

Davidson, S.L. and de Loë, R.C. 2014.
Watershed governance: Transcending boundaries.
Water Alternatives 7(2): 367-387



Watershed Governance: Transcending Boundaries

Seanna L. Davidson

Water Policy and Governance Group, University of Waterloo, Waterloo, Ontario, Canada;
seanna.davidson@uwaterloo.ca

Rob C. de Loë

Department of Environment and Resource Studies, University of Waterloo, Waterloo, Ontario, Canada;
rdeloe@uwaterloo.ca

ABSTRACT: Watershed boundaries are widely accepted by many water practitioners and researchers as the de facto ideal boundary for both water management and governance activities. In governance, watershed boundaries are typically considered an effective way to integrate the social, political, and environmental systems they encompass. However, the utility and authenticity of the watershed boundary for water governance should not be assumed. Instead, both scholars and practitioners ought to carefully consider the circumstances under which watershed boundaries provide an appropriate frame for governance. The purpose of this paper is to identify how water governance can transcend the watershed boundary. An empirical case study of governance for water in Ontario, Canada, reveals boundary-related challenges. In this case, issues relating to boundary selection, accountability, participation and empowerment, policysheds and problemsheds reveal the strengths and weaknesses of relying on watershed boundaries as a frame of reference for governance. The case also highlights promising alternatives that are being used to transcend the watershed boundary.

KEYWORDS: Water governance, watershed boundaries, Lake Simcoe, Ontario, Canada

INTRODUCTION

Watershed boundaries are widely accepted by many water practitioners and researchers as the de facto ideal boundary for both water management and governance activities (e.g. European Commission, 2001; Global Water Partnership, 2003). In the context of governance, defined here as "the structures and processes through which people in societies make decisions and share power" (Young, 1992), watershed boundaries are typically considered an effective way to integrate the social, political, and environmental systems they encompass (Mitchell, 1990). The value of using the watershed boundary for purposes such as identifying critical connections among related systems and organizing data collection is not in dispute. However, the utility and authenticity of the watershed boundary for water *governance* should not be assumed (Cohen and Davidson, 2011). Both scholars and practitioners need to carefully consider the circumstances under which watershed boundaries provide an appropriate frame for organizing societies to make decisions and take actions to address water problems and opportunities.

The purpose of this paper is to identify how water governance can transcend the watershed boundary. Specifically, we seek tools and mechanisms for water governance that do not rely on the watershed boundary for implementation. The paper begins by briefly reviewing the literature supporting the 'watershed is best' argument before returning to a set of watershed boundary challenges identified by Cohen and Davidson (2011). This framework is then applied to an empirical water governance case where profound boundary-related challenges exist. Our empirical example

reveals the distinct and specific responses that are being utilized by practitioners to overcome watershed boundary challenges in a specific location. The results are presented in two sections. First, the case is examined in light of the identified water boundary challenges to discuss how these are prevalent in the watershed. Second, the results highlight instances where alternative non-boundary dependent tools for water governance are applied or created. The discussion argues that the watershed boundary has utility when applied in a limited and focused manner, and then draws attention to opportunities for water governance that can transcend the watershed boundary.

WATER GOVERNANCE: IN OR OVER THE BOUNDARY?

Governance in watershed boundaries

The notion that the watershed provides an ideal boundary for management has been common for some time. The use of watershed boundaries was noted in third century China (Molle, 2009). Drainage areas were mapped in Spain and France in the mid-1800s (Blomquist and Schlager, 2005; Molle, 2009). Several rationales for the appropriateness of watershed boundaries have been advanced. First is the apparent naturalness of the boundary (Commission of the European Communities, 2007; Parkes et al., 2010; Saravanan et al., 2009; Warner et al., 2008; White, 1957). Watersheds are defined by hydrological processes. Thus, they are "distinct, easily mapped, and stable" (Barrow, 1998) and "define basic, ecologically and geomorphologically relevant management units" (Montgomery et al., 1995). These properties, it has been suggested, make them a tangible and manageable unit for water governance (Kenney, 1999).

With the acceptance of the boundary as natural, it is often asserted that watersheds are the most appropriate scale for defining the jurisdiction of water-related organizations. From this perspective, considerations such as social, political, economic, and environmental functions relevant to water governance should be organized and integrated at this scale (Huitema et al., 2009; Leach, 2006; Schmidt and Morrison, 2012). This perspective is evident in the European Union, where watersheds (or catchments) are a defining feature of governance under the Water Directorate Framework (Commission of the European Communities, 2007). The appeal of the watershed boundary as an organizing principle is the assumption that organizing activities around this spatial unit will permit systematic integration of issues, participation of relevant stakeholders, and more effective resource management (Montgomery et al., 1995; Schmidt and Morrison, 2012; Woolley and McGinnis, 1999). Veale (2010) outlines several additional purported strengths of the use of the watershed boundary. In particular, Veale draws attention to the ways in which watersheds provide a framework for measuring ecosystem conditions and environmental stresses; the role that watersheds can play as bridging tools for agencies; and finally, the fact that human communities can relate to their landscapes, making it an appropriate boundary for engagement.

Watershed boundary challenges

A growing body of literature is arguing that watershed boundaries are useful in limited applications and that the utility of the watershed boundaries relates primarily to whether it is being used for water management or governance purposes (Cohen and Davidson, 2011). It is therefore important to make the distinction clear between governance and management. Here, we define management as "the operational, on-the-ground activity to regulate a resource and conditions of its use" (Nowlan and Bakker, 2007: 5). Designing water allocation plans, responding to flooding, and undertaking day-to-day water quality testing are examples of water management activities. In contrast, we use the term governance to refer to "the structures and processes by which people in societies make decisions and share power" (Young, 1992: 160). Our concern in this paper is with governance, and consequently the use of watershed boundaries for water governance. Most recently Cohen and Davidson (2011) have

synthesized five distinct challenges that exist including boundary selection, accountability, public participation, problemsheds, and policysheds. In the following section, we briefly review each of the challenges, some of which have been combined for brevity.

Boundary selection

The challenges associated with selecting which watershed boundary for water governance are diverse and extensive. Johns and Rasmussen (2008: 61) note that the "multi-jurisdictional scale and fugitive or transitory nature of water and its many interrelated uses make it hard to fit neatly within well-defined categories" for governance. For instance, the catchment area of a tributary river may be nested within a larger watershed or basin. The nested nature of hydrological boundaries thus makes the selection of the boundary contestable (Fitzsimmons, 1996). Additionally, watershed boundaries are rarely absolute in terms of time or space (Saravanan et al., 2009; Warner et al., 2008). Many water systems have been altered by human beings over time and therefore the naturalness of a watershed is often unclear (Fitzsimmons, 1996; Warner et al., 2008). Consequently, authors such as Blomquist and Schlager (2005) and Warner et al. (2008) note that the selection of watershed boundaries is essentially a political choice, with Fitzsimmons (1998: 218) going so far as to suggest that the "system boundaries and internal elements may be chosen at will". To illustrate, in California the 'watershed' boundary used by an organization involved in the management of the Santa Ynes River was redrawn several times over the lifespan of the organization to reflect changing priorities and interests (Woolley and McGinnis, 1999).

Accountability and participation

Watershed boundaries used for political organizations are also problematic. Often watershed organizations are not granted independent power or authority for their watershed (Huitema et al., 2009). Thus, they do little more than advise (Barrow, 1998). Without legislatively-defined authority and responsibility and/or financial support from governments, the accountability of watershed organizations can be reduced, and their legitimacy diminished. Tied to concerns of accountability are issues of public participation. Activities of a watershed organization often assume that citizens recognize and engage at the watershed scale. However, this is not necessarily the case (Ferreyra et al., 2008; Reeve and Brunckhorst, 2007; Saravanan et al., 2009). Therefore, citizens may not hold their watershed organization accountable in cases where they are not involved (Reeve and Brunckhorst, 2007; Wengert, 1985: 303).

