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A Century of Sharing Water Supplies Between Canadian and American Borderland Communities

By
Patrick Forest

For the Program on Water Issues
Munk School of Global Affairs
University of Toronto

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PF, August 2010

A Century of Sharing Water Supplies Between Canadian and American Borderland Communities

Patrick Forest

Introduction

The entry into force of the Canada-United States Free Trade Agreement in 1989 and the North American Free Trade Association (NAFTA) in 1994 reignited a decades-old debate: should Canada allow bulk water exports across its borders? This question has been (and continues to be) the subject of intense debate within Canada. At the societal level, Non-Governmental Organizations (NGOs) have actively debated and challenged the legal positions of the provincial and federal governments. At the academic level, researchers have published a voluminous literature on the commodification of water, its legal status, the impacts of a precedent, and the capacity of Canada to restrict water exports within the context of NAFTA. Under pressure from their constituents, decision-makers have adopted a series of heterogenous laws and agreements in response to the various challenges as outlined in the academic literature.

The facts are these: Canadians seem rather indifferent to the commercialization of bottled water, and notwithstanding isolated protests, appear generally incapable of giving up their dependence on the selling or natural resources such as the oil extracted from the Alberta tar sands. However, Canadians are massively opposed to bulk water exports (Nanos 2009). Water, it would appear, is as much a part of the Canadian DNA as the *grands espaces*, the winter, and our constitutional quarrels.

Since the early 1960s, the water export debate has revolved around Canadian concerns about the multiplication of continental scale water transfers and the fear of an American takeover of Canada's hydrological resources. This hydro-nationalism has in the past produced such poignant pleas as Gen. A.G.L. McNaughton's "A monstrous concept, a diabolic thesis" (1967), and calls to protect our natural heritage from our neighbour. People have tended to overlook the fact that most schemes regarding water transfers were crafted by Canadian professors, civil servants, and engineers, and instead have focused on the mother-of-all schemes: NAWAPA (North American Water and Power Alliance, designed by the California engineering firm The Ralph M. Parsons Company in 1964). This latter scheme embodies all that was wrong with water planning in that period: the idea of nature being totally subservient to man's needs, a total disregard for environmental issues, the belief that every drop of water should be used, and a highly biased view about what constitutes progress. If it had been enacted, NAWAPA would have meant a dramatic redrawing of the North American waterscape. But despite the fact that it was never acted upon, and moreover that it is now considered to be a "dinosaur" (Lasserre 2005), that is to say, dead and buried, NAWAPA's ghost still haunts debates about continental water usage, acting as a springboard for opponents to any bulk water transfer schemes.

More recently, experiences in the 1990s have shown that even smaller, local removals still have the ability to cast a shadow over Canada's sovereignty and to stir up controversy. Proposals for bulk water exports by carriers (Sun Belt Water in 1991 and the Nova Group in 1998) that never materialized attracted significant public and media attention in Canada. Such proposals also helped to shift the debate from one that focused only on sovereignty issues to one that also included consideration of legal-commercial issues. In particular, NAFTA gave rise to doubts about Canada's ability to protect water in its natural state; this despite the federal government's claim that such water is not a 'good' or a 'product' and therefore NAFTA does not apply to bulk water exports.

Given all this often tortured and impassioned rhetoric, we might wonder, has Canada in fact ever transferred bulk water south of the border? The answer to this question – and it is a "yes" – is the subject of this paper. Canada has (and does) transfer bulk water south of the border and the United States has (and does) transfer bulk water north of the border via a number of *transboundary local water supply agreements*. This paper provides factual information about these agreements, including their duration, the volume of water transferred, the direction of the flows, and other important facts. The paper also offers an overview of these inter-local water supplies, including their history, their evolution, their spatial organization, and how they contribute to inter-local cooperation between Canada and the United States.

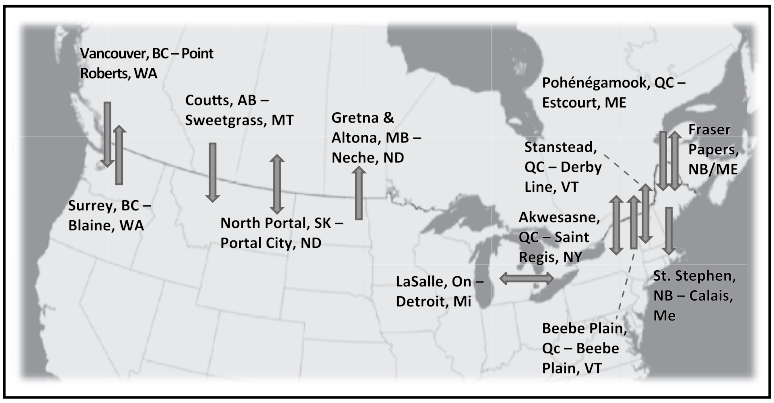
Transboundary Local Water Supplies

The government of Canada has certainly never agreed to continental bulk water export schemes. And while there are a limited number of diversions in the Great Lakes Basin and exports of hydro-electricity by the provinces, none of them actually involve physical water transfers across the border through human means such as canals, aqueducts or water pipelines. However, there *is* one type of bulk water transfer between Canada and the United States that does exist, albeit one that is limited in scope and volume, has existed for many decades and has attracted little attention: *transboundary local water supplies* between borderland communities. For this paper, twelve[1] such agreements have been identified, ranging from coast to coast, of which ten are currently operating (see Figure 1).

These water transfers evolved out of social and physical proximity, and were fuelled by a shared willingness among the communities to address issues relating to compromised water quality and inadequate water quantity. Triggers for this cooperation on water included wells that became choked with sand, experienced a productivity decline, or became contaminated by agricultural effluent or chemicals, as well as intense population growth that put pressure on local hydrological resources. Common to all these transboundary local water supplies was the development of inter-local agreements as a creative solution to their challenges, thanks to local initiatives, but also sometimes as a result of the provincial or federal government involvement. In response to local needs, these transboundary local water supplies evolved endogenously and independently from each other, building on decades of cooperation in social, institutional, and economic realms. Setting aside their differences, the communities developed mechanisms and agreements to address their water supply problems in a way that was beneficial to both parties.

In most cases, the communities involved in transboundary local water supplies are small and the water transfers are similarly small in volume. Typically, in communities of this size, water infrastructure represents a significant financial burden. By contrast, Detroit's water removals, which supply millions of customers, are much larger than all the other water transfers combined. However, a major difference between the Detroit situation and that in the other borderland communities studied is that in Detroit the water comes from a transboundary water source (that is, the Detroit River) rather than from a neighbouring community. (Detroit does, however, pay taxes to LaSalle in Ontario for the water it withdraws). For the other borderland communities, sharing infrastructure represents an opportunity to save on costs and offers a more affordable alternative when no other local sources are available at comparative prices.

Figure 1. Locations of transboundary local water supplies



Source: Forest (2009) and Google Maps

1. An additional category of transboundary water transfer is that involving border crossing stations. In a few cases, Canadians or American custom offices are sharing their water supplies with their counterparts.

Transboundary local water supplies can be divided into three broad categories:

i) asymmetric (unidirectional, towards either Canada or the United States);

ii) reciprocal (the Canadian *and* American communities can supply each other); and

iii) systemic (in which each community's contribution is vital for the proper working of the overall system).

In all 12 cases surveyed, water transfers occur within the same hydrological basin or use the same transboundary aquifer. In none have water pipes or aqueducts been extended to the hinterland. And only borderland Canadian and American communities benefit from these water supplies. The cooperation on water has clearly been driven by geographical proximity, since many of the communities are separated from each other by a mere line on the ground, or sometimes no more than flowerpots, as is the case in Stanstead, Québec. Having close social relationships and frequent interactions has helped to craft a strong sense of neighbourly togetherness. Moreover it is the very local nature of these transfers that has kept them under the radar: more often than not, the water transfers that sustain the communities have not been covered by national media, in spite of the fact that they can be found all across Canada and at one time or another, have involved all the provinces that share a border with the contiguous United States.

