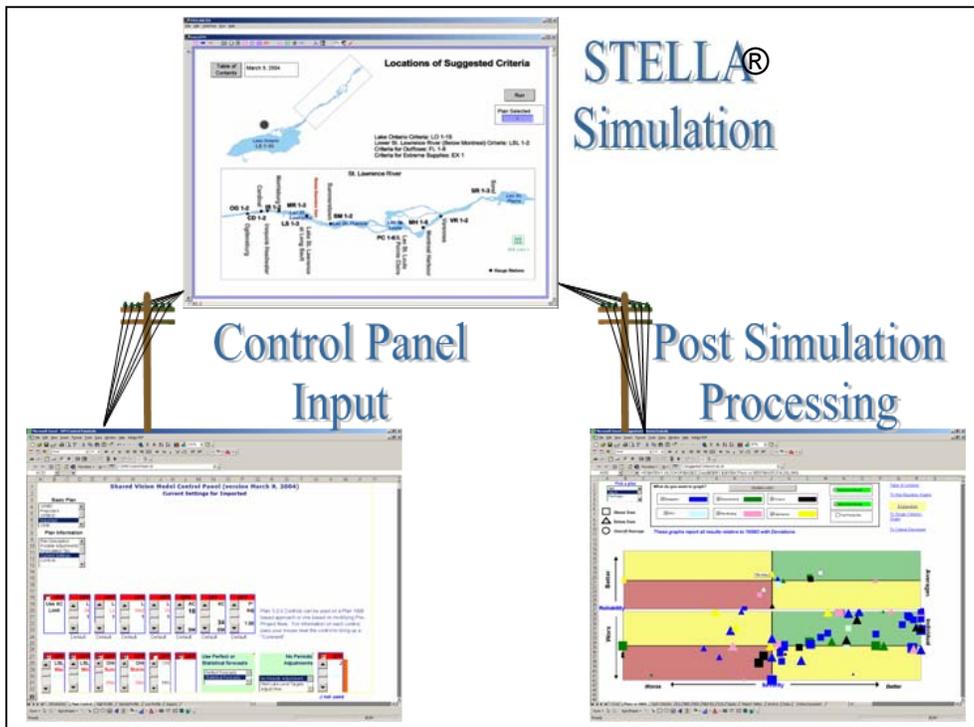


**SEVENTH PROGRESS REPORT
to the
INTERNATIONAL JOINT COMMISSION
by the
INTERNATIONAL LAKE ONTARIO – ST. LAWRENCE RIVER STUDY BOARD**

**Covering the period
26 September 2003 through 14 March 2004**



**14 March 2004
Buffalo, New York
Ottawa, Ontario**

INTERNATIONAL LAKE ONTARIO-ST. LAWRENCE RIVER STUDY BOARD

Buffalo, New York
Ottawa, Ontario
14 March 2004

International Joint Commission
Washington, D.C.
Ottawa, Ontario

Commissioners:

The International Lake Ontario-St. Lawrence River Study Board submits herein its seventh Semi-annual Progress Report, covering activities from 26 September 2003 to 14 March 2004.

1. SUMMARY

Since the last report, much progress has been made in the identification of performance indicators and criteria, which are being used in the triangular evaluation process by the Plan Formulation and Evaluation Group (PFEG). At the Board's 2-3 December 2003 in Akwesasne, New York, a draft plan was introduced as well as a possible procedure for evaluation using reliability, vulnerability and resilience as metrics. Over twenty participants representing various Technical Work Groups (TWG) and the Board met in Burlington, Ontario in February for a weeklong workshop to formulate alternative plans. The resulting plans were presented at a Study-wide workshop in Toronto, Ontario on 12-13 March 2004. This was the most significant single event to date for the Study with more than ninety participants.

Several final reports from TWGs were provided during the period including the "Great Lakes Climate Change Hydrologic Impact Assessment" by the Hydraulics and Hydrologic Modeling TWG and the "Impacts of Level Fluctuations in the St. Lawrence River on Water Treatment Plant Operations" by École Polytechnique de Montréal for the Municipal, Industrial and Domestic Water Uses TWG. Much of the TWG science work was completed during this period.