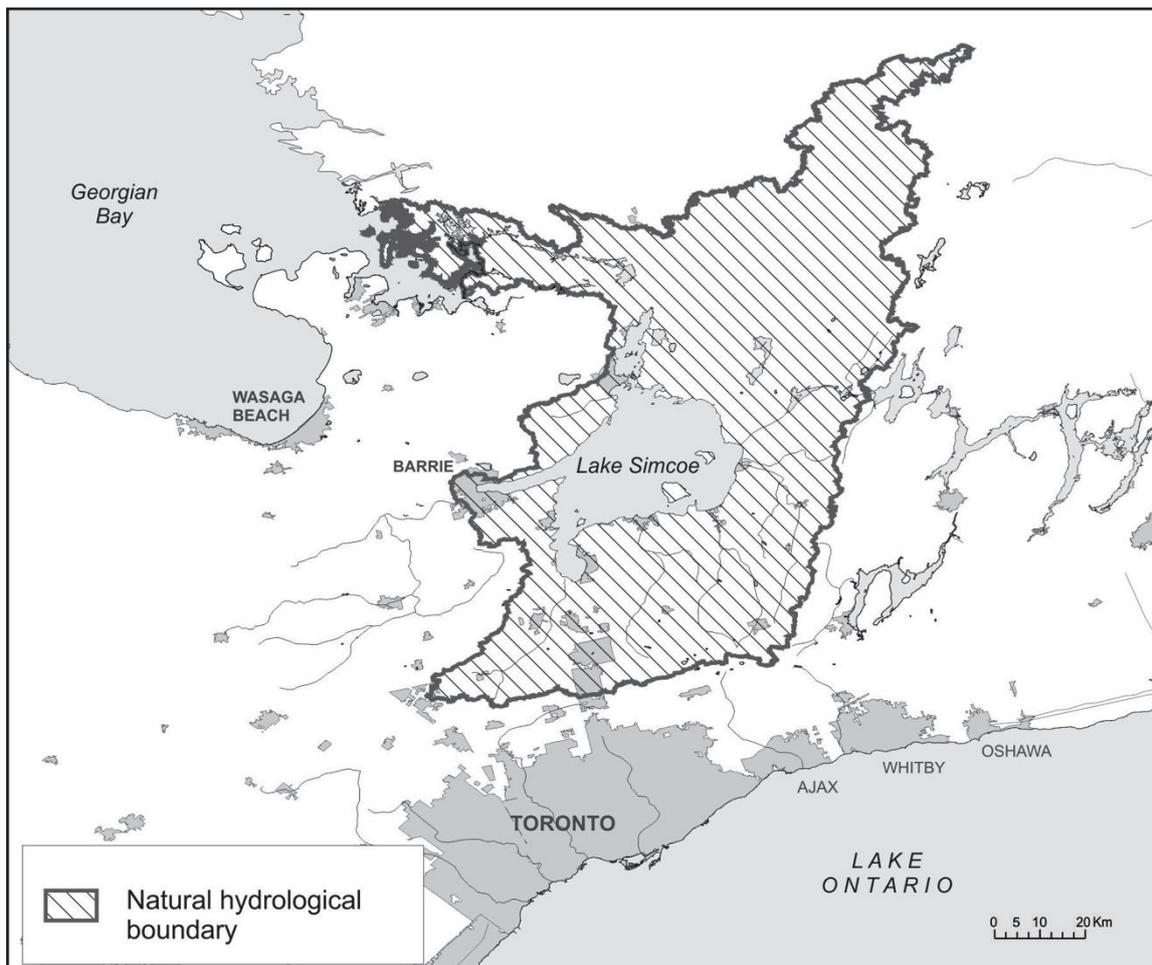
Problemsheds and policysheds

The issues of problemsheds and policysheds both relate to the spatial misfits among the various social and ecological systems that exist in the area of any watershed. Problemsheds are generated when separate environmental problems operate within the same ecological boundaries. Unfortunately, this is not the case in most circumstances (Cohen and Davidson, 2011). While some environmental problems experienced within a watershed are generated or created within its boundaries, this is by no means guaranteed (Griffith et al., 1999). Common examples of problems that manifest within a watershed but are generated wholly or partly outside that watershed include climate change and atmospheric deposition (Fitzsimmons, 1996). Policysheds are similar in concept to problemsheds. Policysheds represent a geography where multiple policies apply and have overlapping, but not identical geographical jurisdictions (Molle, 2007; Tiesman and Edelenbos, 2011; Warner et al., 2008). In the context of a watershed this could mean that a land use policy applies in the northern portion of the watershed, but not in the southern. This variation in policy application across the watershed presents significant challenges for implementing cohesive and integrative planning and management within a watershed (Cohen and Davidson, 2011; Galaz et al., 2008).

THE LAKE SIMCOE WATERSHED

The kinds of boundary issues discussed in this paper are starkly revealed in the Lake Simcoe watershed of southern Ontario, Canada (Figure 1). Lake Simcoe is located north of Toronto, Canada's largest city. The Lake Simcoe watershed has a total land and water surface area of 3303 sq km, with the lake itself accounting for 722 sq km. This makes it southern Ontario's largest inland lakes apart from the Great Lakes. Water quality problems in Lake Simcoe have been serious and well documented since the 1970s. Key problems include nutrient loads from phosphorous, invasive species, land use change impacts, anticipated climate change, and the impacts of water-related recreational developments such as boating and fishing (LSSAC, 2008). Land use planning in the watershed involves 23 different municipal governments, each with its own municipal land use plans, as well as five provincial pieces of legislation that direct land use planning for the watershed. Watershed-based conservation authorities (CAs) are an important part of the environmental management landscape in Ontario.

Figure 1. Lake Simcoe watershed.



CAs are watershed management bodies created under provincial legislation at the request of local municipalities. They have specific responsibilities for land and water management under their enabling legislation, including flood plain management and shoreline protection. Thus, the Lake Simcoe Region Conservation Authority (LSRCA) is an important actor in this watershed. In addition to the provincial government, municipalities, and the local LSRCA, there also are several departments of the Canadian

federal government with jurisdictional authority in the watershed. An important example is the Department of Fisheries and Oceans, which has responsibilities relating to the management and protection of fish and fish habitat.

In 2009, the provincial government passed the *Lake Simcoe Protection Act* (LSPA) (R.S.O. 2008, c. 23).¹ The LSPA is the first provincial law in Canada to provide coordinated protection and planning for an individual watershed. The Act is being implemented through the Lake Simcoe Protection Plan (LSPP) (Government of Ontario, 2009). While the provincial government holds ultimate responsibility for the Act, several governance actors including the LSRCA and municipal governments have been identified as implementation partners. The Lake Simcoe watershed illustrates several of the watershed boundary challenges highlighted in this paper. First, the LSPA institutionalizes a watershed boundary, which creates several of the boundary selection issues outlined above. Second, even though a watershed organization exists (the Lake Simcoe Region Conservation Authority), governance in this watershed occurs through the efforts of a number of organizations that do not have mandates or jurisdictions that are defined by the watershed. This introduces challenges related to accountability, engagement, and empowerment. Third, the presence of multiple governments in the watershed creates a complex, multilevel, cross-scale setting that has the potential to introduce issues of policysheds and problemsheds.

METHODS

The research utilized a single, in-depth case study approach. The Lake Simcoe case provides an important example of an attempt to address water governance challenges through a novel legal framework. This case involves a highly complex set of jurisdictional interactions, significant environmental governance challenges, and a diverse and inter-connected set of actors. The introduction of the LSPA and the LSPP took place over a relatively short period of time (LSPA announced in 2007, LSPA legislation passed in 2008, and the LSPP finalized in 2009), with significant input from a wide range of actors who promoted a variety of emerging environmental concepts. As such, a single case method was ideally suited to examining why decisions were made and how they were implemented because it permitted a deep analysis of the context, actors and interactions within a single geographic location (Yin, 2009).

Data relating to governance processes, structures, and outcomes were gathered through analysis of key documents, including the Lake Simcoe Protection Act (LSPA) (LSPA, R.S.O. 2008, c.23), the Lake Simcoe Protection Plan (LSPP) (Government of Ontario, 2009) and Regulation 219 (LSPA, R.S.O. 219/09), meeting minutes from LSEMS, and the multiple committees and meetings leading to the creation of the Act and Plan. This information was supplemented by a select number of key informants. Interviews were conducted for a larger study of which this research was one component (Davidson, 2013). Six interviews regarding the application of watershed boundaries were conducted with staff from the provincial government and the conservation authority. Questions asked how the watershed boundary had been developed and applied over time in the Lake Simcoe watershed.

¹ R.S.O. 2008, c. 23 provides the legal reference for the Lake Simcoe Protection Act. Similar references follow throughout this paper for each of the pieces of legislation and regulations identified. Ontario legislation can be accessed through www.e-laws.gov.on.ca

RESULTS

Boundary challenges

Boundary challenges in the Lake Simcoe case are identified in this section. Results are organized around the five challenges discussed previously.