Public Policy on Transboundary Local Water Supplies

Despite their very local nature, transboundary local water supplies are inherently multiscalar. Because they straddle the border, their regulation involves local communities, provincial and state governments,

Table 1. List of transboundary local water supplies

Communities	Direction of the flows	Duration	Volume
1. Greater Vancouver Regional District, British Columbia and Point Roberts Water District, Washington	US	1987 -	3,182.2 cubic metres per day
2. Surrey, British Columbia and Blaine, Washington	CAN	1948 -	Variable
3. Coutts, Alberta and Sweetgrass, Montana	US	1963 -	33.33 cubic metres per day
4. North Portal, Saskatchewan and Portal City, North Dakota	CAN & US	Circa 1960 -	454.6 cubic metres per day
5. Gretna and Altona, Manitoba and Neche, North Dakota	CAN	Until 1995	908.4 cubic metres per day
6. LaSalle/province of Ontario and Detroit, Michigan	US	1964 -	Up to 331,506 cubic metres per day
7. Akwesasne First Nations, Québec and Saint Regis Mohawk Tribe, New York	CAN & US	Unknown	400 cubic metres per day
8. Beebe Plain, Québec and Beebe Plain, Vermont	CAN	Circa 1900/1930 - 2004	Unknown
9. Stanstead, Québec and Derby Line, Vermont	CAN & US	1906 -	Up to 1,007.23 cubic metres per day
10. Pohénégamook, Québec and Estcourt, Maine	US	1975 -	5 cubic metres per day
11. Edmundston, New Brunswick and Madawaska, Maine (Twin Rivers Paper Company)*	CAN & US	1920 -	Unknown
12. St. Stephen, New Brunswick and Calais, Maine	US	1903 - 2000	2,649.5 cubic metres per day maximum

*Despite being included in the list, this transfer does not involve potable water supplies. It is a commodity pipeline that carries wood fibre mixed with surface water from one plant to another across the border.

Canadian and American federal governments, and sometimes bi-national organizations, such as the International Boundary Commission and the International Joint Commission.

The issue of bulk water exports was addressed by the Inquiry on Federal Water Policy that reported in 1985 (Pearse, Bertrand, and MacLaren, 1985). Following the Inquiry, Quinn (1990, 168) noted that one of its major contributions was "to distinguish clearly between small-scale exports, such as containerized shipments or local community arrangements, and large-scale interbasin river diversions with their more serious economic, social and environmental implications". He then added that such small-scale exports should not be forbidden but should be regulated. Although the adoption of the Federal Water Policy helped framed federal policy regarding water and led the way for greater cooperation with the provinces, no specific action was taken concerning transboundary local water supplies. One possible rationale is that the transfers are limited in size and volume, and of little threat to Canada's water resources. Being geographically scattered from coast to coast, they belong to a multitude of different provincial and federal jurisdictions. Moreover, each transfer has a variety of peculiarities, particularly in terms of size and type, which coupled with their geographic dispersal means that the creation of a dedicated national policy seems unlikely.

Although transboundary local water supplies are local, small-scale and rooted in pragmatism, they still involve the sovereignty of Canada because of their transboundary nature. If regulation seems unwarranted and unwieldy, they could be addressed through the creation and maintenance of a pan-Canadian transboundary local water supplies database. Such a database would help civil servants monitor the evolution of these transfers, provide support in case of need, and share best practices between one inter-local transfer and another. This is particularly salient given that the provincial and federal civil servants interviewed during the course of this research had little knowledge of the history and modes of organization of these water transfers transfers, and indeed, sometimes even of their very existence.

Information such as maps, legal contracts, as well as qualitative and quantitative data, could be gathered and archived in the database. Updates and maintenance could be ensured through annual meetings, with one-off meetings to solicit legal advice and to help disseminate best practices among concerned communities called on an as-needed basis. Such a collaborative and informative approach would require very little administrative supervision, relatively infrequent meetings, and would be inexpensive and unobtrusive. It would also be advantageous for the borderland communities, since they would benefit from the knowledge of federal and provincial agencies without undue bureaucratic involvement.

It is important to note that alternative approaches to the regulation of transboundary local water supplies, such as the creation of International Water Districts, have been studied and rejected (Forest 2009). Such approaches would internationalize the inter-local agreements or directly involve upper levels of government in the day-to-day management of the water transfers and would lead to an accumulation of administrative strata that could be experienced as a burden by the local communities, who are used to managing their own affairs. Moreover, provinces can hardly be expected to relinquish their control over core areas of jurisdiction such as municipal affairs.

However, in the event of proposals for *new* transboundary local water supplies or the *expansion* of existing ones, we would argue for the adoption of a regulatory mechanism establishing a set of principles to determine if the projects:

i) are socially and locally acceptable (including giving NGOs a voice in the process);

ii) have been through an environmental impact assessment;

iii) involve a water stress that is recurrent;

iv) are inter-local;

v) have alternatives that are economically competitive; and

vi) involve appropriate charges for the water supplied.

Contributing to the Dialogue on Bulk Water Exports

This paper draws upon empirical investigations undertaken during the author's doctoral research (Forest 2009), which made it possible to extend the number of "known" cases of transboundary local water supplies from four to twelve sets of borderland communities (current and historical ones). It is hoped that the paper contributes to a better understanding of Canada's hydrological resources and the uses that are made of them, especially with respect to transboundary water issues. It is a matter of concern to all Canadians that we have a clear idea of how our waters are shared and transferred. In recent years, we have seen that even local events such as the controversies surrounding Devil's Lake or the Detroit River removals have the capacity to morph into national issues and create international tensions. Transboundary local water supply agreements demonstrate that inter-local transboundary cooperation can lead to creative and pragmatic solutions to local water supply issues. These transfers provide an important insight into the strong relationship between Canada and the United States, one that allows communities from *each* side of the border to benefit from this type of agreement.

We hope that this paper helps to reinforce the distinction between a bulk water *export* and a bulk water *transfer*, even if it does not formally engage with the legal aspects of transboundary local water supplies, which is the focus of a forthcoming paper that will be published in a special edition of *Cahiers de Droi*t dedicated to water (Forest 2010). Stated briefly, the forthcoming paper argues that prior to NAFTA, authors did not distinguish water exports (commercial) from water transfers (non-commercial), so that any human-related transfer was treated as a water export (whether it be a profit-seeking corporate proposal to export water, a continental multi-purpose scheme such as NAWAPA, or an inter-local water agreement between two small borderland communities). We contend that a distinction should be made with respect to transboundary local water supplies, even though some authors still regard them as "water exports" (Thompson, Morin, and Campbell 2007). Transboundary local water supplies are not the typical bulk water exports that Canadians have in mind when they oppose water exports.

Transboundary local water supplies are not commercial transactions that treat potable water as a good, a point that is clarified in the *Cahiers de Droit* paper (Forest 2010) and supported by the empirical data found in this paper. Rather, they involve the sharing of infrastructure, not just water. While water is certainly flowing across the border, it is part of a larger system involving withdrawal from the source, the treatment process, and transportation from its place of origin up to the border. Thus it is not just water that is brought up to the border between the two countries, but a whole public service package. These water transfers are not being made between profit-seeking buyers and sellers. The price of the water supplied is not negotiated in the context of a free market, but is part of an inter-local agreement involving public actors or fiduciaries of the public good. As NAFTA applies only to the exchange of goods and services in the context of commercial transactions, it does not apply to transboundary local water supplies. We recommend, therefore, that such supplies not be referred to as "water exports", since they are fundamentally different from exports involving commercial transactions, such as bottled water. Instead, they belong to the category of "water transfers", which does not convey a commercial meaning. This terminology can avoid dubious discussions about whether or not transboundary local water supplies constitute a precedent under NAFTA, or if they modify the legal status of water in its natural state.

Methodology

A systematic survey of transboundary water supplies was conducted along the Canadian-American border. Contact was made with contiguous twin communities, defined here as institutional communities (a metropolitan area, city, town, or water district) located less than 20 kilometres from one another and at a maximum of 10 kilometres from the border.[2] A review of national newspapers did not uncover evidence of

2. In a similar exercise on European borderland communities, Furmankiewicz (2005, 147) enlarged the scope of his research to communities "located up to 100 km from the state border and no more than 200 km from one another […]." However, if all Canadian communities located less than 200 kilometres from the border had been contacted, it would have meant thousands of possible agreements, and would have proven overwhelming and probably useless as all transfers take place within few kilometres from the border.

any water transfers at greater distances than these. The survey of these transfers was conducted by using informatic tools, such as Google Maps, and atlases. The twin communities were then contacted by phone or by email until confirmation was received (whether or not they are or have been parties to known water transfers). Once the information was collected, a database was built to facilitate analysis.

The data and information presented in this paper were collected through interviews, emails, document collection, and fieldwork. The latter took place in the borderlands of British Columbia/Washington, Alberta/Montana, and Québec/Vermont where interviews were conducted with the local and regional actors. Most notably, fieldwork helped to establish contacts that gave access to data and actors (Giroux 2003; Lofland et al. 2005). Interviewees were directly involved in or had an understanding of the issues relating to transboundary local water supplies. The key actors technique (Weiss 1995) was helpful for selecting the most appropriate actors, while the snowball technique (Valentine 2005; Gauthier 1997) was helpful for contacting previously unknown actors. Overall, 127 persons were contacted for this research, leading to 71 transcribed interviews. Actors mostly came from the local level (72 actors), but also from the regional (34 actors) and national levels (21 actors). Anonymity was granted to the participants. A semi-directed interview format was used. It involved legal, historical, institutional and technical questions, while further comments were invited and welcomed. The Ethics Committee of Université Laval oversaw the research process.

