In the game but on the sidelines:
Municipalities in polycentric water governance processes

by

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Abstract:

Municipalities and, by extension, city regions have increasingly been singled out as important entities in polycentric policy processes (e.g. Thomas, 2003). While perhaps important for economic growth and innovation, such importance and influence is questioned in relation to other issues such as water policy. Yet water policy is multifaceted. At its core are a bundle of property rights which include rights of access, withdrawal, management, exclusion and transfer (Schlager & Ostrom, 1992; Sproule-Jones, 2002). While the role and influence of municipalities in access and withdrawal issues (water permitting) may be minimal (Levesque, 2008), does such a position hold for water management issues? This is important given the fact water management efforts often entail placing restrictions on land activities—a standard municipal responsibility. One would assume significant municipal influence in such efforts yet this is far from clear given the multi-level multi-lateral processes typically involved. This paper draws on the common pool resource literature to examine the role and influence of municipalities in source water protection planning activities. It is a comparative case study of Ontario, New York and Nebraska for the time period 1980-2006. The analysis is then related to a core debate on property rights in the resources literature, that is, how changes in the nature of a good affect its governance as applied to municipalities. The results are part of my larger project probing the effect of nested institutional arrangements on policy changes.

1.0 Introduction

The protection of drinking water sources has become increasingly important over the past 20 years. Dry rivers that result from the overpumping of groundwater from nearby wells and droughts, as was the case with the Republican River in Nebraska from 2003-2007, have done much to raise awareness of the need to protect the quantity of our water resources. Little is gained, however, with an ample supply of water if it is rendered unfit for human consumption due to contamination. The contamination of the Town of Walkerton's water supply due to *E coli* (0157:H7) in manure runoff from a nearby farm in 2000 illustrates this point. Seven people died and over 2,300 others became ill from having consumed the contaminated water (O'Connor, 2002). A similar situation occurred a year earlier at the Washington County Fairgrounds in New York. In this case, two people died and 781 people became ill after having consumed water contaminated with *E coli* (0157:H7) from either manure runoff or a septic system (NYDOH, 2000).

Source water protection (SWP), the broad term used to define the protection of both surface and groundwater[1], is multifaceted. It includes assessing the availability of water resources, its vulnerability to contamination, as well as, identifying potential contamination sources (Ontario, Integrated Environmental Planning Division, 2004: 6). Such assessments for surface water sources are typically done on a watershed basis, that is, the drainage area for a river or lake and their tributaries (O'Connor, 2002). In relation to groundwater, activities are centred on private or municipal wells (or well field), groundwater recharge areas or on whole aquifers—saturated permeable geologic units that can transmit significant quantities of water (Freeze and Cherry, 1979: 47). Management strategies are then developed to mitigate against such contamination and often include placing restrictions on local land use activities which are embedded in a municipality's official plan. Various other measures are also used such as setback distances, buffer zones and land acquisitions (National Research Council, 2000).

The role of municipalities in water resources management is intriguing. At its core are property rights. These include rights of access, withdrawal, management, exclusion and transfer (Schlager and Ostrom, 1992; Sproule-Jones 2002). Municipal involvement in policy changes related to each of these rights is unclear. On the one hand, the role and influence of municipalities in access and withdrawal issues (water permitting) may be minimal (Heinmiller, 2006; Levesque, 2008). On the other hand, one would assume municipalities would be significant players in the policy process for water management issues given the fact water management efforts often entail placing restrictions on land activities—a standard municipal responsibility. This is usually achieved through the development of official plans which classifies property within municipal boundaries into different categories to accommodate various residential, commercial, institutional and agricultural uses. Municipalities are also responsible for the supply of water and wastewater services to its residents. But such planning does not occur in a vacuum. Provinces and states usually maintain some sort of municipal oversight. In Ontario, municipal land use policies must be consistent with provincial policy statements and local land use decisions can be appealed to the Ontario Municipal Board, a politically appointed provincial body which usually has final say in matters.[2] Similarly, in most US states, local laws need to be consistent with state constitutions and general laws (e.g. New York, Department of State, 2000: 3-4; Winter, 1958, 1980; Krane et al., 2001). Given the range of affected stakeholders and the multilevel

multi-lateral policy processes typically involved in source water protection activities, the significance of municipalities in such processes is questioned.

This paper traces source water protection policy changes in Ontario, New York and Nebraska and assesses the role of municipalities in such changes. These jurisdictions offer a good test for municipal involvement given their acute awareness of municipal groundwater quality issues (Ontario, Nebraska), their extensive municipal powers (New York), highly decentralized nature (Nebraska) and groundwater dependency. The first section examines the multifaceted nature of property rights while the second illuminates rights associated with water resources. Municipal powers to encroach on such rights are examined in the third section while the fourth provides insights for the methodologies. The results for each jurisdiction are then profiled. Source water protection involves placing limits on land uses. This means encroaching on the associated property rights for which municipalities have significant powers and interests. Yet municipalities remain minor players in legislative and regulatory change processes that affect such powers and interests as is the case with source water protection. In other words, municipalities are in the game but on the sidelines.

2.0 Property Rights

At the heart of source water protection activities are property rights, a basic knowledge of which is required to understand the complexity involved in source water protection activities especially in terms of how municipalities are affected. Property rights are legally sanctioned rules permitting specific courses of action in particular situations (Commons, 1968; Libecap, 1986). The possession of a right by one person means that others have an obligation to observe that right (Ostrom, 2003). Property rights apply to land and water resources as equally as they do to one's home and are multifaceted. Components include rights of access, withdrawal, management, exclusion and alienation (Schlager and Ostrom, 1992; Sproule-Jones, 2002). The right to withdrawal, for instance, refers to who has the right to appropriate groundwater. However, this right may be limited if one does not have the right to enter private property (access) and drill a water well. Similarly, exclusion (e.g. who decides who has access rights) and alienation (right to sell/lease exclusion and management rights) rights affect both access and withdrawal rights. Complexity increases when, for example, the right to manage the groundwater resource is posited in the broader community among multiple interests. For example, in Ontario, the Ministry of the Environment, Conservation Authorities, Conservation Ontario and the Ministry of Natural Resources have all been involved in source protection planning activities since 1999 (see Ontario, Advisory Committee, 2003).

