Ripple Effects

Volume 6, September 2003

Contents

Dear Friend of Lake Ontario and the St. Lawrence River:

The summer was an active time for the Study. With the technical work groups taking advantage of the warmer months to perform their fieldwork, the Public Interest Advisory Group holding public meetings in June, August and September, and the public enjoying their waterfront properties and boating opportunities, it was a good time to be thinking about water levels.*

First of all, we wish to thank all of you for your participation during our meetings this summer. The information you provided us has been relayed to the Study Team, as your feedback is an integral part of the Study process. Furthermore, in this volume of Ripple Effects, we have responded to some of your comments and questions regarding our Year-One Reports on page 8. Finally, we are asking you to review our performance indicators on pages 12-13 and provide us with additional information if you think we have missed anything.

If you have any questions or comments about the Study, or would like one of our PIAG members to speak to your interest group, please contact the communications representative in your country.

Sincerely,

Dan Barletta, D.D.S.
U.S. Lead
Public Interest Advisory Group

Marcel Lussier
Canadian Lead
Public Interest Advisory Group

*The International Lake Ontario-St. Lawrence River Study was set in motion in December 2000 by the International Joint Commission to assess and evaluate the Commission's Order of Approval used to regulate outflows from Lake Ontario through the St. Lawrence River. The Study is evaluating the impacts of changing water levels on shoreline communities, domestic and industrial water uses, commercial navigation, hydropower production, the environment, and recreational boating and tourism. The Study will also take into account the forecasted effects of climate change.

The Public Interest Advisory Group is a volunteer group appointed by the International Joint Commission to ensure effective communication between the public and the International Lake Ontario-St. Lawrence River Study Team. This newsletter is published by the Public Interest Advisory Group to help keep you informed about the Study.

Environmental Technical Work Group Update

By Brad Parker, Co-Lead, Environmental Technical Work Group, and Michelle Tracy, Study Public Information Officer, Canada

The Environmental Technical Work Group is now in its third year of data collection and analysis. This summer, we were in the process of completing much of the fieldwork. We have been examining a number of performance indicators, including representatives of wetland birds and waterfowl; herpatiles (frogs, toads, and especially turtles); fish; muskrats; aquatic plants; and rare plant and animal species. We are looking to see how water-level changes affect the productivity and life-cycles of certain species.

As we near the end of our fieldwork, we will be refining the performance indicators of the environmental health of the Lake Ontario-St. Lawrence River system. With performance indicators, we will be better able to determine which water management plan(s) will be best for the environment. We will use the data gathered from our fieldwork to map and model possible environmental scenarios under different water-level regulation plans.

The Environmental TWG will be meeting in Cornwall, Ontario, in mid-October to hear the results of these summer field surveys from all research scientists. If you are interested in attending, please contact the communications representative in your country.

Sampling quandrangle full of cattails.

Photo: Douglas Wilcox

Measuring plot width at Wilmot Creek, Upper St. Lawrence.

Photo: Greg Grabas

The Environmental Technical Work Group Needs Your Input

If you observe changes in the Lake Ontario-St. Lawrence environment that you believe are influenced by water-level control, and you would like to pass on your observations, please contact:

Brad Parker at (613) 947-0003, ParkerB@ottawa.ijc.org

or

Joe Atkinson (716) 645-2088, ext. 2325, atkinson@eng.buffalo.edu.

Muskrats as Ecosystem Engineers in Freshwater Wetlands

Jason Toner and John Farrell, State University of New York College of Environmental Science and Forestry

The Environmental Technical Work Group is currently evaluating muskrat populations as part of the Study. Water level regulation of Lake Ontario and the Upper St. Lawrence River has likely affected muskrat populations. New hydrologic management scenarios have the potential to benefit muskrat populations on a large scale and indirectly enhance structure and function of many wetland complexes.

Often considered an "ecosystem engineer", the muskrat plays many key roles in freshwater wetland communities.

Photo: John Farrell

The Muskrat

Often considered an "ecosystem engineer", the muskrat plays many key roles in freshwater wetland communities. Muskrats influence wetlands through their use of vegetation as a food source, and as a lodge and mound building material. At healthy population levels, muskrats significantly influence habitat structure and diversity by increasing open water areas and creating an enhanced "edge effect" between open water and emergent vegetation that benefits many components of freshwater wetlands. Muskrat activities are known to enhance wetland plant diversity and abundance, productivity and decomposition of vegetation, as well as bird, mammal, and invertebrate communities.

Example of muskrat disturbance in cattail-dominated, drowned river mouth habitat of Cranberry Creek in the Thousand Islands Region of the St. Lawrence River, New York.