Table 2. Contacted twin communities

Yukon – British Columbia
Stewart – Hyder

British Columbia – Washington
Greater Vancouver Regional District – Point Roberts
Surrey – Blaine
Abbotsford – Sumas
Osoyoos – Oroville
Rock Creek – Chesaw
Grand Forks – Danville
Christina Lake – Cascade and Laurier
Rossland – Velvet
Montrose – Boundary

British Columbia – Idaho
Creston – Lister and Porthill
Kingsgate – Eastport

Alberta – Montana
Del Bonita – Del Bonita
Aden (Forty Mile County No. 8) – Whitlash
Coutts – Sweetgrass

Saskatchewan – Montana
Orkney – Morgan
Estevan – Noonan

Saskatchewan – North Dakota
North Portal – Portal City

Manitoba – North Dakota
Snowflake – Hannah
Gretna/Altona – Neche
Emerson – Pembina

Manitoba – Minnesota
Emerson – St. Vincent

Ontario – Michigan
Sault Ste. Marie – Sault Ste. Marie
Sarnia – Port Huron
Corunna – Marysville
Courtrigh – St. Clair
Sombra – Marine City
Rainy River – Baudette
Fort Frances – International Falls
Fort Frances – Ranier
Windsor – Detroit
LaSalle – Detroit
Amherstburg – Grosse Ile

Ontario – New York
Fort Erie – Buffalo
Niagara Falls – Niagara
Niagara-on-the-Lake – Youngstown
Brockville – Morristown
Prescott – Ogdensburg
Cornwall – Roosevelttown
Franklin – Churubusco
Maitland – Morristown
Morrisburg – Waddington

Québec – New York
Akwesasne – St. Regis Mohawk Tribe
Hemmingford Village – Mooers
Saint-Bernard-de-Lacolle – Rouses Point

Québec – Vermont
Saint-Armand – Highgate Center
Frelighsburg – East Franklin
Abercorn – Richford
Mansonville – North Troy
Stanstead – Derby Line
Beebe – Beebe Plain

Québec – Maine
Woburn – Coburn Gore
Pohénégamook – Estcourt

New Brunswick – Maine
Saint-François-de-Madawaska – St. John Plantation
Clair – Fort Kent
Edmundston – Madawaska
Perth-Andover – Fort Fairfield
St. Stephen – Calais
St. Leonard – Van Buren

Source: Forest (2009)

Table 3. Conversion measures

Metric unit	US equivalent	US unit	Metric equivalent
1 kilometre	0.621 mile	1 mile	1.609 km
1 litre	0.264 gallon	1 gallon	3.785 litres
1,000 litres = 1 cubic metre **1 imperial gallon = 4,546 litres**			

Results and Database

The following sections introduce the empirical data that was gathered for each of the transboundary local water supplies. Historical and social context is provided for all water transfers. To clarify the comparisons, a summary table is provided for each water transfer that summarizes key information (see the table below).

Table 4. Legend of summary tables

Still active?	Is the water agreement currently active?
Supplying	Which community is supplying the water?
Benefitting country	Which community is receiving the water?
Basics of the agreement	What is the purpose of the agreement?
Contract?	Is there a contract in place?
Frequency	How frequent is the transfer: constant or intermittent?
Duration	When did these water transfers start/stop?
Daily volume of water transferred	How much water is crossing the border?
Engineering	How is the water transported?
Water source	Where is the water coming from?
Costs	How much is paid for the water?
Other	Other relevant information

Greater Vancouver Regional District, British Columbia and Point Roberts Water District, Washington

For many decades the Greater Vancouver Regional District (2,116,581 inhabitants, Statistics Canada 2006) and Point Roberts (1,308 inhabitants, U.S. Census Bureau 2000) have had a close relationship eased by proximity and direct access by road. With the growth in Vancouver's population, and the suburbanization of adjacent lands, Point Roberts remains one of the last affordable summer resorts in the Vancouver area. It benefits from its beach's reputation and clement weather, but also from the presence of many bars, gas stations, affordable real estate, and low taxes. Its long-time reputation as a tourist Mecca (The Bellingham Herald 1946) attracts many Canadians, who help to more than quadruple its population during summertime.

From a geographical perspective, Point Roberts is unique because it is separated from the continental United States by Boundary Bay and hence can only be reached by land through Canadian territory. The presence of Canadians in Point Roberts is very obvious and according to a report published by Whatcom County (1979, 51), they represent 81% of owner addresses. Despite the seasonal nature of Point Roberts' population, its water needs are increasing. However, insufficient surface water and the declining productivity of its wells jeopardize development. Indeed, since the 1960s, local residents have worried that the existing wells will not meet the demand, particularly as many are choking with sand. In the 1970s, after British Columbia refused a request to supply extra water, Point Roberts had no choice but to truck in water from Blaine, at a high cost and over a distance of 40 kilometres (The Bellingham Herald 1973).

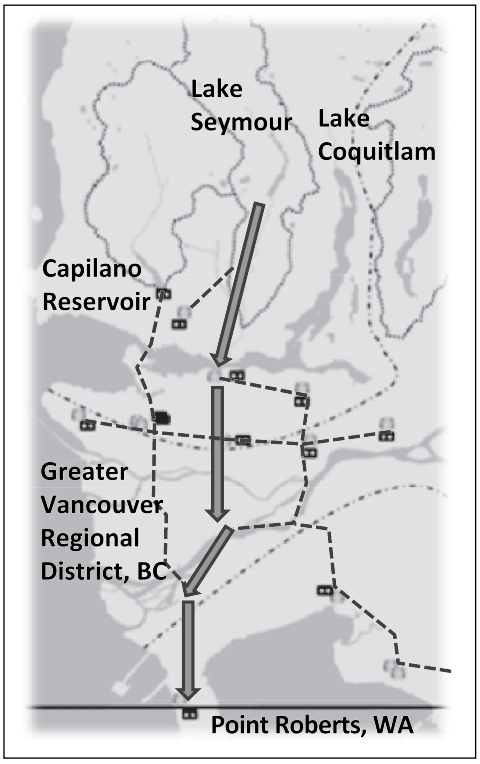
After being rebuffed many times by British Columbia (see Figure 2), and after exploring many alternative scenarios, an agreement to transfer water was finally reached with the Province in the mid-1980s, following a change in government. Since 1987, water has flowed south across the border. Originating from Seymour Lake north of Vancouver, water is pumped through the GVRD's water supply network before reaching the border through a 1.3 kilometre pipe and a 22,730 cubic metre reservoir (both financed by Point Roberts).

The 1996 adoption of the *Water Act* by the Province of British Columbia banned water exports, but included an exemption for Point Roberts and capped water transfers to the municipality at 3,182.2 cubic metres per day. Despite being charged the same fees as other municipalities within the GVRD, Point Roberts is required to pay for each cubic metre to which it is entitled, regardless of how much it uses. In 2010, this represented US $582,000 (Olson 2009). The fee structure is a challenge for Point Roberts, as it uses far less water in the winter months, and has only the summer months to recoup the money to pay for operating costs.

Figure 2. Cartoons relating to Point Roberts' water supplies

Source: Ocean Star (1984, 1985)

Figure 3. GVRD and PRWD water transfers



Source: The author. Data from Metro Vancouver (2008) and Esri data (2004)

Table 5. GVRD and Point Roberts Water District water supply agreement

Still active?	Yes
Supplying	Greater Vancouver Water District, British Columbia
Benefitting country	Point Roberts, Washington
Basics of the agreement	To supply potable water across the border
Contract?	Yes, a formal contract was signed by both parties.
Frequency	Constant supplies
Duration	Since 1987
Daily volume of water transferred	Up to 3,182.2 cubic metres. On average, Point Roberts uses only a third of that volume.
Engineering	A pipe connects Point Roberts to the GVWD's network. A reservoir was built contiguous with the border.
Water source	Seymour Lake, north of Vancouver
Costs	For the year 2010, Point Roberts is paying US $582,000.
Other	Point Roberts' water needs are today jeopardized by the 3,182.2 cubic metres daily cap since the volume of water available per inhabitant does not meet the State of Washington's standards. Alternative scenarios other than adhering to the supply maximum are being studied. For instance, a new reservoir might be built. In the meantime, the State of Washington has exempted Point Roberts from the standards and allows that a lower volume of water per inhabitant is made available.

