July 2001

RIPPLE EFFECTS

International Lake Ontario-St. Lawrence River Study Board

What is the Study All About?

INSIDE

The International Lake Ontario - St. Lawrence River Study was set in motion in 2000 by the International Joint Commission to examine the effects of water level and flow variations on all users and interest groups and determine if better regulation were possible at the existing structures controlling Lake Ontario outflows. Currently, outflows are regulated based on criteria set by the IJC in 1956 (available at www.losl.org). The five-year study will work to identify and evaluate how changes to current Lake Ontario regulation will affect the interests of various users, while ensuring that any suggested changes are consistent with relevant treaties and agreements between Canada and the United States. (Particularly relevant is Article VIII of the Boundary Waters Treaty, available at www.ijc.org.) The study will not examine structural changes to the existing authorized control works that make Lake Ontario outflow regulation possible. Rather, priority will be on the identification of other measures to alleviate adverse impacts of water level and flow fluctuations.

How the Study is Organized

The study team comprises experts and decision makers from government, academia, native communities and other groups in the US and Canada. Scientific and technical work will be carried out by eight Technical Work Groups (TWGs), overseen by a binational Study Board that reports to the IJC. The Study Board will approve the work plans of the following TWGs:

Coastal Zone will investigate impacts of water level fluctuations on shore property, with particular attention to erosion and flood processes.

Commercial Navigation will investigate the impacts of water levels on fishing, cargo shipping, cruise/tour operations, tug and barge operations, ship construction and government vessel operations.

Common Data Needs will collect and update information on depths and elevations (bathymetric and topographic data) in critical areas of the system and share findings with other work groups.

Environment will investigate impacts of water level variations on fish, birds, plants and other wildlife in the system, and will focus particularly on ecological effects on wetlands.

Hydrology and Hydraulics Modeling will develop models to predict water levels and flows in the system based on different regulation plans and climate scenarios.

Water Uses will investigate impacts of water level variations on industrial, municipal and domestic water intakes and treatment facilities.

Hydroelectric Power Generation will evaluate how different regulation plans affect power generation.

Recreational Boating and Tourism will investigate impacts of water levels on individual boaters, marinas and tourism.

Public Information Advisory Group (PIAG) is not a TWG per se, but a group of 24 volunteers working to ensure effective communication between the study team and the public. Co-chaired by individuals from the U.S. and Canada, PIAG is developing and implementing a public awareness program, of which this newsletter is a part, and liaising with TWGs to ensure input from the public is heard and the study's goals and activities are well publicized.

The first work plan approved by the Study Board, that of the Common Data Needs TWG, is discussed in this newsletter. Coming issues will highlight activities and findings of other TWGs.

For more information, please consult the "Plan of Study For Criteria Review," which can be found at www.losl.org.

Perspectives on Lake Ontario Regulation

by Frank H. Quinn, Ph.D., P.E., Board Member, Lake Ontario - St. Lawrence River Study Board

The 1950s were a time of expansion throughout North America. The freeway system was designed and built to enhance travel and transportation, and large water projects were constructed and operated in the west to provide for cheap hydropower and irrigation. In the east, the signature project of the decade was the Lake Ontario - St. Lawrence River portion of the St. Lawrence Seaway System. It was originally designed to provide cheap hydropower for industry and a sea route to enhance international trade in the Great Lakes. Following the record high lake levels of 1952, shore protection for the riparians along Lake Ontario and the St. Lawrence River was included in the final design. In the context of the times, the major interests considered in the design of the water management plan were hydropower, navigation, and shore protection. Environmental resources were viewed in terms of exploitation, rather than protection or enhancement. Also, during these times recreational boating was primarily limited to outboard boats, small cabin cruisers, and small sailboats, many with swing keels. These are the considerations that set the framework for the design of a regulation plan for Lake Ontario.

