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Date:

February 15, 2010

Title:

Governance and sustainability at a municipal scale: The challenge of water conservation

Key Words:

Water, conservation, sustainability, governance, municipal, Canada

Eau, économisation de l'eau, développement durable, gouvernance, municipale, Canada

Abstract:

Municipal water conservation is increasingly promoted as a key dimension of environmental sustainability at the local scale. Progress towards municipal water conservation in Canada has, however, been poor. This paper examines the governance dimension of water conservation, and presents evidence in support of the argument that conservation efforts on the part of water utilities or municipal leaders are often constrained by factors external to their operational and/or political jurisdiction, some of which are derived from the multi-scalar and fragmented nature of environmental governance in Canada. To explore these issues, this paper presents a case study of municipal water conservation in Canada, highlighting barriers and limitations and suggesting how they might be resolved.

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Introduction

The governance of municipal water supply has undergone significant shifts in many countries over the past 20 years. These shifts have resulted from reforms in water management, partly driven by concerns over limiting costs and improving the 'efficiency' and 'sustainability' of services (Graham and Phillips 1998; Sancton 2005; Collin et al. 2002). In addition, broader reforms to municipal governance have had significant impacts. Governments have enacted new legislation and strategies for working with municipalities and non-governmental actors, and municipalities have experimented with a variety of new programs and management models for water supply (de Bettignies and Ross 2004; Parson 2000). Many of these initiatives were intended to improve managerial efficiency while achieving sustainability goals—notably, water conservation. Yet, as explored below, the progress of Canadian municipalities with respect to water conservation has been slower than expected. This suggests that significant barriers to municipal water sustainability may still exist. Exploring these barriers, with a focus on governance issues, is the focus of this paper, which develops the analysis of water conservation as one example of the broader drive for sustainability at the municipal scale in Canada.

As context for this discussion, it is important to note that water governance in Canada has undergone a series of significant transformations over the past decade. New legislative frameworks (notably in Ontario and Alberta), new organizations (such as Manitoba's Ministry of Water Stewardship), and new goals (such as source water protection) have been created in almost all Canadian jurisdictions (Sproule-Jones et al. 2008; de Loë 2009; de Loë and Kreutzwiser 2005; Bakker 2007). Given the

decentralized nature of the division of powers for water under Canadian federalism, these initiatives have been provincially led (and are reflective, some analysts argue, of the high degree of jurisdictional fragmentation that characterizes water governance in Canada (Hill et al. 2008). In terms of municipal governance, changes such as municipal amalgamations, realignment of responsibilities between levels of government, shifts in funding availability and new forms of evaluation have themselves led to many important changes in relation to the delivery of municipal water supply (Bakker and Cameron 2005; Kipfer and Keil 2002; Thomson 2006).

Within this changing governance landscape, municipalities—traditionally charged with responsibility for water supply—have been expected to undertake significant programming changes in the pursuit of goals of sustainability and water security. Conservation has become a critical issue in many Canadian municipalities for a range of reasons, including: local water availability (e.g. Waterloo and York regions in Ontario); increasing pressure on existing water sources due to population growth or changes in commercial and industrial use (e.g. the Okanagan Valley in BC); conflicts among uses (as in southern Alberta); insufficient infrastructural capacity (e.g. Toronto); or concerns with leakage (e.g. Halifax). To address these issues, many municipalities have embarked on extensive conservation programs. But success has been limited: some utilities find their efforts stymied in a number of ways (this research) while others have barely implemented programs at all (Brandes and Ferguson 2004).

Why would this be the case? Most research on barriers to water conservation focuses on practices within water utilities (e.g. Waller 1998; Roach et al. 2004; US Environmental

Protection Agency 1998; Wolfe 2009) or with user incentives (e.g. pricing). This focus is usually considered appropriate because water utilities are primarily (if not uniquely) responsible for implementing water conservation and users for responding. However, we argue that this is inadequate. As explored below, through an extensive research project involving 18 municipal case studies across Canada¹, we have found that even the most assertive water conservation programs are constrained by a variety of governance-related factors over which water utilities, and even municipalities, have little control. Water conservation is, in other words, not a stand-alone issue: it is intertwined with broader patterns and practices of governance.

These arguments are developed over three further sections. In section 2, we identify the main reasons for the poor performance of Canadian municipalities vis-à-vis water conservation. The approach of leaving water conservation to utilities suffers four key problems associated with jurisdictional issues in governance (absent mandates, conflicting incentives, lacking assistance from senior governments, and lacking consideration of conservation in governance reform). In section 3, we discuss how these issues can be resolved, highlighting specific ways in which the accountability and engagement of governments and non-states actors in conservation can be improved. We conclude with a discussion of the broader implications of our research findings for policies that might affect municipal governance and sustainability concerns.

1. The limits to conservation as a utility mandate

It is the central premise of this paper that the main reason why conservation in Canada's municipal water supply sector is faltering in terms of need, interest, and the relative success of other countries relates to a lack of attention to governance. This lack of attention pertains to both a lack of engagement by governments (at all levels) in their necessary roles, and a failure to account for the impact of a variety of governance policies toward municipalities on conservation. Generally, governments in Canada have neither engaged in their responsibilities vis-à-vis conservation, nor have they formally delegated these responsibilities to utilities (entailing the purposeful assignment of authority and responsibility). Rather, as the entities most immediately affected by poor conservation, utilities are left to fill the policy gaps left by senior governments. This approach reflects a general lack of shared governance on environmental issues in Canada's federal context (see Peters 1995; Harrison 1996) and has been compounded by further pressure towards devolution and NPM in recent years.