Photo: John Farrell

The extent of muskrat disturbance within a wetlands is determined by their population size, which is influenced by several wetland characteristics. Primary factors regulating populations include food availability (principally wetland plants), water levels, and disease when populations are too dense. Cattail stands harbor the healthiest populations, in terms of numbers and condition, by providing optimal lodge construction material and an important year-round food source. Water level is the most important environmental factor regulating muskrat populations. Water depth during the winter (in northern wetlands), along with magnitude and timing of fluctuations, can determine the presence or absence of muskrats, and consequently their benefits to wetland communities.

The study is focused on the influence of water levels (including future proposed management scenarios) on muskrat abundance, and includes research on muskrat impacts on wetlands. The potential benefits of muskrats to fish populations, through the maintenance of northern pike spawning habitat, is also being investigated.

Winter muskrat population survey with Trimble™ GPS unit to map muskrat distribution and estimate populations in relation to habitat conditions

Photo: John Farrell

Research on Northern Pike and Herpatiles in the Lower St. Lawrence River

By Alain Armellin, Biologist, Environment Canada

Painted turtle at Boucherville, Quebec.

Photo: Alain Armellin

This spring and summer, the Environmental Technical Work Group completed the fieldwork on the reproduction and year-class strength of northern pike in the St. Lawrence River, and described the habitats of herpatiles (frogs, tree frogs, snapping turtles, etc.). Many wetlands were sampled between Lake St. Louis and Lake St. Pierre, in locations such as Îles de la Paix, Îles de Boucherville and St. Francis Bay. Our fieldwork for the northern pike took place from mid-April to mid-May, and for the herpatiles, from June to July.

The very low water levels observed in April 2003 (1 m or 3.3 ft below the long-term average) had a great impact on the availability of reproductive habitat for the northern pike. In actuality, only the low marsh, where bulrushes and cattails dominate, was flooded. This type of habitat is far from being optimal for the spawning of the northern pike. Compared with other years, we observed low quantities of eggs during the spring of 2003. Thus, the 2003-year class is probably small. However, the capture of adults and young was made easier, which allowed us to complete our sampling in the scheduled time period. A preliminary analysis of our results underlined the importance of levels and flows in the determination of year class of the northern pike in the St. Lawrence.

The main species inventoried during our land work were the leopard frog, the green frog, the snapping turtle, and the painted turtle, all common species in the St. Lawrence valley. These species showed a preference for the lower marshes dominated by bulrushes and cattails, and the shallow channels between islands. At first glance, the herpatile community of the St. Lawrence is, compared to Lake Ontario, much less

Sampling for amphibians and reptiles in the marshes of the Lower St. Lawrence.

Photo: Alain Armellin

abundant and diverse. The populations of amphibians and reptiles of the St. Lawrence seem to be isolated and reduced in numbers. This situation is partially due to the fact that the St. Lawrence lies at the northern limit of their distribution, and the fragmentation of their habitat has led to an isolation of different populations along the River. The herpatiles of the St. Lawrence are thus very sensitive to any disruptions of their environment.

Commissioner Brooks Looks at Water-Level Issues in the Thousand Islands Area

By Russ Trowbridge, International Joint Commission Study Liaison

Commissioner Irene Brooks stopped by Clayton on June 21 to discuss the Study and hear local concerns about water-level management practices in the Upper St. Lawrence. The visit, organized by International Water Levels Coalition (IWLC) president Ron Daly, included participation by members of the IWLC, Save the River, the Thousand Islands Association and David Whitmore of Representative John McHugh's staff. The local hosts described the difficulties confronting marinas under last August's low-water conditions, and suggested some areas of improvement for the management of membership of the International St. Lawrence River Control Board. Clayton resident Paul Thiebeau then gave Commissioner Brooks a boat tour of local marinas to show the challenges local boaters and marinas face during low-water periods.

The Commissioner assured her hosts that the water levels Study would take their views and concerns into account. She renewed a standing offer for the IWLC to nominate a member to fill a U.S. vacancy on the Study's Public Interest Advisory Group (PIAG), noting the importance of having all stakeholder groups engage in the Study now, at a time when the Plan Formulation Evaluation Group is just starting to develop various options for a new water-level regulation plan. Paul Thiebeau recently joined the PIAG as a representative for the Coalition. Welcome, Paul!

The visit to Clayton was part of Commissioner Brooks' orientation to the St. Lawrence River area, shortly after her assignment as lead U.S. Commissioner for the Study. Other stops included the Port of Montreal and the International St. Lawrence River Board of Control Board meeting in Montreal, Quebec; Environment Canada's St. Lawrence Centre in Cornwall, Ontario; and the New York Power Authority and St. Lawrence Seaway Development Corporation in Massena, New York

Commissioner Brooks and IWLC President Ron Daly touring Thousand Islands marinas.