Legal positions vary with the different configurations of the property rights components. In other words, the above five components can be grouped into many different "bundles" of rights with each bundle associated with different legal positions as shown in Table 1. For example, a property owner typically possesses all of the components yet someone authorized to use groundwater may only have access and withdrawal rights. Furthermore, legal positions are affected by different levels of stakeholder adaptability which necessarily affects groundwater's management (Sproule-Jones, 2002). Note that an individual, a corporate or non-corporate entity may all be authorized groundwater users (legal position) yet their organizational structure affects how quickly (and thoroughly) they can implement management practices.

Table 1: Legal Positions, Property Rights Components, Governance Levels*

Component	Legal Position			
	Owner	Proprietor	Claimant	Authorized User
Collective Choice Rules				
Management	✓	✓	✓	
Exclusion	✓	✓	✓	
Alienation	✓			
Operational Choice Rules				
Access	✓	✓	✓	✓
Withdrawal	✓	✓	✓	✓

*Adapted from Schlager and Ostrom, 1992.

Property rights components, associated bundles and legal positions are spread over different governance levels as shown in Table 1. These multiple governance levels of rules are termed "rule stacks" by Sproule-Jones (2002) and represent different scales of analyses. Operational choice rules largely affect day-to-day decisions of where, when and how to protect groundwater, such as placing limits on manure spreading. Collective choice rules are rules about rules, that is, "they are rules about how operational rules are reviewed and changed" (Sproule-Jones, 2002). Lastly, and not shown in Table 1, are constitutional choice rules which determine who is eligible and what rules are to be used to make collective choice rules and operational choice rules. These include underlying water rights and a country or state's constitution, each of which is briefly discussed below. Constitutional choice rules are the slowest rules to change followed by collective choice rules and operational choice rules. This third point introduces issues of scale in relation to groundwater governance, that is, the need for layered governance arrangements since property rights are dispersed over at least two or more governance layers and the potential exists to have many different yet overlapping governance units addressing each property right or bundles of property rights at the same level.

Both vertical and horizontal elements of layered governance arrangements are readily seen in relation to source water protection. Vertically, the federal system of government in Canada and the United States is a good example where a federal or national government exists with sub-national units such as states or provinces followed by even smaller units of government such as municipalities. In some situations, intraregional governance units such as Nebraska's Natural Resource Districts with broad powers over the state's water resources are found sandwiched between municipal and state level governments. Interregional governance units can also be found located between state and national governments. The Susquehanna River Basin Commission with vast watershed management powers over the Susquehanna River flowing through the states of New York, Pennsylvania and Maryland is a good example of such an entity (see Susquehanna River Basin Commission, 1972). Horizontally, multiple governance units with some institutional autonomy over the resource

can exist at any one layer of governance. This can be seen in relation to source water protection activities in New York State where one finds the state Geological Survey, the Department of Health's Bureau of Water Supply Protection, the Department of Environmental Conservation's Groundwater Management Unit (Division of Water) and the New York Rural Water Association, among others, all involved in an intricate web of activity at the state level (see New York, Department of Health, 1999). Similar multiple units can be found at other levels of governance.

We now have a better understanding of the multifaceted nature of property rights—their components, associated legal positions and governance levels—that confront stakeholders. Yet any source water protection activity will necessarily produce "winners" or "losers". That is, they will restrict the property right allocation for some people while enhancing the allocation for others. This is seen in limits on time of year applications for manure on agricultural fields. Farmers are limited in what they can do while other property owners benefit due to improved water quality conditions. How property rights are allocated becomes important since they can affect source water protection management options.

3.0 Added complexity: Groundwater rights

The basis for groundwater rights in the eastern U.S., including New York, and a few central states such as Nebraska, Central and Atlantic Canada remains in the English Common Law concept of riparian rights for surface water. Riparian rights are the legal rights landowners possess when their land abuts either a river or other body of surface water. They do not confer ownership rights but are rather rights to the "natural flow and quality of that water, subject to the same rights as [a] neighbour" (Sproule-Jones, 2002: 64). In essence, rights to the resource are vested in the land under which the resource flows and include rights to access, transfer (depending on downstream riparians) and obstruct (though this is far from settled). Rights to divert and pollute the waters is not included. Furthermore, whether or not one could use water for non-domestic purposes depends on whether or not the jurisdiction in question has adopted the "natural flow" or "reasonable use" theory of water. The natural flow theory entitles downstream riparians to receive water "in its natural state, in flow, quantity and quality" (Percy, 1988). This essentially precludes large scale uses of water, especially non-domestic ones. Alternatively, the "reasonable use theory" of surface water allows for non-domestic water uses provided the usage does not unreasonably affect the use of water by other riparians (Percy, 1988: 4).

In much of the western U.S., western and northern Canada, water rights are vested in the resource itself and not attached to the land. Groundwater rights, in this case, follow the prior allocation system, that is, rights are assigned on a first come, first served basis. In times of shortages, the most senior water license holder is allowed to meet their requirements in full even if it means extinguishing the resource for use by less senior water rights holders (Percy, 1988; DuMars and Minier, 2004).

It is from these principles that groundwater rights are derived. English Common Law long ago distinguished between underground streams and percolating waters.[2] Underground streams are subject to the same riparian rights that apply to surface water discussed above. Percolating waters are governed by the rule of capture. Under this regime, groundwater rights are attached to the property in question and the property owner has full access to percolating waters for as much water as they desire even if it harms a neighbour's

groundwater rights. The limitation is that a landowner in the U.S. cannot "maliciously cause injury to another" with similar limitations in Canada, such as being unable to "[drive] a shaft from his property diagonally into a water deposit underlying his neighbour's land" (DuMars and Minier, 2004: 42-3; LaForest, 1973: 415 respectively). No prioritization of groundwater rights exists under the rule of capture.