Computers were not available for use in the design of water management plans during the 1950s. The Lake Ontario regulation plan was designed by engineers using elementary calculators, triangles and sheets of graph paper. The lack of computers limited the number of runs of various scenarios which could be used to design the plan. The design followed the basic procedure of taking the historical record, 1860-1954, and developing a plan that would fit the exact historical sequence of water supplies, without the need of deviations. When a problem occurred, the triangle was used to shift the appropriate rule curve to solve the particular issue. Plan 1958D met the criteria and successfully ran using the historical water supplies. Alas, nature always loves the hidden flaw. It is extremely unusual to find exact sequences of climate/water supplies repeating themselves exactly, particularly over 100 years duration. For Lake Ontario, problems started with the drought of the 1960s. The plan was not designed to handle this particular sequence of water supplies. The same can be said for the high water supply period of the 1970s and 1980s. Deviations from the Plan were plentiful (and successful) through this period. However, the Plan was not working as originally envisioned, namely, without deviations unless truly unusual conditions occurred. Still, the overall aims of regulation (reducing the range of levels and changing the seasonal lake level cycle to benefit power and navigation) were satisfied.

We approach today's study of Lake Ontario Regulation in a new light. Much has changed in the 40 years since the current regulation plan was developed. We have new tools and computers to better design water management plans. The environmental movement began influencing Great Lakes decisions in the early 1970s. We appreciate the need to preserve and protect the environment, something Native Americans and many local citizens have known for generations. At the same time we must still consider the needs of commerce and industry. However, the relative priorities need not be the same as when the Plan was originally developed. Also, recreational boating has come into its own with the higher lake levels and a major boost in discretionary income in the 1970s and 1980s. This interest was not envisioned in the original design. The other component that was missing in the original design, because of the times, was public participation and input into the design process, which brings us to our present study.

We now have a unique opportunity (and obligation) to reevaluate Lake Ontario regulation in the light of the additional interests - the environment and recreational boating - and of economic changes affecting the original interests to develop the best possible water management plan. We have the opportunity to consider the potential impacts of climate change, changed variability of water supplies, and we can use hydrologic forecasting and risk assessment in testing, assessing, and operating alternative plans. And finally, this study is bringing together dedicated scientists and engineers, along with knowledgeable citizens and Native Americans representing both countries to provide the broad background and state of knowledge necessary for the successful reevaluation of Lake Ontario regulation.

The International Lake Ontario - St. Lawrence River Study Board

Members

Dr. Eugene Stakhiv, U.S. co-chair. Dr. Stakhiv has pioneered the use of modeling as a decision-making and public involvement tool in watershed planning. He is chief of policy and special studies, U.S. Army Corps of Engineers Institute for Water Resources.

Doug Cuthbert, Canadian co-chair. As a senior sciences manager, Mr. Cuthbert is responsible for Environment Canada's work on water quantity issues throughout Ontario and the Great Lakes.

André Carpentier is a civil engineer currently in charge of transboundary basins for the Quebec Ministry of the Environment.

Lynn Cleary has held several management positions in the Canadian Public Service. Recently, she was the regional director of the St. Lawrence Center of Environment Canada. She is currently the director of the Biosphere of Montreal.

Ian Crawford has served as senior advisor on water and natural resource issues to the Province of Ontario since 1984. Currently he is manager of water power projects, Ontario Ministry of Natural Resources.

Erin M. Crotty recently became Commissioner of the New York State Department of Environmental Conservation.

Dalton Foster is a retired biochemist. Long concerned with the ecology of the St. Lawrence River, he currently is technical advisor to the International Water Levels Coalition. He also serves as U.S. co-chair of the Public Interest Advisory Group.

Sandra L. LeBarron, with close to twenty years experience with environmental issues, represents Commissioner Erin M. Crotty on the Study Board. As regional director with the New York State Department of Environmental Conservation, she is responsible for programs in Jefferson, Lewis, St. Lawrence, Herkimer and Oneida counties.

F. Henry Lickers serves as director, Environmental Division, Mohawk Council of Akwesasne and has long worked on Great Lakes and St. Lawrence ecosystem health issues.

Dr. Daniel P. Loucks has pursued a distinguished career in many areas of water resources management and systems analysis. Currently he is a professor in the School of Civil and Environmental Engineering, Cornell University.

