environmental impact. As European settlement expanded into the area, there was a gradual but steady shift from exploiting the lakes' resources for commercial purposes (particularly through the extensive logging of forests and transporting large quantities of cut timber to mills, along with other products, on the Kawartha Lakes system) to enjoying the lakes for recreational purposes in the post-war era (such as providing a seasonal vacation retreat). In recent years, it has supported a more permanent population through conversions of seasonal to year-round residences, and it has steadily become more attractive as a retirement destination.

During settlement in the 19th century, steam boats and log runs were common sights on the Kawartha Lakes, due to the construction of the dam and locks systems at Fenelon Falls and Rosedale. Further inland, expansive forests were cleared to fuel the timber industry (and later to allow for farming), and wetlands were drained to create fertile crop lands. The construction of the Talbot sector, crossing the watershed divide and including the Kirkfield lock in 1907, allowed travel by boat to Lake Simcoe.

By the mid-20th century, land use in the upland and southern parts of the basins formed a distinctly rural landscape interspersed with remnant tracts of natural lands that have historically been too wet or too rocky to farm productively. The shoreline became heavily settled with residential cottages and dwellings during and after this time period, particularly in the urban centres of Fenelon Falls, Coboconk, and Rosedale, but also in several smaller lakeside communities.

Current Land Use

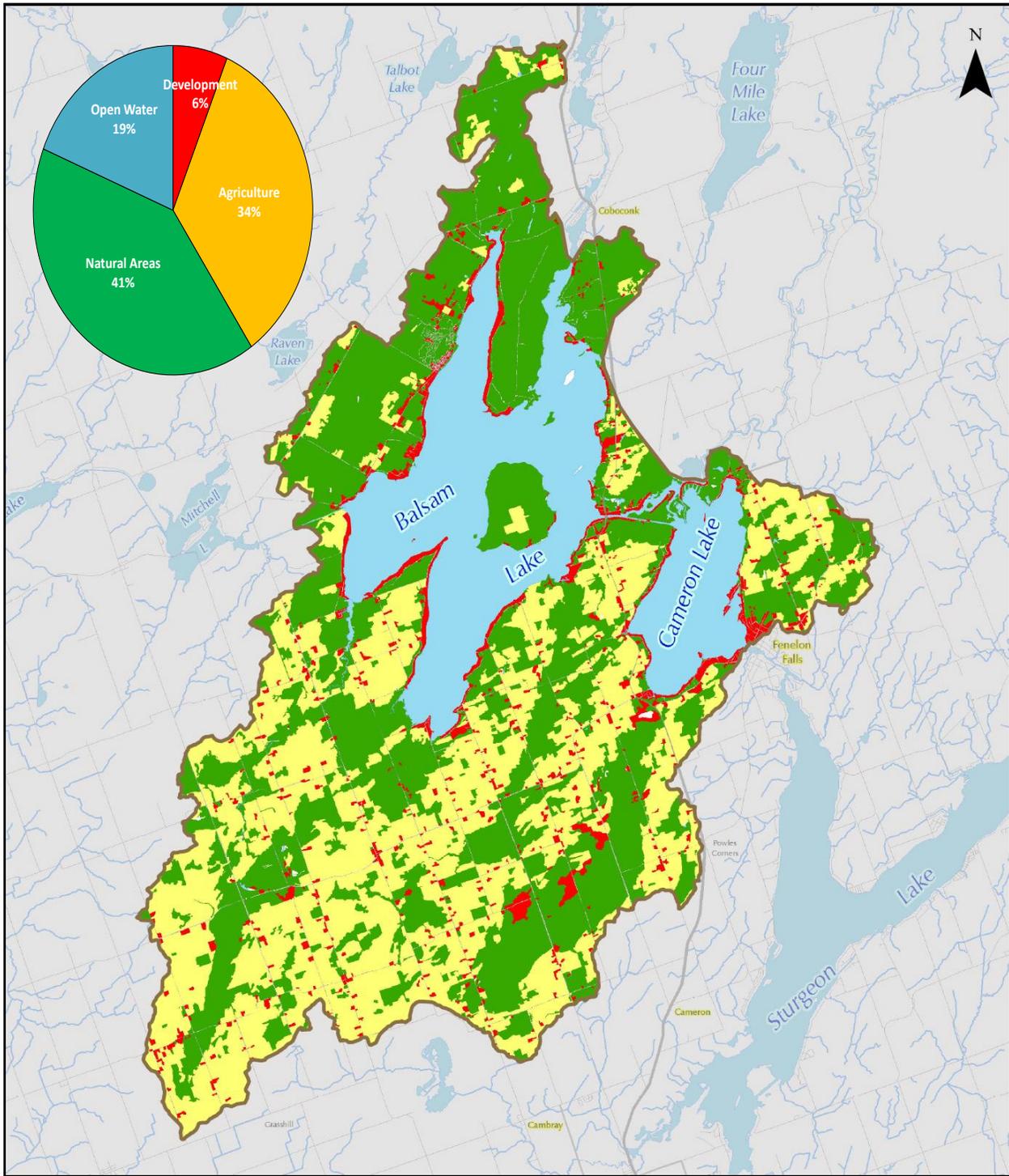
The major land use types in the core planning area are natural areas (41%), agriculture (34%), open water (19%), and development (6%) (Figure 1.3). The northern part of the basins is now mostly natural cover, owing in large part to Indian Point Provincial Park and large wetland areas.

The landscape around the southern parts of the lakes' basins is distinctly agriculture-based. Farming is a main source of economic activity in this region. Grain and hay crops dominate farm enterprises, and beef cattle production is second. Due to market forces, there is an apparent trend to more land conversion from pasture lands to crop fields resulting in land clearing and drainage improvements, typically tile draining. Also, there seems to be a trend toward fewer farms, managing larger areas of land.

The natural areas on the landscape consist mainly of wetlands with a few scattered forest areas. The majority of these features still exist today because they have always been too difficult to farm effectively, as they are extremely wet, low-lying areas.

Most of the developed areas in the planning area are located in Fenelon Falls and scattered along shoreline areas. There is a significant summer influx of seasonal residents in these areas due to cottage, tourism, and recreational opportunities. Reliable tourism and manufacturing industries, as well as transportation corridors to and from the Greater Toronto Area, are key to sustaining the prosperity of these communities. Numerous lake-related businesses and organizations cater to tourism and seasonal residents, for example, lodges, golf courses, bed and breakfasts, entertainment, landscaping, and property management.

Specific population counts for the Balsam Lake and Cameron Lake watersheds are unknown, however, the current population (as of 2011) of the City of Kawartha Lakes is 73,215. By 2031, the forecast for the municipality is a permanent population totaling approximately 100,000. The majority of this increase will occur in urban areas around lakes.



Land Use

- Natural Areas
- Development Areas
- Agriculture

- BCLMP Planning Area
- Roads
- Waterbodies

0 2 4 6 8 kilometres

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Additional Data Sources

Figure 1.3: Map showing major land use types within the core Balsam Lake and Cameron Lake Management Planning boundary

Shoreline

The shoreline of Balsam Lake and Cameron Lake combined is approximately 141 kilometres (km) in length. Balsam Lake is 98 km and Cameron Lake is 43 km in shoreline length. As shown in Figure 1.3, and Table 1.3, urban development in Balsam Lake and Cameron Lake planning area is concentrated along these shoreline areas. As of 2008, approximately 45% of the shoreline on Balsam Lake and 50% of the shoreline on Cameron Lake, has been developed within a 30-metre distance from shore. Most of this area has been cleared of natural vegetation to accommodate cottage or residential property development. Historically, shoreline development on both lakes was dominated by three-season cottage dwellings. More recently, there has been a shift to more permanent home dwellings as seasonal dwellings are being upgraded to four-season residences.

The rate of development has been more rapid along the shoreline of these lakes than in any other part of the planning area. Mystic Consulting Services and Ecoplans Limited (2005) report that building densities along the shorelines of all the Kawartha Lakes have dramatically increased since the 1950s. Balsam Lake is no exception, experiencing a 100% increase between 1952 and 1968 and a further 140% increase between 1968 and 1994 (Figure 1.4). At present, there are approximately 2,000 residences located along the shoreline of both lakes. Balsam Lake has 1,380 and Cameron Lake has 588 residences.

As a consequence of increased development intensity, the shoreline has also been significantly altered at the water's edge (that is, the shore/water interface). In Balsam Lake, it is estimated that 25% (or 22 km in length) of the water's edge consists of artificial land use including concrete, wood, manicured lawn, armour stone, and other materials (Figure 1.5).

Table 1.3: Table showing major land use types along the Balsam Lake and Cameron Lake shorelines, within varying distances from shore

		Distance from shore				
		15m	30m	100m	500m	1km
Balsam Lake	Developed (%)	50%	54%	50%	19%	13%
	Natural (%)	48%	45%	48%	67%	67%
	Agricultural (%)	1%	1%	2%	14%	19%
Cameron Lake	Developed (%)	46%	50%	48%	28%	21%
	Natural (%)	54%	50%	49%	47%	44%
	Agricultural (%)	0%	0%	3%	25%	35%

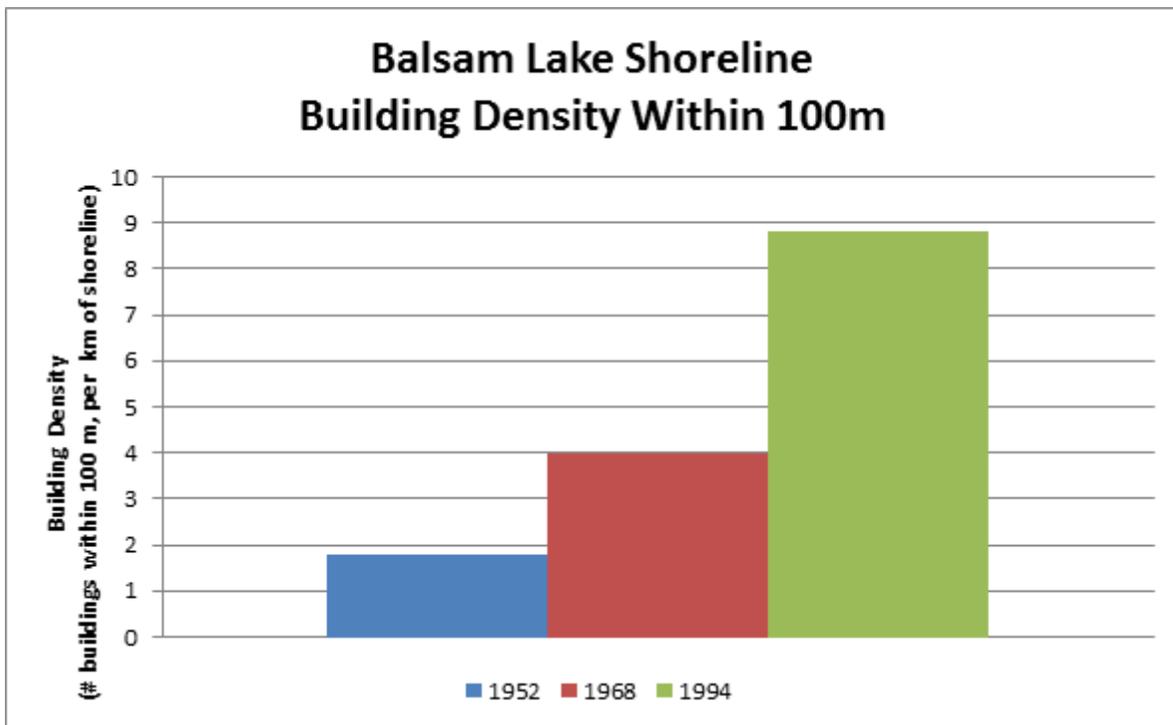


Figure 1.4: Balsam Lake shoreline building density in 1952, 1968, and 1994

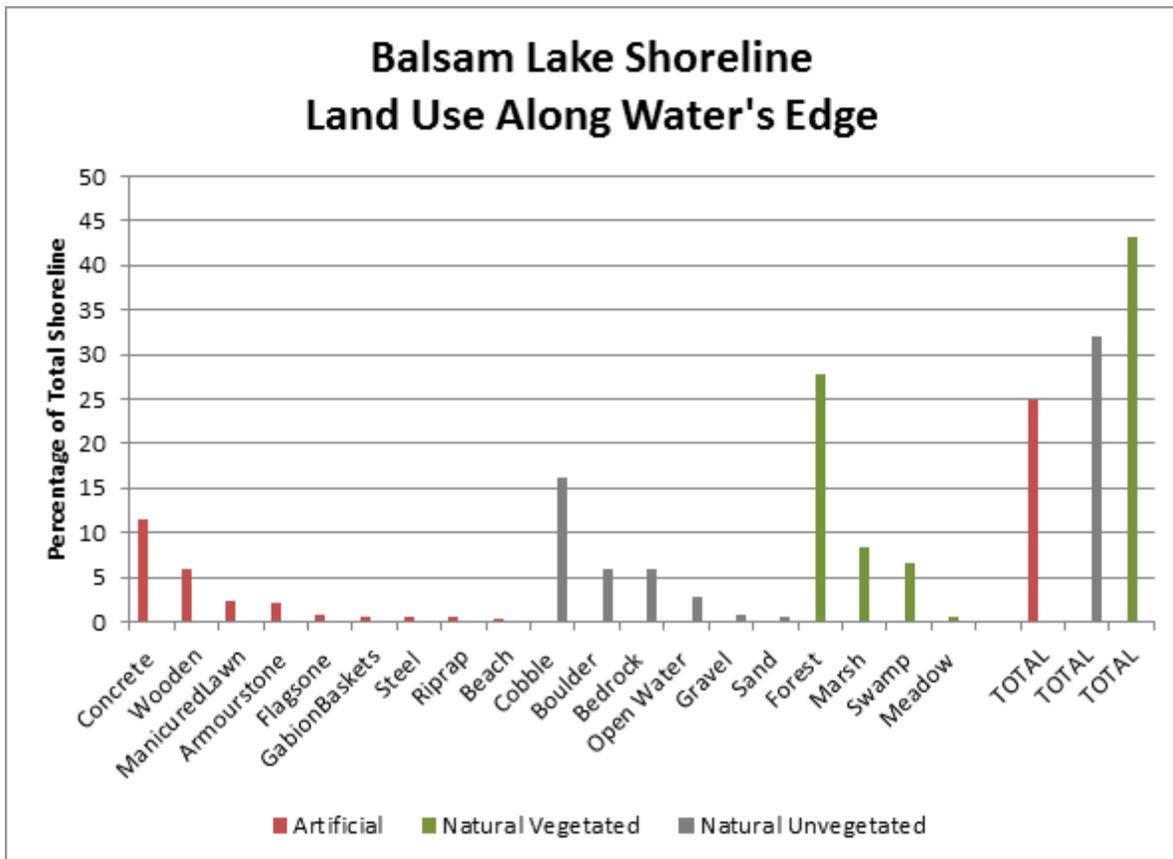


Figure 1.5: Major land use characteristics at the water's edge of the Balsam Lake shoreline

Tourism and Recreation

Balsam Lake and Cameron Lake are central lakes of the Trent-Severn Waterway system. The lakes connect, via locks and canals, to Sturgeon Lake (Fenelon Falls Lock #34), Mitchell Lake (Trent Canal), and to each other (Rosedale Lock #35). The locks at Fenelon Falls are the third busiest along the navigable system. In 2011 alone, approximately 7,000 vessels travelled through Fenelon Falls. Together, the traffic through these locks comprised just over 11% of all lock-traffic through the Trent-Severn Waterway system on an annual basis.

The lakes provide ample opportunities for swimming, boating (power, canoe, and sailboat), fishing, and hunting, all of which are key recreational activities on the lake. Fishing is particularly significant. A 2005 survey of recreational fishing in Ontario (Ministry of Natural Resources, 2009) indicates that the Kawartha Lakes provide one of the largest recreational fisheries in Ontario in terms of number of days fished. Balsam Lake, in particular, was ranked in the top 25 of all Ontario Lakes, and it hosts numerous competitive fishing tournaments every year. Historically, the Kawartha Lakes have attracted significant numbers of anglers because of highly desired fish stocks (especially walleye) and high natural productivity of the lakes. Within Fisheries Management Zone 17 (i.e., the Kawartha Lakes region and coldwater streams along Lake Ontario), it is estimated that investment expenditures related directly or indirectly to fishing totaled approximately \$114 million in 2005 alone (Ontario Ministry of Natural Resources, 2010).

There are five active public beaches on Balsam Lake (Coboconk Lions Park, Killarney Bay, Birch Point, Blanchard's Road, and Balsam Lake Provincial Park), and one on Cameron Lake (Bond Street, Fenelon Falls). Within the last five years, these beaches have been posted as "unsafe for swimming" 66 times, which is approximately one-quarter of the time tested. Bond Street Beach and Coboconk Lions Park Beach are the beaches most often considered unsafe for swimming due to high levels of bacteria in the water (Figure 1.6). Balsam Lake Provincial Park Beach has never been posted during this time.

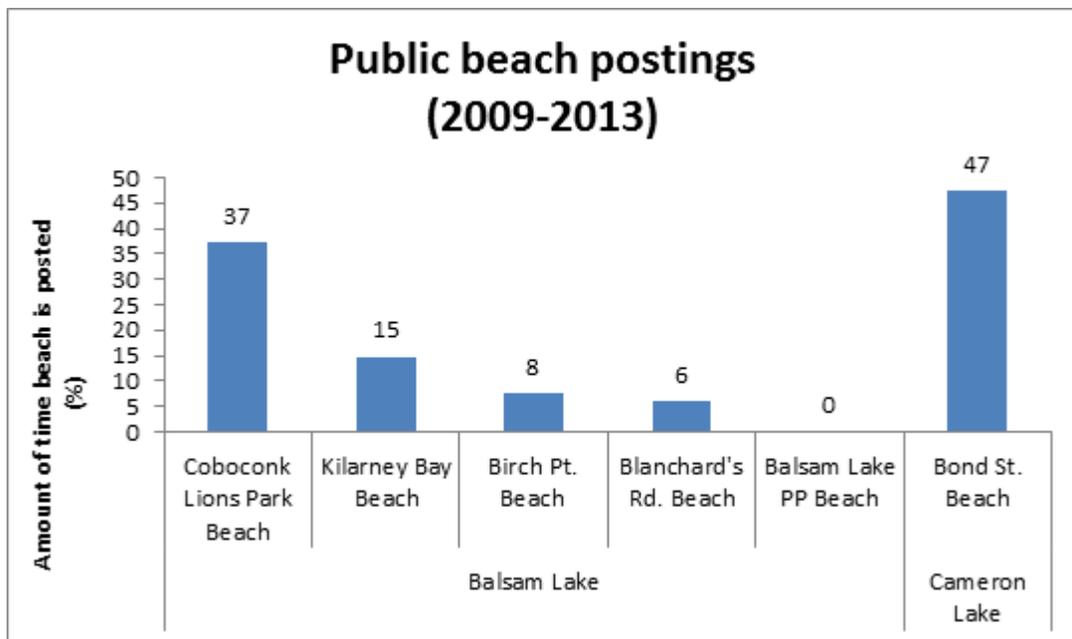


Figure 1.6: The amount of time (in percent) that each public beach has been posted during the swimming season (June, July, and August), between 2009 and 2013

The seasonal influx of vacationers in the municipality in the summer months is upwards of 17,500 (which equals an increase of 25% of the population), who mostly visit cottages and lakeside communities. The total seasonal population is forecast to grow from 31,000 (as of 2006) to approximately 37,500 by 2031. In 2008, an estimated total of 1,263,000 personal visits were made to the City of Kawartha Lakes, 56% of which were made for pleasure, making it the seventh most visited destination in Ontario. Total visitor spending that year was approximately \$111 million, and visitors were mostly Ontario residents. Balsam Lake, due to its clear-water state compared to most other Kawartha Lakes, is particularly attractive for waterfront living and water-based recreational activities.

Balsam Lake Provincial Park is a popular tourism destination in the summer, offering approximately 500 camping sites. In an average year, the park attracts approximately 150,000 visitors.

Drinking Water and Wastewater

For the drinking water supply, there is one municipal intake system that draws water from Cameron Lake for residents of Fenelon Falls. Many private systems have individual or communal pump intakes on lake shorelines, however, most private residences along the lake draw groundwater from wells. In terms of wastewater, the majority of residents along Balsam Lake and Cameron Lake are on private septic systems. Wastewater generated by urban areas in Fenelon Falls and Coboconk is treated at the respective water pollution control plants. Treated wastewater from Coboconk outlets into the Gull River, whereas wastewater from Fenelon Falls outlets into Sturgeon Lake.

Water Levels and Flows

The surface area of Balsam Lake is approximately 48 km² and Cameron Lake is 15 km², which makes them the fourth and seventh largest lakes, respectively, of the 13 large named Kawartha Lakes. In water volume, Balsam Lake is the second largest lake, at approximately 237 million cubic metres (m³). The volume of Cameron Lake, at approximately 100 million m³, is the fifth largest. Cameron Lake is one of the deepest of the Kawartha Lakes, with an average depth of 9.3 metres (m) and a maximum depth of 18.2 m. The Balsam Lake average and maximum depths are 4.8 m and 14.9 m, respectively. The water levels of both lakes are regulated by a Trent-Severn Waterway dam and lock structure at Rosedale (for Balsam Lake) and Fenelon Falls (for Cameron Lake). The water level in Balsam Lake is also regulated on the western side by the lock at Kirkfield (in the summer) and by the gate in the canal between Balsam Lake and Mitchell Lake (in the winter). During periods of extremely high runoff events, flows are occasionally diverted west along that route to Mitchell Lake.

Balsam Lake, on average, receives 840 million m³ of water flow every year. Most of this water (86%) comes from the Gull River, which outlets at Coboconk at the northeast end of the lake (Figure 1.7). The remaining water inputs include direct precipitation (5%), Balsam Lake Subwatershed (4%), Corben Creek (3%), Staples River (2%), and septic systems around the lake (<0.1%). Water exits Balsam Lake through the Rosedale River into Cameron Lake. In some years, when extremely high spring flows are entering the lake, some water exits (through dam manipulation) west to Mitchell Lake. On average, the water in Balsam Lake is replenished with new water (that is, flushed) approximately 3.5 times per year.

Cameron Lake, on average, receives 1.4 billion m³ of water flow every year. Most of this water comes from the Burnt River (50%), which outlets at the north end of the lake, and from Balsam Lake (46%), which outlets through the Rosedale River at the west side of the lake (Figure 1.7). The remaining water inputs include Pearn's Creek (1%), direct precipitation (1%), Martin Creek South (1%), Cameron Lake Subwatershed (<1%), and septic systems around the lake (<0.1%). Water exits Cameron Lake through Fenelon Falls into Sturgeon Lake and continues southeast through the Kawartha Lakes, eventually draining into Lake Ontario through the Trent River and the Bay of Quinte. Cameron Lake has a much higher flushing rate than Balsam Lake, at approximately 12.5 times per year.