Boundary selection

The selection of boundaries for environmental management is often a political exercise (Blomquist and Schlager, 2005). In the case of Lake Simcoe, the legally-defined boundary used for the LSPA does not match the hydrological boundary of the watershed. The selection of the boundary for the LSPA is based upon several criteria, which will be discussed here. The first of which is the historical use of boundaries for management and later governance in the watershed.

The first boundary utilized for watershed management was defined as the jurisdictional boundary for the LSRCA, and was delineated based on the area of greatest concern for phosphorous entering the lake. The boundary included only the southern portion of Lake Simcoe. A LSRCA staff member commented, "there are maps in this office where there is a line going right across the middle of the lake". Thus, from the beginning, the boundary was hardly 'watershed' based.

As evidence began to mount that the source of the problems were beyond the initial boundary, there was an effort to expand the jurisdiction of the LSRCA and therefore the boundary used for watershed management. However, in order to increase the geographic scope of the LSRCA's jurisdiction, the municipal governments of these new areas would be required to become partners in the LSRCA, requiring political manoeuvring and negotiation. At this time, some municipal governments chose not to join. This resulted in a watershed management boundary that excluded Lake Couchiching to the north of Lake Simcoe, which is a part of Lake Simcoe's natural hydrological boundary (Figure 2). The boundary defined at this time continues to be the jurisdictional boundary for the LSRCA, and was the scale at which watershed management and governance were operationalized until the time of the LSPA.

Interviews with Ontario government staff suggest that several factors were considered in establishing the boundary for the Act and Plan, including how the scale of boundary would impact the scope of actors to engage, the area contributing to the environmental problems, and the manageability of the resulting policy. Also considered was whether the Act and Plan would be limited to just the Lake, or if it should be the watershed. Limiting the scope of the Act and Plan to the Lake would limit the number of government agencies involved and would include those historically participating, including the MOE, MNR, and the LSRCA, who have responsibility for shorelines and water resources. Whereas increasing the scale of the Act and Plan to include the watershed (and therefore the surrounding land resources) would then involve other government agencies such as Ministry of Municipal Affairs and Housing (MMAH) who is responsible for land use planning. A senior MNR staff person commented,

One thing we had to do early in the game was decide, are we going to focus on what we call the blue polygon, what we call the lake, or include the land base surrounding it. If we have focused on the polygon, it would have been really only a MOE only legislation because it would have been water quality and would have dealt with any of the sewage treatment plants that flow into the lake, that sort of thing. But we recognized that the watershed is a significant input.

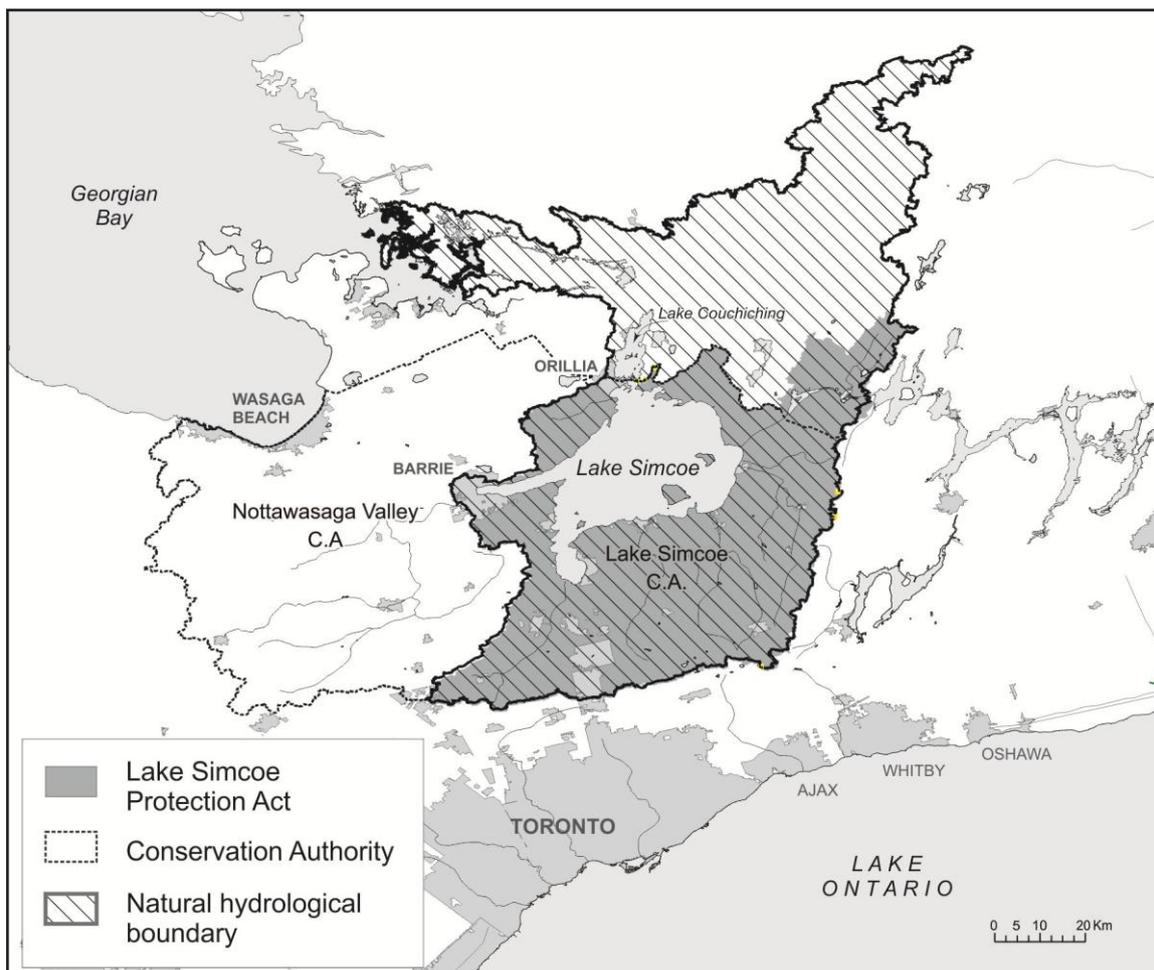
Monitoring by the LSRCA and the MNR indicated that the entire Lake Simcoe watershed should be included in the legislative boundary because of the geographic scope of phosphorus loadings. An Ontario government staff member clarified that the Lake Simcoe watershed boundary was ultimately selected based on what would be a manageable geographical/political area:

[The boundary is] generally based on a watershed boundary, but ultimately it is just a defined boundary sometimes out of convenience more than anything else. The true Lake Simcoe watershed... technically it could include Lake Couchiching, it is really just defining where you want to manage your resources.

The resulting boundary in the LSPA (Section 2) is delineated as follows "(a) Lake Simcoe and the part of Ontario, the water of which drains into Lake Simcoe, or (b) if the boundaries of the area are described by clause (a) are described more specifically in the regulations, the area within those boundaries" (LSPA, R.S.O. 2008: c.23). Figure 2 illustrates the LSPA boundary, which encompasses the LSRCA jurisdiction, and a small additional section in the north-east, but it does not extend to the full hydrological boundary, and importantly continues to exclude the municipal jurisdiction that did not join the LSRCA.

The selected legislative boundary is also malleable because it can be altered through regulatory changes if it is determined through research and scientific evidence that there is an area outside of the existing boundary that "directly affects, or would directly affect the ecological health of the Lake Simcoe watershed" (LSPA, R.S.O. 2008, c. 23, s. 13(3)(b)). If scientific monitoring and assessment conducted under the LSPA identify significant impacts originating from outside the existing watershed boundary, then that boundary can be altered to include additional geographic areas. Interviews with two Ontario government staff suggest that it is likely that the boundary will change again as information improves. Hence, the 'natural' hydrological boundary is not the *de facto* boundary in this legislation. Instead, several additional criteria, including political considerations, defined the legislative boundary.

Figure 2. Lake Simcoe watershed and jurisdictional boundaries.



