

Canada's Freshwater in a Continental Context

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It is no real mystery why Canada's population and economy are an order of magnitude smaller than what exists south of the border. So much of our northern environment is beyond the range of comfort, too cold and too barren to support more intensive development. But we do have some compensating values, of which the most prized by Canadians may be our rich heritage of lakes, rivers and wetlands. An economist, thinking in terms of trade, would call it our comparative advantage. But is Canada's freshwater essentially a trade commodity, about to become the latest in a series of natural resource exports which began four centuries ago with fish and fur, and continues today through forests, fuel and minerals? That is an issue which has provoked so much anxiety among Canadians, even as Canada and the United States cooperate routinely in managing their shared boundary waters.

This presentation considers both the pattern of existing interbasin water diversions within, and proposals for exporting water between, Canada and the United States in the latter decades of the 20th century. Interest has since waned in these developments, because of a fundamental shift in mature economies from water supply to water demand management. But many are not convinced. Canadians and their American neighbors in the Great Lakes basin continue to pursue legal protection for their water heritage over the long term.

Resources Availability

Canada is considered, even by its own citizens, to be wealthy in water resources. Media accounts often mistakenly credit this country with a quarter

to a half or more of the world's freshwater supply (Maich 2005), reflecting the popular image of Canada as a land of northern ice and snow and of innumerable sparkling lakes stretching to the horizon. The perception of water abundance, or surplus, comes from two sources. First is a failure to distinguish the portion of water which is annually renewable from the total volume in lakes, rivers, glaciers and ground water. The Great Lakes are a prime example – 99 percent of their volume is a legacy of the melting of the Pleistocene ice sheets thousands of years ago and thus is not renewable in human time scales. Second is a tendency of our egocentric society to reduce water needs to per capita availability, as though no other forms of life or ecological relations mattered. In per capita terms, Canada has less than 1 percent of the world's population and about 7 percent of the world's renewable water resources. But we also have 7 percent of the world's landmass, and in this perspective, a fair share, not a surplus, of fresh water. In fact, the Canadian and American shares of global renewable fresh water are not much different, at roughly 7 percent and 6.5 percent, respectively (Gleick 2006). That is not out of line, considering that Canada's geographical extent is slightly larger than that of the United States.

The odds are long that it will ever be practicable, in either economic or environmental terms, to redistribute water or people on a continental scale. Canada and the United States will continue to experience natural imbalances in their water supplies from time to time and from place to place. The relative wealth of water in our northern regions, especially Alaska and Canada's three territories will remain largely untapped, while

we face the less glamorous task of reforming the wasteful practices that have made our two countries the most profligate water users in the world. In this respect, we may have more in common than we want to think.

Water Diversion and Export

Despite four decades of sporadic controversy on this issue without resolution, a former Alberta

premier recently expressed his view that a major push from the United States for Canadian water would emerge within 3 to 5 years (Lougheed 2005). That seems unlikely for two reasons: first, Canadians continue overwhelmingly to oppose the very idea of selling our freshwater resources; and second, Americans seem to have less interest in the issue than previously.