Water levels in the lakes are regulated by Parks Canada, Ontario Waterways division, with the primary mandate to maintain enough water in the system during the months of late spring, summer, and early fall to accommodate vessel navigation through the waterway. The full navigation water levels in Balsam Lake and Cameron Lake are 256.2 and 255.04 metres above sea level, respectively. The lake levels are reduced in the winter months in preparation for spring runoff, largely from the northern reservoir lakes and their watersheds extending into Algonquin Park. These fluctuations are similar to those expected on natural lakes, except that on natural lakes the frequency and amplitude of water level fluctuations (that is, extreme highs and lows) are typically greater. The average annual water levels are shown in Figure 1.8.

The tributaries entering Balsam Lake and Cameron Lake, however, tend to exhibit well-defined seasonal flow patterns, more typical of a natural flow regime. High flows typically occur during early spring, associated with snowmelt, and throughout the year following high precipitation events. Low flows are usually observed in the summer and winter months. Groundwater discharge areas are limited in the planning area, therefore many sections on the smaller tributaries often run dry during summer months or have limited sustained flow.

The locations of all water inputs including local subwatershed drainage areas (excluding Gull River and Burnt River) are shown in Figure 1.9. During certain times of the year, some of the tributaries at their downstream sections (e.g., Staples River and Martin Creek South) may actually flow upstream or backwards, as significant inputs into the lakes from the larger Gull River and Burnt River raise the lakes water levels higher than the outlets of these systems.

Abundant wetlands and forested areas in the northern portion of the Balsam Lake and Cameron Lake watersheds provide significant benefits for surface water by moderating stream flow, providing high and low flow mitigation, and assisting in groundwater recharge.

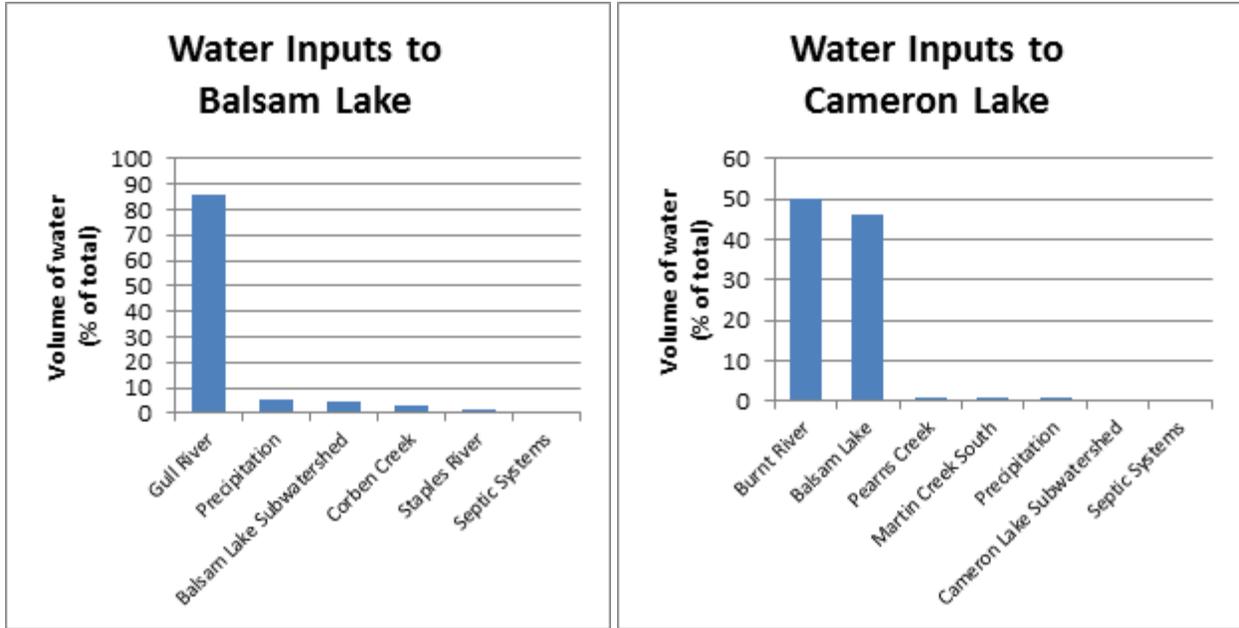


Figure 1.7: The major sources of water, by volume, entering Balsam Lake and Cameron Lake on an average yearly basis (2011-2014)

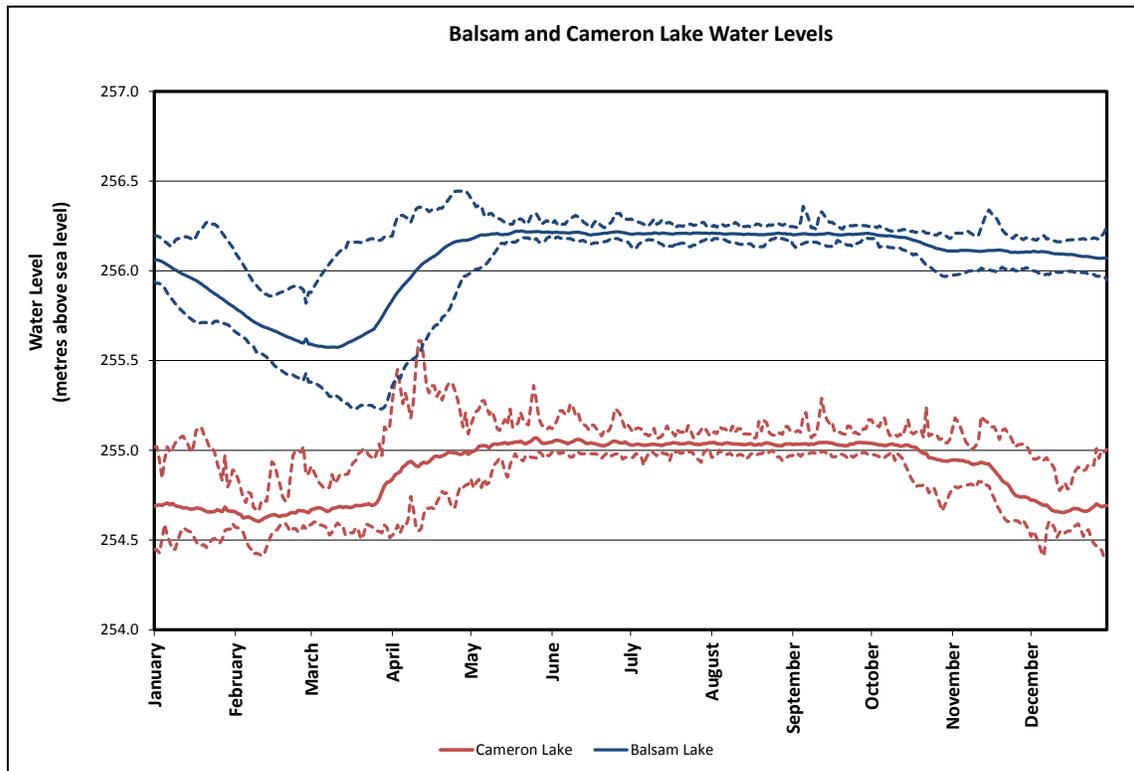
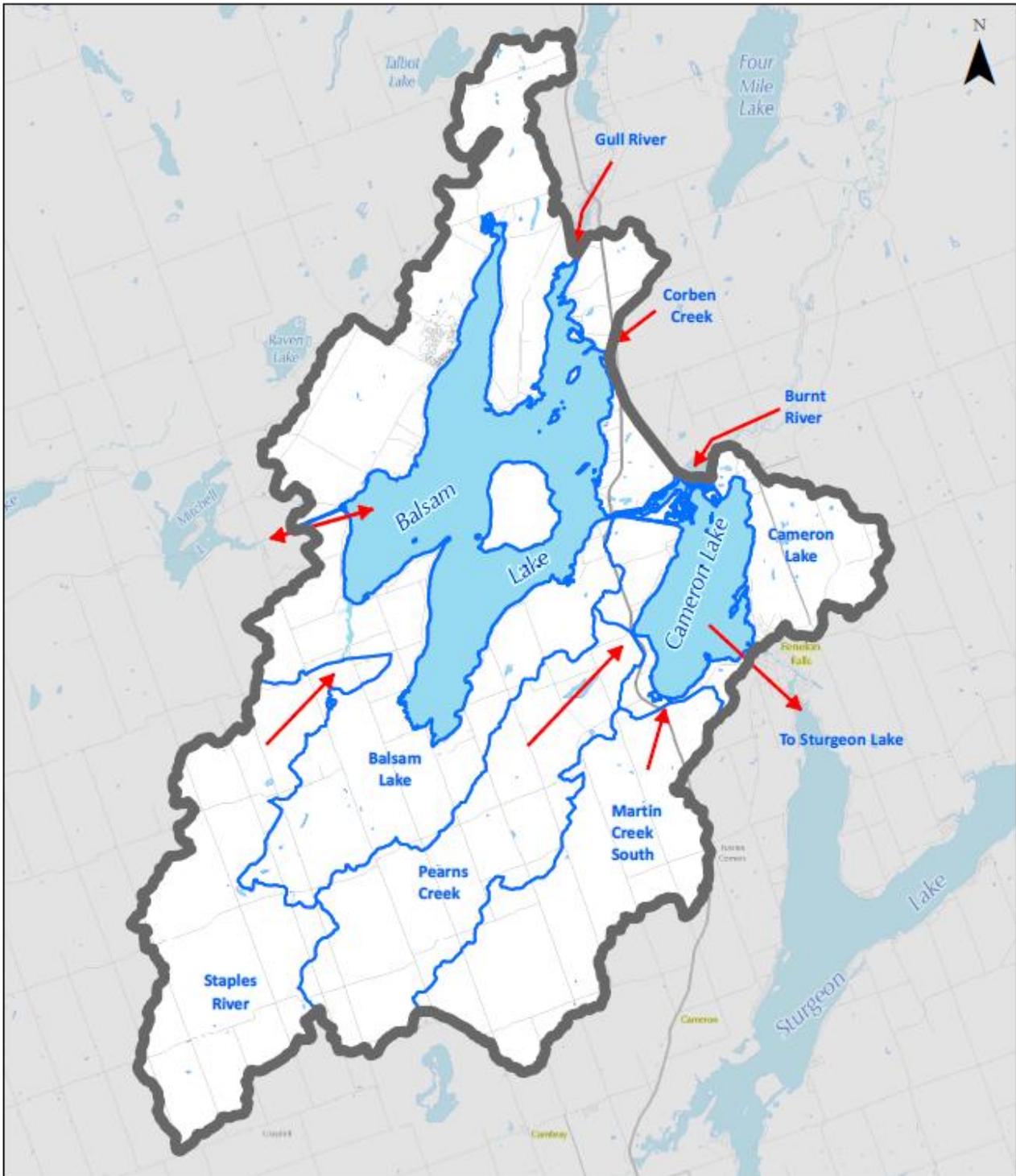


Figure 1.8: Daily average (solid line), maximum and minimum (dashed lines) water levels of Balsam Lake and Cameron Lake (1973-2013)



Water Flow Direction

-  Water Flow Direction
-  Subwatershed Boundary

-  BCLMP Planning Area
-  Roads
-  Waterbodies

0 2 4 6 8 kilometres

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Additional Data Sources



Figure 1.9: Major subwatersheds and their flow direction within the Balsam Lake and Cameron Lake Management Planning area

Water Quality

The need to maintain good water quality conditions in Balsam Lake and Cameron Lake is a major trigger for development of the *Balsam Lake and Cameron Lake Management Plan*. Good water quality is important to maintaining the environmental, economic, and socio-cultural benefits provided by the lakes.

Traditionally, Balsam Lake and Cameron Lake have been considered two of the “cleanest lakes” in the Kawartha Lakes system. This is due in large part to the drainage areas of their watersheds having extremely low development, and that most of their water comes from nutrient-poor lands off the Canadian Shield. These lakes have traditionally been in a clear-water dominated state, with no widespread algae blooms.

Some lakes in the Kawartha Lakes system (e.g., Sturgeon Lake and Rice Lake) have shifted in the last 40 years from a murky open-water dominated lake with frequent algae blooms to a clearer lake with more abundant aquatic plants. This coincided with substantial decreases in nutrient concentrations, largely as a result of phosphate reduction regulations and wastewater treatment improvements. During this time period, average total phosphorus concentrations in Balsam Lake and Cameron Lake decreased by approximately 40%. Since both lakes were initially in a clear-water state, such improvements have not resulted in such a dramatic ecosystem shift as in other downstream lakes.

At present, Balsam Lake and Cameron Lake are characterized as being on the threshold between oligotrophic (low productivity) and mesotrophic (moderately productive) water bodies. According to the *Provincial Water Quality Objectives* (Ontario Ministry of Environment and Energy, 1994), to avoid nuisance concentrations of algae in lakes with historically low nutrient concentrations, the average total phosphorus concentrations for the ice-free period should not exceed 10 micrograms per litre (µg/L). As shown in Figure 1.10, according to recent water chemistry sampling, all sections of Balsam Lake meet this criterion, whereas 3 out of 4 sections on Cameron Lake do not. Compared to other Kawartha Lakes, these two lakes have excellent water quality.

As stated in the *Provincial Water Quality Objectives* (Ontario Ministry of Environment and Energy, 1994), excessive plant growth in rivers and streams should not be evident at a total phosphorus concentration below 30 µg/L. As shown in Figure 1.11, according to recent water chemistry sampling, all major river systems and Local Subwatersheds have phosphorus concentrations that meet this objective.

Phosphorus Loading by Water Source

Another way of summarizing phosphorus information is to convert concentrations to loading amounts. Loading is the amount of phosphorus, by weight, that enters the lake on a yearly basis.

For Balsam Lake, the phosphorus loading data from 2011 to 2014 indicate that approximately 8,303 kg of phosphorus enter the lake every year. Of these inputs, 32% (2,635 kg) remains in the lake and 68% (5,668 kg) leaves the lake through the Rosedale River to Cameron Lake and through the Trent Canal to Mitchell Lake. The majority of phosphorus enters the lake during the spring, when elevated runoff caused by snowmelt and precipitation carries large quantities of nutrients into the lake. Figure 1.12a provides a breakdown of current phosphorus inputs into the lake by water input source. The categories represent inputs from the catchment areas identified in Figure 1.9. The following provides a summary of current phosphorus loadings into Balsam Lake each year by water source.

- Gull River accounts for 70% (5,811 kg) of the total. Flow from the Gull River has the lowest average phosphorus concentrations (8 µg/L) of any inflow. Since the volume of flow entering Balsam Lake from the river is extremely high (86% of the total inflow), it accounts for a major portion of nutrient loadings into the lake. This loading value also includes inputs from the Coboconk Wastewater Treatment Plant (3 kg, less than 0.1% of the total).

- Local Subwatersheds account for 20% (1,682 kg) of the total. This includes all phosphorus entering Balsam Lake from subwatersheds within the core planning area. The Balsam Lake Subwatershed accounts for the majority of phosphorus in this category (18% or 1,493 kg), which includes several unnamed tributaries as well as all of the shoreline septic systems around the lake. The other local subwatershed, the Staples River, accounts for 2% (189 kg).
- Atmospheric deposition accounts for 7% (560 kg) of the total. This category includes inputs from wet deposition such as rain, snow, and dew, as well as from dry deposition from dust. Due to the large watershed area of Balsam Lake compared with its total lake area, the contribution from atmospheric deposition is relatively low compared to other large lakes in southern Ontario. For example, it accounts for approximately 27% of phosphorus entering Lake Simcoe and 20% for Lake Scugog. These two lakes differ from Balsam Lake in that they have relatively small upstream catchment areas in relation to their large lake surface areas.
- Corben Creek accounts for 3% (250 kg) of the total. This tributary of Balsam Lake has low nutrient concentrations owing to its relatively undeveloped and forested drainage area that includes Four Mile Lake.

For Cameron Lake, the phosphorus loading data from 2011 to 2014 indicate that approximately 16,368 kg of phosphorus enter the lake every year. Of these inputs, 13% (2,151 kg) remains in the lake and 87% (14,216 kg) leaves the lake through Fenelon Falls. The majority of this phosphorus also enters the lake during the spring, when elevated runoff caused by snowmelt and precipitation carries large quantities of nutrients into the lake. Figure 1.12b provides a breakdown of current phosphorus inputs into the lake by water input source. The categories represent inputs from the catchment areas identified in Figure 1.9. The following provides a summary of current phosphorus loadings into Cameron Lake each year by water source.

- Burnt River accounts for 62% (10,178 kg) of the total. Flow from the Burnt River has relatively low average phosphorus concentrations (11 ug/L), but since the volume of flow entering Cameron Lake from the river is high (50% of the total inflow), it accounts for the majority of nutrient loadings into the lake.
- Balsam Lake inputs account for 30% (4,845 kg) of the total. This includes all the waters emptying from Balsam Lake into Cameron Lake from the west through the Rosedale River.
- Local Subwatersheds account for 7% (1,172 kg) of the total. This includes all phosphorus entering Cameron Lake from subwatersheds within the core planning area. The Cameron Lake Subwatershed accounts for the majority of phosphorus in this category (4% or 653 kg), which includes several unnamed tributaries as well as all of the shoreline septic systems around the lake. In the other local subwatershed, Martin Creek South accounts for 2% (268 kg) and Pearn's Creek accounts for 2% (251 kg) of the load.
- Atmospheric deposition accounts for 1% (173 kg) of the total. This category includes inputs from wet deposition such as rain, snow, and dew, as well as from dry deposition from dust. Similar to Balsam Lake values, the large watershed area of Cameron Lake, compared with its total lake area, makes the contribution from atmospheric deposition relatively low compared to other large lakes that have relatively small upstream catchment areas in relation to their large lake surface areas.

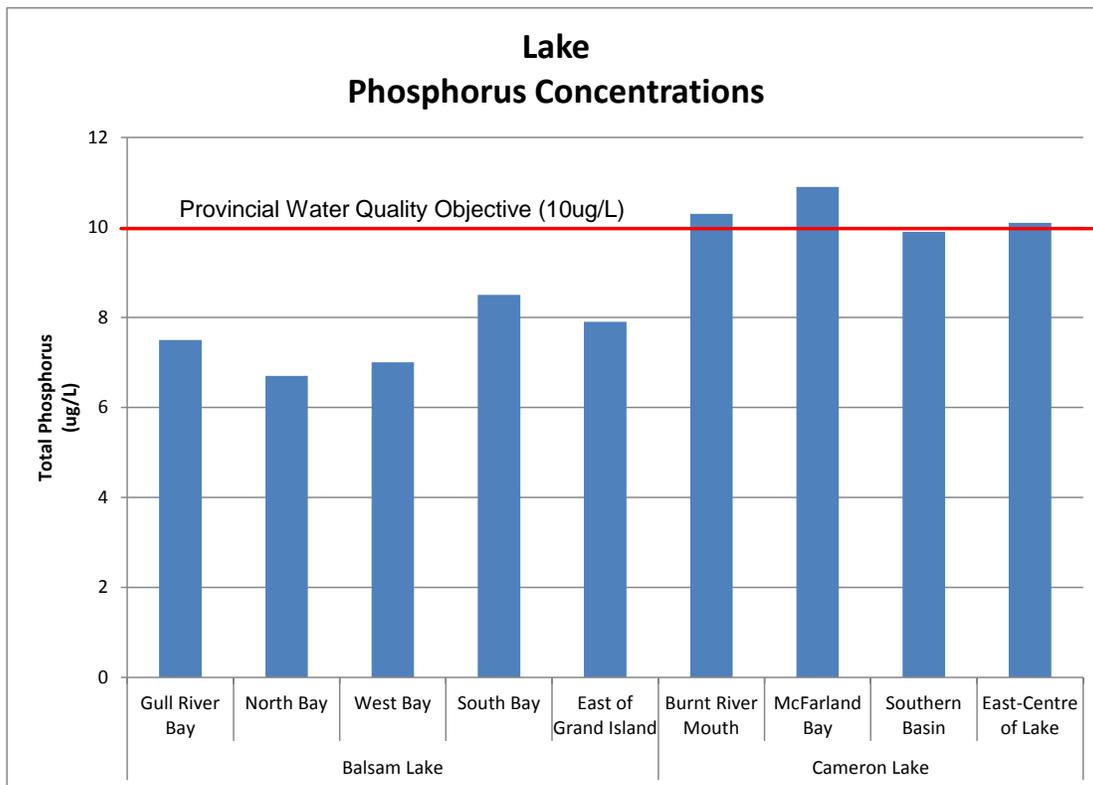


Figure 1.10: Average phosphorus concentrations (2011-2014) in Balsam Lake and Cameron Lake during the ice-free period, in relation to provincial water quality objectives

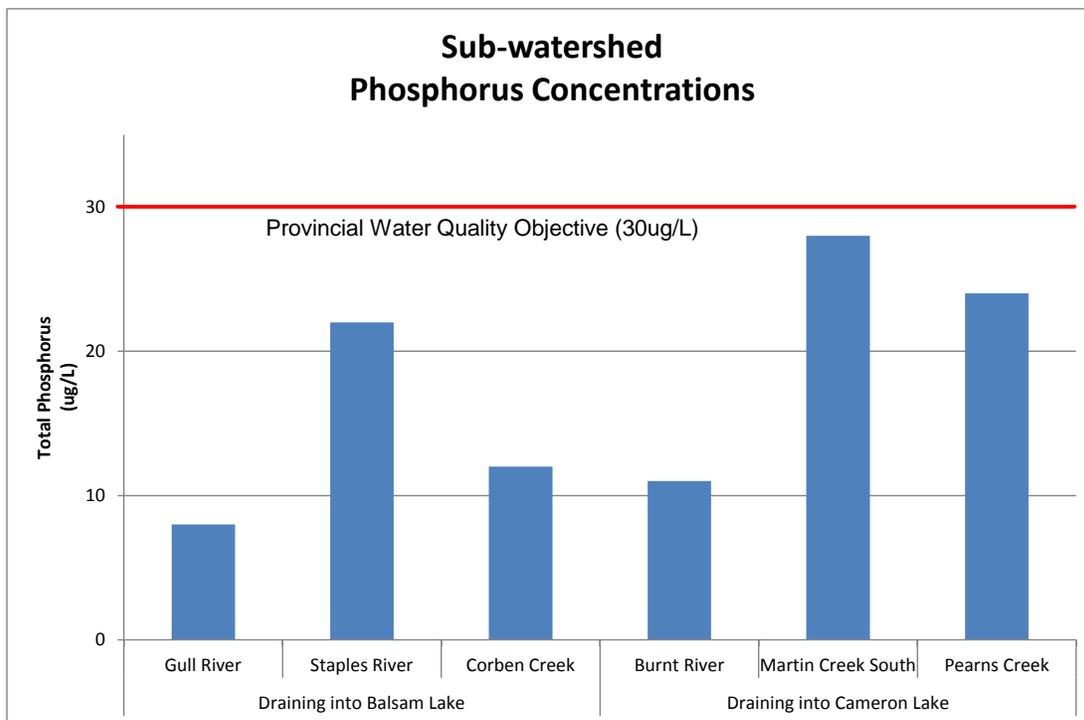


Figure 1.11: Average phosphorus concentrations (2011-2014) in lake subwatersheds and large tributaries, in relation to provincial water quality objectives