Canada has frequently been found to have among the highest water use per capita and lowest water prices among its peers in the OECD (OECD 2006, 2003; Boyd 2001). Environment Canada has also found practices toward water efficiency wanting, recently stating that the water-pricing structures applied to 55% of Canadians do not promote conservation (Environment Canada 2008). Behind these statistics is the underlying issue of the lack of engagement with water conservation within Canadian municipal and water governance. This means that even where water utilities or municipalities may actively pursue water conservation, their efforts will be limited by factors external to their control. This is not a result of insufficient practitioner/researcher attention to the issue;

significant work has been conducted on improving water conservation in Canada (e.g. Waller 1998; Shrubsole and Tate 1993; Tate 1990; Tate 2001; Tate and Lacelle 1995). Yet, little progress has been made in terms of a national conservation outlook (Brandes and Ferguson 2003). In fact, while both municipal governance and water governance have seen important changes in many provinces, the governance measures to facilitate conservation have generally not followed suit.

Governance frameworks for conservation have remained largely static. As stated above, conservation has been neither devolved nor delegated to utilities through any formal arrangement or transfer of authority. This can appear adequate given the prevalent technical view of water efficiency that places its achievement with the transfer and application of best practices. However, it ignores the important governance issues that arise (both through devolution in other issue areas and the need for increased shared governance to foster conservation). Similarly, for sustainability issues more generally, research has shown the best-practices approach to be limited precisely because of its neglect of governance issues (Bulkeley 2006).

On the surface, the problem of conservation in municipal supply seems unrelated to issues of restructuring in municipal governance. Yet, as discussed in sections 2b and 2d, these reforms have had profound effects in many instances. In particular, the implementation of new ideas about how governments should operate and be evaluated (along the lines of the new public management –NPM) have combined with low levels of municipal empowerment to create challenges to municipal-led sustainability. For example, devolution in governance – based on the idea that services should be delivered

as proximate to the “customer” as possible - has involved the transfer of many responsibilities from provinces to municipalities (Hobson and St-Hilaire 1996). While most provinces have reconfigured their municipal acts to keep pace with such changes (e.g. Ontario, BC), even developing special acts for certain cities (e.g. Winnipeg, Toronto, St. John's), in many cases municipalities still find that they lack the needed capacity to meet their new exigencies (Graham et al. 1998; McAllister 2004; Bradford 2004; Lidstone 2004). Some even argue that despite the widespread changes to municipal legislation, these have not resulted in any ‘fundamental’ change to municipal governance (Garcea and LeSage 2005).

This research reveals four key governance barriers to successful municipal conservation programming: (1) utilities lack a mandate for conservation; (2) utilities and municipalities face conflicting incentives regarding conservation that have been compounded by the rising importance of NPM; (3) municipalities lack assistance from senior governments on issues falling within their jurisdiction; and (4) municipalities lack engagement with utilities and municipalities on the impact of governance change at the local level. These issues compound one another. For example, the lack of mandate means that when conflicting incentives arise, it is conservation that will be sidelined in favour of official utility exigencies. Moreover, even if utilities had an official mandate for conservation, their efforts would remain limited by the lack of engagement from senior governments who have important policy roles that cannot be filled by utilities or even by municipal governments.

a) Lack of a conservation mandate

In Canada, conservation is generally not included in the basic mandate of water supply providers. For example, there are generally no efficiency or leakage standards to meet in water licensing or delivery.² In absence of a mandate for water conservation, it is unlikely that utilities will engage in initiatives that involve political risk or significant upfront investments for long-term benefits.

In Ontario, for example, water conservation programs are the purview of water utilities to implement, as they deem necessary. The legislated and recommended duties of owners and operators of municipal water systems do not include conservation (or efficiency) in water taking or delivery (Table 1). As such, neither utilities nor municipal representatives have regulatory requirements to support their conservation initiatives when conflicts (or other challenges) arise. In Toronto, for example, the utility was unable to implement lawn watering restrictions because of a perception in local government that people should only be limited by their willingness (or ability) to pay.³ The water provider in Peel faced a similar situation because the regional government did not like the optics of restricting local water use while they were selling water to the region of York.⁴ In Kingston, on the other hand, members of local council felt that they lacked sufficient influence over the utility to advance a conservation agenda, while utility staff felt unable to harmonize water rates due to council resistance.⁵

Some regulatory backstop or mandate is required. Even in Alberta, where the provincial government has made conservation a key focus by setting it as one of the three pillars of its "Water for Life" framework (see Government of Alberta 2003), local watershed managers and utility operators highlight the fact that no provincial regulatory "backstop"

is in place. As such, while plans may be developed there is nothing to ensure implementation in a complicated network of competing uses.⁶ As the research data demonstrate, the sometimes-conflicting interests of council and utilities can mean that various efficiency (and equity) strategies go unimplemented although there may be sound environmental, social and economic reasons to do so. Moreover, a lack of regulatory support means that conservation and efficiency programs may suffer where they impinge upon existing utility mandates, other utility goals, or the goals of municipal governments. This is particularly visible in terms of the conflicting incentives that utilities face, which are discussed in the next section.

