



The formation and viability of a non-basin water management: The US–Canada case

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Abstract

Despite the much-vaunted advantages of basin-wide management many transboundary water regimes do not conform in practice to the basin-wide scale. This study examines whether a spatial alternative that includes only parts of the basin is indeed viable. To this end the US–Canada case is examined. Two questions are asked: why has a non-basin scale been adopted? And whether this option is indeed viable. The review of the negotiations leading up to the US–Canada 1909 Boundary Treaty, and to the establishment of the International Joint Commission (IJC) to control the boundary water (i.e., only the water that crosses the boundary at the point of crossing), shows that the choice of this scale was an outcome of a deadlock in negotiations at the basin scale. The boundary scale was chosen as it reduced the number of players involved in the decision-making process and, consequently, the political costs of a basin-wide agreement. Inevitably, in the subsequent decades the regime faced challenges due to the discrepancy between its jurisdiction and basins. Perhaps the most severe challenge was posed by the Chicago Diversion that was excluded from the regime jurisdiction. Therefore, the paper focuses on how the boundary scale addressed the Chicago diversion externalities. The discussion of this case suggests that the combination of the flexibility of the regime and its interpretations, the nature of the resource (inter-connected lakes) and the two-way upstream–downstream relations along the borders allowed this challenge to be contained. It seems, thus, that a regime can indeed be set at a different scale than the basin-wide one and still be viable.

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1. Introduction

Approximately 263 river basins in the world, covering 45.3% of the earth's total land surface, are shared by two or more countries (Wolf et al., 1999). This mismatch between political and physical boundaries, combined with the increasingly strained competition for water resources, often result in water use within one country directly impacting that of another state (often called externalities). In such cases cooperation over the shared water basins is required to internalize these externalities, and thereby to prevent the escalation of disputes that

originate from unilateral action (World Water Assessment Program, 2003).

Cooperation over transboundary natural resources is largely often formalized through treaties (Young and Levy, 1999; Susskind, 1994; Beach et al., 2000). Indeed, in the field of water resource management during that last half of the 20th century approximately 295 international water agreements were negotiated and signed including cases of treaties signed between hostile countries (United Nation Environmental Program, 2002).

Negotiating an agreement to govern transboundary water requires setting the appropriate geographical scale of negotiations and management. The geographical scale is the spatial framework within which government decisions are made (often referred to as administrative spaces or jurisdiction). It is often suggested that this

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scale should be set at a basin-wide. A basin-wide scale allows land, water and human development issues to be integrated, thereby potentially internalizing all externalities, regardless of political boundaries (Kliot et al., 2001; Lundqvist et al., 1985; Gleick, 1993). However, in practice many transboundary institutions do not conform to the basin-wide scale. These include some of the most successful examples of transboundary cooperation. Such is the case of the Rhine Treaty that excluded many of the Rhine basin states from the treaty preview, or the case of the US/Mexico 1944 Treaty that pertains to several basin concurrently (Fischhendler and Feitelson, 2003).

This discrepancy between the basin-wide theory and practice raises the question why are other geographical scales adopted. In particular, this study asks why a narrowly defined spatial scale (that excludes much of the basin area from its jurisdiction) is often established to govern transboundary water. The study also seeks to examine whether such a regime can remain viable. Viability is defined as ability of the regime to foster effective cooperation; to last for decades, and its ability to internalize externalities, despite its seemingly limited spatial scale.

The study argues that the deviation from basin scale management should not be viewed as an error, but rather as a necessity if an agreement on transboundary water is to be reached at all. Thus, excluding significant parts of the basin area from the regime jurisdiction can resolve an impasse in negotiations at the basin scale. It also argues that often many of the adverse implications of ignoring the basin-wide scale can be mitigated and thus the regime can remain viable despite ignoring the integrity of the water resources.

The study focuses on the US and Canada water regime, first formalized almost a century ago when the 1909 Boundary Treaty was signed and the International Joint Commission (IJC) created. This regime—still functioning—is often cited as a model of success for other states seeking to regulate their international water (Holsti and Levy, 1974; Cohen, 1976; Legault, 2000). However, although the 1909 Treaty and the IJC's performance were intensively studied (e.g., Bloomfield and Fitzgerald, 1958; Dreisziger, 1974; Carroll, 1988) the role and function of the IJC as a boundary commission (as opposed to a basin commission) has not been explicitly examined. As the institutional system has been in place for almost a century this case allows for an analysis of the viability of this spatial choice.

The paper begins by setting the theoretical background for the need to reconcile the discrepancy between the basin-wide theory and practice. Second, it describes the conditions that led to the formation of a boundary regime to regulate the US–Canada shared water and especially the role of a boundary treaty (as opposed to a basin one) in the establishment of a management regime. Then it examines how the viability of the boundary

treaty and its subsequent institution was sustained. To this end the tactics used to mitigate the adverse implications of this management system, which disregards the hydrological unity of the basin, is examined, focusing on the Chicago Diversion (which was excluded from the management jurisdiction over the Great Lakes). It concludes by discussing the conditions under which a non-basin-wide system may be adopted and sustained. Due to the large scope of the issues addressed, and for the sake of brevity, this paper does not address issues of water quality.