It is true that a few private sector promoters in

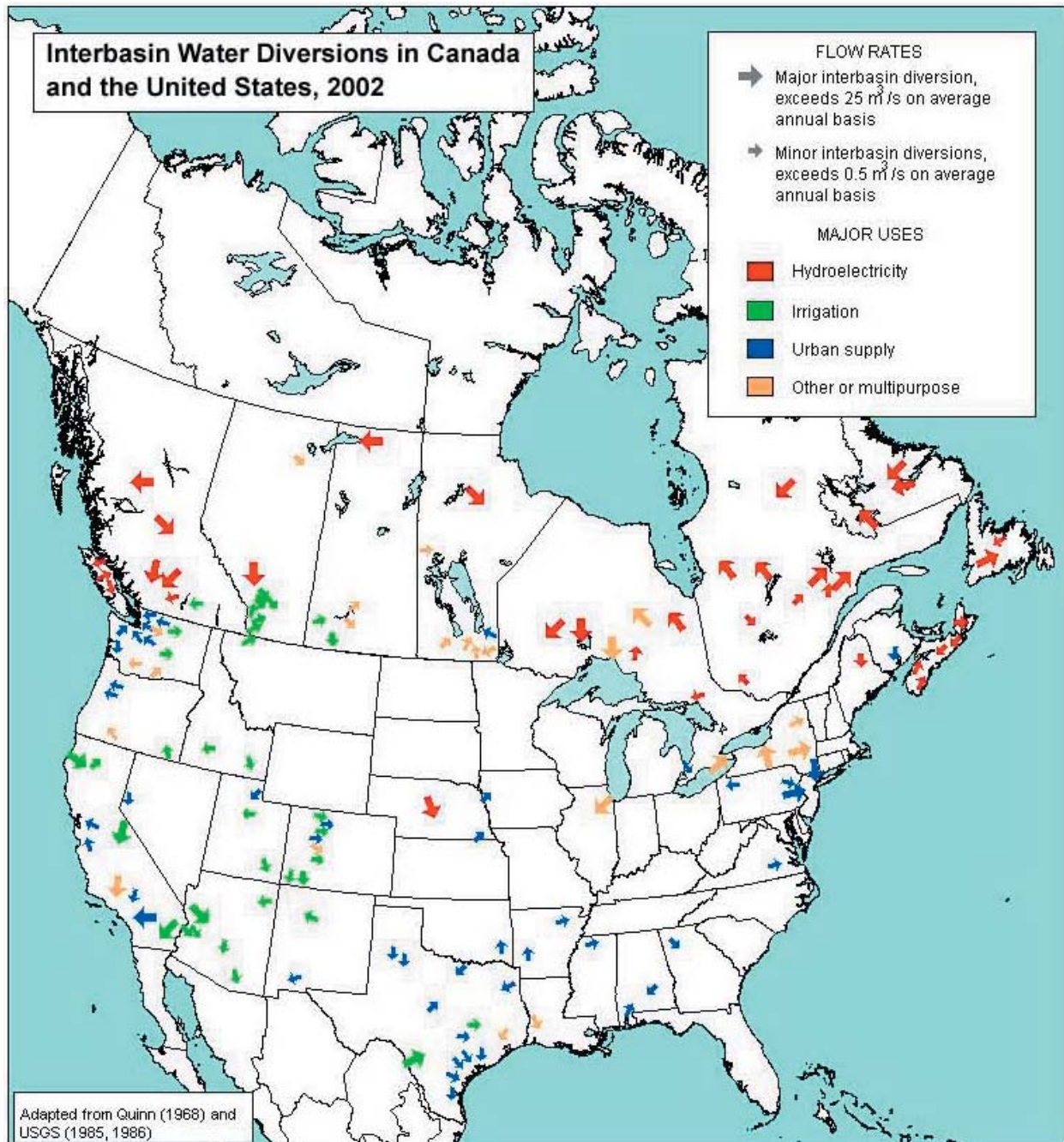


Figure 1. Interbasin Water Diversions in Canada and the United States, 2002.

each country have done their best, beginning in the 1960s, to make their continental pipedreams come to life, but we should not take them too seriously. Parsons' NAWAPA, Kierans' GRAND Canal and others of this genre are short on engineering, economic and environmental details; they are not supported politically by any government in either country; they are basically nothing more than lines on a map (Day and Quinn 1992).

What is perhaps more interesting is the pattern of interbasin water diversions that already exists within the two countries (Figure 1). This has not changed significantly in the last two decades, suggesting that the era of big dam and diversion construction in North America is effectively over, with the prominent exception of Quebec. Of special note are the different uses that diversions serve in the two countries: mostly electricity generation

in Canada, a non-consumptive use, and mostly irrigation and municipal uses in the United States (Quinn 2004). Note also that existing interbasin diversions take place within political borders – provincial, state and national – not across them. Canadian interbasin diversions, at least four times greater in volume than those in the United States, are not the first stages of a pipeline leading south of the border. The largest of them concentrate flows for hydroelectric power production, and thus transmit electricity, not water, to the market. It is estimated that 97 percent of the gross water storage capacity of large dams and about the same percentage of the flow diverted between watersheds in Canada are for hydroelectric power production (Table 1). Three projects – the diversions into La Grande River in the James Bay region of Quebec, the Churchill River diversion to the Nelson River

Table 1. Canada's large dams and interbasin diversions, 2002.

Province/ Territory	Large Dams*			Interbasin Diversions**		
	Number of Dams	Gross Stor- age Capacity, 10 ⁹ m ³	Percent of Capacity for Hydropower Generation	Number of Diversions	Mean Annual Flow, m ³ s	Percent of Flow for Hydropower Generation
British Columbia	99	150	99	11	340	99
Alberta	59	7	54	9	71	18
Saskatchewan	44	29	75	5	33	85
Manitoba	41	80	99	7	784	99
Ontario	122	57	88	9	555	94
Quebec	333	470	98	9	1,851	100
New Brunswick	16	2	96	1	2	--
Nova Scotia	37	2	93	6	23	100
P.E.I.	--	--	--	--	--	--
Newfoundland	90	92	100	5	716	100
Yukon	4	<1	100	--	--	--
NWT	4	<1	100	--	--	--
Nunavut	--	--	--	--	--	--
CANADA	850	890	97	62	4,375	98

* Defined by the Canadian Dam Association as those at least 15 meters in height, or 10 meters and meeting other specified conditions. Includes all large dams with the exception of tailings dams.

