Future Canada-US water relations: "Stresses within a water distressed world"

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I. The global backdrop

"The World is in Water Crisis" says the BBC. The UN Secretary General asks, in a year-end broadcast, if the next wars will be water wars. "Water is the 21st Century Gold" avers a Middle Eastern research group. Rains fail, water tables drop and then crops wither, roots die, lands erode and soil blows away. At the same time, in other places floods increase in frequency and intensity. The impact extends beyond humanity: about one quarter of the fresh water fish species are endangered. Major rivers no longer reach the sea for weeks on end, every year. The Aral Sea is drying up. Fully 50% of the global wetlands disappeared in the 20th century.[1] Mangrove swamps are being pulled out. Aquifer levels are falling, not everywhere, but in far too many places. What is going on? Could we really 'run out of water'. And will the US need for water drive to conflict with Canada's own water needs?

Of course the surface world is mostly water. But within this watery world, only 2.5% of world's water is fresh water, with less than 1% available for use. Humans draw down about 56% of that 1% of water that is actually *accessible* to us. Water use sextupled when population doubled since the 1950s (ie added 3 billion). As we move toward 2050, adding the next 2-3 billion, sextupling once again isn't possible – we're already over the half way mark in terms of using the water readily available to us. [2] The Great Lakes, shared by Canada and the US contain some 20% of the planet's surface water.

We all require water for the agricultural (about 70 to 80% of the water use) and industrial goods that we use, perhaps for the energy we consume, and for personal use. Huge population increase has reduced the absolute amount available *per person* for these purposes. In addition, water shows great variability in time and place around the globe. Some parts of India receive 90% of their water in five days of rain, perhaps spread over two intervals a year. If there is no capacity to store this water there will be no more for months to come.

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[1] Kirsten Schuyt and Luke Brander, Living Waters: Conserving the Source of life: The Economic Values of the World's Wetlands, World Wide Fund for Nature, Gland Amsterdam 2004

[2] Shiklomanov, 1997 in The UN World Water Development Report: Water For People, Water For Life, World Water Assessment Programme, UNESCO Publishing 2003

Quality issues impact on quantity. In the last 50 years alone, humankind is reported to have invented about 100,000 chemicals to help us with food and industry and daily life; humans use the streams and rivers around us dispose of these and agricultural and human waste products. Ninety percent of the South's wastewater goes untreated into the streams and oceans with consequences for the downstream and the reefs and coastal regions. Ergo, above and beyond the fact that there is

China uses 25-50 tons of water to produce a ton of steel – Germany, Japan and US take 5 tons of water to make 1 ton of steel – here water quality is an issue
The Aswan high dam is built in where summer temperatures reach 44 degrees C. Were it further upstream, the evaporation losses would be cut substantially.
Saudi Arabia uses fossil water (ie laid down eons ago, not replenishable) for agriculture.
India and China between them probably pump about twice the Nile River's worth of water *more than rainfall will replenish* from underground sources for irrigated agriculture – often both the electricity to make this possible, and the water are free

Water cannot be created; it can only be managed. And water is local, quintessentially so, unlike energy or food commodities which travel through trade. How has our current water management allowed us to get into such real difficulty with this essential, vital resource? Here are some of the management issues:

Traditional delivery systems are based on traditional ways of looking at water.
Many Governments see their principal role as delivering water to their citizens and avoid the needed policy decisions.
Water is managed sectorally.
There is usually no Ministry of Water, often water governance; investments, use-decisions etc. are organized sectorally. Close to 20 Federal bodies in Canada and the US can make 'sovereign' water decisions – (not to count the provincial, municipal, First Nations authorities)
No single UN water organization sets global standards for water resource management. Sectoral standards exist for agriculture, health, water transport et al
"Water should be no cost/low cost" is tenet of many who advocate that water is a Human Right, and insist that it must be free (the relevant UN resolution says 'affordable')[5] Many see a Koranic proscription against charging for water though several Islamic countries charge for the services involved in delivery.
Governance systems don't reflect the reality that Rivers, lakes, and groundwater don't respect national boundaries;

But things are changing. It is increasingly accepted that the essential role of public authorities is to establish the policy and regulatory framework for water resource management.[6] In many countries there are moves to reform and development of new institutional frameworks**.** Increasingly there is provision for water basin authorities in national regimes. Many Canadian provinces are working along these lines.

There are also new ways of looking at the

Deciding on, protecting the environmental share
Managing inspection functions
Ensuring data collection, retention and distribution
Managing public debate on issues
Managing communication on water issues.
Ensuring subsidy for poorest populations

There is a lot of agreement within the water community about the correct remedies, but they are not simple, not at all. Moving to a conscious, transparent, publicly announced allocation of available water is a fraught process almost guaranteed to generate more enemies than friends for the party doing the allocating. The move toward charging for water services offers opposition parties an instant election issue. Managing across boundaries and agreeing to share the benefits of water, often between neighbours with centuries old traditions of mistrust is not easy. Current arrangements favour the powerful; who will speak for the weak? Irrigated-land agriculturalists in many countries have much more power than either the rural or urban poor. In some places, there are taboos against wastewater re-use. Who speaks for the environment?

with India continuing to pay Pakistan for the costs of building and operating dams, which Pakistan continued to build and operate – right through several periods of Indo-Pakistan hostilities. The Mekong River treaty held, with some difficulties, right through the Vietnam War. The Jordan River treaty is more observed than it is violated, though it is violated.