2. Spaces of water management

The basin-wide approach is widely advocated. Economists endorse the basin-wide paradigm since they assume that this paradigm will optimize the opportunity cost of investments and the efficient use of scarce water (Rogers, 1991). For environmentalists this paradigm implies the best way to protect the natural regime of the basin and to ensure that the human effect is rendered the least harmful (Waterbury, 2002). It may also harmonize long-run ecosystem needs with direct water exploitation, and thus can help operationalize the notion of sustainable water development (Raskin et al., 1996). International lawyers have also agreed that the critical unit of analysis for international water resources is the international drainage basin (Caponera, 1985; Housen-Couriel, 1994). As a result, the International Law Commission submitted to the UN General Assembly in 1991 the first draft of Articles of the Convention on Non-Navigational use of International Water Courses, based upon the basin-wide paradigm. Lately, the European Union has also followed in the UN's footsteps as it discusses a new framework directive that establishes some principles of integrated basin management in the international river basins shared by EU Member States (Correia and deSilva, 1999).

Given this widespread advocacy it is not surprising that numerous efforts to implement basin-wide institutions were undertaken for various purposes, including water appropriation, water quality, land use planning and infrastructure development. However, it was already observed that basin-wide initiatives often fail, at both the planning/negotiation and management stages (Pope, 1981; Mitchell, 1983; Waterbury, 1997). This failure has been attributed to the disregard of the physical, social and political heterogeneity of the basin and region in the attempts to craft comprehensive solutions that encompass all the players of the basin (Waterbury, 1997; Daniels and Bassett, 2002). If the broad context is ignored the resulting basin-wide regime may lead to infringements on state/local entities' sovereignty (Goldfarb, 1994; Keiter, 1994; Adler, 1995; Lee and Dinar, 1996), time-consuming planning (O'Riordan, 1981; Pope, 1981; Mitchell, 1983), and an asymmetry in the benefits and

costs of cooperation (Dufournaud and Harrington, 1990; Schroeder-Wildberg, 2002). Consequently, researchers began to question the belief in integrated water management (Wescoat, 1984; Walther, 1987; Born and Sonzogni, 1995; Biswas, 2004); some even claim that it is a “holy grail” that cannot be implemented at all (Bartlett, 1990).

In light of the failure of many basin-wide institutions, it was suggested that if we continue to await the advent of basin-wide accords, based on some notion of optimality, the wait might be long and perhaps fruitless (Waterbury, 1997). Therefore, the need for more flexible and openly negotiated administrative spaces has been stressed (Stevens, 1997; Zimmerer, 1994, 2000; Molden and Douglan, 2002).

One possible generic space of negotiation/management that differs from the basin-wide scale is a wider supra-basin scale, whereby several basins are negotiated and managed concurrently. This option allows for broader issues to be linked and thus may increase the basket of benefits of an agreement (Fischhendler and Feitelson, 2003). It may also better address the links between long distance transbasin water transfers, water quality and watershed ecosystem degradation (Michel, 2000). Finally, it may also better address the hydrological conductivity between groundwater and surface water (Wescoat, 1992). The need to move beyond the river basin was indeed the basis for the US–Mexico 1944 agreement, as it resolved conflicts that arose at the basin scale (Fischhendler and Feitelson, 2003). It was also the CALFED¹ program that included the Tijuana watershed in the Colorado basin management zone in order to protect the Colorado’s water quality. The adoption of a supra-basin scale in the Mexico–US case also had long-term implications as it limited the ability to adapt management regimes to changes in the environment, thereby constraining the ability to address environmental stresses and crisis (Fischhendler et al., 2004).

From a management perspective this option does not necessarily contradict the basin management approach, as the whole basin can still be included within the (wider) regime jurisdiction.

This paper analyzes another option—reducing the negotiations transboundary management space to include only the critical part of the basin (a reduction approach). This option excludes troublesome areas from the regime’s jurisdiction, thereby reducing the number of players involved in the decision-making process. This may, in turn, reduce the political costs² of a basin-wide

agreement and thereby may allow a transboundary water regime to be established. However, this option necessarily contravenes the basin-wide paradigm as it disregards the hydrological unity of drainage basins. Thus, sustaining non-basin regimes may be problematic, especially when new externalities emerge beyond the regime’s jurisdiction. These may lead to new disputes over resource use, and may even threaten the existing regime. This is often the case of new sources of water diversions or water pollutions that are not included in the original regime’s jurisdiction.

The next section examines why a limited in scale regime was set in the US–Canada case.

3. The formation of a boundary water management

3.1. Conflicting spatial preferences

Like many other borders, the US–Canada boundary was drawn without much reference to environmental systems (LeMarquand and Scott, 1980). In fact, about 150 lakes and rivers are transacted by this boundary (Fig. 1) (Cohen, 1977). Already at the end of the 19th century a discrepancy between political and hydrological boundaries resulted in potential externalities when Canada announced plans to divert the Niagara’s water, which the US had been using for hydroelectricity production. In response, the US State Department called for regulating the transboundary water of the Great Lakes (Dreisziger, 1974). Subsequently, the US initiated the formation of an International Commission for the Great Lakes in 1902 (Dreisziger, 1974).

While the US concerns focused on the area adjacent to the border, Canada became alarmed when the Sanitary District of the city of Chicago³ diverted water from Lake Michigan, an exclusively US lake remote from the boundary line (Dreisziger, 1974) (see Fig. 1). The aim of this diversion was to dilute the city’s sewage and reverse its flow from Lake Michigan to the Mississippi River (Naujoks, 1946). Since the district did not believe that there were any restrictions on the maximum quantities that could be diverted—but was well aware of the growing needs of the city—it built the Chicago Main Channel with a capacity of 10,000-cubic feet per second (c.f.s.) (see Fig. 2a). By 1900 the canal was pumping 5000 c.f.s. of the lake’s water (Cain, 1969). Canada interpreted this as a threat to the Great Lakes water level (Canadian House of Commons Debates, 1905, p. 40—hereafter Commons Debates). Other concerns Canada had at the time were the proposed diversion of the Rainy River watershed by the Minnesota Canal and the obstruction

¹ The aim of CALFED is to develop and implement a long-term comprehensive plan that will improve water management for beneficial uses of the San Francisco Bay-Delta System. For more see Michel (2000).