Accountability

Leading up to the LSPA, there were two mechanisms in place regarding accountability for actions and decision making by government agencies in the watershed. The Lake Simcoe Environmental Management Strategy (LSEMS) was a partnership between several government agencies and the LSRCA through which the agencies collaborated on efforts to improve the state of the watershed. The LSRCA is responsible for watershed planning and permitting regarding waterfront developments and is a public agency. However, neither the LSRCA, nor the LSEMS program had jurisdictional authority to create and implement new regulations to protect or enhance the watershed. Additionally, prior to the LSPA being introduced, the LSEMS program had undertaken a governance review process which included community members and multi-sector stakeholders. However, with the introduction of the LSPA, the governance recommendations made by the multi-stakeholder LSEMS governance review were never implemented by the provincial government. Thus, while a watershed organization did exist (LSRCA), it lacked authority to implement new legislative controls. When a new governance structure was created by the LSEMS program through a multi-stakeholder effort, it was bypassed as a result of the introduction of the LSPA.

The LSPP sought to address some issues of accountability. The first component that the Plan used to address accountability was clarification of the relationships among separate pieces of legislation that affect the watershed. The LSPP include two types of policies that have legal effects regarding policy decisions under other pieces of provincial legislation such as the *Ontario Water Resources Act* (LSPA, R.S.O. 1990, c. O.40). In this context, decisions made under the *Ontario Water Resources Act* must conform to or consider the policies of the LSPP (Government of Ontario, 2009). Therefore, the Plan lays out the legislative decision-making hierarchy for the numerous provincial pieces of legislation that have overlapping jurisdiction in the watershed. In doing so, the Plan seeks to identify which legislation holds highest authority, and therefore can be used to identify those actors and processes for decision-making and implementation responsibilities.

The second component of the LSPP relating to accountability is the specific identification of public agencies that have responsibility for each policy, or in some cases, a group of responsible agencies. In the case of a group of agencies, one will be identified as the lead agency for specific policy concerns. When a public agency has been identified as responsible for a particular type of policy, it is required "to comply with any obligations imposed on it by the monitoring policy" (Government of Ontario, 2009). This action, in effect, gives legal ramifications to any inaction on the policy item by the government agency. Lastly, the LSPP identifies how agencies can be held accountable to the public, and makes specific reference to courts, tribunals, and progress reports as required by the LSPP (Government of Ontario, 2009). These components clarify who is responsible for what actions, to what other policy or legislation the Plan must adhere, and how issues of accountability can be addressed through specific governance mechanisms.

A third accountability component of the LSPP is the inclusion of progress and goal achievement indicators and reporting. Each chapter of the LSPP focuses on one of the major threats to the watershed. Progress metrics are included in each chapter (except those relating to recreational use and climate change), as are targets and indicators (Government of Ontario, 2009). The inclusion of progress metrics is especially useful for governance actors to monitor and assess the implementation and achievement of the LSPP's goals. In laying out specifically the goals to be achieved, and requiring reporting on these items, the public has access to the recorded progress of the Plan and can consequently hold the provincial government more accountable for their successes, but also their failures to reach the goals of the Plan.

Other accountability measures for the public are provided by the legislated annual action reports, five year progress reports, and the 10 year full review produced by the provincial government, each of which are published on the Environmental Bill of Rights Registry – a public disclosure mechanism used

in Ontario (LSPA, R.S.O. 2008, c. 23, s. 12(3)). Additionally, any proposed amendments to the LSPP must also be posted to the Environmental Bill of Rights Registry (LSPA, R.S.O. 2008, c. 23, s. 13(3)(c)). Thus, a number of measures have been incorporated into the LSPA to ensure accountability for actions by government actors required by the LSPP.

In addition to the requirement placed on the government by the LSPP, it is important to consider the creation and implementation of the LSPA and Plan as an act of accountability on the part of government. Importantly, six interviewees noted that the LSPA and LSPP exist specifically because of the actions of non-governmental groups in the watershed. The data from these six interviews suggested that the provincial government was motivated to introduce the LSPA because of the efforts of the watershed groups who became a visible and vocal force and demanded stronger protection for the lake. To illustrate, an Ontario government staff member noted

You had an enormous environmental NGO collaboration out there that caught the ear of government and they had both the federal ear and the provincial ear and they wanted a number of things from the province. They wanted legislation, they wanted something with teeth. They wanted a Lake Simcoe Protection Act. They wanted the Government of Ontario to step up to the plate and what they meant by that was that they wanted more involvement by the province.

As a result of the public pressure, and action by environmental non-governmental organizations (ENGOS), the provincial government was responsive to their calls and introduced the LSPA. That in itself demonstrates a degree of accountability on the part of government. In the following section on participation and empowerment, the findings demonstrate how direct involvement of non-government actors in the LSPA and LSPP processes also contribute to holding the provincial government accountable to its stated goals and actions in Lake Simcoe.

Participation and empowerment

Engaging communities across a geographical area as large as the Lake Simcoe watershed (Figure 1) can be difficult and costly. Considerable diversity exists in the types of people in the watershed, including urban, rural, agricultural, First Nations, and recreational/seasonal residents. Historically, engagement of members of the public has also been limited to the jurisdictional area of the LSRCA, the boundaries of which, as noted earlier, do not accord with the hydrological boundary of the watershed. Primarily these challenges regarding participation and empowerment relate to the devolution of power and authority.

The results from this research demonstrate that issues of power and authority devolution are more complex in the context of multi-level governance mechanisms. From one perspective both power and authority have remained with the provincial government with the implementation of the LSPA because no formal decision making power was devolved to a watershed-based non-governmental group or agency. Two interviewees suggested that there was never any intention by the government to share authority with stakeholders. For example, one provincial government staff person noted "this was still a provincial exercise; having an LSPA and having a LSPP was promulgated by the province. Even though [during development of the LSPA and LSPP] we did go to great effort to consult [the public], it wasn't a shared product, it was a provincial product". This argument was reinforced by a second provincial government staff member who stated "at the end of the day the government still holds the final level of authority". However, a contrasting perspective argued that some power and authority was granted to stakeholders. A third provincial government staff person observed,

Why I said this is a hybrid [governance model] is they [the provincial government] have also enshrined these committees to ensure that people have a formal seat at the table, so it's very transparent. In terms of what people's views are and what advice they give government. Governments can take the advice, sometimes they will leave it, but with these formal committees its difficult if you choose not to.

In this comment the third government official is referring to two committees that were established under the LSPA: the Lake Simcoe Science Committee and the Lake Simcoe Coordinating Committee. The two committees provide opportunity for non-government actors to directly engage and access provincial government actors. Both committees are enshrined in the LSPA as permanent committees that engage directly with government policy makers and are comprised of community and multi-sector actors (LSPA, R.S.O. 2008, c. 23, s. 18, 19). The Science Committee is charged with providing advice to the Minister of Environment regarding the ecological health of the Lake Simcoe watershed for a wide range of issues, including the identification of threats, research needs, types of monitoring programs, and advising on the extent to which proposed amendments adhere to the precautionary principle (LSPA, R.S.O. 2008, c. 23, s. 18). The Coordinating Committee is charged with overseeing the implementation of the LSPP, providing advice regarding implementation, and making recommendations on amendments to the government (LSPA, R.S.O. 2008, c. 23, s. 19). Together, the members of the two committees are granted direct access to decision makers, and have a formal mandate to provide advice to the provincial government on the implementation process of the LSPP.

Both of the Science and Coordinating committees are extensions of previous committees that were developed during the creation of the LSPP. Prior to the Act, the Lake Simcoe Science Advisory Committee (LSSAC) held much of the same responsibility for informing and advising the Minister during the creation of the LSPP (Government of Ontario, 2008). The efforts of the committee culminated in the report, *Lake Simcoe and its Watershed: Report to the Minister of Environment* (LSSCA, 2008), which informed the key issues and structure of the LSPP. The Lake Simcoe Stakeholder Advisory Committee also was comprised of a diverse group of stakeholders and was charged with providing feedback on the development of the LSPP from the social perspective. Each committee was engaged in an intense six month period of consultation during the development of the LSPP, during which government staff prepared drafts of each section of the LSPP along with corresponding research and presentations. These would be presented to the Science Committee for consideration. The input from the Science Committee was then used to update the LSPP. The Stakeholder Committee had an opportunity to review and comment on the draft LSPP. The process of the review meetings provides an important view into the collaborative relationship amongst the actors involved. While the government directed the topics of conversation, and provided the physical and political space for dialogue, interview responses indicated that the input received from the committees was considered valuable by government officials, and essential to the success of the process. A senior staff member from the MOE commented, "I'll be the first to say, we wouldn't have half the stuff if it wasn't for them [ENGO's on the Stakeholder Committee]".