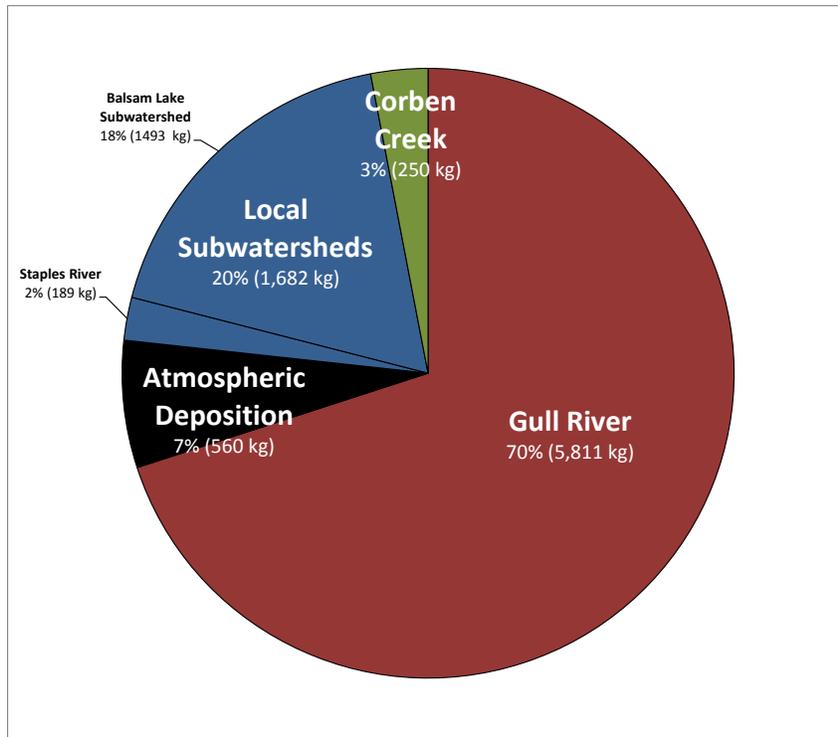


Figure 1.12a: Average annual phosphorus loadings into Balsam Lake, by major water source (2011-2014)

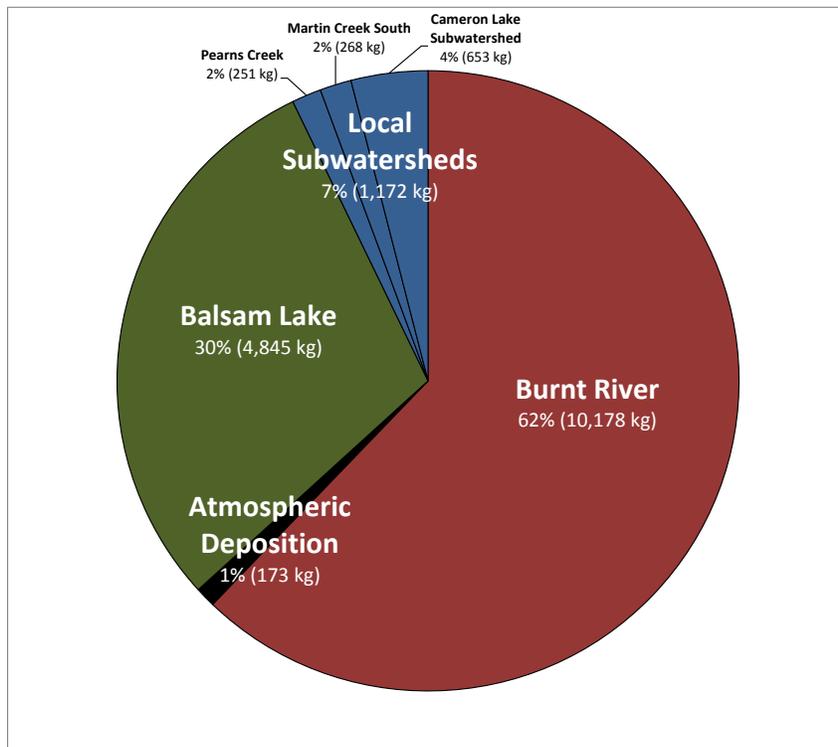


Figure 1.12b: Average annual phosphorus loadings into Cameron Lake, by major water source (2011-2014)

Phosphorus Loading by Sector

To determine the amount of phosphorus loadings into each lake by sector, inputs from the Local Subwatersheds category (i.e., the blue pie slices of Figures 1.12a and 1.12b) have been broken out into the estimated inputs generated from Natural Sources, Agricultural Runoff, Urban Runoff, and Shoreline Septic Systems. This approach assists in developing water quality benchmarks for the Local Subwatersheds in the core Balsam Lake and Cameron Lake Management Planning area.

The following provides a summary of current phosphorus loadings into Balsam Lake, by sector, in the Local Subwatersheds category (Figure 1.13a). These account for 20% (1,682 kg) of the total inputs into the lake, from the Balsam Lake Subwatershed (18% or 1493 kg) and Staples River water sources (2% or 189 kg).

- Shoreline Septic Systems account for an estimated 51% (851 kg) of the Local Subwatersheds category or 10% of the total entering Balsam Lake. This value includes estimated inputs from systems in close proximity to the Balsam Lake shoreline. There are approximately 1,380 residences with private septic systems within 75 m of the lake. To calculate phosphorus loading from septics, it was estimated that 50% of the phosphorus leaving each septic tank eventually reaches the lake. The phosphorus entering the lake from septic systems is of particular concern because it is orthophosphate, a form of phosphorus that is readily available for instantaneous algae growth.
- Natural Sources account for an estimated 30% (506 kg) of the Local Subwatersheds category or 6% of the total entering Balsam Lake. This source represents phosphorus that is deemed to enter the lake naturally (that is, without human origin) through stream and river flow within the core planning area. Examples of these inputs include wetlands and forests.
- Urban Runoff accounts for an estimated 13% (222 kg) of the Local Subwatersheds category or 3% of the total entering Balsam Lake. This represents the phosphorus generated from towns and other developed areas around the lake that enters the lake through stream overland flow within the core planning area. Examples of phosphorus inputs from urban areas include lawn fertilizers and pet wastes.
- Agricultural Runoff accounts for an estimated 6% (103 kg) of the Local Subwatersheds category or 1% of the total entering Balsam Lake. This represents the farm-generated phosphorus estimated to come from crop lands and pasture fields that enters the lake through stream and river flow within the core planning area. Examples of these inputs include fertilizer applications, field erosion, and livestock manure.

The following provides a summary of current phosphorus loadings into Cameron Lake, by sector, in the Local Subwatersheds category (Figure 1.13b). These account for 7% (1,172 kg) of the total inputs into the lake, from Cameron Lake Subwatershed (4% or 653 kg), Martin Creek South (2% or 268 kg), and Pearn's Creek (2% or 251 kg) water sources.

- Shoreline Septic Systems account for an estimated 31% (363 kg) of the Local Subwatersheds category or 2% of the total entering Cameron Lake. This value includes estimated inputs from systems in close proximity to the Cameron Lake shoreline. There are approximately 588 residences with private septic systems within 75 m of the lake. To calculate phosphorus loading from septics, it was estimated that 50% of the phosphorus leaving each septic tank eventually reaches the lake. The phosphorus entering the lake from septic systems is of particular concern because it is orthophosphate, a form of phosphorus that is readily available for instantaneous algae growth.
- Agricultural Runoff accounts for an estimated 30% (353 kg) of the Local Subwatersheds category or 2% of the total entering Cameron Lake. This represents the farm-generated phosphorus estimated to come from crop lands and pasture fields that enters the lake through stream and river flow within the core planning area. Examples of these inputs include fertilizer applications, field erosion, and livestock manure.

- Natural Sources account for an estimated 26% (304 kg) of the Local Subwatersheds category or 2% of the total entering Cameron Lake. This source represents phosphorus that is deemed to enter the lake naturally (that is, without human origin) through stream and river flow within the core planning area. Examples of these inputs include wetlands and forests.
- Urban Runoff accounts for an estimated 13% (152 kg) of the Local Subwatersheds category or 1% of the total entering Cameron Lake. This represents the phosphorus generated from towns and other developed areas around the lake that enters the lake through stream overland flow within the core planning area. Examples of phosphorus inputs from urban areas include lawn fertilizers and pet wastes.

Phosphorus Benchmarks

All subwatersheds have phosphorus concentrations that meet the *Provincial Water Quality Objectives* (Ontario Ministry of Environment and Energy, 1994). However, in striving to maintain the existing healthy water quality conditions, there is a need to reduce contamination to buffer impacts from future cumulative pressures. Thus, management benchmarks have been developed for phosphorus loading amounts based on their estimated contributions by sector.

As illustrated, there are four major water sources that load phosphorus into Balsam Lake: Gull River, Local Subwatersheds, Atmospheric Deposition, and Corben Creek (Figure 1.12a), and into Cameron Lake: Burnt River, Balsam Lake, Local Subwatersheds, and Atmospheric Deposition (Figure 1.12b). Sector-specific benchmarks have been developed for the sources of phosphorus considered manageable and within the scope of the core Balsam Lake and Cameron Lake planning area. This only includes the Local Subwatersheds category.

No sector-specific benchmarks have been developed at this time for the Gull and Burnt River systems because of their extremely large basins that extend well beyond the core Balsam Lake and Cameron Lake Management Planning area. However, these systems are significant contributors of phosphorus, therefore it will be important to work with partners in these areas to ensure responsible water quality management. Potential benchmarks for Corben Creek will be considered in the near future during the development of the Four Mile Lake Management Plan. No benchmarks exist for Atmospheric Deposition because it is considered an unmanageable source.

As shown in Figures 1.13a and 1.13b, the Local Subwatershed category has been further broken down into four sector-specific phosphorus contributions: Natural Sources, Agricultural Runoff, Urban Runoff, and Shoreline Septic Systems. The sector-based benchmarks only apply to Agricultural Runoff, Urban Runoff, and Shoreline Septic Systems categories. These three sources are considered manageable, whereas Natural Sources are not.

Benchmarks for shoreline septic systems were developed by estimating that approximately 5% of existing systems are "failing" (i.e., not functioning properly, which in the worst case equates to direct pollution into the lake). Therefore, the benchmark expresses how much reduction is needed to offset the "failing" loadings. Benchmarks for urban runoff were developed by estimating that the existing loading from these areas could be reduced by approximately 50% with the uptake of lot-level water quality improvement practices. The benchmark for agricultural runoff is to maintain or lower existing average loading conditions.

- The overall phosphorus benchmark for Balsam Lake is a maximum loading rate of approximately 1,027 kg per year. This equals a reduction of existing average annual phosphorous loadings by 149 kg (minus 13% of current loading from manageable sources) from the core planning area that drains into Balsam Lake (Table 1.4). Sector-specific phosphorus benchmarks are
 - 111 kg/year (minus 50% of current loading) or less, from Urban Runoff;
 - 103 kg/year (current loading) or less, from Agricultural Runoff; and
 - 813 kg/year (minus 4% of current loading) or less, from Shoreline Septic Systems.

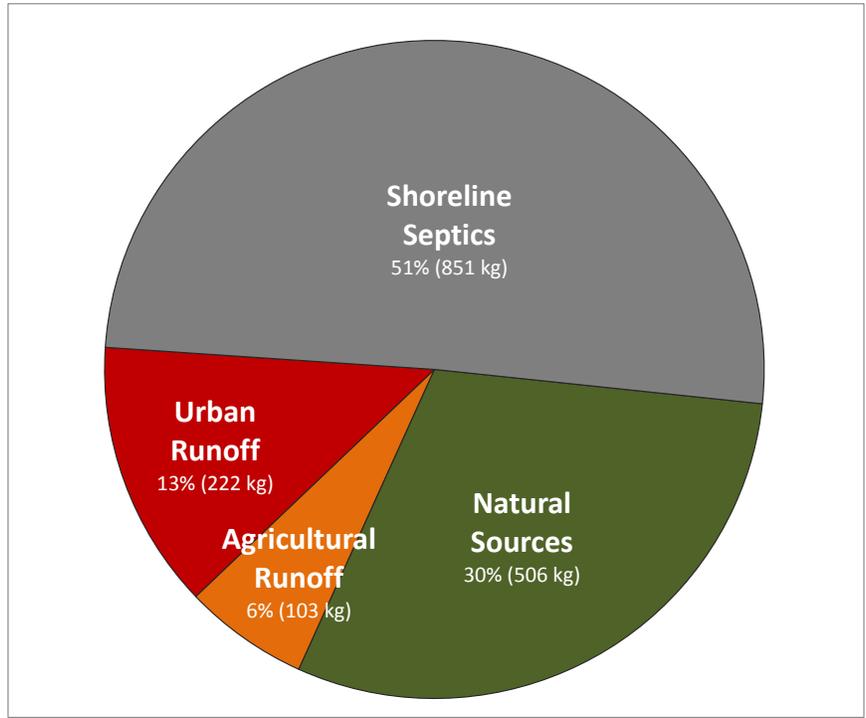


Figure 1.13a: Average annual phosphorus loading into Balsam Lake from Local Subwatersheds only, by sector (2011-2014)

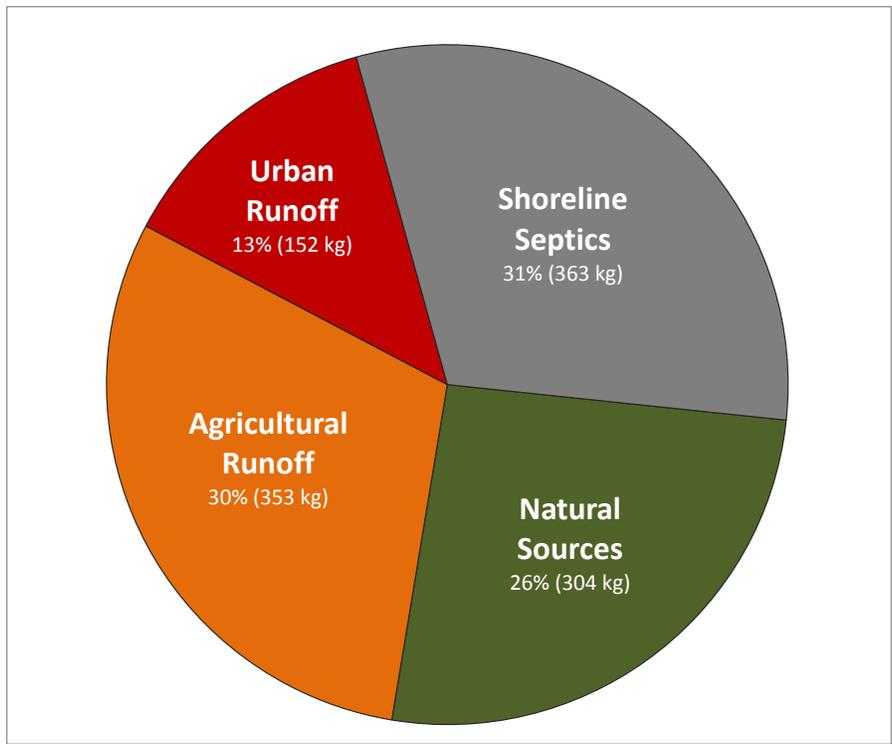


Figure 1.13b: Average annual phosphorus loading into Cameron Lake from Local Subwatersheds only, by sector (2011-2014)

- The overall phosphorus benchmark for Cameron Lake is the achievement of a maximum loading rate of approximately 776 kg per year. This equals a reduction of existing average annual phosphorous loadings by 92 kg (minus 11% of current loading from manageable sources) from the core planning area that drains into Cameron Lake (Table 1.4). Sector-specific phosphorus benchmarks are
 - 76 kg/year (minus 50% of current loading) or less, from Urban Runoff;
 - 353 kg/year (current loading) or less, from Agricultural Runoff; and
 - 347 kg/year (minus 4% of current loading) or less, from Shoreline Septic Systems.

Table 1.4: Phosphorus benchmarks on a sector basis

	Major Input Source	Existing Phosphorus Inputs (kg/year)	Benchmark Water Quality Objectives (kg/year)	Overall Reduction Needed (kg/year)
Balsam Lake	Urban Runoff*	222	111	111 (50%)
	Agricultural Runoff**	103	103	Maintain existing
	Shoreline Septic Systems***	851	813	38 (4%)
	Subtotal: Manageable Sectors	1,176	1,027	149 (13%)
	Natural Sources****	506	-	-
	Total: All Sectors in Local Subwatersheds	1,682		
Cameron Lake	Urban Runoff*	152	76	76 (50%)
	Agricultural Runoff**	353	353	Maintain existing
	Shoreline Septic Systems***	363	347	16 (4%)
	Subtotal: Manageable Sectors	868	776	92 (11%)
	Natural Sources****	306	-	-
	Total: All Sectors in Local Subwatersheds	1,172		

*Benchmarks for urban runoff are based on research from other areas of Ontario that suggests that by implementing various best-management practices, it is reasonable to expect a 50% decrease in phosphorous inputs from urban areas.

**Benchmarks for agricultural runoff are not suggested at this time, because many of the tributaries that drain agricultural lands within the planning area generally meet provincial water quality objectives. Therefore, the objective is to maintain loading amounts at approximately current values.

*** Benchmarks for shoreline septic systems currently do not exist. It is estimated that approximately 5% of existing shoreline septic systems are considered "failing," which equals approximately 38 kg and 16 kg per year of phosphorus going into Balsam Lake and Cameron Lake, respectively. Therefore, a 4% reduction from existing loading values is needed to make up this difference.

**** Benchmarks for natural sources are not applicable, and thus are not included in the overall reduction needed values.

Aquatic Ecosystems

Aquatic ecosystems refer to the water-related components that support life in and around Balsam Lake and Cameron Lake. Healthy aquatic life provides significant benefits such as economic revenue (e.g., a high quality fishery that attracts anglers to the area), social significance (e.g., a picturesque cottage-country setting with abundant wildlife), and ecological integrity (e.g., a self-perpetuating food web). As our lake-based communities continue to grow, so do the pressures placed on its ecosystem. The cumulative effects of pressures such as incremental habitat loss, pollution, and introductions of non-native species can cause dramatic shifts in the lake food web. Responsible management is needed not just at a property level, but also in recognizing that life in these lakes is dependent upon multiple components connected at a broader ecosystem level.

Due to the interconnectedness of the Kawartha Lakes, most aquatic life found in Balsam and Cameron Lakes and their tributaries is found in the other Kawartha Lakes as well. However, there are many unique characteristics worth noting, particularly in fish communities and aquatic habitat conditions.

Aquatic habitat conditions and the fish community structure in the Kawartha Lakes have changed with time. In general, since the mid-1970s, their aquatic ecosystems have shifted from a relatively murky, nutrient-enriched environment to more clear-water, aquatic plant-dominated systems. This is a result of reductions in nutrient loadings, the invasion of zebra mussels, and increasing water temperatures, along with other factors. Consequently, the fish community structure in the lake has also changed, not only from the Kawartha Lakes-wide ecosystem shift, but from other factors such as invasive species proliferation. Due to the traditionally clear-water dominated state of Balsam Lake and Cameron Lake, they have not experienced such drastic ecosystem shifts from phosphorus reductions because water clarity has always been relatively good compared to other lakes. However, both lakes have undergone a significant increase in water clarity during this time period. Other factors mentioned above (e.g., invasive species) have played a more dominant role in ecosystem structure and change in these lakes than improvements in water clarity.

Balsam Lake, Cameron Lake, and their tributaries support diverse coolwater and warmwater fish communities. Approximately 36 fish species have been documented in the core Balsam Lake and Cameron Lake Management Planning area (Table 1.5). The fish community structure in both lakes has changed over time through intentional stocking, range extensions, unintentional introductions, and non-native species invasions. Between 1999 and 2011, the most large-bodied fish species found in Balsam Lake, in terms of relative biomass, were smallmouth bass, black crappie, walleye, bluegill, common carp, rock bass, largemouth bass, white sucker, muskellunge, and pumpkinseed. Lake herring, a coldwater fish species, has been documented in the deeper basins of both lakes, however, the amount of coldwater habitat to support this species is limited to small volumes in the deeper basins. No known species listed as Special Concern, Threatened, or Endangered have been documented.

The lakes support a significant recreational fishery; the most targeted species are walleye, smallmouth bass, largemouth bass, and muskellunge. Other important fishery species include yellow perch, black crappie, and sunfish. Many Kawartha Lakes have recently experienced dramatic declines in walleye populations, largely attributed to the above-mentioned changes to their aquatic ecosystem that have favoured other fish species (e.g., bass). Balsam Lake and Cameron Lake have not experienced such a drastic ecosystem shift during the same time. Accordingly, Balsam Lake walleye populations have remained relatively stable. Lake-specific walleye regulations introduced in 2001 and decreased walleye harvest over the years have likely also contributed to walleye stability. The Kawartha Lakes, which include Balsam and Cameron lakes, support one of the largest inland lake recreational fisheries in Ontario.

Areas particularly important for maintaining healthy ecosystems in Balsam Lake and Cameron Lake are in the nearshore and shoreline of the lake and also in the streams and rivers that drain into the lake.

Nearshore areas are the shallow areas of the lake (usually less than 3 m in depth) next to shorelines. These are extremely important areas for biological productivity; they are utilized by many fish including important top predator species, such as muskellunge and walleye, for spawning, nursery, and feeding. Balsam Lake and Cameron Lake have a

relatively narrow width of nearshore area compared to most other Kawartha Lakes, where the majority of nearshore areas are adjacent to shorelines and in the bays at the outlets of major tributaries. The low natural productivity of Balsam Lake and Cameron Lake makes these nearshore areas especially important in supporting the aquatic ecosystem.

Lake tributaries provide important ecological pathways to and from the lakes. There are approximately 20 tributaries that drain directly into Balsam Lake and approximately nine that drain directly into Cameron Lake. Many of these, including Gull River, Staples River, Pearn's Creek, Martin Creek South, and Hannavan's Creek, have been documented as providing spawning habitat for important migratory lake-dwelling fish species such as walleye, muskellunge, and/or white sucker. Most tributaries have extensive wetland areas along the outlets, whereas their upper headwaters typically flow through active agricultural lands. The dams located at Rosedale, Coboconk, and Fenelon Falls act as physical barriers that limit migratory routes and other ecological pathways. However, the lock and canal systems do facilitate movement of aquatic life between lakes.

Table 1.5: Fish species present or recorded historically in Balsam Lake and Cameron Lake and in tributaries within the core planning area

Fish by Common Names		
black crappie¹	creek chub	pearl dace
blacknose dace	emerald shiner	redhorse
blacknose shiner	fathead minnow	pumpkinseed
bluegill¹	finescale dace	rock bass ¹
bluntnose minnow	golden shiner	smallmouth bass
brassy minnow	Iowa darter	spottail shiner
brook stickleback	largemouth bass¹	trout-perch
brown bullhead	least darter	walleye¹
burbot	logperch	white sucker
central mudminnow	mottled sculpin	yellow perch
cisco (lake herring)	muskellunge	
common carp ¹	northern pike ¹	
common shiner	northern redbelly dace	

¹ denotes species that are non-native to the Kawartha Lakes region
Bold indicates important species to the recreational fishery

Terrestrial Natural Heritage

Balsam Lake and Cameron Lake are located in an area known as "The Land Between," a transitional zone between two distinct ecological units: the Canadian Shield and the St. Lawrence Lowlands. This overlap in area is significant on a provincial scale as it provides a unique concentration and diversity of natural heritage features that occur within both of these distinct land-form types.