Photo: Russ Trowbridge

Commissioner Brooks presenting certificates to IWLC members Dalton Foster and Bea Schermerhorn for their past work with the PIAG.

Photo: Russ Trowbridge

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Public Interest Advisory Group Holds Meetings in Wilson, NY

By Aaron Smith, Study Student Assistant, U.S.

The Public Interest Advisory Group held two meetings in Wilson, New York, on June 19, 2003. The meetings produced valuable input from different stakeholders interested in the Lake Ontario-St. Lawrence system. This information will be used by the Study while developing recommendations for future regulation plans.

In the afternoon, a roundtable discussion brought elected officials from towns and villages across Niagara and Orleans counties. After a PIAG presentation, these officials participated in a wide-ranging discussion voicing their opinions and concerns. The officials felt that the Study's data-collection, which examines many different areas of the system, is important to the people they represent. The concern was raised, however, that once a positive plan is created, putting it into action will be a most difficult task.

In the evening, the PIAG conducted a public meeting drawing over 60 people from the two counties.

After the presentation, there was a lengthy discussion touching upon many concerns from environmental impacts, such as fish spawning, to how water levels affect shoreline property owners and recreational boaters.

After the discussion, attendees responded to our survey, which will help us in planning our future meetings.

The PIAG is committed to improving stakeholder understanding through education, and encourages everyone interested to participate in the Study process. Future meetings will be held across the Lake and River system. PIAG members are available for group presentations if you are interested: just contact one of our Communications Specialists or let us know at **www.losl.org**.

Peter Zabel, third-generation shoreline property owner, relays his concerns to the PIAG regarding extensive property loss due to erosion.

Photo: Aaron Smith

Todd Fetzer, Vice-Commodore of House of the Niagara-on-the-Lake-Sailing Club, talks about the impacts of low water levels to sailboaters.

Photo: Aaron Smith

Water Uses Group Visits Akwesasne

By Brad Parker, Co-Lead, Environmental Technical Work Group, and Michelle Tracy, Study Public Information Officer, Canada

The Domestic, Industrial, and Municipal Water Uses Technical Work Group is responsible for ensuring that all impacts of water-level regulation on intakes and outlets are well documented. Members of this TWG have been traveling around the Lake Ontario-St. Lawrence River system collecting information about facilities. They will be defining when and how these facilities could be affected by water-level changes.

As part of this research, the Water Uses TWG visited the Akwesasne water filtration and purification stations on June 10, 2003. The TWG members were able to gather the necessary information to add these facilities to the data, so that they can be included in the modeling of possible impacts of water-level regulation plans.

James Snyder, Clayton Barnes and Annie Carrière at the water treatment plant in Akwesasne.

Photo: Denis Péloquin

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Dan Barletta, U.S. Co-Chair, Public Interest Advisory Group

Photo: Arleen Kreusch

PIAG Speakers Bureau

The Public Interest Advisory Group membership would like to meet with you. A representative from your area can give a presentation about the Study to your group. Please contact the communications staff listed at the end of this newsletter to request a presentation.

United States

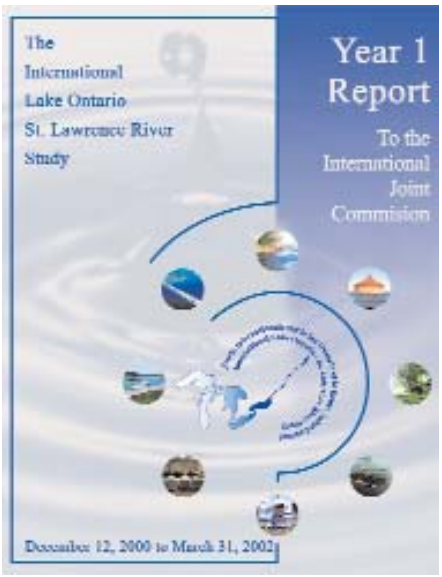
Dr. Dan Barletta - Rochester, NY
Paul Finnegan - Albany, NY
Thomas McAuslan - Oswego, NY
Tony McKenna - West Amherst, NY
Jon Montan - Canton, NY
Henry Stewart - Rochester, NY
Max Streibel - Rochester, NY
Paul Thiebeau - Clayton, NY
Scott Tripoli - Mannsville, NY
Stephanie Weiss - Clayton, NY

Canada

Marcel Lussier - Brossard, QC
Larry Field - Downsview, ON
Michel Gagné - Montreal, QC
John Hall - Burlington, ON
Marc Hudon - Trois-Rivières, QC
Elaine Kennedy - St. Andrews W, ON
Anjuna Langevin - Montreal, QC
Sandra Lawn - Prescott, ON
Michel Turgeon - Montreal, QC
Paul Webb - North Augusta, ON
Al Will - Hamilton, ON

Responses to Your Questions and Concerns About the Year-One Reports

By Ed Eryuzlu and Tony Eberhardt, Study Co-Managers



Question: Meetings cover the Great Lakes and Canada along the River - why no meetings on the U.S. side of the River?