All three jurisdictions investigated for this paper—Ontario, New York and Nebraska—have developed legal regimes that modify these groundwater rights. Statutory limitations such as water permitting systems have been placed on the rule of capture so that all groundwater is governed under the reasonable use doctrine. Nebraska has gone further and coupled the reasonable use doctrine with a system of correlative rights. Groundwater rights are assigned based on the surface area of the land overlying the aquifer in question. A landowner has the correlative or co-equal right to use "his share in proportion to the overlying land owned by him" in a reasonable and beneficial manner (DuMars and Minier, 2004: 43). Such a system reserves the right to allocate water for the courts in order to meet changing environmental and community conditions. For example, in times of prolonged drought, the courts can reduce each landowner's allocation to reflect the available groundwater supply.

Such modifications have been needed to address difficulties with groundwater rights. For municipalities, the establishment of new sources of drinking water can be problematic. For instance, the doctrine of reasonable use which bans water transfers off properties essentially prohibits the use of groundwater as a municipal water supply (Richardson Jr., 2002). Note that municipalities would be transferring the resource off the property from where it is pumped and selling it to householders across its jurisdiction for consumption. Furthermore, as Richardson Jr. (2002) argues, groundwater rights are inadequately incorporated into current legal systems. Groundwater rights holders must revert to the law of "nuisance", "takings" or "loss of lateral subjacent support" for redress, which do not directly deal with the problem at hand. In other words, suing one *directly* for affecting the groundwater under your property is rare, rather, one has to sue a third party if a neighbour's use of groundwater has interfered with the private use and quiet enjoyment of their land, such as draining the aquifer to the point where land subsidence occurs causing damage to one's home. Note that in this case, one is suing the neighbour under the law of nuisance (loss of quiet enjoyment and use of property) and not directly for the groundwater infraction (see Richardson Jr., 2002). As can be seen, it is these different groundwater rights doctrines that are at the root of groundwater management policy.

4.0 Municipalities, Source Water Protection and Policy Change

Source water protection affects property rights associated with water and land resources. Municipalities are intricately tied to such resources given their responsibilities. Ontario's Municipal Act, for instance, outlines municipal functions as those including public utilities (e.g. drinking water systems), waste management, drainage and flood control, highways and other transportation systems (Ontario Municipal Act, 2003; for a broader overview, see Ivey et al., 2006). Similarly, local governments in New York possess some of the most advanced home rule powers[4] in the United States (Coons, 1998: 10). Article IX of the state's constitution provides a broad grant of power to local governments over their "own property, affairs and government" including the procurement and supply of water services to its

citizens (New York, Department of State, 2000: 3-4; New York, Legislative Commission, 2007). Furthermore, Article II, section 10, the Municipal Home Rule Law, of the Statute of Local Governments, allows local governments to legislate for the protection and enhancement of the physical and visual environment (s.10.1 ii (a) 11), licensing of facilities (s.10.1 ii (a) 12), roads, highways and transit facilities (s.10.1 ii (a) 6 and 7) (e.g. Town of Milan, 2006; see also, New York, Department of State, 2000).

A different situation exists in Nebraska where home rule is "illusory" in large part due to the highly decentralized nature of the state (Krane et al., 2001; Breckenridge, 1984; Mueller, 1984). Municipalities here also have broad powers of water supply and wastewater services. However, much administrative responsibility has been assigned to state agencies such as the Department of Health, the Department of Environmental Control/Quality, as well as, Natural Resource Districts. This latter body is interlocal in nature with its boundaries delineated roughly along hydrogeological lines and typically incorporates several cities or counties for the management of water and other resources (Nebraska Blue Book, 2008). For instance, the Upper Big Blue Natural Resource District contains parts of eight counties and at least eight municipalities with populations greater than 2,500 people (Nebraska Association of Resources Districts, 2009). However, as those interviewed for this research noted, each District is governed by a Board of Directors comprised of agricultural and municipal stakeholders with agricultural interests usually in the majority (see for example, CPNRD, n.d.).

Constraints on these broad municipal powers exist. For example, land use planning by Ontario municipalities must be consistent with Provincial Policy Statements for water and agriculture, among others (Ontario Planning Act, 1990; see also Siegel, 2009 for a broad overview). Municipal policies in New York must also be consistent with the state constitution and state general laws (New York, Department of State, 2000).[5] A similar situation exists in Nebraska (e.g. Miewald and Longo, 1993; Winter, 1958).

Given the type and complexity of property rights involved and municipal functions, one would expect municipalities to be actively involved in policy changes related to water resources and especially source water protection. Such policy changes affect the management component of water resources yet significant municipal involvement is unclear. Research into access and withdrawal components of water resources suggests the minimal involvement of municipal entities. Heinmiller's (2006) investigation of how water abundance or scarcity affects the development of water rights in the Great Lakes basin in North America and the Murray-Darling Basin in Australia is instructive. As water scarcity increased in the Murray-Darling basin, a ministerial council was formed at the basin level (covering at least three sub-national states) to address changes to water rights for resource users. Such a council is an example of an interregional governance unit. Similarly, the investigation of how territorial conceptions of "community" found in the water resources literature relates to understanding changes in groundwater policy in the Great Lakes basin and the High Plains aquifer in the US Midwest by Levesque (2008) has found similar results. Simply put, local governments defined on a municipal basis were found to be largely irrelevant for ground water policy changes while intraregional governance units (e.g. Nebraska Natural Resource Districts which incorporate several smaller municipal entities) were critical to such changes. The question is whether such results hold for the management component of groundwater rights.

