

Expanding the Ontology of Security Studies:

An Innovative Framework for Canadian Water Security

Cindy Strömer – Centre for Military and Strategic Studies, University of Calgary

Abstract: In some cases, the strategic studies and security ontology is protected by traditionalists in the field. This article takes the research beyond what is termed a ‘tired debate’, and moves forward by outlining the strategic importance of water resources in Canada. Various provinces have already made some significant progress in implementing water strategies, though there are some latent obstacles: namely, the risk of policy fragmentation between jurisdictions, and the lack of a grand national strategy regarding water in Canada. The innovative framework proposed in this article attempts to redefine the cap-and-trade system already developed for greenhouse gas emissions in the United States, and adapt it for a limit-and-remit system. While still in its conceptual infancy, this framework could motivate conservation both at the individual and industry levels by using a non-punitive, incentive-based rewards program.

Strategic and security studies have long since grappled with the debate of whether emergent conceptions of security should really be a part of what can be considered the traditional ontology of the field. As Stephen Walt famously stated in his article “The Renaissance of Security Studies”, strategic and security studies is “the study of the threat, use and control of military force.”¹

In the last twenty years, and with a greater concentration in the latter part of that time, the depth and breadth of literature suggesting the importance of emerging concepts of security convince many contemporary scholars that we have already moved past this tired debate. With this sentiment out and in the open, we can then proceed with the condition that the environment, its natural resources, and the threats and opportunities associated with both are a matter of security, and can be discussed within the field of strategic and security studies.

¹ Stephen M. Walt, “The Renaissance of Security Studies” *International Studies Quarterly* 35:2 (1991), 212.

Water in Canada

Canadians value water; at least they think it is important. In fact, “by a margin of 3-1, they chose water over oil and gas as the key natural resource for Canada’s future.”²

However, when it comes to how Canadians treat water, it somehow falls off the priority list and washes down the drain with the other on average 329 litres used by each Canadian every day.³

Beyond water use, Canadians are experiencing a multitude of water challenges which extend beyond individual activity. As many as “25 percent of Canadian communities experienced water shortages during the latter half of the 1990’s”⁴, and climate irregularities bring the other side of that coin; floods. Without a vertically integrated water strategy, this leaves Canadians and their water vulnerable to a plethora of threats and challenges.

Water Governance in Canada

In the last decade, there has been some improvement in water governance across the country. Ontario, largely motivated by the Walkerton tragedy, (where approximately 2500 people became ill and at least seven died⁵) created a new legal foundation for drinking water safety. The Ministry of the Environment in Ontario started their public awareness program of Drinking Water Ontario⁶, but the provinces vast surface and groundwater supplies are not yet integrated into a grand provincial strategy.

² Nik Nanos, “Canadians Overwhelmingly Choose Water as Our Most Important Natural Resource” *Policy Options*, July-August 2009, 12.

³ Karen Bakker, “Water Security: Canada’s Challenge” *Policy Options* July-August 2009, 18.

⁴ *Ibid.*, 16.

⁵ *Ibid.*

⁶ Ministry of the Environment, “Water” <http://www.ene.gov.on.ca/en/water/index.php> (Accessed 21 October 2009)

Alberta, in a response to “concerns about water shortages and degraded ecosystem quality,” overhauled its ‘first-in-time, first-in-right’ water resource allocation system in 2000, and by 2002 announced its new framework for water governance called Water for Life.⁷ Seven years later, Lorne Taylor, the lead on the Water for Life strategy, is making efforts for timely reassessment to ensure that the new strategy is indeed making a difference.

Also in 2002, the government of Quebec introduced its Water Policy to protect this unique resource, to ensure sustainable development, and to protect public health and ecosystems.⁸ Unfortunately, like many policies, many of the provincial initiatives are still awaiting full implementation, and those that began the process are still requiring reassessment and evaluation.