Natural cover on the landscape (that is, forests, wetlands, meadows, and vegetative corridors along water courses and shorelines) is essential to maintaining healthy lakes and their watersheds. The services provided by these natural features include the following:

- Filter and utilize nutrients, absorbing sediments and other pollutants from surface water runoff.
- Improve air quality through filtration and oxygen release.
- Provide natural aesthetic vistas.
- Provide wildlife habitat, including habitat for species we are just starting to understand (e.g., a wide range of pollinators).
- Provide the first line of defense in flood attenuation by absorbing high water levels.
- Provide recreational opportunities such as hunting, hiking, and wildlife watching.
- Reduce shoreline erosion.
- Sequester carbon to reduce atmospheric carbon dioxide levels, thus contributing to the mitigation of the effects of climate change.
- Moderate summer temperature extremes through shade and transpiration.

Agricultural and urban development typically results in the loss and fragmentation of natural cover. At present, the core Balsam Lake and Cameron Lake planning area contains approximately 136 km² of natural cover, representing 50% of the total *terrestrial* land cover (i.e., lake surface areas excluded) (Figure 1.13). Areas of natural cover are generally more extensive in the northern part of the planning area than in the south. In the north, there are extensive tracts of natural cover corresponding with few areas of urban development and less intensive agriculture. Forest cover that includes treed wetlands (i.e., swamps) accounts for 38%. Wetlands that also include treed wetlands account for 20%. Meadows and grasslands account for 8%. The largest natural community types are coniferous swamps (10%), coniferous forests (9%), and mixed forests (7%).

Approximately 45% of the shoreline area around Balsam Lake is considered as natural cover, with coniferous forests as the dominant type. There are four provincially significant wetlands along the shoreline: Balsam Lake #14 – at Hannavan's Creek outlet; Indian Point – southeast of the peninsula; Staples Creek – at the river outlet; and Corben Creek – at the creek outlet. Along Cameron Lake shoreline, approximately 50% is considered natural land cover, with mixed swamp and meadow marsh wetlands dominant. There are three provincially significant wetlands along the shoreline: Cameron Lake #6 – at Martin Creek South outlet; Pearn's Creek – at the creek outlet; and Balsam Lake #15 – at Burnt River outlet.

Within the core Balsam Lake and Cameron Lake planning area, natural cover provides habitat for locally or provincially rare wildlife species including:

- 14 bird species: bank swallow, barn swallow, black tern, bobolink, chimney swift, common nighthawk, eastern meadowlark, eastern wood-peewee, whip-poor-will, golden-winged warbler, Henslow's sparrow, least bittern, loggerhead shrike, and olive-sided flycatcher;
- six turtle species: Blanding's turtle, eastern musk turtle, northern map turtle, spotted turtle, wood turtle, and snapping turtle;
- four snake species: Dekay's brownsnake, eastern hog-nosed snake, eastern ribbon snake, and milksnake;
- one lizard species: five-lined skink; and
- one tree species: butternut.

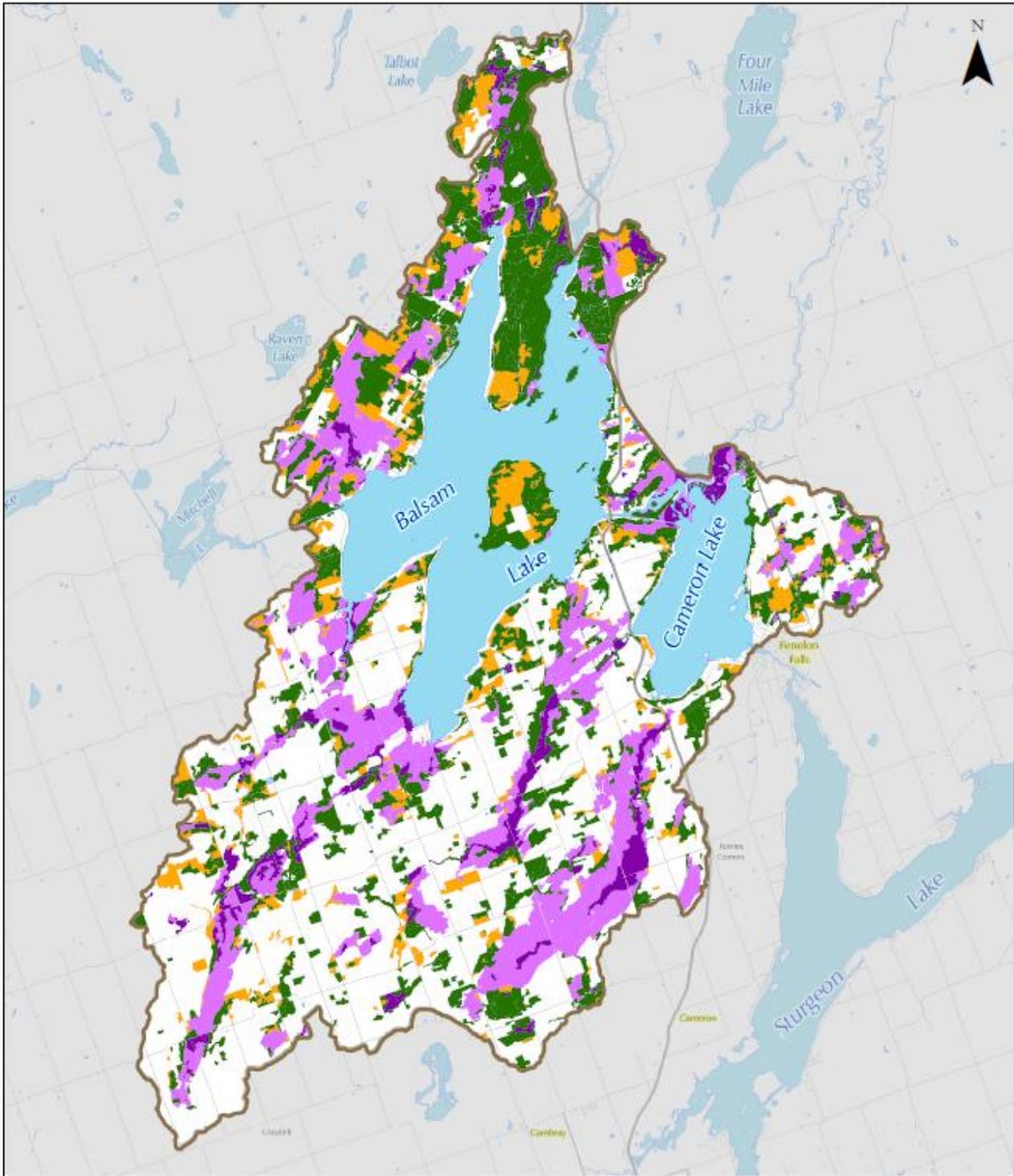
Many of these species at risk will benefit from maintaining and/or enhancing healthy ecosystems within the core Balsam Lake and Cameron Lake planning area.

According to a research document titled *How Much Habitat is Enough?* (Environment Canada, 2013), a certain minimum amount of natural cover types are needed on the landscape to maintain healthy ecosystems. These benchmarks exist for forest, wetland, and streamside vegetation amounts. We can compare existing natural cover values in the core planning area against these benchmarks to provide insight into the condition of our terrestrial natural heritage. Table 1.6 provides a summary of management benchmarks calculated for each subwatershed, each lake, and the core planning area. Where the existing natural cover level is below the benchmark, the additional cover required to meet the benchmark has been presented.

The forest cover benchmark is 50%. These benchmarks can vary depending on the level of risk. The minimum forest cover benchmark is 30 to 39% forest cover. This is a high-risk approach that may only support marginally healthy aquatic systems. Forest cover of 40 to 49% is a medium-risk approach likely to support moderately healthy aquatic systems. Forest cover of 50% or more is a low-risk approach likely to support most of the potential species and healthy aquatic systems. The existing forest cover in the core planning area is 38%, so it falls into the high-risk category, and it does not meet the low-risk benchmark. In fact, none of the subwatersheds meet the benchmark. Forest cover in the Local Subwatersheds draining into Balsam Lake, at 41%, falls into the medium-risk category. This area will require an increase in 1,452 hectares (ha) of forest cover to meet the low-risk benchmark. Forest cover within the Local Subwatersheds draining into Cameron Lake, at 33%, falls into the high-risk category. This area will require an increase in 1,933 ha of forest cover to meet the low-risk benchmark.

The wetland cover benchmark is 10%. At least 10% of any subwatershed or planning area should be in a wetland state to maintain ecological benefits. Existing wetland cover in the core Balsam Lake and Cameron Lake planning area is 20%, which meets this benchmark. The subwatersheds of Martin Creek South and Balsam Lake Tributaries have particularly extensive wetland areas.

The streamside vegetation benchmark is 75%. At least 75% of the total stream and/or river length in any subwatershed or planning area should have natural vegetation along both banks. Existing streamside cover in the core Balsam Lake and Cameron Lake planning area is 72%, which is just shy of this benchmark. This equals a natural cover deficit of 3% (50 ha). Streamside vegetation is lacking in four of the subwatersheds, including the Cameron Lake Tributaries, Staples River, Pearns Creek, and Martin Creek South. Streamside vegetation in the Local Subwatersheds draining into Balsam Lake, at 76%, meets the benchmark. However, the streamside vegetation in the Local Subwatersheds draining into Cameron Lake, at 22%, does not meet the benchmark. These areas will require an increase of 67 ha of streamside vegetation.



Natural Cover

- Forest
- Meadow
- Treed Wetland
- Wetland
- BCLMP Planning Area
- Roads
- Waterbodies
- Rivers & Streams

0 2 4 6 8 kilometres

PRODUCED BY Kawartha Conservation
with data supplied under license by members of the Ontario
Geospatial Data Exchange.
Additional Data Sources

Figure 1.13: Map showing natural cover types within the Balsam & Cameron Lake Management Planning area

Table 1.6: Table summarizing existing forest, wetland, and streamside vegetation cover within the core Balsam & Cameron Lake Management Planning area, in relation to ecosystem health benchmarks

		Forests Benchmark = >50%		Wetlands Benchmark = >10%		Streamside Vegetation Benchmark = >75%	
Lake	Subwatershed	Existing %	Needed % (ha)	Existing %	Needed % (ha)	Existing %	Needed % (ha)
Balsam Lake	Balsam Lake	49%	1% (116)	21%	-	84%	-
	Staples River	22%	28% (1336)	14%	-	64%	11% (42)
	All Balsam Lake Subwatersheds	41%	9% (1452)	19%	-	76%	-
Cameron Lake	Cameron Lake	30%	20% (503)	14%	-	64%	11% (9)
	Martin Creek South	42%	8% (336)	33%	-	72%	3% (8)
	Pearns Creek	25%	25% (1095)	17%	-	65%	10% (41)
	All Cameron Lake Subwatersheds	33%	17% (1933)	22%	-	67%	8% (57)
All Balsam Lake and Cameron Lake Subwatersheds (i.e., core management plan area)		38%	12% (3386)	20%	-	72%	3% (49)

Red text: existing amount does not meet benchmark

Green text: existing amount meets benchmark

2.0 Management Objectives



*Public Open House
(Coboconk, August 2013)*

2.1 Introduction

This chapter provides a summary of the management objectives of the Balsam Lake and Cameron Lake Management Plan. Objectives are "*what we want to achieve*" through a coordinated approach to managing the lakes. The objectives form the basis of the Implementation Strategies and were developed through community consultation. Each management objective is organized into the following: Background, Issues, and Implementation Approach. There are seven objectives in total.

Background provides a summary of the objective, including its origin and why it's important. Key points are highlighted, such as valued components, current state, and apparent trends that are relevant in implementing the *Balsam Lake and Cameron Lake Management Plan*. Wherever possible, pictures help illustrate key points.

Issues are barriers that prevent us from realizing the objective. Issues have been identified by two means: (1) technical studies, science-based research, and anticipated relevance and (2) concerns expressed through the lake-stakeholder consultation process.

Implementation Approach is a summary of how we intend to address issues and fully realize our objectives. Actions are presented under each strategy in Chapter 3: Implementation Strategies. For specific details related to each action, please refer to Implementation Strategies.

Strategies

- **Stewardship:** Actions that are tailored to rural, urban, and shoreline landowners, including public property managers and lake users to deliver best management practices on their properties for the benefit of all and the future health of the lakes
- **Strategic Planning:** Actions that focus on strengthening the land use planning and policy framework, with an emphasis on updating the municipal Official Plan
- **Urban and Rural Infrastructure:** Actions that focus on maintaining sustainable operations in government infrastructure and construction works, including the stormwater and wastewater network, shoreline public-access areas, roads, municipal drains, and construction sites
- **Research and Monitoring:** Actions that are focused on research to better understand the lakes' responses to emerging pressures, as well as tracking environmental health and plan effectiveness through time
- **Communications and Outreach:** Actions that encourage dialogue and information-sharing among all stakeholders and promote sustainable practices to maintain healthy lake environments. In this chapter, there are no specific Communications and Outreach actions identified because effective communication is crucial to implementing all aspects of the management plan. Please refer to the Communications and Outreach Strategy in Chapter 3 for action details.

2.2 Management Objective #1:

Maintain excellent water quality conditions

BACKGROUND:

- Balsam Lake and Cameron Lake have some of the best water quality of all the Kawartha Lakes. These lakes have traditionally been clean and clear due to their location as the most upstream lakes in the system as well as the nearly pristine water inputs from Gull River and Burnt River. There have been no documented blue-green algae blooms or any other serious contamination of these water bodies. There is overwhelming community support for maintaining existing lake water quality conditions.
- Life in and around the lake needs clean water. Fenelon Falls residents and businesses obtain their drinking water from Cameron Lake, and several lakeside residents draw water along shorelines for personal use. Aquatic ecosystems also need clean water to thrive. Excessive inputs of raw sewage, nutrients, sediments, toxic chemicals, and other elements can negatively impact the quality of the lake water for human use and ecosystem needs. Balsam Lake and Cameron Lake can be considered “headwater lakes,” therefore clean water will ultimately benefit downstream lakes in the system.

ISSUES:

- High concentration of pollution in surface water runoff from urban areas. Although urban areas are limited around these lakes, they tend to contain significant amounts of hardened surfaces where pollutants (such as pet feces, oil, fertilizers, salt, etc.) accumulate. After a rain, these harmful substances are washed into the lake instead of being purified by gradually filtering through vegetation into the ground. Certain agricultural practices such as excessive fertilizer applications, as well as tile draining and ditching along streams, can have a similar effect.
- Potential eutrophication of the lakes through excessive nutrient and sediment inputs. Eutrophication is the term used to describe the accelerated aging process of lakes from consistently high nutrient inputs, in particular, phosphorus and nitrogen. Symptoms of eutrophication include frequent blue-green algae blooms, high algae growth, and oxygen depletion in lake water. Significant inputs of nutrients enter the lakes from surface water runoff, but also from other sources such as septic systems and precipitation. According to recent phosphorus testing, Cameron Lake sits on the cusp of not meeting provincial water quality guidelines. If nutrient levels rise further, both lakes could be prone to the above-mentioned symptoms of a nutrient-enriched water body. Proliferation of aquatic plants and algae in the nearshore area could impede shoreline access in shallow bays in the future.
- Potential contamination from other sources. Contaminant spills from power boats, grey water discharge from houseboats, oil spills from shoreline properties, raw wastes from partial bypasses at Coboconk Sewage Treatment Facility, and other disturbances are all potential areas of concern when trying to maintain excellent water quality conditions.

IMPLEMENTATION ACTIONS:

Stewardship

- Implement lot-level measures such as reducing fertilizer use, increasing infiltration, capturing stormwater runoff, and other practices that conserve water and reduce pollution in targeted urban areas and waterfront communities [Action A1 - page 53].
- Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded /ice-damaged sections [Action A2 - page 54].
- Reduce potential pollution from septic systems into the lakes by undertaking responsible management and maintenance [Action A5 - page 57].
- Implement measures such as vegetated buffer strips along streams, conservation tillage, and other practices that reduce nutrient and soil loss from farms, with assistance from local cost-share programs [Action A6 - page 58].
- Implement programs to educate lake users about proper boat maintenance, grey water disposal, and the locations of sensitive habitats to reduce the risk of pollution and lake ecosystem disturbance [Action A7 – page 59].

Strategic Planning

- Amend and strengthen the *City of Kawartha Lakes Official Plan* and Secondary Plans policy to require protection of the natural environment through specific measures, such as development setbacks within 30 metres of shorelines or streams [Action B1 - page 61].
- Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality [Action B3 – page 63].
- Implement the *Trent Source Protection Plan* (Kawartha-Haliburton Sourcewater Protection Authority, 2014) to address threats to municipal drinking water systems [Action B5 - page 65].

Urban and Rural Infrastructure

- Through stormwater management planning, improve the quality and control of stormwater in the urban settlement areas of Fenelon Falls and Coboconk [Action C1 – page 68].
- Implement effective sediment and erosion control measures and other practices to prevent contaminants from reaching local watercourses during road work, agricultural drainage, and other construction projects [Action C2 – page 69].
- Operate Coboconk sewage treatment facility at maximum efficiency in terms of pollutant removal and capacity [Action C4 – page 71].

Research and Monitoring

- Undertake pilot projects to test the effectiveness of innovative approaches in identified priority areas that have nuisance aquatic plants and poor water quality [Action D1 – page 73].

2.3 Management Objective #2:

Enhance swimming opportunities at public beaches

BACKGROUND:

- There are six public beaches on Balsam Lake and Cameron Lake. Active beaches on Balsam Lake include Coboconk Lions Park Beach, Balsam Lake Provincial Park Beach, Blanchard's Road Beach, Killarney Bay Beach, and Birch Point Beach. There is only one active beach on Cameron Lake, which is Bond Street Beach in Fenelon Falls. The beaches at Bond Street and Balsam Lake Provincial Park are particularly popular during the summer months, providing opportunities for public enjoyment along the shoreline.
- All public beaches are routinely tested to determine if safe for swimming. The local Health Unit and Provincial Park staff (Balsam Lake Beach only) test the water at all beaches in June, July, and August to advise swimmers whether the beach is deemed safe for swimming at that particular time. If the water at the beach is found to contain high *E. coli* levels, it is considered potentially hazardous to human health and posted as "unsafe for swimming."

ISSUES:

- High *E. coli* at certain beaches, leading to beach postings. Within the last five years, all beaches, with the exception of Balsam Lake Provincial Park, have been posted as unsafe for swimming at least once. Two of the six beaches (Coboconk Lions Park and Bond Street, both in urban centres) are most often posted due to *E. coli* contamination. High *E. coli* concentrations are likely the result of excessive feces from birds, particularly Canada Geese. Other contributing factors may include urban runoff contaminated with pet feces following storm events and/or shallow, warm waters with limited water circulation.
- Safety concerns at Bond Street Beach. At Bond Street Beach in Fenelon Falls there are several dilapidated concrete piers extending into the water in and around the swimming area. Beach users have expressed concerns about child safety due to the failing structures.

IMPLEMENTATION ACTIONS:

Urban and Rural Infrastructure

- Through stormwater management planning, improve the quality and control of stormwater in the urban settlement areas of Fenelon Falls and Coboconk [*Action C1 - page 68*].
- Increase community enjoyment of public beaches and waterfronts by deterring geese, conducting regular maintenance, and increasing public access to shorelines [*Action C3 – page 70*].

2.4 Management Objective #3:

Maintain the biodiversity of the lake ecosystem

BACKGROUND:

- Biodiversity is what sustains healthy aquatic and terrestrial ecosystems. It includes all varieties of life and all habitats of the lakes and their watersheds. Biodiversity helps sustain the goods and services provided by the lake ecosystem, such as provisioning services (e.g., food and fresh water), regulating services (e.g., air quality regulation, erosion regulation, and pollination), and cultural services (e.g., educational values, inspiration, and sense of place). Native biodiversity, or life that is naturally occurring in an area, provides greater benefits to the lake ecosystem than non-native biodiversity. Balsam Lake and Cameron Lake are located within a distinct ecoregion known as “The Land Between,” which is known for supporting high levels of biodiversity.

ISSUES:

- Proliferation of non-native invasive species. The Trent-Severn system, due to its interconnectedness and heavy human use, is particularly prone to the introduction and spread of non-native species. Several non-native species are well established in Balsam Lake and Cameron Lake including common carp, zebra mussels, Eurasian water-milfoil, curly-leaved pondweed, purple loosestrife, and rusty crayfish. More recently, northern pike, yellow iris, Phragmites, and spiny water flea have been documented. A particularly immediate threat is the proliferation of northern pike, which could have a negative impact on muskellunge, the largest native top predator fish species.
- Loss and fragmentation of natural habitats. Large expansive natural areas, with natural linkage corridors between them, are needed to sustain healthy landscape conditions. Natural cover loss is due to land clearing for agriculture and urban purposes. Existing wetland areas within the planning area are extensive. However, vegetative cover along lake tributaries does not meet benchmark guidelines, especially along small- to medium-sized streams. Further, total forest cover in the planning area just meets minimum thresholds, which is considered a high-risk approach that may only support marginally healthy aquatic systems.
- Species at risk. Within the planning area, there are several documented wildlife species that are at risk. The species that particularly rely on aquatic habitat for persistence in Balsam Lake and Cameron Lake include two bird species: black tern and least bittern, as well as several turtle species: Blanding’s turtle, eastern musk turtle, northern map turtle, spotted turtle, wood turtle, and snapping turtle. Major threats to these species include loss of habitat (e.g., draining of wetlands for agricultural purposes), increased disturbance from urban encroachment, direct mortality and injury by road vehicles and boat propellers, and climate change.

IMPLEMENTATION ACTIONS:

Stewardship

- Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections [Action A2 – page 54].
- Implement measures such as boat and equipment sanitization to reduce the risk of transfer of invasive species between water bodies [Action A3 – page 55].
- Develop a reforestation program to re-establish and manage natural cover on marginal rural lands, particularly in subwatersheds that do not meet forest cover benchmarks [Action A4 – page 56].
- Implement measures such as vegetated buffer strips along streams, conservation tillage, and other practices that reduce nutrient and soil loss from farms, with assistance from cost-share programs [Action A6 – page 58].

Strategic Planning

- Amend and strengthen the *City of Kawartha Lakes Official Plan* and Secondary Plans policy to require protection of the natural environment through specific measures, such as regulating development adjacent to shorelines or streams [Action B1 – page 61].
- Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality [Action B3 – page 63].
- Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines [Action B4 – page 64].
- Implement the *Fisheries Management Plan for Fisheries Management Zone 17* (Ontario Ministry of Natural Resources, 2009); *Kawarthas, Naturally Connected Natural Heritage Systems Strategy* (Ontario Ministry of Natural Resources. Draft, 2013); *Our Kawartha Lakes Integrated Community Sustainability Plan* (City of Kawartha Lakes. Draft, 2013); and *Balsam Lake and Indian Point Provincial Park Plans* [Action B5 – page 65].