Answer: In the past we have held meetings in Clayton and Ogdensburg on the U.S. side of the River. So that people from both countries have an opportunity to learn about the Study and express their concerns and ideas, meetings are held in both the U.S. and Canada. Along with meetings on the Canadian side, the Public Interest Advisory Group held public meetings this summer in the U.S. locations of Wilson, Greece, and Sodus Bay, in New York. The PIAG was also invited to present at the Native American Fish and Wildlife Society's Northeast Regional Conference in Akwesasne, New York.

Comment: An excellent job of investigating all aspects. Please pay attention to the comments of property owners as we need help in protecting what land we have left. And,

Question: I would like to know why certain money-making enterprises are given more consideration with the raising of the level of lake water while thousands of property owners are seeing their land destroyed by erosion.

Answer: As in the case of comments and feedback from all others impacted by water levels in the system, we appreciate hearing from property owners. We are making every effort to ensure that their concerns are carefully considered, and we are employing the best available data and scientific means to find possible solutions to these problems.

Question: I understand this is a 5-year project - are there specifics, benchmarks, and timetables for each group?

Answer: The Study Board was given a five-year mandate, terminating in March 2006. We have developed a project schedule encompassing the full Study period, with well-defined timelines for the various phases of the Study. These include the various phases of data collection, the many studies to be undertaken, the development of options and criteria, and the different phases of public consultation as the work evolves from the initial stages to its conclusion.

Comment: I am very concerned about the introduction of foreign species - the result of little inspection of ballast dumping before entering the system. Because of the limited season and water level variations (which nature controls!) I believe the one factor both governments could control is better inspections and penalties for shippers and commercial cruise ships.

Answer: The Study mandate is focused on the possible impacts of varying the flows and water levels in the Lake Ontario - St. Lawrence River system. The Study mandate does not include recommendations on inspections of vessels entering these waterways. However, the International Joint Commission is highly concerned about this and has been alerting the U.S. and Canadian governments about the need to address this issue.

Question: Is funding secure for the rest of the Study?

Answer: The framework of the Study was set out in the September 1999 report titled "Plan of Study for Criteria Review". This document outlined all anticipated works as well as the budget for the 5-year duration of Study. The report was submitted to the U.S. and Canadian governments and received approval to proceed, with the initial funding to each country. While there are no guarantees, we are confident that the funding for the remainder of the Study will be forth coming, and we are proceeding on that assumption.

Question: How did the input from this PIAG impact the direction of the International Lake Ontario-St. Lawrence River Study Board? What meaningful way did they respond?

Answer: The PIAG is working closely with the Study Board to keep abreast of all the work, progress and findings, and to provide feedback to and from the public. The work is not finished and the involvement of the PIAG is ongoing. This will continue as a very key element of the Study mandate throughout our work.

Comment: All interests should be considered equally versus any politically strong group being favored.

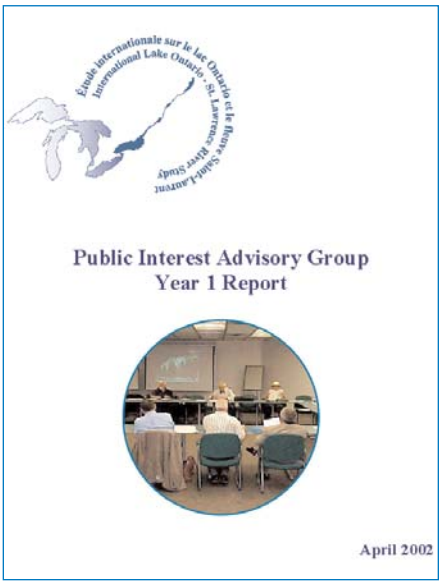
Response: Considering all interests as comprehensively as possible, with equal concern to and recognition of their issues and needs, is an objective of our work. This is being done not only through regular and extensive consultations but also in our efforts to find fair and equitable solutions based on factual scientific approaches.

Question: Will the study focus on problem years or overall levels?