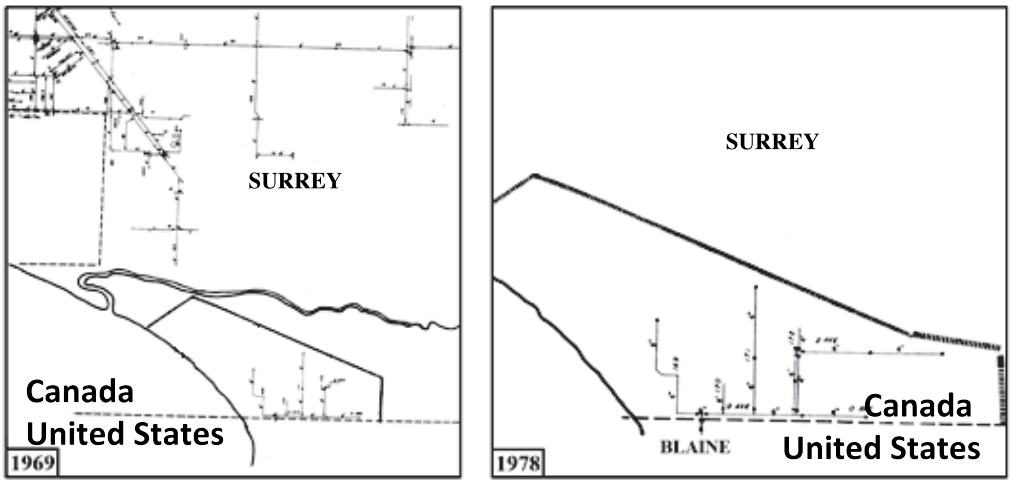
Surrey, British Columbia and Blaine, Washington

The City of Blaine, Washington, (3,770 inhabitants, U.S. Census Bureau 2000) has been a long-time water partner of the City of Surrey, British Columbia (394,976 inhabitants, Statistics Canada 2006). For the last six decades, Blaine has supplied water to different Canadian customers including a golf course, households, and a border crossing station (see Figure 4). Paradoxically, Surrey has plenty of water with which it could satisfy its own needs, as was noted in a report published as far back as 1949: "The geology of the Municipality is highly favourable to the occurrence of large supplies of ground water. The annual rainfall is far in excess of that necessary to replenish seasonally any amount of ground water which might be extracted." (Dolmage 1949)

The cooperation between the two communities began during the period following the Second World War, when the expansion of Surrey's water network was not able to keep pace with its population growth, especially in the borderland areas. As recently as 1940, there was no public water service in Surrey, with the exception of three small private systems (Livingstone 1958). By 1948, the City of Blaine was supplying water to individual households in Surrey near the border.[3] An institutional agreement was reached on January 24th, 1949 between the District of Surrey and the City of Blaine to provide water for the Douglas area home development, located east of the King George highway, "for inter alia the sale of water by the City and the purchase of water by the District" (City of Blaine and Corporation of the district of Surrey 1974; Corporation of the District of Surrey 1948).

The municipality of Surrey gradually expanded its water distribution network which grew from 86 km in 1949, to 245 km in 1953, and to 422 km in 1957 (*ibid.)*. At the time of the 1957 expansion, the young municipality did not extend the water distribution network to service residents living near the border because it was deemed to be too expensive (Corporation of the District of Surrey 1980, 6), especially since most of its population was (and still is) located in the northern part of the municipality. Over time, the continued expansion of Surrey's water network caused an increase in the amount of water received from Blaine. Minutes from the Surrey City Council reveal that by 1974, all water made available by Blaine was being used (643 litres of water per minute), and no more increase in supplies could be expected. In 1981, Surrey attempted to reach an agreement with Blaine for a common water system, but that scheme never materialized, although in 1983, Blaine did agree to supply water to the Hazelmere Golf & Tennis club (the deal is now concluded). Today, Surrey's water system supplies much of its jurisdiction – especially the borderland – and only the Pacific border crossing still receives its water from Blaine, and has done so since 1986.

Figure 4. Blaine and Surrey water supplies (1969 and 1978)



Source: Adapted from District of Surrey (1969, 1972, 1978)

3. Archives shows that the City of Blaine was directly supplying individuals across the border, as was the case with Mr. Hewitt from the Douglas area home development, who agreed to a water supply contract of $150 (Corporation of the District of Surrey 1948).

Table 6. Surrey and Blaine water supply agreement

Still active?	Yes
Supplying community	Blaine, Washington
Benefitting community	Surrey, British Columbia
Basics of the agreement	To supply potable water across the border
Contract?	Many, with different customers
Frequency	Constant supplies
Duration	Since at least 1948
Daily volume of water transferred	Variable
Engineering	Starting from Blaine's water network, water pipes cross the border.
Water source	Nine wells located in Blaine annually produce 2,081 million cubic metres.
Costs	N/A
Other	N/A

Coutts, Alberta and Sweetgrass, Montana

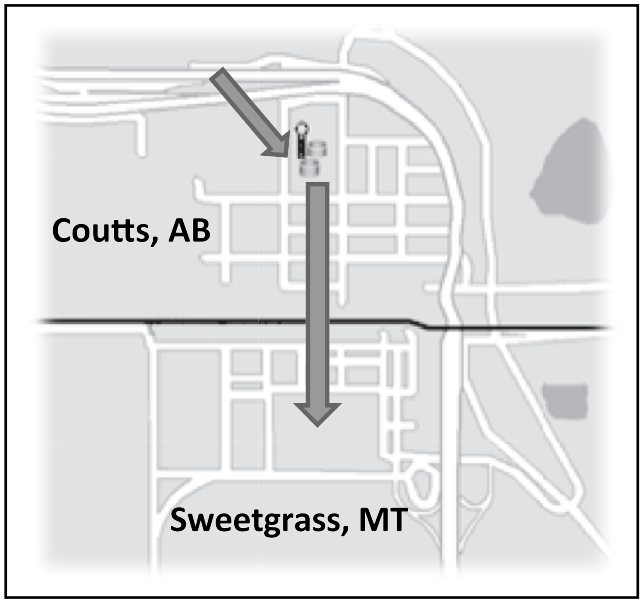
Coutts, Alberta (305 inhabitants, Statistics Canada 2006), and Sweetgrass, Montana (approximately 100 inhabitants), are long-time partners in water. Since 1963, the former has been supplying the latter with potable water pumped from the nearby international Milk River, located 11 kilometres north of the border[4]. A set of seven water pumps (four close to the river and three in Coutts) draw up the water, which is then stored in a series of tanks. The water tower itself, located in Coutts, has a capacity of 227.3 cubic metres, and is complemented by a storage well located under the water tower (454.6 cubic metres), two reservoirs beside the water tower (5,909.8 cubic metres), and two reservoirs located close to the river (4,546 cubic metres). To supply Sweetgrass, a 30 metre pipe was built leading to the border and an additional pump was installed.

Figure 5. Plain landscape, surroundings of Coutts

Source: the author

Sweetgrass accounts for roughly 13% of the water consumption of the two communities. For example, in December 2006, Sweetgrass consumed 1,000 cubic metres out of a total of 7,704 cubic metres of water consumed. The charges for water delivery are asymmetrical. Citizens of Coutts pay a monthly fee of CAN $12.50 for water distribution plus a rate of CAN $0.22/cubic meter for consumed water, while the community of Sweetgrass pays CAN $3.60 for 4.5 cubic metres of water. Sweetgrass is also charged a minimum bill of CAN $1,100 per month.

Figure 6. Coutts and Sweetgrass water supplies



Source: Forest (2009) and Google Maps

4. According to our source, the current agreement might end in a couple of years since alternative water sources might be preferred: Coutts, Alberta would be served by a pipeline from the Town of Milk River, Alberta while Sweetgrass, Montana would get its water from Lake Elwell, Montana.

Table 7. Coutts and Sweetgrass water supply agreement

Still active?	Yes
Supplying community	Coutts, Alberta
Benefitting community	Sweetgrass, Montana
Basics of the agreement	Supplying potable water across the border
Contract?	A written contract
Frequency	Constant supplies
Duration	Since 1963 (Danylchuk, 1985)
Daily volume of water transferred	Approximately 33 cubic meters
Engineering	A 30 metre long pipe stretches to the border from Coutts, Alberta. The system includes multiple reservoirs and seven pumps are used to transport the water. Each community's wastewater is treated through its own sedimentation pond.
Water source	Milk river, 11 kilometres north of Coutts, Alberta
Costs	Sweetgrass, Montana, pays a higher price: CAN $3.60/4.5 cubic metres, with a minimum purchase of CAN $1,100/month.
Other	According to Danylchuk (1985), Sweetgrass was paying CAN $1.90 per 3.78 cubic metres in 1985, while Coutts' citizens paid a flat fee of CAN $18 per month. The agreement might change within the next three years as Coutts might get its water supplies from the Town of Milk River through a pipeline while Sweetgrass is looking at other regional alternatives

North Portal, Saskatchewan and Portal City, North Dakota

North Portal, Saskatchewan, (100 inhabitants, Statistics Canada 2001) and Portal City, North Dakota, (131 habitants, U.S. Census Bureau 2000) are located across the border from one another. In the 1960s, they verbally agreed to supply each other with water in case of emergency or for system maintenance purposes. This informal agreement has been continuously renewed ever since. The water supplies can go in either direction according to the needs of each community thanks to the interconnectivity of their water systems. For example, when Portal City was installing its water tower 10 years ago, North Portal supplied its neighbour for six months. Such transfers occur regularly, on average three to five times a year for periods of between two and five days. While the water comes from wells located on each side of the border, the aquifer itself is transnational. According to a local respondent, at one time the communities were negotiating a formal contract to make their partnership official, but realized that such an agreement would require more administrative work. As a result, no contract has yet been signed.

