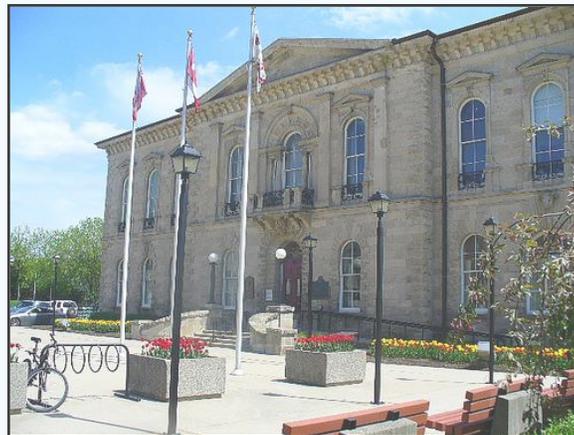


## **Moving Toward a Soft Path Approach? A Case Study of Water Management in Guelph, Ontario**



Since/depuis 1970

**CANADIAN INSTITUTE FOR  
ENVIRONMENTAL LAW AND POLICY**

**L'INSTITUT CANADIEN DU  
DROIT ET DE LA POLITIQUE  
DE L'ENVIRONNEMENT**

# **Moving Toward a Soft Path Approach? A Case Study of Water Management in Guelph, Ontario**

**By Matt Binstock**

**Canadian Institute for Environmental Law and Policy**

**January 2010**

## Acknowledgements

The Canadian Institute for Environmental Law and Policy (CIELAP) and the author would like to offer our sincere thanks to the Walter and Duncan Gordon Foundation and Friends of the Earth for their support of this report, and to Susan Holtz for providing invaluable guidance throughout the project.

Copyright © 2010 Canadian Institute for Environmental Law and Policy.

ISBN # 978-1-896588-69-8

This publication can be downloaded from our website at [www.cielap.org](http://www.cielap.org)

For more information about this publication contact:

CIELAP  
130 Spadina Avenue Suite 305  
Toronto, Ontario M5V 2L4

Tel: (416)923-3529  
Fax: (416)923-5949  
[www.cielap.org](http://www.cielap.org)  
[cielap@cielap.org](mailto:cielap@cielap.org)

## About CIELAP

Founded in 1970, the Canadian Institute for Environmental Law and Policy (CIELAP) is an independent, not-for-profit professional research and educational institute. CIELAP is incorporated under the laws of the Province of Ontario and registered with Revenue Canada as a charitable organization. Our registration number is 11883 3417 RR0001.

CIELAP's mission is to inform legislative, policy and regulatory outcomes for Sustainability at the national and provincial/territorial levels of government in Canada.

## About the Author

Matt Binstock authored this report as a component of research conducted for a Water Policy Fellowship sponsored by the Walter and Duncan Gordon Foundation. Matt holds a Bachelors Degree in Environmental Studies from Trent University and a Masters Degree in Planning from York University.



## Table of Contents

<b>Executive Summary</b> .....	<b>i</b>
<b>Introduction</b> .....	<b>1</b>
<b>Methods</b> .....	<b>2</b>
<b>The Soft Path for Water</b> .....	<b>2</b>
<b>Canadian Soft Path Case Studies</b> .....	<b>3</b>
<b>Why Do We Need A Soft Path? Growth Challenges in Ontario’s Greater Golden Horseshoe Region</b>	<b>4</b>
Connecting Growth, Development Trends, and Water Supplies .....	6
Great Lakes Charter, Great Lakes Charter Annex, and Implementation Agreements .....	6
Growth Challenges in the Grand River Watershed .....	7
Growth Challenges in Dufferin County .....	7
Growth Challenges in Simcoe County .....	8
<b>Case Study: Guelph, Ontario</b> .....	<b>9</b>
Community Engagement in Guelph .....	10
Incorporating Sustainability into Guiding Principles .....	11
Water Supply Master Plan .....	11
Guelph Water Conservation and Efficiency Strategy .....	12
Wastewater Treatment Master Plan .....	12
Growth Management Strategy .....	12
<b>Local Professionals</b> .....	<b>13</b>
<b>Guelph as a Soft Path Pilot Project</b> .....	<b>13</b>
<b>Findings of the Guelph Case Study in Broader Context: Lessons Learned</b> .....	<b>14</b>
<b>Conclusions</b> .....	<b>16</b>
<b>Recommendations</b> .....	<b>17</b>
<b>Bibliography</b> .....	<b>18</b>

## Executive Summary

This report provides an overview of the current state of water quantity issues related to urban growth in the Greater Golden Horseshoe Region of Ontario (GGH). The GGH region is currently one of the fastest growing regions in North America. Growth in the GGH region thus far has largely been characterized by resource intensive urban sprawl. The Province of Ontario passed legislation for a regional growth management plan, the *Growth Plan for the Greater Golden Horseshoe*, in 2006 (referred to herein as the *Growth Plan*) in an attempt to reorient the nature of development across the region. To some extent, the *Growth Plan* combines the contradictory goals of environmental conservation and growth management. The *Growth Plan* calls for the protection of natural systems and the advancement of a culture of conservation in the region, but at the same time includes provisions for expanding infrastructure and frames growth as inevitable (Wekerle et al, 2007).

Some municipalities designated to grow within the plan's 20 year timeframe, especially those reliant on groundwater, are considering large scale water infrastructure projects such as pipelines to the Great Lakes system, or expansion of existing infrastructure to meet future demand. While the *Growth Plan* states that construction or expansion of water and wastewater systems is to be precluded by water demand management and considered in the context of the Great Lakes Basin Agreements, it is too early to determine whether these agreements, or the *Growth Plan*, will be sufficient to prevent unnecessary water infrastructure projects that could be avoided through aggressive water conservation and efficiency planning.

The “soft path” for water, an emerging framework for sustainable water management adapted from the concept of energy soft paths in the 1970s, shows particular promise for regions such as the GGH due to its emphasis on avoiding new water infrastructure. This report attempts to provide an early assessment of the soft path for water's ability to meet challenges presented by growth in the GGH region by examining the city of Guelph, Ontario as a “pilot project” municipality. This approach is used to gain initial insights into how the soft path concept might play out in practice and to identify enabling conditions that have allowed Guelph to pursue measures that align with the soft path's core principles.

Awareness and appreciation for ecological limits among a significant portion of the population in Guelph, as well as an active local non-profit sector were found to be critical factors in the city's emergence as a recent leader in water conservation. In addition, the presence of municipal staff members who are either supportive of the water soft path concept itself, or hold a preference for maintaining growth within the city's current carrying capacity, allowed for the translation of public concerns into an effective local policy framework for sustainable long term growth. Specific measures adopted by the city that align with soft path principles include the deferral and possible elimination of a pipeline to Lake Erie to support future growth, pilot projects that attempt to match water quality to the type of service required, and the revision of long term growth forecasts to reflect the local availability of water supplies and assimilative capacity for wastewater.

When considered in the context of findings from recent Canadian survey research on both the general public's and policy maker's perceptions of water issues, the city of Guelph's relative level of awareness by comparison may at least partially explain why the city's water management and general long term planning approach is more consistently focused on ecological sustainability, while others continue to pursue an infrastructure based strategy. These findings also highlight the need to bridge the gap between the perceived importance of public education programs in encouraging water conservation among municipal policy makers, and the extent to which such programs are funded and implemented in Ontario that has been identified in recent research.

Finally, while some city staff and citizens supported the soft path's principles, use of the soft path term itself appeared to be of less importance than advancing water sustainability goals in general. This suggests that soft path advocates may be most successful by playing an informatory role in the municipal long term planning process.

Recommendations include:

### **1) *Provincial:***

- When forecasts contained in Schedule 3 of the *Growth Plan for the Greater Golden Horseshoe* are subjected to a five year review, growth targets in any of the affected municipalities where water and wastewater limitations exist should be revisited and reduced wherever possible.
- The province should also adopt a model similar to the assured water supply laws used in the United States to reduce or prevent growth where proof of sufficient water resources cannot be provided by developers.
- As a component of the upcoming conservation and efficiency strategy, the province should provide financial support to grassroots groups, municipal professionals and schools to aid in fostering the creation of conservation and efficiency efforts tailored to the specific needs of communities across the province that can also be sustained over the long term.

### **2) *Municipal:***

- A significant effort should be made to create and expand campaigns and initiatives to raise awareness and education at all levels, ranging from municipal professionals to young children. While the actual savings are challenging to quantify, making investing in these measures a harder sell, the Guelph case study provides additional evidence that an aware and engaged community is crucial to municipal level adoption of a holistic and sustainable water management strategy.

### **3) *Soft Path Advocates:***

- Soft path practitioners should continue to find innovative partnerships and arrangements to promote soft path thinking in municipalities. This is starting to take place, and this case study reveals that soft path researchers and advocates can play a meaningful role in informing municipal decision makers, who can then adapt the soft path concept into a “best fit” for local realities.