At its December meeting, the Board approved a proposal from the Akwesasne Task Force on the Environment (ATFE) for a community outreach program to identify the unique issues related to native peoples in this area. Also related to public outreach, the Public Interest Advisory Group (PIAG) outlined its extensive program of public meetings that will take place during August-September 2004. PIAG completed and distributed two issues of "*Ripple Effects*" to about 4400 people during the period (the sixth and seventh volumes).

On 10 December 2003, representatives of the Study Board presented the Shared Vision Model and an information management strategy to the Commission at its executive session. The Board continues to follow through on the recommendations made by the Commission at that meeting. The Board's "Vision, Goal and Guidelines" were also presented.

The following is a summary of other significant accomplishments during this reporting period.

- Draft regulation criteria and performance indicators have been developed and refined by all TWGs defining conditions for specific interests and locales, although some are expected to provide additional indicators.
- Connections between evaluative models developed by the Coastal and Environmental TWGs and the Shared Vision Model (SVM) have been completed.
- All work by the H&H TWG is essentially complete and hydrologic products have been provided to various TWGs for individual evaluations and also incorporated into the SVM.
- A study of ship vibrations and bank erosion on Cornwall Island was completed.

2. BOARD ACTIVITIES

During its 2-3 December 2003 meeting, the Board heard updates and proposals from each of the TWGs. Year 4 work plans were presented. However, decisions regarding their approval were deferred until more detailed information could be provided due to limited available funding. The Board did approve a community outreach program on Akwesasne Lands. The program includes a number of meetings with community leaders and elders, as well as, radio call-in programs. The goal of the program is to develop a series of performance indicators unique to the community for incorporation in the SVM. The program will be complete in April 2004. The program is in addition to the on-going evaluation of the Akwesasne marsh being conducted by the Environmental TWG and the assessment of boaters in that region by the Recreational Boating TWG.

At the meeting, the Board also approved a Study of the relationship between ship vibrations and bank erosion on Cornwall Island that forms part of the Mohawk Territory of Akwesasne. The Study, conducted by Pacific International Engineering, Corp., determined that the range of water level regulation scenarios presently under consideration could only result in minimal influence on the flow conditions in the area. Reference was made, however, to the alignment of the channel as the underlying factor causing undercutting at the southwest tip of the island.

The PFEG presented a procedure for evaluating alternative plans which includes assessing reliability – the ability of a plan to meet proposed criteria, vulnerability – the frequency of failure, and resilience – the average time it takes for a plan to return to a state of compliance. The Board approved the procedure. Approval was also given to a proposal to fund a “trade-off” analysis tapping the wisdom of experts in this field as an added alternative plan evaluation tool.

During the IJC Executive Session on 10 December 2003, representatives from PFEG gave an overview of the SVM and the procedure for developing and evaluating plan alternatives. An update on information management was also given. Much of the discussion regarding these topics centered on post-Study actions.

The Board conducted a conference call on 28 January 2004 to specifically discuss the year 4 budget. Since the totals for all proposals presented at the December 2003 meeting exceeded available funding, each TWG was asked to revise their work plans to cover essential activities and negotiate with agencies and contractors to reduce costs. After careful refinement, the TWGs successfully provided revised work plans that required reduced funding without compromising results. All plans presented were approved resulting in a much smaller U.S. and Canadian shortfall. The Board will continue to pursue measures to eliminate the shortfall.

During the 12-13 March 2004 PFEG workshop, the Board was presented with a modified SVM and a number of first draft alternative plans. The Board instructed the PFEG to continue refining alternatives incorporating all performance indicators. Refined alternative plans will be presented at the next PFEG workshop in June.

3. PUBLIC INTEREST ADVISORY GROUP ACTIVITIES

The PIAG continued its two-way communications with the public around Lake Ontario and along the St. Lawrence River.