In sum, the issue of whether or not power and authority have been shared with non-government actors prompts deeper consideration of the meaning of power and authority. From a multilevel governance perspective, both the provincial government and the non-government actors have specific authority and power. A key concern is how inter-organizational dynamics play into these processes. While the provincial government holds ultimate authority for rule-making and is responsible for implementation of legislation, non-government actors on both committees have demonstrated that they hold the power and authority to influence and sway the direction of the policy process. In particular, they secured for themselves a permanent, legislatively-enshrined level of participation that requires them to give advice, but importantly, also gives them the power to request changes to the LSPP.

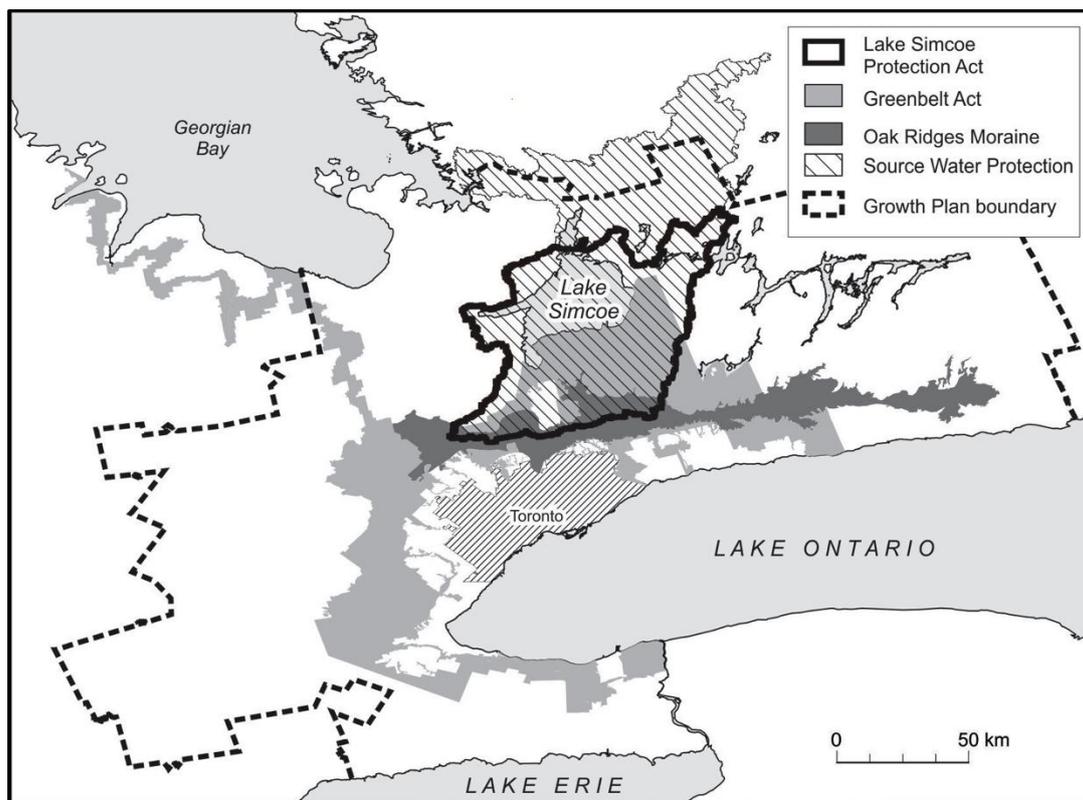
Policysheds

In the Lake Simcoe watershed, land use planning involves 23 different municipal land-use plans, five provincial statutes that direct land use planning, and a separate watershed planning process directed by the LSRCA (Figure 3). Thus the policyshed is a patchwork of overlapping and competing management programs, legislations, and land-use planning systems – most of which do not align neatly with the

watershed boundary. A senior staff person from the Ministry of Municipal Affairs and Housing commented,

There's a lot of provincial legislation and plans that impact this geography, the Planning Act, which is guided by the provincial policy statement that is province wide, and obviously applies to the watershed, the Growth Plan so the greater golden horseshoe,² you have the Greenbelt Plan,³ you have the Oak Ridges Moraine Conservation Plan, and now you have the Lake Simcoe Protection Plan, and soon under the Clean Water Act, you'll have Source Protection Plans that will be created. Technically they are another mandated provincial plan. So in making decisions, you can see the layers of complexity that are in place now in comparison to even eight years ago.

Figure 3. Provincial level policyshed in Lake Simcoe.



Note: This map outlines the multitude of provincial policy and legislation that directs planning, growth and environmental protection in the area within and beyond the LSPA governance boundary. It highlights the inherent complexity for governance decisions within the watershed.

Regarding the policy landscape, the aim of the LSPP was twofold. First, the LSPP functions as an integration mechanism for areas where the LSPP overlaps with other land use policies. Second, the LSPP aims to create a cohesive policy landscape throughout the watershed by introducing complementary

² The Growth Plan for the Greater Golden Horseshoe is a provincial planning document that directs urban growth in the area surrounding the Toronto urban metropolis, Canada's largest city.

³ The Greenbelt Plan is a provincial planning document that protects agricultural land in the area immediately surrounding the Greater Toronto Area.

policies for areas not currently covered by existing land-use planning policies. The LSPP uses three key mechanisms to implement these aims.

First, in the areas outside of other provincial land-use plans, the mechanism for integration is a requirement for municipal Official Plan to conform with the LSPP. In other words, where no other provincial land-use plans have jurisdiction, the municipality must alter its Official Plan regulations to be in accordance with those set out in the LSPP (LSPA, R.S.O. 2008, c. 23, s. 6(3)). Therefore existing land-use policies, and the LSPP are integrated through an already established decision-making process that clarifies which policies have greater authority. In an effort to ensure there are few loopholes, the LSPA explicitly states that if there is conflict between any of the policies that have application within the watershed, the one that provides the greatest protection to the ecological health of the watershed prevails (LSPA, R.S.O. 2008, c. 23, s. 6(4)).

Second, in order to avoid duplication and to achieve a level of integration, the LSPP does not apply to areas already covered by Provincial land-use plans within the Lake Simcoe watershed. Falling within parts of the watershed boundary are five other provincial land and water management policies. With the exception of one focused on source water protection (a provincial program organized on a watershed basis under the *Clean Water Act* (S.O. 2006, c. 22), each of the plans relates primarily to natural heritage feature protection through land-use planning policies. Thus Chapter 6 of the LSPP, which relates to natural heritage features, notes where other plans have jurisdiction; the policies noted in this section therefore only apply to areas outside of the boundaries of these plans (Government of Ontario, 2009; LSPA, R.S.O. 2008, c. 23, s. 6(5)).

Finally, Subsection 6 of the LSPP also extends the integration mechanism to all decisions by public bodies. Therefore, any comment, submission, advice, or decision by a public body shall also conform to the LSPP (LSPA, R.S.O. 2008, c. 23, s. 6(7)). Thus the LSPP specifically identifies its relationship to other planning policies within the watershed, and explicitly states how, and by what means they should interact through established decision-making processes. Together, these three mechanisms have the potential to aid implementation agencies (i.e. government, LSRCA) by clarifying the interactions and relationships between multiple policies and the hierarchical nature of which one takes precedence. Cumulatively, the mechanisms seek to create a more holistic and integrated planning environment for the watershed.

Problemsheds

The concept of 'problemsheds' refers to the area affected by an environmental problem. For example, in Lake Simcoe one problemshed is defined by the landscape on which an invasive species has established itself. Another example is the area where atmospheric phosphorus is deposited. Similar to policysheds, there often is incongruence between watershed boundaries and the spatial scope of other environmental challenges and their problemsheds. The LSPP includes a number of governance mechanisms designed to address the issue of problemsheds.

First, the LSPA gives permission to the government agencies listed in the LSPP to conduct research and monitoring activities outside of the watershed boundary in order to determine whether or not activities affect the ecological health of the watershed (LSPA, R.S.O. 2008, c. 23, s. 3(3)). These areas can be understood as 'grey zones' under the Plan. An example of a grey zone is the concern around atmospheric deposition of phosphorus coming from sources "beyond the watershed, but close enough that they are contributing to the atmospheric load" (Government of Ontario, 2009). This was mentioned by an MOE scientist who commented, "one thing I think will come up fairly early on in the research is identifying areas that are beyond the watershed boundary but close enough that they are contributing to the atmospheric load and that we should expand our stewardship into those areas". This is estimated to be 19 tonnes of the 72 tonnes of phosphorus that enter the lake annually. As previously noted, the LSPA permits amendments to the boundary of the Plan if an area has been

demonstrated to generate a negative environmental impact on the watershed. Therefore, the objective of this clause in the LSPA is to allow new areas to be brought under the jurisdiction of the LSPA and LSPP.