5.0 Methods

Ontario, New York and Nebraska were selected for this comparative case study. All three have significant populations' dependant on groundwater as their principal source of drinking water. In Ontario, 29 per cent of the population rely on groundwater as their source of drinking water while 33 per cent and 87 per cent of the respective populations of New York and Nebraska are dependent on groundwater as their principal source of drinking water (Glennon, 2002: 31; NYSDEC, 1990; Rutherford, 2004). These figures mask the fact rural populations are almost entirely dependent on groundwater for their needs (Rutherford, 2004). These figures are also conservative given they do not include other uses such as irrigation, manufacturing and ecosystem functions. For instance, 97 per cent of groundwater used in Nebraska is for the irrigation of crops such as corn (Maupin and Barber, 2005). In addition, significant portions of Ontario and New York lie within the Great Lakes basin while the majority of Nebraska overlies the High Plains aquifer. Both are significant sources of groundwater representing 3.5 and 4 per cent of the world's fresh groundwater supplies respectively (Gleick, 1996; Grannemann et al., 2000; McGuire, 2007; Opie, 1993). The two regions are also understudied in the resource governance literature which focuses on the US Southwest and developing countries (e.g. Blomquist, 1992).

The cases are similar in other respects. Groundwater resources in each region are stressed by significant increases in pollution from various sources including farms and septic systems (e.g. Opie, 2000; Hanson and Trout, 2001; Madramootoo et al., 2007). All jurisdictions are also part of federal systems of government, Canada and the United States, and have similar underlying ground water rights regimes, as well as, broad municipal land and water powers (previously discussed).

The aim of the research is to assess municipal involvement in source water protection policy changes and is inclusive of wellhead protection programs (see Note 1). Groundwater policy changes were traced and plotted along a continuum for the time period 1980 to 2006, which was an active legislative and regulatory period of activity in each area. It was also a sufficiently long time frame to detect patterns of change. To account for the complexity of public policy, groundwater policy changes were classified as being either a change in policy goals, policy instruments or policy instrument settings and involved the examination of both primary (government documents, websites and factsheets) and secondary sources.

Layered governance arrangements surrounding policy changes were then mapped. This necessitated identifying and plotting the principal governance units involved in the process (for an example, see Appendix 1). Primary and secondary sources revealed the number of governance units and governance layers involved in the process which serves as an indication of the complexity of the institutional arrangements. Relationships between governance units were then examined to gain insights into the strengths of linkages between governance units in order to assess municipal involvement. Such linkages were assessed, via a content analysis of their core activities, as either strategic or functional in nature. Linkages were strategic where governance units intentionally forged connections between themselves in the pursuance of their goals. Functional linkages existed if governance units were connected to each other either in socioeconomic or biogeophysical terms (see Young, 2002). 43 semi-structured interviews (11 for Ontario, 13 for New York, 19 for Nebraska)[6] with key officials in all jurisdictions were conducted in 2006-2007 to provide in-depth knowledge of

the policy changes that occurred and to clarify actor and institutional configurations.[7] The results that follow provide an overview of the institutional and actor configurations for each jurisdiction while focusing on municipal involvement. They are thus descriptive in nature.

6.0 Results

Ontario

Source water protection is a relatively recent phenomenon in Ontario having largely emerged after the May 2000 Walkerton water tragedy. Previously, the protection of water resources in the province was haphazard and dates back to the post-WWII era. For instance, the Ontario Water Resources Commission was established in 1957 to develop and protect the province's water resources. A high level of regulatory activity for water protection ensued over the next 15 years yet this flurry of activity surrounded "hard assets" in terms of the construction and management of sewage treatment plants. This was in contrast to the broad powers given to the Commission enabling them to designate water protection areas which were largely unused (e.g. OWRC Annual Reports, 1957-72).

Water protection activities remained fragmented until the turn of the twenty-first century. Some progress was made on curtailing point sources of pollution such as phosphorous by the Commission's successor, the Ministry of the Environment, and on upgrading municipal sewage treatment facilities in large part due to provisions and funding under the Great Lakes Water Quality Agreement between Canada and the United States (Canada, n.d.). Farmers were also encouraged to adopt (voluntary) best management practices for manure spreading on farm fields which were developed and refined in the 1970s and 1980s in large part by the Ministry of Agriculture and Food (Benidickson, 2002: 123).

The Ministry of Natural Resources has had and continues to have oversight for protecting Ontario's lakes and rivers including shorelines and banks under the Lakes and Rivers Improvement Act (Percy, 1988: 83-6). In addition, since 1946 it oversees and funds Conservation Authorities in the province. Conservation Authorities are "local, watershed management agencies that deliver services and programs that protect and manage water and other natural resources in partnership with government, landowners and other organizations" (Conservation Ontario, n.d.). These services include flood and erosion control with the operation of recreational services, an important byproduct of their central mandate. Major cutbacks to their budgets (42 per cent) in the 1990s seriously hampered their efforts to fulfill their mandate (see Woolstencroft, 1997; McKenzie, 2002).

This brief overview highlights a fragmented institutional structure which has led some to argue that leadership on water quality protection is lacking in the province (de Loe, 1991). This is not surprising given the fact that until recently no groundwater strategy, including for the protection of drinking water sources such as wellheads, existed for the province (Neufeld, 1987). This is even more significant given the well publicized groundwater tragedies in Woburn, Massachusetts and in the Ontario communities of Port Loring and Elmira in the 1970s and 1980s (Harr, 1995; Benidickson, 2002).

However, in May 2000, everything changed. Seven people in Walkerton, Ontario died and several hundred others became ill after consuming contaminated groundwater. The Walkerton Inquiry was subsequently established to investigate what went wrong and to make recommendations to address the problems. A renewed focus on groundwater ensued. In particular, an aggressive research agenda was established with the launch of regional

groundwater studies in 2001-2002 to better understand groundwater-surface water dynamics, contamination threats and to delineate and assess municipal wellhead protection areas (OMOE, Land Use Policy Branch, 2001). Part two of the Inquiry's Report released in May 2002 included 22 recommendations related to watershed-based source protection planning (O'Connor, 2002).