The PIAG participated in the PFEG workshop held in Buffalo in October to continue their instruction in the SVM. Understanding of this model will enable the group to communicate the model’s functions and results back to the public later this summer.

The PIAG continued to plan its upcoming summer public meetings in conjunction and coordination with the PFEG and the Study Board. The PIAG continued to meet with stakeholders and give smaller group presentations including participating in two open houses about the Study held for members of the Akwesasne Nation. A Rochester, NY, cable television station added a PIAG member introduction to the current PIAG presentation and broadcast the presentation several times over the air.

At each meeting, the PIAG took note of the concerns of citizens and passed them on to the appropriate TWG. The PIAG also asked the citizens about their views on the performance indicators being developed for the Study. During last summer's public meetings, the public was surveyed regarding their concerns about performance indicators. Channels of communication were continued by developing a web-based survey about performance indicators, which was added to the Study web site, and by asking for comments in a mail-back piece in the Study's newsletter, "*Ripple Effects*". This allowed for additional public input into the performance indicators being developed. Their input was passed along to specific TWGs for comment. The results of these public comments will be transmitted back to the person who submitted the performance indicators concern and included as part of the PIAG's Year 3 report.

The PIAG participated along with members of the Study Board and TWGs on an Akwesasne call-in radio program devoted to the Lake Ontario-St. Lawrence River Study.

The whole PIAG met in January along with a number of smaller subcommittees via teleconference. Members want to utilize the PIAG budget to serve the public rather than to pay for meetings as much as possible. During these calls, the group continued to plan its meetings for the upcoming summer. Future communication protocols for the International St. Lawrence River Board of Control were also addressed.

The PIAG met in March to participate in the PFEG workshop in Toronto. A meeting was held after the workshop to discuss the results of this workshop and how it will affect the summer meetings. Also discussed was how the findings of the TWGs would be presented to the public and a means of gaining their trust in the science behind the Study to help with acceptance of the results and possible tradeoffs needed for the future alternative regulation plans developed by the Study.

4. TECHNICAL WORK GROUP ACTIVITIES

A list of currently appointed and proposed TWG members along with Board liaisons to the TWGs is included as Attachment 2.

4.1 Information Management

The main focus of the Information Management TWG during the reporting period has been to implement key components of the Study's integrated information management (IM) strategy. These components include the advancement of Internet-based geographic information systems (GIS), development of bilingual metadata listings of study data and reports, design of a comprehensive document management system and initial development of web-based information discovery tools. The Quebec node of the distributed information management system has been fully operational during this period. The New York node,

supported by the Great Lakes Commission was put on line during this period. The Ontario node of the distributed network has largely been addressed through proxies, and is expected to be brought on line after April 2004.

During this period, the TWG began to conceptualize functional linkages between the IM strategy and the SVM. The TWG produced detailed options for long-term information management strategies for the IJC to consider.

4.2 Coastal TWG

The Coastal TWG held meetings on 17 September 2003 and 11 March 2004 to review study progress, address areas of concern and discuss future work activities. In addition a conference call was held by the CTWG on 6 January 2004. Most of the group's members and consultants participated in the major PFEG workshop held on 12-13 March 2004. Members of the TWG have also been involved in supporting various activities of the PIAG.

The majority of the coastal technical investigations being performed for Lake Ontario and the Upper St. Lawrence River are being accomplished under contract by W.F. Baird and Associates, whereas those being performed on the Lower River are being accomplished by Pacific International Engineering in conjunction with Environment Canada. Work during the current reporting period has been primarily focused on system-wide assessments, economic evaluations, criteria review and developing impact functions for the SVM. The completion of these tasks and the completion of year three of the Study represent the end of the major technical coastal investigations.

The review of current and proposed regulation criteria and development of impact functions for the SVM has required extensive discussion and coordination with PFEG. Revised draft regulation criteria have been developed as well as impact functions for all of the primary coastal performance indicators. Impact functions are the mathematical relationships or algorithms that describe the various performance indicators. The group's consultants met with PFEG members on several occasions to discuss output of technical investigations, hydrologic scenarios and the development of algorithms for input to the SVM.