² Political costs can be defined as the cost of bargaining, which is the function of the resistance that needs to be overcome in order to establish new regime. For more, see Furubotn and Richter (2000).

³ The Metropolitan Sanitary District of Chicago was created in 1889 in order to keep sewage pollution—that during the late 19th century resulted in the outbreak of several epidemics—out of Lake Michigan.

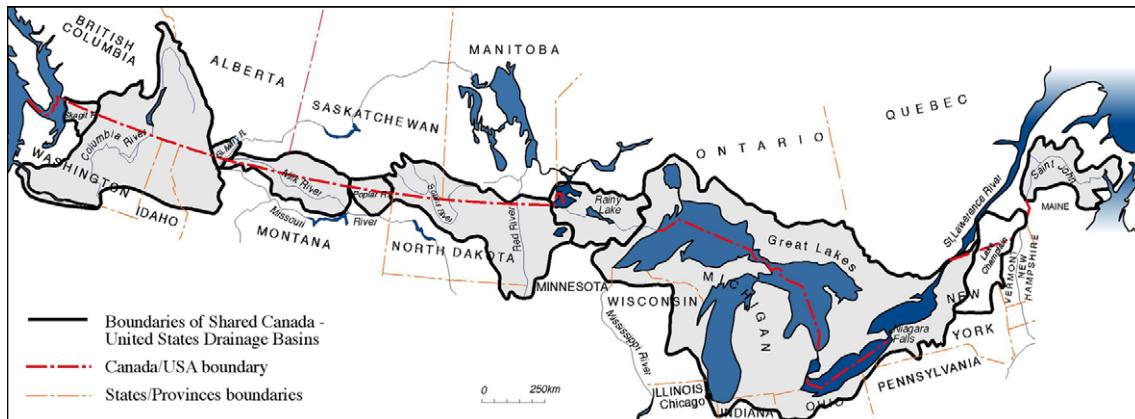


Fig. 1. Transboundary basins between the US and Canada.

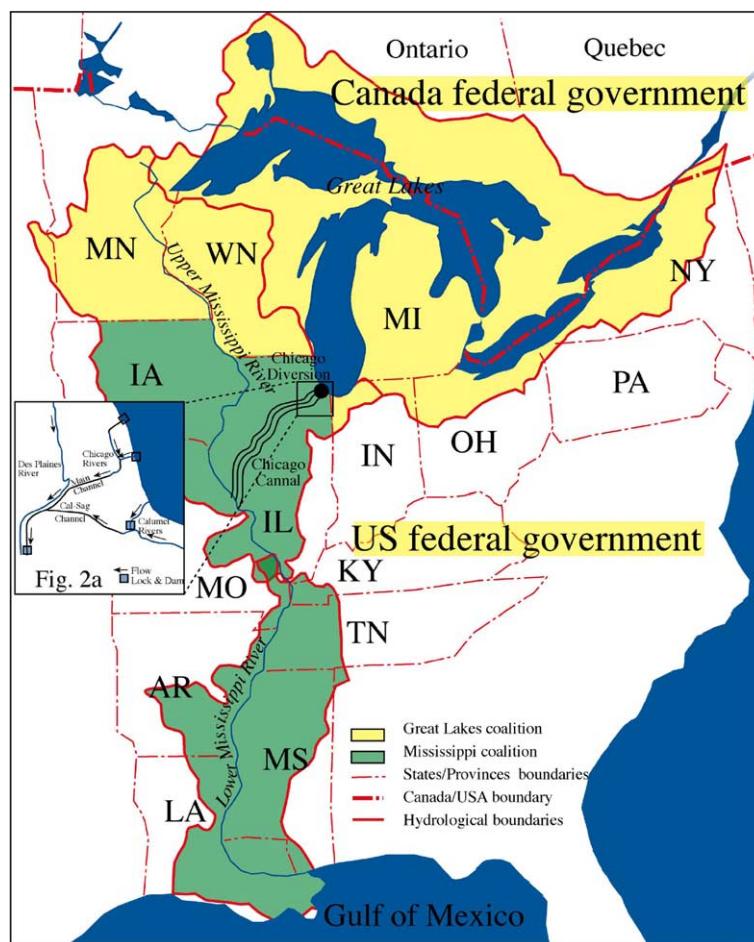


Fig. 2. Distribution of support and opposition to internalize the Chicago Diversion in the late 1920s.

of the St. John River in the state of Maine, which interfered with the floating of logs further down river on the Canadian side (Dreisziger, 1974, p. 59).

All this motivated Canada to join the US initiative to establish an international regime. Since Canada would benefit from the regulation of issues beyond the boundary line, it sought a commission whose jurisdiction would extend over all the basins crossing that line,

including the tributaries of the Great Lakes. This process of setting one treaty and one commission to govern all the transboundary basins would have allowed the commission to restrict the Chicago Diversion and settle controversies on the other international basins. In contrast, the US understood that it was about to pay the cost of a wide-scale regime, and thus wanted a commission that was limited in scope and jurisdiction, which would

regulate only the Great Lakes (without including tributary water) dissected by the boundary line. This, the Americans believed, would ensure the commission's jurisdiction over the future regulation of the Niagara Falls and Lake Erie without limiting the Chicago Diversion. These conflicting needs delayed the cooperation by three years. Finally, in 1904, the temporary International Water Commission (IWC) was established. However, it was vested only with investigative power; no consensus was reached regarding its scope and jurisdiction (Commons Debates, 1909, pp. 6585–6586).

