

THE LAKE ONTARIO-ST. LAWRENCE RIVER LEVELS STUDY AND THE UNESCO/WMO HYDROLOGY FOR ENVIRONMENT, LIFE, AND POLICY (HELP) PROGRAMME

Fifth Downstream, First Upstream: Lake Ontario as Great Lakes–St. Lawrence River Sentinel

Public Comments submitted to:
Canadian Section Secretary
International Joint Commission
234 Laurier Avenue West, 22nd Floor
Ottawa, ON K1P 6K6
Tel: 613-995-0088
Fax: 613-993-5583
commission@ottawa.ijc.org

Catherine Masson, masson_5@sympatico.ca
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Each Great Lakes–St. Lawrence River basin has distinct hydrological, geological, geographical and meteorological features. The Lake Ontario watershed has a unique ‘fifth downstream, first upstream’ place in this waterway. The ratio of Lake Ontario’s surface area to watershed ratio is 1:6. At the deep hole in the Ontario’s southeast quadrant, the maximum depth is 170m below the surface of the Atlantic Ocean. Of the five Great Lakes, Ontario’s inflows and outflows are the most vigorous. Canals and diversions guide recreational and commercial marine ship traffic across its breadth. A dense riparian network transports nutrients and sediments to an impoverished fishery and an impaired aquatic ecosystem.

The Final Report by the **International Lake Ontario – St. Lawrence River Study Board** (LOSL, 2006) to the **International Joint Commission** and the current Great Lakes Water Quality Agreement (GLWQA) Review both hold the potential to elevate the stewardship of our Great Laurentian River to exemplary international cooperation in civilised social and scientific conduct.

Although the United Nations Educational, Scientific and Cultural Organization (UNESCO) is now demonstrating leadership in promoting best ethical, economic and ecological freshwater practices, international responsibility for sustainable watershed and lake basin management generally lacks hydrological coordination. This is most notable in relations between North America and the Global South where shared dialogues linking science, policy and citizens are limited.

Hydrology for the Environment, Life, and Policy

In its Fifty-eighth session, the United Nations General Assembly adopted a resolution declaring the ‘International Decade for Action: Water for Life, 2005-2015’. In so doing, the Assembly recalls its resolution proclaiming the year 2003 the ‘International Year of Freshwater,’ the ‘International Decade of Water Supply and Sanitation 1981-1991,’ and the ‘International Hydrological Decade 1965-1974.’ The ‘Water for Life’ Decade began on World Water Day, March 22, 2005. The two Parties to the GLWQA and the Boundary Waters Treaty of 1909 should ensure formal representation and public participation in 2005-2015 Decade activities.

The UNESCO/World Meteorological Organization (WMO) Hydrology for the Environment, Life, and Policy (HELP) Programme¹ proposes to integrate policy development with science. The HELP program facilitates Demonstration, Learning and Operational Basins. At each stage of the program, scientific research conducted becomes more interdisciplinary, first across abiotic disciplines (hydrology, remote sensing, atmospheric science), then a merging of abiotic and biotic disciplines (adding ecology and plant physiology), and finally a further merging with the social sciences and policy and decision making for resource management.

At this point, there has been an inadequate effort to bring hydrology into Great Lakes binational policy. Hydrological modelling correlates land-based human activities with lake-effect deposition, surface and groundwater contamination, productive and metabolic impairments in aquatic and terrestrial populations and harmful environmental health effects in human communities. The hydraulic regime of tributary watersheds directly affects the water quality and levels in the boundary waters. Many external influences are internalised when hydrodynamics are considered in policy and decision-making, in conjunction with the established trinity of physical, biological and chemical limnology (Dixon and Easter, 1986).

Lind and Glass remind that “governance by reaction” (1984, 137), is a common policy direction in North America. Broad international agreements such as the LOSL Study and the GLWQA (IJC, 1994) are meant, “to be self-educative, as well. It is not that government educates. It is that we educate ourselves through the public expression of beliefs and commitments which many share or which may legitimately be argued to have moral or traditional weight even when not so widely shared” (1984, 139). We must adapt to the challenges of climate change and the potential for innovative applications of hydrology and meteorology, economic funding mechanisms and science – policy integration to alleviate hydroclimatic variability at various levels of scale.

Implementation is a dynamic process of negotiation directed at the achievement of objectives set forth in legislative acts, executive orders, judicial decisions, rules and regulations, accruing substantive responsibilities, benefits and consequences. Despite earlier nomination the program, HELP is not yet implemented in the Lake Ontario watershed as it is managed under the binational jurisdiction of Canada, the United States, the IJC and the Lake Ontario LaMP. The Lake Ontario watershed should be re-nominated as a participating basin in the HELP programme. This international hydrological initiative will help us to link LOSL

¹ URL:

http://portal.unesco.org/sc_nat/ev.php?URL_ID=1205&URL_DO=DO_TOPIC&URL_SECTION=201&PHPSESSID=c971c6427bbfb95ab84a7f9ded2d3ba7

to similar programmes operating in other HELP basin, so that we can share what we have learned about meeting human needs and understanding our impacts on ecological systems.