Apart from the constitutional jurisdiction obligations outlined in section 92, provincial initiatives to create better governance structures for enhanced water security are commendable. These initiatives demonstrate a willingness among all provinces and territories to emphasize the need for a better integrated, trans-jurisdictional water governance strategy. There is a consensus among the Canadian Council of Ministers of the Environment, as stated in the Whitehorse Communique, that there is a need for a “strategic national vision that captures existing water priorities.”⁹

Without cooperation and integration between the federal and provincial government, any water strategies developed will risk jurisdictional fragmentation and a breakdown of accountability and ease of reporting. Since several provinces have yet to begin

⁷ Rob de Loë, “A Canadian Vision and Strategy for Water in the 21st Century” *Policy Options*, July-August 2009, 22.

⁸ Ministry of the Environment of Quebec, “Water Policy. Water, Our Life. Our Future.” <http://www.mddep.gouv.qc.ca/eau/politique/index-en.htm> (Accessed 21 October 2009)

⁹ De Loë, 24.

developing a strategy, or are still in the infancy of their programs, there is an opportunity for Canada to be one of the first federal systems to devise and implement a grand national strategy when it comes to water resources. This approach will better prepare Canada for achieving its water security goals well before the country finds itself in crisis.

Unfortunately, as much as the federal government discussed a national water strategy in 1987, it was never fully implemented. Twenty years later, “reflecting the revival of concern for water across the country, the federal government took steps to clarify its water-related priorities through the 2007 Action Plan on Clean Water.”¹⁰ A grand national strategy for water in Canada also provides “numerous and tangible”¹¹ benefits for Canadians. These include: better geopolitical positioning so Canada can adequately and appropriately respond to rising international water stress; a significant reduction in legal and jurisdictional fragmentation which can increase efficiency throughout all levels of water management; an improved strategy, which is adequately funded, to provide Canadians with clean drinking water for generations to come while mitigating the impact of climate change and other unpredictable variables with water supply and quality. Ultimately, Canadians and their government will be better able to clearly identify what water means to the country, and in turn, will be better able to protect such a valuable resource.

It might seem somewhat preemptive to develop a grand national strategy for something as plentiful and ubiquitous as water, but this is a perspective riddled with faults. Canadian water resources are at risk. Threats to water resources in Canada are

¹⁰ De Loë, 22.

¹¹ Ibid., 24.

many; however, it is still important to realize that Canada still has time to adequately mitigate damage and protect water quality and quantity.

Threats to Water in Canada

An international analysis of water security renders all sorts of data on the propensity of water shortages to instigate conflict, data on the Middle East water situation, and how climate change may exacerbate already precarious international relations issues. Since much of the water security scholarship addresses these issues, a departure to Canadian water security is most appropriate.

One of the most pressing concerns in water security studies is the obvious lack of sufficient water resources data. As it stands, “over 10 million Canadians depend on groundwater for drinking, but our groundwater reserves are not even completely mapped, and groundwater quality monitoring is variable, to say the least.”¹² With water allocation schemes often adopting the centuries old ‘first-in-time, first-in-right’ procedure, water rights are assigned without doing proper assessments or even guaranteeing the supply allotted. This has detrimental effects since appropriation rights are strongly upheld, often at the peril of the ecosystems from which the water is drawn.

Without this sufficient data, it is easy for Canadians to hold inaccurate assumptions about water resources in Canada. As Karen Bakker writes, Canadians have to rehabilitate themselves away from the notion that Canada is the “Kuwait of Water.”¹³ Since Canada has roughly 6.5 percent of the world’s fresh water, and roughly 7 percent of the world’s land mass, it stands to reason that we have just enough water to sustain the ecosystems on which our population depends on for more than just drinking water. Furthermore, much

¹² Bakker, 16.

¹³ Ibid., 17.

of the water in Canada flows north, away from the major population centres, and much of the rest is locked in glaciers, permanent ice, or snow. In some cases, especially with water, access speaks volumes compared to gross supply.