Upon review, the Ministry of the Environment struck an Advisory Committee on Watershed-based Source Protection Planning in November of 2002. It was instructed to provide advice on a framework for how to proceed and issued its final report in April of 2003, a mere five months later. This 25 member Advisory Committee included representation from nine government departments (e.g. Ministry of the Environment, Ministry of Municipal Affairs and Housing), 10 interest associations (e.g. Aggregate Producers Association of Ontario, Ontario Water Works Association), five government associations (e.g. Association of Municipalities of Ontario, Conservation Ontario) and one academic (see MOE, 2003). No direct municipal representation on this Advisory Committee existed. Instead, municipal concerns had to be largely brought forward by their representative organizations, the Association of Municipalities of Ontario and Conservation Authorities, whose Boards of Directors are municipal entities (Association of Municipalities of Ontario, 2009; Upper Thames River Conservation Authority, 2009).

Given the short time line, admittedly for political reasons[8], the workload was "pretty intense" for those involved considering source water protection was in addition to their regular work with their respective organizations. While the full Advisory Group only met about ten times overall at two to three week intervals, smaller working groups were in constant contact to address the many aspects (Interview with Conservation Ontario Official). In the end, it recommended the formation of Source Water Protection Planning Committees (SWPPCs) by grouping existing individual Conservation Authorities into larger watershed entities. It is these SWPPCs that would engage local stakeholders to identify risks to drinking water sources and to develop mitigation and information management plans. It was unclear at the time who would oversee the implementation of the plans.

Not much happened with the release of the Advisory Committee's report. Rather, the McGuinty Liberal government, newly elected as of October 2003, "buried" the report and chose to set up two committees of its own in December 2003 (Interview with Conservation Ontario Official). A 17 member Technical Experts Committee was established to "provide technical advice that would guide how plans were to be developed, what data might be needed, what standards might be required, and how threats and risks to drinking water were to be managed" (Ontario, MOE, Technical Experts Committee, 2004: 1). Of the 17 members, three were from municipalities and one was from a Conservation Authority. The Association of Municipalities of Ontario was not a party to the Technical Experts Committee nor was there any municipal representation on the 22 member Threats Assessment Working Group—a related group set up to help the Technical Experts Committee.

The second committee formed by the McGuinty government was a 22 member Implementation Committee. It's role "was to provide advice on approaches to achieve source water protection and funding mechanisms." (Ontario, MOE, Implementation Committee, 2004: 1) While dominated by representatives from sector organizations such as the Ontario Federation of Agriculture and the Ontario Ground Water Association and non-governmental organizations such as Ducks Unlimited, direct municipal representation consisted of two municipalities (York Region, Hastings County), while indirectly there were two municipal interest organizations (Association of Municipalities of Ontario, Ontario Municipal Administrators Association) and

two Conservation Authorities. Both the Technical Experts and Implementation Committees met monthly from January until November 2004 at which time their reports were issued. It is the basis of these reports that led to the passage of the Ontario Clean Water Act in late 2006 and subsequent regulatory development (Lower Thames et al., 2007; Ontario, 2007).

Source Water protection legislative changes in Ontario was provincially driven with little municipal involvement. Few municipalities were directly part of the process; none sat on the Advisory Committee on Watershed-based Source Protection Planning and there was only token representation on either the Technical Experts or Implementation Committees. This is surprising given their interests and functions in land use planning and water services. Yet their interests were seemingly represented, albeit indirectly. A representative from the Association of Ontario Municipalities, the municipal umbrella organization in the province, sat on two of the three committees while Conservation Authorities and their umbrella organization, Conservation Ontario, were heavily involved in the process. In fact, the Walkerton water tragedy provided Conservation Authorities with the opportunity to re-establish themselves after the severe funding cuts they experienced in the 1990s given the report from the Walkerton Inquiry which recommended a watershed based approach to protect Ontario's drinking water supply (*O'Connor Report*, 2002). It bears repeating that Conservation Authority Board of Directors are made up of representatives from their member municipalities (see Upper Thames River Conservation Authority, 2009). It is also largely through such indirect representation that municipal strategic linkages existed. Communiqués would be exchanged, information shared and positions developed for how to address issues. Such work built on the many positive and functional linkages between the organizations.

New York

New York is a home rule state. That alone is a principal reason for the existing fragmented groundwater governance regulatory framework. Local control over affairs is greatly increased with many local governments enacting rules and regulations (and assume primacy) as long as they are as stringent as those put forth by the State. Water quality protection measures are a case in point and have long been established. Watershed Rules and Regulations (WRRs), for example, were established at the turn of the twentieth century by local governments and focused on water pollution control to minimize disease outbreaks related to water supplies such as typhoid deaths. They established, among other things, minimum separation distances for such items as privies, stables and cemeteries, as well as, provided local authorities with enforcement powers (e.g. New York, Department of Health, WRRs for Village of Akron, Erie County, NYCRR 10, Part 113, s. 113.1). Later amendments have addressed newer threats to water supplies such as salt storage and radioactive materials (e.g. New York, Department of Health , Houghton Water District, Alleghany County, NYCRR 10, Part 101, s. 101.4). Note that not all local governments such as cities and towns in the Great Lakes Basin have established Watershed Rules and Regulations (e.g. Herkimer County municipalities) and many of the WRRs are idiosyncratic and have persisted until recently due to local and technological peculiarities.[9]

Recently, many state programs have been developed to protect groundwater resources. For instance, amendments to the federal Clean Water Act in 1987 necessitated development of plans to address toxics, non-point source pollution, coastal pollution and watershed protection (USEPA, 2002). New York has responded by developing and

enhancing many programs such as the State Pollutant Discharge Elimination System (New York, Department of Environmental Conservation, n.d.). At the same time, the watershed protection concept has taken root and emphasizes, among other things, sound scientific principles and widespread stakeholder participation. Watershed protection was further advanced through Unified Watershed Assessments mandated by the US Environmental Protection Agency Clean Water Action Plan in 1998. New York's plan for all 54 watersheds identified priority areas for additional efforts and funding for water quality issues (New York, Department of Environmental Conservation, 1998). It is from this plan that each watershed developed Watershed Restoration Action Strategies to address priority areas (e.g. Genesee/Finger Lakes Regional Planning Council, 2004).