Robert (Shawn) Martin, a biologist by training and a member of the Wolf Clan, is the Clean Water Manager for the Environment Division of the Saint Regis Mohawk Tribe. His work is devoted to the protection and enhancement of biological, chemical and traditional uses of the Territory waters in the community.

Fred Parkinson is a hydraulic engineer and private consultant who has led ice, navigation and sediment transport studies of the St. Lawrence River and other waters. He also serves as Canadian co-chair of the Public Interest Advisory Group.

Dr. Frank Quinn is an expert on climate change and a senior research hydrologist at the Great Lakes Environmental Research Laboratory of the National Oceanic and Atmospheric Administration.

Dr. Steven Renzetti, Associate Professor of Economics, Director of the Environmental Economics Program at Brock University, has written a number of articles concerned with establishing efficient prices for water as well as modeling the demand for water.

Dr. Frank Sciremammano Jr. is professor of mechanical engineering at the Rochester Institute of Technology. His research has focused on long-range water level forecasting and mitigating environmental pollution.

General Managers

Before joining the Study full-time, **Dr. Anthony J. Eberhardt** was Chief of the Lower Great Lakes Water Control Center for the U.S. Army Corps of Engineers, and the U.S. regulation representative to the International St. Lawrence River Board of Control.

Ed Eryuzlu, now working full-time with the Study, is a civil engineer specializing in hydraulics with over thirty years experience with water resource issues; most recently he served as Director of Waterways Development with the Canadian Coast Guard.

Continuing an Honoured Tradition

This past June the International Lake Ontario - St. Lawrence Study Board visited the Mohawk Nation community of Akwesasne and took part in a traditional gathering. The community of Akwesasne straddles the Canada - U.S. border, along the St. Lawrence River near Cornwall, Ontario and Massena, New York. Akwesasne is also part of the Haudenosaunee (Iroquois) confederacy and is the home of two distinct tribal governments. Henry Lickers, Director of the Environmental Division of the Mohawk Council and a Study Board member, organized the gathering in an effort to open lines of communication between the Study Board and the Mohawk people.

Members of the Akwesasne community have long observed the environmental effects of varying water levels in and around the St. Lawrence. As a result, they possess a considerable store of knowledge of potential value to the Study. Collaboration is the goal, but communication will be the challenge - the Mohawk culture traditionally conveys information orally, while much of the work of this study board will be written and technical.

The meeting's participants included Robert (Shawn) Martin, Clean Water Manager with the Saint Regis Mohawk Tribal Council's Environment Division and Study Board Member, Chief Hilda Smoke, Jim Ransom, member of the Haudenosaunee Environmental Task Force, and Chief Margie Thompson of the Mohawk Council. Jim Ransom, also a member of the study's Environmental Technical Working Group, spoke at length to participants about the importance of maintaining and protecting the environment.

In keeping with Mohawk tradition, Dave Arquette opened and closed the meeting with the Thanksgiving Address, known as Ohen:ton Karihwatehkwen, the "Words That Come Before All Else". The Address is spoken to give thanks to the Creator and to ask each person in the meeting to set aside personal agendas in order to focus on a common purpose. Evidently it was taken to heart: the twenty-odd participants were able to zero in on the task at hand and developed a number of strategies for cooperation.

The exchange of ideas and lively dialogue worked up participants' appetites which Richard David kindly satisfied with "Indian tacos" and strawberry punch. Hospitality was later continued in a newly erected Long House, where board members were treated to a traditional social and dance complete with singers. Everyone was given an opportunity - and some took it - to join in dances and song, including a Friendship dance, a dance honouring women and a warrior's dance.

Besides the warm spirit of inclusive cooperation it established, participants agree that the meeting was educational and fruitful, resulting in a unanimous pledge to work together. The Study Board thanks Henry Lickers for organizing the visit and the Mohawk people for their hospitality and kindness.