There is a “long-standing myth of water abundance combined with a tendency to prioritize economic development over environmental protection.”¹⁴ With those kinds of attitudes prevalent in both the media and politics, it is not surprising that most Canadians operate with the age-old assumption that there is an inexhaustible supply, somewhere out there.

As much as drinking water purification methods are over a century old, and still in use, delivery systems for this water are failing after so much time. Initially, heavy cast iron pipes were installed, and these seem to be standing the test of time. However, these are more often found in older cities, dating back to well before the First World War. In the 1920’s, much of the pipes installed were made of ductile iron with an expected life of approximately 75 years. After the Second World War, lightweight steel piping replaced other materials, and was estimated to last only 50 years. It is only recently that highly durable plastics are making their way in to more contemporary water delivery systems.¹⁵ The nasty consequence of all of this is that “an unusually large percentage of the nation’s underground piping is starting to leak at the same time.”¹⁶ To adequately replace and repair this critical infrastructure, Canada is going to have to find \$100 billion, and soon.¹⁷ These leaks and infrastructure failures threaten water security in Canada due to several reasons: first, losses from the system through the cracks accounts for staggering amounts

¹⁴ De Loë, 21

¹⁵ Harry Swain, “Drinking Water and Waste Water: A Primer” *Policy Options* July-August, 2009. 29.

¹⁶ *Ibid.*, 29.

¹⁷ Bakker, 16.

in several municipalities; second, these cracks and leaks allow pathogens and other materials to enter the system *after* the sanitation and filtration process. This renders water quality assurances moot in many places where the drinking water delivery systems are failing.

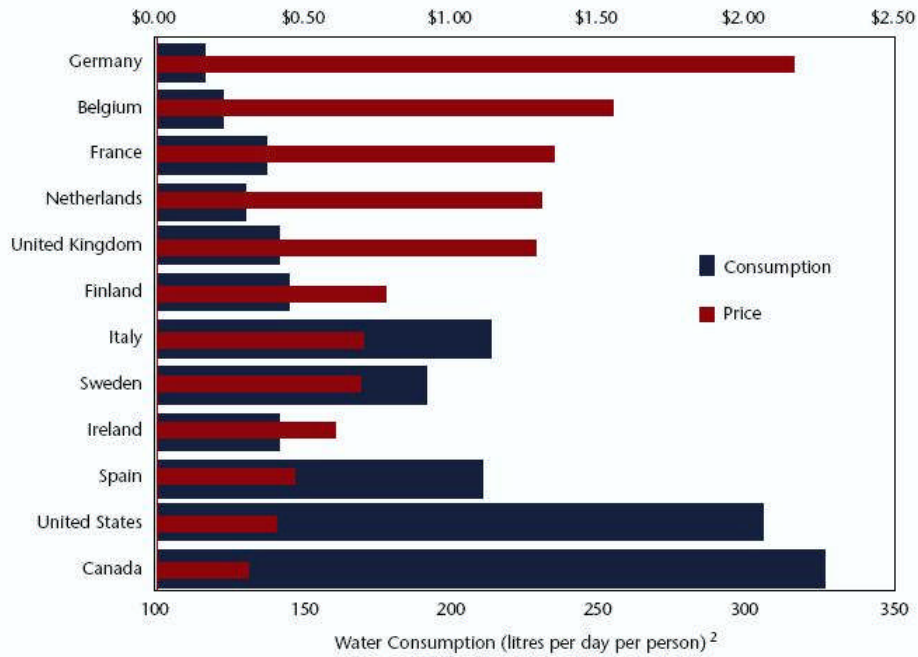
While water purification processes are fairly standard and quite thorough, it appears that consistent straining of the capacity of water purification plants and the introduction of new impurities challenge a tried and tested process. It is difficult not to think about the Walkerton tragedy when thinking of examples where drinking water purification processes failed. 2500 people became ill and at least seven people died, and what is alarming, “the factors that contributed to the contamination of Walkerton’s water supply existed across Canada during the 1990’s. Thus a similar outbreak could have happened in many parts of the country.”¹⁸ Canadians are also introducing many new chemicals and compounds in the water. From sunscreens to prescription medications, there are many substances which established and known methods of water purification cannot yet remove from the water. As Harry Swain writes, “Many persistent organic pollutants and endocrine-disrupting substances, such as the synthetic estrogens that are the active ingredients in birth control pills, pass unchallenged through both sewage and water treatment plants and are now part of our surface source water.”

