Lake Ontario – St. Lawrence River Water Levels Task Force

Discover whether the following statement is true:
"The water levels issue defies a solution that satisfies everyone".[1]

Committee Overview

Welcome to the Lake Ontario – St. Lawrence River Water Levels Task Force! While the issues, background events, and positions outlined in this backgrounder are real, this task force is a fictional committee. This new committee was created to amalgamate the very real work conducted over the last ten years by the International Joint Commission (IJC) in regulating water levels and flows in the Lake Ontario – St. Lawrence River basin and considering alternative regulatory frameworks. The ultimate goal of the IJC, and this task force, is to balance the perspectives and interests impacted both positively and negatively by artificial water level regulation. These include, among others: responsibilities of various levels of government, commercial navigation interests, environmental needs, hydroelectric power generation requirements, municipal and industrial water uses, property ownership demands, and tourism opportunities. Exploring this goal, the task force will conduct a consultation with stakeholder subgroup representatives and, using this information, prepare a letter to the IJC containing an outline of a proposal with advice on a new water regulation plan for the region. The proposal is expected to incorporate and serve the range of economic, social, and environmental needs impacted by the decision.

Note: this is a consultative, bilingual committee. Simultaneous interpretation will be provided.

Introduction

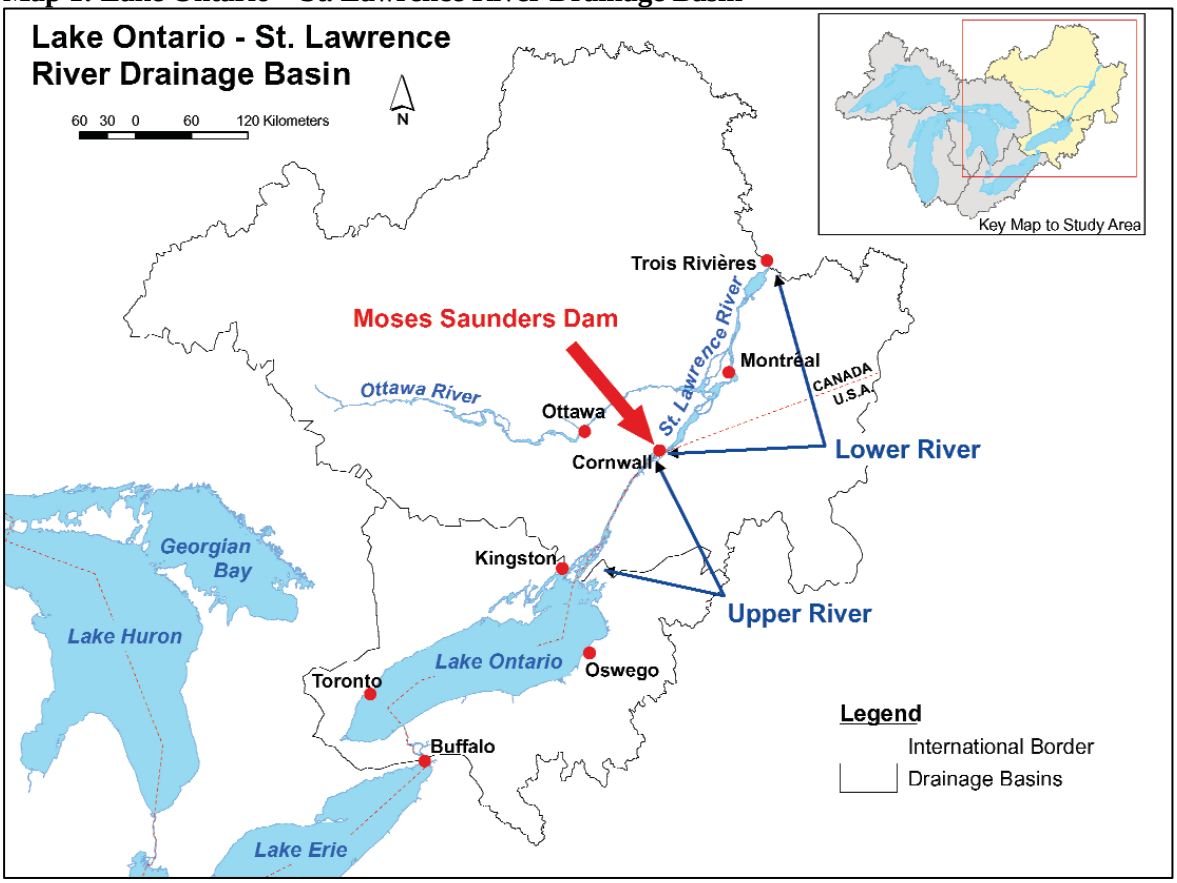
An ongoing and rather heated debate has transpired over the last 50 years concerning the control of water levels and flows from Lake Ontario to the St. Lawrence River. In 1952, at the recommendation of the IJC, the United States and Canadian governments decided to physically control (regulate) water levels in the Lake Ontario – St. Lawrence (LOSL) River basin, which reduced natural fluctuations and flooding. Many stakeholders have since enjoyed significant economic and social benefits from the regulation. However, the implications of this decision on the ecology of the basin have been equally profound.