Also developed during this time period were U.S. and Canadian year-four work plans. The year –four work plans are limited to refinement of input of the SVM, verification of SVM output and support to the PIAG.

4.3 Environmental TWG

Fieldwork is mostly completed for the group. The muskrat study was completed during the past winter, and plans have been made to incorporate the Akwesasne Marsh study, which will be conducted during the upcoming spring and summer, into the Integrated Ecosystem Response Model (IERM) and the environmental portion of the SVM. A meeting was held between the U.S. co-lead and

researchers associated with that study (including other ETWG members), to determine the best way to incorporate expected results, given the timing of the Study with respect to the model development schedule.

The main focus of the group is currently on developing input for the IERM and SVM. The modeling integration subgroup continues to function to facilitate this effort. The Limno-Tech Inc. (LTI) modelers and the U.S. TWG co-lead met with the U.S. co-lead of PFEG, in November to map out a schedule and strategy to achieve the modeling goals over the next year. Principal modelers have been identified for both the lake and the river sections of the Study, and they are working together to develop a joint IERM for the entire group.

In anticipation of the model development focus for the coming year, LTI has initiated a “model update” newsletter that is distributed every 2 – 4 weeks to the group. It provides opportunities for feedback, coordination, and communication in general, in the course of model development. In addition, the U.S. co-lead has initiated development of a web page for the TWG to use, as a means of organizing information, providing documentation, and, particularly for the upcoming efforts, to provide an efficient means of disseminating modeling results to the group and inviting feedback. The goal is to produce a true “group” model, in the sense that all researchers in the TWG will have had an opportunity for input and focusing in the model development, as well as interpretation of results. The TWG will continue to work with PFEG to further develop the model for incorporation in the SVM.

The group is also working with PFEG to further define (and refine) definitions of performance indicators and to develop criteria for regulation plan development. The TWG was also asked by PIAG to respond to a list of public comments on performance indicators. Responses from group members are currently being collated and will be provided in the near future.

A full group meeting was held at SUNY-ESF in Syracuse in February, to provide an update on work to date, and especially to discuss activities for the upcoming year. This discussion focused on the modeling efforts, along with information that would be needed from each of the researchers in order to reach modeling goals. Budgets were discussed, and a plan was developed to deal with the Canadian budget, which is still significantly over the amount available.

4.4 Recreational Boating/Tourism TWG

During the reporting period, the group met in Niagara Falls, Ontario on 18-19 November 2003 and in Syracuse, New York on 11-12 February 2004.

The list of performance indicators was refined as data was analyzed and initial stage-damage curves were created. A group of indicators was added to the list based on actual days boated in 2002 and potential days that could have been boated if not for high or low water level conditions. These new indicators

affected estimates primarily in the months of September and October when low water conditions typically reduce the amount of recreational boating that occurs. There are now 12 recreational boating performance indicators measuring use and economic impact.

U.S. stage damage curves were created for boaters based on their method of accessing the lake or river – marina/yacht club, private dock, or boat launch ramp, and for charter boat operators. These curves were estimated for each month using the 12 performance indicators. Aggregate curves summing recreational boater and charter boat operator data were created by reach (Lake Ontario, Upper St. Lawrence River – Alex. Bay area, Upper St. Lawrence River – Ogdensburg area).

Using the U.S. methodology as a template, Canadian stage-damage curves were created incorporating Canadian data gathered from inventories and surveys. All but two of the performance indicators developed for the U.S. data could be derived using the Canadian data. Aggregate curves summing boater use at marinas/yacht clubs, private docks, and boat launch ramps (where possible) were created for 6 reaches. Three Canadian reaches corresponded exactly to those in the U.S. so that the data could ultimately be aggregated by reach. The other three reaches were on the Lower St. Lawrence River (Lake St. Louis, Lake St. Pierre, and Montreal-Contrecoeur).