## Introduction

Many municipalities throughout the world are adopting water management strategies that focus on conservation, adoption of high efficiency technologies and, perhaps most importantly, a shift in attitude that increasingly reflects the intrinsic value of water. However, we currently stand at a crossroads in water management—while many municipalities are pursuing a conservation-based approach, others continue to pursue large infrastructure projects, such as pipelines to the Great Lakes system, as they are still viewed as the safest and most reliable solutions to long-term municipal water supply challenges. While the technologies, concepts, and management tools to bring water conservation and efficiency to the forefront—as opposed to as an add-on to an infrastructure-based strategy—are now widely available, what is needed is a more widespread change in perception, or a culture of conservation, to drive their adoption on a much wider scale. In many cases, aggressive conservation and efficiency strategies have emerged only in jurisdictions with significant water supply challenges, where there may be little choice other than to find ways to use less. Other jurisdictions that have not faced similar challenges continue to have relatively poor track records on water use.

At the time that this research project was first being contemplated in late 2007, the Environmental Commissioner of Ontario had recently released his annual report entitled *Reconciling our Priorities*. The report argued that Ontario's *Growth Plan for the Greater Golden Horseshoe*, the broad-reaching strategy that will shape the direction of growth and planning for Ontario's fastest growing region, is fundamentally at odds with the goal of living sustainably within our local watersheds. The Commissioner's report noted two communities, the city of Guelph and the city of Waterloo, both dependent largely on groundwater, are approaching the limits of their current water and wastewater capacity, and are also designated as targets for growth and intensification under the province's *Growth Plan*. The situation created by the *Growth Plan* in Waterloo and Guelph was described by the Commissioner as “putting the cart before the horse”, prioritizing the goals of population expansion and economic growth over the benefits of living within the capacity of local ecosystems.

The province has established a broad vision for the GGH region, but many of the details on how to actually get there are now left up to the municipalities. The soft path for water could be an appropriate tool for addressing water supply limitations exacerbated by the *Growth Plan*, but more research will be required to determine the feasibility of its use and the barriers that might be encountered in incorporating soft path concepts into municipal planning over the coming years. This project attempted to generate research that would bridge the gap between the recent identification of water supply issues in the *Growth Plan* and the solutions required to address those challenges.

While Guelph's approach is aggressive by Ontario standards, the water consumption levels that form the targets of Guelph's strategy still rank relatively low in comparison with other jurisdictions on an international scale (City of Guelph et al, 2006). In fact, Canadians are currently the second largest consumers of water, outranked only by the United States. The fact that Guelph and a handful of others still represent a minority of communities taking a conservation-oriented approach to long-term water planning suggests that additional research is needed on how a community can be motivated to value and conserve water in a province where the “myth of abundance” has shaped attitudes and perceptions of water for many years.

## Methods

This research employed a case study approach to determine the drivers of Guelph's conservation-based long-term water management strategy. In addition, the report also provides an extensive review of current events, conferences, and recent developments in the literature to determine factors that contribute, or can potentially contribute, to the adoption of successful municipal conservation and efficiency strategies.

Previous research by De Loe et al. (2002) assessed the city of Guelph's capacity to protect groundwater resources in comparison with other nearby municipalities. De Loe et al. examined municipal documents, planning reports, annual reports, council minutes, consultants' reports, and studies prepared by conservation authorities, in addition to interviewing municipal staff, politicians, and local citizens. This case study employs a similar methodology, reviewing recent local research and relying on interviews with local ENGO representatives, as well as municipal staff.

## The Soft Path for Water

The soft path for water is a long range planning tool that can generate larger water savings than traditional demand management practices (Brandes & Brooks, 2005). Demand management measures generally include reducing the quantity of water necessary to complete required tasks, altering tasks themselves to require less water or lower qualities of water, encouraging water use to occur outside of peak demand periods and increasing the ability of water systems to maintain service during periods of drought (Brooks, 2006).

Greater savings are achieved with the soft path approach by challenging the conventional planning methods that have constrained demand management to include only measures that are considered cost effective (Brooks & Holtz, 2009). The soft path builds on typical water demand management, but also incorporates distinctly different conservation measures including changes in water use habits, institutional reforms and alteration of economic and population growth patterns (Brandes & Brooks, 2005; Brooks & Holtz, 2009).

The soft path for water originated from the soft path for energy concept developed by Amory Lovins in the 1970s (Holtz, 2007). The energy soft path described a future in which numerous small-scale renewable energy supplies, coupled with a focus on increased efficiency and demand management, would replace a traditional "hard path" approach based on a large, centralized infrastructure and the use of non-renewable resources such as fossil fuels. Lovins' energy soft path also emphasized the importance of focusing on the services provided by energy inputs, rather than viewing energy as an end in itself. In doing so, it becomes possible to consider a wider variety of means to achieve the same service (Brooks & Holtz, 2009). In the context of the soft path for water, this may include highly efficient technologies that do not require water at all, such as composting toilets (Brandes & Brooks, 2005).

Brandes and Brooks (2006) define the core principles of the soft path concept as: 1) Treat water as a service rather than an end in itself 2) Make ecological sustainability a fundamental criterion 3) Match the quality of water delivered to that needed by the end use 4) Plan from the future, back to the present.

One of the key conceptual differences between a water soft path and demand management is that a soft path requires an analysis of the ways in which water demand can be reduced to more accurately reflect the local availability of water. A soft path approach uses the carrying capacity of the local watershed as the basis of long-term planning decisions such as establishing population growth targets. A municipality or region crafting a long term planning strategy may use a goal such as "no new water supplies" for several decades and

then proceed to create the specific measures for achieving this goal (Holtz, 2007). This “backcasting” approach makes the soft path concept ideal for Ontario’s Greater Golden Horseshoe Region, where the decision to expand communities typically precludes a consideration of the constraints posed by local water availability.

## Canadian Soft Path Case Studies

Since the term “soft path for water” was first coined by Peter Gleick in 1998 it has become the subject of substantial research, with several Canadian case studies taking place in recent years. Despite having to rely on estimates to fill in data gaps where water end uses, percentage of the population expected to adopt water saving technologies, and overall population growth are not wholly known, these case studies demonstrate a very high potential for water use reduction in municipal, industrial, watershed, and provincial contexts. The majority of these gains in efficiency are achieved using existing technologies.

A 2006 case study of Oliver, British Columbia found that by using the soft path approach, a goal of establishing no new water supplies until 2050 is possible, even with a population increase of 100,000 occurring within this timeframe (Brandes et al., 2007). The Oliver case study also compares the potential for conservation under the soft path approach against traditional demand management, finding that while savings were possible with demand management, they were not significant enough in themselves to offset the increased demands of population growth (Brandes et al., 2007). Detailed modeling of a soft path scenario at the watershed scale for Annapolis Valley, Nova Scotia found that reducing current water consumption levels by 50 percent was possible while still meeting the demands of future population growth (Issacman & Daborn, 2006). Similarly, a Kay et al. (2007) case study examining the entire province of Ontario found that adopting soft path measures could also result in a 50 percent annual reduction of water use from current levels.

A number of jurisdictions are beginning to incorporate elements of the soft path into their long term planning approach. Brooks and Holtz (2009) note that if one of these communities maintains their current interest, valuable evidence of how to move the soft path concept from a research and analysis phase into local and regional planning will be generated. Thus far, progress in determining what is necessary to develop soft path water policies has generally been slow (Wolfe & Elton, 2009).

Municipal staff and governments may also have reservations about adopting a fully realized soft path approach. Holtz (2008) notes that municipal staff, politicians, and other decision makers are unlikely to wholly adopt and endorse a soft path approach, but that this does not mean that progress in developing aggressive water conservation programs cannot be made. Instead, a potentially more effective approach is to use the ‘soft path’ label as a means to initiate a dialogue with water professionals and local politicians, who can inform locally developed strategies.

Wolfe and Elton (2009) note that while a sizable body of soft path research has been published for provincial, sectoral, and watershed scales, municipal scale soft path planning is now a subject of increasing attention. Wolfe and Elton also point to a lack of consideration for “underlying norms, values, and knowledge that create and sustain the well-recognized barriers to soft path innovation,” and suggest that social capital can either promote or discourage water management efforts. This case study attempts to identify the enabling conditions that may allow municipalities to transition into a soft path approach to long term planning.

## Why Do We Need A Soft Path? Growth Challenges in Ontario's Greater Golden Horseshoe Region

A third of Canada's population live in highly urban watersheds and sixty-five percent of these residents are located in Ontario (Rothwell, 2006). Furthermore, over six million of these residents are located in a single watershed spanning the Greater Toronto Area, the Greater Golden Horseshoe and the Niagara Peninsula (Rothwell, 2006). The GGH is also currently one of the fastest growing regions in North America (Ontario Ministry of Public Infrastructure Renewal, 2006).