In the beginning…economic and social benefits

In 1952, the IJC approved a major hydroelectric power project along the St. Lawrence River at Cornwall, Ontario, and Massena, New York. One of the main components of this project involved constructing the Robert Moses - Robert H. Saunders Power Dam (Moses-Saunders Dam) located 100 km southwest of Montreal. Built in partnership by the New York Power Authority and Ontario Hydro (now Ontario Power Generation), the Moses-Saunders Dam was completed in 1958, spanning the equivalent of ten football fields with the capacity to produce energy for one million people.[2]

The goal of the hydroelectric power project was to regulate the outflow of water from Lake Ontario which in turn affects water levels and flows on Lake Ontario and the St. Lawrence River, impacting levels as far downstream as Lac St. Pierre near Trois-Rivières, Québec.

Map 1: Lake Ontario – St. Lawrence River Drainage Basin



Source: Lake Ontario – St. Lawrence River Study Board - Final Report 2006, http://losl.org/PDF/report-main-e.pdf

While natural climatic and wind conditions usually determine water levels and flows, a regulation plan was put in place by the IJC to control the outflow of Lake Ontario water through the dam. A *regulation plan* is a set of rules that responds to the current level of the Lake, forecasts inflows, and incorporates ice conditions, season and other factors affecting water levels and flows into a decision-making framework.

The dam project, together with the regulation plan, would ultimately provide a number of benefits including: reduced risk of flooding to shoreline communities; enhanced commercial navigation opportunities; as well as generation of electrical power for the region, not to mention employment and other economic development spinoffs. The decision to create the dam and minimize water fluctuations also increased property values and tourism along the shores of Lake Ontario and the upper St. Lawrence.[3]

Over time…stakeholder conflicts and environmental implications

After regulating the water levels, several conflicts associated with specific stakeholder needs and geographic locations have arisen. Lake Ontario residents typically want the water to be fairly stable. Those living along Lake at times need lower water levels to prevent erosion of land and property. Some properties are no more than two meters above the Lake's current water level and at risk of flooding in extreme weather conditions. Yet communities and businesses along the Lake also need water high enough for power plants, industry, boating, beach enjoyment, municipal water intake, and other needs.

In contrast, those living and working along the St. Lawrence require enough water in the system to allow ships to pass through, enable municipalities and industries to intake water, and prevent salt water intrusion and contamination. Some predict that preventing natural water flows could have greater consequences for residents on the St. Lawrence, as opposed to Lake Ontario, particularly if the flow of water causes the river to dry up in some locations. If the outflow at Moses-Saunders dam is increased by 12 percent, it takes one week for Lake Ontario to drop one inch, but this corresponds to an increase of 11 inches by the time the water flows along the St. Lawrence and hits Montreal.[4] Significant fluctuations (highs and lows periodically) also help protect the productivity and value of nearshore zones, including wetlands, beaches, and natural areas along the St. Lawrence River. It appears that both the geography and specific interests have resulted in conflicting view points on water levels and flows within the basin.