Beyond the issues of purification, Canadians also challenge the whole notion of conservation by being severe water wasters. With a per capita consumption rate of anywhere between 275 and 450 litres/day, Canadians rank as number one, and this is not an instance where first is best. The perception of limitless supply coupled with some of

¹⁸ De Loë, 21.

the lowest costs in the world result in what could be described as reckless behaviour when it comes to water consumption.

FIGURE 1. WATER PRICE IN SELECTED COUNTRIES (DOLLARS PER CUBIC METRE)¹



Source: Council of Canadian Academies' Expert Panel on Groundwater (2009). "Sustainable Management of Groundwater in Canada."
¹ purchasing power parity

In situations where water is delivered with a flat rate, consumption exceeds 400L/day/person. When water is charged for based on actual usage, consumption falls below 250L/day/person. This might lead water strategists to the conclusion that raising the price on a usage based fee schedule would invariably result in better water conservation habits. Unfortunately, this is easier suggested than implemented as “the

main challenge in reforming water prices is to provide the correct signal to consumers of supply costs while avoiding any potential negative effects on low-income households.”¹⁹

An emergent threat, gaining much attention in media and academia in the last few years is what some refer to as ‘Climate Change’²⁰. As early as 1993, scholars such as Peter Gleick wrote about the impact of increasing climate irregularities on fresh water resources.²¹ His prognosis fifteen years ago was not very positive, and it can be assumed that since climate irregularities have increased over the years that the situation is becoming more dire. One of the greatest impacts that climate change has on fresh water resources, is that it “effectively makes obsolete all our old assumptions about the behaviour of water supply.”²²

The greatest effect that climate change could have on fresh water resources is two-fold; first, increased evaporative losses with higher temperatures, and second, the corresponding increase in demand for irrigation and hydration.²³ Since the impact of climate change on fresh water resources is uncertain, it makes some sense to exercise the precautionary principle: Canada needs to act and create and implement a grand national strategy to protect Canadian water resources for now and the future.

When discussing threats to Canadian water resources, it is not uncommon for the subject of bulk water exports to come to the table, almost first. It seems time to lay these fears to rest. First, neither Canada nor the U.S. has sanctioned this behaviour, and second,

¹⁹ Steven Renzetti and Colin Busby, “Water Pricing: Infrastructure Grants Hinder Necessary Reform” *Policy Options*, July-August 2009, 35.

²⁰ For more detail on the science of climate change, see the report of the Intergovernmental Panel of Climate Change, *Climate Change: The IPCC Scientific Assessment* (Cambridge: Cambridge University Press, 1990)

²¹ Peter H. Gleick “Water and Conflict: Fresh Water Resources and International Security” *International Security* 18:1 (1993), 96

²² Ibid.

²³ Ibid.

the NAFTA does not provide for this kind of transfer. Economically, it also does not make sense to sell bulk water. “As a generality”, writes Ralph Pentland, “it is safe to assume that most large-scale long-distance export schemes would return about a nickel or a dime for every dollar invested.”²⁴ Furthermore, the United States are not running out of water: they use only approximately ten percent of its renewable water supply annually, and water use “has actually been declining over the past two decades.”²⁵

Since various regions in the United States have already experienced crisis-level water shortages both in quantity and quality, the U.S. has made some significant adjustments, especially in the agriculture sector. The U.S. also stumbled across what the water security community refers to as ‘Virtual Water’, because the U.S. “accidentally exported a lot of its water use to less developed nations, as a result of outsourcing much of its manufacturing to low-labour-cost countries.”²⁶ So, by having other countries bear the water burden, the U.S. was able to keep its water resources in the ecosystem rather than in factories.