Answer: The focus of the Study goes beyond "problem years". For instance we are currently developing various scenarios that will take into account possible climate changes. We would like to test any proposed options against such various scenarios to determine, to the greatest possible extent, the robustness of what may be proposed.

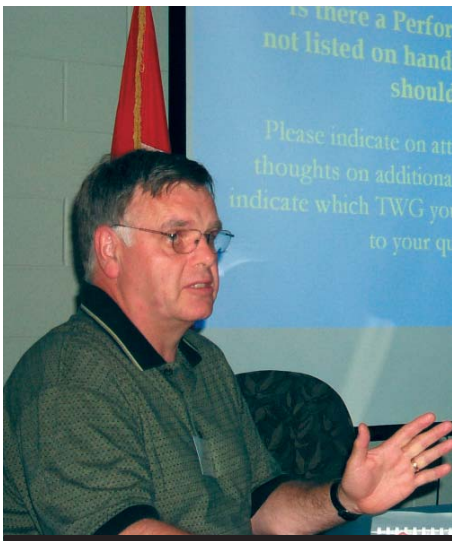
Question: Will the study ignore areas where development was done in flood plains?

Answer: The coastal data collection, subsequent studies and analyses, and impact evaluations do not exclude areas where there is development of any nature. This is consistent with our objective to be all-inclusive regarding our full awareness of all areas that may potentially be impacted by the regulation of the flows and levels on the Lake as well as along the River.



Public Interest Advisory Group Holds Meetings in Niagara-on-the-Lake

By Michelle Tracy, Study Public Information Officer, Canada



Larry Field, PIAG, asks stakeholders for input regarding performance indicators.

Photo: Michelle Tracy

On June 18, 2003, approximately 40 people, including members of the Study Team, and U.S. Commissioner Irene Brooks, the lead U.S. Commissioner on the Study, gathered for meetings held by the Public Interest Advisory Group in Niagara-on-the-Lake, Ontario. The City of Burlington, the City of Hamilton, the Royal Botanical Gardens, the Ontario Sailing Association, local Conservation Authorities, and shoreline property owners were among the interest groups present at the meetings.

Discussions, which followed the PIAG presentations on the water levels Study, focused primarily on environmental concerns and on the concerns of shoreline property owners.

An important new aspect to these meetings was that participants were asked to identify possible performance indicators important to them and communicate these to the Study Team. Performance indicators are a measure of economic, social, or environmental health. In the context of the Study, performance indicators relate to the impacts of different water levels in Lake Ontario and the St. Lawrence River.

Environmentalists would like to see some measure of biological integrity, not just diversity, reflected in the performance indicators. They also suggested adding some species for consideration, such as walleye and bowfin, to the indicator "Young-of-year production based on area and quality of spawning and nursery habitat for fish". Another suggested indicator is the annual total numbers of migratory waterfowl, which would be an indicator of annual aquatic food production.

Shoreline property owners want the value of the loss of their land to erosion to be taken into account. One lakeshore owner spoke about the 70-foot white sand beach that he had when he bought his place.

Jean Williams of the Rattray Marsh Protection Association shares concerns about the impacts of changing water levels on the marsh in Mississauga, Ont.

Photo: Michelle Tracy

Now there is just silt and mud where the beach once was. He was concerned that the needs of hydropower and commercial navigation were taking priority over the needs of shoreline property owners. As a response to many questions and concerns by shoreline property owners, an additional few slides were presented illustrating the process of coastal erosion, as well as some of the benefits, for instance, the creation of sand, which, when deposited, will eventually create the desired beaches.

The Study Team duly noted these and other concerns. We would like to thank all participants for their valuable questions and contributions. You are an integral part of the Study's consultation process.

As PIAG member Sandra Lawn noted in her closing remarks, "Knowledge is powerful, but only when shared".

The Real Plan Formulation and Evaluation Process Begins

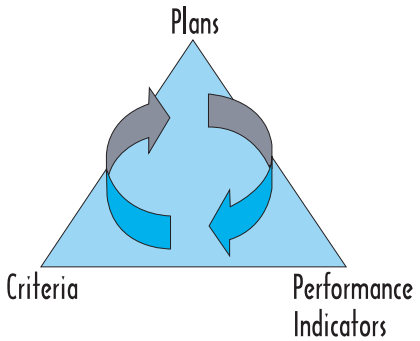
By Bill Werick and Wendy Leger, Plan Formulation and Evaluation Group Co-Leads

The Plan Formulation and Evaluation Group (PFEG) is the component of the Lake Ontario-St. Lawrence River Study that integrates the interests of stakeholders into a series of full-scope water-management options.