3.2. Deadlock in negotiation at a basin scale

To ease the drought in the mid-south of the US, Minnesota proposed in 1907 that the Great Lakes water be diverted southward through the Chicago Diversion to the Mississippi basin. This initiative was stopped by the protests of Canada and the IWC, combined with internal opposition of the US states bordering the Great Lakes that were concerned about the effect of the diversion on lake levels (Commons Debates, 1910, p. 907).

The perceived risk to water levels further encouraged Canada to establish a permanent authority with jurisdiction over non-boundary water issues that would serve as a judicial tribunal to settle differences along the entire boundary line (Carroll, 1988, pp. 40–41). Canada also hoped that equal representation in such a powerful authority would help offset its power disparity with the US (Gibbons, 1953; Commons Debates, 1909, p. 6639) and give the Canadian federal government control over provincially owned resources, such as non-boundary rivers and lakes (Cohen, 1976).

However, Canadian opposition did not deter the Chicago Sanitary District from planning to divert more Great Lakes water for sanitation purposes in the Calumet region by constructing the Cal-Sag Canal (Cain, 1978) (Fig. 2a). Therefore, the state of Illinois objected to any future basin-wide agreement and wanted to exclude Lake Michigan from any future treaty (Cain, 1969, p. 390). This was supported by the Mississippi basin States, which realized that an international basin-wide regime would block the option of diverting the Great Lakes' water to the Mississippi River to ease the frequent droughts along the Mississippi basin.

Since water in the US is a state issue, the federal government was also troubled by such an initiative. It was afraid this proposed supra-basin regime would infringe on its states' sovereignty by advancing issue linkages across the transboundary basins. This could result in sacrificing the interests of some states in one part of the US to secure the benefits of others in another part of the country (Memorandum of the State Department, 1958, pp. 23–24). Consequently, the US insisted that each party reserve for itself exclusive jurisdiction over the use

and diversions of all waters on its own side of the line (McDougall, 1971).

As a result of these conflicting spatial preferences the 1906 Treaty based upon basin-wide international control of multiple basins suggested by Canada was rejected by the US (Memorandum of the State Department, 1958, pp. 58–59). Instead the US advanced a possible treaty on boundary water, where both countries would benefit from cooperation (Memorandum of the State Department, 1958, pp. 16–17). This resulted in a second draft, in which all matters that lay wholly within the jurisdiction of one or the other of the governments were left out (Dreisziger, 1974, pp. 151, 157).

3.3. Boundary system as a spatial compromise

By attempting to advance a basin-wide regime over the Great Lakes, Canada ignored the adverse implications of including many players with conflicting spatial preferences (especially Illinois, which was supported by the Mississippi Basin States). This resulted in a deadlock in negotiations. The impasse was resolved only in 1909 by which both sides were ready to compromise (Commons Debates, 1910, p. 910) and settle for a spatially limited agreement that excluded troublesome areas (Memorandum of the State Department, 1958, p. 59). Canada was aware that it had to adjust the proposed regime's jurisdiction from basin-wide to boundary if a treaty was to be signed (Bourne, 1974). The US accepted the enlargement of the scope of treaty to the entire US–Canada frontier. Yet, Canada also succeeded in including in the treaty a litigation provision,⁴ a reference mechanism⁵ and the exclusion of the Milk and St. Mary Rivers from this limited sovereignty principle by setting different principles for water allocation in these two rivers.

Consequently, in 1909 a Treaty was signed and the International Joint Commission was established with jurisdiction over boundary⁶ issues. This boundary regime is a combination of supra- and sub-basin management. The supra-basin management is manifested in the concurrent negotiations of all-transboundary basins

⁴ This mechanism enables Canadian citizens to file lawsuits against US citizens in US courts of law in case of transboundary externalities (Commons Debates, 1910, p. 871).

⁵ A reference mechanism, enables, by joint consent, both countries to study any related water question (whether tributary, transboundary or boundary) (Cohen, 1958). However, this reference mechanism was conditioned on mutual consent and its recommendations were not legally binding.

⁶ Boundary waters are defined as "the waters from main shore of the lakes and rivers and connecting waterways, or the portion thereof, along which the international boundary between the United States and the Dominion of Canada passes, including all bays, arms, and inlets thereof, but not including tributary waters which in their natural channels would flow into such lakes, rivers and waterways" (1909 Treaty, Article, IV).

and in the establishment of one agreement and one institution to manage them. The sub-basin management confines the jurisdiction of the treaty and the IJC to boundary (rather than basin) water.

The risk stemming from the Chicago Diversion, however, was left open since the treaty pertained only to boundary water and deliberately excluded any reference to this specific diversion ([Memorandum of the State Department, 1958, p. 41](#)). Furthermore, the US succeeded to exclude the Chicago Diversion from the mechanism of litigation to recover damages by restricting that mechanism to cases that already existed ([Memorandum of the State Department, 1958, p. 48](#)).

4. The hydrological challenge: the case of the Chicago Diversion

By restricting the joint management to the border area the states/provinces were excluded from the new international federal regime. As a result, the political costs of a wider-in-scale agreement were reduced. However, this spatial restriction also provided each side with the legal right to take unilateral action with regard to non-boundary water, thereby disregarding the hydrological unity of drainage basins. Consequently, soon after the treaty was signed there was a need to address the risk of hydrological externalities. The most immediate and severe challenge was posed by the Chicago Diversion. This section focuses, therefore, on this case in order to examine how the potential implications of unilateral action outside the regime's jurisdiction were addressed.