Common Data Needs Technical Work Group

Jean-François Cantin
Roger Gauthier, **U.S. Lead**
Frank Kenny
Wendy Leger, **Canadian Lead**
Paul Murawski
Joan Pope

Mapping the Shoreline

By Wendy Leger and Roger Gauthier, Common Data Needs TWG

A major goal of the IJC Lake Ontario - St. Lawrence River Study is to assess impacts of fluctuating water levels on various user communities in the near shore zone of the system. The near shore is the most active, dynamic and productive zone within the system. The actions of waves and wind shape beaches, dunes, and shore bluffs. These land-forms and the local climatic effects of the large water bodies around them determine the characteristics of local biological communities. These communities, in turn, sustain the amazing diversity of wildlife that enriches each of the Great Lakes. From narrow beaches weathered by wind and waves, to vast coastal wetlands, inland forests or dune fields, near shore ecosystems are products of the lakes.

The near shore zone is also where humans interact most with the lake and river. We live along their shores and use access to water for industry, commerce, water supply and recreation. And yet, detailed mapping of land-forms in the near shore zone and assessments of changes over time have until recently been overlooked. Traditional mapping approaches have not allowed for the type of detailed coverage necessary for modeling and analyzing impacts.

Recent technology advances in airborne laser mapping systems now provide unprecedented potential for the mapping of coastal topography and bathymetry using airborne LIDAR (Light Detection and Ranging) systems that have a ± 15-cm vertical and 3-metre horizontal accuracy. LIDAR is an active remote sensing system that uses pulses of light to illuminate the terrain. By measuring the travel time of the laser pulse from the aircraft to the ground and back to the aircraft, a highly accurate spot elevation can be calculated.

The Plan of Study identified that high resolution mapping of the near shore both on the land side (topography) and under water (bathymetry) was critical for modeling flooding, erosion and low water level impacts of different lake level scenarios. These impacts would need to be assessed on wetland health and sustainability and economics to private and public shore properties, municipal water intakes and outflows, recreational boating facilities and public bathing beaches.

A Common Data Needs Technical Work Group (TWG) was established under the study to complete the mapping along the shores of Lake Ontario and the St. Lawrence River. A million dollars (U.S.) was identified in the 2001 study budget for the topographic and bathymetric mapping initiative, split equally between U.S. and Canada.

The initial goal was to collect topographic and bathymetric mapping for the entire shoreline of Lake Ontario and the St. Lawrence River. Unfortunately, the funding available was insufficient to complete this objective. The Common Data Needs TWG, therefore, conducted a detailed assessment of critical priorities and the utility of existing data. This assessment looked at areas most sensitive to water level changes, both environmentally and economically; existing studies and reports; and the accuracy, resolution and age of existing topographic, bathymetric and imagery data for the near shore zone.

Regional shore units were identified along the shoreline to facilitate this prioritization exercise. The study area was divided into four geo-

graphic regions to define the shore units: Lake Ontario - U.S, Lake Ontario - Canada, Upper St. Lawrence River (Wolfe Island to Cornwall/Massena) and Lower St. Lawrence River (Cornwall/Massena to Trois-Rivières). Thirty shore units were identified for the study area.

While there are a number of companies offering topographic LIDAR collection, there are only two bathymetric LIDAR systems in the world. In North America, the only system is the SHOALS (Scanning Hydrographic Operational Airborne LIDAR System) operated by the U.S. Army Corps of Engineers. The SHOALS system uses a green laser to penetrate water and detect bottom depths and an infrared laser that cannot penetrate water to detect the water surface location. The SHOALS system can penetrate up to 2 to 3 times the visible depth, the standard measurement of water clarity. A major limitation to SHOALS use is turbidity, which affects large areas of both the upper and lower St. Lawrence River. Because of this limitation, traditional acoustic soundings from a small boat will be conducted in high priority areas of the river wherever possible and economically feasible.

Based on the prioritization exercise the following areas and schedule were identified for the mapping initiative.

The topographic and bathymetric data gathered will be used to generate computer models of near shore landforms including elevation, slope and aspect. These digital elevation models (DEMs) will be combined with other mapping products of wetland habitats and cultural features in a comprehensive Geographic Information System (GIS) for the study.