This summer, PFEG began what is arguably its most important task: connecting all of the Technical Work Group research to the decisions the Study Board has to make. These connections are being made uniformly and mathematically in the Shared Vision Model.

Our goal is to create a single model the Study Board can use to formulate new regulation plans and criteria.

The model will also determine the economic and environmental effects of each plan based on research from the six Technical Work Groups. This is a new approach. In the earlier days of water studies, specialists did their research and individually reviewed a small group of plans. A planner assembled the specialists' results, appendix by appendix and then presented a static report to decision-makers. In the process, researchers often found their research was not designed to directly answer the questions decision-makers had to answer. Adding another plan or redirecting the research at that point cost a lot of money, when there was usually little time or money left.



The triangular evaluation approach the Board adopted in March.

The shared vision process takes a more integrated approach; helping to bridge the gap between researchers and decision-makers while the Study is still going on. For instance, earlier this year, Study participants provided ideas for new criteria to replace the Orders of Approval criteria. PFEG assembled a long list (criteria "a" through "oo", some with sub-sections) and is now modeling those draft criteria. During the summer, PFEG looked at how a variety of plans scored against these criteria and presented our initial review to the Study Board in August.

Furthermore, this summer, PFEG has been working with the Technical Work Groups (TWGs) to develop performance indicators that express in detailed terms how their research can be quantitatively linked to changes in levels and flows. A summary of the work done with each TWG is listed below.

Commercial Navigation - The Commercial Navigation Technical Work Group gave PFEG a spreadsheet example of how costs versus available depth of water would be calculated for ships traveling from Montreal to Thunder Bay on Lake Superior. This summer, PFEG and the Hydrologic & Hydraulic TWG modeled the water depths at controlling points in that route and then translated Commercial Navigation TWG's spreadsheet relationships into the Shared Vision Model. Additional routes will be modeled starting this Fall.

Hydropower - The Hydropower TWG has developed a spreadsheet model that calculates Hydropower performance indicators. PFEG worked with the Hydropower TWG to translate those results into the Shared Vision Model.

Recreational Boating - Over the summer, PFEG and the Recreational Boating TWG attempted to determine the best way to aggregate marina data. In some reaches this was simple, in others (especially the area between Lake Ontario and Cornwall-Massena), it was more difficult because the slope of the water surface changes dramatically at different Lake Ontario levels and flow rates through the dam.

Environment - The Environmental TWG has started building the environmental "wing" of the Shared Vision Model, working closely with individual researchers and PFEG. Although PFEG expects these environmental relationships will be among the most difficult to state in mathematical terms, it recognizes the importance of accurately interpreting effects of different water-management plans on the natural environment.

Coastal - PFEG met with the Coastal TWG contractors in August to start the difficult process of incorporating the complex mathematical algorithms that define coastal erosion into the Shared Vision Model.

Water Uses - Current studies are looking at the impact of water levels on the functioning of water filtration plants, as well as the impact of low levels on water quality. Studies are also exploring the impacts of discharge from purification plants versus discharge from filtration plants, particularly in the context of low levels.

Please look to our next issue for a detailed account of the Study Board's meeting in Montreal, where the PFEG presented an early draft of the Shared Vision Model.

Hydroelectric Power Technical Work Group Update

By John Osinski, Co-Lead Hydroelectric Power Technical Work Group

The introduction to the Hydroelectric Power Technical Work Group (TWG) Web page states that "Sufficient information is available to evaluate the Hydroelectric Power interest. New studies or additional data collection are not required". This statement should not imply a lack of interest or concern about the implications of a new plan of regulation; rather it is based on almost 40 years of experience in working with the Plan of Regulation to generate electricity.

Accordingly, while other sectors have had to address the need for original research to support the Study effort, our focus has been the identification of criteria for consideration by the Study Board. We will also be modeling the impacts that might result from changes to the plan of regulation that may result from this effort.

The levels on Lake Ontario dictate the outflows as determined by the Plan of Regulation. The outflow of Lake Ontario through the St. Lawrence River provides the source of water used for hydroelectric developments near Cornwall/Massena operated by Ontario Power Generation (OPG) and New York Power Authority (NYPA), and near Montreal by Hydro Québec. Together, these facilities have the potential to generate approximately 3000 megawatts.

Hydropower is an important resource to the basin, providing significant economic and environmental benefits. As society continues to deal with stricter regulation of air emissions, both conventional pollutants and greenhouse gases, the importance of maintaining emission-less hydropower generation sources will increase.

In the past year the hydropower entities have established the following performance indicators for use by the PFEG in developing a new plan:

1) Maximize plant efficiency;
2) Maximize value of megawatts produced;
3) Flow stability;
4) Flow predictability; and
5) Flexibility during winter operations to establish and maintain a stable ice cover.