Figure 7. North Portal and Portal City water supplies

Source: Forest (2009) and Google Maps

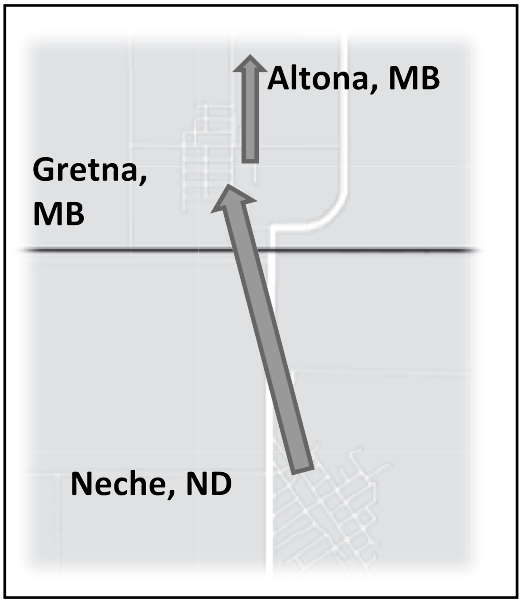
Table 8. North Portal and Portal City water supply agreement

Still active?	Yes
Supplying community	North Portal, Saskatchewan and Portal City, North Dakota
Benefitting community	North Portal, Saskatchewan and Portal City, North Dakota
Basics of the agreement	To supply potable water across the border to each other in case of emergency or for system maintenance purposes.
Contract?	Verbal agreement. The parties were negotiating a more formal agreement in recent years, but stopped since it would have mean more administrative work.
Frequency	Intermittent supplies, according to each community's needs. Around 3-5 times per year, generally for 2-5 day periods.
Duration	Since the 1960s
Daily volume of water transferred	Up to 454.6 cubic metres
Engineering	A pipeline connects the two communities.
Water source	Underground. There are many wells dug in each community. Portal City's wells are deeper than the ones of North Portal.
Costs	Free of charge
Other	Both communities share many services, such as: a golf course, a fire department, an ambulance, a community chorus, a church, etc.

Gretna and Altona, Manitoba and Neche, North Dakota

The communities of Gretna, Manitoba (574 inhabitants, Statistics Canada 2006) and Altona, Manitoba (3,709 inhabitants, Statistics Canada 2006) have long been supplied with water by their closest American neighbour, Neche, North Dakota (437 inhabitants, U.S. Census Bureau 2000), through an agreement between the latter and the Manitoba Water Services Board. According to Day and Quinn (1992), those transfers began in the 1970s, at which time 70,000 cubic metres of water were flowing north every year. However, research has shown that the probable starting date for water transfer was 1960. The transfers stopped in 1998, when Gretna's water tower had to be changed following provincial regulation. At the same time, Neche was modifying its water system. Gretna then decided to join the Pembina Valley Water Coop (PVWC), which is a cooperative of 18 Canadian municipalities-owners active in water delivery. Since then, cooperation in the realm of water between the Canadian and American communities has ended.

Figure 8. Gretna/Altona and Neche water supplies



Source: Forest (2009) and Google Maps

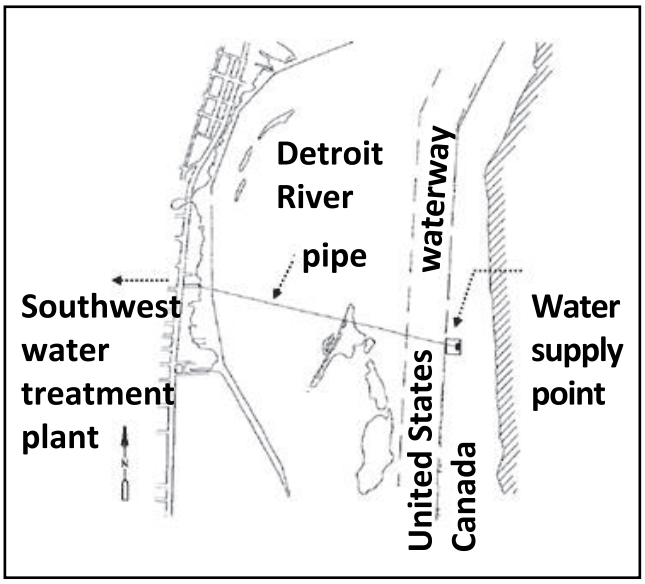
Table 9. Gretna, Altona and Neche water supply agreement

Still active?	No
Supplying community	Neche, North Dakota
Benefitting community	Gretna & Altona, Manitoba
Basics of the agreement	To supply potable water across the border.
Contract?	A written agreement was signed between Neche and the Manitoba Water Services Board.
Frequency	Constant supplies
Duration	1960-1998
Daily volume of water transferred	Up to 908.4 cubic metres
Engineering	A water pipe connected the communities of Gretna (water tower) and Altona (water reservoir). The community of Altona received water both from Neche and a plant located on the Red River.
Water source	Pembina River
Costs	$2.25 per 4,546 litres with a minimum consumption of 20,457 litres
Other	The agreement stopped as additional upgrades required substantial funding, but also for political reasons since the governments of Manitoba and of Canada would have had to be petitioned for that funding.

LaSalle, Ontario/Province of Ontario - Detroit, Michigan

In 2008, a controversy emerged over the news that the City of Detroit had been supposedly pumping 121 billion litres of water a year from the Canadian side of the Detroit River since 1964. The Ontario and Canadian governments were accused of being overly passive in their reaction by some NGOs, who feared that the removals could establish a precedent leading to the export of water on a larger scale (CBC News 2008). Ultimately, in 2009 the City of Detroit was granted an exemption to provincial regulations under the *Ontario Water Resources Act* and was allowed to continue its water removal. The decision was based on the assumption that the water removal made no material difference to the flow and level of the Detroit River as the water would then be piped back into the river. This controversy illustrates how even local water transfers can be inflated out of proportion and become matters of national interest.

Figure 9. LaSalle/Province of Ontario and Detroit water supply



Source: Forest (2009) and Google Maps

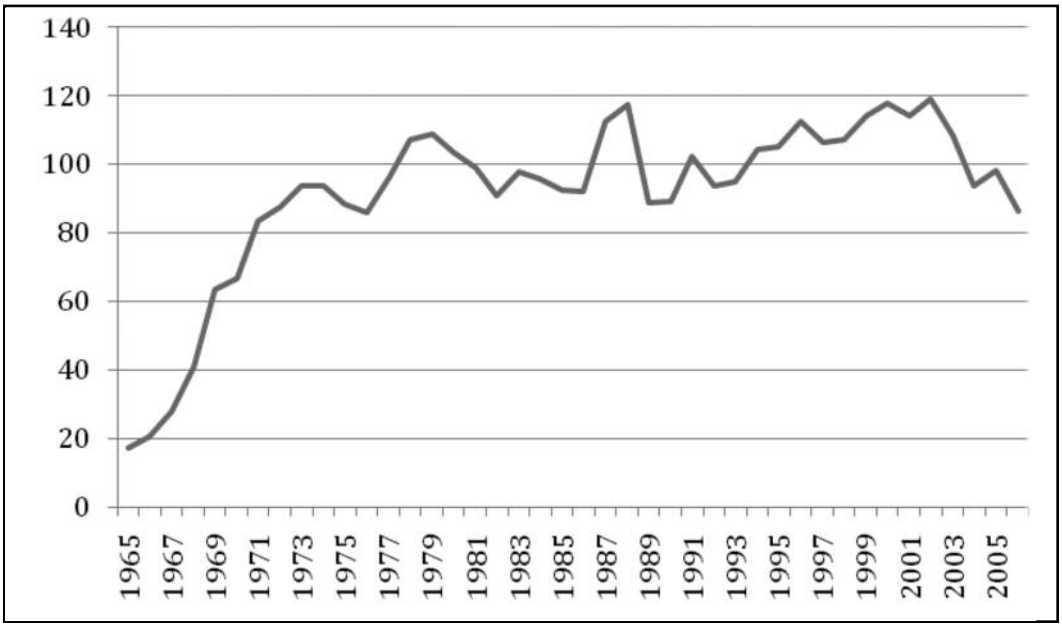
The history of the Detroit water removals began on November 15, 1957, when Wayne County and the province of Ontario signed a lease[5] allowing for the installation of a water supply point on the bottom of the Detroit River, on the Canadian side of the international border. In 1959, Wayne County transferred the lease and the infrastructure to the City of Detroit. Nearly ten years later, in 1968, the water supply point was at the center of a dispute between the City of Detroit and the community of Sandwich West (which became part of LaSalle in 1991). The dispute arose from the fact that LaSalle was charging Detroit property taxes for the bottom of the river where the water intake was located. Detroit challenged those charges based on the *Ontario Property Tax Act*, which exempts local governments from property taxes. The dispute went to the Ontario Court of Appeal (1968), and eventually to the Supreme Court of Canada (1970) which ruled that the law only applied to Canadian governments.