Proposed criteria have been drafted by the TWG based on the group's review of the combined U.S. – Canadian performance indicators by reach.

4.5 Commercial Navigation TWG

Work during the reporting period concentrated on developing the Commercial Navigation Impact Model. This involved writing a scope of work, evaluating submitted proposals, recommending an award and executing the contract.

The contractor took the goals and objectives of the TWG, and the metrics that the TWG had identified, and used them to develop an economic impact model. The model identified the relationship between water level changes and a range of commercial navigation impacts.

This work involved close coordination with the contractor during the length of the contract. Involvement with the contractor included: an initial meeting with the contractor at the start of the contract to ensure that the commercial navigation objectives and metrics were understood; providing the contractor with model input data with respect to vessel operating costs, fleet data, port data, hydraulic data, etc.; multiple follow-up meetings/conferences with the contractor to ensure work addresses various commercial navigation concerns; review of status reports and work accomplished to date; comments on work performed to date and identification of areas of concern; review of the contractor's preliminary methodology to evaluate economic impacts; providing revisions, additions to the

methodology so it will clearly reflect commercial navigation concerns and be technically sound; identify the needs of PFEG and help the contractor to develop inputs PFEG needs for the SVM; provide a list of potential outputs and level of aggregation that the model would generate; review sample test runs; and provide a final list of output the model will produce.

The Contractor will produce a working Economic Impact Model and its code, all input files needed to run the model, and documentation on how to run the model.

TWG representatives participated in Board meetings held during this reporting period. The TWG also participated in PFEG workshops on the SVM, an Economic Advisors Workshop and a PFEG Plan Formulation Workshop.

Also developed during this time period were U.S. and Canadian year-four work plans. The year-four work plans concentrate on interfacing the Commercial Navigation Economic Impact model with the Stella-version of the SVM and participation at PIAG workshops.

4.6 Hydroelectric Power Generation TWG

During the reporting period, the Hydropower TWG continued its review of performance indicators and suggested criteria for input into the SVM and its various iterations and provided suggestions and feedback to revised criteria as distributed by PFEG. The TWG also provided desired levels and outflows to define criteria that would address hydropower's performance indicators.

Members of the group participated in meetings with PFEG (and its economic advisors) throughout the period, particularly, John Ching of Ontario Power Generation and Cindy Lavean of the New York Power Authority.

TWG members met via 6 conference calls and a meeting in Montreal to develop evaluation models, define criteria for performance indicators and discuss PFEG activities. As a follow-up to the February plan formulation workshop, a hydropower-based model was developed for consideration by PFEG.

4.7 Domestic, Industrial and Municipal Water Uses TWG

The TWG met on 21 October 2003 and 20 January 2004.

The Water Uses TWG worked with two consultants, one in Canada and one in the U.S. to determine potential impacts of lake and river level fluctuations on industrial, municipal, and domestic water uses.

In Canada, activities during the period focused on assessment of potential impacts on water and wastewater treatment plants in the Lower St. Lawrence (between the Ontario border and Trois-Rivieres, Quebec). The objectives were:

- Complete an in-depth analysis of the data base of 30 drinking water treatment plant intakes located in the Lower St. Lawrence that were identified in a previous study in order to quantify the impacts of reduced water levels on drinking water treatment plant (WTP) operation,
- Identify potential water quality degradations related to water levels and evaluate their anticipated impacts on drinking water treatment plants, and,
- Identify potential adverse impacts of water levels on wastewater treatment plants (WWTP)

The results of the analysis for the first objective highlighted the fact that WTPs in the Lower St. Lawrence are vulnerable to low water levels. Any variation of the flow that would lower the water level close to the historical minimum (20.04 m) or even the chart datum in Pointe-Claire (20.35 m) would be critical for at least 3 plants. The fact that the Montreal principal intake is one of the most vulnerable ones emphasizes the critical impacts of low water levels on drinking water treatment plants. In recent years, similar water levels were reached, forcing Montreal to open its emergency intake.