Table 1: Expectations and Responsibilities of Owners and Operators of Municipal Water Systems

Document	Responsibilities/Expectations of Municipal Officials Responsible for Water Supply
Safe Drinking Water Act, Section 11	<ul style="list-style-type: none"> • All water provided by the drinking-water system meets prescribed drinking-water quality standards; • The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair; • All facilities are appropriately staffed and supervised; • All sampling, testing and monitoring requirements are complied with; and • All reporting requirements are complied with.
Drinking-Water System Regulation	<ul style="list-style-type: none"> • Sample and test; • Use an accredited laboratory; • Report adverse test results; • Obtain an approval and a permit to take water; • Have a professional engineer certify that non-residential supplies are in compliance; • Have certified operators or trained persons according to the category of the system; • Prepare an annual report; and • Prepare an annual summary report.
Reports of the Walkerton Inquiry, Parts I and II	<ul style="list-style-type: none"> • Being acquainted with drinking-water legislation and regulations; • Learning about drinking-water safety and the operation of water works facilities; • Familiarization with their municipal drinking-water systems and their approvals; • Setting the overall policy direction for the municipal drinking-water system; • Clearly defining and understanding the roles and responsibilities of councilors, senior management and other municipal officials who exercise decision-making authority over the system; • Hiring competent senior management and conducting regular performance appraisals; • Asking for and receiving periodic and annual reports from senior management on the operation of the municipal drinking-water system; • Periodically auditing or evaluating the performance of the external operating authority if one has been contracted by the municipality to run the drinking-water system; • Reading and asking questions about any reports which identify declining water quality;

Document	Responsibilities/Expectations of Municipal Officials Responsible for Water Supply
	<ul style="list-style-type: none"> • Being satisfied that appropriate steps are taken to address any issues; and • Seeking outside expertise when needed.

Source: Compiled from (Ministry of the Environment 2007).

b) Conflicting incentives

Water utilities have conflicting incentives in relation to water efficiency. Recently, these have been compounded by changes in governance that favour a turn to business based management principles (e.g. the new public management NPM). The conflicting incentives can be placed into two general categories. First, shifts in governance have included increased demand for utilities to be self-financing, which is dependent on water sales. This is an important step, but without additional measures to assist utilities to achieve these goals (e.g. ring-fencing water rates and guidance on price setting) as well as requirements for efficiency and conservation, such programs are likely to be frustrated (and the environmental element of “full costs” to be disregarded). Second, the increased importance of NPM has also advanced economic based criteria for the evaluation and development of programs. These issues serve to limit the stability and breadth of the programs developed.

The energy experience with efficiency can also be used to highlight the potential consequences of these conflicting incentives. Utility dependence on sales (of water or energy) for revenue generation, for example, has been an issue. In the energy sector, successful demand side management (DSM) has been negatively associated with revenue (Hirst et al. 1996; Loughran and Kulick 2004) ‘involving costly direct incentives to reduce precious sales or as a surrogate for social programmes’ (Gellings 1996). Water utilities are likewise often required to recover costs through user fees, which can yield

resistance within the respective financial departments to DSM that is 'too' successful (de Loë et al. 2001). This issue was raised among utility conservation staff in both Toronto and Durham.⁷

These issues are compounded by recent exigencies that governments operate according to NPM principles. For example, in cities like Toronto, Durham and Peel, efficiency programming is justified in terms of a cost-benefit case whereby the cost of saving water through efficiency programs must be no more than 1/3 of the cost expanding infrastructure to produce the equivalent amount of water (Veritec Consulting 2004, 2002; Zamojc 2005). By way of another example, in Kingston, one member of utility management stated that given the need to recover costs, they were interested in addressing leakage, which represented lost revenue, than trying to reduce consumption.⁸

Importantly, these conflicting incentives reflect a perceived rather than an actual contradiction in the application of water conservation and efficiency programs. Conservation is seen a potential threat to utility revenue because of short-term planning horizons, the influence of which could be alleviated by a mandate for conservation within the legislation on utility governance and hence pricing structures that account for the effect of conservation (as in Toronto). Reducing water or energy demand is known to both delay and reduce infrastructural investments. In the energy sector, such savings on infrastructure have been found to far outweigh the costs of DSM (Gellings 1996). The shorter time-horizons (and short-term thinking) associated with current budgets, on the other hand, have a variety of long-term consequences (Juuti and Katko 2005).

The influence of NPM can also serve to affect type of conservation programs deployed in other ways. According to the survey results, although public education and participation programs are considered both very important and relatively easy to implement (as compared to other conservation programs), they were among the least adopted (Figure 2). Utility staff explained that given the need to justify programs on a cost-benefit basis, it was difficult to advance programs whose effects could not be estimated in terms of water (and therefore costs) saved.

Conflicting incentives, such as those discussed here, are compounded by the lack of conservation mandate (at any level including that of the utility). But such a mandate alone would be insufficient to create an environment that enables utility conservation programs to realize their maximum potential. To do this other, external, incentives and constraints must be applied. Indeed, the energy experience demonstrates that the adoption of DSM techniques required government legislative and economic intervention (Loughran and Kulick 2004). Yet, in the Canadian water sector, senior governments have not embraced their needed roles. This is the subject of the next section.