2.5 Management Objective #4:

Enhance and maintain the natural integrity of the shoreline

BACKGROUND:

- The zone between land and water is often referred to as the Ribbon of Life. Shoreline areas are extremely rich in biodiversity and provide multiple benefits to the lake ecosystem including filtering contaminants, preventing erosion, and providing fish and wildlife habitat. The shorelines around Balsam Lake and Cameron Lake are approximately 100 km and 50 km long, respectively.
- The lake shoreline is a dynamic system. Natural forces such as currents, wave action, and ice movement can be a source of shoreline accumulation (that is, gaining land) or shoreline erosion (that is, losing land). A natural shoreline provides a stable waterfront in most instances, due to its ability to stabilize soil, absorb wave energy, and slow lot-level surface water runoff. Shoreline degradation is often accelerated by waterfront modifications such as removal of natural cover, hardening, infilling, and dredging.

ISSUES:

- Dense urban development along the lake shoreline. The shorelines of Balsam Lake and Cameron Lake are some of the most heavily developed of all the Kawartha Lakes. Artificial shorelines can cause reduced aquatic habitat potential, less water quality buffering capacity, greater wave action, land/water isolation, and other negative implications for the lake. Over half of the shoreline on both lakes has been developed.
- Loss of shoreline property from erosion. Some areas of the lakes are prone to waterfront damage due to a number of factors including dense urban development near the water's edge, movement of lake ice back and forth on the shoreline, and above-average water levels in the spring.

IMPLEMENTATION ACTIONS:

Stewardship

- Implement lot-level measures such as reducing fertilizer use, increasing infiltration, capturing stormwater runoff, and other practices that conserve water and reduce pollution in targeted urban areas and waterfront communities [Action A1 – page 53].
- Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections [Action A2 – page 54].
- Develop a reforestation program to re-establish and manage natural cover on marginal rural lands, particularly in subwatersheds that do not meet forest cover benchmarks [Action A4 – page 56].
- Reduce potential pollution from septic systems into the lake by undertaking responsible management and maintenance [Action A5 – page 57].

Strategic Planning

- Amend and strengthen the *City of Kawartha Lakes Official Plan* and Secondary Plan policy to require protection of the natural environment through specific measures, such as development setbacks within 30 metres of shorelines or streams [Action B1 – page 61].
- Develop a Shoreline Secondary Plan that provides enhanced land use planning direction specific to shoreline areas around the lakes [Action B2 – page 62].
- Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality [Action B3 – page 63].
- Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines [Action B4 – page 64].
- Initiate a trial one-window permit application process for shoreline works between Parks Canada and Kawartha Conservation [Action B6 – page 66].

2.6 Management Objective #5:

Maintain healthy and productive sport fish populations

BACKGROUND:

- Recreational fishing is a big industry in the Kawartha Lakes. The Kawartha Lakes support one of the largest recreational fisheries in Ontario. Fishing for warmwater species on these lakes has traditionally been excellent due to the high productivity of the lake waters. In Balsam Lake and Cameron Lake, the most sought-after fish species have traditionally been walleye (also known as pickerel), muskellunge, and yellow perch. To a lesser degree, largemouth bass, smallmouth bass, and more recently black crappie, are targeted by anglers as well. The season for yellow perch, black crappie, and sunfish became open all year in the Kawartha Lakes in 2010, which expanded angling opportunities.
- Shallow nearshore areas along the shoreline are important aquatic habitats. Most fish in Balsam and Cameron Lakes use these productive areas for spawning and nursery. Many of the areas immediately below dams, along rocky shallow areas, near wetlands, and at the outlets of lake tributaries are also known to be important areas for fish.

ISSUES:

- Potential decline in muskellunge due to northern pike range expansion. Northern pike have been recently confirmed in Balsam Lake and Cameron Lake. This fish is native to Lake Ontario but is not naturally occurring in the Kawartha Lakes and due to its aggressive growth and preference for similar habitats, it can cause population declines in the native muskellunge. Northern pike populations have been consistently expanding from the western lakes and rivers connected with the Trent-Severn Waterway, and they have now been formally documented in almost all of the Kawartha Lakes.
- Loss and fragmentation of aquatic habitat along the shoreline and in small- to medium-sized tributaries. A significant portion of the shorelines on both lakes has been altered through development. Much of this area has been hardened with concrete, armour stone, and other materials, creating non-natural shorelines which can impact the nearshore area and reduce aquatic habitat potential. Aquatic habitat loss and fragmentation are evident along most small- to medium-sized lake tributaries (particularly in their headwaters), due to the conversion of lands into agricultural production.

IMPLEMENTATION ACTIONS:

Stewardship

- Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections [Action A2 - page 54].
- Implement measures such as boat and equipment sanitization to reduce the risk of transfer of invasive species between water bodies [Action A3 – page 55].

Strategic Planning

- Amend and strengthen the *City of Kawartha Lakes Official Plan* and Secondary Plan policy to require protection of the natural environment through specific measures, such as development setbacks within 30 metres of shorelines or streams [Action B1 - page 61].
- Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality [Action B3 – page 63].
- Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines [Action B4 – page 64].
- Implement the *Fisheries Management Plan for Fisheries Management Zone 17* [Action B5 – page 65].

Urban and Rural Infrastructure

- Implement effective sediment and erosion control measures and other practices to prevent contaminants from reaching local watercourses during road work, agricultural drainage, and other construction projects [Action C2 - page 69].

2.7 Management Objective #6:

Ensure permit application process for works projects is transparent and efficient

BACKGROUND:

- Work projects in Balsam Lake and Cameron Lake or along their shorelines typically need approvals from local planning authorities. Examples of works include shoreline grading, aquatic plant removal, boathouse construction, retaining wall creation, and other projects that occur close to the water's edge. Permits are required from Parks Canada, Kawartha Conservation, and/or the City of Kawartha Lakes. As a general rule, works occurring above the high water mark require approval from the conservation authority; works below high water mark require approval from Parks Canada, and works that occur in both areas require approval from both organizations. Building permits for shoreline structures are typically required from the City of Kawartha Lakes. Approvals are required to ensure human safety and maintain the integrity of the lake environment. Currently, Parks Canada and Kawartha Conservation are conducting a “one-window” pilot project on Sturgeon Lake. If this project is deemed a success in making the permit process more efficient for the public, it will be considered for application on other lakes.

ISSUES:

- Confusion and frustration from shoreline owners and contractors. Due to the multi-jurisdictional nature of the lakes and shorelines, there is often confusion as to what types of projects require approvals, who to send information to for approval, and how long the wait times are for approvals.

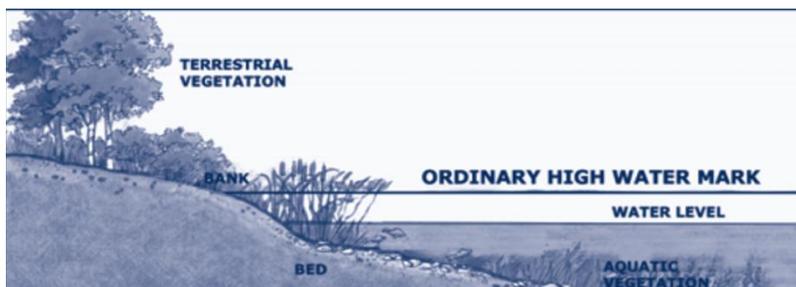


Diagram showing approximate location of ordinary high water mark in relation to water levels in the lakes. In Balsam Lake and Cameron Lake, through water-level regulation, these levels are equal during summer navigation season.

IMPLEMENTATION ACTIONS:

Strategic Planning

- Initiate a trial one-window permit application process for shoreline works between Parks Canada and Kawartha Conservation [Action B6 – page 66].

2.8 Management Objective #7:

Improve our understanding of how the lakes will respond to emerging pressures

BACKGROUND:

- Solid scientific understanding of lake-based pressures and how the lake ecosystem will respond to them are key elements in directing management decisions. Some of the important emerging pressures include:
 - Climate change. It is generally agreed that climate change is predicted to increase water temperatures and alter natural hydrological processes (e.g., more extreme weather events and changes to rainfall patterns). This will likely have impacts on multiple facets of the lake ecosystem including water quality, aquatic ecosystems, and water levels and flows.
 - Cumulative development. It is unknown at what point development in the watershed/shoreline can cause serious negative implications for the lake aquatic ecosystem. Shoreline areas, in particular, are at risk of increasing development and urbanization. Cumulative draining of farmlands (e.g., through tile systems) may also warrant further investigation. There is a need to improve scientific understanding about the interactions of these stressors with the lakes to better manage the resource.
 - Non-point sources of pollution. These are diffuse sources of pollution that are not easily measured because there is no single "outlet." A particular area of focus should be quantifying nutrient inputs into the nearshore areas of the lakes (e.g., from septic systems and urban areas) because values are not well understood at this time.
 - Invasive species. Species introductions into areas outside their naturally occurring range can have profound impacts on lake dynamics. Zebra mussel proliferation in the Kawartha Lakes—resulting in increasing water clarity and leading to the proliferation of aquatic plants—is an example of the ecosystem-level impact of invasive species. Northern pike proliferation is of particular concern.
 - Emerging contaminants. There is a need to know the potential environmental impact of introducing into the lake environment certain non-traditional chemical compounds, such as nano-silvers, pharmaceuticals, micro-beads, hormones, antibiotics, and pesticides.

ISSUES:

- Lack of coordination of research and monitoring initiatives, and information management. Many different organizations and agencies are actively collecting data on various aspects of the lake ecosystem, e.g., the Kawartha Lake Stewards Association, Muskies Canada, City of Kawartha Lakes, Kawartha Conservation, Ontario Ministry of Natural Resources and Forestry, etc. At this time, there is no coordinated approach to these efforts, and there is no collective information management system in place.

IMPLEMENTATION ACTIONS:

Research and Monitoring

- Implement a coordinated lake monitoring program that regularly tracks key indicators of lake watershed health including nutrients, forest cover, fish communities, and oxygen levels [Action D2 – page 74].
- Conduct research to more accurately identify shoreline sources of nutrients and potential impacts to nearshore areas of the lakes [Action D3 – page 75].
- Conduct research to identify how the lake ecosystem responds to stressors such as cumulative development, climate change, and invasive species [Action D4 – page 76].
- Determine the socio-economic value of Balsam Lake and Cameron Lake, with emphasis on the value of goods and services provided by natural resources [Action D5 – page 77].

3.0 Implementation Strategies



Showcasing innovative pilot projects to help improve water quality.
Back left is a constructed wetland. Front right is an aeration fountain.
(Outlet of Gull River, Coboconk, September 2014)

3.1 Introduction

The following Implementation Strategies provide a framework for a coordinated approach to maintaining a healthy Balsam Lake and Cameron Lake. Integrated efforts are fundamental to improving the environment in and around the lakes. Everyone in the watersheds shares a responsibility for the current state of the lakes, so everyone is needed to participate in management efforts. A broad spectrum of partners, businesses, and residents is required in the implementation process in the watersheds. Working simultaneously, they can accomplish tasks in different areas. The more actions and strategies accomplished, the more likely that objectives for a healthy lake environment will be met.

Implementation Strategies provide a suite of actions to help achieve the management objectives outlined in Chapter 2. For greater on-the-ground applicability, actions are presented under the following strategies:

- Stewardship Strategy,
- Strategic Planning Strategy,
- Urban and Rural Infrastructure Strategy,
- Research and Monitoring Strategy, and
- Communications and Outreach Strategy.

Within each strategy, an introductory context is provided for approaches to implementation along with detailed actions. The format for each management action is as follows:

Action: A brief description of the management approach.

Urgency: The level of urgency for undertaking the particular action. A value was assigned for each action based on the five criteria listed below, and it was averaged to determine the overall urgency level for the action. Please refer to Appendix C for more detail.

CRITERIA	Level	Value	Details
#1. Action meets multiple objectives?	High	3	Meets many (over half of) objectives
	Medium	2	Meets a few objectives
	Low	1	Meets a single objective
#2. Action is affordable?	High	3	Cost < \$5,000; easy to acquire local funding
	Medium	2	Cost >\$5,000 and <\$50,000; typical medium project proposal
	Low	1	Cost >\$50,000; must acquire significant funding
#3. Action has support from community?	High	3	Overwhelming support
	Medium	2	Majority support
	Low	1	Localized support
#4. Action builds public support for implementation?	High	3	High profile; includes a large number of stakeholders
	Medium	2	Medium profile; includes a medium number of stakeholders
	Low	1	Low profile; includes a small number of stakeholders
#5. Action has timely environmental benefit?	High	3	Short term (5 years or less) improvement
	Medium	2	Long term (5 years or more) improvement
	Low	1	Maintain status quo

Rationale: A description of why the action is important and how it supports the level of urgency.

Priority Areas: A description of where the action is needed the most. It is most often geography based (e.g., specific subwatersheds or areas of development), but it is also based on other contexts (e.g., a specific industry or threats). Some priorities are to be determined at a later stage.

Lead and (Partner) Implementers: Organizations, groups, or individuals who have been identified during the planning process as potentially leading or partnering in the implementation of actions. Partners are in parentheses.

Deliverables: A description of specific details and/or project measurables leading to successful implementation of an action. In some cases, a specific numeric target is identified.

3.2 Stewardship Strategy

We must all understand our collective impact on the lakes and be informed as to *what we can do* to help sustain a healthy lake and its watershed. This strategy is comprised of core actions focused on farms and rural lands, towns and urban lands, shoreline areas, and lake users. The primary focus of this strategy is to develop an understanding of individual responsibility for effective land and soil stewardship practices at the property level. A second major focus of this strategy is to provide technical assistance and/or resources that result in positive stewardship actions.

Where necessary, financial incentives should be considered for projects with extraordinary cost or complexity (e.g., a large erosion remediation project extending across several properties). The Scugog WATER Fund, a successful incentive program currently offered to help protect Lake Scugog in the Durham Region, could be a model for this initiative. The stewardship strategy works in conjunction with the Communications and Outreach Strategy and incorporates other cost-sharing stewardship programs such as the Environmental Farm Plan.



Rehabilitating the shoreline at Garnet Graham Park adjacent to Bond Street Beach, using native shrubs and grasses (*Fenelon Falls on the east shore of Cameron Lake, Summer 2014*)

Action A1: Urban and waterfront lot-level measures

Implement lot-level measures such as reducing fertilizer use, increasing infiltration, capturing stormwater runoff, and other practices that conserve water and reduce pollution in targeted urban areas and waterfront communities.

Urgency

- High

Rationale

- Developed areas account for approximately 6% of the Balsam Lake and Cameron Lake planning area, yet contribute disproportionately high amounts of sediments, nutrients, and other contaminants typically through increased surface water runoff over fertilized lawns, parks, and hardened surfaces running into the lakes. In phosphorus loadings, it is estimated that urban areas contribute 13% (222 kg per year) to Balsam Lake and 13% (152 kg per year) to Cameron Lake from all Local Subwatershed sources. Most urban areas within the watersheds of the lakes are located along shorelines. A 50% reduction in urban phosphorus loading is needed to achieve the water quality benchmark for each lake.

Priority areas

- Town of Fenelon Falls, Rosedale, Coboconk, and other small communities along the shorelines

Lead and (partner) implementers

- Lake associations; urban residents; businesses; property managers; Balsam Lake Provincial Park; City of Kawartha Lakes Public Works; (City of Kawartha Lakes Environmental Advisory Committee; Kawartha Conservation; Fenelon Falls Horticultural Society; Residents of Rosedale)

Deliverables

- Develop a program that provides educational and project management assistance, and financial assistance where possible, to urban and waterfront residents to support the uptake of lot-level measures for water stewardship action.
 - Within a five-year period, achieve a target of 50% of urban residential, commercial, and public properties implementing lot-level measures such as:
 - Maintain a buffer strip of natural vegetation along urban waterfronts and stream banks to filter runoff, prevent erosion, and provide wildlife habitat.
 - Capture and store storm runoff via rain barrels, grassed swales, vegetated depressions, rain gardens, splash pads or “roll up” attachments to downspouts, and private stormwater management ponds as applicable.
 - Maintain trees and other landscape plants that help slow surface water runoff and reduce soil erosion; replace at-risk, dying, or storm-damaged trees with trees and shrubs of appropriate species.
 - Mow lawns to no less than three inches in height to encourage healthier root development and help absorb more moisture.
 - Work toward a low or no phosphorus fertilizer and gradual reduction, then eliminate chemical fertilizer use on lawns; leave mulched clippings to decompose and use yard compost for soil amendments; avoid discarding of clippings in waterways.
 - Conduct soil testing to determine actual nutrient deficiencies.
 - Maintain permeable surfaces, such as porous asphalt or vegetated swales, as alternatives to hardened driveways, walkways, and parking lots.
 - Maintain septic systems with regular pump-outs.
 - Take advantage of hazardous waste and recycling programs.
 - Dispose of pet wastes in the garbage and discourage feeding of waterfowl.
- Over the long term, achieve a 50% reduction in existing phosphorus loading from local urban sources to achieve a loading target of approximately 111 kg per year for Balsam Lake, and 76 kg per year for Cameron Lake.

Action A2: Natural landscaping along shorelines

Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections.

Urgency

- High

Rationale

- Shoreline areas are often referred to as the Ribbon of Life around our lakes and are particularly sensitive to development. The Balsam Lake and Cameron Lake shorelines are among the most heavily developed of the Kawartha Lakes; about 50% of the shoreline on Cameron Lake, and 45% on Balsam Lake, is in a developed state within 30 metres of the lake. In addition, much of the shore-water interface has been altered, which reduces the vegetative buffering benefits provided by natural shorelines. Pressures along the shoreline are expected to grow as waterfront lots are popular retirement destinations for an aging population and as lake water quality continues to improve.

Priority areas

- Densely populated waterfront communities and back lot developments adjacent to waterfronts

Lead and (partner) implementers

- Kawartha Conservation; Parks Canada: Trent-Severn Waterway; Ontario Parks; Cottage and Road Associations; shoreline property owners and managers; (Federation of Ontario Cottagers' Associations; City of Kawartha Lakes; local volunteer lake stewards; local nurseries; Fenelon Falls Horticultural Society)

Deliverables

- Develop a program to engage residents, providing technical assistance and expertise, supporting community volunteers, and encouraging business and industry to implement practices that protect the integrity of the shoreline.
 - Within a five-year period, achieve a target of 50% of residences with greater than 25% of their shoreline naturalized to a minimum of three metres (10 feet) from the water's edge.
 - Within a five-year period, achieve a target of 50% of shoreline properties practising lot-level measures such as:
 - Maintain a buffer strip of natural vegetation along the shoreline, the wider the better; establish a "no-mow" zone along the shoreline.
 - Minimize waterfront development of structures (excluding erosion protection) to 25% or less of total frontage.
 - Select dock or boathouse sites where little or no vegetation currently exists.
 - Re-vegetate disturbed soil areas as soon as possible to stabilize loose soils.
 - Retain fallen trees and large rocks in the nearshore zone, unless they are a hazard to boats or swimmers.
- Develop a shoreline-focused incentive program that provides financial and/or project management assistance to encourage property owners with extraordinary issues to decommission hardened shorelines (e.g., vertical retaining walls) or repair severely eroded/ice- or wave-damaged sections and replace with natural materials.
 - Establish a Review Committee comprised of municipal staff, conservation authority staff, and cottagers' association representatives to provide program direction and review project applications on a confidential basis.
 - Every year, decommission vertical retaining walls or repair severely ice-damaged shorelines on three to five properties.

Action A3: Prevention and Control of Invasive Species

Implement measures such as boat and equipment sanitization to reduce the risk of transfer of invasive species between water bodies.

Urgency

- High

Rationale

- The introduction and spread of non-native species throughout the aquatic and terrestrial environment is generating profound implications for ecosystem health throughout North America. These “invasive species” have significantly altered the Balsam Lake and Cameron Lake ecosystem already, usually to the detriment of biodiversity and lake-based values. With its connection to the other Kawartha Lakes, the introduction and spread of invasive species can be aided by unimpeded transportation routes (e.g., the Trent-Severn Waterway) and recreational activities (e.g., boating). Northern pike is a significant non-native species due to their recent proliferation and potential to displace muskellunge.

Priority areas:

- Vessels and equipment that travel between lakes,
- Construction sites, and
- Recreation corridors.

Lead and (partner) implementers

- Invading Species Awareness Program - Ontario Ministry of Natural Resources and Forestry, and Ontario Federation of Anglers and Hunters; Muskies Canada; recreational boaters and anglers; City of Kawartha Lakes (Ontario Invasive Plants Council; Kawartha Conservation; Kawartha Lake Stewards Association; construction industry)

Deliverables

- Implement best management practices to reduce the risk of introducing and spreading invasive species, for example:
 - Inspect boats, trailers, boating equipment, fishing tackle and nets, and remove any visible plants or animals before leaving any water body.
 - Drain water from the motor, live well, and bilge and transom wells while on land, before leaving the water body.
 - Empty bait buckets on land before leaving the water body; avoid releasing live bait into a water body or transferring from one water body into another.
 - Wash and dry fishing tackle, nets, boat, and equipment to kill harmful species that may not be visible to the eye.
 - Install and utilize wash stations adjacent to public boat launch facilities.
- Report invasive species sightings through the Invading Species Hotline: 1-800-563-7711 and/or the Early Detection and Distribution Mapping System (EDD MapS Ontario): www.eddmaps.org/ontario
- Facilitate public education, for example:
 - Learn how to prevent the spread of invasive species.
 - Learn how to identify existing invasive species and species that could potentially threaten watershed health.
 - Access information from organizations such as the Invading Species Awareness Program and the Invasive Plants Council to gain access and disseminate information to lake stakeholders.
 - Use best-bet control and management approaches.
 - Host workshops and develop factsheets on emerging invasive species (e.g., emerald ash borer, *Phragmites*, etc.).

Action A4: Reforestation program

Develop a reforestation program to re-establish and manage natural cover on marginal rural lands, particularly in subwatersheds that do not meet forest cover benchmarks.

Urgency

- Medium

Rationale

- Forest cover in the Balsam Lake and Cameron Lake core planning area is 128 km², representing 38% of the total land area. This barely meets minimum threshold values, and it is a high-risk approach that may only support marginally healthy aquatic systems. There is a strong desire among lake stakeholders to maintain excellent ecological conditions in the lakes and their watersheds. Thus a threshold of 50% is desired because it represents a low-risk approach that is likely to support healthy conditions. This indicates a landscape deficit for the Balsam Lake and Cameron Lake core management area of 12% (40 km² or 9,884 acres). Small stream corridors would particularly benefit from reforestation, as there is currently a benchmark deficit in the core management area of 3% (0.5 km² or 124 acres). It is not feasible to fully address the above deficit. The reforestation program should emphasize strategic tree planting of the highest priority sites, with natural succession attending to the reforestation and natural cover establishment of other areas.