The impact assessment of lower water levels on water quality was the second main objective. The issue of potential water quality degradation under very low water levels became a secondary issue when it was demonstrated that WTP production was vulnerable to water levels similar to those observed over the last decade. However, the discussion on the impacts of water levels on water quality clearly identified some influence. The Ottawa River was proven to have an impact on the water quality at the Montreal intake, especially in springtime. The opening of the emergency intake was also shown to influence water quality through the demonstration of increased chemical costs.

Contrary to water treatment plants, high water levels were suspected to have an impact on wastewater treatment plants. However, the data suggests that it does not represent a widespread problem, as only two utilities were able to provide a critical high water elevation. It was determined that wastewater treatment plants are less affected by water levels than drinking water plants.

In the U.S., study activities during the reporting period focused on documenting potential problems associated with self-supplied residential systems. These systems are generally concentrated in two geographic areas: 1) shoreline communities in the Thousand Islands area of Ontario and the U.S. and 2) portions of the Upper St. Lawrence (e.g., Lake St. Lawrence). Between 8 and 20 August 2003, banner advertisements were placed in seven local newspapers in shoreline areas of Jefferson and St. Lawrence counties in New York and the Kingston and Brockville regions in Ontario. The banner briefly summarized the intent of the study, and provided several questions designed to focus responses from the target audience along with contact information. In total, only 17 residents (3 in Ontario and 14 in New York) replied to the advertisement. Most of

the respondents were from the U.S. side of the lake in bayside communities surrounding Watertown, New York. Canadian respondents were all from communities near Bath, Ontario.

The majority of respondents occupied their lakefront homes on a year-round basis. Only four of the 17 were seasonal occupants. Over 90 percent of respondents use water from their shorewells for non-potable purposes only. Bottled water from retail outlets or natural springs is typically used for drinking. For all respondents, bottled water was their only alternative source of water. Reported problems centered around capacity issues in the form of intermittent flows or insufficient flows. Several respondents also reported concern regarding the quality of well water. All problems were categorized as “severe,” “significant” or “mild.” “Mild” indicates a sporadic reduction in capacity or moderately poor water quality. “Significant” designates a reduction in flows to a household that requires water conservation measures (e.g., restricted toilet flushing or fewer showers) or water that required treatment with added chemicals, and lastly, “severe” is characteristic of homes where water was intermittently unavailable or one where water quality precluded use. Of the 17 responses, 6 were categorized as mild, 4 as significant and 7 as severe. Six of the 7 respondents with problems classified as severe have deepened their existing wells or have constructed new wells. The remaining respondent was planning construction of a new well at the time of the survey. None of the respondents with mild or significant problems have made major changes to their shorewell.

Another activity during the reporting period was focused on two thermal power facilities in New York that had reported significant concerns or impacts associated with source water elevation. The objective is to determine relationships between source water elevation and economic costs associated with the loss of head for cooling water intakes for the power plants and to approximate economic costs of structural measures to address low and high water impacts. Due to security concerns and other staffing issues at the two facilities, initial data collection activities were limited. However, on-site visits took place in early March and results will be available during the next reporting period.

4.8 Hydrologic and Hydraulic (H&H) Modeling TWG

Activities continued on several fronts for the H & H TWG. Most of the planned work is finished and some minor activities will be completed in the next couple of months. The following projects are noted:

- Stochastic flow generation – This major component of generating net basin supplies achieved several milestones with some work outstanding. Dr. Oli Sveinsson completed the Stochastic Analysis Modelling and Simulation (SAMS) in order for it to employ unequal record lengths on the Great Lakes and Ottawa River systems. Using SAMS, Hydro Quebec was able to produce the synthetic time series for the net basin supplies (NBS) for the four Great Lakes basins and about fifty Ottawa River watersheds

categorized into five hydrologic regions. A meeting was held in March 2004 to finalize the results and scope out the final report.