Despite the US Secretary of War's restriction of the Chicago Diversion in 1901 to 4167 c.f.s. of water, by the time the 1909 treaty was being negotiated the Chicago Sanitation District was already building the Cal-Sag Channel, aiming to divert more water ([Diversion memorandum, 1912](#)) ([Fig. 2a](#)). In 1907 and 1913 the District applied to the secretary of war to increase the diversion to 10,000 c.f.s. In both cases the increase was denied on the grounds that it would significantly lower the level of the Great Lakes system, which would jeopardize US relations with Canada, decrease electricity production along the Niagara Falls and interfere with the navigational capacity of the Great Lakes ([Naujoks, 1946](#)). It was made clear, however, that this diversion was in any case beyond the jurisdiction of the 1909 treaty and the IJC as boundary treaty and commission ([Stimson, 1913](#)).

Although the US federal government had not authorized any more than 4167 c.f.s., at least 8000 c.f.s. were diverted by 1912 ([Diversion memorandum, 1912](#)). This increase led the Canadian federal government to protest, especially due to its adverse implications on power production and navigation and their fear that the diversion would be formalized through congressional legislation ([Geddes, 1921; Howard, 1924](#)). This fear was well

founded as Illinois, supported by the Mississippi Basin States, intended to propose in 1924 a congressional act to allow it to withdraw 10,000 c.f.s. ([Boston Transcript, 1924](#)). Despite Canada's ongoing protest, in the early 1920s the diversion indeed rose to almost 10,000 c.f.s. ([Fulton, 1994](#)).

The diversion was regulated in 1925 as a result of injunction bills filed by the US Great Lakes bordering states to the US Supreme Court. The Supreme Court fixed the diversion at 4167 c.f.s., but also affirmed the power of the secretary of war to boost that figure ([Tarlock, 1994, p. 109](#)). Indeed, a few months later the secretary, due to the risk of an outbreak of sewage-related diseases, and despite the Canadian protest (e.g., [Howard, 1925](#)), allowed the district to divert 8500 c.f.s. for four years ([Naujoks, 1946](#)). Canada and the Province of Ontario responded by sending additional letters of protest over the unilateral action, arguing that the diversion conflicted with the need for joint consent ([Beaudry, 1927](#)).

This situation, of some players opposing an increase in the Chicago Diversion while others supported it, generated two coalitions. One was the Great Lakes coalition, comprised of the Canadian federal government and the provinces/states bordering the Great Lakes (except Illinois)—which opposed an increase of the Chicago Diversion. The other was made up of the US states along the Mississippi (except Minnesota and Wisconsin, which supported the Great Lakes coalition since they are riparians on both basins); it supported the increase ([Fig. 2b](#)).

Following another injunction filed by the US Great Lakes coalition against the district and the state of Illinois in 1927 a special master was appointed by the court, who stressed that Canada had no legal grounds for protest since it had accepted the boundary regime set by the 1909 treaty ([Commons Debates, 1928, p. 544](#)). Although the court did not formally consider Canadian rights it did issue, in 1930, a decree that reduced the diversion to 6500 c.f.s. immediately, to 5000 c.f.s. by 1935, and to 1500 c.f.s. by 1938, as well as allowing domestic pumping ([Tarlock, 1994](#)).

Canada's failure to adjust the international regime to govern the Chicago Diversion and the concern of the Great Lakes states (excluding Illinois) over an increased diversion (at times of drought along the Mississippi) motivated both to seek other mechanisms to internalize the externalities generated by the diversion ([Subcommittee of the Committee of Foreign Relations Hearings, 1934, pp. 298, 305, 587](#)). In the early 1930s, while Canada and the US were negotiating the St. Lawrence Treaty,⁷ these partners, together with the US State Department,

⁷ Already in the early 1920s the US and Canada negotiated an agreement aimed to deepen the St. Lawrence River connecting the Great Lakes to the sea in order to increase the navigational capacity of the river.

insisted that the new treaty should legally forbid any diversion of water from the entire Great Lakes basin (Simsarian, 1938). Indeed, the draft treaty presented for ratification to the Senate did include such a provision (McDermott, 1934). However, on March 10, 1934 the treaty failed to pass as the Mississippi coalition, joined by neighbouring states, such as Texas and Kansas, voted against it (Hickerson, 1934). The results of the failure to internalize the Chicago Diversion through an international regime were already seen in the 1940s while Illinois petitioned the Supreme Court for modification of the 1930 decree, seeking to increase the diversion. Indeed, in 1940 the court allowed an increase to 10,000 c.f.s. for 10 days (Changnon and Harper, 1994, p. 16).

In the late 1950s, Illinois had plans to increase the Chicago Diversion by appealing to both the Supreme Court and Congress. In this case, Chicago cited the 1909 treaty as a legal basis for unilateral diversion (Bourne, 1974). Indeed, in 1956, due to the continuing drought on the Mississippi, Illinois requested an emergency release of 10,000 c.f.s. of water to be diverted from Lake Michigan, and the Supreme Court authorized this diversion for 76 days (Changnon and Harper, 1994, p. 31; Fulton, 1994, p. 58).