Understanding and managing water resources from a virtual water perspective is highly advantageous, especially when it comes to exporting manufacturing and production. Since much of the water-cost is borne in the refining process, it makes certain sense to shift the burden elsewhere, ideally, somewhere with greater access and supply than the exporting country. Unfortunately, this becomes somewhat sinister if it is done at the detriment of the importing country, and done with the idea of shifting water burdens without all parties being privy to the policy.

²⁴ Ralph Pentland, “The Future of Canada-US Water Relations: The Need for Modernization” *Policy Options* July-August, 2009, 61.

²⁵ Ibid.

²⁶ Ibid.

An Answer for Water Security in Canada

After outlining the various, and multiple, threats to water security in Canada, it is as important to offer a potential solution to the main problem of over consumption.

Addressing only the citizen contribution would only address half of the equation; a solution would also have to address industry. Canada's natural resource sectors alone account for approximately 22% of water consumption and 18% of pollutant releases to water.²⁷ Since this sector contributes close to 16% of total GDP in 2007, and employs one in thirty Canadians, a non-punitive, incentive-driven system needs to be put in place to encourage conservation where possible and better water management where necessary.

One such system is one similar to a greenhouse gas emissions 'cap-and-trade' system, with the eventual goal of reduction. Rather than a 'cap-and-tax' system, which even on a semantic level is rather unpalatable, a system based on rewards and incentives, like a 'limit-and-remit' would be easier to implement. First, it avoids the "toxic term" taxes, and instead, replaces it with the idea of opportunities, and markets. Second, most companies and communities are more inclined towards a system which allows the market and incentives to regulate the system, rather than have the government collect the financial surpluses as in a cap-and-tax system. Finally, with a cap-and-trade, or limit-and-remit system, companies can play a more active role in bettering their situation, and individuals can take their rewards into their own hands.²⁸

Such a system, while still in its conceptual infancy, requires a few adjustments in the current order. First, Canada needs to accept water as a strategic resource, deserving of

²⁷ David McLaughlan, "Water and the Future of Canada's Natural Resource Sectors" *Policy Options*, July-August 2009, 71.

²⁸ Amy Sinden, "Revenue-Neutral Cap and Trade" *Environmental Law Reporter: News and Analysis* October, 2009. "<http://www.eli.org> (Accessed 21 October 2009).

additional attention, management, and protection. Second, the pricing of water needs to better reflect its value, and potential cost of environmental reclamation most necessarily in the natural resources sectors of the economy. Utility companies need to adjust their roles from being revenue-generating and shareholder dividend-paying entities, to conduits in a larger, more environmentally minded system.

In this way, a water limit-and-remit system would work something like the following. Based on national and provincial averages, a ceiling, or upper limit of water consumption would be established. For this example, the limit would be 400L/day/person. While this figure is above some of the regional usage figures, it is well below some of the higher usage averages in the country. By setting the initial limit high, many more people would qualify for the reward, at least at first. Like in any cap-and-trade system, the eventual goal is reduction, and this applies here too.

Individuals who use less than this amount, are then able to remit this amount back to the utility company. The utility company then either credits the unused litres for another time, or more favourably, would reduce the utility charges for that individual by the percentage of litres conserved from the total upper limit. The incentive, or reward for the utility company to reward the individual, would come from the ability of the utility company to sell the unused litres to industry at an appropriate cost per litre. At the moment, the natural resources sector pays an exorbitantly low price for water, if anything at all, yet it accounts for almost one fifth of total water consumption in the country.

While this might initially impede implementation of this program, (no industry or company would naturally be willing to pay more for a material normally taken for

granted), it is a necessary evil which must be overcome. As noted earlier, under-pricing simply leads to a lack of conservation-innovation and waste.

Industry then, by not wanting to pay more for water, would more likely develop water-conserving methods. Furthermore, the same system of ceilings and rewards for using less than the allowed amounts could also allow industry the chance for rebates, or reduced pricing.