Priority areas:

- Subwatersheds that do not meet minimum forest cover benchmarks or that are at a high-risk level: Staples River, Pearn's Creek, and Cameron Lake Tributaries; other areas identified in a Natural Heritage Strategy;
- Along headwater streams that do not meet minimum vegetation benchmarks: Staples River, Cameron Lake Tributaries, Pearn's Creek, and Martin Creek South; and
- Lands with marginal agricultural values or areas that can be effectively reforested through natural regeneration at no cost or by small-scale, strategic tree planting at lower densities.

Lead and (partner) implementers

- Trees Ontario; Kawartha Conservation; cottagers' associations; (Kawartha Chapter of the Ontario Woodlot Association; private landowners)

Deliverables

- Finalize the Kawarthas, Naturally Connected Natural Heritage Systems Strategy within the Balsam Lake and Cameron Lake basins.
 - Use this strategy to identify priority sites that will be effectively reforested through natural regeneration at no cost, and field or open area sites appropriate for large-scale tree planting or small-scale, strategic tree planting at lower densities.
- Develop a reforestation program to undertake large-scale reforestation projects, focusing on the priority areas in the above subwatersheds. The program would provide assistance to participants in developing property-specific planting plans, obtaining trees at competitive prices, planting trees, and other resources.
 - Expand the existing bulk sales program for private landowners who pick up their own trees and do the planting on their own properties.
 - Engage youth by organizing tree planting opportunities for Scouts and other youth groups.
 - Within a five-year period, achieve a target of increasing forest cover in the core Balsam Lake and Cameron Lake planning area by 1% (100 acres) of the current deficit, per year, by planting (50%) and natural regeneration (50%). This equates to planting approximately 30,000 to 35,000 trees and shrubs annually.
 - Within a five-year period, achieve a target of increasing streamside vegetation in the core Balsam Lake and Cameron Lake planning area by 1% (1.2 acres) of the current deficit, per year, by planting (50%) and natural regeneration (50%). This equates to planting approximately 500 trees and shrubs annually along headwater stream corridors.
- Develop an effective partnership with Trees Ontario to fully utilize provincial funding in support of the Fifty Million Tree program.

Action A5: Septic system maintenance

Reduce potential pollution from septic systems into the lakes by undertaking responsible management and maintenance.

Urgency

- Medium

Rationale

- Septic systems at shoreline residences and community properties on the strip of land around the lakes are estimated to contribute almost 10% (851 kg per year) of the total phosphorus load into Balsam Lake and 31% (363 kg per year) into Cameron Lake. A 4% reduction in septic system loading is needed to achieve the water quality benchmarks for both lakes. Ongoing studies may yet illustrate that this source of phosphorus has a potentially significant influence on nearshore algae blooms, because it is readily available for uptake (orthophosphate). In addition, bacteria from sewage is often ineffectively treated or contained by faulty septic systems. Human health should be a major consideration when faulty systems are in the vicinity of residential wells and beaches. Individual and communal waterfront septic systems must be properly installed and maintained.

Priority areas

- Densely populated shoreline areas; older septic systems

Lead and (partner) implementers

- City of Kawartha Lakes; Haliburton, Kawartha, Pine Ridge District Health Unit; shoreline property owners; (septic system businesses; Kawartha Conservation)

Deliverables

- Over the long term, achieve a 4% reduction in existing phosphorus loading from shoreline septic systems to achieve a loading target of approximately 813 kg per year in Balsam Lake and 347 kg per year in Cameron Lake.
 - Implement the recently approved City of Kawartha Lakes "Septic Rehabilitation Loan Program." This allows owners to enter into a longer-term payback agreement to access funds for improving their system.
 - Develop regulatory means for legislating the upgrade of outdated or faulty septic systems (e.g., a municipal by-law requiring a certificate of approval prior to a property sale).
 - Conduct periodic "dock talk" extension services and local workshops with a focus on helping homeowners understand, inspect, and manage septic systems.
 - Create a comprehensive municipal or regional inventory of all septic systems in the Balsam Lake and Cameron Lake watersheds, detailing type, location, and year of construction.
 - Continue investigating official complaints of malfunctioning systems to address potential health hazards and determine corrective actions as required.

Action A6: Nutrient and soil loss from farms

Implement measures such as vegetated buffer strips along streams, conservation tillage, and other practices that reduce nutrient and soil loss from farms, with assistance from cost-share programs.

Urgency

- Medium

Rationale

- At 34% of the total land use, agriculture is the dominant element (after natural areas) within the Balsam Lake and Cameron Lake planning area. The proper management of farmlands is essential in maintaining the environmental health of the watershed, in decreasing phosphorus and nitrogen loads, and in reducing sediment loss into the lake via drainage ditches and other small tributaries. Over the past 20 years, farmers have made significant gains in applying enhanced water quality protection measures through the Environmental Farm Plan. In terms of phosphorus loadings, it is estimated that local rural areas contribute approximately 1% (103 kg per year) into Balsam Lake and 2% (353 kg per year) into Cameron Lake from all sources. Maintaining existing agricultural phosphorus loading, or lower, is needed to achieve the water quality benchmark. Since there is a recent trend towards conversion of marginal/pasturelands to croplands, a key consideration is not to impede the application of nutrients required for crop production, but rather to encourage the management practices that retain nutrients and soils onsite for crop utilization.

Priority areas

- Subwatersheds of the Staples River and the Cameron Lake Tributaries; other localized high-risk sites

Lead and (partner) implementers

- Ontario Soil and Crop Improvement Association: delivery agent for the Environmental Farm Plan; farmers; (Ontario Ministry of Agriculture, Food and Rural Affairs; Kawartha Conservation; City of Kawartha Lakes; agri-businesses)

Deliverables

- Develop a local program to provide additional financial and project management incentives to landowners in the Balsam Lake and Cameron Lake planning area to *top up* Environmental Farm Plan incentives, focusing on surface water and soil management improvements in high priority areas.
 - Establish a Review Committee comprised of municipal, provincial, and conservation authority staff, and agricultural representatives. It will provide program direction, collaborate on applications for external funding, and review project applications on a confidential basis.
 - Every year, conduct five to 10 agricultural improvement projects in priority subwatersheds such as:
 - Grassy waterways on erodible crop land sites;
 - Vegetated buffer strips adjacent to watercourses;
 - Grazing land management: fencing, crossings, alternative watering systems;
 - Improved manure storage;
 - Livestock yards/feedlot operation runoff management and diversion of upslope water;
 - Conservation tillage and cover crops that stabilize soils and reduce erosion;
 - Nutrient management planning: implementation of precision agricultural practices including the use of GPS and satellite navigation technology for more accurate application of nutrients; and
 - Wetland restoration and protection.
- Over the long term, maintain or lower existing phosphorus loading from local agricultural sources to achieve a loading target of approximately 103 kg per year or less in Balsam Lake and 353 kg per year or less in Cameron Lake.

Action A7: Boating awareness programs

Implement programs to educate lake users about proper boat maintenance, grey water disposal, and the locations of sensitive habitats to reduce the risk of pollution and lake ecosystem disturbance.

Urgency

- Medium

Rationale

- Balsam Lake and Cameron Lake are heavily used lakes for recreational purposes, particularly for pleasure craft. Due to the potential for lake contamination by chemicals (e.g., gas, oil, etc.) and grey water (e.g., holding tanks) on board most of these vessels, there is a need to educate people about properly maintaining equipment and disposing of wastes.

Priority areas

- Older boats and large boats (e.g., yachts and houseboats)

Lead and (partner) implementers

- Recreational boaters; Boating Ontario; local marinas; (Kawartha Lake Stewards Association)

Deliverables

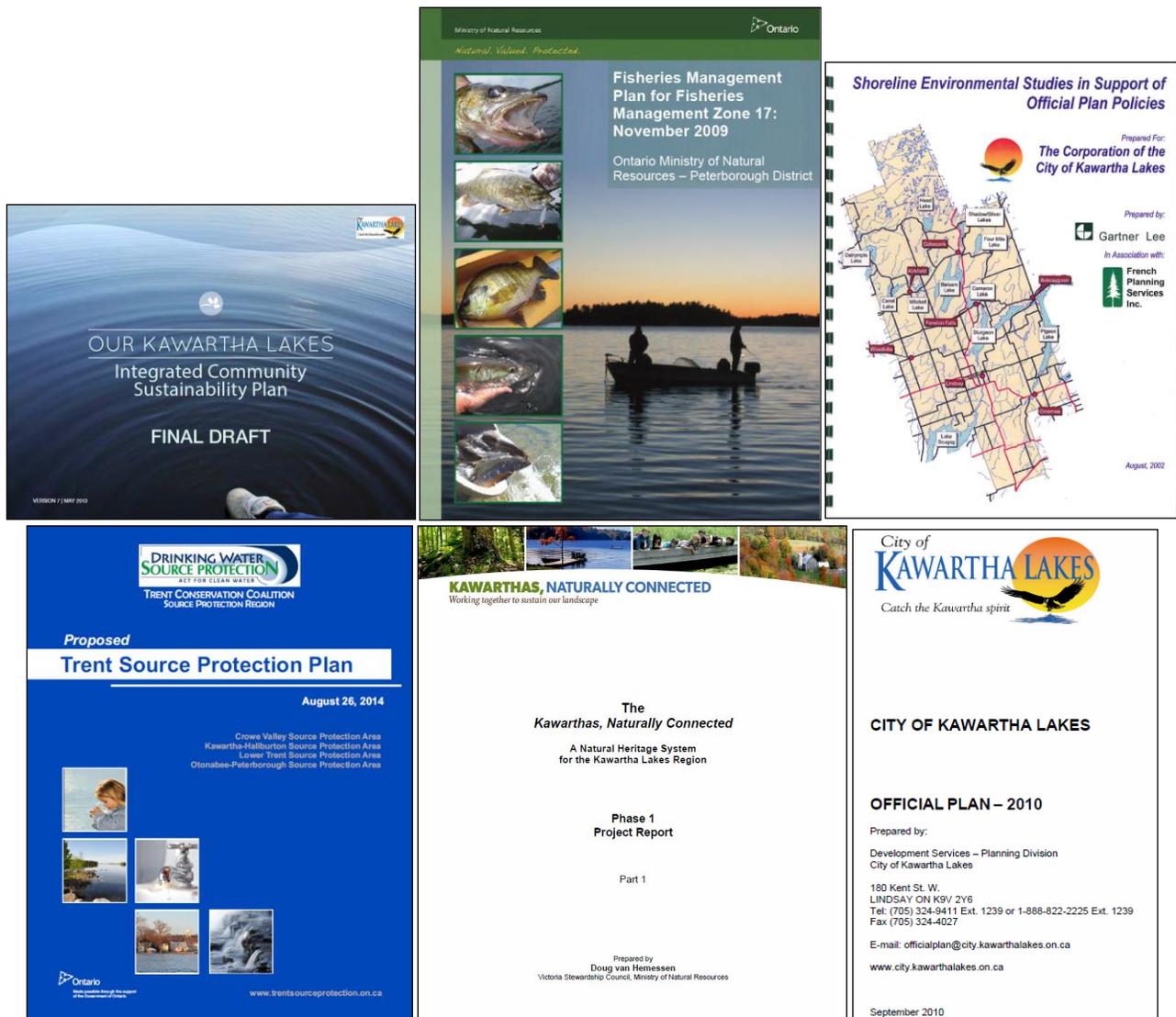
- Implement a Clean Boater campaign, to ensure a proactive approach to reducing risk of water contamination, through measures such as the following:
 - Practise preventative maintenance, including regular engine and equipment inspection and servicing.
 - Keep oil absorbent pads and containment pans or trays under the engine when it is not in water.
 - Know the fuel capacity prior to filling tanks; when possible, fill away from water over a spill containment system.
 - Store petroleum products carefully to reduce risk of spillage.
 - Minimize the use of harsh cleaners by rinsing boats regularly, or if a boat needs cleaning beyond the soft cleaning, first remove the boat from the water.
 - Dispose of grey water waste on land in appropriate facilities.
 - Use low-impact recreational practices (e.g., canoeing, kayaking, sailing, etc.) and technologies (e.g., four-stroke motors).
- Minimize disturbance to sensitive ecological features with measures such as the following:
 - Reduce your wake and ensure the boat is an appropriate distance from shore; this minimizes the turbidity (soil and sediment disturbance) and damage to nearshore areas.
- Minimize noise and speed levels when operating near populated waterfront communities.
- Marinas are required to obtain Clean Marine Program certification through Boating Ontario.

3.3 Strategic Planning Strategy

The primary focus of this strategy is to integrate proactive approaches for lake health and environmental protection measures into operational planning policies within a framework of existing planning tools and legislation. One area of focus is reviewing and strengthening the water protection and natural heritage policies in the *City of Kawartha Lakes Official Plan*. Any remedial implementation plans and actions must be supported by the official policies, plans, and relevant legislation. If necessary, these should be updated or newly developed.

It is important to enhance collaboration among municipal planning staff, federal and provincial regulating authorities, and Kawartha Conservation staff regarding shoreline regulations and permitting procedures. This will streamline processes and improve transparency for the general public.

The implementation of the *Balsam Lake and Cameron Lake Management Plan* will be linked with existing strategic planning initiatives that further leverage efforts to improve the health of the lakes and watersheds.



Examples of recently developed planning initiatives that support the Lake Management Plan

Action B1: Official Plan

Amend and strengthen the *City of Kawartha Lakes Official Plan* and Secondary Plans policy to require protection of the natural environment through specific measures such as development adjacent to shorelines or streams.

Urgency

- High

Rationale

- Municipal Official Plans and Secondary Plans provide the structure for planning and development in the core Balsam Lake and Cameron Lake planning area. The current *City of Kawartha Lakes Official Plan* requires stronger wording and specific policy to protect the lake environment. Important natural areas (e.g., wetlands, woodlands, and fish spawning areas) must be identified on maps and have appropriate policies to preserve and protect them.

Priority areas:

- Shoreline areas, and
- Areas to be determined, as defined by a natural heritage strategy (e.g., Kawarthas, Naturally Connected Natural Heritage Systems Strategy).

Lead and (partner) implementers

- City of Kawartha Lakes; (Kawartha Conservation; Ontario Ministry of Natural Resources and Forestry; consultants)

Deliverables

- Amend *City of Kawartha Lakes Official Plan* and Secondary Plans to include strong natural heritage policy (with corresponding maps) to protect the ecological function of important natural areas and improve water quality in the lakes.
 - Strengthen shoreline protection provisions to ensure that the natural features and functions of shorelines and nearshore areas are maintained.
 - Review and integrate, where applicable, the shoreline-based policy recommendations in the document, *Shoreline Environmental Studies in Support of Official Plan Policies for the City of Kawartha Lakes* (Gartner Lee and French Planning Services, 2002).
 - Consider requiring new multi-lot residential, commercial, and/or industrial developments to achieve a "no-net-increase" in phosphorus inputs entering the lake from the pre-development compared to the post-development footprint.
 - Consider requiring natural treatments (e.g., native plantings and natural rock) to be integrated wherever feasible for shoreline alteration works.
 - Work with partners to identify natural heritage areas to be protected and ensure the corresponding policy is in effect.
 - Strengthen wording (e.g., "shall" instead of "should," and "require" instead of "encourage") for policies that apply to water quality and natural heritage protection measures.
 - Consider applying the enhanced lake protection provisions (e.g., vegetation protection zones, natural heritage evaluations, etc.) used in the Lake Simcoe watershed (as per the *Lake Simcoe Protection Plan*) to the Balsam Lake and Cameron Lake planning area.
 - Integrate goals and objectives developed in the Our Kawartha Lakes Integrated Community Sustainability Plan initiative into the Official Plan strategic directions.
 - Provide for greater water quality protection measures (e.g., water quality and quantity control standards) for developments in back lots.
 - Enable Site Plan Control (see Action B3) and Tree Conservation By-laws (see Action B4) to be adopted.
- Conduct effective enforcement of policies through inter-agency coordination.

Action B2: Shoreline Secondary Plan

Develop a Shoreline Secondary Plan that provides enhanced land use planning direction specific to shoreline areas around the lakes.

Urgency

- High

Rationale

- Secondary Plans provide enhanced planning direction for growth and development, giving a local context to policy provisions contained in the overarching Official Plan. The shorelines of Balsam Lake and Cameron Lake are considered a sensitive area that contributes directly to the health of the lake(s) system. Currently, the shoreline areas around the lakes are quite heavily developed and alterations are only expected to continue as local and Greater Toronto Area (GTA) urban communities expand and more seasonal dwellings are converted to permanent residences. There is a need to strengthen water quality and natural heritage protection policies around shorelines to mitigate land use impacts resulting from any increase in shoreline development and association alterations. The Secondary Plans would provide clear policy direction (e.g., zoning, types of land use or activities permitted in certain areas, siting of infrastructure, etc.) to shoreline areas, particularly for planning future development.

Priority areas

- Shorelines around Balsam Lake and Cameron Lake, including island shorelines

Lead and (partner) implementers

- City of Kawartha Lakes; (Kawartha Conservation; Parks Canada; Ontario Ministry of Natural Resources and Forestry; consultants)

Deliverables

- A Shoreline Secondary Plan will include strong natural heritage policy (and corresponding maps) to protect the ecological functions of important natural areas and improve water quality in the lake.
 - Consider harmonizing existing shoreline development policies of the Trent-Severn Waterway, Kawartha Conservation, Ontario Ministry of Natural Resources and Forestry, and City of Kawartha Lakes.
 - Review and integrate, where applicable, the shoreline-based policy recommendations in the document *Shoreline Environmental Studies in Support of Official Plan Policies for the City of Kawartha Lakes* (Gartner Lee and French Planning Services, 2002).

Action B3: Site plan control for shorelines

Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality.

Urgency

- High

Rationale

- Site plan control is a very useful planning tool to enhance shoreline protection measures. Implementation of this by-law would require applications to include plans of the existing development and a site alteration proposal. As a condition of approval, the municipality would require measures that enhance lake health such as preservation of mature vegetation, natural shoreline landscaping, and appropriate treatment of driveways (e.g., requiring gravel or a porous material). This control would apply to development activities (e.g., building construction, site grading, etc.). The authority to use this tool must first be set out in the municipal Official Plan.

Priority areas

- To be determined based on consultations; consider application to shorelines and areas of back-lot development adjacent to shorelines

Lead and (partner) implementers

- City of Kawartha Lakes

Deliverables

- Amend *City of Kawartha Lakes Official Plan* and Secondary Plans to enable site plan control by-law.
- Develop a site plan control by-law.
 - The scope and criteria of the by-law (e.g., to which projects it applies) would be determined through the municipal process, which should emphasize public consultation.
 - Incorporate the following: preservation of natural vegetation, enhanced stormwater management measures, development setbacks from key natural heritage features (e.g., wetlands), provision for natural shoreline structures, etc.
- Conduct effective enforcement of the by-law through inter-agency coordination.

Action B4: Tree conservation by-law

Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines.

Urgency

- Medium

Rationale

- Forested areas along the lake shoreline maintain the integrity of the lake ecosystem by stabilizing soils, moderating temperature, providing fish and wildlife habitat, reducing surface water runoff, and utilizing nutrients. The intent of this action is to prevent the clear-cutting of large tracts of forested areas along shoreline prior to a development application. The act of "cutting down" or "injuring" a tree is not typically considered development, therefore this practice would not fall under the proposed site plan control by-law action. An additional level of protection is necessary. The authority to use this tool must first be set out in the municipal Official Plan.

Priority areas

- To be determined based on consultations; consider application to large (e.g., greater than one hectare) forested areas along the Balsam Lake and Cameron Lake shorelines

Lead and (partner) implementers

- City of Kawartha Lakes

Deliverables

- Amend *City of Kawartha Lakes Official Plan* and Secondary Plans to enable tree conservation by-law.
- Develop a tree conservation by-law.
 - The scope and criteria of the by-law (e.g., to which projects it applies) would be determined through the municipal process, which should emphasize public consultation.
 - Require a permit from shoreline property owners to cut or injure trees considered to be within the scope of the by-law.
- Conduct effective enforcement of the by-law through inter-agency coordination.

Action B5: Implement plans

Implement the following plans: *Trent Source Protection Plan*; *Fisheries Management Plan for Fisheries Management Zone 17*; Kawarthas, Naturally Connected Natural Heritage Systems Strategy; Our Kawartha Lakes Integrated Community Sustainability Plan; and Balsam Lake and Indian Point Provincial Park Plans.

Urgency

- Medium

Rationale

- Various resource planning initiatives (government, community, or industry-led plans) directly or indirectly support the enhancement of the lake environment. In most instances, successful implementation of these initiatives will assist in the long-term sustainability of Balsam Lake and Cameron Lake.

Priority areas

- Protect important natural heritage areas.
- Maintain no/low drinking water threats to the municipal water systems of Fenelon Falls (Cameron Lake).

Lead and (partner) implementers

- As per lead and partners identified in respective plans

Deliverables

- Finalize and implement the Kawarthas, Naturally Connected Natural Heritage Systems Strategy.
 - Focus on identification of priority areas in core *Balsam & Cameron Lake Management Plan* area for reforestation or areas of critical ecological significance that must be protected from incompatible development.
- Implement the *Trent Source Protection Plan*.
 - Focus on addressing drinking water threats to the Fenelon Falls municipal water intake system.
- Implement the Our Kawartha Lakes Integrated Community Sustainability Plan.
 - Focus on integrating water-based objectives and targets into municipal planning and policy.
- Implement the *Fisheries Management Plan for Fisheries Management Zone 17*.
 - Focus on implementing actions identified in the Walleye Management Strategy, Muskellunge and Northern Pike Strategy, and Invasive Species Strategy.
- Implement the Balsam Lake and Indian Point Provincial Park Management Plans.
 - Focus on shoreline water quality, natural heritage protection, and good recreational access to the lake.

Action B6: Shoreline works

Initiate a trial one-window permit application process for shoreline works between Parks Canada and Kawartha Conservation.

Urgency

- Medium

Rationale

- The purpose of the coordinated approach is to implement and evaluate a shoreline Permit Protocol for Balsam Lake and Cameron Lake for permits issued by Parks Canada and Kawartha Conservation. This coordinated shoreline permitting and approval project was piloted on Sturgeon Lake in 2014, in response to the recommendations in the 2008 report, *It's All About The Water: Report of The Panel on the Future of the Trent-Severn Waterway*. Preliminary results from the pilot project suggest that the one-window process is effective from a client services and inter-agency coordination perspective. The intent is to greatly simplify the shoreline permitting process and support the restoration of the shoreline.

Priority areas

- Shoreline areas

Lead and (partner) implementers

- Kawartha Conservation when the majority of works is along the shoreline; Parks Canada when the majority of works is in-water

Deliverables

- Implement the one-window project for development activities originating on Balsam Lake and Cameron Lake properties.
 - Use the lessons learned from the Sturgeon Lake one-window pilot and apply them to Balsam Lake and Cameron Lake.
 - Implement for a period of one year from the date the Partnership Agreement comes into effect.
 - Make the approval process simpler, faster, and less confusing for the public as follows:
 - Support a more consistent application of shoreline policies.
 - Clarify the jurisdictional scope of permitting activities.
 - Improve public awareness about the use of the permitting processes.
- Conduct an evaluation of the pilot project following one year of implementation.
- Conduct effective enforcement of policies through inter-agency coordination.