At the same time, Canada as an upper riparian planned to dam the Columbia River and to divert water from the transboundary Kootenay and Columbia Rivers into the Fraser, a wholly Canadian stream, in order to regulate the Columbia's seasonal fluctuation and to produce hydroelectricity (Bourne, 1959). Canada, and particularly the Province of British Columbia, disregarded the dependence of the northwestern US on this water, arguing their right to divert this non-boundary water under the 1909 Treaty (Bourne, 1959). As a response to these concurrent controversies, the IJC launched a joint investigation, although neither case was a boundary issue. In order to explore the risk of the Chicago Diversion, the IJC used a reference that already existed to check Lake Ontario levels (Subcommittee of Committee of Public Works, 1954) and a general reference issued a decade earlier to probe a controversy on the Columbia (External Affairs, 1957, pp. 247, 272). Finally, since the 1909 treaty and the IJC set uniform rules for the whole boundary line, a unilateral diversion on the Columbia River was presumed to reflect on the diversion of the Great Lakes water, and vice versa. Consequently, both sides refrained from unilateral diversions (Diversion of Water from Lake Michigan at Chicago Report, 1959; House Report, 1959; Piper, 1967, pp. 100–101).

Soon after, as a result of the severe drought between 1961 and 1964, the Great Lakes levels dropped to an unprecedented low (Changnon and Harper, 1994; Cohen, 1988). This resulted in losses of 19–26% to hydroelectric utilities' production on the Niagara and St. Lawrence Rivers, a reduction of cargo loads and

crops (Cohen, 1988). The fear of the US states bordering the Great Lakes that the Mississippi states will use a legal loophole of the 1930 decree, allowing them to increase their domestic uses, and the 1961–1964 drought led to an additional Supreme Court decree. This decree, issued in 1967, set the diversion at 3200 c.f.s., including domestic pumpage (Fulton, 1994, p. 76). However, the court also permitted Illinois to apply for increased diversion for domestic use (US Supreme Court, 1967).

During the drought of 1987–1988 (resulting again from low flows on the Mississippi River) Illinois and the Mississippi Basin States appealed once again for increasing the Chicago Diversion. Yet, strong domestic opposition on behalf of the Great Lakes states, coupled with Canadian opposition through the IJC and the estimation that such a diversion would have only minor impact on the flow of the Mississippi River, succeeded in blocking this proposal (Canadian Year Book, 1989).

In short, the reference mechanisms often allowed the IJC to probe issues beyond its formal jurisdiction, instead of formally expanding the international regime's jurisdiction by new treaties (as the St. Lawrence Treaty tried—and failed to pass). However, the risk for an increase in diversion of the Great Lakes' water, together with narrow definition of the IJC's jurisdiction triggered the establishment of new forms of regulation, discussed below.

5. The emergence of a new water management

As a result of the weak federal and international authority over non-boundary water, several private initiatives (receiving provincial support) to divert Canadian water to the US were advanced.⁸ These proposals and the 1961–1964 regional droughts clarified to both sides the difficulties of maintaining the integrity of the water resources on the basis of the limited jurisdiction of the IJC. Thus, both sides began promoting new strategies to protect the Great Lakes water.

At the federal level, Canada initiated a review process of its water policy and recommended that legislative mechanisms to regulate these transfers and mitigate the risk of water export be sought (Commons Debates, 1993, p. 19998). This resulted in the 1987 federal water policy that prohibits large-scale exports of water from Canada through diversion from lakes and rivers (Commons Debates, 1993, p. 20009). This policy was

⁸ Among them were, the Central North American Project, the 1966 Kuiper Diversion Scheme, the 1968 Western States Water Augmentation Concept (Scott, 1985), and the 1987 suggestion of the governor of Wisconsin to divert the Great Lakes water to the US (Changnon, 1987). Lately, in 1996, the city of Akron in Ohio initiated the Akron Diversion to sell water to nearby jurisdictions beyond the Great Lakes divide (Marsh, 1999).

Table 1
Recent mechanisms to protect the Great Lakes water

Mechanism	Aim	Year initiated	Participants	Initiators
The Great Lakes Water Quality Agreement, its 1978 amendment and 1986 protocol	Adopting an ecosystem approach	1972	Federal governments IJC	Great Lakes states, provinces, Federal governments
The Council of the Great Lakes Governors, the Great Lakes Charter and annex	Adopting basin-wide management	1985	Great Lakes states, provinces	States, provinces
Transboundary watershed boards	<ul style="list-style-type: none"> • Joint basin-wide management • Integrate quality and quantity issues 	1997	IJC, States, provinces and local players	IJC
Binational Executive Committee	<ul style="list-style-type: none"> • Implement the Great Lakes Water Quality Agreement • Direct communication channels between Federal governments 	1995	Federal governments, Ontario and Great Lakes states	Federal governments

Sources: based up on information provided by Pete (2002), Great Lakes Governors Task Force (1985), Johnson (2002), Council of the Great Lakes Governors (2002), Kangas (2002) and Cowgill (2002).

finally formalized by Bill C-15 to amend the International Boundary Water Treaty Act, which conditions any boundary water diversion (except for domestic use) outside the basin on federal approval issued by a permit system, rather than by international approval granted by the IJC. However, this amendment was restricted to boundary water to avoid infringement of the provinces' authority (Fawcett, 2002). This federal reform was accompanied by a series of provincial reforms in which most provinces developed similar policies or legislation to protect water resources from commercialization (Commons Debates, 1999, p. 11611). However, the economic incentive to sell water to the US recently resulted in Ontario and Newfoundland attempting to provide permits for private companies to divert Great Lakes water to the US (Commons Debates, 1999, p. 11614; Council of the Great Lakes Governors, 2002).