Such programs largely resulted from the increased focus groundwater protection received in the 1980s due to the discovery of several major cancer clusters based on groundwater contamination.[10] This focus was federally driven with the Environmental Protection Agency playing a significant role in the process. Prior to 1970, the federal government largely dealt with interstate commerce issues in relation to water, something individual states could not address due to constitutional limitations. This was achieved through various statutes including the Rivers and Harbors Act of 1899 and the Federal Water Pollution Control Act of 1956 (treatment plant construction grants). The need to eliminate lax state enforcement activity due to interstate competition for businesses led, in part, to the EPA's establishment in 1970. Since then, both the Clean Water Act (1987; and its predecessor, the Water Pollution Control Act; 1948 as amended), addressing point source discharges, and the Safe Drinking Water Act (1974 as amended), addressing the public drinking water systems, water quality and groundwater, have figured prominently in groundwater activities (USEPA, 2002).

Changes to the Safe Drinking Water Act in 1986 and in 1996 are of particular interest. The 1986 amendments “requested” the voluntary development of Wellhead Protection Programs (WHPPs) by states as an inexpensive way of protecting groundwater supplies. This included the delineation of wellhead protection areas, identification of potential contamination sources and development of groundwater management approaches to protect the resource (USEPA, 2002). It was hoped that the development of wellhead protection plans would ensue though few "on the ground" protection activities occurred (Interview with USEPA Official). For instance, while NY was one of the first states to develop a WHPP (1990), which officials admitted was a "large effort" and a "good idea", it mainly clarified concepts related to work "largely done under other programs", and, as such, "never really took off" (Interviews with EPA, Department of Health and Department of Environmental Conservation Officials). The same officials also all noted the fact that the program was not funded ensured little protection activity occurred.

Municipal participation in changes to the federal Safe Drinking Water Act in 1986 was mixed and largely indirect. For instance, the body that provides advice, information and recommendations to the Environmental Protection Agency on policies and regulations, the National Drinking Water Advisory Council, had approximately half of its members drawn from water utilities and regional planning councils and included two direct municipal representatives (city, township). Moreover, its Source Water Working Group had one township, two county and one water authority member among its 24 members (New York, Department of Environmental Conservation, 1990). Other indirect municipal involvement

occurred as legislative changes proceeded through Congress where municipal associations such as the National Association of Cities and the National League of Cities were pulled into the many separate negotiation processes (Interview with USEPA Official).[11]

The development of New York's Wellhead Protection Program showed a similar pattern. While program details were developed by the state Department of Environmental Conservation, a Wellhead Protection Advisory Committee provided added expertise and guidance (New York, Department of Environmental Conservation 1990: 54-55). Of the 36 members on this Committee, 15 represented county governments (e.g. health, planning departments) while one represented towns (Association of Towns of the State of New York) (New York, Department of Environmental Conservation, 1990: Acknowledgements).

A similar situation existed for legislative changes to the federal Safe Drinking Water Act, 1996. The 1996 amendments extended the source water program to include surface water supplies by *mandating* development of Source Water Assessment Programs (SWAPs) within two years (USEPA, n.d.; New York, Department of Health, 1999). Moreover, funding was provided through the Drinking Water State Revolving Fund (DWSRF), with approximately 5.6 million dollars for New York alone.[12] To be clear, the development of a state Source Water Assessment Program and individual plans were mandatory, implementation of the plans was voluntary. It was hoped that once the public was enlightened about the situation, they would pressure their local officials to address problems. In practice, however, and as one EPA official noted, it has not worked out that way with few "on the ground" activities taking place (Interview with USEPA Official).

Municipal participation in the 1996 federal changes was comparable to the changes that occurred a decade earlier. The National Drinking Water Advisory Council membership was similar and various associations were once again engaged in negotiations with the Environmental Protection Agency in order to get changes through Congress. At the state level, New York's Department of Health was responsible for developing the Source Water Assessment Program and consulted with its Source Water Protection Coordinating Committee. It is this latter Committee where municipal involvement was directed through 18 representatives (of 93) from County Health or Planning Councils, as well as, broader associations such as the Association of Towns of the State of New York (New York, Department of Health, 1999 SWAP: 3, Appendix C).

Similar to Ontario, few municipalities were directly involved in legislative changes for source water protection in New York. Part of this can be attributed to time constraints and difficulties in trying to access federal policy processes where much of the policy change was initiated. Rather, indirect participation via representative organizations was the norm. This is a pattern that continued at the state level where either the state Departments of Environmental Conservation or Health were charged with developing wellhead protection and source water protection programs respectively. Municipal representation was largely either through state associations, Regional and County Planning Councils or County Health Departments, the last two of which are interlocal governance entities. These channels allowed for the formation of strategic linkages for how to address pending state and federal policy changes, linkages which built on the existing positive functional overlaps of the respective governments.

Nebraska

Water and Nebraska are intrinsically linked both in name and substance. Nebraska is an aboriginal word meaning "broad, flat water" in reference to the state's many rivers such as the Platte which can vary up to a mile wide and between a few inches to a couple of feet deep (Manley, 1993: 9-11). Nebraska is also the "Groundwater State" of North America with the majority of the state overlying the Ogallala Aquifer and possessing two thirds of the aquifer's water volume (University of Nebraska, 1998: 7; Ashworth, 2006: 25-6). It is this abundance of groundwater that Nebraskans are dependent on as a source of drinking water and for agricultural production.

Efforts to protect drinking water resources are varied and pre-date federally driven source water protection activities by two decades. For example, the Nebraska Department of Health, charged with regulating public water supply systems, first developed voluntary sanitary well construction standards in 1965 in conjunction with the Nebraska Well Drillers Association and the University of Nebraska's Conservation and Survey Division (Nebraska Well Drillers Association Annual Conference Minutes, 1957, 1965-1966; Seidel, 1993: 236). The Department of Health has also long required minimum separation distances between wells and various contamination sources as well as the development of contingency plans for emergency situations (Nebraska Department of Environmental Control, 1991: 1, 10).