The Detroit Water and Sewage Department is the third largest of its kind in the United States, supplying water to 4.3 million people located in 125 communities (Detroit Water and Sewage Department 2009). Water pumped from the Detroit River is treated at the Southwest Treatment Plant, built in 1964. The water supply point is located on the bottom of the Detroit River, east of the trench of the Great Lakes St. Lawrence Seaway, in Canadian territory (see Figure 9). This location was deliberately chosen because the quality of the water is better on the Canadian side, which receives less industrial discharges and farming runoff than the U.S. side. The presence of the trench also allows faster water flows which contribute to better water quality on the Canadian side (Detroit Water and Sewage Department 2004, 5-8). The Detroit transboundary local water supply agreement is different from the other agreements in existence, since it does not involve the connection of two different water supply systems. Except for taxation purposes, LaSalle is not involved in this water transfer.

Contrary to what was reported by CBC, Detroit has not removed 121 billion litres of water annually since 1964. The City of Detroit has clarified that "the number rather refers to the legal withdrawal limit established under the new agreement with the Province of Ontario." (Detroit Water and Sewerage Department 2010). Prior to the 2009 exemption, there was no limit on water withdrawals. However, as shown in the following figure, the amount of water that has actually been pumped from the river is significantly below that maximum.

5. It is noted in a judgement from the Ontario Court of Appeal (1968, 628) that "The lease expires in 1991 when the City of Detroit has the option to purchase the water structure as well as the rest of the water supply system for one dollar."

Figure 10. Total Annual Filtration, Southwest Water Treatment Plant, in billions of litres, 1965-2006)



Source: Detroit Water and Sewerage Department (2007)

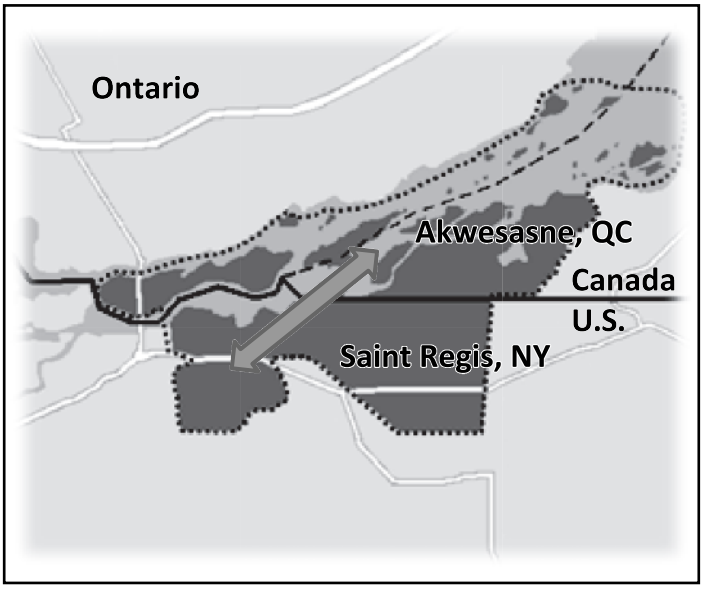
Table 10. LaSalle/Province of Ontario and Detroit water supply agreement

Still active?	Yes
Supplying community	LaSalle, Ontario and the province of Ontario
Benefitting community	Detroit, Michigan
Basics of the agreement	Detroit is allowed to remove water from Canada's side of the border.
Contract?	Yes, a formal one
Frequency	Constant supplies
Duration	Since 1964
Daily volume of water transferred	Up to 331 million litres of water (121 billion litres of water per year)
Engineering	A pipe connects the water supply point to the treatment plant, which is located in the U.S.
Water source	Canadian side of the Detroit river
Costs	N/A
Other	N/A

Akwesasne First Nations, Québec and Saint Regis Mohawk Tribe, New York

The native communities of Akwesasne, Québec (and Ontario), and Saint Regis Mohawk Tribe, New York, are in fact a single community. They maintain very close social and political ties. Water is one of the domains that underline their commitment to each other. Although their water systems are not permanently connected, they can be connected very quickly in case of emergency. In the recent past, two events necessitated a transboundary water transfer. In 1998, an ice storm caused a service interruption in Akwesasne. The Saint Regis Mohawk Tribe then supplied water to its neighbour for two or three days at 400 cubic metres per day. In 2000, it was the turn of Akwesasne to supply the Saint Regis Mohawk Tribe with approximately the same amount of water for a couple of days while the latter was repairing its water system.

Figure 11. Akwesasne First Nations and Saint Regis Mohawk Tribe water supplies



Source: Forest (2009) and Google Maps

Table 11. Akwesasne First Nations and Saint Regis Mohawk Tribe water supply agreement

Still active?	Yes
Supplying community	Akwesasne First Nations, Québec and Saint Regis Mohawk Tribe, New York
Benefitting community	Akwesasne First Nations, Québec and Saint Regis Mohawk Tribe, New York
Basics of the agreement	To supply potable water across the border in case of emergency.
Contract?	Verbal agreement
Frequency	Intermittent supplies, for a few days only
Duration	According to need, on a short term basis
Daily volume of water transferred	Up to 400 cubic metres
Engineering	There is no permanent water connection between the two water supply systems. When needed, the hydrants from each side of the border are connected by fire hoses with a diameter of 3" (7.6 cm).
Water source	St. Lawrence River (for both communities)
Costs	Only minimal costs are charged to cover the price of labour and chemical products.
Other	N/A

Stanstead, Québec and Derby Line, Vermont

Stanstead, Québec (2,957 inhabitants, Statistics Canada 2006) and Derby Line, Vermont (776 habitants, U.S. Census Bureau 2000) are partners in the longest running and most integrated transboundary local water agreement to date. Because of simultaneous urban and industrial development on both sides of the border, the two communities developed a system of close cooperation over time, one that encompasses many services, among them water and wastewater, but also a transboundary library (see Figure 12).

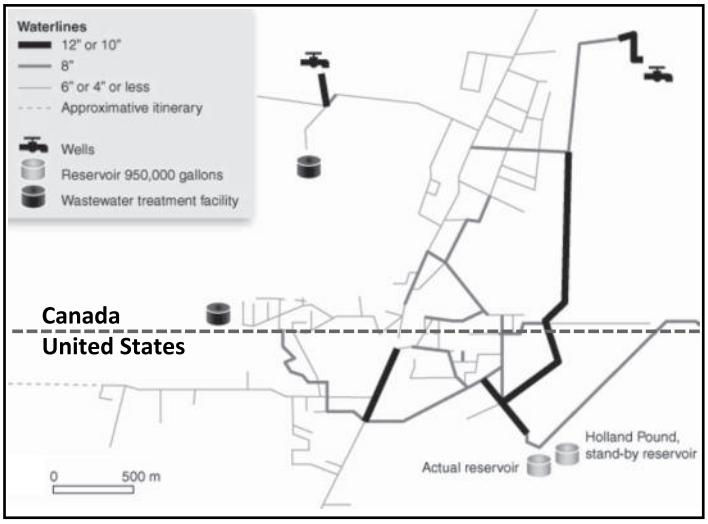
Figure 12. Haskell Library, Stanstead

Source: the author

Local businessmen founded the International Water Company (IWC) in 1906 to supply potable water to the nearby towns of Stanstead, Québec, Rock Island, Québec, and Derby Line, Vermont. Incorporated in Vermont, the IWC was in charge of maintaining, taxing, and distributing the water from the lake-reservoir of Holland Pond, located east of Derby Line on the American side of the border.