Back at the individual level, those individuals who exceed the ceiling would not face a penalty initially. It is hoped that the reward for under-usage would be attractive enough to motivate better conservation methods and increase the number of under-users. As the system matures, over-use might incur higher prices (just as it might in industry), but there would not be a 'tax', per-se.

Again, while this system is still in its conceptual infancy, it provides a promising non-punitive incentive-based program which so far renders the possibility of creating an urgently needed driver for better conservation practices. Since conserving water at both the individual and industry level is now only motivated by an abstract norm of 'doing good', this system may be the answer. Real rewards, real pay-offs, real results.

Conclusion

Without forgoing the theoretical component of this research, it is important to take the inquiry past existing, or even concluded debates. It has been argued by long-time scholars such as Peter Gleick²⁹, Malin Falkenmark³⁰, and John Volger³¹ that the

²⁹ His article "Water and Conflict: Fresh Water Resources and International Security" cited earlier, is one of the more cited works on climate change and its impact on water resources.

³⁰ Malin Falkenmark's work ("The Greatest Water Problem: The Inability to Link Environmental Security, Water Security and Food Security" *Water Resources Development* 17:4 (2001), 539-554.) has informed this authors previous research.

³¹ John Volger, "The Environment in International Relations: legacies and contentions" in *The Environment and International Relations* John Volger and Mark Imber Eds. (Routledge: New York, 1996)

environment is indeed worthy of inquiry through the strategic studies and security lens. By conceptualizing the issue with the knowledge and understanding of military strategy, the wisdom of Clausewitz, Sun-Tzu and others, the discipline can reach out to others and perhaps provide the answer. Rather than viewing ontological expansion of a field as a threat, viewing it as an opportunity to expand *into* other fields creates a better environment for idea-sharing.

Canadians seem to care about water, the environment, and access to clean drinking water. Ignoring the true cost and risk associated with threats to water resources, renders this highly important resource at the peril of misinformation, disorganization, and waste. By creating an attractive cost, and resource-saving system, it seems Canadians will be able to adequately protect water resources for future generations, and of course, for the environment, on which all lives depend.

Works Cited

- Bakker, Karen “Water Security: Canada’s Challenge” *Policy Options* July-August (2009), 16-20.
- de Loë, Rob “A Canadian Vision and Strategy for Water in the 21st Century” *Policy Options*, July-August (2009), 21-24.
- Gleick, Peter H. “Water and Conflict: Fresh Water Resources and International Security” *International Security* 18:1 (1993), 79-112.
- McLaughlan, David “Water and the Future of Canada’s Natural Resource Sectors” *Policy Options*, July-August (2009), 70-73.
- Ministry of the Environment of Quebec, “Water Policy. Water, Our Life. Our Future.” <http://www.mddep.gouv.qc.ca/eau/politique/index-en.htm> (Accessed 21 October 2009)
- Ministry of the Environment, “Water” <http://www.ene.gov.on.ca/en/water/index.php> (Accessed 21 October 2009)
- Nanos, Nik “Canadians Overwhelmingly Choose Water as Our Most Important Natural Resource” *Policy Options*, July-August (2009), 12-15.
- Pentland, Ralph “The Future of Canada-US Water Relations: The Need for Modernization” *Policy Options* July-August, (2009), 60-64.
- Renzetti, Steven and Colin Busby “Water Pricing: Infrastructure Grants Hinder Necessary Reform” *Policy Options*, July-August (2009), 32-35.
- Sinden, Amy “Revenue-Neutral Cap and Trade” *Environmental Law Reporter: News and Analysis* October, 2009. “<http://www.eli.org> (Accessed 21 October 2009).

Swain, Harry “Drinking Water and Waste Water: A Primer” *Policy Options* July-August, (2009), 26-30.

Walt, Stephen M. “The Renaissance of Security Studies” *International Studies Quarterly* 35:2 (1991), 211-233.