To see a detailed map of the areas where SHOALS surveys will be conducted, visit the Common Data Needs section of our website (www.losl.org, Technical Working Groups, Common Data Needs).

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Canada

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Marc Hudon

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Sandra S. Lawn

Michel Turgeon

Paul Webb

Al Will

Public Group Advises Lake Ontario - St. Lawrence Study

by Dalton Foster and Fred Parkinson

Since completion of the St. Lawrence Seaway in 1959, water levels in Lake Ontario and the St. Lawrence River have been controlled with the primary objective of satisfying requirements of the hydropower industry, commercial navigation and riparians. For a number of years now, other people along the system, both individuals and associations, have made it known that their interests should also be incorporated into the regulation plan. Prime among their concerns are the environment, shoreline erosion, recreational boating and tourism.

Recognizing these other views, the IJC established a Public Interest Advisory Group (PIAG) to act as a contact organization between the public and the technical/scientific working groups responsible for carrying out the studies. Members of the PIAG are all volunteers, and many have long been associated with efforts to review and possibly improve the manner in which the lake and river system is regulated.

The volunteers come from varied backgrounds and geographic areas. Some own businesses, some have scientific training, many are primarily concerned with the environment, and others are simply concerned residents. They come from the western extremes of Lake Ontario down to the lower St. Lawrence River in the east. They come from both Canada and the U.S., twelve from each country.

The mission of the group is to serve as an active communications link between the public and both the IJC and the scientific/technical working groups. This has been a daunting task. In a recent issue of the journal Science, Sir Robert May, president of the Royal Society of London, discusses this challenge in an editorial entitled "Science and Society." In this editorial he asks - "So how best to conduct the dialogue, as old as democracy itself, between government policymakers and the public in complex scientific areas, in a manner that fosters trust?" Sir Robert offers the following advice. "Consult widely and get the best people; but also make sure that dissenting voices are heard; recognize and admit uncertainty; and above all, be open and publish all advice."

These are not easy tasks. People's subjective outlooks greatly influence their perception of the information they receive and what they observe on the lake or river. We, the PIAG members, are aware that there are varied, and sometimes conflicting, views held by people within the system from different geographic areas and with different water level concerns. The PIAG will need to not only bridge the communications gap between the public and the IJC and scientific/technical groups, but also between the various areas and interests among the public.

The PIAG has chosen two initial tasks. First, we have put together a general informational presentation package that we hope will better explain the scope of the study and what is to be done. This information will be presented in open, public meetings, in which people are invited to take part in active question and answer sessions on their local situations. Secondly, and most importantly, we will be asking the public to fill in survey questionnaires describing how their experiences, both good and bad, are influenced by the water levels. We will bring this information back to the study process.

To this end, the PIAG began taking the presentation package and survey questionnaires to the public in early June of this year. The first presentation was before the annual meeting of the International Water Levels Coalition held in Rockport, ON. The response was very favorable. Since then we have made a number of presentations from the Rochester, NY area down-river to Quebec. Responses to our questionnaires continue to arrive daily by mail.

In fulfilling our objectives, PIAG wishes to ensure that the results of the study reflect the interests and the "natural knowledge" of the public. If you would like more information or a presentation in your area, please contact Amanda Morelli, Public Affairs Representative in our Ottawa office, via email at: morellia@ottawa.ijc.org

Sir Robert M. May, Science, 292, (No. 5519), 1021, (2001)

Water Levels Survey

The PIAG needs your help in assessing the effects of water levels on your property (shoreline), your recreational boating activities and/or the environment and habitat. They have developed a survey for this purpose, now online at www.losl.org. Click on "Public Information Advisory Group" and download "Water Levels Survey". PIAG members look forward to hearing from you.

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Six Months of Meetings Get the Lake Ontario - St. Lawrence River Study Underway

by Doug Cuthbert, Canadian Study Director

Considerable progress has been made since the International Joint Commission held a meeting in Washington, DC on December 12, 2000, at which point the Lake Ontario - St. Lawrence River Study was handed over to this Board. Since then, the Board has met four times in face-to-face meetings and has held regular conference calls. The 14 member Board is now at full strength following the June 13th appointment of Steven Renzetti, from Brock University in St. Catharines, Ontario.