For several decades, urban growth in the GGH has been characterized by low density urban sprawl built primarily in greenfield areas. In response to public concern over the environmental impacts of sprawl in the late 1990s, the Ontario government began to introduce policies aimed at preventing development on ecologically sensitive lands, but until recently these only dealt with specific areas of concern within the GGH region.

In an attempt to curb the trend of low density development on a larger scale, the Ontario government passed *Places to Grow: a Growth Plan for the Greater Golden Horseshoe* in 2006. The *Growth Plan* aims to direct the expected influx of new residents to the GGH into selected "urban growth centers" throughout the region. Schedule 3 of the *Growth Plan* mandates specific population and employment densities for each growth center. The *Growth Plan* also aims to balance environmental and economic objectives and promote a culture of conservation (Ontario Ministry of Public Infrastructure Renewal, 2006). *Places to Grow* is intended to inform decision making on a range of issues, from land use and infrastructure planning to resource management (Ontario Ministry of Public Infrastructure Renewal, 2006).

Figure 1: Ontario's Greater Golden Horseshoe Region



Source: Places to Grow - Growth Plan for the Greater Golden Horseshoe, 2006

The *Growth Plan* sets out a number of requirements for water and wastewater systems in the GGH. Section 3.2.5 of the *Growth Plan* encourages municipalities to plan and develop water and wastewater infrastructure that returns water to the Great Lakes watershed where the withdrawal originated (Ontario Ministry of Public Infrastructure Renewal, 2006). Construction of new water infrastructure or expansion of existing facilities are only to be considered if demand management and conservation strategies are being implemented and the application is considered in the context of any applicable Great Lakes Basin agreements (Ontario Ministry of Public Infrastructure Renewal, 2006). Currently, there are no concrete definitions of what conservation measures will consist of, or specific benchmarks to be achieved before infrastructure expansions are approved as the best option.

### *Connecting Growth, Development Trends, and Water Supplies*

Development decisions often involve a tradeoff between financial and ecological benefits. Bosch et al. (2003) note that low density residential development has the most significant hydrological impacts for reasons such as the high level of impervious surfaces created, which reduce groundwater recharge. However, residential developers often favor this form since it has historically been the most successful format for developers to follow in the region. Low-density developments also tend to have the highest estimated land value and property taxes, and thus generate the largest net revenues for municipalities (Bosch et al., 2003). Compact, high-density developments have less hydrological impact but may result in reduced land values and local revenues (Bosch et al., 2003). As a result, municipalities faced with new expenditures to service increasing populations may opt for low-density greenfield developments to make up for the costs of accommodating growth (Bosch et al., 2003).

Generally, municipalities require developers to pay the up-front costs of new infrastructure rather than go into debt to finance it themselves. For developers, the cost of “front-ending” infrastructure is another incentive to pursue larger projects that are more likely to cover the up-front expenses (Birnbaum et al., 2004). Ultimately, this is a cycle that may lead to an increasing appetite for supply side solutions to meet new water needs, such as pipelines to the Great Lakes system.

Some suggest that the cumulative impact of seemingly small diversions from the Great Lakes system for municipal purposes may eventually lead to significant ecological impacts in the region. In comparison with many other jurisdictions, Canada has only realized a fraction of the potential for water conservation and efficiency to defer the need for this form of water infrastructure (Miller & Stack, 2004; Morris & Maas, 2007).

### *Great Lakes Charter, Great Lakes Charter Annex, and Implementation Agreements*

The policy framework for approving water withdrawals from the Great Lakes provides protection against new withdrawals originating outside of the Great Lakes Basin through the recently ratified Great Lakes Compact, but communities within the Basin and some falling partially within the Basin are still permitted to develop lake based municipal water supplies in some cases. The 1985 Great Lakes Charter Agreement requires the eight states and two provinces in the Great Lakes Basin to inform and consult each other on significant water takings occurring on either side (Council of Great Lakes Governors, 1985). The Charter is a good faith agreement between the signatories, but the addition of the Great Lakes Charter Annex 2001 introduced binding agreements for signatory states and provinces. The first of these agreements, the *Great Lakes Basin Water Resources Sustainability Agreement* (GLBWRSAs), was passed in 2005.

Annex implementation measures aimed specifically at promoting water conservation and efficiency began in 2007 when Basin states and provinces completed the *Draft Regional Water Conservation and Efficiency Objectives*, a

requirement of the GLBW RSA. The *Conservation and Efficiency Objectives* are intended to help Basin states and provinces establish local conservation plans, which they are required to implement two years after the necessary legislation has been passed (GLBW RSA, 2005).

The province of Ontario is in the process of developing a conservation and efficiency strategy as required under the GLBW RSA agreements. It is currently unclear what targets will be included in the strategy and whether or not they will provide specific mandatory goals for municipalities to conform their local policies to, in a manner similar to the *Growth Plan for the Greater Golden Horseshoe*.

### *Growth Challenges in the Grand River Watershed*

The urban municipalities of the Grand River Watershed, particularly Kitchener, Waterloo, Cambridge, and Guelph are among the fastest growing cities in Canada (Grand River Conservation Authority, 2005). The Waterloo region has also been identified as one of the main drivers of the Ontario economy (Grand River Conservation Authority, 2007). The provincial government predicts that populations in the urban municipalities of the Grand River Watershed will increase by 57 percent by 2031 (Grand River Conservation Authority, 2005). A report by Hemson Consulting, which informed the *Growth Plan*, noted that Great Lakes-based water supplies may need to be considered to accommodate new populations in these areas of the GGH, suggesting that this may have been a preferred approach during the early development of the plan (Hemson Consulting, 2005).

“Wellington County, Waterloo Region and Brant County are forecast to experience significant growth under all scenarios. However, there are potentially very significant servicing issues for the larger urban communities as well as the smaller communities within these areas. Waterloo Region and Guelph rely on groundwater, while Brantford’s water supply is from the Grand River. All three of these communities rely on wastewater disposal through the Grand River system (via the Speed River in Guelph). The forecast growth will challenge the limits of both the groundwater sources and the Grand River effluent capacity. Alternative approaches to servicing, including systems from the Great Lakes, may need to be considered during the forecast period (Hemson Consulting, 2005).”

Waterloo region was cited as an example of a community facing water scarcity as early as the first attempt at a provincial level water conservation and efficiency strategy in 1992 (Sharrat et al., 1992). As a result, Waterloo has pursued substantial water conservation programs. However, in recent years, ongoing growth pressures on the region have meant that the consideration of a shared pipeline to Lake Erie with other municipalities in the region has remained on its list of long-term planning options (XCG Consultants & Region of Waterloo, 2009).

### *Growth Challenges in Dufferin County*

Dufferin County, located in the Credit River Watershed, is also designated for expansion in the *Growth Plan*. Dufferin County is particularly significant to the Southern Ontario region’s overall hydrological integrity (Muvihill, 2006). The Nottawasaga, Credit, Grand, and Humber Rivers, which form a significant provincial bioregion, have headwater catchment areas within Dufferin County’s boundaries (Muvihill, 2006). While Dufferin County has seen less development than other areas closer to the Greater Toronto Area, it has

experienced population growth pressures in recent years, which will increase with the province's new designation under the *Growth Plan*. The region's population is expected to increase by 27,000 people by 2031 according to the *Growth Plan*'s forecasts.

Consultants that examined the potential impact of the *Growth Plan* on Dufferin County found that with the area's current assimilative capacity of headwaters streams for sewage effluent, only a population increase of 13,000 is feasible unless additional capacity is developed (Weston Consulting, 2006). The consultants recommended that specific growth targets for Dufferin County not be adopted until additional assessments have taken place (Weston Consulting, 2006). However, a local planner indicated that the province's population targets could not be adjusted (pers comm, 2007).

The most urbanized municipalities in Dufferin County: Orangeville, Shelburne, and East Luther Grand Valley are currently working to expand their sewage treatment capacities. However, in Dufferin County's largest towns, Orangeville and Shelburne, the current expansions underway will not be sufficient to accommodate long-term growth expectations (Dillon Consulting et al., 2009). Mulvihill (2006) suggests that planning decisions made in the town of Orangeville will hold significance for the greater bioregion. Others have noted that currently, smaller municipalities in the Grand and Credit River watersheds may not have sufficient funds to implement water conservation and efficiency strategies (pers comm, 2009).

### *Growth Challenges in Simcoe County*

Most of Simcoe County also relies heavily on groundwater. Following the passing of the Oak Ridges Moraine Conservation Plan (2002) and the Greenbelt Plan (2005) which restricted development closer to the city of Toronto, Simcoe County experienced tremendous growth driven by the demand for developable land still within reasonable proximity to the Greater Toronto Area (Birnbbaum et al., 2004). As a result, there have been proposals to build pipelines to supply lake water to landlocked municipalities. Currently, a pipeline that draws water from Georgian Bay (a large bay of Lake Huron) running from the village of Collingwood to the town of Alliston, which also services the town of New Tecumseth, is the only large municipal water pipeline in Simcoe County, but it has not been without problems.