Other examples of addressing issues related to problemsheds in the LSPP include policies dealing with water quantity, climate change, and invasive species. Section 5.2 of the LSPP calls for water budgets to be developed for sub-watersheds that exist as part of the larger hydro-geological area (Government of Ontario, 2009). In Section 7.11, the LSPP attempts to deal with the immense problemshed of climate change. It states that valuable effort can be made within the watershed, to adapt to and build resiliency to the impacts that will result from negative activities outside the watershed (Government of Ontario, 2009). Finally, section 7.3 calls for a regulatory proposal to require anglers who use live bait to use only bait caught within the watershed, with the goal of preventing the spread of invasive species (Government of Ontario, 2009). This clause in the statute recognizes the external nature of invasive species but draws on the concept of localism to prevent further invasion by requiring bait to be locally sourced. These policies are valuable in that they do not ignore the externalities of problemsheds impacting the watershed, but instead identify and attempt to address them within and sometimes beyond watershed.

Table 1 summarizes the watershed boundary challenges, how they are manifested in this case, as well as how they are being addressed in Lake Simcoe.

Table 1. Watershed boundary challenges and Lake Simcoe.

Problem noted in literature	Presence of problem in Lake Simcoe	Approaches utilized in Lake Simcoe
<i>Boundary selection</i>		
Nested set of watershed boundaries	Lake Simcoe watershed nested within the Great Lakes Basin, and contains 18 sub-watersheds (basin report)	Identified a 'manageable area'
'Naturalness' of boundary in question as a result of human impact	Watershed heavily impacted by residential development and Holland Marsh	Source of environmental problems
Politically influenced	Watershed boundary selection historically linked to the membership of municipal governments in the LSRCA (wood) which created jurisdictional area	Engagement of government agencies
		Potential to be altered based on new knowledge
<i>Accountability</i>		
Limitations in authority of watershed organization	LSEMS has no teeth to implement regulations, no authority	Clear distinctions between types of policies in LSPP
Poor accountability mechanisms because of lack of authority and reporting structure	Had proposed new governance, but was dissolved by LSPA	Identifies specific responsible authorities
		Include targets and indicators which provide metrics to measure progress
		Legislated review periods
		LSPA and LSPP a response to action of citizens and NGOs
<i>Participation and empowerment</i>		
Watershed boundary is not a meaningful boundary for public, so participation and therefore	Watershed is extremely large and a diverse population.	Ultimate authority remained with the provincial government for decision making
	Primary division is between urban,	

accountability is weak	recreational and agricultural and First Nation residents. Costly to engage whole watershed Historically engagement also limited by LSRCA jurisdictional authority	Intensive use of stakeholder and science committees to influence development of LSPP Stewardship Network Permanent multi-sector and science committees with direct access to policy process. Coordinating committee with power to request amendments, and directly oversee implementation process
<i>Policysheds</i> Incongruence between policy jurisdiction and environmental challenges	Multiple provincial, municipal and watershed scale policy programs which resulted in fragmented and overlapping policy landscape	Reduction of duplication between LSPP and previously established provincial land use plans Integration of LSPP policies with municipal jurisdictions through Official LSPP conformity All comments, submissions, advice or decisions by public bodies must conform to LSPP
<i>Problemsheds</i> Incongruence between boundaries of multiple environmental problems	Several environmental challenges are derived from outside of the watershed, i.e. invasive species and atmospheric deposition of phosphorus	Allow for research and monitoring outside of legislated boundary to understand extent of externalities Permits for amendments to boundary to include area of externalities if necessary to regulate negative activities Recognition of externalities impact on watershed, and introduces policies to mitigate problems where feasible

Additional mechanisms utilized in Lake Simcoe

In the previous sections we demonstrated how various mechanism and tools were used in response to the boundary challenged identified for water governance. In this section, we highlight mechanisms and tools used in Lake Simcoe that do not relate specifically to a water boundary challenge, but that introduce additional tools and mechanisms for water governance. These tools and mechanisms help to transcend the watershed boundary.

The LSPP is structured around four different types of policies. Strategic Actions play an important role in the adaptive nature of the LSPP by introducing issues or problems acknowledged to play a role in either the restoration, or degradation of the watershed (i.e. shoreline protection or recreation), but which require further research, consultation, or monitoring in order to formulate how they should be addressed. Thus, Strategic Actions identify the type of work to be done, which may later be used to bring amendments to the LSPP as a result of their analysis. This type of action is related to the LSPA being considered an 'enabling' piece of legislation, in that it provides authority for the LSPA to develop regulations around an issue, without stating the details of the regulation (LSPA, R.S.O. 2008, c. 23, s. 26, 27). This also permits the agencies named in the LSPP an opportunity to further determine whether a) a regulation is necessary, and b) what the appropriate approach and details of the regulation would be. An example is the case of on-site sewage treatment (septic systems) noted in Section 4.13 of the LSPP which calls for the proposal of a regulation of these systems when in 100 m of a shoreline (Government

of Ontario, 2009). Therefore, the combination of the strategic actions, and the enabling capacity of the LSPA permit the governance system to adhere to the pre-cautionary principle.

Also, the LSPP has the potential to be amended at any time, as noted in Section 8.13 (Government of Ontario, 2009). This is unique to the LSPP, in comparison with other provincial level plans, which can only be amended during their 10 year review. As noted by one government staff member, the LSPP was less than one year old before there were consultations being held for amendments to the Phosphorus Strategy and Shoreline Protection Strategy. Additionally, the LSPP can be amended as a result of research, monitoring, and reporting reviews (annual and 5 year review). Thus, the LSPP has the potential to be very responsive to new knowledge and understanding, and incorporate this quickly into the management of the LSPP, permitting the plan to be very adaptive in nature.

Lastly, the implementation of this LSPP occurs through policy integration which takes place at several levels of government. Specifically, both levels of municipal Official Plans must conform to the LSPP. The actions and management plans of the Lake Simcoe Conservation Authority, which provide a watershed scale jurisdiction, are also guided by the LSPP in addition to other provincial level agencies and legislation that must be integrated with the LSPP. Second, multilevel learning and collaboration has occurred primarily through the Committees for the Plan, and will continue to take place in the permanent committees. In addition to these committees, there were also a number of other consultation and training events that permitted cross level learning. These include training for municipal planners and the public on the implementation of the LSPP, the extensive consultations held prior to the introduction of the LSPA, and consultations currently taking place for amendments to the LSPP. Combined, these approaches provide a precautionary, adaptive and multi-level governance process.

BOUNDED AND UNBOUNDED WATER GOVERNANCE

The aim in this paper was to explore how governance for water can transcend the watershed boundary. The case demonstrated that boundaries are useful for purposes such as delimiting the scope of an organisation's mandate, or the coverage of a statute. In the case of Lake Simcoe, a boundary was necessary to identify the scope of the legislation, and therefore the geographical area over which the legislation grants authority to certain actors in decision making. The boundary chosen was largely based on hydrological parameters (i.e. the Lake Simcoe watershed). In that sense, the use of a boundary in Lake Simcoe responds to the call from authors who argue that governance should be organized and integrated at this scale (Huitema et al., 2009; Leach, 2006; Schmidt and Morrison, 2012).

Yet a review of watershed boundary challenges as present in Lake Simcoe reveal several instances where the watershed boundary is not being applied in the truest sense or utilized for all activities. For example, the water governance boundary in this case is only loosely based on the natural hydrological boundary. The data from this study show that the hydrological boundary was only a starting point; it was adjusted based on a number of other social and political considerations. Thus, while a boundary was utilized to define the scope of the *Lake Simcoe Protection Act*, it was not selected based on the inherent 'naturalness' of the watershed. Additionally, the legislative boundary does not limit the research and monitoring activities of the legislation. While most of these activities will take place within the legislative (watershed) boundary, research and monitoring will also take place outside the boundary if an issue of concern is identified that could be impacting the watershed. Therefore, the case of Lake Simcoe reinforces that strict adherence to watershed boundaries is not necessary (or desirable).

Importantly, a review of non-boundary dependent tools in the case highlight a focus on process, rather than boundaries, for water governance permitting greater attention to coordination across levels and scales. Water governance mechanisms that help to transcend the watershed boundary are identified below (Table 2).