Study Secretariat offices have been established in Buffalo, New York and Ottawa, Ontario and are staffed by full time General Managers, Dr. Tony Eberhardt and Ed Eryuzlu. Amanda Morelli has joined the team as the Public Information Officer in Ottawa and this inaugural newsletter is one of her first initiatives. The Study Co-Directors, Doug Cuthbert, representing the Canadian Section , and Dr. Gene Stakhiv of the US Section, along with the General Managers, make a point of meeting at least every two weeks in person or by teleconference.

The PIAG, consists of 24 members and as a group have met on three separate occasions. The PIAG is lead by Dalton Foster on the US side and by Fred Parkinson on the Canadian side. The PIAG's activities so far include the distribution of a questionnaire designed to gauge people's comfort with water levels. They have also developed an extensive PowerPoint presentation and are using it to educate and inform communities throughout the Lake Ontario - St. Lawrence River system. The presentation was first shown and very well received on June 2nd at the Annual General Meeting of the International Water Levels Coalition in Rockport, Ontario. The PIAG members have copies of this show and are presenting it at other venues around the lake and river throughout the summer. If you are holding or participating in a meeting at which this material would be useful, please contact a PIAG member or Amanda Morelli in Ottawa at (613) 992-5727.

Further, eight TWG have been established, with most of them having already met at least once. These working groups have produced their Year 1 work plans, are funded and have begun, a wide range of required technical and scientific work in support of the study. At last count a total of 80 people are listed as members of the TWGs. Lastly, the Board and PIAG members who will liaise with these TWGs have been identified and are committed to working productively together.

Some 120 people are now engaged in the study effort with three to four dozen meetings having been held over the past six months. That is a lot of talking and opportunity for information exchange! In addition to meeting with the International Water Levels Coalition on June 2nd, the Board was invited to the Mohawk Lands of Akwesasne on June 12 - 13 and discussed the study with representatives of the Mohawk Councils. The Board's first public meeting is scheduled for September 13 in association with the IJC's 2001 biennial Public Forum in Montreal - (Check the IJC's web site at www.ijc.org and click on "Montréal Public Forum").

A lot of work on this Lake Ontario - St. Lawrence River water levels regulation study has been initiated, with many people engaged in the effort. So now that we're organized, it's on with the job! Stay tuned for future reports and please let us know your thoughts.

First Annual Public Meeting

Please Join Us

The International Lake Ontario - St. Lawrence River Study Board will be holding its first annual public meeting on September 13th, 2001, at the Delta Centre-Ville Hotel in Montréal, Québec from 7:30 to 9:30 pm. The meeting will coincide with the International Joint Commission's Public Forum on Great Lakes - St. Lawrence Water Quality, being held on September 14th and 15th at the same location.

The Study invites you to take part in both events. For more information about the IJC's Public Forum, please visit www.ijc.org.

The Study's public meeting agenda is being finalized as this newsletter goes to press. To obtain your copy of the agenda, visit the Study's website at: www.losl.org and click on "Upcoming Events," or contact Amanda Morelli by phone at (613) 992-5727.

Tell Us What You Think

Have Your Say

To ensure that the study is successful, we're relying on you to tell us your thoughts. We want to know how you feel about the study and what we are doing. Your comments will help us to develop final recommendations that take into account the needs and opinions of the people who live and work in the Lake Ontario - St. Lawrence River area. As the Study progresses, there will be many opportunities for you to participate, in person, by phone and on-line. Details will be made available as the study progresses. Visit www.losl.org as often as possible for updates and information.

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- to be announced

Ripple Effects is published periodically by the Public Information Advisory Group (PIAG) of the International Lake Ontario - St. Lawrence River Study Board

Editor: Amanda Morelli

We would like to thank all those who contributed to the first edition of Ripple Effects.

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