Some also believe the factors involved in making decisions about water levels and flows in the basin have been largely in favour of economic interests and to the advantage of certain geographic locations, sometimes at the expense of ecosystem needs. While the natural ecology of the basin long thrived under variable water levels prior to the dam, studies now show that optimal levels for maintaining diverse wetlands and biodiversity need to mimic the natural pattern of fluctuations as closely as possible. Variable water levels are essential for nearshore and wetland habitats and the flora and fauna they support.

Fighting nature, in disrupting the natural flows and variations in water levels with construction of the Moses-Saunders dam, has had dramatic negative effects on the Lake Ontario – St. Lawrence River ecosystem over the years. A recent study conducted by the IJC International Lake Ontario – St. Lawrence River Study Board attempted to quantify some of the environmental losses. In their final report released in 2006, it was found that half of two critical types of wetlands have completely disappeared in Lake Ontario and the St. Lawrence River since the 1950s.[5] Globally significant biodiversity has been lost, including fish, birds, wildlife and plant species, it is believed in large part due to the unnatural water regulation. The St. Lawrence is now considered by some to be an endangered river.[6]

These new studies have provided evidence suggesting the environment has been harmed by the Boundary Waters Treaty and the framework for flow regulation supported by the IJC. Added to this, escalating concerns and dissatisfaction with respect to other issues have led stakeholders to vocally express opposing

and often conflicting points of view. The IJC continues to seek a solution to balance the diverse economic, social and ecological needs of the region.

The Background

The IJC was established by the Boundary Waters Treaty of 1909 to help the United States and Canadian governments prevent and resolve disputes over the use of the waters they share. Generally speaking, the IJC has a number of roles that are administrative, regulatory, investigative, and evaluative in nature. It administers various water apportionment (distribution) arrangements under the Boundary Waters Treaty. It approves and regulates proposals for work in transboundary waters. The IJC also conducts investigative studies, provides advice, and makes recommendations on transboundary issues referred by governments. In addition, its responsibilities include evaluating and assessing progress on restoring the Great Lakes basin ecosystem, reporting on transboundary air and water pollution, and other matters of common concern along the international boundary.

In this case of Cornwall and Massena, the IJC is responsible for approving, monitoring and advising on all projects and plans that affect the natural levels and flows of boundary waters, as stipulated under the Boundary Waters Treaty. While it has yet to find and implement a solution that can be agreed to by all parties, over the past 50 plus years the IJC has facilitated and managed a number of key events, studies, consultations, and report recommendations, seeking to balance various interests in the Lake Ontario – St. Lawrence River water regulation system. Some of these activities include:[7]

1952: In 1952, a document called an Order of Approval was issued by the IJC to permit the Moses-Saunders project that would regulate the flow of water. The Order included a set of management and evaluation criteria to guide the development of a future regulation plan. Following the guidelines of the Boundary Waters Treaty, an order of precedence was observed among select water uses: domestic and sanitary purposes, then navigation, then power and irrigation (other needs like the environment and recreation were not prioritized at that time).

1956 - 1963: In 1956, the original 1952 Order of Approval was amended and new set of criteria were developed for a regulation plan to control outflows from Lake Ontario to the St. Lawrence. Water regulation was deemed the responsibility of the IJC International St. Lawrence River Board of Control. The dam was completed in 1958, and in 1963 the IJC began using a regulation plan (Plan 1958D).

1973 - 1997: A range of public participation studies were completed to consider traditional water uses (domestic, sanitary, navigation, hydropower, irrigation) as well as emerging interests (wetland protection, coastal processes, boating and tourism). In 1997, a new regulation plan (Plan 1998) was recommended but never implemented because the IJC felt it did not know enough about the environmental impacts.

1999 - 2000: After nearly 50 years, in 1999 the IJC indicated to the United States and Canadian governments that it was becoming increasingly urgent to review the regulation of Lake Ontario outflows in light of vocal discontent by some stakeholders, growing water uses, and emerging climate change impacts. A year later, the IJC established the International Lake Ontario - St. Lawrence River Study Board to assess the 1956 revised Order of Approval and put forward alternative management options.

2006: After five years of research at a cost of US $20M, the Study Board released a report on May 31, 2006, recommending three optional regulation plans for managing water levels and flows:

1. **Plan A+** focused on keeping water fluctuation within the narrowest range possible, benefiting recreational boaters and protecting property owners from shoreline erosion and flooding.