3.4 Urban and Rural Infrastructure Strategy

A significant focus of this strategy is to reduce impacts to the lakes resulting from urban and rural infrastructure maintenance. This is mainly a municipal responsibility, with emphasis on enhanced control of stormwater, water quality and quantity, soil erosion, and maintenance of public spaces. However, other stakeholders involved in the construction industry are similarly responsible for ensuring that their activities are not detrimental to the health of the lakes.

The recommended urban stormwater management strategy will provide an integrated, comprehensive stormwater management plan in all urban catchment areas. Implementation of this strategy can help reduce contaminants from urban runoff by using water quality and quantity treatment and by reducing or eliminating the sources of pollutants. The use of innovative 21st-century approaches should ensure that urban development is sustainable and minimizes impact to the lakes.



*Garnet Graham Park on Bond Street Beach in Fenelon Falls
(Cameron Lake, 2014)*

Action C1: Stormwater management

Through stormwater management planning, improve the quality and control of stormwater in the urban settlement areas of Fenelon Falls and Coboconk.

Urgency

- High

Rationale

- Fenelon Falls, Coboconk, and, to a lesser degree, Rosedale are the largest urban centres on Balsam Lake and Cameron Lake. Urban areas, although representing a relatively small part of the planning area, are significant contributors of sediments and contaminants, including nutrients and bacteria. This is mainly due to increased seasonal and stormwater runoff from hardened surfaces, typical of highly developed areas. Efforts should be focused on improving stormwater quality in priority areas based on calculated flow and nutrient loading; this includes the type of stormwater control, size, location, and cost estimate. Recent advances in the application of low impact development (LID) standards in Greater Toronto Area settings have proven to be extremely cost-effective in achieving enhanced stormwater quality and quantity control.

Priority areas

- Defined sewersheds (to be determined) in major urban settlement areas

Lead and (partner) implementers

- City of Kawartha Lakes; (Centre for Alternative Wastewater Treatment; Water Research and Innovation Network (WRAIN); Kawartha Conservation)

Deliverables

- Undertake an urban stormwater management initiative that provides an integrated approach to master drainage planning, including water quality and quantity treatment, for all urban catchment areas.
 - Create an inventory of all urban storm drainage systems (including delineation of sewersheds), conduct regular inspections, and establish a maintenance schedule.
 - Identify those sewersheds that contribute the highest inputs of nutrients and sediments.
 - Identify opportunities to retrofit existing units or create new stormwater infrastructure to improve water treatment (in quality and quantity) where appropriate, with an emphasis on applying low impact development (LID) and other innovative technologies.

Action C2: Infrastructure maintenance and construction practices

Implement effective sediment and erosion control measures and other practices to prevent contaminants from reaching local watercourses during road work, agricultural drainage, and other construction projects.

Urgency

- High

Rationale

- Routine maintenance of drainage ditches along rural road networks is often needed to remove the build-up of silt and sediments. In the case of roadside ditches, the accumulation of sediments over time may impede the ability of the ditch to drain water efficiently during precipitation events and high-water periods. This is similar to agricultural drainage corridors, where it is also necessary to maintain unimpeded water conveyance during crop growth periods. These practices can potentially involve dredging or altering the channel for increased through-flow. This can damage the aquatic ecosystem, including the harmful alteration of in-stream habitat, destabilization of banks, introduction of excessive sediments into our lakes, etc. A number of cost-effective options incorporate the natural environment (e.g., vegetation and its root systems), which will help minimize maintenance costs while protecting the environment. In the case of roadside ditches and construction sites, the focus should be on reducing sediment loading into nearby (downslope) watercourses.

Priority areas:

- Road ditches with steep slopes and highly erodible soils,
- Road ditches that drain immediately into lake-connecting watercourses, and
- All construction worksites.

Lead and (partner) implementers

- City of Kawartha Lakes; (Ontario Ministry of Agriculture, Food and Rural Affairs ; Kawartha Conservation; construction industry)

Deliverables

- Avoid conducting construction projects during sensitive periods for fish and wildlife, where this is appropriate.
- Identify and install effective measures to prevent disturbed soils and sediments from migrating into the watercourses. Use standards outlined in the document, *Erosion and Sediment Control Guideline for Urban Construction* (Toronto and Region Conservation Authority, 2006). For example:
 - Focus on site-level containment of sediments, recognizing that advanced controls are often required to protect sensitive natural heritage features.
 - Plant disturbed areas with soil-stabilizing vegetation, preferably native species.
 - Use sediment blankets or matting for disturbed banks.
 - Work in low-flow periods; develop a back-up plan in case of heavy rains/melt.
- Host periodic workshops for contractors, consultants, project managers, and developers to ensure effective communications and knowledge of the most up-to-date measures for controlling the movement of sediments off-site.

Action C3: Improvement of public waterfront

Increase community enjoyment of public beaches and parks by deterring geese, conducting regular maintenance, and increasing public access to shorelines.

Urgency

- Medium

Rationale

- Public access to Balsam Lake and Cameron Lake provides a primary connection to the lake. Certain public beaches are often posted as unsafe for swimming due to elevated bacteria concentrations. From 2009 to 2013, beaches were posted 66 times. During the swimming season, Bond Street Beach in Fenelon Falls was posted almost half of the time, while Coboconk Beach was posted almost one-third of the time. It is anticipated that active management of these spaces will increase public enjoyment opportunities at our beaches and other waterfront parks.

Priority areas:

- Bond Street Beach in Fenelon Falls, Lions Club Park Beach in Coboconk, other beaches as necessary, and
- Public parks.

Lead and (partner) implementers

- City of Kawartha Lakes; Kawartha Land Trust; beach stewards; (school students; volunteer organizations)

Deliverables

- Within a five-year period, achieve a target of 80% (approximately 53 postings) reduction in the amount of time that public beaches are posted as unsafe for swimming.
 - Conduct routine maintenance at public spaces, including beaches, such as regular garbage pick-up, clean-up of pet and bird feces, and provision of adequate feces disposal facilities.
 - Investigate the potential to implement higher levels of urban storm runoff management in beach areas.
 - Investigate the feasibility of beach stewards or volunteers (e.g., 40-hour commitments) doing clean-ups weekly during the summer months.
 - Implement ways to deter geese such as creating and maintaining tall vegetation or wider buffers, dog presence, bangers, falconry, oiling eggs, or consider expanding/providing waterfowl hunting opportunities.
- Develop a strategic plan for the acquisition of additional properties and work with partners (e.g., Kawartha Land Trust) to secure additional properties that provide increased access to waterfront areas.

Action C4: Sewage treatment facility

Operate Coboconk sewage treatment facility at maximum efficiency for pollutant removal and capacity.

Urgency

- Medium

Rationale

- One municipal wastewater treatment plant exists within the planning area. It services the urban community of Coboconk and empties treated water directly into the mouth of the Gull River. Over the years, all treatment plants in the City of Kawartha Lakes have improved treatment efficiency and reduced phosphorus input to the lake dramatically. Coboconk lagoon system continues to function extremely well and its treated discharge into Balsam Lake is negligible in terms of total phosphorus loadings. On occasion, however, excessive water flow amounts entering the treatment plants (from heavy rainfall events) have overloaded the facility capacity, in the recent past. This has led to partial by-pass events when some untreated wastewater enters the lake. It is important for the treatment plants to be able to process large-flow events.

Priority areas

- Coboconk Wastewater Treatment Plant

Lead and (partner) implementers

- City of Kawartha Lakes; (Centre for Alternative Wastewater Treatment; urban residents)

Deliverables

- Identify opportunities to reduce the amount of stormwater entering the wastewater treatment conveyance system (e.g., disconnecting downspouts, low-impact development opportunities, etc.); identify storm vs. combined storm/sewage infrastructure, and investigate the options to mitigate.
- Reduce partial bypass events at treatment plants when overloaded with stormwater.
- Ensure that pumping stations have back-up power supplies and/or other features to prevent spillage to waterways.

3.5 Research and Monitoring Strategy

All management decisions, as well as remedial and restorative actions, depend on sound scientific data and knowledge. Further lake-based research will shed light on the many information gaps identified by this planning process, including emerging 21st-century pressures. Further monitoring is crucial for determining the effectiveness of current lake-based programming and for identifying new opportunities to engage stakeholders. This adaptive management approach ensures that priorities remain relevant as new information becomes available.

A key component of this strategy is collaboration among groups and institutions already active on the lakes. There is great value in using the expertise of local community members, volunteers, and citizen scientists. We promote the sharing of local knowledge and expertise that, in some cases, spans generations. This will help build plan interest and lead to the increased “buy-in” of local people. As project partners create the momentum, the community will come on board.



Kawartha Conservation staff measuring water quality at the outlet of Gull River (Coboconk, June 2011)

Action D1: Innovative water quality management approaches

Undertake pilot projects to test the effectiveness of innovative management approaches to nuisance aquatic plants and poor water quality, in priority areas.

Urgency

- High

Rationale

- The purpose of this action is to test the effectiveness of a suite of projects at a relatively local scale that could be applied to a broader scale, if proven valid. These pilot projects will address many information gaps in innovative water management approaches and technology. With high profile, numerous small projects of a collaborative nature are likely to garner solid support for implementation efforts. It is essential that these projects contain a monitoring component to determine their effectiveness.

Priority areas

- Various, depending on the nature of the pilot project

Lead and (partner) implementers

- (Water Research and Innovation Network; academia; industry; government agencies; and others, depending on project scope and location)

Deliverables

- Within the next two to three years, facilitate pilot projects or other study initiatives on the following:
 - Innovative approaches for enhancing the quality of urban stormwater before it enters the lake, for example:
 - Test constructed wetlands (e.g., floating islands).
 - Construct low-impact development techniques to control runoff, such as bioswales, infiltration trenches, and permeable pavement.
 - Innovative approaches for enhancing the quality of rural stormwater and/or drainage runoff, for example:
 - Use controlled tile drainage.
 - Use other farm-beneficial management practices.

Action D2: Lake monitoring

Implement a coordinated lake monitoring program that regularly tracks key indicators of lake watershed health, including nutrients, forest cover, fish communities, and oxygen levels.

Urgency

- Medium

Rationale

- Routine collection of lake and watershed data provides critical information about the ongoing state of Balsam Lake, Cameron Lake, and their watersheds. It also helps to monitor progress on the planning targets, while allowing early detection of hot spots. Various agencies and groups are actively monitoring Balsam Lake, Cameron Lake, and their watersheds; coordination is key to reducing duplication and increasing efficiency. We need to support and take advantage of local monitoring, drawing on contributions from volunteers, community organizations, and local academia.

Priority areas

- Balsam Lake, Cameron Lake, and their watersheds

Lead and (partner) implementers

- Kawartha Conservation; (Kawartha Lake Stewards Association; Fleming College; Trent University; provincial ministries; Muskies Canada; Parks Canada; Ontario Federation of Anglers and Hunters; citizen scientists)

Deliverables

- Develop a list of science-based lake and watershed health indicators that are practical enough to be understood by the general public. Example indicators include the following:
 - Water quality: nutrient status, contaminant inputs, temperature, oxygen, etc.;
 - Water quantity: lake water levels, flow inputs, etc.;
 - Aquatic ecosystems: biodiversity, primary production, fishes, aquatic plants, etc.; and
 - Terrestrial natural heritage: forest cover, natural shorelines, etc.
- Conduct routine monitoring of Balsam Lake, Cameron Lake, and their watersheds using appropriate lake and watershed health indicators.
 - Coordinate monitoring activities between academia and active groups.
 - Use a "pressure-state-response" feedback loop for monitoring, so that efforts are directed at (a) recognizing relevant pressures/threats to lake health, (b) determining to what degree these impact the state of lake health, and (c) determining the effectiveness of management response.
 - Integrate monitoring efforts into secondary and post-secondary institutions, where practical.
 - Increase data collection opportunities by volunteers, citizen scientists, and local stakeholders.

Action D3: Sources of nutrients

Conduct research to more accurately identify shoreline sources of nutrients and potential impacts to nearshore areas of the lakes.

Urgency

- Medium

Rationale

- The purpose of the research is to determine how shoreline dwellings affect nearshore ecosystems in lakes by the release of nutrients. This requires the investigation of nutrient chemistry and ecological processes of the nearshore ecosystems of Balsam Lake and Cameron Lake. Such studies will provide better insight into actual contributions from shoreline septic systems, since loading amounts have only been estimated at this time. The main objective of such research is to study the presence and quantity of nutrients in nearshore areas adjacent to shorelines (that vary in the amount and type of residential development), with a particular emphasis on better quantifying septic system impacts.

Priority areas

- Shoreline and nearshore areas

Lead and (partner) implementers

- Trent University; (Kawartha Lake Stewards Association; Kawartha Conservation; Fleming College)

Deliverables

- Conduct nearshore zone sampling for source detection and assessment of ecosystem services.
- Quantify shoreline nutrient input from septic systems and other sources.
- Stimulate and support additional studies of advanced research that will produce more precise knowledge of septic system nutrient input.

Action D4: Understanding lake ecosystem stressors

Conduct research to identify how the lake ecosystem responds to stressors such as cumulative development, climate change, and invasive species.

Urgency

- Low

Rationale

- The key driver for the proposed research is the anticipated increase of development along the shorelines of Balsam Lake, Cameron Lake, and in surrounding urban areas, and the consequent pressures on the lake ecosystem. There is an urgent need to improve scientific understanding about these interactions – particularly for climate change and invasive species in the lake watersheds – so that appropriate management responses may be developed.

Priority areas:

- Cumulative development along shorelines,
- Climate change, and
- Invasive species in aquatic ecosystems.

Lead and (partner) implementers

- (Kawartha Conservation; colleges and universities; Kawartha Lake Stewards Association; provincial ministries)

Deliverables

- Conduct research on potential lake ecosystem changes resulting from climate change, invasive species, and cumulative shoreline development.
 - Investigate options for predictive modeling tools and decision-support systems to guide management efforts to mitigate any negative impacts of emerging pressures.
- Conduct research on how to protect and manage muskellunge populations from the significant threat of northern pike proliferation.
- Conduct a climate change vulnerability assessment.
- Conduct research to identify lake and watershed health thresholds and carrying capacity.

Action D5: Socio-economic value

Determine the socio-economic value of Balsam Lake and Cameron Lake, with emphasis on the value of goods and services provided by natural resources.

Urgency

- Low

Rationale

- Currently, the socio-economic value of Balsam Lake and Cameron Lake – the direct and indirect monetary value to the municipality and local communities – is unknown. One information gap is the significance of the lake ecosystem services (e.g., providing clean water, fishing opportunities, recreational values, natural spaces, clean air, etc.) to the broader community. Recognition of the value of ecosystem services and the impact of human development on them is becoming more widespread through recent research (e.g., *Lake Simcoe Basin's Natural Capital: The Value of the Watershed's Ecosystem Services* (S. Wilson, 2008) and the *Value of Greenbelt Eco-Services Study* (S. Wilson, 2008) reports). However, public knowledge of the vital role of these services in quality of life is limited, so it is important that communities have information about the value of natural areas.

Priority areas

- To be determined

Lead and (partner) implementers

- Chamber of Commerce; City of Kawartha Lakes; (Trent University and other academic institutions; Fleming College; David Suzuki Foundation)

Deliverables

- Identify key ecosystem goods and services provided to humans (Balsam Lake and Cameron Lake users and stakeholders, in particular) from Balsam Lake and Cameron Lake resources.
- Identify the environmental, social, and economic value of ecosystem goods and services.
- Produce a summary report.

3.6 Communications and Outreach Strategy

Communication and outreach help set the *Balsam Lake and Cameron Lake Management Plan* in motion and provide the mechanisms for plan updates and adjustments to meet changing community needs and environmental conditions. This involves communicating information about the lakes and watersheds; providing actions to sustain a healthy environment, community, and economy; receiving feedback from stakeholders about implementation of the plan (including plan updates and adjustments); and assisting collaboration on the plan and related projects.

The Communication and Outreach Strategy supports the other strategies through these four objectives:

1. Enable informed decision making and actions that contribute to the goal of the plan.
2. Motivate actions that protect Balsam Lake and Cameron Lake.
3. Create the cultural conditions for long-term sustainability of the lakes.
4. Provide transparency and accountability for the plan and its implementation.

Many people have a stake in the implementation of the *Balsam Lake and Cameron Lake Management Plan*. They are grouped into target audiences by the different forms of communication and outreach required for implementing the plan. Audience groups include shoreline property owners, agricultural and rural landowners, urban residents, businesses, tourists and other visitors, municipal councillors and staff, lake associations, agencies and related organizations, developers, funders, and Kawartha Conservation staff.

Barriers to implementation (which will be assessed by research in this strategy) include:

- Poor understanding of watershed connections (e.g., the impact of urban residents on the lakes), including why specific actions are needed, and the corresponding benefits of those actions;
- Upfront costs and lack of agreement on who is responsible for watershed protection (e.g., landowners may see agencies as responsible, and agencies may see greater need for landowners to take responsibility);
- Lack of knowledge of what to do and how to do it;
- Good conditions may entrench a “business as usual” attitude; and
- Challenges of keeping the brand and awareness of the plan at the forefront.

Opportunities to support the implementation of this strategy include:

- Strong involvement from community leaders and representatives of the committees for lake management planning;
- Research and stewardship activities by groups in the watershed such as the Balsam Lake Association, Kawartha Lake Stewards Association, Fleming College, Federation of Ontario Cottagers’ Associations, and Trent University;
- Outreach such as the Blue Canoe Program, which provides information about lake management planning and collects information through surveys;
- Increasing concern about excessive aquatic plant growth, blue-green algae, and other symptoms of lake enrichment, as well as invasive species, climate change, and other issues identified in surveys;
- Science to back up the strategies;
- Emphasis in the community on the need for stewardship actions by individual property owners;
- Release of booklets and other communication materials;
- Establishment of a web page for the program and other communication mediums;
- In-house skills, such as online media, writing, and presentation;
- Media coverage surrounding lake management planning, the *2013 Kawartha Watershed Report Card* (Kawartha Conservation, 2013), open house events, and other Kawartha Conservation and partner activities.



*Community Advisory Panel meeting
(Lindsay, 2013)*

Action E1: Keeping stakeholders informed

Communicate the science, solutions, and outcomes of plan implementation.

Urgency

- High

Rationale

- A large amount of information and analysis has been generated through plan development, providing a baseline for setting environmental targets. It enables informed decision-making and actions that contribute to the goal of the plan. Through information sharing it will be possible to track any improvement or decline in conditions, measure the effectiveness of actions, and respond to emerging issues in a changing environment. Transparency and accountability to stakeholders are necessary for ongoing funding and support for plan implementation. Further, two large watershed systems, the Gull and Burnt Rivers, drain into Balsam Lake and Cameron Lake but are not within the scope of the core planning area. Due to the large flow volumes that these rivers contribute, a subtle increase in pollution can significantly influence water quality in the lakes. Therefore, to maintain healthy lake conditions, it is important to communicate the objectives of the *Balsam Lake and Cameron Lake Management Plan* to upstream users.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation; City of Kawartha Lakes; Kawartha Lake Stewards Association; Federation of Ontario Cottagers' Associations; (local agricultural organizations and other community groups; Coalition of Haliburton Property Owners' Associations; Coalition for Equitable Water Flow)

Deliverables

- Distribute a report every two years on monitoring results, implementation of stewardship actions, impacts of actions, and other changes in the watershed. Main target audience: municipal councillors and staff, lake associations, agricultural organizations, other related organizations and agencies, funders, provincial staff, Kawartha Conservation staff, and organizations in the Gull and Burnt River systems.
- Provide updates via newsletters, social media, newspapers, radio, and television. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, developers, and businesses.
- Maintain a web page for lake management planning to host reports, updates, and related resources. Main target audience: municipal councillors and staff, lake associations, agencies and related organizations, funders, and Kawartha Conservation staff.
- Develop infographics and posters that include facts and findings about Balsam Lake and Cameron Lake, issues and solutions, ecological connections, and human-environment relationships. The graphics will be professionally designed and suitable for hanging in cottages, offices, and other settings; for posting online; and for distributing through social media. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, businesses, developers, municipal councillors and staff, Kawartha Conservation staff, and organizations in the Gull and Burnt River systems.
- Provide presentations by request, to contribute the latest information and updates, answer questions, and talk directly with people in the community.
- Showcase new technologies, innovations, and practices, where appropriate.

Action E2: Community Advisory Panel

Maintain the Community Advisory Panel to ensure effective communication, agency support, and collaboration among lake stakeholders during plan implementation.

Urgency

- High

Rationale

- With the implementation of the *Balsam Lake and Cameron Lake Management Plan*, maintaining relationships among all project partners is essential for communicating with the watershed community. The Community Advisory Panel will continue to help provide this function. The panel will also evaluate various plan implementation components by assessing whether actions are appropriate and meet targets, and by recommending responses.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation; City of Kawartha Lakes; (Kawartha Lake Stewards Association; Federation of Ontario Cottagers' Associations; agricultural groups; community organizations)

Deliverables

- Maintain the Community Advisory Panel membership, with an increasing focus on plan implementation.
 - Maintain the partnerships from the lake study and research period.
 - Receive input on plan implementation, and on changes in the landscape and in communities.
 - Assist with funding proposals and acquisition of resources for program delivery.
 - Stakeholder representatives: municipal councils and staff, industry leaders for farmers and businesses, shoreline and urban communities, community champions and organizations.
 - Solicit more representation from “upstream” stakeholders (e.g., the Coalition of Haliburton Property Owners' Associations, Coalition For Equitable Water Flow, etc.).
 - Take ownership of monitoring the completion of implementation actions.

Action E3: Science and Technical Committee

Maintain the Science and Technical Committee to ensure effective communication, support, and collaboration among monitoring and research-based organizations.

Urgency

- High

Rationale

- A Science and Technical Committee provided specialized input and leadership pertaining to the science and research processes during the development of the Balsam Lake and Cameron Lake Management Planning project. The membership of the committee covers many areas of expertise and knowledge; it includes organizations with an interest in the outcomes of the lake management planning and in the scientific research of the lake ecosystem. Since research and monitoring are integral components of the lake management process, this technical forum should continue to provide input and support.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation; (Otonabee Conservation; Trent University, Fleming College and other academic institutions; municipalities; provincial ministries; Parks Canada; Kawartha Lake Stewards Association)

Deliverables

- Maintain the Science and Technical Committee membership, with an increasing focus on supporting plan implementation efforts.
 - Maintain the development of partnerships achieved during the lake study and research period.
 - Receive input on plan implementation and emerging issues.
 - Assist with funding proposals and acquisition of resources for science and research delivery.
- Consider expanding the membership and scope of the committee to a Kawartha Lakes-wide initiative.
- Communicate on a regular basis to ensure technical information sharing.

Action E4: Stakeholder Input

Create opportunities for stakeholder input through plan implementation, and assess stakeholder concerns, barriers, and knowledge gaps regularly.