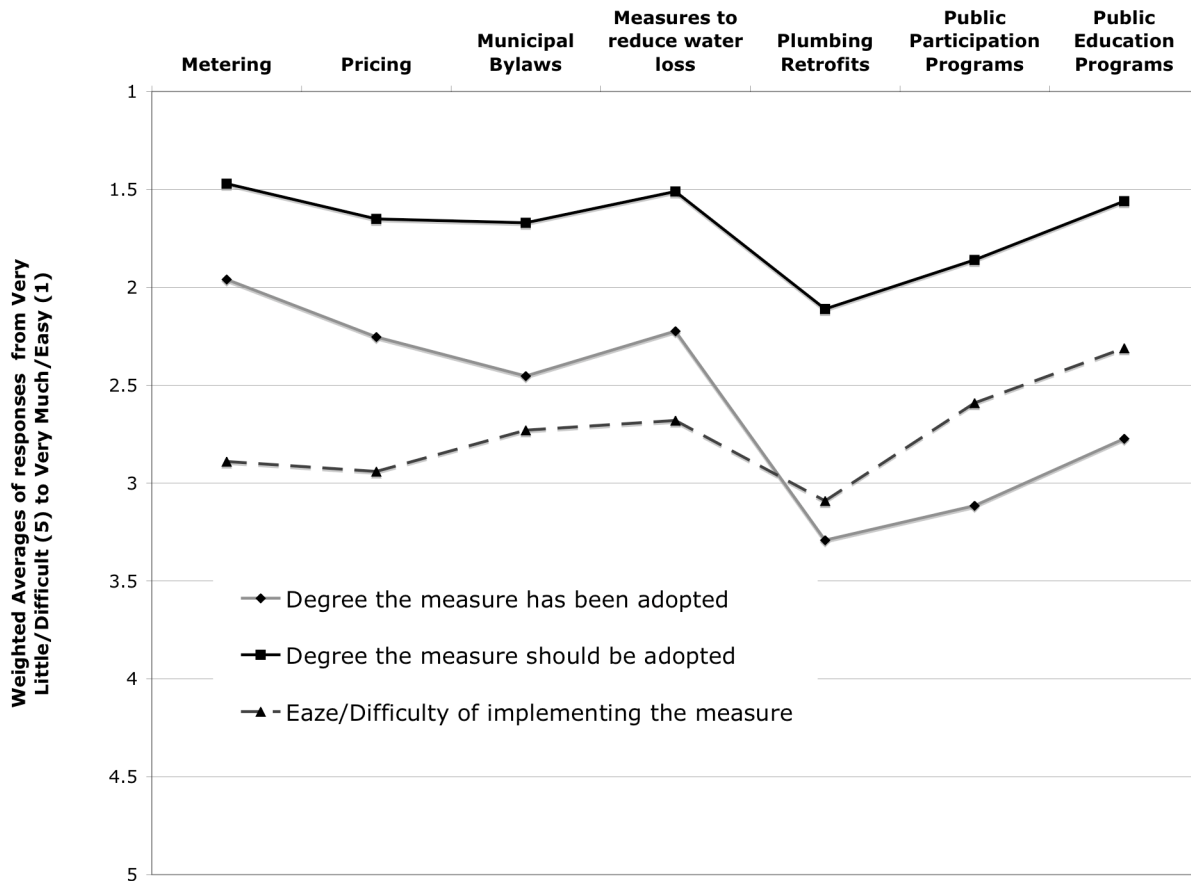


Figure 1: Responses of water utility managers on the level of actual and foreseen implementation of various efficiency measures as well as the relative ease/difficulty of implementing them, N=98

c) Lack of assistance

Our findings indicate that many programs for water conservation cannot achieve their potential in absence of actions from higher scales of government. While it is true that despite a similar lack of support, municipalities have taken leadership on a number of key issues related to sustainability, such as climate change (FCM 2006), sustainable transportation (Hatzopoulou and Miller 2008); food policy (Friedmann 2007; Mendes 2008); the conversion of brown-field sites (De Sousa 2003); and sustainable lawn care (Sandberg and Foster 2005). In some cases, as has been shown with water

management, even where responsibility for management has been delegated to municipalities, decision-making power may continue to reside with higher levels of government (Norman and Bakker 2009). In terms of water conservation, many municipalities have pushed forward despite a lack of assistance. But, as shown, below the potential impact of their efforts is significantly diminished by the lack of support available.

Issues surrounding efficient fixture programs provide a telling example.⁹ In Canada, the federal scale is responsible for setting technological standards and performance testing. Plumbing codes, on the other hand, which specify what devices may be implemented in new construction and renovations, are the purview of the provinces. Despite the fact that municipalities have demonstrated significant interest in regulation for the quality and sale of efficient fixtures,¹⁰ there remains no national ban on inefficient fixtures, no standards for or regulation of devices claiming to be efficient, and no significant requirements for efficiency levels in most provincial plumbing codes. As we demonstrate below, this generates insecurity in terms of the potential benefits of investing in such measures, which may explain why plumbing retrofits ranked most poorly in the survey among utility providers in terms of actual and prospective levels of implementation as well as the perceived difficulties associated with implementation (Figure 2).

This lack of support on the part of senior governments has obvious consequences for the environment such as unnecessary pressure on water resources and wastewater-receiving bodies. It also places unnecessary cost burdens on utilities that are under pressure to reduce water demand (e.g. due to physical water shortage or infrastructural

capacity). Utilities that do pursue efficient fixture replacement programs will face both excessive expense for the programs and uncertainty of their success. This compounds their challenges with respect to justifying programs on a cost benefit basis as emphasized under NPM (see above).