** Diversions meet two criteria: mean annual diversion rate is not less than 0.5 cubic meters per second; and diverted flow does not return to stream of origin or to parent system within 25 km of point of withdrawal.

Sources: Canadian Dam Association 2003; Quinn 2004.

Manitoba, and the diversions above Churchill Falls in Labrador (Newfoundland) - account for two-thirds of all water diverted in Canada.

A brief mention may suffice for other means of exporting freshwater. Despite repeated efforts by entrepreneurs and brief flirtation with their proposals on the part of coastal provinces, the first ship scheduled to transport Canadian water in bulk outside this country has yet to leave port. Alaska, the only jurisdiction on the continent which remains open to bids for shipping freshwater resources in bulk, has yet to make a major sale, either to other parts of the United States or to foreign markets. And the trade in bottled water between Canada and the United States, while sometimes raising justifiable questions in terms of community impacts, is of no more significance internationally than the export of beer or soft drinks (Hidel-Eyster International 1999).

Meanwhile, south of our border, there appears to be less interest in importing water than at any time in the past three decades. During that period, Southwestern states have been rebuffed in turn by their better-watered neighbors in the Pacific Northwest, the lower Mississippi, the Missouri and the Great Lakes basin states. That does not seem to have caused a problem however, so much as a change in direction. Water supplies within the Southwest are not running out, they are of necessity being used more efficiently. The many alternatives to water importation, switching the emphasis from pursuing water that users don't have to maximizing the value of water they do have, are proving to date generally less costly in both economic and environmental terms. Conservation pricing, conjunctive use of ground and surface water, desalination, wastewater treatment and recycling, drip irrigation, voluntary marketing among users, low-flow appliances, leak reductions: the possibilities keep expanding. With a little pressure from its neighboring states, California has reached agreement with the U.S. Secretary of the Interior to reduce its overuse of the Colorado River and, just as important, to reallocate huge volumes of the remaining apportionment from the Imperial and Coachella irrigation districts to higher-valued urban uses (Murphy 2003). This puts into effect the largest transfer of water from farms to cities to date in North America.

According to the U.S. Geological Survey (2004), water use for the country as a whole peaked in 1980 and has not reached that level since. Americans have, in effect, broken the link between population and water use. The nature of this conference in Santa Fe is a good indication of the wider range of options being explored and implemented to stretch regional water supplies in the United States. Canadians used to say that Americans should stop wasting their water and looking elsewhere for relief. Now the shoe is on the other foot: Canadians have been slow to improve their own conservation and efficiency practices. The Organization for Economic Cooperation and Development (OECD) has been critical for some time of Canada's overuse of water, second only to the U.S. in per capita terms, and reflecting the lowest prices charged for this resource of all countries in the industrialized world (Organization for Economic Cooperation and Development 2000).

Recent Events

If current economic trends seem to discourage further large-scale, long-distance water redistribution, it would be a mistake to suggest that this issue will disappear, that it will not return in changing circumstances to trouble future Canada-U.S. water relations. Although both national governments have recently asserted that international trade agreements are no threat to the sovereign right of governments to protect their resources (International Joint Commission 2000), Canadians remain concerned in particular, about their rights and obligations with respect to NAFTA and the World Trade Organization. An incident in 1998 forced the Government of Canada finally to take steps to improve its defense against bulk water export.

As a result of the controversy caused by a Canadian firm obtaining a provincial permit to export water in bulk by ship from Lake Superior to Asia, the Government of Canada decided it must do something to resolve this longstanding issue on a broader scale and for the longer term. In the following year, it announced a strategy, based on environmental, rather than trade grounds (Government of Canada 1999). In essence, major watersheds or basins would become the geographical basis for preventing bulk water

“removals.” Mindful of provincial primacy in the management of natural resources, the federal government proposed that all provincial and territorial governments prohibit, by legislation or regulations, bulk water removals from watersheds within their jurisdictions.

Protecting water, its ecological integrity and its use in the source region, within natural rather than political boundaries, was initiated as a defense against bulk removals, whether for use elsewhere in Canada or in other countries, thus avoiding the discrimination that could bring international trade challenges. Federal and provincial laws, regulations and policies are now in place across the country for this purpose, including amendments to the federal International Boundary Waters Treaty Act (Government of Canada 2002) to prohibit removal of water in bulk from the Canadian portion of Canada-U.S. boundary waters. Provision is made for overriding this prohibition in a situation of short-term humanitarian need. The vulnerability apparent in this approach is that any of the provinces, as resource owners, can opt out at any time to further their own trade interests.