While similar, the power entities operate under different electrical system controls and environments that place greater emphasis on one performance indicator versus another.

- Hydro Québec, for example, operates within a system that is predominantly (95%) dependent on hydropower. Therefore it is of greater importance to Hydro Québec to maximize plant efficiency.
- OPG and NYPA operate within environments where hydropower is an important contribution to the power supply, but where nuclear and fossil-fired generation predominates. OPG and NYPA wish to maximize plant efficiency, but it is of greater importance to maximize the dollar value of megawatts produced even if some plant efficiencies are occasionally compromised.
- Hydro Québec is primarily a winter peak system, whereas NYPA and OPG experience greater peaks and demand during the summer months.

Robert Moses-Robert H. Saunders Power Dam

Photo: Courtesy of the New York Power Authority.

- All entities agree that flow predictability and stability are important to scheduling plant maintenance and energy production. In addition, flexibility to establish and maintain a stable ice cover is critical to all users of the system since ice jams can restrict the outflows and cause flooding, as well as impact municipal water supplies.

As the plan evaluation process continues, NYPA and OPG will develop a performance indicator evaluation model based on their similar environments. Hydro Québec will develop its model independently. The power entities will then coordinate the results to be presented to the Study Board.

Beauharnois Power Station

Photo: Courtesy of Hydro-Québec.

Study Seeking Input Regarding Draft Performance Indicators

Performance indicators are a measure of economic, social, or environmental health. In the context of the Study, performance indicators relate to the impacts of different water levels in Lake Ontario and the St. Lawrence River. This is a summary of the draft performance indicators that could be recommended by the Environmental; Recreational Boating and Tourism; Coastal Processes; Commercial Navigation; Domestic, Industrial, and Municipal Water Uses; and Hydroelectric Power Technical Work Groups. Based on information we have received over the summer from the Study Team and from the public, we will refine and possibly change these indicators.

Performance indicators will be used to evaluate both plans and criteria. Plans and criteria will change based on how each meet the performance indicators established by the Technical Work Groups.

If you have a suggestion for a performance indicator for your area that is not on this list, please mail it back to us for consideration by the Study (please see the back tear-out page of this newsletter).

Environmental Technical Work Group

The Environmental Technical Work Group identified the following performance indicators. These indicators and their relationship to water levels and flows are subject to change based on findings from ongoing research.

Lake and River

- Wetland breeding bird populations and group diversity, including rare and endangered species. Several species will be tracked.

Lake Ontario and Upper River

- Wetland habitat abundance and diversity.
- Percent of the wetland area dominated by cattails.
- Muskrat abundance, measured by the number of muskrat houses per hectare (2.5 acres).
- Young-of-year production based on area and quality of spawning and nursery habitat for fish, including northern pike, yellow perch, largemouth bass, and smallmouth bass.
- Growth rates in young-of-year class.
- Abundance of northern pike.

Lower St. Lawrence River

- Surface area of large wetland classes (number of hectares of deep and shallow marshes, prairie meadows, shrubby and forested swamps).
- Extent of invasive species in some areas (reduced diversity).
- Area of emergent wetlands in southern Lake Saint-Pierre.
- Biomass of above-ground (green) parts of submerged aquatic vegetation.
- Wetland diversity.
- Population of wildfowl (ducks and geese), including breeding and nesting success rates.
- Amphibian diversity and abundance.
- Production of several species of fish.
- Northern pike year-class strength.
- Habitat for endangered species, including Least Bittern, Yellow Rail, Wood Turtle, Northern Map Turtle, Eastern Spiny Softshell, Cooper Redhorse, Channel Darter, Bridle Shiner, Green Dragon, American Water-willow, and May Apple.

Recreational Boating and Tourism Technical Work Group

The first three benefit categories listed below can be combined at a site, and site information can be combined over a broad region to produce relatively simple stage-damage curves.

- Economic benefits of small boat recreation.
- Economic damages to marinas.
- Economic damages to commercial tour boat operations.
- Changes in regional income and employment.

Coastal Processes Technical Work Group

Both economic and non-economic measures of impacts will be used in determining whether a regulation plan and criteria set will serve coastal interests well. Interest satisfaction score statistics could be used to supplement economic evaluations and to guide the development of criteria.