Funding the pipeline, which cost nearly 28.3 million dollars to complete, was a challenge because of the small populations of the partnering municipalities (Hoggett, 2009). The financing arrangement involved a grant from the province, loans from the Ontario Clean Water Agency (OCWA) as well as loans from a private construction firm and the town of New Tecumseth. Additional costs were to be recovered through arrangements with neighboring municipalities, but when these agreements fell through, a significant debt for the project remained (Hoggett, 2009). Clearview Township has recently secured an arrangement to connect to the Collingwood–Alliston pipeline, a decision made possible through new funding from the province's Infrastructure Investment Initiative Grant. Now that the OCWA has taken control of the pipeline, one possibility is to loop it into a larger water supply system to gain access to potentially larger purchasers (Hoggett, 2009).

In June 2009, the Ontario Ministry of the Environment completed the *Lake Simcoe Protection Plan*. The plan is intended to protect the Lake Simcoe watershed from ongoing development pressures, and contains measures to protect both water quantity and water quality. The plan requires the largest municipalities in the watershed to develop water conservation and efficiency strategies. However, specific requirements are lacking. The Plan does require municipal conservation strategies to have specific targets and timeframes, but does not provide

benchmarks or deadlines for completion. In addition, conservation and efficiency strategies are not required to be initiated until five years after the passing of the plan (Ontario Ministry of the Environment, 2009).

Considered together, these examples highlight the need to examine alternatives to a long term water planning strategy based on the development of new infrastructure in the GGH region. While Ontario's water conservation and efficiency strategy will at best mandate, and at minimum encourage, intensified conservation efforts in municipalities across the province, a great deal of work will be required to ensure that the plan is implemented effectively. Regardless of the specifics of the plan, its release may provide a period of opportunity during which many municipalities will be more aware of water conservation and efficiency and thus more willing to consider alternative approaches to water management.

### Case Study: Guelph, Ontario

Guelph is a mid-sized city in Wellington County, located in the Southwestern portion of the GGH region. With a population of 115,000, Guelph is currently one of the largest cities to rely almost entirely on groundwater and is also one of the fastest growing cities in Canada (City of Guelph & Resource Management Strategies Inc, 2009). Guelph's drinking water is supplied by 23 groundwater wells and a shallow groundwater collector system. (City of Guelph et al, 2006) Guelph's wastewater is currently discharged into the Speed River, which has an assimilative capacity of 73.3 million liters per day (City of Guelph & Resource Management Strategies Inc, 2009). This capacity, expected to be reached in 2024, is one of the key determinants of Guelph's ability to grow beyond its current population (City of Guelph & Resource Management Strategies Inc, 2009).

Guelph's recent efforts to develop a long term planning strategy that relies heavily on water conservation and efficiency has been described as a potential pilot project for the soft path that could have wider relevance to the other municipalities facing similar conditions (Etienne, 2008). For this reason, Guelph was examined over the course of several months as the city prepared its 2009 water conservation and efficiency strategy and negotiated with the provincial government to reduce its growth target under the *Growth Plan* to reflect the assimilative capacity of the Speed River.

Under the *Growth Plan*, Guelph was originally scheduled to grow to between 175,000 and 195,000 people by 2031 (Ontario Ministry of Public Infrastructure Renewal, 2006). These projections were closest to the upper estimates of what was expected for the city prior to the enactment of the *Growth Plan* and will equate to a substantial increase in water demand for the municipality (City of Guelph et al, 2006). Statistics from Guelph's Water Supply Master Plan (2006) estimate that the degree of growth proposed under the *Growth Plan* will push daily water demand well above the current sustainable rate of 75,000 cubic meters per day to just under 250,000 cubic meters per day (City of Guelph et al, 2006).

In some regards, Guelph was already viewed as environmentally progressive prior to the city's response to the recent challenges presented by population growth. A previous case study by De Loe et al. (2002) based on data collected during the late 1990s had already identified Guelph as having the strongest capacity to protect local groundwater resources in comparison to the nearby municipalities of Orangeville and Erin. While two of the factors contributing to Guelph's higher groundwater protection capacity were its size and human resources capacity, the city also had several advantages over Orangeville and Erin that were not tied to size, such as political commitment, citizen involvement, linkages with outside agencies, and institutional arrangements (DeLoe et al, 2002). Researchers noted that the main feature that distinguished Guelph from

the other municipalities studied was “continual and multidimensional” community involvement (DeLoe et al, 2002).

### *Community Engagement in Guelph*

Nearly a decade after the DeLoe et al case study, Guelph exhibits many of these same characteristics in 2009. Guelph is beginning to gain attention in the region as a leader in developing water conservation and efficiency strategies. This was found to be a result of the views held by some key municipal staff members and politicians, as well as the broader community, which has consistently pressured local government to incorporate sustainability measures into a wide range of local planning initiatives.

Several factors were attributed to Guelph’s rate of public participation and awareness. The University of Guelph is a significant contributor to local initiatives, bringing an influx of new ideas and support to the community. Partnerships between citizens with an interest in water conservation and university students formed around small-scale projects such as rainwater harvesting (pers comm, 2009).

Some activist groups have also been directly founded by university faculty, making them well positioned to participate in local planning and development decisions and to provide valuable background research for citizens’ groups. Local environmentalists appear to form a loosely based “umbrella group” in the community, with core members participating in multiple groups at one time. These citizens are united under a general interest in monitoring development proposals that may impact significant local ecological features.

An additional umbrella group, the Guelph Civic League, is more broadly focused on fostering general civic engagement in Guelph, provides an additional layer of support for local organizations. Memberships for participation in the Guelph Civic League are purchased on an annual basis for a minimal fee. The group aims to generally “encourage the formation of citizen-led groups, promote dialogue between citizens, organizations, and local government” (Guelph Civic League, 2009). The approach used by the Guelph Civic League has been regarded as successful and has since been emulated by other municipalities seeking to stimulate civic engagement.

The initial partnerships formed among local citizens developed into a more focused entity following an application from the Nestle Corporation to increase water withdrawals at their local water bottling branch on the outskirts of Guelph (pers comm, 2009). Over time, the group also focused their efforts on eliminating a proposed pipeline option to Lake Erie and maintained a strong presence in the public consultation process for the 2006 Water Supply Master Plan. Initially, the group operated on a 100 percent volunteer basis, comprised of a mix of students and retirees. However, this organization recently received funding from the Ontario government to hire an executive director and a dedicated staff member to expand their programming to include an in-school water education program. A municipal staff member in Guelph responsible for conservation and efficiency planning notes that conditions in Guelph are in some ways unique to the city in comparison to others in the region.

“Guelph is a very unique City. The Guelph community is very environmentally conscious, educated and engaged in community initiatives. Community groups are very active and regardless of City involvement. [The]University [is a] key driver in many initiatives and pushing innovation. This creates a fantastic culture overall and the ability to implement projects or innovative ideas on a local level. The Guelph community actively wants to be at

the forefront of water and energy conservation and calls for new approaches to be part of these planning initiatives (pers comm, 2009).”

In the early 1990s Guelph conducted a study of its water system and determined that water conservation programs would be necessary to allow Guelph to continue relying on groundwater resources over the long term (City of Guelph et al, 2006). While Guelph initially developed a water conservation and efficiency strategy in 1999, city council at the time was not supportive of actually implementing the measures identified in the plan, which remained in a partially implemented state until the completion of the Water Supply Master Plan in 2006 (pers comm, 2009). One former municipal staff member noted that it was difficult to gain support for even minor measures such as rebate programs for water efficient household fixtures during this time (pers comm, 2009). The 1999 strategy was never fully funded to the extent recommended by the consultants who developed the strategy (City of Guelph et al, 2006). The current city council is described as being much more supportive of investment in conservation and efficiency measures (pers comm., 2009).

Public engagement, specifically surrounding the development of the 2006 Water Supply Master Plan, was cited as a key factor in shifting the focus of the plan from infrastructure to conservation and efficiency (pers comm, 2009). This pressure led to conservation being viewed as a new source of water supply in the 2006 Water Supply Master Plan. Both members of municipal staff and local ENGOs noted that the politicizing of water issues played an important role in these early stages of the city’s long-term water supply planning. Local ENGO members cited communicating the limits of the city’s groundwater supplies to the average citizen as a turning point in their campaigns to vote in a more environmentally conscientious city council (pers comm., 2009).