The US also promoted a reform at the federal level. In 1986 Congress passed the Water Resources Development Act. This act prohibits any diversion of Great Lakes water without the consent of all eight governors (Article, b(3), Water Resource Development Act, 1986), thereby transferring the power from Congress to the governors of the Great Lakes states (Hill, 1989). This strengthened the Great Lakes Commission, which was set up as an advisory body to protect the basin ecosystem. When Ontario and Quebec joined it, the Great Lakes Commission turned into a binational agency (Declaration of Partnerships, 1999), though it functions only as an advisory body with no substantive authority⁹ (Hill, 1989).

⁹ Although its role is advisory, it provides information on public policy issues; it is an effective forum for developing and coordinating public policy; and a unified, system wide voice to advocate member interests. For more see Great Lakes Commission website: <http://www.glc.org/about/strategy/>.

At the international level, the weakness of both federal governments and the IJC to control diversions has led to many proposals to formally amend IJC jurisdiction to accommodate water diversions in the whole basin, even by renegotiating the existing boundary treaty (Morgan, 1966; Sugarman, 1986; Greenpeace, 1989; IJC, 1985). This demand is supported by the success of the Great Lakes Water Quality Agreement¹⁰ that adopted an ecosystem scale. However, it has become clear that such an action requires that the different states and provinces relinquish power to federal and international bodies (Morgan, 1966). So far they have not shown any readiness to do so (Hill, 1989). As a result, suggestions to update the 1909 Treaty and IJC jurisdiction to a basin-wide control were rejected (Sugarman, 1986; LeMarquand, 1993). Instead, both governments agreed several times to issue references to investigate consumptive use and water diversions in the entire basin thereby broadly interpreting the 1909 Treaty. Three examples are the 1976 and the 1977 references that resulted in the 1981 and the 1985 basin-wide investigation (IJC, 1981, 1985) and the recent 2000 investigation to address the possibility of climate change (IJC, 2000a). Recently, in 1997 a reference was issued allowing the IJC to establish transboundary watershed boards for the all-transboundary basins along the US/Canada border (IJC, 1997). Yet, the commission recently limited this ambitious attempt to reformulate the IJC jurisdiction as it realized that it did not have the support of all states and provinces along the shared watersheds (IJC, 2000b). Finally, the 1909 Treaty was supplemented with other international mechanisms, mostly at the state/province level in order to

¹⁰ This agreement, signed in 1972 and updated in 1978 and 1987, aimed to apply water-quality standards to the Great Lakes. For more, see Becker (1996).

expand the Great Lakes regime jurisdiction. Some of these are summarized in Table 1.

The outcome of all these multiple efforts is a de facto multi-layered management regime. Still, the original treaty or the spatial scale mandate of the IJC was not formally modified.

6. Discussion

Keohane (1995) suggests that when the number of actors involved increases, the problems of cooperation multiply. Given the multiplicity of players, many with conflicting preferences, it is not surprising that Canada's initiative to establish a basin-wide regime for the Great Lakes resulted in high bargaining cost especially for the Mississippi co-basin states, thereby leading to an impasse in the negotiations. Consequently, only what was managerially crucial (the boundary water) ultimately was included in the transboundary regime, thereby excluding the tributaries of the Great Lakes from the regime.

This reduction has enabled domestic players to maintain control over their water resources. Concurrently, it allowed the federal governments to conclude an agreement without the need to consult domestic players. This reduced the political cost of reaching a basin-wide agreement. Yet, the readiness to forgo basin-wide control over the Great Lakes was somewhat compensated by the widening of the regime's jurisdiction to stretch along the entire boundary. This provided Canada with benefits in the form of equal power along the boundary line and an informal mechanism to regulate the Chicago Diversion, as the same rules that apply to the Great Lakes also apply to other basins where Canada is the upper riparian.

This spatial compromise established a boundary regime in which certain parts of many basins are managed concurrently by the IJC, while the rest of the basins are managed by local or regional intra-country institutions. This hybrid scale helped to ensure that only what is managerially crucial will be included in the regime and thus offset the cost both the US and Canada were to incur from a too wide or too narrow spatial regime.

This conclusion—that excluding players from international regimes can reduce political costs—highlights why the majority of treaties regulating international water are binational (Beach et al., 2000, p. 49). Yet, it is important to keep in mind that political costs are not necessarily a function of the number of players; they are also determined by prior political and institutional arrangements.

However, this spatial option limits the capacity to internalize externalities, as it allows provinces/states to disregard the integrity of the water resources by diverting tributary water. As a result, during the first two decades of the 20th century when outflow through the

Chicago Diversion increased the Great Lakes' water level dropped, resulting in economic and environmental losses for all Great Lakes states. Regional droughts in the southern US have exacerbated the danger of such externalities.

Such difficulties in maintaining a viable boundary regime that can address all externalities have led to calls for widening the IJC's jurisdiction towards a basin-wide and even towards an ecosystem approach. However, the current objection of many provinces to renegotiate the 1909 Treaty, and the IJC's belief that limiting the commission to what is environmentally essential—i.e., boundary issues—was what enabled it to circumvent political pitfalls, encouraged the IJC to maintain its formal jurisdiction (Mackenzie, 2002; Vechsler, 2002). Instead of a renegotiation process, which could take years and whose outcome is uncertain, the IJC used mechanisms already included in the 1909 treaty to address issues beyond their formal jurisdiction, such as the Chicago Diversion.