Lake and Upper River Performance Indicators

- Erosion. Economic losses due to erosion that threatens land and buildings, including, and limited by, the timing and costs of building high-quality shore protection to avoid further damage.
- Existing Shoreline Protection Structures. Additional costs, if any, to improve existing structures to meet the revised 25-year-design water level of a specific regulation plan. If a regulation plan does not raise the 25-year-design level, then there is no cost.
- Flooding. Damages to structures and contents based on existing Federal Emergency Management Agency (FEMA) depth damage curves.
- Sediment Budgets. Value of eroded sediment (at property parcel level) for regional sediment budgets based on trucking the equivalent quantity of sand from a local quarry to build beaches.
- Beach Access. Economic value of recreational opportunity.

Lower River Performance Indicators

- Erosion. Area of land lost due to erosion.
- Erosion. Economic losses due to erosion will be calculated from the total aerial loss of land.
- Flooding. Aerial extent of flooding events will be evaluated and damages to properties affected will be assessed. Damages to properties will be assessed with FEMA-style depth damage curves. Both the infrastructure and the contents of these areas will be examined.
- Other indicators, such as turbidity and loss of recreational areas, are currently under evaluation.

Commercial Navigation Technical Work Group

The economic benefits associated with transportation cost savings. Transportation costs increase when water levels are low because the same cargo must be carried on more ships. Costs also rise when high velocities slow or interrupt shipping.

Hydroelectric Power Technical Work Group

Hydropower facilities in New York, Ontario and Quebec serve residential and industrial consumers throughout their respective state and provinces. In addition, in compliance with existing federal licensing requirements, New York Power Authority must provide a portion of the power generated from its St. Lawrence and Niagara River facilities to customers in Ohio, Pennsylvania, Vermont, Massachusetts, Connecticut, Rhode Island, and New Jersey.

The objectives of regulation for hydroelectric power are to maximize power (megawatts), assure that flows are predictable and stable, and manage ice conditions.

- Power, in megawatts, will be calculated based on daily weighted flows, and the elevational difference of the water surface at the forebay (above the dam) and the tailwater (below the dam) at each power dam.
- The economic value of power, measured by the costs of replacement power.
- Flow predictability.
- Flow Stability. The metric used in the Shared Vision Model can be the weekly variation in flow, with lower changes (or fluctuation) considered better.
- Ice cover for winter operation. A properly formed ice cover allows flows to be maximized during the winter because flow friction and obstruction are minimized.

Domestic, Industrial, and Municipal Water Uses Technical Work Group

In Lake Ontario and the Upper St. Lawrence River, low water levels can adversely affect the supply of water to thermal power generating plants, shore wells in Jefferson and St. Lawrence Counties and the Frontenac Islands, and lake intake lines on the shores of Lake St. Lawrence. City water supplies in the Montreal area can also be threatened by very low flows. Most of the effects can be measured in economic terms, either in additional costs to provide the same level of service or in the loss of benefits if full service cannot be provided. Whether affecting a few homeowners, a power plant, or the City of Montreal, problems tend to develop in the same progression:

- Increased pumping costs for thermal plants in Lake Ontario.
- Value of lost energy production from thermal plants in Lake Ontario.
- Value of lost water supply services (i.e., extra costs linked to additional treatment of potable water and to replacements of commercially bottled water, cost of landscaping losses, closures of industry) in the Montreal area.
- Economic costs due to high water flooding causing sewer/septic system backup for shore residents.
- Economic impacts would be capped (as with coastal erosion damages) by the cost of structural measures that would stop damages.

Next Issue:

Our next issue will include a detailed article regarding the results of the Study Board meeting in Montreal in September and summaries of the Public Interest Advisory Group meetings held during August and September.

The U.S. Border Patrol has asked us to provide the following phone number to our shoreline readers.

If you see anything suspicious happening along the Lake or River shoreline, please contact:

U.S.: 1-800-331-0353

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

www.losl.org

Please share this newsletter with a friend.

Contacting Us

If you are interested in sharing your concerns about water levels in Lake Ontario and the St. Lawrence River, would like to receive more information about the Study, or would like to participate in one of our meetings, please contact the communication representative in your country.

U.S.

Arleen Kreusch
Public Affairs Specialist
1776 Niagara Street
Buffalo, NY 14207-3199
Tel: (716) 879-4438
Fax: (716) 879-4486
arleen.k.kreusch@lrb01.usace.army.mil

Canada

Michelle Tracy
Public Information Officer
234 Laurier Avenue West • 22nd Floor
Ottawa, ON K1P 6K6
Tel: (613) 992-5727
Fax: (613) 995-9644
tracym@ottawa.ijc.org

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Hello!

❑ *I would like to recommend that the following performance indicator:*

_____

_____

_____

_____

be looked at by the _____ *Technical Work Group*
for the _____ *area.*

Submitted by:

Name: _____
Organization: _____
Address: _____

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