Fifth Downstream, First Upstream

Patterns of confluence taken by each of the Great Lakes–St. Lawrence River basins distinguish each one as individual hydrographic units. The Lake Ontario watershed holds a sentinel position as the fifth downstream, first upstream lake in this Great Laurentian River. This 90,000 km² watershed and the 18,000 km² lake is the receiving body for the four upstream Great Lakes, and serves as a major sink for significant amounts of contaminated run-off. Due to its strategic position at the head of the Great Lakes St. Lawrence Seaway, Lake Ontario is often the first (though not always the first discernible,) host to invasive species in the ballasts of ocean-going vessels.

Canadians and Americans, Ontarians and New Yorkers living in Lake Ontario's watershed share a diverse mix of rural, urban and impounded catchments and coastlines. Thinking through this lake and its watershed allows us to see it as a geophysical unit overlaid with international, jurisdictional, administrative and proprietorial boundaries. The Boundary Waters regime established designated beneficial uses of Great Lakes waters as legitimate social values. A major disjunction among organizations operating at all levels concerns political economies authorising the degradation of aquatic and terrestrial ecosystems. Ethical ecologies of water emphasise the production of knowledge and use by people for the defence of life. They represent the collective trust that civil societies invest into critical core values meant to endure through ecological, economic and political dialogues.

These and other concerns might serve as the basis of HELP projects in the Great Lakes and the St. Lawrence River basins, using novel hydraulic and hydrologic management alternatives novel hydraulic and hydrologic systems (Endreny *et al*, 2000; Endreny *et al*, 2001; Endreny, 2003). With LOSL, this took the form of the **Shared Vision Model** composed of a pyramid of four computer models connecting all Study research to the guidelines of the Study Board to identify and evaluate each plan (LOSL, 2006, 31-81.) Further recommendations were derived from the outreach activities and experiences of the Study Board and **Public Interest Advisory Group** (LOSL, 2006, 89-82.)

The North American Great Lakes–St. Lawrence River basin community enjoys advanced scientific methods, political stability, public participation and the financial resources to fully implement hydrological management plans (Fuller and Shear, 2002). Transboundary water governance must respond to rapid urbanisation, development and expansion challenges. Citizens have yet to define effective operating standards in reference to water quality and water quantity, articulate moral responsibilities towards future generations, and settle outstanding indebtedness to indigenous peoples. Lessons learned from these experiences will provide lasting socially and scientifically relevant benefits—globally and locally.

Bottom-Up Approach

Most of HELP's implementation is within the HELP basins themselves, consistent with the 'bottom-up' approach of the programme. HELP's contribution to the UNESCO

Integrated Water Resource Management (IWRM) process is defining knowledge gaps and acting via a global network of basins. Through the involvement and support of stakeholders, longer-term visionary values of research with subsequent benefits to society may accrue sooner (Bonnell, 2004.) Through the present binational IJC reference mechanism or the GLWQA review process itself, it is possible but institutionally challenging to recommend that the Lake Ontario basin be designated as a binational participating basin within the UNESCO/WMO HELP Initiative community.

Existing and emerging impairments arise from rights-based civil policies as opposed to the needs-based laws of nature. Rothman (1995) amongst others, notes that negotiations ideally move along three stages: the adversarial stage, where each side defines its positions, or rights; the reflexive stage, where the needs of each side bringing them to their positions is addressed; and finally, to the integrative stage, where negotiators brainstorm together to address each side's underlying interests.

The **Public Interest Advisory Group** is an example to how the participatory action process is integral to the citizens of Great Lakes–St. Lawrence River basin; to research and teach what they and future generations will need in terms of ethics, law, economics hydrology and science. A comprehensive process is required that vests all citizens with the responsibility to contribute. Grassroots organisations may be underfunded, but join in sharing their motivation to create positive change. These citizen groups and their networks of linkages are the places to start UNESCO/WMO HELP Basin programme nomination and implementation.

Together, we can address the responsibilities of individuals and societies living within complex and fragmented watersheds and provides ways to preserve and improve of health and well being of present and future generations. Communication is the key.

Great Lakes- St. Lawrence River Sentinel

The world is watching us here in North America as we proceed with the review of the GLWQA. We need to remember how very fortunate we all are: two nations living in harmony with these vast freshwater seas. We must be bold and visionary. Let us demonstrate global leadership in Tran boundary water governance. Let our peoples be emboldened to contribute to these negotiations in the ways they know best.

There are no short cuts around the hard work of learning ethical and ecological principles and practices. All who want to play a role in the debate must quickly learn more of these approaches. Only then will we have a chance of developing bioregional, national and international environmental policies that will protect watersheds while sustaining social processes. The residents of the Lake Ontario watershed need to recognise that we are all at a critical moment in time.

Let us not be afraid to reach beyond our respective borders if necessary, for the highest ethical, political and legal organisational principles we can, and commit ourselves to the most effective ecological and economic operational practices possible. What will it take to introduce the UNESCO/WMO Hydrology for the Environment, Life, and Policy (HELP) Programme to the Lake Ontario watershed and thereby to the entire Great Lakes–St. Lawrence River basin? The time is now.

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* **Featured in the February 2006 edition of *Water21*** - (8/02/06) Global Focus Column: ‘Help for HELP.’ An ongoing UNESCO-backed initiative is working to bring together water scientists, lawyers and policy makers to shape river basin management. Bill McCann reports on progress of the Hydrology for the Environment, Life and Policy approach, a new book from IWA Publishing on the topic, and creation of the world’s first UNESCO HELP centre at the University of Dundee. URL:
http://www.iwapublishing.com/template.cfm?name=w21feb06_feats Accessed 3.9.06.