The reference mechanism proved useful in allowing the IJC to investigate issues beyond its formal jurisdiction. Examples include the 1977 reference, the 1985 investigation and the 1997 IJC initiative to establish river basin boards. The successes of the reference mechanism may be attributed to its voluntary status. By being temporary, advisory and narrowly defined in scope, this mechanism seems to circumvent the cost of intuitional operation associated with a formal revision of the regime's jurisdiction. This motivates the Canadian federal government today not to change the advisory status of a reference and to issue more references for the IJC to investigate (Fawcett, 2002). In contrast, the binding process of upgrading the regime's jurisdiction largely failed. An example of such a failure is the 1932 attempt to internalize the Chicago Diversion through the St. Lawrence Treaty. This illustrates the importance of "soft laws"¹¹ in increasing and fostering cooperation. This conclusion is also supported by the evidence of the 1987 Rhine Action Program which, although not legally binding, was almost fully implemented (Dieperink, 1998), and the 1994 agreement for the protection of the Meuse, which is based upon a non-binding action program (Mostert, 1999).

Another option to widen the regime's jurisdiction is by re-interpreting the original treaty. Such re-interpretation of the commissions' jurisdiction was used only when an ad hoc crisis created potential reciprocal benefits from an adjustment. The regional drought of 1961–1964 along the Great Lakes is an example. In this case, when the mutual consensus for issuing a reference was lacking, the IJC expanded its jurisdiction by using existing refer-

¹¹ Soft laws are voluntary agreements, and negotiated rulemaking (as opposed to treaties that are formal and binding).

ences issued for other cases, as happened in the case of the Columbia and the Chicago Diversions in the late 1950s. This lack of consensus for issuing a reference raised the need for flexibility in treaty interpretation to prevent unilateral diversions, which may have undermined the treaty.

Several additional factors may help explain the regime's viability over time, despite the widespread options for unilateral action beyond its jurisdiction. The two main factors pertain to the attributes of the trans-boundary resources, and to the specific parties to the agreement.

The Great Lakes are common pool resources¹² where the parties share the storage capacity, rather than the flow. Common pool resources provide an incentive for parties to cooperate and even to enforce cooperation by an internal regime. The coalition of the US Great Lakes states is a case in point. This coalition highlighted the implications of unilateral diversion on the amity between both sides, on the confidence already established between both sides and on the economic effect of lowering the Great Lakes water on both parties. This forced Illinois to cooperate through court decrees.

Another feature of the resources that precluded the US from unilaterally diverting water through the Chicago Diversion was the two-way upstream/downstream relations along the entire boundary line—especially the fact that Canada is the upstream riparian on the Columbia River. As a result of these considerations, unilateral diversions of non-boundary water including the Chicago Diversion were largely restricted and a more flexible case-by-case approach was used (McDougall, 1971).

The readiness to enter into binding agreements on water issues is a function of the relationship between the parties (Lowi, 1993). The relationship between the US and Canada was friendly throughout the 20th century. The desire of both parties to maintain these relations played a significant restraining role on unilateral actions. Canada, indeed, did stress the adverse implications of the Chicago Diversion on the amity between the two countries in its efforts to limit the amounts diverted.

The growing awareness of the common transboundary interests of the actors at the sub-national level may partially explain the growing readiness to adopt new measures as supplements to the boundary regime. This is the case of the Council of the Great Lakes Governors and its Charter advancing a basin-wide control, the process of strengthening the domestic regime in both countries, adopting the Water Quality Agreement and its ecosystem approach and the latest IJC river basin boards. The success of these measures to widen the IJC's

jurisdiction as a boundary regime can be perhaps explained by their voluntarily nature and the increasing involvement of the provinces and states in the regime.

7. Conclusions

The main conclusion that can be drawn from the US–Canada case is that a reduction approach is indeed viable. The political costs involved in establishing a regime that is limited to boundary water were low relative to the costs of a basin-wide regime. Moreover, the spatially limited boundary regime has been successful in promoting cooperation for almost a century of rapid change. In contrast, the basin-wide approach led to a deadlock in negotiations, as it necessitated a consensus between multiple stakeholders in a decentralized water system. Even in cases where a wider scale regime was established, such as the case of the 1972 Great Lakes Water Quality Agreement and its 1978 update, the focus of pollution prevention was put on those areas adjacent to the boundary water (Carroll, 1988, p. 137).

Yet, for a regime to be viable it must do more than just foster cooperation. A regime has to last for decades of rapid political and environmental changes in order to avoid the high cost of treaty renegotiation. Indeed, the boundary regime was found robust despite the many calls for treaty renegotiation. The longevity of the treaty was made possible by the ability to address externalities beyond the regime's formal jurisdiction. In other words, adaptive management has to be built into the regime so as to address emerging externalities and contingencies without undermining the existing regime structure.

Given the viability requirements excluding some of the basin areas and players from the regime should be considered only when: (i) there is a high level of confidence between the parties, (ii) the resource can tolerate some degree of upstream diversions, (iii) there are two-way upstream/downstream relations within the area included in the agreement, and (iv) mechanisms exist in the agreement that allow to concerns beyond the management space to be addressed. In the US–Canada case these include a reference mechanism, litigation provisions, flexibility in treaty interpretation and the possibility of supplementing the existing regime with "soft" laws and agreements. Furthermore, it is important to identify carefully the cases where players may—or may not—be excluded since cooperation over some natural resources may require joint action by all the parties.

This result emphasizes the need to reconsider the uncritical support of the basin-wide approach and to explore other spatial management alternatives. It also stress that there is a range of possible outcomes of initial negotiations and treaties. Falling short of a treaty that includes only the necessary areas does not constitute a

¹² Common pool resources are often defined as a natural resource that does not enable to exclude people from the benefits of using it (Ostrom, 1990).

failure—it may succeed when along-term perspective is taken.

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