2. **Plan B+** focused on benefiting the environment by returning the Lake Ontario – St. Lawrence River system to a more naturally fluctuating system, while taking into account other interests.
3. **Plan D+** focused on providing gains for recreational boaters, hydropower and commercial navigation, with some losses for property owners and some benefits to the ecosystem.

Note: Plan E, the Natural Flow Plan, was not formally put forward to the IJC because of its economic impacts, but it was considered "the best possible plan for the environment" by the LOSL Environmental Technical Work Group of the Study Board.

2008: Over the next two years, the IJC reviewed the proposed regulation plans, consulted with stakeholders and incorporated public comments and feedback, and met with the government officials. The IJC leaned toward Plan B+, but also proposed incorporating mitigation measures (compensation) to assist those who would be affected by the decision. A new plan called "**Plan 2007**" was developed as a product of the evaluation and feedback received during the consultations. It ended up being similar to Plan D+ with some environmental improvements.

On March 28, 2008, the IJC released a proposed new Order of Approval and regulation plan (Plan 2007) for public comment. Click here for the March 28 news release and the video where IJC Chairs Herb Gray and Irene Brooks describe the proposal. From March to July 2008, the IJC held a public comment period on the proposed new Order and regulation plan. Commissioners considered the stakeholder views submitted and proposed leaving the current plan in place, however; various interests expressed concern with this decision. The testimony from hearings and other consultative methods showed serious divisions by geography and by interest, and there was little support for regulation Plan 2007. In the end, the IJC concluded that this proposed regulation plan was not a practical option for implementation and needed a revised set of goals, objectives and criteria. Revisions would move the framework towards more natural flows to benefit the environment, while still balancing other interests.

In a letter dated September 4, 2008, IJC wrote the United States and Canadian governments requesting support to work toward the goal of more natural flows while respecting others interests. The IJC proposed a one-year process with Canada, the United States, New York, Québec, and Ontario to attempt to resolve the outstanding issues, find a more balanced approach, and obtain direction and consensus on the future of the water flow regulation. This involved forming a small **working group**, comprised of IJC staff and select representatives from the above governments, who will now provide recommendations and develop a mitigation and adaptive management framework.[8] In the interim the 1956D regulation plan will stay in effect.

Current Status

By mid-2009, the IJC working group on Lake Ontario – St. Lawrence River Water Flows plans to come to a decision by taking into account the stakeholder viewpoints in such a way that it can balance environmental needs but also protect other interests from the potential impacts caused by moving toward more natural levels. (Note: at time of writing, this decision and advice was not released, so please search for updates). The IJC's goal is to sign a new Order of Approval and implement a new regulation plan shortly thereafter. This will also involve creating a new Board, called the International Lake Ontario – St. Lawrence River Board, to oversee the implementation of the new Order of Approval, to manage the agreed upon regulation plan, and to coordinate a long-term mitigation, restoration, and adaptive shoreline management program.

Adaptive management is a formal process for continually improving or adapting a management approach, policy and set of practices as a result of learning from the outcomes. In this case, an adaptive approach involves monitoring how water levels and flows affect the natural and manmade components of the

ecosystem, and then adjusting a regulation plan based on those monitored results. All proposals would benefit from incorporating this kind of approach, where the guidance is not set in stone but rather changed to reflect evolving needs. This is important when noting the status of the issue and development of a solution. There may never be the right answer for the long-term but action is still required.

Task Force

Given the extensive work that the IJC has done, with the assistance of past study boards, technical work groups, an interest advisory group and other partners, to consider the complexity of issues involved in regulating water flows in the Lake Ontario – St. Lawrence River basin and resolve emerging concerns, this task force aims to build on this work. The struggle involved in balancing a diverse set of demands on Lake Ontario and the St. Lawrence River system, on both sides of the border, will be explored through a consultative process to learn about the issues and work towards a solution. The first two sessions of this task force committee will focus on the bringing the many perspectives involved in the debate to the forefront using a consultation format. The next two sessions will involve all members of the task force working together to put forward priorities and draft recommendations within a proposal letter.

Consultation

Stakeholder consultation is critical to any path forward. Progress is dependent on public understanding of the causes of the water level problems and that realization that all proposed solutions have consequences for others. To achieve this understanding, the major interests and relevant public in the basin will become involved in the decision-making process that directly or indirectly affects them.