Many other water protection mechanisms have been promulgated by the Nebraska Department of Environmental Control which has a broad water protection mandate. This includes the development of a Water Quality Standards and Use Classification system (Title 118) for point and non-point sources of contamination where wellheads are assigned the most stringent protection classification (Nebraska Department of Environmental Control, 1991: 1). Other measures include a permitting system for the discharge of pollutant to state waters (Title 119), design requirements for wastewater treatment facilities (Title 123) and livestock waste facilities (Title 130). In the late 1970s and early 1980s, the Department of Environmental Control has enacted licensing, control and remediation measures for solid waste disposal sites (Title 132), hazardous substances and facilities (Titles 126 and 128) and septic systems (Title 128) (Nebraska Department of Environmental Control, 1991: 9-10). Other measures are jointly administered between the Department of Environmental Control and Natural Resource Districts, the latter being interlocal or intraregional in nature (Breckenridge, 1984). That is, their boundaries are delineated roughly along hydrogeological lines and typically incorporate several cities or counties for the management of water and other resources (Nebraska, 2008).[13] Of note for groundwater protection is Title 196 which allows for the designation of groundwater quality protection areas to address non-point sources of pollution (Nebraska Department of Environmental Control, 1991: 10-1).

Nebraska had an elaborate groundwater policy framework by the time of the 1986 changes to the federal Safe Drinking Water Act (profiled in the last section and not repeated here). Given such a framework, it is no surprise that Nebraska welcomed the development of a wellhead protection program as mandated by the federal legislation and was one of the first states to have its program approved by the Environmental Protection Agency (June 1991). As a USEPA official noted, Nebraska "welcomes any opportunity to protect its groundwater" and that "it is above the curve when compared to other states" (Interview with USEPA Official). Similar to New York, however, the lack of federal and state dollars ensured that Nebraska developed a "no budget, low budget wellhead protection program" (Nebraska

Department of Environmental Control, 1991; Interview with Nebraska Department of Environmental Quality Official).

The Department of Environmental Control developed the state's Wellhead Protection Program. In order to provide added guidance and increase representation, two committees were established in September 1988. The first, an 18 member Technical Advisory Committee largely consisted of state agencies and had no direct municipal representation. Indirect municipal representation existed via the League of Nebraska Municipalities, which provides assistance and input for member municipalities for various issues including drinking water (League of Nebraska Municipalities, 2009).[14] Indirect municipal representation is also found via the Nebraska Association of Resource Districts, the umbrella association for Nebraska Natural Resource Districts. Note that each individual District is governed by a Board of Directors comprised of agricultural and municipal representatives with agricultural interests typically in the majority (see also, for example, CPNRD, n.d.). Hence, such municipal representation can be seen as "diluted" at best. The Technical Advisory Committee met only four times over the next year yet, similar to Ontario, subcommittees, formed to address various issues, met much more frequently (Nebraska Department of Environmental Control, 1991: 52).

A much more limited role existed for the Citizen's Advisory Committee, the second committee that was formed. Membership consisted of various interest groups such as the Farmers Union of Nebraska, Nebraska Cattlemen and the Nebraska Well Drillers Association. Direct municipal representation was non-existent yet indirect representation existed given the fact the Nebraska Association of Resources Districts was also a member of this committee. The Nebraska Association of County Officials was also a member of this committee and offered another form of indirect representation. This Committee had limited input given it only met once to review a draft of the proposed program (Nebraska Department of Environmental Control, 1991: 52-7).

A similar situation unfolded for development of the state's Source Water Protection Program in response to the 1996 amendments to the federal Safe Drinking Water Act. Recall that these amendments extended wellhead protection to surface water sources of drinking water. The state's program was internally developed by the Department of Environmental Quality[15] (Nebraska Department of Environmental Quality, 1999: iv). In its development, wide consultation was made with stakeholders by way of two separate processes. In developing the program, the department consulted widely with stakeholders by way of two processes. First, a 45 member Advisory Committee was formed to discuss the federal requirements and how to blend them with the existing Wellhead Protection Program, as well as, to comment on the Department's proposals. Of these members, two directly represented municipal water systems for the cites of Omaha and Lincoln, the two largest cities in the state. Indirect municipal representation is found via the League of Nebraska Municipalities, the Nebraska Association of Resources Districts and the Nebraska Association of County Officials, the same entities that were involved a decade earlier. Yet this Committee was different not only for directly having two municipal representatives but also for creating a Surface Water Users Committee as a subcommittee to directly address surface water issues. Membership on this 17 member subcommittee included six municipal representatives, three municipal utility operators and one Natural Resources District, which afforded ample municipal representation. The full Advisory Committee met a total of four times as did the

Surface Water Users Committee (Nebraska Department of Environmental Quality, 1999: 7-1-7-4). The second stakeholder consultation process consisted of a series of 22 public presentations. Four of these were with Natural Resources Districts and its umbrella association, the Nebraska Association of Resources Districts. One presentation each was done with the Nebraska Association of County Officials, one county health department and the League of Nebraska Municipalities (Nebraska Department of Environmental Quality, 1999). Municipalities were represented in each of these sessions indirectly via their membership in the associations.

Municipal involvement in Nebraska source water protection legislative changes is mixed. Both sets of regulatory changes were federally driven with changes to the Safe Drinking Water Act. Nebraska municipalities had minimal involvement with the federal changes as was the case with New York. Municipalities had a similar minimal involvement with the required legislative changes at the state level in response to the 1986 federal amendments. Rather municipal involvement occurred indirectly through other associations such as the League of Nebraska Municipalities. The situation was somewhat different in response to the 1996 amendments to the federal Safe Drinking Water Act. Indirect municipal representation continued but also included direct meetings with specific associations such as the League of Nebraska Municipalities. It also included direct municipal representation by way of a Surface Water Users Sub-Committee to the Advisory Committee on Source Water Protection. Hence municipalities were more directly involved in the legislative and regulatory process yet their role was still limited given the plethora of business and environmental interest groups that dominated the committees (see, for example, Nebraska Department of Environmental Quality, 1999: 7-2).