The inaction on the part of the federal scale to create and monitor product standards in addition to the reticence of the federal and provincial scales to ban high-flow devices (as in the US and Europe), engenders low demand for the devices among consumers and low interest in producing a functioning low-flush toilet among suppliers. When municipalities in Ontario began implementing efficient fixture replacement programs in the late 1990s, for example, they found that many of the toilets they purchased and installed did not perform to specification. Instead of reducing the water consumed, in many cases water consumption increased because of the need for multiple flushes or because the flushes were at higher flows than specified.¹¹

Here, efforts that should be centralized are instead duplicated across municipalities and the success of programs is severely limited regardless of the investments made.

Municipalities concerned with addressing water demand consistently highlighted the continued sale of high flow devices as an important impediment to their conservation programs.¹² This was a concern because of the ability for consumers to replace efficient devices with high-flow ones (reducing the impact of programs), and the costs passed on to utilities through the lack of regulation. As one workshop participant asked, "Why must a municipality spend around \$40 million to provide financial incentives to direct a

consumer purchase toward a water-efficient device when other jurisdictions have banned the sale of inefficient toilets outright?”.¹³

Although Ontario and British Columbia have implemented efficiency requirements in their provincial plumbing codes (of varying degrees), there are still compelling reasons for national standards. Most obviously, most provinces and territories continue to lack any regulations. There are also more subtle issues. Not only are consumers still able to purchase high flow devices out of province, the lack of standards and regulations can also make it difficult for retailers to stock the efficient devices. In Alberta, for example, one respondent explained that retail-purchasing practices often do not comply with the Alberta Plumbing Code because the buying offices of many retailers operating in Alberta are located in Ontario.¹⁴

d) Lack of consideration

Across Canada’s provinces, significant restructuring of governance has taken place over the past 15 years that has had profound impacts on water conservation. Federal, provincial and municipal policy can have important effects on conservation, though it is generally understood as local issue. What is less obvious, but equally important, is that policy change need not be overtly water related to affect conservation. Recent changes in approaches to municipal governance, for example, have had profound consequences for conservation that were neither expected nor considered. What the data below demonstrate is that when realigning the distribution of power, authority and financing among levels of government (as was the case with recent tendencies toward

devolution), the impacts on local water efficiency and conservation can be important and merit reflection.

Devolution and the increased importance of NPM in the public sector have had important negative effects on full cost recovery, which in turn stresses budgets and spending on conservation. Municipal downloading in Ontario meant that municipalities were charged to meet more responsibilities with often-decreased budgets (Keil 2002; Montgomery 2002; Clark 2002; Hackworth and Moriah 2006). In Toronto, several respondents noted the temptation to construe municipal projects as water related in order to borrow from the water rate to bolster municipal coffers.¹⁵ Not only does this reduce utility budgets and thus opportunities for more aggressive conservation programming, it increases conflicts over resources between municipalities and utilities. This in turn stimulates pressure from utilities and provincial government to restructure as an arm's length business models in order to ensure the ring-fencing of revenues.¹⁶ In other research related to this project, we have shown how arm's length business models for water supply can have adverse impacts on conservation (Furlong and Bakker forthcoming 2010).

Municipal amalgamation is another important and overlooked restructuring process that has influenced water efficiency programming. Municipal amalgamation was an important municipal restructuring activity in both Ontario and Quebec in the late 1990s and early part of 2000 (Kushner and Siegel 2003; Sancton 2005; Bish 2001). In Ontario, for example, the number of municipalities was reduced by 45%, from 815 to 448 between 1996 and 2002 (SuperBuild 2002). Amalgamation has proven to be a double-edged

sword for the advancement of conservation programs. On the one hand, amalgamation setback some programs, resulted in the loss of working relationships between the province and utilities on supportive legislation, and has been of limited effectiveness in rate harmonization across formerly separate municipalities. On the other hand, in some cases, amalgamation has led to greater information sharing and larger, better-funded programs over the long-term. These issues are clarified below.

In terms of hindering existing programs, the 1998 amalgamation of Metro Toronto into the City of Toronto was argued to have yielded a general regression in municipal programs of at least 20, if not 30, years.¹⁷ Water efficiency programming was no exception. For political reasons, existing water conservation programs had to be halted and begun as new in order to promote the new city as amalgamation, as opposed to annexation.¹⁸ Other challenges to programming arose due to coordination issues because of the size and number of 'players' in the new city, which complicated buy-in. Still, several years on, the city has programs that it never had under Metro and a much larger budget.¹⁹ In the case of Sherbrooke, QB, meters were removed from the municipality following amalgamation, as the other members of the new municipality did not have them.²⁰

Moreover, in several cases, amalgamation proved unable to address some of the barriers to more sustainable water supply associated with regional governance (see Table 3). This was especially visible in terms of rate harmonization, which is of particular importance for achieving equity in the cost of refurbishing infrastructure.²¹ Metro Toronto's original 1992 water efficiency plan included working with area municipalities to

establish common rate structures (Commissioner of Works 1992). The new City of Toronto would inherit this project upon amalgamation in 1998. As of 2006 (after 8 years), rate harmonization had finally been accomplished across the former municipalities (with the exception of as yet unmetered units) but not yet across user groups (Development Policy and Research Division 2006). Kingston was also unable to achieve rate harmonization across the former municipalities following amalgamation in 1998, inhibiting cross-subsidization for infrastructure renewal projects in different parts of the new city.²² In 2007, an agreement was finally achieved to harmonize rates across the former municipalities by January 1, 2010 (Utilities Kingston 2008).