There will be seven subgroups within this task force representing the following perspectives: government responsibilities, commercial navigation, environmental protection and restoration, hydroelectric power, municipal and industrial water use, property ownership, and recreational boating and tourism. Each of the subgroups will research and provide their perspectives during the task force sessions. During the consultation, members could seek out alliances and ways in which their goals align as well as how they agree or disagree with a proposed course of action. Members are encouraged to begin working toward drafting a set of priorities that could be incorporated into the proposal.

The objectives of the stakeholder participation sessions might be to: (open to discussion and revision)

1. Identify and share stakeholder priorities, perspectives and expertise;
2. Enhance understanding of the range of issues and problems related to fluctuating water levels, and consequences of proposed solutions;
3. Incorporate stakeholder advice into recommendations and decisions

During the sessions, the IAG Committee (hyperlink to committee backgrounder) may interject once or twice during the process with additional public and stakeholder opinions. They participants could make a short presentation, conduct an interview, or facilitate a mini impromptu press conference.

Proposal Development

In the final two sessions, the task force will define its priorities and work quickly to sketch a short (~ 2 page) draft outline of a proposal containing suggestions for a water regulation plan that could help resolve some of the conflicting issues. The proposal letter written to the IJC is expected to incorporate and serve the range of economic, social, and environmental needs impacted by the decision. The following guiding principles for the regulation of water flows might be helpful in the process:

1. Contribute to the ecological integrity of the Lake Ontario – St. Lawrence River system.
2. Produce a net benefit, without disproportionate loss to any particular interest or geographic area.
3. Respond to unusual, unexpected or emerging conditions affecting the system.
4. Ensure adaptable management to accommodate climate change and natural variability.
5. Allow for transparent decision-making, engaging and considering the full range of interests affected by any decisions with broad government, stakeholder and public input.

Perspectives and Roles

The following provides a summary of the main subgroup perspectives involved, as described earlier, as well as possible roles. Representing these subgroup positions, members will express the various viewpoints to serve as a conduit for stakeholder input. Information shared should relay the complexity of the positions yet be delivered in a way that enhances understanding and collaborative action.

A. IJC & Government Working Group

Modeling the working group that the IJC referenced in its last major update to the US and Canadian governments in September 2008, this subgroup is comprised of select IJC Commissioners and staff as well as representatives from the federal, New York, Québec, Ontario and Aboriginal governments. There will be an equal number of Commissioners and staff on the committee from each side of the border. The Commissioners will not be responsible for chairing the meeting (that is the responsibility of the staff director) but will be expected to respond to and make note of the issues and perspectives raised during the stakeholder sessions and contributing to the deliberations by responding and asking for clarification.

Although the IJC only reports to the two federal governments, a distinct effort by the IJC has been directed toward incorporating advice and feedback from a range of government officials and staff at the federal, state, provincial and municipal levels, and Aboriginal self-governments as well. Government officials, in this working group, will represent their key departments, ministries and agencies within each government with a united position, keeping in mind the balancing act they must conduct with to satisfy their own conflicting management priorities, such as: using natural resources, protecting the environment, promoting tourism and economic development, and investing in energy and infrastructure, to name a few. Note that some governments have expressed concerns over the proposed regulation plans, while others fully support one particular option, so members of this working group will not hold the same perspective.

It will be important for both these IJC and government positions to be familiar with the range of issues and concerns to assist in understanding the stakeholder views and facilitating decisions on a draft proposal outline.

B. Commercial Navigation

Commercial navigation on the St. Lawrence Seaway includes vessel operations associated commercial cargo ships, commercial fishing, tug and barge operations, cruise and tour companies, ship construction and repair operations, and government vessels. This includes local commercial traffic on Lake Ontario, which is affected to a limited degree by water level fluctuations, as well as deep sea traffic to and from Montreal to the Atlantic Ocean. The ship channel to Montreal is open year-round and is impacted by water level fluctuations, a factor of Lake Ontario outflow, ice conditions, and flow from the Ottawa River.