Legislative design

In this case the LSPP is a mechanism used to harmonize the policies within the watershed, and is intended to create clearly defined areas of policy authority between the policies that apply to the watershed. This occurs through two mechanisms. First, the highest level of authority is identified in cases where there is overlap among mandates. Second, the LSPP ensures cross-scale coordination through the municipal Official Plan process through which all policies of the LSPA and other provincial policies are implemented. In doing so, competition between policies is reduced and linkages across scales are improved.

Table 2. Strategies for water governance.

Thematic area	Strategy
Legislative design	<ul style="list-style-type: none"> - Harmonization of new and existing policies - Utilize existing mechanisms to implement harmonization - Multi-scalar response to watershed challenges
Organizational arrangements	<ul style="list-style-type: none"> - Clear identification of which governing agencies are responsible for individual responsibilities - Implementation, monitoring and authorities exist at multiple levels - Utilize existing organizational authority
Role of science	<ul style="list-style-type: none"> - Underpins entire development process - Directs adaptations of legislation and regulations - Led by non-government scientists - Adaptive approach built on precautionary principle
Multi- actor governance	<ul style="list-style-type: none"> - Role for non-government actors in policy development, review and implementation - Shared institutions created by engagement in policy creation and implementation rather than through a new organization
Jurisdictional boundary	<ul style="list-style-type: none"> - Amendable based on emerging science - Defined by capacity to manage (within political, economic and social contexts)

Working across multiple levels and scales is an important way to address the question of the mismatch between watershed boundaries and relevant policysheds and problemsheds. Doing so recognizes that not all action must take place at one scale (i.e. the watershed). The implementation of the LSPP takes place at a variety of scales and levels to address both issues of policysheds and problemsheds. For example, municipal Official Plans are used by municipal government for land use decisions, sub-watershed plans are utilized for water management activities, and the shoreline is one of the many areas of focus for improving natural aquatic habitat. Importantly, the LSPP does not use the watershed boundary to attempt to encircle all of the environmental challenges facing the watershed. Rather it permits strategic policy options for dealing with the problems arising outside of the watershed, but which have impact within the watershed.

Organizational arrangements

Also significant, a new watershed organization was not created to implement the LSPA. Instead, coordination across multiple levels and scales of organizations and government agencies was identified

through the LSPP development process as a potentially more effective approach. Consequently, the LSPP is implemented by relevant actors at the municipal, provincial, and federal government levels, and by members of local community and environmental groups. This approach stands in contrast to calls for the creation of new agencies at the watershed scale that are expected to provide this integrative function (e.g. European Union Water Directors, 2003; Global Water Partnership, Technical Advisory Committee, 2000).

Role of science

Another important characteristic of the LSPP is its recognition of the 'unknown scale' through explicit inclusion of a kind of 'grey zone' around the LSPA legislative boundary. These grey areas are an opportunity to include in the legislated area of the LSPA, areas where externalities are generated, if determined through research and monitoring activities. Therefore, the LSPA gives government the authority to take actions to improve the ecological health of the watershed even though the problem that threatens the watershed is generated outside of its boundaries. The LSPP also has the capacity to introduce regulations or environmental management plans for grey zones introduced into the legislated area. Therefore, the LSPP recognizes that new scales may also be identified, and permits their inclusion into the management of the watershed. Whether or not this approach will be effective could not be determined through this research. Nonetheless, it stands as a potential example of the kind of adaptive approach to governance that increasingly is being called for.

Multi-actor governance

Constructing shared institutions requires a focus on the quality of interactions and joint development of policies and programs through learning by doing. This insight is useful for considering the approach in Lake Simcoe regarding policysheds and participation and empowerment. Policysheds can only be effectively created through a joint appreciation and commitment to integration and coordination across scales, while empowerment in participation comes from the quality interactions and joint development of policies and programs. The two committees created by the LSPA (the Science and Coordinating Committees) have permanent access to government, and have the power to call for amendments to the LSPA. This provides a meaningful empowerment opportunity for those involved. The fact that the government engaged members of the public deeply in developing the LSPP is also important. The two predecessor committees that provided a mechanism for this interaction were involved in an intense negotiation process to determine key elements of the LSPP and to provide input to its overall direction. Finally, coordination efforts necessitated by the Official Plan conformity process required open communication among various levels of government and between agencies to achieve a level of integration between the various provincial and municipal policies. This too demonstrates the multilevel governance approach of the LSPA and LSPP.

Jurisdictional boundary

Folke (2005) suggests that flexible and adaptive institutions are necessary, and that decision makers should be able to respond to new knowledge, technical capacity, and resources. In the Lake Simcoe case, flexible and adaptive institutions and behaviours underlay the design of the LSPA and the LSPP. Critically, the jurisdictional boundary can be amended by government based on new scientific information relating to the problemshed gathered through monitoring activities, or outcomes from Strategic Action policies. The Strategic Action policies leave a place holder in the LSPP for future areas of study where issues have been identified as a potential concern, but which require further research, consultation, or monitoring in order to formulate how they should be addressed. Thus, Strategic Actions identify the type of work to be done, which may later be used to bring amendments to the LSPP as a result of their analysis. The LSPA is also an 'enabling' piece of legislation, in that it provides

authority for the LSPA to develop regulations around an issue, without stating the details of the regulation (LSPA, R.S.O. 2008, c. 23, s. 26, 27). This also permits the agencies named in the LSPP an opportunity to further determine whether a regulation is necessary, and what the appropriate approach and details of the regulation would be. These measures can lead to amendments to the LSPA, but importantly, the amendments can take place at any time. This distinguishes the LSPA from other statutes that can only be reviewed at fixed intervals, if at all.

CONCLUSIONS

Water governance scholars and practitioners have long grappled with questions surrounding how best to engage actors, to formulate policies and plans, and to achieve successful implementation (Bakker and Cooke, 2011; Morrison et al., 2004; Smith and Porter, 2010). Watershed boundaries have been identified as a way to ease the challenges of obtaining participation, integrating resource problems and providing a coherent policy framework (Grigg, 2008; Mitchell, 2005; Rahaman and Varis, 2005; Savenije and van der Zaag, 2008). Yet critical analyses of the role of the watershed boundary for governance are pointing to a host of challenges (Blomquist and Schlager, 2005; Fitzsimmons, 1996; Warner et al., 2008; Woolley and McGinnis, 1999). These relate to boundary selection, participation and empowerment, accountability, policysheds, and problemsheds. Critiques of the use of the watershed to define the scope for governance suggest that doing so does not ensure integration of processes, issues, problems, or policies. More fundamentally, there is little evidence that adopting a watershed boundary necessarily leads to harmonized policies, reduced power struggles, or more effective collaboration. Whether applied by legislation or policy, watershed boundaries simply create another jurisdictional boundary for governance. As Tiesman and Edelenbos (2011: 102) have noted, "no redefinition of boundaries will make boundaries disappear". What then is the role of the watershed boundary in governance for water?

Results from this research show that a watershed boundary can be used to define a legislated area, and to delimit management areas as has been suggested by watershed governance scholars. However, the case of Lake Simcoe has highlighted a number of caveats for identifying and applying a watershed boundary for water governance. In the case of Lake Simcoe, the watershed boundary was not a strictly hydrological boundary, but was modified based on both political and management needs. However, the case also indicated that issues of accountability, participation, and empowerment can be navigated through non-bounded mechanisms. Through this analysis we highlighted specific opportunities for improving water governance in ways that are not based on watershed boundaries.

Perhaps most importantly, this research indicated that non-boundary governance mechanisms were being used extensively by the provincial government to navigate a complex water system. The LSPA and LSPP include mechanisms for learning followed by adaptation, the creation of shared institutions, and multiple mechanisms to integrate issues and solutions across scales and levels. This is an important advancement in water governance as it demonstrates a focus on process. Specifically, the case illustrates the principles of adaptation, learning by doing, and accepting that not all is understood about our physical and social environment. It also highlights the fact that these systems are in constant flux, and our capacity to govern them is dependent upon our ability to become dynamic, responsive, and adaptable governance actors.

REFERENCES

- Bakker, K. and Cooke, C. 2011. Water governance in Canada: Innovation and fragmentation. *International Journal of Water Resources Development* 27(2): 275-289.
- Barrow, C.J. 1998. River basin development planning and management: A critical review. *World Development* 26(1): 171-186.