### *Incorporating Sustainability into Guiding Principles*

Municipal staff in Guelph noted that city council’s Strategic Plan was the initial impetus for incorporating principles of ecological sustainability into other local planning initiatives (pers comm, 2009). The 2007 Strategic Plan provides a broad based strategy that includes the goal of becoming a leader in conservation and resource management among comparable Canadian cities (City of Guelph, 2007). Departmental business plans are said to be linked directly to the priorities identified in city council’s Strategic Plan (City of Guelph, 2007). Environmental goals also feature prominently in the previous Strategic Plan published in 2005, such as managing growth in a sustainable manner and acting as strong environmental stewards, however, the sustainability goals identified in the 2007 Strategic Plan are more specific and ambitious (City of Guelph 2005a).

### *Water Supply Master Plan*

Guelph’s Water Supply Master Plan could in some respects be considered an example of “backcasting” based on a community vision. The water supply master plan does not set a goal of “no new water” but this type of thinking has clearly been incorporated into the plan, as well as the supplementary Water Conservation and Efficiency Strategy. Furthermore, the fact that the plan was revised after initially being presented as an infrastructure plan outlines the importance of community engagement in establishing the proper vision to guide more detailed strategies, such as the subsequent Water Conservation and Efficiency Strategy.

As a result of public pressure, the percentage target for water conservation in the Water Supply Master Plan was increased. A draft Water Supply Master Plan published in 2005 identified a 10-15 percent reduction in water use as a long term goal, whereas the target was increased to 20 percent in the final plan (pers comm,

2009). Strong opposition to the Lake Erie pipeline option listed in the Water Supply Master Plan was observed in meetings held as part of the consultation process (City of Guelph, 2005b; 2006a; 2006b). Comments submitted by citizens during this time demonstrated an understanding of and a preference for letting the local ecosystem act as the determinant of the city's growth limits (City of Guelph, 2005b; 2006a; 2006b).

### *Guelph Water Conservation and Efficiency Strategy*

The Guelph Water Conservation and Efficiency Strategy was initiated in the winter of 2007 and completed in the spring of 2009. The Conservation and Efficiency Strategy deals specifically with the goal of meeting 20 percent of new water demand through conservation and efficiency measures by 2025 established through city council's endorsement of the 2006 Water Supply Master Plan. The process of developing the Conservation and Efficiency Strategy was highly consultative, with both a community public advisory committee and regular public information sessions taking place as the plan was formulated.

In observing public consultation sessions for the Conservation and Efficiency Strategy, it was noted that some of the recommendations made by members of water related citizen groups were incorporated into the final draft. For example, core members of local environmentalist groups pressured city staff and consultants working on the strategy to incorporate measures to protect the city's urban forest canopy from development pressures because of its importance to groundwater recharge functions. Ultimately, this measure was included in the final Conservation and Efficiency Strategy. Specific measures included in the final Conservation and Efficiency Strategy also demonstrate that the city is attempting to match the level of water quality to that required by the service provided, such as the inclusion of household wastewater reuse pilot projects and rebate programs for both homebuilders and homeowners who adopt wastewater reuse systems (City of Guelph & Resource Management Strategies Inc, 2009).

### *Wastewater Treatment Master Plan*

Infrastructure deferral is also seen to be a priority in Guelph's wastewater treatment operations and is reflected in the most recent draft of the city's Wastewater Treatment Master Plan. Guelph's wastewater treatment strategy thus far has focused on investing in skilled practitioners over additional sewerage capacity (Wheeler, 2008). The city has made a significant investment in senior management to position itself as a leader both within the Grand River Watershed and provincially (Wheeler, 2008). This has included the hiring of staff specifically to implement the strategic planning process.

Guelph's strategy has focused on improving operator efficiency, through both training and operational reforms. This approach has resulted in fewer treatment bypasses where wastewater flows directly into the Speed River (Grand River Conservation Authority, 2008). Guelph's Wastewater Treatment Master Plan also calls for further study into urban wastewater reuse and strategies to adapt to the potential local impacts climate change (City of Guelph & CH2M Hill, 2009). As of late 2008, Guelph had deferred 11 million dollars in wastewater infrastructure costs, with another 20 to 30 million expected in future savings as a result of the city's strategy.

### *Growth Management Strategy*

Another feature of Guelph's approach to long term planning that aligns with the soft path concept is the decision to limit population growth in the city based on the current ability of the Speed River to assimilate wastewater. The city of Guelph determined its carrying capacity to the year 2031 to be 165,000 based primarily on the assimilative capacity of the Speed River, and secondly on the finite nature of the city's

groundwater supply (Guelph Community Development and Environmental Services, 2008). This move required a significant degree of additional consultations with Ontario's Ministry of Public Infrastructure Renewal (now the Ontario Ministry of Energy and Infrastructure) (pers comm, 2009).

Utilizing local water and wastewater capacity limitations as the determinant for growth potential is also a very rare, if not unprecedented decision in the GGH, given the region's pro-development history. However, in a number of jurisdictions in the US, there is a legal basis for preventing development unless proof of a sufficient long term water supply can be submitted. This approach, usually referred to as an assured supply law, has recently been used in California as a means of addressing the severe water shortages currently being experienced (Steinhauer, 2008). While California's assured supply law was established in 2001, water authorities have only recently begun to use the previously unimplemented legislation to deny approval for development proposals where water supplies are currently lacking (Steinhauer, 2008).

### Local Professionals

Another important component to Guelph's success in bringing water conservation and efficiency to the forefront of long term planning is the conservation oriented views of select municipal staff. While the initial push toward a conservation based approach may have originated with the general public, municipal professionals have been noted as important facilitators of the process of moving toward demand side water management approaches (Brooks & Wolfe, 2007). Wolfe (2008; 2009) argues that shifting the emphasis onto the social capital of water practitioners allows for a broader scope of analysis that goes beyond attempting to understand water consumers, to an analysis of entire communities and their decision makers. The views of local professionals appear to have had considerable influence on Guelph's water management approach, as key municipal staff in charge of water conservation and growth management were either directly receptive to the soft path concept, or indirectly to its core principles.

### Guelph as a Soft Path Pilot Project

While a number of features of Guelph's approach to long term planning align with the core principles of the soft path for water, the case study also identified some areas of the soft path which are less likely for municipalities to adopt. The first of these is explicit use of the soft path name. Holtz (2007) suggests that for a water soft path approach to be successful, it may not be necessary for all of the decision makers involved to identify the actions they are undertaking as "soft path". Key decision makers, staff and citizens in Guelph all exhibited an understanding and appreciation of ecological limits as an appropriate determining factor for growth, but not all were necessarily familiar with the specific soft path concept. While some staff and citizens supported the soft path's principles, use of the term appeared less important than advancing water sustainability in general. This suggests that soft path advocates may be most successful by playing an informatory role in the municipal long term planning process, emphasizing and clarifying how a soft path goes beyond the demand management practices that are most familiar to municipal staff.

One municipal staff member noted that the key to further implementation of the soft path may lie in the flexibility of the concept and the possibility of following the principles of multiple approaches to sustainable water management, noting that while they fully agreed with the soft path concept, it was unlikely to be explicitly used as the basis for municipal planning efforts. Instead, the City has chosen to pursue other smaller scale sources of water supply to service future growth, and to create supply redundancy for emergency situations where potential threats to existing supply may occur (pers comm, 2009).

Brooks and Holtz (2009) have also suggested that although the soft path approach advocates reducing demand as an alternative to increasing supply, an alternative way of understanding the soft path may be as a tool to shift the balance away from an entrenched preference for supply based measures. The need to create redundancy in water systems to compensate for potential failures could be another barrier to the full adoption of a water management strategy premised on developing no new water supplies. The need to improve water supply redundancy was recently used to make the case for developing a new pipeline from Genesee County in the US to Lake Huron (City of Detroit Water and Sewerage Department, 2009).

Secondly, there was a significant gap between Guelph's final conservation target and the potential conservation targets implied under a fully implemented soft path plan in case studies of the Annapolis Valley Watershed, the town of Oliver, British Columbia and the Province of Ontario. While these case studies suggest a water demand reduction of up to 50 percent is possible, Guelph's Water Supply Master Plan only prescribes a 20 percent demand reduction by 2025. One practitioner noted that in a scenario where 50 percent conservation was required, the financial impact on the municipality may be such that water rates become unaffordable to some community members or cause business closures (pers comm, 2009). This may in part be due to the "double edged sword" effect, in which municipalities must raise water rates to compensate for decreased revenues as consumers use less water, a phenomenon that has recently been experienced in nearby Peel Region (Wallace, 2008). An international scan of water conservation and efficiency initiatives finds that most programs tend to fall into the 20-30 percent conservation target range.