Commercial navigation requires water deep enough for the shipping vessels to pass and dock. Higher flows through the seaway and power project reduce the level of Lake St. Lawrence, which is immediately

upstream of the project. These low levels can be hazardous to navigation and result in ship groundings. In addition, high flows can produce cross-currents that make it difficult to control a vessel.[9]

C. Environmental Protection & Restoration

Non-governmental organizations and research institutions have expressed concern with the reduction in nearshore areas that has taken place since the water level regulation was first implemented. Many environmental organizations believe the primary factor that the IJC should consider when making decisions about a new regulatory regime ought to be ecosystem needs. Some groups and scientific research institutions are encouraging the IJC to adopt a plan that restores more natural water fluctuations.

D. Hydroelectric Power

Power production on the St. Lawrence River depends on predictable river flows. While high water levels on Lake Ontario produce benefits for hydropower, they often mean higher flows in the St. Lawrence River, which can have negative impacts. More electricity can be generated when there is a greater volume of water passing the power stations; however, the consequence of lowering Lake St. Lawrence decreases the amount of electricity generated for each cubic foot of water.[10] Short term discretionary deviations from the proposed water flow regulation plan may be recommended by this subgroup to address matters that affect energy production such as winter operations, emergencies, flood discharges from the Ottawa River, peaking and ponding, and other short term situations. Overly stringent limitations on such deviations could cause inefficiencies in power generation.

E. Municipal & Industrial Water Use

Municipal and industrial operations rely directly on water levels and flows to provide drinking water and wastewater treatment, among other needs, and to produce goods and provide services. Minimum water levels are required for municipal and industrial operations. Maximum water levels allow for better dilution of wastes but can also cause flooding of septic systems resulting in groundwater contamination.

F. Property Ownership

Property owners have an interest in securing the value of their property along the water. They often want to minimize the fluctuation of water levels to ensure land, water, and existing infrastructure remain intact for current use and when it comes time to sell and realize the value of their investments.

G. Recreational Boating & Tourism

In the United States, there are 200-250 marinas on the U.S. shores from Porter to Massena, New York. In Canada, there are over 200 private marinas on Lake Ontario and the St. Lawrence River. In addition, there are a number of publicly accessible ramps and docks. The boating season stretches from the first of April through to the end of October. During this period boaters are susceptible to fluctuating water levels. For each marina, there is a range of water levels where optimum conditions exist with no adverse impacts on users. When water levels are low, some boaters cannot launch their boats in the spring, haul out in the fall, or operate in shallow areas. When levels are high, fixed docks and buildings may become inundated. Other problems include reduced bridge clearances and submerged water hazards. If boaters are unhappy with their access capabilities as a result of high or low water levels, this has a direct impact on the local tourism industry resulting in lost revenues. Dredging and floating docks are corrective measures but costly and time-consuming. Disgruntled boaters may either move to another marina, buy a smaller boat that requires less depth, or quit boating entirely.

Questions to Consider

1. Does the challenge of water flow regulation in the Lake Ontario – St. Lawrence River system defy a solution? Is "balancing" interests the most appropriate term?
2. Which government and stakeholder interests (benefits/costs) should be prioritized and why? Who, if any, should be required to compromise?
3. Which perspective would you expect to have the strongest voice? On a continuum, who would have the greatest/least capacity to monitor concerns and respond to the IJC with feedback?
4. How might today's economic climate sway the ultimate decision on water levels and flows? How does the uncertainty of climate change factor into the equation?
5. What are some of the costs and benefits associated with your perspective and role/s? Which costs are difficult to factor in because of the challenge of quantifying them?
6. Should specific interests be compensated for losses that result from the regulation of water flows? What mechanism should be in place to help implement and pay for these mitigation costs?
7. What would you recommend the IJC have done differently in the past and do in the future?
8. How might lessons learned in other jurisdictions assist the IJC in this case? What are some of the options available instead of water flow regulation through dam projects? Are they viable?

* Please make a note of other questions that could be shared with the group for consideration and debate.