Over the following decades, the IWC's shares were gradually bought up by the three municipalities such that they assumed complete control in the 1950s. While still a private company today – city councillors have to buy a CAN $1 share to sit on the company's board – the IWC is managed as a transnational public water utility. Regulations brought in by the State of Maine necessitated the construction of a new reservoir to replace the old one in 1996. At that time, the now-merged communities of Stanstead, Rock Island and Beebe Plain, Québec (today called Stanstead) decided to sign a new agreement with Beebe Plain, Vermont, which led to a reconfiguration of the water supply system. Two wells able to supply 2.5 cubic metres of water per minute were drilled in Stanstead, while a new reservoir was built beside the old one in Derby Line. The Canadian and American communities became owners of the new infrastructure and the water pipe networks located on their respective territories, while the IWC retained ownership over the old reservoir as well as responsibility for maintenance of the core infrastructure. Since 1996, the water source has shifted from surface water to groundwater (a transnational aquifer). Once withdrawn in Québec, the water is treated and pumped across the border to the reservoir on the U.S. side, where it is stored before being distributed throughout the water network. Wastewater is treated in Québec. Figure 13 illustrates the spatial organization of this system, particularly the underground infrastructure crossing the border and linking Stanstead to its twin community of Derby Line.

Figure 13. Stanstead and Derby Line water supplies



Source: Cartography Lab, Geography Department, Université Laval

Table 12. Stanstead and Derby Line water supply agreement

Still active?	Yes
Supplying community	Stanstead, Québec, since 1996. (Before, it was the benefitting community.)
Benefitting community	Derby Line, Vermont, since 1996. (Before, it was the supplying community.)
Basics of the agreement	A locally owned, public corporation, the International Water Company, has managed the water supplies and wastewater of Stanstead, Québec and Derby Line, Vermont since 1906.
Contract?	Yes, a formal contract exist
Frequency	Constant supplies
Duration	Since 1906
Daily volume of water transferred	Up to 3,600 cubic meters, approximately 30% of which is transferred to Derby Line.
Engineering	The wells, water treatment plant and sewage treatment plants are located in Stanstead, Québec, while the reservoir is located in Beebe Plain, Vermont. Each side's infrastructure is essential to the proper functioning of the whole system and cannot work separately.
Water source	Underground water from a transnational aquifer is extracted from two wells located in Stanstead, Québec.
Costs	The International Water Company (IWC) charges the two communities, which then tax their own citizens. 72% of the budget of the IWC is financed by Stanstead, and 28% by Derby Line.
Other	N/A

Beebe Plain, Québec and Beebe Plain, Vermont

Before merging with Stanstead and Rock Island in 1996, Beebe Plain, Québec was dependent upon its U.S. counterpart for its water supply. Beebe Plain, Vermont is a community of a few dozen inhabitants that is separated from its neighbour by Canusa Street, down the middle of which runs the international boundary. Since at least the early 1900s, water was brought in to the Québec town through pipes from wells located in nearby hills on the American side.

Figure 14. Water reservoir, Beebe Plain, Québec

Source: the author

Profound changes were made to this system beginning in 1987, following the deterioration of the wells as a result of choking with sand. At that time, three new wells were drilled on the Canadian side; these were cheaper to operate due to lower energy costs. A reservoir was also built three metres from the border (see Figure 14). The construction of the reservoir required the authorization of the International Boundary Commission, which regulates works built close to the border.

After the merging of the communities of Stanstead, Rock Island and Beebe Plain, Québec in 1996, a 30.5 cm pipe was laid to connect Beebe Plain, Québec to the International Water Company's network (see the Stanstead, Québec and Derby Line, Vermont water supply agreement). The investment was required for emergency purposes (especially in case of fire), and can deliver 64.3 litres of water per minute. An extra pipe was subsequently laid to supply water to Beebe Plain, Vermont. Today, the water delivered by the IWC is the main source of water for both the American and the Canadian Beebe Plains.

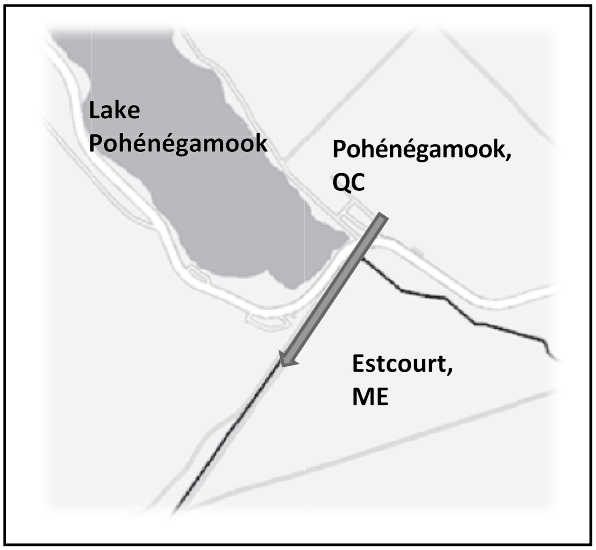
Table 13. Beebe Plain, Québec and Beebe Plain, Vermont water supply agreement

Still active?	No
Supplying community	Beebe Plain, Vermont, until 2004.
Benefitting community	Beebe Plain, Québec, until 2004.
Basics of the agreement	To supply potable water across the border.
Contract?	No formal contract
Frequency	Constant supplies
Duration	Circa 1900-1930, until 2004/2006
Daily volume of water transferred	Unknown
Engineering	A pipe connected Beebe Plain, Vermont to Beebe Plain, Québec.
Water source	Water originating in the nearby hills located on the American side. Beginning in 1987, existing wells were replaced by new ones in Canada. Today, most of the water comes from the IWC's water network, which draws upon water from two wells in Stanstead, Québec.
Costs	Unknown
Other	N/A

Pohénégamook, Québec and Estcourt, Maine

The founding of Pohénégamook, Québec on October 23rd, 1973 following the merger of three contiguous communities (Saint-Éleuthère, Sully, and Saint-Pierre-d'Estcourt) was soon followed by discussions on its water supplies. Water had previously been supplied by private entrepreneurs using private wells, but the citizens of the newly merged town agreed to the construction of a 40-kilometre long water distribution network to provide water to all previously independent neighbourhoods. Pohénégamook (2,940 inhabitants, Statistics Canada 2006) then offered to supply water to Estcourt, Maine, a very small and isolated non-incorporated community of approximately 15 inhabitants located right across the border. The aqueduct was finished in 1975, and has since supplied both communities. This service is in addition to others that are also shared, such as waste management and electricity.

Figure 15. Pohénégamook and Estcourt water supplies



Source: Forest (2009) and Google Maps

Table 14. Pohénégamook and Estcourt water supply agreement

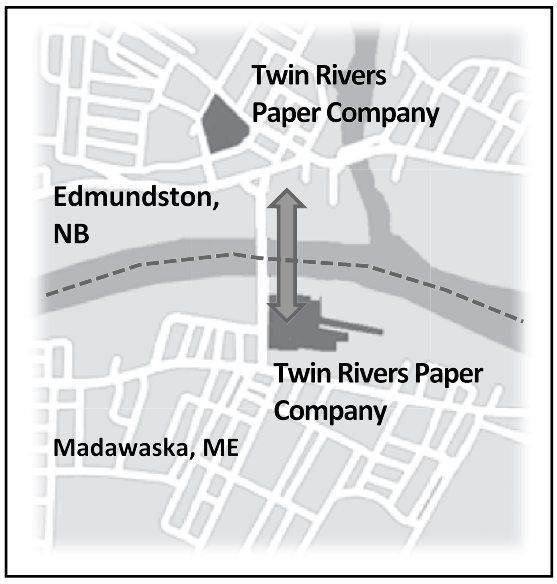
Still active?	Yes
Supplying community	Pohénégamook, Québec
Benefitting community	Estcourt, Maine
Basics of the agreement	To supply potable water across the border and treatment of wastewater.
Contract?	Verbal agreement
Frequency	Constant supplies
Duration	Since 1975
Daily volume of water transferred	Up to 5 cubic metres per day
Engineering	A pipe connects Pohénégamook, Québec to Estcourt, Maine.
Water source	A well, located in the neighbourhood of Saint-Pierre-d'Estcourt, Québec, provides 1,000 cubic metres of water per day to both Pohénégamook and Estcourt, Maine.
Costs	Each household on either side of the border has to pay CAN $245 per year for the aqueduct, and a similar amount for wastewater services, payable in one or four instalments.
Other	N/A

Edmunston, New Brunswick and Madawaska, Maine

The water transfers between Edmundston (16,643 inhabitants, Statistics Canada 2006) and Madawaska (4,534 inhabitants, U.S. Census Bureau 2000) are significantly different than the other transboundary local water supplies in existence. They are between two plants belonging to the same company, Twin Rivers Paper Company (previously known as Fraser Papers), and they do not involve potable water. Instead, surface water from the Canadian side of the Madawaska River is withdrawn and mixed with pulp to facilitate its transportation across the border through commodity pipelines, in the context of industrial activities. These transfers have been included in this paper because they involve the transfer of bulk water across the border.

The Edmundston plant produces sulphite pulp and uncoated groundwood, which is then processed into paper at the Madawaska plant (annual capacity: 460,000 tons of paper). For this to happen, two pipelines have been laid across the border to enable the transfer of pulp mixed with water from the Canadian plant to the American. Eight other pipelines transport steam and water to the Madawaska plant, with residual water and condensation being returned to Edmundston.