From Oregon, Aaron Wolff has studied several hundred water relationships and found that 2/3 of all events involving water issues between two or more states have in fact been cooperative, with acute violence being rare. Where there is violence, the water issue is usually as subset of other difficult issues. USA intelligence reports suggest that shortages have often stimulated cooperative arrangements for sharing scarcity. [9]

As countries come up against tighter and tighter limits, conflict may increase. Wolff's Axiom says that "the likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to change"[10]. In other words, the strong linkages, history, technical capacity and managerial competence of the Canada/USA International Joint Commission suggest that it will help our two countries to find solutions to new challenges such as deformed fish, zebra mussels, declining Great Lakes Water levels, and the like. In the Aral Sea, given the weak linkages between the regional countries, it is much less likely that solutions will emerge easily.

IV. North American implications

It is not surprising that Canada and the US will both experience challenges related to their own and the global water situation in the next few decades.

Global warming will change rainfall and water patterns in ways that can be predicted, but not ascertained. Stress will increase demand for water.

Increased migration caused by water shortages: today there are about 450 million people in 29 countries facing water shortage, and by 2025 about 2.7 billion, or 1/3 of the expected world population will live in regions facing severe water scarcity [11] . More people will move.

Increased demand for "virtual water" crops, ie as the water supply diminishes, countries will give priority to urban water use at the expense of cereals and look to find high-water value food imports: (1- 3 tons of water per ton of cereal product) but especially animal protein (3-5 tons water per ton of product).. According to current climate change predictions, this will offer new opportunities for Canada and parts of the US.

- World cereal demand will go up 50% from 1997 to 2020 requiring a 20% increase in water use even under optimal water use conditions.

We share some problems – seriously outdated water infrastructure. – trillions for US - $40 billion for Canada – will probably result in new ownership/management models.

[9] US National Intelligence Council – Global Trends 2015 [10] Aaron Wolf.
[11] IWMI – International Institute of Water Management, Colombo, Sri Lanka

V. Spillover into Canada-US relations.

Canadians constitute only 1 in 200 of the planetary population – but we have some amount between 7 and 13% of the world's supply of freshwater. There is reputed to be some 2 million *unnamed* lakes in the Canadian north. It is an article of faith that the USA has its collective eye on Canadian water. Is this likely to be so?

YES, in that

The USA population, and therefore demand for water is continuing to increase

- Major part of growth in Sunbelt and very dry South West.
- Climate change will make this zone hotter and drier.

Ogallala aquifer prospects – not bright.

Mexican water situation - Colorado – likely to get worse with consequent pull on water further north.

Current USA regime not exactly into conservation measures

Climate change will likely increase export opportunities for US cereal producers – if they have enough water

Canada is discovering new water stress – first Canadian conference (Lethbridge 2004) on Water Shortage. Seven Canadian rivers now have seasonal difficulties, including some shared, eg Milk River

There will be demands for more water at peak times – (even if not 'additional' in the treaty sense)

- Fish – Colombia River treaty – USA environmentalists pushing for more timely draw down (from fish point of view – not electricity need)
- Forest Fires
- Electrical Generation - already happened during blackouts and extraordinary events, to advantage of both Canadian and US power plants and populations.

NO, because:

US water use is in fact going down

- California – Pacific Institute's "Waste Not, Want Not" estimates that up to one-third of California's current urban water use can be saved using existing technology. And at least 85% of this savings can be saved at costs below what it will cost to tap into new sources of supply and without the social, environmental, and economic impacts that any major water project will bring.[12]

Industrial use is more or less stable: to be EPA compliant, industries construct continuous loop system – uses less, puts back cleaner water

There are two big rivers before Western US need get to Canada: Colombia and Klamath

Significant technology gains

- Desalinization – now literally thousands of desal plants – sea water is 97% of earth

[12] Pacific Institute

New technology = new results = new price results (50c to $1.00 vs 45c per cu meter conventional benchmark cost).
Two thirds of desal plants in Middle East, ¼ in Saudi Arabia
Florida, California, some two dozen more under serious consideration[13]
Process – boiling, membranes and a lot of new technology

- Waste water re-use – advanced wastewater treatment combining microfiltration with reverse osmosis –
  Agriculture, industrial, indirect potable, aquifer recharge
- Aquifer recharge

Membranes, membranes, membranes
Nanotechnology to clean up existing water especially metals
Agricultural breeding – new seeds, new crops, new methods – less water use.
New Economic Arrangements

- SanDiego – buys from farmers – moves to 'economic' higher value use
- Water Markets - Australia – established water markets – Farmer installs drip, sells saved water, pays for drip system

No known mega projects on the drafting table – Newfoundland lakes notwithstanding
Strong institutional arrangements

- Maintaining water quality – avoids having to find more
- IJC – Great Lakes Water Quality Agreement - [14]

[13] www.globalwaterintel.com GWI – August 2004
[14] International Joint Comission: Canada and United States 2003 Annual report, see also Handbook.