- Blomquist, W. and Schlager, E. 2005. Political pitfalls of integrated watershed management. *Society and Natural Resources* 18(2): 101-117.
- Cohen, A. and Davidson, S. 2011. The watershed approach: Challenges, antecedents, and the transition from technical tool to governance unit. *Water Alternatives* 4(1): 1-14.
- Commission of the European Communities. 2007. *Towards sustainable water management in the European Union. First Stage in the Implementation of the Water Framework Directive*. Brussels: EU.
- Davidson, S.L. 2013. Transformations in water governance: An examination of the Lake Simcoe watershed. Unpublished PhD Thesis, University of Waterloo, Waterloo, ON.
- European Commission. 2001. Common strategy on the implementation of the Water Framework Directive. Brussels: European Commission.
- European Union Water Directors. 2003. Common strategy on the implementation of the Water Framework Directive: Best practices in river basin planning, Work Package 2: Guidance on the Planning Process, Version 4.3, European Union Water Directors.
- Ferreira, C.; de Loë, R.C. and Kreuzwiser, R. D. 2008. Imagined communities, contested watersheds: Challenges to integrated water resources management in agricultural areas. *Journal of Rural Studies* 24(3): 304-321.
- Fitzsimmons, A.K. 1996. Sound policy or smoke and mirrors: Does ecosystem management make sense? *Water Resources Bulletin* 32(2): 217-227.
- Fitzsimmons, A.K. 1998. Why a policy of federal management and protection of ecosystems is a bad idea. *Landscape and Urban Planning* 40(1-3): 195-202.
- Folke, C.; Hahn, T.; Olsson, P. and Norberg, J. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30: 441-473.
- Galaz, V.; Olsson, P.; Hahn, T.; Folke, C. and Svedin, U. 2008. The problem of fit among biophysical systems, environmental and resource regimes, and broader governance systems: insights and emerging challenges. In Young, O.R.; King, L.A. and Schroeder, H. (Eds), *Institutions and environmental change: Principal findings, applications, and research frontiers*, pp. 147-186. Cambridge, Massachusetts: MIT Press.
- Global Water Partnership. 2003. *Effective water governance: Learning from the dialogues*. Stockholm, Sweden: GWP.
- Global Water Partnership, Technical Advisory Committee. 2000. *Integrated water resources management*. Stockholm, Sweden: Global Water Partnership.
- Government of Ontario. Lake Simcoe Science Advisory Committee. Media Release. 2008.
- Government of Ontario. Lake Simcoe Protection Plan. 2009. Toronto, Queen's Printer for Ontario.
- Griffith, G.E.; Omernik, J.M. and Woods, A.J. 1999. Ecoregions, watersheds, basins and HUCs: How state and federal agencies frame water quality. *Journal of Soil and Water Conservation* 54(1): 666-677.
- Grigg, N.S. 2008. Integrated water resources management: Balancing views and improving practice. *Water International* 33(3): 279-292.
- Huitema, D.; Mostert, E.; Egas, W.; Moellenkamp, S.; Pahl-Wostl, C. and Yalcin, R. 2009. Adaptive water governance: Assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda. *Ecology and Society* 14(1).
- Johns, C. and Rasmussen, K. 2008. Institutions for water resource management in Canada. In Sproule-Jones, M.; Johns, C. and Heinmiller, T. (Eds), *Canadian water politics*, pp. 59-89. Montreal, Quebec: McGill-Queen's University Press.
- Kenney, D.S. 1999. Historical and sociopolitical context of the western watersheds movement. *Journal of the American Water Resources Association* 35(3): 493-503.
- LSPA (Lake Simcoe Protection Act), R.S.O. 2008, c. 23
- LPSA, O Reg 219/09
- Lake Simcoe Science Advisory Committee. 2008. Lake Simcoe and its watershed. Report to the Minister of the Environment. Toronto: Queen's Printer for Ontario.
- Leach, W.D. 2006. Collaborative public management and democracy: Evidence from western watershed partnerships. *Public Administration Review* S1(special issue): 100-110.

- Mitchell, B. (Ed). 1990. *Integrated water management: International experiences and perspectives*. London: Belhaven Press.
- Mitchell, B. 2005. Integrated water resource management, institutional arrangements, and land-use planning. *Environment and Planning A* 37(8): 1335-1352.
- Molle, F. 2007. Scales and power in river basin management: The Chao Phraya River in Thailand. *The Geographical Journal* 173(4): 358-373.
- Molle, F. 2009. River-basin planning and management: The social life of a concept. *Geoforum* 40(3): 484-494.
- Montgomery, D.R.; Grant, G.E. and Sullivan, K. 1995. Watershed analysis as a framework for implementing ecosystem management. *Journal of the American Water Resources Association* 31(3): 369-386.
- Morrison, T.H.; McDonald, G.T. and Lane, M.B. 2004. Integrating natural resources for better environmental outcomes. *Australian Geographer* 35(3): 243-258.
- Nowlan, L. and Bakker, K. 2007. *Delegating water governance: Issues and challenges in the BC context*. British Columbia: UBC Program on Water Governance.
- Parkes, M.W.; Morrison, K.E.; Bunch, M.J.; Hallstrom, L.K.; Neudoerffer, R.C.; Venema, H.D. and Waltner-Toews, D. 2010. Towards integrated governance for water, health and social-ecological systems: The watershed governance prism. *Global Environmental Change* 20(4): 693-704.
- Rahaman, M.M. and Varis, O. 2005. Integrated water resources management: Evolution, prospects and future challenges. *Sustainability: Science, Practice and Policy* 1(1): 15-21.
- Reeve, I. and Brunckhorst, D. 2007. Spatially bounded regions for resource governance. *Australasian Journal of Environmental Management* 14(3): 39-51.
- Saravanan, V.S.; McDonald G.T. and Mollinga, P.P. 2009. Critical review of integrated water resources management: Moving beyond polarised discourse. *Natural Resources Forum* 33(1): 76-86.
- Savenije, H.H.G. and van der Zaag, P. 2008. Integrated water resources management: Concepts and issues. *Physics and Chemistry of the Earth* 33(5): 290-297.
- Schmidt, P. and Morrison, T.H. 2012. Watershed management in an urban setting: Process, scale and administration. *Land Use Policy* 29(1): 45-52.
- Smith, L.E.D. and Porter, K.S. 2010. Management of catchments for the protection of water resources: Drawing on the New York City watershed experience. *Regional Environmental Change* 10(4): 311-326.
- Tiesman, G.R. and Edelenbos, J. 2011. Towards a perspective of system synchronization in water governance: A synthesis of empirical lessons and complexity theories. *International Review of Administrative Sciences* 77(1): 101-118.
- Veale, B. 2010. Assessing the influence and effectiveness of watershed report cards on watershed management: A study of watershed organizations in Canada. PhD thesis, University of Waterloo, Waterloo, Ontario.
- Warner, J.; Wester, P. and Bolding, A. 2008. Going with the flow: River basins as the natural units for water management? *Water Policy* 10(2): 121-138.
- Wengert, N. 1985. The river basin concept as seen from a management perspective in USA. In Lundqvist, J.; Lohm, U. and Falkenmark, M. (Eds), *Strategies for river basin management*, pp. 299-305: D. Reidel Publishing Company.
- White, G.C. 1957. A perspective of river basin development. *Law and Contemporary Problems* 22(2): 157-187.
- Woolley, J.T. and McGinnis, M.V. 1999. The politics of watershed policymaking. *Policy Studies Journal* 27(3): 578-594.
- Yin, R.K. 2009. *Case study research: Design and methods*. 4th edition, Applied Social Research Methods Series, Vol. 5. Thousand Oaks, California: Sage Publications.
- Young, O.R. 1992. The effectiveness of international institutions: Hard cases and critical variables. In Rosenau, J.N. and Czempiel, E.O. (Eds), *Governance without government: Order and change in world politics*, pp. 160-194. Cambridge, UK: Cambridge University Press.

THIS ARTICLE IS DISTRIBUTED UNDER THE TERMS OF THE CREATIVE COMMONS *ATTRIBUTION-NONCOMMERCIAL-SHAREALIKE* LICENSE WHICH PERMITS ANY NON COMMERCIAL USE, DISTRIBUTION, AND REPRODUCTION IN ANY MEDIUM, PROVIDED THE ORIGINAL AUTHOR(S) AND SOURCE ARE CREDITED. SEE [HTTP://CREATIVECOMMONS.ORG/LICENSES/BY-NC-SA/3.0/LEGALCODE](http://creativecommons.org/licenses/by-nc-sa/3.0/legalcode)