Existing interbasin diversions in Canada are “grandfathered” and not subject to reversal in this new legal regime. It may seem hypocritical for Canada’s senior governments to adopt a strategy of restricting freshwater resources to use within their watersheds, given the record number of interbasin diversions in operation across the country. On the contrary, public unrest has increased as more cases are documented of the negative impacts of these projects on environmental processes and on those communities, especially in the north, that have been displaced or otherwise disadvantaged. It is what we have learned from this wealth of experience that leads us toward a more cautious and conserving approach today. A number of hydropower proposals, including those featuring interbasin diversion, have been rejected or modified in the last two decades.

Future Challenges

If Canadian governments have taken action to protect their own waters, that isn’t necessarily the end of the story. At some point in the not-too-distant future, the United States may face water shortages seemingly beyond the scope of user efficiencies

to offset, quite likely as a consequence of climate warming. Canada, of course, would experience a similar problem, but perhaps not to the same degree. Should Canada refuse to enter into a water export agreement in these circumstances, what would prevent the U.S. from taking a disproportionate share of waters along the international boundary, specifically from the Great Lakes, the largest pool of surface water by far on the continent? It would not even require encroachment onto Canadian territory, only the enlargement of a project which has been in place for over a century.

In that respect, the Chicago diversion poses a long-term threat to Canada. The international boundary does not pass through Lake Michigan; it is therefore the one Great Lake which is tributary to a boundary water, not a boundary water itself, under the terms of the Boundary Waters Treaty of 1909. Canada has consistently opposed any increase in diversion volumes from Lake Michigan to the Mississippi River basin beyond what is already permitted under a 1967 U.S. Supreme Court order (Chagnon and Harper 1994). That hasn’t stopped the U.S. Government, however, from considering larger diversions on two occasions since then. With some expansion of the channel capacity near Joliet, Illinois, to prevent



Figure 2. Editorial cartoon, Toronto Sun, July 23, 1988 (pg. 10).

local flooding, it could be accomplished easily within U.S. jurisdiction (Figure 2). However, there is some doubt that the U.S. Government will move in this direction. The reason is that most residents on the U.S. side of the Great Lakes are just as determined as their Canadian neighbors to protect their shared waters from external demands. This became abundantly clear during public hearings held by the International Joint Commission (2000), and subsequently during negotiations among the 2 provinces and 8 states which finally agreed on an Annex for the Great Lakes Charter in 2005 (Annin 2006). Among other things, this document leaves no room for Illinois to divert additional water out of the basin at Chicago. Only if the legislatures of all 8 states ratify this agreement, and Congress subsequently approves it, will it become law, in the form of an interstate compact (Council of Great Lakes Governors 2006). We may not know the outcome for several more years.

What options does that leave for the United States, and for Canada which is also beginning to experience serious droughts in its western provinces? By now it should be obvious that, for the most part, water demands must be resolved at the local and regional levels where they occur, not by looking to distant sources for relief. The advantages of this perspective is that there are usually a number of ways to address water demands and the potential for some of them will not soon, and may never, be exhausted. At the international level, as well, the United Nations advocates that the solution to future water crises rests with countries learning to use water more efficiently, not in shipping a low-value, high-weight substance like freshwater around the world.

Ironically, as we extend our search for water to outer space early in this 21st century, we are still following 19th century water doctrines and priorities on earth. Between 70 percent and 80 percent of water consumed in the western states, and a somewhat smaller percentage in the western provinces, goes to agriculture; too much of it based on old, leaky irrigation facilities and government subsidies for both the water used and the crops grown. With only modest improvements in efficiency, however, enough water would remain for agriculture, while releasing what is conserved for the pressing needs of municipal, industrial and

recreational uses and the environmental base of our modern world.

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Frank Quinn received his B.A. from the University of Toronto and his Ph.D. in Geography from the University of Washington, Seattle. Aside from 35 years of water planning and policy experience with the Government of Canada, he has lectured at universities in both countries. In 1984-85 he was Research Director of the Inquiry on Federal Water Policy (Canada), in 1999-2000 Special Adviser to the International Joint Commission which had received a Reference from Canada and the United States to investigate the consumption, diversion and removal of Great Lakes waters. His major areas of interest are federal water policy, water diversion and export, and Canada-U.S. boundary water issues. Recently retired from government, he is consulting part-time. He can be reached at: f_dquinn@yahoo.ca.

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