Although the negative impacts of amalgamation on conservation/efficiency are often attenuated over many years, the lost time used to recuperate as opposed to improve or extend programs is significant. Consideration of the potential impacts on conservation and efficiency, prior to carrying out amalgamations, could have led to the mitigation or even avoidance of many issues. Such attention could prove especially important for small supplies that often lack the resources – human and financial – to go it alone and thus might benefit from the amalgamation of the water utilities to create economies of scope (Furlong and Bakker 2008; Swain 2005).

Just as amalgamation has been found to have important effects on water efficiency and conservation programming, so too have (a) municipal downloading and funding cuts from provinces, (b) the incorporation of new public management principles into the public sector (section 3b), (c) the adoption of new business models to operate water utilities (Furlong and Bakker forthcoming 2010) and (d) new approaches to oversight

including voluntary regulation. As such, governments at all scales need to consider the impacts of new policy on water efficiency and conservation if the negative impacts are to be mitigated and the positive ones to be fostered. This implies greater engagement and shared governance.

2. Working together: Utilities, governments and non-governmental actors

As demonstrated above, our research with municipalities and utilities that have strived to implement far-reaching water conservation programs highlights the importance of governance arrangements in the existing approach to water efficiency that is prevalent in Canada (Furlong and Bakker 2008). Four key barriers to conservation stemming from the devolution of conservation to utilities were discussed: lack of mandate, conflicting incentives, lack of assistance and lack of engagement from senior governments.

Particular improvements in two aspects of governance can go a long way to redressing these barriers: accountability for water efficiency and shared (as opposed to devolved) governance. These are discussed in turn below.

a) Getting accountable – rethinking devolution

It is a common adage in environmental politics that governments lack 'the political will' to address critical issues (e.g. Stratos 2002). This same assessment of the limited approach to water conservation in Canada was repeated throughout the research interviews. Concern with political will, however, actually reflects a problem of insufficient accountability. The implementation of goals for improved water governance should depend on established criteria supported by clear lines of accountability for achieving them, rather than the vagaries of political will.

Accountability means that different levels of government are held responsible for the aspects of sustainable water management that fall within their domains (it is thus closely linked to shared governance). In practice, however, accountability has proven difficult to achieve. For accountability to exist, mechanisms must be in place to verify if actors are doing what they are supposed to and to compel them to do so if they are not. Arm's-length regulatory boards with clear mandates to oversee utility performance or government action on water management can help to ensure that politically or technically difficult goals are achieved. Progressive regulation from senior governments is another complementary avenue for multi-level accountability.

Table 2 summarizes a number of lacking accountability mechanisms for water conservation in Canada. Key topics where governments need to establish clear goals, requirements and regulatory mechanisms include: full cost recovery, the performance and sale of efficient fixtures, and allocation and reuse. Accountability on these issues requires checks and balances. Still, persons and organizations cannot meet requirements (even where there are regulations in place) if measures are not taken to ensure their capacity to do so. This involves improving municipal and utility access to both knowledge and resources. The range of actions needed on each issue is listed in Table 2.

The ability of utilities to achieve full cost recovery provides a good example of the need for multiple types of support to achieve accountability. Full cost recovery is important for sustainability in water supply, because it enables utilities to fund needed programs and

to take a long term view of both infrastructure and resource management. It requires both formal accountability mechanisms (e.g. regulations and guidelines) and measures to ensure the capacity of utilities to meet these exigencies. Currently, the achievement of full cost recovery is hindered by a lack of oversight to ensure its attainment, and insufficient expertise to achieve what can be both technically and politically difficult. The Nova Scotia Utilities and Revue Board (NSUARB), a provincial level regulator in Nova Scotia, is a unique example in Canada of how to provide both the support and the regulatory exigency for accountability, while ensuring fairness among municipalities and consumers. The NSUARB requires all utilities in Nova Scotia to submit applications for rate changes or infrastructure projects as well as to be periodically report when called upon to do so (Government of Nova Scotia 1989). The members of the board assess the plans to ensure both full cost recovery and fairness to consumers.²³ The NSUARB works in an iterative process with utilities to improve their pricing plans and holds open meetings with communities to ensure that their concerns are addressed (NSUARB 2007).

Accountability – as in the NSUARB case - cannot simply exist through regulation. It must be supported by measures to ensure knowledge and capacity within the water sector such that all involved (governments, service providers, consumers) are able to meet the exigencies of accountability in governance (Table 2). In the water sector, metering is essential to ensure that water managers and consumers have the necessary knowledge to be accountable for their water demand. Utility managers across Canada consistently articulated the need for metering to understand their own systems: to measure the amount of water being used, when, where, by whom and for which purpose.²⁴ Indeed, it

is metering which enables Halifax Water to boast a world-class water loss control program that includes direct interaction with users regarding private leakage (Yates 2005). Beyond knowledge, capacity includes access to the necessary human and financial resources. This is particularly important for small municipalities that may lack both the needed human and financial resources. Improving capacity to meet accountability implies funding mechanisms, renewed work on research and innovation and coordination among municipalities and provinces.