Finally, it is important to note that although Guelph has made substantial progress in integrating sustainability and using local carrying capacity as a determinant for growth, some challenges still remain. Ongoing development pressures are present in some greenfield areas on the outskirts of the city. For example, development pressures on the Paris-Galt Moraine, a significant recharge area for the Grand River Watershed, have raised particular concern among local environmentalists and staff (pers comm, 2009). In spite of the Oak Ridges Moraine in the Toronto centered region of the GGH being afforded specific policies to protect it from development, a recent ruling determined that similar policies would not be created for the Paris-Galt Moraine (Outhit, 2009).

### **Findings of the Guelph Case Study in Broader Context: Lessons Learned**

The ability of largely volunteer-led citizen groups to influence Guelph's long-term planning approach is a testament to the need to foster civic engagement more broadly in the GGH region, as well as the need to transform individual perceptions regarding the water "myth of abundance" on a broader scale.

Although the measures identified as consistent with the soft path in Guelph's long term planning strategy make use of relatively common technologies, it remains among the more innovative and aggressive conservation strategies in Ontario, with experts recently identifying the city as a leader in the field (Maas, 2009). It appears that the somewhat unique conditions created by the level of awareness of environmental issues in the community, as well as practitioners' willingness and capacity to respond to local pressure to live within ecological limits played a major role in shaping the city's long term planning process. The subsequent strategies outlining growth management, water supply, wastewater management and water conservation can be traced back to the broad community goals established by the most recent council, in part voted in because of their stronger environmental focus than the previous council, who supported a pipeline based water supply.

Over the long term, it is possible that the Ontario Building Code will incorporate many of the water saving technologies now considered cutting edge, making them mandatory in new development. While promotion of new technologies is of central importance in advancing water conservation and efficiency, this case study suggests that creating the “continual and multidimensional” community involvement identified by De Loe et al. and reinforced in the current case study should also be prioritized in Ontario.

In addition, technological solutions to conserving water are ultimately dependent on a human commitment to conservation. Campbell et al. (2004) identify “offsetting behavior” as a barrier to the long term success of water efficiency measures. Offsetting behavior occurs when engineering or educational measures to conserve resources do not perform to their expected capacity due to end users’ increasing consumption levels. End users may increase their consumption based on the knowledge that water conserving technologies are in place. The success of water efficient technology in reducing consumption levels can in some cases even be greater when users are unaware that the new devices have been installed (Campbell et al, 2004).

There is strong evidence to suggest that significantly higher conservation and efficiency savings are feasible on a provincial scale. Brooks (2009) notes that in an “aggressive” water conservation scenario, meaning 50 percent of the total possible participants are participating in conservation and efficiency programs, the savings realized would account for 10 percent of total water demand in Ontario. The fact that the most optimistic scenarios are based on a 50 percent participation rate suggests that increased efforts in fostering education, awareness and engagement could result in even higher demand reductions.

This lack of motivation and awareness may be a barrier elsewhere in Ontario and more broadly at the national level. Recent survey based research has demonstrated that attitudes toward freshwater resources are highly nuanced and vary considerably between demographic groups. Despite a general sense that freshwater resources should be a top priority in comparison to other environmental issues, there are significant gaps between perception and reality. Recent surveys identified a paradox in which concern for water resources and peoples’ perceived water use levels contradict actual water consumption levels. On average, Canadians surveyed believed that their water usage was in the range of 60 litres per day, when in fact, actual per capita consumption levels exceed 300 litres per day (RBC and Unilever Canada, 2009). The survey results also reveal that many Canadians believe water conservation is poorly implemented by corporations or by ‘others’ in general, while comparatively, they perceive their own actions in a more positive light (RBC and Unilever Canada, 2009).

A 2007 poll conducted in the Great Lakes Basin also identified significant knowledge gaps among the general public. In particular, young men and women under the age of 35 were found to be far less aware of the benefits of the Great Lakes than older demographic groups. For example, less than half of Torontonians under age 35 were aware that their drinking water supply was obtained from Lake Ontario (McAllister Opinion Research, 2007). Furthermore, younger generations, specifically the under 35 demographic, tend to view the Great Lakes in a negative light (McAllister Opinion Research, 2007).

Furlong (2008) conducted an extensive survey of water related organizations in Ontario, which included municipal water staff, conservation authorities, environmental non-profits and governmental departments dealing with water supply. The survey was intended to generate an overview of key water issues from the perspective of various groups across the province. The survey results indicate that there is a gap between the extent that public education and public participation programs are implemented and the number of respondents that view them as one of the most effective measures to improve environmental sustainability in the water sector (Furlong, 2008). Furlong suggests that the neoliberalization of governance in Ontario has

inhibited the advancement of public education in comparison to other water conservation and efficiency initiatives, for which results may be easier to measure. During a follow up workshop to the survey, experts noted that as municipalities have increasingly been asked to operate like businesses, educational programs where results cannot be quantified are more challenging to justify (Furlong, 2008).

The findings summarized above stand in contrast to recent research of a similar nature conducted in Guelph. As a component of the background research leading up to the 2009 Water Conservation and Efficiency Strategy, consultants conducted telephone surveys and a focus group session to gauge the level of awareness and concern for water issues in the city. The study found that when residents were asked what came to mind when they thought about conservation or the environment in Guelph, water was mentioned more than twice as often as energy and waste (City of Guelph and Metroline Research, 2008). While similar levels of concern over water were noted at the national level in other surveys, residents in Guelph appear to be translating this concern into action, as evidenced by consistently declining water use levels in the city over the last decade. Participants in the survey also demonstrated a strong sense of responsibility for conserving water that often surpassed the desire to simply reduce household expenses. When asked why water issues were the subject of increased concern in the city, the majority of respondents identified the city's finite groundwater supplies (City of Guelph and Oracle Poll Research, 2008).

## Conclusions

This report has aimed to provide an assessment of the linkage between growth, land use planning and water management in the GGH region of Ontario. This report has also aimed to identify policies that influence this linkage. The results of the assessment suggest that growth throughout the region is creating significant challenges for communities that are reliant on finite groundwater supplies. This was found to be true for a number of municipalities in the Grand and Credit River Watersheds, specifically among those designated for population increases under the *Growth Plan*. In some cases, these municipalities lack the size and tax base to fund proper conservation and efficiency initiatives and in others an infrastructure based approach to long term planning appears to be the favored option.

In addition, this report has attempted to gain some initial insights into how the soft path for water might serve as a means of addressing the challenges presented by the growth projections for the region through an analysis of Guelph as a 'pilot' municipality. Many of the measures that were ultimately included in Guelph's 2009 Water Conservation and Efficiency Strategy can be considered consistent with the core principles of the soft path for water. While it is too early to determine whether all of the measures specified in Guelph's Water Conservation and Efficiency strategy will be implemented, the fact that they were included demonstrates potential for soft path measures to be translated into practice. In addition, several possible limitations of the soft path concept in a municipal scenario were identified, such as the explicit endorsement of a soft path plan and a current upper limit to the percentage based conservation targets which is lower than what has been identified as feasible in the Canadian soft path case studies.

Environmental awareness and appreciation for ecological limits in Guelph are a key factor in its recent emergence as a leader in water conservation. Considering the broader Canadian and Great Lakes Basin surveys on awareness of water issues in comparison to those conducted in Guelph, Guelph's higher level of awareness can at least partially explain why their water management and general long term planning approach is consistently focused on ecological sustainability. In a general sample of Canadians, large knowledge gaps

between perceived and actual water use still exist in spite of freshwater resources being considered a high priority in comparison to other issues such as climate change.

A sufficient number of citizens in the city of Guelph hold the beliefs and values necessary to encourage the political will to implement measures that are consistent with a soft path approach. This is evident from the fact that long term planning goals that acknowledge ecological limits to growth have informed water policy, as well as other policies developed by separate municipal departments, such as the city's growth management strategy. While it is unrealistic to suggest that the unique conditions of a given city can be precisely emulated elsewhere, the Guelph case study underlines the importance of establishing high level environmental goals and an awareness of ecological limits among the broader public. This study also highlights the need to bridge the gap between the perceived importance of public education programs for encouraging water conservation among municipal policy makers, and the extent to which such programs are funded and implemented in Ontario. Inclusion of measures aimed at addressing this gap will be central to the long term success of the Province's upcoming water conservation and efficiency strategy.

## Recommendations

### 1) *Provincial:*

- When forecasts contained in Schedule 3 of the *Growth Plan for the Greater Golden Horseshoe* are subjected to a five year review, growth targets in any of the affected municipalities where water and wastewater limitations exist, or are emerging, should be revisited and reduced wherever possible.
- The province should also adopt a model similar to the assured water supply laws used in the United States to reduce or prevent growth where proof of sufficient water resources cannot be provided by developers.
- As a component of the upcoming conservation and efficiency strategy, the province should provide financial support to grassroots groups, municipal professionals and schools to aid in fostering the creation conservation and efficiency efforts tailored to the specific needs of communities across the province that can be sustained over the long term.