7.0 Conclusion

The aim of this paper was to gauge the role of municipalities in legislative and regulatory change processes related to source water protection. Collectively, the results show how municipalities remained minor players in such changes.[16] While various committees and subcommittees were established to provide guidance for the changes, direct municipal representation on such bodies was non-existent to minimal. This was especially the case for Ontario and New York. Nebraska was somewhat different in that direct municipal representation was incorporated in such bodies for legislative changes in response to the 1996 federal Safe Drinking Water Act. Otherwise, municipal representation occurred indirectly via various interest organizations such as Regional and County Planning Councils and the League of Nebraska Municipalities.

The results are surprising. A significant portion of the population of each jurisdiction (at least one third and as high as 87 per cent in Nebraska) is dependent on groundwater as their source of drinking water. Municipalities in each jurisdiction also have various powers enabling them to provide and protect drinking water services for its citizens. These include broad grants of power (though no absolute) over land use designations which include the ability to place restrictions on land uses. The protection of drinking water sources involves such restrictions, that is, they encroach on one's property rights. The potential for conflict thus remains high. Given such parameters, one would assume municipalities would want to be central players in the game trying to affect those changes. Indeed municipalities are in the game yet this research suggests they largely prefer to be on the sidelines watching the play

unfold rather than on the field directly engaged in the play. While it may be true that municipalities remain "creatures of provinces or states", one questions how much of this is by choice as much as anything else.

The implications of this research are largely twofold. The first is the need for municipalities to continually develop and nurture strong linkages with representative organizations such as the Association of Ontario Municipalities and Conservation Authorities in Ontario since it was mainly through such entities that strategic positions were articulated. Robust linkages with such bodies are required to ensure a "healthy" municipal voice at the table. The second implication is bleak. The results suggest that a healthy and direct municipal voice will not occur until groundwater dependency as a source of drinking water becomes almost absolute as is the case with Nebraska. This does not bode well for many municipalities in Ontario and New York given the fact these jurisdictions border the Great Lakes, an important surface water source of drinking water.

Some future research is suggested by this paper. Examination is needed of situational settings where variances in groundwater dependency occur to confirm the results found herein. A related path would be to examine such situations in nonfederal countries where municipal powers are quite different such as in Great Britain and France. Investigation in nonindustrialised or developing countries would also shed light on the relationships between municipal entities, property management rights and water resources. Such investigations would further develop our understanding of the significance of locality on policy change processes related to natural resources.

Notes

1 The term wellhead protection planning is often found in the literature. It refers to activities related to the protection of groundwater sources of drinking water only. Source water protection came along approximately a decade after wellhead protection activities were underway and extended protection of drinking water to surface water sources. The term source water protection as used in this paper is also inclusive of both.

2 Ontario Municipal Board decisions can be appealed to the provincial cabinet.

3 Interestingly, how one was to determine at that time (over 200 years ago) if an underground stream existed, given limited hydrological knowledge, is unknown.

4 Home rule is a way to structure power in US cities. It is not about absolute legal autonomy for local governments, rather, as Frug and Barron point out, "a mixture of state decision making and local discretion" is embraced (2008: 36-8). Nonetheless, local governments are allowed to "design and amend [their] own charter, subject to the laws and constitution of the state and also subject to veto by the state (Patterson, 2008: 539).

5 *General laws* apply to all cities in the state while *special laws* affect a local government only (see Coons, 1998; New York, Department of State, 2000).

6 Interviews were held in the summer and fall of 2007.

7 To ensure accuracy of the relationships and before final analysis, six interviewees (two in each jurisdiction) were sent drafts of the layered governance arrangements that were constructed which led to a few minor adjustments.

8 The government wanted to demonstrate progress on the issue.

9 The City of Syracuse's "pail service" is a prime example. Instituted in 1908 to protect the City's main source of drinking water, Skaneateles Lake, two full time and two part time city employees were

responsible for collecting and emptying from homes and cottages located along the lake up to 250 five gallon pails of raw human sewage from specially built privies into approved treatment facilities. Unable to install septic systems or other alternatives for various reasons (e.g. lot sizes, geology), the pail service continued until 1998 when the remaining 100 homes were ordered to install composting toilets by 2000. The City now collects pails of finished compost once a year -54 in 2003 as compared to 3,402 pails of raw sewage in 1998 (Abbott, 2004).

[10] Cancer clusters are the occurrence of significantly higher than expected number of cases of the same or related cancer among a group of people, a geographic area or period of time (see National Cancer Institute, 2006). Three of these occurred in East Woburn, Massachusetts in the 1970s, Niagara Falls, New York (Love Canal) in 1979, and, in Hinkley, California (Pacific Gas and Electric) from the 1960-1980s.

[11] Other interests that were part of negotiations "at separate tables" included national organizations of water suppliers (e.g. American Water Works Association), environmental groups (e.g. Environmental Defence), businesses (e.g. from oil, gas industry), state organizations (Association of State Drinking Water Administrators) and other government associations (e.g. National Governors Association).

[12] In consideration of the number of public water systems (~9,000) and water sources (~14,000) in New York, the funds were quickly used up (NYS DOH "Source Water Assessment Program Plan 1999, II).

[13] For instance, the Upper Big Blue Natural Resource District contains parts of eight counties and at least eight municipalities with populations greater than 2,500 people (Nebraska Association of Resources Districts, 2009).

[14] The League of Nebraska Municipalities represents the vast majority of Nebraskan cities and villages and whose population totals 98 per cent of Nebraskans who live in municipalities (League of Nebraska Municipalities, 2009).

[15] Formerly the Nebraska Department of Environmental Control.

[16] This is in stark contrast to the significant involvement of municipalities in the development of source water protection plans for their communities.

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Appendix 1: Source Water Protection Governance Units, 1986-1996, New York