Table 2: Problems of lacking accountability for water conservation and efficiency in Canadian municipalities

Issue	Missing Accountability Mechanisms	Case Municipalities Affected
Full cost recovery	<ul style="list-style-type: none"> • Regulations and/or provincial oversight ensuring full cost recovery, • Inclusion of environmental and social factors into full costs, • Regulations to ring-fence water revenues, and • Assistance from higher levels of government to improve the capacity of (especially small) municipalities in determining full costs. 	All, except Halifax and CBRM
Efficient devices	<ul style="list-style-type: none"> • National ban on inefficient devices, • National standards and testing for efficient devices, and • Harmonized provincial plumbing codes addressing efficient devices. 	All
Allocation and reuse	<ul style="list-style-type: none"> • Regulations linking water taking to efficiency • Regulations or other incentives linking water allocation priorities to demonstrated efficiency and conservation • Regulations that enable water reuse under health guidelines where it is feasible and desired by municipalities or other groups (e.g. in agricultural areas) 	Some measures taken in Ontario and Alberta
Knowledge	<ul style="list-style-type: none"> • Regulations on data collecting • Municipal benchmarking • Metering • Research and knowledge dissemination 	All provinces suffer from limited data, municipal benchmarking is ongoing in Ontario and voluntarily across Canada's large municipalities
Financial and human resources	<ul style="list-style-type: none"> • Strategic grants • Provincial support • Coordination • Accountability for full cost recovery • Recognition of the different needs of small and large municipalities 	Small municipalities are particularly affected. However, many utilities face difficulties with ring fencing revenues.

b) Getting engaged – moving to accountable delegation

The problems of accountability discussed above run parallel with issues pertaining to shared governance and delegation. Successful conservation/efficiency programming requires both the engagement of multiple levels of government in addition to some forms of devolution to municipalities and delegation to non-state actors. This is not a contradiction. Rather than widespread devolution, which has hindered municipal capacity to pursue conservation, *accountable delegation* is needed. This means combining the inclusion of new actors and new responsibilities with the development of capacity and regulatory exigencies at multiple levels of governance. More specifically, it is necessary for different levels of government to occupy particular roles if conservation is to be fostered. Simultaneously, senior governments need to empower municipalities and utilities such that the roles they take on themselves will be more effective and the roles they delegate to others are monitored to assure quality.

Just as senior governments should improve ways of relating to municipalities and utilities, municipalities and utilities must also learn to assess when best to engage community groups and other non-state actors in conservation programming. The case study experiences demonstrate that where conservation is most developed, municipalities have a greater sense of empowerment from the province and a variety of non-state actors are engaged in programming. Table 3 summarizes the data showing how shared governance and delegation can improve the effectiveness of efficiency and conservation programming. Four categories for improvement are highlighted: municipal

empowerment, municipal engagement, participation and delegation. In terms of municipal empowerment, the ability of regional water providers to coordinate conservation in local municipalities, as well as new powers for municipalities to create bylaws and raise funds is important in improving conservation. For municipal engagement, municipalities can support utility efforts by removing bureaucratic barriers, promoting partnerships and engaging in data collection and knowledge sharing. Evidence shows that benefits are significant where non-state actors participate directly in program design and promotion. Finally, with respect to delegation, utilities should carefully consider which groups can best operate programs and ensure their longevity into the future. In many cases this will be the utility itself, but in some cases it is not.

Table 3: Key opportunities for shared governance and delegation

Category	Opportunity	Case Study Example
Municipal Empowerment	Regional coordination	Regional bulk water providers highlighted limits to conservation due to their inability to harmonize efficiency and conservation programs across their local municipalities.
	New and creative capacity for bylaws	The BRBC identifies municipal policies and bylaws as the areas of greatest legislative change in Alberta since 2000 (BRBC 2005), including water efficiency and landscaping bylaws (Furlong and Bakker 2008). Waterloo's ban on once through cooling in 1990, led some companies to reduce consumption by 60% (Boyd 2003).
	New and creative capacity for funding	Many municipal officials discussed the constraints on their capacity to raise funds as limiting their ability to engage in new programs.
Municipal Engagement	Address bureaucratic issues	In Kelowna, the Water Smart program worked with City Hall to minimize the bureaucratic burden on developers in order to gain support for their new landscaping bylaw.
	Stimulate conservation within local utilities	The Imagine Calgary program provided goals, motivation and pressure for Calgary Water to go yet further on conservation. Similarly, Vancouver's council endorses residential metering, which has prompted the utility to investigate viable options.
	Promote partnerships	In Calgary, municipal departments and the council work together through an advisory group on sustainability, leading to new efficiency programs. Municipal associations are important for coordinating municipal efforts. Réseau Environnement is an example from Quebec.
	Data collection, and information sharing	In Alberta, municipalities have learned from each other's experiences in developing bylaws. They are also instrumental in fostering negotiations with other user groups.
Participation	Program design	In Calgary and Kelowna, interacting with local businesses and developers yielded important compromises guaranteeing more successful programs.
	Program promotion	Local businesses and retailers have proven a more convenient site for information on programs than utilities, which are generally not as well trafficked.
Delegation	Program implementation	Many utilities work with retailers on their rebate programs. In Edmonton, EPCOR ran its toilet rebate program through Home Depot, making it easier for people to participate in the program. In Cape Breton Regional Municipality (CBRM), the utility found that programming was more credible if implemented by a locally known and trusted NGO.
	Program evolution and updating	In Kelowna, where conservation programming is well developed, they find that once a program is established, it is best to pass it on to a local NGO or business to manage and improve over time.