### 2) *Municipal:*

- A significant effort should be made to create and expand campaigns and initiatives to raise awareness and education at all levels, ranging from municipal professionals to young children. While the actual savings are challenging to quantify, making investing in these measures a harder sell, the Guelph case study provides additional evidence that an aware and engaged community is crucial to municipal level adoption of a holistic and sustainable water management strategy.

### 3) *Soft Path Advocates:*

- Soft path practitioners should continue to find innovative partnerships and arrangements to promote soft path thinking in municipalities. This is starting to take place, and this case study reveals that soft path researchers and advocates can play a meaningful role in informing municipal decision makers, who can then adapt the soft path concept into a "best fit" for local realities.

## Bibliography

- Birnbaum, L., Nicolette, L., & Taylor, Z. (2004). Simcoe County: The New Growth Frontier. Retrieved from the Neptis Foundation website [http://www.neptis.org/library/cf\\_download.cfm?file=Simcoe-Mar\\_2005v2.pdf&path=%5C](http://www.neptis.org/library/cf_download.cfm?file=Simcoe-Mar_2005v2.pdf&path=%5C).
- Bosch, D. J., Lohani, V. K., Dymond, R. L., Kibler, D. F., & Stephenson, K. (2003). The Hydrological and Fiscal Impacts of Residential Development. *Journal of Water Resources Planning and Management*, 107-114.
- Brandes, O. M., & Brooks, D. B. (2005). The Soft Path for Water in a Nutshell. Retrieved from [http://www.foecanada.org/PDF/nutshell\\_lowres\\_final.pdf](http://www.foecanada.org/PDF/nutshell_lowres_final.pdf)
- Brandes, O. M., & Brooks, D. B. (2006). The Soft Path for Water: A Social Approach to the Physical Problem of Achieving Sustainable Water Management. *Horizons*, 71-74.
- Brandes, O., Maas, T., Mjolsness, A., & Reynolds, E. (2007). A Soft Path for Water Case Study: The Town of Oliver, BC. Retrieved from <http://www.foecanada.org/WSP%20Lexicon/Oliver%20Case%20Study.pdf>
- Brooks, D. B. (2006). An Operational Definition of Demand Management. *International Journal of Water Resources Development*, 521-528.
- Brooks, D. B., Brandes, O. M., & Gurman, S. (2009). Why a Soft Path, and Why Now? In D. B. Brooks, O. M. Brandes, & S. Gurman (Eds.), *Making the Most of the Water We Have: The Soft Path Approach to Water Management*. London: Earthscan.
- Brooks, D. B. and Holtz, S. (2009). Water Soft Path Analysis: From Principles to Practice. *Water International*, 158-169.
- Brooks, D., & Wolfe, S. (2007). Institutional Assessment for Effective WDM Implementation and Capacity Development. Retrieved from <https://idl-bnc.idrc.ca/dspace/handle/123456789/38819>
- Brooks, M. (2009). Assessing the Potential for Water Conservation and Efficiency in Ontario: Final Report. Resource Management Strategies Inc.
- Campbell, H. E., Johnson, R. M., & Larsen, E. H. (2004). Prices, Devices, People, or Rules: The Relative Effectiveness of Policy Instruments in Water Conservation. *Review of Policy Research*, 637-662.
- City of Detroit Water and Sewerage Department. (2009, June 29). Regarding: Genesee County Drain Commissioner's Water Withdrawal Permit Application; Comments of the City of Detroit and the Detroit Water and Sewerage Department. Retrieved from <http://www.dwsd.org/announce/GeneseeCountyDrain.pdf>
- City of Guelph. (2005a). A Great Place to Call Home: City of Guelph Strategic Plan 2005 and Beyond. Retrieved from [http://guelph.ca/uploads/Council\\_and\\_Committees/Council/guelph-strategic-plan.pdf](http://guelph.ca/uploads/Council_and_Committees/Council/guelph-strategic-plan.pdf)
- City of Guelph. (2005b). Water Supply Master Plan Public Forum #1 Summary Report. Retrieved from [http://guelph.ca/uploads/ET\\_Group/waterworks/WSMP-public-forum-rpt-8-Mar-05.pdf](http://guelph.ca/uploads/ET_Group/waterworks/WSMP-public-forum-rpt-8-Mar-05.pdf)

- City of Guelph. (2006a). Water Supply Master Plan: Public Advisory Committee Meeting #3. Retrieved from [http://guelph.ca/uploads/ET\\_Group/waterworks/Public\\_Advisory\\_Committee\\_Meeting\\_3\\_Draft\\_Summary.pdf](http://guelph.ca/uploads/ET_Group/waterworks/Public_Advisory_Committee_Meeting_3_Draft_Summary.pdf)
- City of Guelph. (2006b). Water Supply Master Plan: Public Forum #2 Summary Report. Retrieved from [http://guelph.ca/uploads/ET\\_Group/waterworks/Public\\_Forum\\_2%20Summary\\_Report.pdf](http://guelph.ca/uploads/ET_Group/waterworks/Public_Forum_2%20Summary_Report.pdf)
- City of Guelph. (2007). Guelph Strategic Plan: 2007 and Beyond. Retrieved from <http://guelph.ca/uploads/PDF/Guelph-Strategic-Plan-2007.pdf>
- City of Guelph and CH2M Hill Inc. (2009). Guelph Wastewater Treatment Master Plan. Retrieved from [http://guelph.ca/uploads/ET\\_Group/wastewater/WWTMP/Guelph\\_WWTMP\\_Report.pdf](http://guelph.ca/uploads/ET_Group/wastewater/WWTMP/Guelph_WWTMP_Report.pdf)
- City of Guelph Department of Community Development and Environmental Services. (2008). Addendum Report - Guelph's Local Growth Management Strategy Recommendations. Retrieved from [http://www.guelph.ca/uploads/PBS\\_Dept/planning/documents/Guelph%20Growth%20Management/08-83\\_%20June%2023\\_08%20%20LGMS%20Addendum%20report%20FINAL%20includes%20letter%20from%20PIR%20Ministry\\_PK.pdf](http://www.guelph.ca/uploads/PBS_Dept/planning/documents/Guelph%20Growth%20Management/08-83_%20June%2023_08%20%20LGMS%20Addendum%20report%20FINAL%20includes%20letter%20from%20PIR%20Ministry_PK.pdf)
- City of Guelph, Earth Tech Canada Inc, Lura Consulting, Lotowater Geoscience Consultants, and C.N. Watson and Associates Ltd. (2006). City of Guelph Water Supply Master Plan: Draft Final Report. Retrieved from [http://guelph.ca/uploads/ET\\_Group/waterworks/WSMP\\_Draft-Final-Report-Sep1206-rev.pdf](http://guelph.ca/uploads/ET_Group/waterworks/WSMP_Draft-Final-Report-Sep1206-rev.pdf)
- City of Guelph and Metroline Research Group. (2008). Water Efficiency: A Qualitative Market Research Study with Randomly Selected Residents of Guelph. Retrieved from [http://www.guelph.ca/uploads/ET\\_Group/waterworks/WCE%20Study/WCES%20Appendix%20B.pdf](http://www.guelph.ca/uploads/ET_Group/waterworks/WCE%20Study/WCES%20Appendix%20B.pdf)
- City of Guelph and Oracle Poll Research. (2008). City of Guelph - Water Conservation and Efficiency Residential Phone Research Survey. Retrieved from [http://www.guelph.ca/uploads/ET\\_Group/waterworks/WCE%20Study/WCES%20Appendix%20C.pdf](http://www.guelph.ca/uploads/ET_Group/waterworks/WCE%20Study/WCES%20Appendix%20C.pdf)
- City of Guelph & Resource Management Strategies Inc. (2009). City of Guelph: Water Conservation and Efficiency Strategy Update. Retrieved from [http://guelph.ca/uploads/ET\\_Group/waterworks/WCE%20Study/WCES%20Final%20Report.pdf](http://guelph.ca/uploads/ET_Group/waterworks/WCE%20Study/WCES%20Final%20Report.pdf)
- Council of Great Lakes Governors. (1985). The Great Lakes Charter: Principles for the Management of Great Lakes Water Resources. Retrieved from <http://www.cglg.org/pub/charter/index.html>
- De Loe, R. C., Giantomasso, S. E., & Kreutzwiser, R. (2002). Local Capacity for Groundwater Protection in Ontario. *Environmental Management*, 217-233.
- Dillon Consulting and Watson and Associates (2008). The County of Dufferin and its Member Municipalities: Growth Management Study: Phase 1 & 2 Consolidated Report. Retrieved from [http://www.dufferincounty.on.ca/documents/Phase\\_II\\_-\\_Part\\_1\\_December\\_10,\\_2008\\_-\\_Dufferin\\_GWS.pdf](http://www.dufferincounty.on.ca/documents/Phase_II_-_Part_1_December_10,_2008_-_Dufferin_GWS.pdf)
- Environmental Commissioner of Ontario. (2007). Reconciling Our Priorities: 2006-2007 Annual Report of the Environmental Commissioner of Ontario. Retrieved from <http://www.eco.on.ca/eng/index.php/eco-publications/eco-publications-2/2006-07-annual-report.php>