Figure 16. Twin Rivers Paper Co. water supplies



Source: Patrick Forest (2009) and Google maps

Table 15. Edmundston and Madawaska water supply agreement

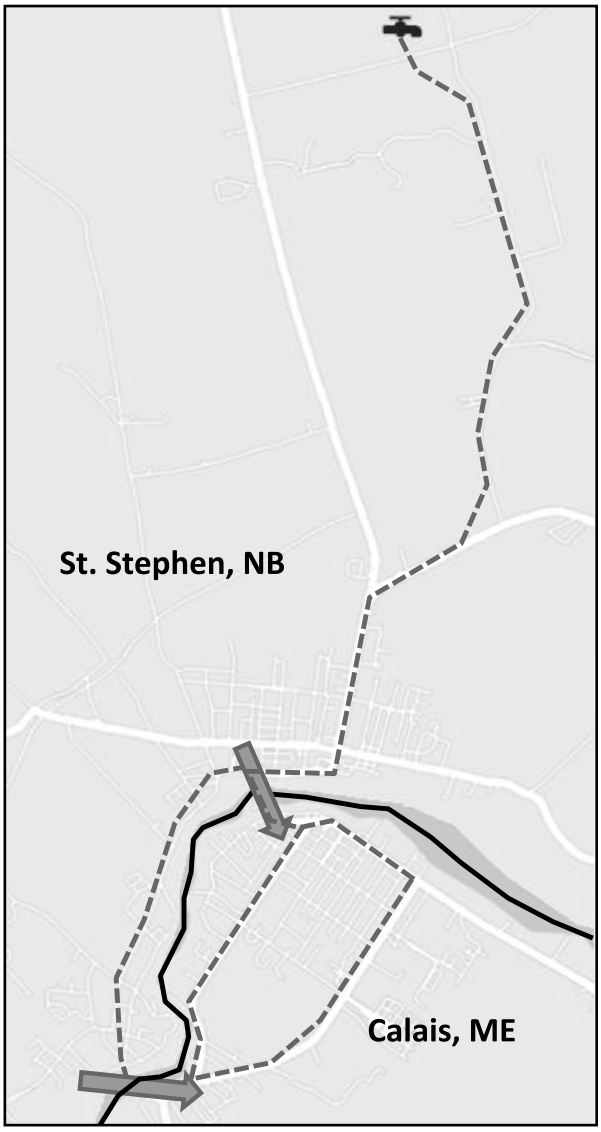
Still active?	Yes
Supplying community	Edmundston, New Brunswick
Benefitting community	Madawaska, Maine
Basics of the agreement	Water is used as a mode of transportation to convey wood fibre across the border through commodity pipelines.
Contract?	No; the transfers occur between two plants belonging to Twin Rivers Paper Company.
Frequency	Constant supplies
Duration	Since 1920
Daily volume of water transferred	N/A
Engineering	Ten pipes cross the border in three different places: i) through the international bridge, ii) under the river, and iii) through the pipe bridge that connects both plants.
Water source	Water is pumped from the Madawaska River on the Canadian side. Residual waters are then dumped into the St. John river. The Madawaska, Maine plant gets its water from the St. John river and dumps its effluents into the same river.
Costs	N/A
Other	N/A

St. Stephen, New Brunswick and Calais, Maine

The town of St. Stephen, New Brunswick (4,780 inhabitants, Statistics Canada 2006) and the city of Calais, Maine (3,447 inhabitants, U.S. Census Bureau 2000) are both located on the St. Croix River. They offer a vivid example of transboundary water cooperation, since their industrialization involved jointly addressing shared water issues.

By the end of the 19th century, the border region in the area saw intense industrial development based on forestry, shipyards, granite, cotton and manufactured goods. These activities were highly polluting, and effluent was discharged into the St. Croix River. The St. Croix was the water source for the Calais Water Supply Company, which at that time supplied the city of Calais and what is now the town of St. Stephen (Peters 2006). By the early 20th century, with increased industrialization along the banks of the river, concerns were being expressed over the river's water quality. The establishment of the Woodland Pulp & Paper Company in 1905 further increased the pollution levels, and that year the Maine Board of Health declared the river's water to be unfit for human consumption. Moreover, the water pressure in the pipe system was deemed to be insufficient to deal with of major fire or emergencies. In 1906, St. Stephen began to construct its own gravity-based water supply system, which became operational in 1908 (Peters 2006), and which supplied the local communities (St. Stephen, the Milltowns and Calais). Initially, the water supplies on the American side were managed by a private company, which paid St. Stephen for the water and then billed the customers. The City of Calais took over the system in the 1980s as the company was no longer profitable, and did so until 2003, when both communities parted ways.

Figure 17. St. Stephen and Calais water supplies



Source: Forest (2009) and Google Maps, adapted from Peters (2006; 2010)

St. Stephen's water originated from a well close to the Dennis Stream, seven kilometres north of the border crossing. Peters (2006) writes "Both the Pump House and Well are considered unique in their conception. Functional in character and embodying the virtues of late nineteenth and early twentieth century design: permanence, austerity, functionality and solidity." Two more wells were later added to satisfy increased demand, in 1978 and 1999 (Peters Circa 2000). The agreement to transfer water ended in 2003, following a tightening of Maine's drinking water standards. At that time St. Stephen was facing water shortages and the town needed all its water for its own citizens and industry. These events prompted Calais to seek out an alternative water source from a nearby aquifer. The end of the agreement was qualified as "amicable" by one of our respondents.

Table 16. St. Stephen and Calais water supplies agreement

Still active?	Ended in 2003
Supplying community	St. Stephen, New Brunswick
Benefitting community	Calais, Maine
Basics of the agreement	To supply potable water across the border
Contract?	A short agreement was signed at regular intervals to address the cost of the water.
Frequency	Constant supplies
Duration	1903-2003
Daily volume of water transferred	A maximum of 2,649.5 cubic metres of water were transferred per day.
Engineering	Two pipes – even possibly a third – connected St. Stephen to Calais. Water was metered at the bridge.
Water source	Underground water pumped by a well at Dennis Stream close to Maxwell crossing, seven kilometres north of the border crossing
Costs	According to a respondent, the charges were reasonable.
Other	According to Day and Quinn (1992), Calais, Maine was supplied with 650 dam3 (one dam3 = 1,000 cubic metres), but part of that supply was then made available to Milltown (90 dam3).

Summary Assessment

This paper has explored the use of transboundary local water supplies to meet the needs of twelve sets of borderland communities along the Canada-U.S. border. By describing the history, evolution, extent and administrative arrangements of these unique water supply agreements, the paper aims to serve as a reference tool for researchers, policy makers and others interested in bulk water transfers and transboundary water issues. We hope that the paper not only contributes to the understanding of a phenomenon that has attracted little attention over the years, but also helps to characterize these transfers for what they are: the sharing of a local public service in response to either compromised water quality or inadequate water quantity. The paper also provides an insight into the strong inter-local relationships that have developed over the years in the Canadian and American borderland. **We have suggested that these transfers do not constitute exportation under NAFTA, since they are not commercial transactions involving the trading of water as a good, exchanged within a free market with buyers and sellers freely setting prices. On the contrary, the paper emphasizes throughout that these inter-local water transfers are the result of the sharing of a public service[6].**

Our research has illustrated how these borderland communities – a great many of them small in size – have successfully negotiated creative, pragmatic, and flexible water transfer agreements with little involvement from upper levels of government. It is important to note that each of these water transfers has emerged endogenously and independently, which underlines the adaptability of the communities involved as well as their ability to engage in the international realm in order to reach inter-local agreements. The inter-local agreements studies are rather practical in scope: many were initially created through verbal agreements, and not all have been institutionalized. The communities surveyed remain overall satisfied with them, especially regarding the cost sharing structures.

Because each set of communities developed its inter-local agreements independently and without knowledge of other agreements, none has benefitted from the past experiences of the others. And despite the small volumes of water involved, as well as the local nature of the transfers, the agreements are nonetheless complex, spanning as they do two different federal jurisdictions, as well as states and provinces. This has led to many challenges relating to the enforcement of water quality and quantity norms, infrastructure, and the accreditation of the employees in charge of joint water supply systems.

In conclusion, this paper has focused on a very particular type of bulk water transfer that takes place between Canada and the United States (and vice versa). **The twelve transboundary local water supply agreements identified are practical and beneficial solutions for the borderland communities involved, solutions that aim to provide safe, abundant, and inexpensive water to their respective populations.** Despite being local and involving limited amounts of water, transboundary local water supply agreements face many technical, legal and jurisdictional challenges. It is our view that the future scaling up or proliferation of such transfers is highly unlikely.

6.The Twin Rivers Paper Company is the exception. However, it does not involve potable water.

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