3. Conclusions:

Although we are not the first to highlight the need for action by governments to improve conservation (e.g. Dangerfield 1993; Brandes 2005; Renzetti and Dupont 1999), our findings are novel in that they: document specific reasons why existing practices create barriers to conservation; highlight the importance of specific types of delegation to non-state actors and municipalities; emphasize the accountability dimension of delegation; and establish the importance of changes in municipal governance to advancing conservation even when they are apparently unrelated to conservation. Taken together, these issues pose, we argue, significant constraints to the substantive application of municipal water conservation programs in Canada.

In many instances, these barriers stem from actions (and inactions) falling within the jurisdictions of each of the four levels of government (federal, first nations, provincial and municipal); utilities often lack the mandate or capacity to address these issues themselves. Thus, our analysis suggests that governance arrangements – both within municipalities and at higher scales of government – are crucial to the success of conservation programming at the local scale. This link between governance and conservation means that (1) in contravention to the common understanding, conservation is not a primarily technical matter that can succeed on 'best practices' alone; (2) specific changes in governance at higher scales of government are necessary to improve municipal water conservation and efficiency; and (3) the achievement of sustainability goals would be enhanced by considering sustainability impacts explicitly in governance restructuring processes.

The research also suggests that conservation programming in Canada will continue to have limited success so long as it is considered a matter of purely municipal or (worse) water utility programming. Rather, we have argued that conservation must be understood and managed in its governance context, which is inherently multi-scalar. Shared governance on conservation in municipal supply – currently absent – is crucial. Municipal water conservation programming that is successful in terms of the level of water saved, at the most efficient level of investment, requires the involvement of senior governments.

Specifically, our research has demonstrated that changes in governance at higher scales will affect conservation programming at the local level. In other words, not only are actions by senior governments needed to support conservation, actions taken by senior governments may have implications for conservation that have not been considered beforehand. This is an especially important issue in the Canadian context, where governance at the provincial scale has been shifting rapidly over the last 20 years. Most of these changes in governance have not been taken with conservation in mind, but may nonetheless create barriers to progress. Heretofore, governance has generally been modified in the service of better business practice, cost reduction, and new divisions of responsibility. Our research indicates that this focus is too narrow, and that sustainability needs to be considered at the outset of policies that touch on municipal governance, in terms of environmental, economic or social issues.

The importance of these findings is obvious for progress on municipal water conservation in the Canadian context. Our argument also raises issues of equity in municipal supply and has broader implications for other types of sustainability programming at the municipal scale. First, without accountability, real engagement from senior governments, and delegation, conservation programming risks producing inequity among consumers or unfairly burdening consumers over utilities (or the opposite). This is because utility managers in Canada generally consider the price of water to be too low to negatively affect consumers (with implicit assumptions of low price elasticity and/or a high ability-to-pay). However, given rising concerns over the financial sustainability of utilities, prices are increasing and costs for innovations in conservation (e.g. metering and price restructuring) are often passed directly to consumers. Without engagement from government, these issues are less likely to be given due consideration (Furlong and Bakker 2008). Second, by demonstrating that the application of “best practices” at the local scale is limited in its ability to foster a transition to conservation, we have drawn attention to the need to take a broader approach to sustainability that accounts for the roles of all levels of government, even where benefits are sought through delegation.

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¹ This paper is based on research conducted by the Program on Water Governance, UBC, from 2005-08. Two large-N surveys and 18 municipal case studies were conducted. In addition, 2 expert workshops were held to refine the research results. The project description, data and reports are available at www.watergovernance.ca/municipal .

² The exception on is with respect to the Great Lakes Water Agreement.

³ Interview #38 with a municipal staff person in Toronto.

⁴ Interview #28 with a regional staff person in Peel.

⁵ Interview #21 with a municipal councilor and #18 with a staff person from Utilities Kingston.

⁶ Interview #4B with a local water efficiency coordinator and consultant.

⁷ Interview #41 with Toronto Water staff and #15 with Durham staff.

⁸ Interview #17 with a Utilities Kingston staff member.

⁹ Others exist and are discussed in Section 3a below.

¹⁰ For example, some municipalities in Alberta have set their own plumbing codes, although it is not within their jurisdiction. In Ontario, a group of municipalities got together to test and rank toilet performance themselves. See Furlong & Bakker (2008: 16) for an overview of provincial and municipal actions.

¹¹ Interview #28 and #38 with Peel Region and Toronto water staff persons and Interview #14 with a water efficiency consultant.

¹² Interview # 4,6, 9, 14 with a variety of local efficiency staff persons and consultants.

¹³ Sustainable Water Infrastructure Management in Canada Workshop, held by the Program on Water Governance, UBC May 5, 2008.

<http://www.watergovernance.ca/Workshop4/>

¹⁴ Interview #6 with a Calgary Water staff person.

¹⁵ Interviews #36 with a Toronto city councilor and #42 with a Toronto staff person.

¹⁶ Interviews #1, #23, #29, #34 with various water management officials.

¹⁷ Interview #42 with City of Toronto staff person.

¹⁸ Interview #38 with Toronto Water staff person.

¹⁹ See footnote #18.

²⁰ Interview #27B with a representative of the Sherbrooke water department.

²¹ Rate harmonization across the Regional Municipality of Cape Breton is what has enabled the water department to bring infrastructure up to provincial standard in all of the island's communities, as it means that expensive improvements are cross-subsidized by all of the region's inhabitants (Interviews #14 and 15 with CBRM staff).

²² Interview #18 with a staff member of Utilities Kingston.

²³ Interviews #13, 15 with utility staff from Nova Scotia.

²⁴ Interviews #9B, 13B, 23, 34 with utility staff from various municipalities.