- Etienne, J. (2008). A 'Soft Path' for Water: Integrated Approaches to Water Demand Management in the Grand River Watershed. Retrieved from [http://www.sustainablecommunities.fcm.ca/files/Webinars/2008/November\\_19-2008/water\\_soft\\_path-en.pdf](http://www.sustainablecommunities.fcm.ca/files/Webinars/2008/November_19-2008/water_soft_path-en.pdf)
- Furlong, K. (2008). Municipal Water Supply Governance in Ontario: Neoliberalization, Utility Restructuring and Infrastructure Management (Doctoral dissertation). Retrieved from <https://circle.ubc.ca/handle/2429/230>
- Gombu, P. (2008, January 26). The High Cost of Using Less Water. *The Toronto Star*. Retrieved from: <http://www.thestar.com/article/297647>
- Grand River Conservation Authority. (2005). Grappling with Growth. *2005 Watershed Report*. Retrieved from [http://www.grandriver.ca/WatershedReportCard/2005\\_Fall\\_Grand.pdf](http://www.grandriver.ca/WatershedReportCard/2005_Fall_Grand.pdf)
- Grand River Conservation Authority. (2007). The New Challenges. *2007 Watershed Report*. Retrieved from [http://www.grandriver.ca/publication/2007\\_fall\\_grand.pdf](http://www.grandriver.ca/publication/2007_fall_grand.pdf)
- Grand River Conservation Authority. (2008). People First in Guelph Wastewater Solution. *Grand Actions: The Grand Strategy Newsletter*, 6. Retrieved from [http://www.grandriver.ca/GrandStrategy/2008\\_novdec\\_grandactions.pdf](http://www.grandriver.ca/GrandStrategy/2008_novdec_grandactions.pdf)
- Guelph Civic League. (2009). *About the Guelph Civic League*. Retrieved from <http://www.guelphcivicleague.ca/page.php?p=1>
- Hemson Consulting Ltd. (2005). The Growth Outlook for the Greater Golden Horseshoe. Retrieved from <http://www.hemson.com/news/GrowthOutlookForGGH%2017Jan2005a.pdf>
- Hoggett, M. (2009, June 01). Report Says Town is Free and Clear on Pipeline. *Alliston Herald*. Retrieved from <http://www.simcoe.com/article/137302>
- Holtz, S. (2007). Policy Change for a Water Soft Path in Canada. Ottawa, Ontario: Friends of the Earth. Retrieved from <http://www.foecanada.org/WSP%20Lexicon/Policy%20Change.pdf>
- Holtz, S. (2008). Energy Soft Paths Then and Water Soft Paths Now: Similarities, Differences, Learnings and Implications. Soft Path Colloquium 2008, Waterloo, Ontario.
- Issacman, L., & Daborn, G. (2006). A Water Soft Path for the Annapolis Valley, Nova Scotia: A Case Study of Sustainable Freshwater Management at a Watershed Scale. Retrieved from <http://www.foecanada.org/WSP%20Lexicon/Annapolis%20Valley.pdf>
- Kay, P. A., Hendricks, E., & Rahman, N. (2007). Sustainable Water Policy: The Soft Path for Water Ontario Case Study. Retrieved from <http://www.foecanada.org/WSP%20Lexicon/Ontario%20Case%20Study.pdf>
- Maas, C. (2009). H2Ontario: A Blueprint for a Comprehensive Water Conservation Strategy. Retrieved from <http://www.waterdsm.org/publication/262>
- McAllister Opinion Research. (2007). Great Lakes Communications Research: Analysis of Public & Policy-Maker Opinion on the Great Lakes & St. Lawrence Ecosystem. *Biodiversity Project and Great Lakes United*.

- Miller, S., & Stack, D. (2004). Great Lakes Charter Annex: Statement to the Standing Committee on the Environment and Sustainable Development. Canadian Environmental Law Association and Great Lakes United. Retrieved from [http://s.cela.ca/files/uploads/498GL\\_Charter\\_Annex.pdf](http://s.cela.ca/files/uploads/498GL_Charter_Annex.pdf)
- Morris, T. and Maas, T. (2007, October 4). Your Tap, Your Toilet and the Great Lakes. *The Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/news/opinions/article786917.ece>
- Mulvihill, P. (2006). Fostering Sustainability in Headwaters County: Using Bioregional and Social Capital Strategies in Support of Sustainability. *Local Environment*, 663-682.
- Ontario Ministry of Public Infrastructure Renewal. (2006). Places to Grow: A Growth Plan for the Greater Golden Horseshoe. Retrieved from <https://www.placestogrow.ca/images/pdfs/FPLAN-ENG-WEB-ALL.pdf>
- Ontario Ministry of the Environment. (2009). Lake Simcoe Protection Plan. Retrieved from <http://www.ene.gov.on.ca/publications/6932e01.pdf>
- Oracle Poll Research. (2008). City of Guelph: Water Conservation and Efficiency Residential Phone Research Survey. City of Guelph. Retrieved from [http://www.guelph.ca/uploads/ET\\_Group/waterworks/WCE%20Study/WCES%20Appendix%20C.pdf](http://www.guelph.ca/uploads/ET_Group/waterworks/WCE%20Study/WCES%20Appendix%20C.pdf)
- Outhit, J. (2009, May 6). No New Laws for Moraine. *The Waterloo Region Record*. Retrieved from <http://news.therecord.com/article/532380>
- RBC and Unilever Canada. (2009). 2009 Canadian Water Attitudes Study. Retrieved from [http://www.probeinternational.org/EVfiles/2009\\_Canadian\\_Water\\_Attitudes\\_Study.pdf](http://www.probeinternational.org/EVfiles/2009_Canadian_Water_Attitudes_Study.pdf)
- Rothwell, N. (2006). Study: The Population Pattern in Canada's Watersheds. *Statistics Canada: The Daily*. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/060105/dq060105b-eng.htm>
- Sharatt, K., Wardle, B., & Fiotakis, G. (1992). Ontario's Water Efficiency Strategy. Toronto: Queens Printer.
- Steinhauer, J. (2008, June 7). Water-Starved California Slows Development. *The New York Times*. Retrieved from [http://www.nytimes.com/2008/06/07/us/07drought.html?\\_r=1&x=5065&x=MYWAY&x=print&x=slogin](http://www.nytimes.com/2008/06/07/us/07drought.html?_r=1&x=5065&x=MYWAY&x=print&x=slogin)
- Wallace, A. (2008, Jan 26). The High Cost of Using Less Water. *The Toronto Star*. Retrieved from <http://www.thestar.com/News/GTA/article/297647>
- Wekerle, G., Sandberg, L. A., Gilbert, L. and Binstock, M. (2007). Nature as a Cornerstone of Growth: Regional and Ecosystems Planning in the Greater Golden Horseshoe. *Canadian Journal of Urban Research*, 20-38.
- Weston Consulting Group Inc. (2005). Re: "Places to Grow" Proposed Growth Plan for the Greater Golden Horseshoe - Response to the Minister of Public Infrastructure Renewal.
- Wheeler, G. (2008). The Future Face of Environmental Stewardship. Presentation to the Grand River Watershed Forum September 19th 2008. Retrieved from <http://www.grandriver.ca/WaterForum/Wheeler08.pdf>
- Wolfe, S. (2008). Capacity, Capability, Collaboration, and Commitment: How Social Networks Influence Practitioners of Municipal Water Demand Management Policy in Ontario, Canada. *Environmental Practice*, 42-52.

- Wolfe, S. (2009). A Social Innovation Framework for Water Demand Management Policy: Practitioners' capabilities, capacity, collaboration and commitment. *Society and Natural Resources*, 474-483.
- Wolfe, S and K. Elton (2009). Pushing the Boundaries: Shifting Water Soft Paths Philosophy Toward Hard Policy in Municipal Water Management. In D. B. Brooks, O. M. Brandes, & S. Gurman (Eds), *Making the Most of the Water We Have: The Soft Path Approach to Water Management*. London: Earthscan.
- XCG Consultants Ltd. and the Regional Municipality of Waterloo. (2007). Region of Waterloo Water Supply Strategy Update Final Report. Retrieved from [http://www.region.waterloo.on.ca/WEB/Region.nsf/97dfc347666efede85256e590071a3d4/37DA67412DB05F2C852576710049EC6A/\\$file/REPORT.pdf?openelement](http://www.region.waterloo.on.ca/WEB/Region.nsf/97dfc347666efede85256e590071a3d4/37DA67412DB05F2C852576710049EC6A/$file/REPORT.pdf?openelement)