Position Paper

Once positions and roles are confirmed, participants will be asked to prepare a short (1-2 pages) position paper on the issue and their perspective:

1. Provide a written stakeholder response to the IJC outlining your assigned position, highlighting key context, concerns, advice and/or a request for action. Once firm in your position, consider how you might need to practice the art of compromise given the range of perspectives involved.
2. Determine which water flow regulation plans your position would support (one specific plan, a combination, or a new reiteration) and provide a rationale for your decision. Hint: Briefly look at the original plan (1958D), the proposed plans (2006), and the most recent proposed plan (Plan 2007). Search for info on the organizations/perspectives you represent (and others). Also search for public consultation feedback they (or similar interests) may have submitted on the plans.

LOSL Resources

Issues

- A must read: *Article introducing the issues & debate:* Heller, Marc (Dec 28, 2008). "War by the Shore", *Watertown Daily Times*, www.watertowndailytimes.com/article/20081228/NEWS02/812299995/-1/NEWS/
- *Article:* www2.canada.com/montrealgazette/news/story.html?id=01fbd5bb-6c01-4b31-a6c6-9444f7e3b41f
- *International St. Lawrence Board of Control - FAQ:* www.islrbc.org/new-Version/faqs.html

Study Board, Order of Approval & Regulation Plans

- *History of the Order of Approval:* www.ijc.org/LOSLdocuments/pdf/LOSL_background_history_e.pdf
- *LOSL Study Board - general information & 2006 Final Report:* http://losl.org/about/about-e.html
- *Historical proposed regulation plans (2006):* http://losl.org/boardroom/plan_e.php
- *Performance indicators for plans:* http://losl.org/boardroom/pisummaries_e.php
- *Proposed new Order of Approval:* www.ijc.org/LOSLdocuments/pdf/LOSL_draft_order_e.pdf
- *IJC video on proposed new Order of Approval & plan (Plan 2007),released March 2008, but not implemented:* http://events.snwebcastcenter.com/ijc/20080328/en/player_archive.php
- *IJC letter with latest update (Sept 2008):* www.ijc.org/en/activities/losl/documents/2008_09_04_Rice_Emerson.pdf

Positions & Roles

- Note: tailored research is required to obtain more info about each position.
- *LSOL Technical Work Groups & positions:* http://losl.org/twg/techboards-e.html
- *Extensive Stakeholder Comments (FYI – scan only):* www.ijc.org/en/activities/losl/comments_order_plan.php
- *Transcripts of Public Hearings (FYI – scan only):* www.ijc.org/en/activities/losl/transcripts.php
- *See LOSL Plan of Study 1999 for overview of perspectives/science:* http://losl.org/PDF/PlanOfStudy_en.pdf

General Links

- *International Joint Commission:* http://www.ijc.org/
- *Boundary Waters Treaty:* http://bwt.ijc.org/
- *Great Lakes Commission:* http://www.glc.org/
- *Great Lakes Information Network:* http://www.great-lakes.net/
- *Great Lakes Environmental Research Laboratory:* http://www.glerl.noaa.gov/
- *Env. Protection Agency - Great Lakes National Program:* http://www.epa.gov/greatlakes/index.html

ENDNOTES

[1] Frank Sciremammano Jr., St. Lawrence River Board of Control, quoted in Heller, M. (Dec 28, 2008). War by the Shore, *Watertown Daily Times*, www.watertowndailytimes.com/article/20081228/NEWS02/812299995/-1/NEWS/
[2] www.stl.nypa.gov/power.html and www2.canada.com/montrealgazette/news/story.html?id=01fbd5bb-6c01-4b31-a6c6-9444f7e3b41f
[3] Clinton Edmond & Assoc. Ltd, in Jackson, J. (July 10, 2008), *Comments on IJC's Proposed New Order of Approval and Plan 2007 for Regulation of Lake Ontario - St. Lawrence River*... Great Lakes United.
[4] www.watertowndailytimes.com/article/20081228/NEWS02/812299995/-1/NEWS/
[5] IJC LOSL Study 2006: http://losl.org/about/about-e.html
[6] American Rivers (March 2008). *America's Most Endangered Rivers: 2008 Edition.*
[7] www.ijc.org/en/activities/losl/index.php
[8] IJC letter (Sept 2008) www.ijc.org/en/activities/losl/documents/2008_09_04_Rice_Emerson.pdf
[9] www.islrbc.org/new-Version/faqs.html
[10] www.islrbc.org/new-Version/faqs.html