Urgency

- High

Rationale

- This action helps evaluate the implementation of the *Balsam Lake and Cameron Lake Management Plan* and encourages an open forum for updates to the plan. This is important as the landscape changes demographically, climatically, ecologically, culturally, and in other ways. An understanding of community needs, values, concerns, interests, barriers, and knowledge gaps is critical to effective communication and program implementation.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation

Deliverables

- Conduct a representative knowledge, attitudes, and behaviours (KAB) survey of the watershed population to create a baseline. Conduct future surveys to measure changes. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, businesses, and developers.
- Obtain public and stakeholder feedback on reports (every two years) to gauge perceptions of the state of the lake and direction of the plan, through a survey. Main target audience: municipal councillors and staff, lake associations, related organizations, other stakeholders, and Kawartha Conservation staff.
- Compile and analyse other surveys and audience research undertaken in the priority area.
- Implement customer relations tracking/demographics mapping software to manage information collected about each target group through stewardship activities, surveys, and other sources.

Action E5: Profile Balsam Lake and Cameron Lake

Outline the natural heritage features, social values, and economic values associated with Balsam Lake and Cameron Lake, including a long-term vision for the lakes and a shared sense of responsibility to protect them.

Urgency

- High

Rationale

- Many outstanding natural and cultural features make up Balsam and Cameron lakes and the surrounding lands. Encouraging an ecological perspective involves recognizing connections between people and their actions on the landscape. This perspective highlights how ecological ties are also community and economic ties; what one does on the land has ecological implications for the local community and economy. This provides a foundation for stewardship activities and promotes Balsam and Cameron lakes as a desirable place to visit and invest.

Priority areas

- Kawartha Lakes wide, Ontario wide

Lead and (partner) implementers

- Kawartha Conservation; City of Kawartha Lakes; Chamber of Commerce; Federation of Ontario Cottagers' Associations

Deliverables

- Contribute information about the lakes and their natural features to tourism-focused and other communication sources that profile the City of Kawartha Lakes, Balsam Lake, and Cameron Lake. Main target audience: tourists and other visitors, funders, businesses, and shoreline property owners.
- Contribute information about the lake, its natural features, and protection ideas to local school curricula, other local environmental education programming, and organizations in the Gull and Burnt River systems. Main target audience: shoreline property owners, urban residents, agricultural and rural landowners.
- Build a strong brand for the plan that signifies shared responsibility; community effort; science-based programming; and ecological, community, and economic ties. Main target audience: shoreline property owners, agricultural and rural landowners, businesses, urban residents, municipal councillors and staff, lake associations, agencies and related organizations, developers, funders, and Kawartha Conservation staff.

Action E6: Collaboration

Work collaboratively with people and projects that contribute to the objectives of the lake plan.

Urgency

- High

Rationale

- A large amount of information and analysis has been generated in the development of the *Balsam Lake and Cameron Lake Management Plan* that may contribute to other related initiatives in the watersheds. Representatives of a wide range of stakeholders must collaborate on program aspects of the *Balsam Lake and Cameron Lake Management Plan*, including science and research, funding proposals, and other project support. They need to look for unique partnership opportunities for lake management projects.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation; Kawartha Lake Stewards Association; (City of Kawartha Lakes; Federation of Ontario Cottagers' Associations; community organizations; local businesses)

Deliverables

- Provide research and information from the plan and support objectives relevant to the plan. With this goal, participate in working groups and committees, and work with organizations such as the following:
 - Business chambers;
 - City of Kawartha Lakes Economic Development;
 - Cottage, lake, and rate payer associations and environmental groups;
 - Curve Lake First Nation;
 - Developers;
 - Educational institutions such as Fleming College, Trent University, the Trillium Lakelands District School Board, and the Peterborough Victoria Northumberland and Clarington Catholic District School Board;
 - International Centre of Excellence for Water Quality;
 - Mississaugas of Scugog Island First Nation;
 - Regional Tourism Organization 8 (RTO8);
 - Water Management Advisory Council for the Trent-Severn Waterway; and
 - Water Research and Innovation Network (WRAIN).
- Provide assistance with the incorporation of plan research and analysis, and the implementation of best management practices to organizations. Main target audience: municipal councillors and staff, lake associations, agencies and related organizations, developers, funders, and Kawartha Conservation staff.

Action E7: Community Based Social Marketing

Undertake Community Based Social Marketing to motivate lake and watershed friendly lifestyles.

Urgency

- Medium

Rationale

- Community Based Social Marketing (CBSM) techniques are proven to influence behaviour and contribute to new social norms that endure in the long term. Some of these techniques will be used in conjunction with stewardship programming by adding an additional communication component. Key elements of CBSM include obtaining voluntary commitments from participants to undertake an action; publicizing that commitment to reinforce the action and encourage others to make commitments; following up with the participant within a specified time; providing reminders close to where the action is taken; and publicizing the completed action to further reinforce the behaviour and encourage others to follow suit.

Priority areas

- Kawartha Lakes wide

Lead and (partner) implementers

- Kawartha Conservation; (Federation of Ontario Cottagers' Associations)

Deliverables

- Maintain the Blue Canoe program, a communication initiative that provides waterfront property owners with information about the responsible management of shorelines.
- Publicize commitments (obtained in stewardship programming) on the Kawartha Conservation website and through Kawartha Conservation and partner social media channels. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, and businesses.
- Place signs or stickers that serve as a reminder near a voluntary action location. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, and businesses.
- Publish stories featuring people who take action: online (website, blog, interactive map), in social media and video, in stewardship presentations, and through traditional media. Main target audience: shoreline property owners, agricultural and rural landowners, urban residents, businesses, funders, developers, and municipal councillors and staff.

Action E8: Youth Engagement

Engage school youth in environmental programming and volunteer opportunities.

Urgency

- Medium

Rationale

- Youth will play a significant role in managing our water resources in the coming years. Early engagement is needed to help prepare youth for the management challenges ahead, especially in the sustainability of local waterways and solutions needed. Recent research suggests that Nature Deficit Disorder is a widespread occurrence among urban youth, and that more regular opportunities for appreciating the outdoors are needed. By taking advantage of internship and volunteer positions, youth will gain practical experience in the field of resource management while fulfilling required community-based volunteer hours.

Priority areas

- Primary and secondary schools

Lead and (partner) implementers

- Trillium Lakelands District School Board; Peterborough Victoria Northumberland and Clarington Catholic District School Board; Kawartha Conservation; (Kawartha Field Naturalists; Boys & Girls Clubs of Kawartha Lakes)

Deliverables

- Develop formalized educational programs that integrate lake-based environmental communications, stewardship, and research into 10 to 15 Ontario primary and secondary schools, through curriculum-based lessons, activities, and teaching tools.
- Make available youth internship, co-op, and/or volunteer opportunities at local businesses, organizations, and clubs involved in water resource management.
- Consider the development of an Outdoor Education Centre to host youth programming.
- Promote greater youth involvement in lake stewardship volunteer opportunities including:
 - Shoreline and public park restoration projects, such as tree and garden plantings; and
 - Urban projects, such as the implementation of the Yellow Fish Road program to draw attention to storm sewers draining directly into a waterway.

3.7 Moving To Implementation

The *Balsam Lake and Cameron Lake Management Plan* provides a solid framework for a coordinated approach to maintaining healthy lakes and watersheds for all uses. However, successful implementation will require ongoing commitments (financial and otherwise) from all identified partners to fully realize and sustain a healthy lake environment.

Creating and maintaining effective partnerships is essential to the success of this management plan. The more stakeholders, resources, and knowledge applied to each action item, the better the result. Everyone around the lake is accountable for responsible lake management. Early implementation efforts should highlight small successful projects from individuals and groups to build momentum.

Specific costs of action item deliverables were intentionally omitted from the *Balsam Lake and Cameron Lake Management Plan*. At early stages of implementation, it is essential to develop a solid business plan to attract potential funders, sponsorships, and commitments from many sectors. Efforts should also emphasize the assembly of relevant expertise, even if those partners have not yet been identified in the plan implementation.

Many of the strategies and actions developed in this plan can be applied to other lakes as well. However, we have focused primarily on the priorities of stakeholders and ecosystem-based issues specific to Balsam Lake and Cameron Lake. Careful consideration is needed in applying management approaches from this plan to other lakes, as each lake is unique with its own set of issues and community-based values.

To assess progress and remain accountable, the *Balsam Lake and Cameron Lake Management Plan* should be reviewed and updated, if necessary, in a five- to 10-year time period. Reporting and evaluating the progress of project deliverables should be conducted more often, for example, on an annual basis. This will allow stakeholders to adjust priorities and assess targets and deliverables using an adaptive management approach.

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Appendix A: Key Stakeholders

Everyone has a role to play in maintaining a healthy Balsam Lake and Cameron Lake. A wide range of communities, organizations, and individuals depends on healthy lake conditions to sustain their livelihoods. Successful implementation of the management actions identified in Chapter 3 relies heavily on a cooperative approach among these stakeholders for their support and direction. Table A provides a working list of key lake-based stakeholders.

Table A: Key lake management stakeholders

Federal Government	Parks Canada, Trent-Severn Waterway (now Ontario Waterways); Fisheries and Oceans Canada; Transport Canada
Provincial Government	Ministry of Natural Resources and Forestry (Peterborough District, Bancroft District, Ontario Parks); Ministry of the Environment and Climate Change (Eastern Region); Ministry of Municipal Affairs and Housing; Ministry of Transportation; Ministry of Agriculture, Food and Rural Affairs
Municipal Government	City of Kawartha Lakes Council; Departments of Public Works, Planning & Development Services, and Community Services; Haliburton, Kawartha, Pine Ridge District Health Unit
Stewardship Groups	Kawartha Lake Stewards Association; Ontario Soil and Crop Improvement Association (Environmental Farm Plan); Kawartha Field Naturalists; Ontario Federation of Anglers and Hunters; Ducks Unlimited; Kawartha Land Trust; Kawartha Conservation; City of Kawartha Lakes Environmental Advisory Committee; Lakeland Alliance; Friends of the Osprey
Agriculture	City of Kawartha Lakes Agricultural Development Advisory Board; Victoria County Soil and Crop Improvement Association; Victoria-Haliburton Federation of Agriculture; Victoria Cattlemen's Association; and others
Lakeside Communities	Federation of Ontario Cottagers' Associations; Balsam Lake Association; Cameron Lake South Shore Cottage Association; Sunny Acres Resort; Town of Fenelon Falls; Town of Rosedale (Residents of Rosedale); Moorings Association; Indian Point Property Owners' Association; Balsam Lake Trailer Park & Marina; Town of Coboconk; Dewey's Island Property Owners Association; East Cameron Lake and Area Ratepayers' Association
Academia	Trillium Lakelands District School Board; Kawartha Pine Ridge District School Board; Peterborough Victoria Northumberland and Clarington Catholic District School Board; Fleming College; Trent University and other academic institutions
Lake-related Businesses and Clubs	Balsam Lake Sailing Club, Victoria Rail Trail (Cameron Lake), Scouts Canada, Lindsay Bassmasters, Muskies Canada, Boys & Girls Clubs of Kawartha Lakes, Rosedale Marina, Pride of Balsam Lake Marine, Nahma Lodge Marine, Fenelon Falls Marina, Balsam Lake Marina, Thompson's Marina, Tour Boat Operators; Fenelon Falls Horticultural Society, and others

Appendix B: Existing Planning Initiatives

A number of current management planning initiatives relate to the *Balsam Lake and Cameron Lake Management Plan* goal of maintaining a healthy and sustainable Balsam Lake and Cameron Lake. To realize this goal, support for these initiatives is crucial. For maximum leverage, efforts should be integrated wherever possible. The following initiatives are particularly relevant:

- Our Kawartha Lakes Integrated Community Sustainability Plan (City of Kawartha Lakes, Draft, 2013). This plan, led by the local municipality, provides a framework for sustainable management for 10 key themes: Water, Agriculture, Natural Systems, Resource Consumption, Health and Education, Economy, Culture and Heritage, Active Communities, Accessibility, and Financial Filter. The plan recognizes lake management planning as a key step in achieving a sustainable municipality. As such, they should be integrated when seeking funding for implementation efforts.
- Shoreline Environmental Studies in Support of Official Plan Policies for the City of Kawartha Lakes (Gartner Lee and French Planning Services, 2002). This initiative resulted in a thorough list of shoreline-based planning advice and approaches, which were recommended to the City of Kawartha Lakes for integration into their Official Plan. Many of these were considered in the development of the Strategic Planning Strategy outlined in Chapter 3.
- City of Kawartha Lakes Official Plan (City of Kawartha Lakes, 2012). The Official Plan is a policy document containing a statement of Council's commitments to guide development and land use within the municipality. The Official Plan contains a number of policies that address protection of water resources including lakes and water quality. It allows implementation for a number of planning tools including Secondary Plans (more detailed plans of a specific area), Zoning and other by-laws, Subdivision Control, Consent Applications (to sever land into a limited number of parcels), and Site Plan Control.
- Community Based Secondary Plans for the City of Kawartha Lakes (City of Kawartha Lakes, Draft, 2014). The City of Kawartha Lakes is studying the long-term growth and development of five settlement areas: Bobcaygeon, Fenelon Falls, Lindsay, Omemee, and Woodville. Secondary plans provide more detailed planning and policy approaches for these urban areas. Fenelon Falls is located on Cameron Lake and has the potential to directly influence land use, landscape changes, and water quality conditions.
- Kawarthas, Naturally Connected Natural Heritage Systems Strategy (Ontario Ministry of Natural Resources, Draft, 2013). This strategy identifies significant landscape features and functions in the Kawartha Lakes region that help maintain functioning ecosystems. Using a base set of ecosystem-based targets (e.g., maintaining 30% forest cover on the landscape), the strategy will determine which landscape-level features are priority areas for protection and/or restoration. All of the Balsam Lake and Cameron Lake planning area is within the scope of this initiative. Accordingly, the completed strategy will be a valuable tool for the implementation of many action items outlined in Chapter 3.
- Water Research and Innovation Network (WRAIN). WRAIN assists the water and wastewater industry to accelerate market adoption of new technologies with collaboration and demonstration sites. The network consists of researchers, municipal service providers, and economic development professionals. Balsam Lake and Cameron Lake, under pressure from a variety of land uses (e.g., urban wastewater, agricultural runoff, shoreline development, etc.), has potential as a location to pilot innovative approaches.
- Fisheries Management Plan for Fisheries Management Zone 17 (Ontario Ministry of Natural Resources, 2009). This plan provides provincial direction for the management of fisheries resources within the Kawartha Lakes management zone, including recreational use as well as science and monitoring aspects. The plan presents management strategies for the following themes: Walleye, Largemouth and Smallmouth Bass, Panfish,

Muskellunge and Northern Pike, Coldwater Stream Fisheries, Other Fish Species, Invasive Species and Disease Management, Awareness and Education, and Monitoring and Assessment. Successful implementation of this plan will be crucial for achieving objectives identified in Chapter 2.

- Trent Source Protection Plan (Kawartha-Haliburton Sourcewater Protection Authority, 2014). This plan seeks to protect municipal sources of drinking water from groundwater wells and surface water intake systems. Residents of Fenelon Falls obtain their drinking water from a municipal surface water intake drawing from Cameron Lake. Stewardship actions identified in the plan and the development of risk management plans to deal with specific threats to municipal drinking water supplies and systems will be crucial for maintaining good water quality conditions in Cameron Lake.
- Balsam Lake and Indian Point Provincial Parks Management Plan. A park management plan defines the protected area's goal, objectives, and long-term direction for the protection, development, management, and use of its natural values. The plans also address such issues as permitted activities, site restoration, and resource management. Balsam Lake Park is managed as a multi-use recreational park, whereas Indian Point Park is managed more as a nature preserve.
- Relevant Provincial and Federal Legislation. Various pieces of legislation provide the foundation for planning, policy, and/or plan implementation. The federal statutes of most relevance include: the *Historic Canals Regulations*, *Fisheries Act*, *Navigation Protection Act* (formerly the *Navigable Waters Protection Act*), *Species at Risk Act*, *Migratory Birds Convention Act*, *Canadian Environmental Assessment Act*, and *Canadian Environmental Protection Act*. The provincial statutes of most relevance include: the *Planning Act*, *Clean Water Act*, *Conservation Authorities Act*, *Endangered Species Act*, *Environmental Assessment Act*, *Fish and Wildlife Conservation Act*, *Green Energy Act*, *Lakes and Rivers Improvement Act*, *Oak Ridges Moraine Conservation Act*, *Public Lands Act*, *Ontario Water Resources Act*, *Nutrient Management Act*, *Drainage Act*, *Pesticides Act*, and *Environmental Protection Act*.

Appendix C: Assessment of Action Urgency

The following provides more details with respect to the outcomes of evaluating each management action, contained within Chapter 3: Implementation Strategies, against five criteria.

CRITERIA	Level	Value	Details
#1. Action meets multiple objectives?	High	3	Meets many (over half of) objectives
	Medium	2	Meets a few objectives
	Low	1	Meets a single objective
#2. Action is affordable?	High	3	Cost < \$5,000; easy to acquire local funding
	Medium	2	Cost >\$5,000 and <\$50,000; typical medium project proposal
	Low	1	Cost >\$50,000; must acquire significant funding
#3. Action has support from community?	High	3	Overwhelming support
	Medium	2	Majority support
	Low	1	Localized support
#4. Action builds public support for implementation?	High	3	High profile; includes a large number of stakeholders
	Medium	2	Medium profile; includes a medium number of stakeholders
	Low	1	Low profile; includes a small number of stakeholders
#5. Action has timely environmental benefit?	High	3	Short term (5 years or less) improvement
	Medium	2	Long term (5 years or more) improvement
	Low	1	Maintain status quo

ACTIONS	Criteria Number					Summed	Average	Urgency
	#1	#2	#3	#4	#5			
STEWARDSHIP STRATEGY								
A1: Implement lot-level measures such as reducing fertilizer use, increasing infiltration, capturing stormwater runoff, and other practices that conserve water and reduce pollution in targeted urban areas and waterfront communities.	2	2	3	3	3	13	2.6	High
A2: Implement a natural landscaping approach along shoreline properties, with particular focus on decommissioning hardened shorelines and addressing severely eroded/ice-damaged sections.	3	2	3	3	3	14	2.8	High
A3: Implement measures such as boat and equipment sanitization to reduce the risk of transfer of invasive species between water bodies.	2	3	3	3	2	13	2.6	High
A4: Develop a reforestation program to re-establish and manage natural cover on marginal rural lands, particularly in subwatersheds that do not meet forest cover benchmarks.	2	1	2	2	2	9	1.8	Medium
A5: Reduce potential pollution from septic systems into the lakes by undertaking responsible management and maintenance.	2	2	2	3	2	11	2.2	Medium
A6: Implement measures such as vegetated buffer strips along streams, conservation tillage, and other practices that reduce nutrient and soil loss from farms, with assistance from local cost-share programs.	2	2	3	3	2	12	2.4	Medium
A8: Implement programs to educate lake users about proper boat maintenance, grey water disposal, and the locations of sensitive habitats to reduce the risk of pollution and lake ecosystem disturbance.	1	3	3	1	3	11	2.2	Medium

ACTIONS	Criteria Number					Summed	Average	Urgency
	#1	#2	#3	#4	#5			
STRATEGIC PLANNING STRATEGY								
B1: Amend and strengthen the <i>City of Kawartha Lakes Official Plan</i> , and Secondary Plans policy to require protection of the natural environment through specific measures, such as development setbacks adjacent to shorelines or streams.	3	3	3	3	2	14	2.8	High
B2: Develop a Shoreline Secondary Plan that provides enhanced land use planning direction specific to shoreline areas around the lakes.	3	3	3	3	2	14	2.8	High
B3: Develop a site plan control by-law for shoreline areas to protect natural vegetation and significant habitat, establish buffer zones, and improve water quality.	3	3	3	2	2	13	2.6	High
B4: Develop a tree conservation by-law that requires the retention of large existing forested areas along shorelines.	3	2	2	2	2	11	2.2	Medium
B5: Implement the following plans: Trent Source Protection Plan, Fisheries Management Plan for Zone 17, Kawarthas Naturally Connected Natural Heritage Systems Strategy, Our City of Kawartha Lakes Integrated Community Sustainability Plan, and Balsam Lake and Indian Point Provincial Park Plans.	3	1	3	3	2	12	2.4	Medium
B6: Initiate a trial one-window permit application process for shoreline works between Parks Canada and Kawartha Conservation.	3	2	3	2	2	12	2.4	Medium
URBAN AND RURAL INFRASTRUCTURE STRATEGY								
C1: Through stormwater management planning, improve the quality and control of stormwater in urban settlement areas of Fenelon Falls and Coboconk.	2	2	3	3	3	13	2.6	High
C2: Implement effective sediment and erosion control measures and other practices to prevent contaminants from reaching local watercourses during road, agricultural drainage, and other construction projects.	2	3	3	2	3	13	2.6	High
C3: Increase community enjoyment of public beaches and parks by deterring geese, conducting regular maintenance and increasing public access to shorelines.	1	2	3	3	3	12	2.4	Medium
C4: Operate Coboconk sewage treatment facility at maximum efficiency for pollutant removal and capacity.	1	1	3	2	2	9	1.8	Medium
RESEARCH AND MONITORING STRATEGY								
D1: Undertake pilot projects to test the effectiveness of innovative management approaches to nuisance aquatic plants and poor water quality in priority areas.	2	2	3	3	3	13	2.6	High
D2: Implement a coordinated lake monitoring program that regularly tracks key indicators of lake watershed health, including nutrients, forest cover, fish communities and oxygen levels.	1	1	2	3	1	8	1.6	Medium
D3: Conduct research to more accurately identify shoreline sources of nutrients, such as septic systems, and potential impacts to nearshore areas of the lake.	1	1	3	3	1	9	1.8	Medium
D4: Conduct research to identify how the lake ecosystem responds to stressors such as cumulative development, climate change and invasive species.	2	1	2	1	1	7	1.4	Low
D5: Determine the socio-economic value of Balsam and Cameron lakes, with emphasis on the value of goods and services provided by natural resources.	1	2	1	1	1	6	1.2	Low
COMMUNICATIONS AND OUTREACH STRATEGY								
E1: Communicate the science, issues, solutions, targets and outcomes of plan implementation.	3	2	3	3	2	13	2.6	High

ACTIONS	Criteria Number					Summed	Average	Urgency
	#1	#2	#3	#4	#5			
E2: Maintain the Community Advisory Panel to ensure effective communication, agency support, and collaboration among lake stakeholders during plan implementation.	3	2	3	3	2	13	2.6	High
E3: Maintain Science and Tech Committee to ensure effective communication, agency support, and collaboration among monitoring and research-based organizations.	3	2	3	3	2	13	2.6	High
E4: Create opportunities for stakeholder input through plan implementation, and regularly assess stakeholder needs, concerns, barriers and knowledge gaps.	3	3	3	3	2	14	2.8	High
E5: Profile the natural heritage features, social values, and economic values of Balsam Lake and Cameron Lake, including a long-term vision for the lakes and a shared sense of responsibility to protect them.	3	3	3	3	2	14	2.8	High
E6: Work collaboratively with people and projects that contribute to the objectives of the lake plan.	3	3	3	3	2	14	2.8	High
E7: Undertake Community Based Social Marketing to motivate lake and watershed friendly lifestyles.	3	1	3	3	2	12	2.4	Medium
E8: Engage school youth in environmental programming and volunteer opportunities.	3	1	3	3	2	12	2.4	Medium

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