- Flow routing of the NBS was carried out in Environment Canada's Cornwall office that required code adjustments in the model to account for hydrologic conditions beyond the capabilities of the model. Tests or sample data for 10,000 years of flow sequences were employed and information for the net total supplies from Lake Erie and net basin supplies into Lake Ontario were provided to PFEG. The MENVQ model for the Ottawa River required similar code changes and the flows are expected to be finalized by the end of March 2004.
- During this reporting period, work was finalized and a report printed in developing net basin supplies under climate change scenarios for the Great Lakes system. The final report by Dr. Tom Croley is available at the ftp site. When the NBS for the warm-dry scenario was routed through the Great Lakes – Ottawa River systems, severe routing problems were noted. While Lake Ontario will be handled by the SVM of the PFEG, new code was required for the Ottawa River reservoir management scheme. This activity was finalized in March 2004.
- Several requests for the results from the 2-D hydrodynamic model of the St. Lawrence River were fulfilled. Notable among the requests was the substantial analysis required by the Recreation Boating TWG.
- A contract with Dr. Robert Chu of Aqualinks and Ohio State University was developed and the work is in progress for the temperature modeling of the selected sections of Lake Ontario.
- The fisheries group of the Environmental TWG requested temperature series for the Bay of Quinte region. The Burlington office of Environment Canada developed a hydrodynamic-temperature linked model. All the data has been collected and reduced for input into the specialized and specific model that is being developed for this purpose. Results will be made available to Dr. K. Minns and Susan Doka of DFO.
- Project work for downstream snowmelt forecasts was initiated, employing a high resolution global atmospheric model (GEM-global at 45 km), local area distributed hydrological models (Watflood, Hydrotel and Cequeau), two hydraulic models of the Montreal Archipelago (Archipel, Simulac) and a hybrid approach for nowcasting snow on the ground using snow surveys, observed and simulated solid precipitation and a snowmelt model.
- Time series based on the consideration of ice effects was completed and is being used in the SVM.

- Work was initiated on modeling of the local inflows using Sacramento Soil Moisture Accounting Model, the Snow-17 model, RES-J reservoir operations model and other relevant routing tools for the U.S. watersheds. The basins being studied are – Racquette, Oswegatchie, Grass, Salmon and Saint Regis.

4.9 Plan Formulation and Evaluation TWG

On 12-13 March 2004, the Plan Formulation and Evaluation Group hosted a Study-wide, Practice-Decision workshop in Toronto. The objective of this workshop was for the Study Board to practice the full decision process including evaluating plans with criteria, and performance indicators, considering tradeoffs and the presentation of results. For PFEG and the rest of the study team, it was an opportunity to learn more about how the Board will make their decision and what is important to them in the decision process.

All work carried out by the PFEG over the past six months has been done in anticipation and preparation for the March workshop. At the workshop, PFEG presented all progress to date on the Shared Vision Model, including some new plans, revised criteria and some, but not all, performance indicators.

In October 2003, PFEG hosted a joint PFEG/TWG meeting to discuss all issues related to the TWGs with an emphasis on hydrologic and hydraulic requirements, and performance indicators including economic and non-economic metrics. This resulted in an updated list of performance indicators and led to a subsequent meeting with TWG representatives and the Economic Advisory Committee in December to advise on the Standards and Guidelines document and discuss and resolve various Study-wide and TWG-specific questions on methods and assumptions related to economic analyses. Progress was made on issues surrounding discounting, serial dependence, regional analysis and a framework was worked out for contextual narratives from the various interests groups.

In January, PFEG began coding the first performance indicators functions into the SVM for recession and wetland plant diversity for Lake Ontario. In February, PFEG held a plan formulation workshop and invited a number of Study members to assist in the plan formulation process. This was a weeklong workshop in which individuals were trained to use the STELLA® version of the SVM to formulate plans. Following the workshop, participants continued working on plans that could be used in the March workshop. Three basic strategies were pursued, plans based on Plan 1998, plans based on pre-project conditions and plans based on an interest satisfaction approach. By the March workshop, five new plans had been submitted by the plan formulators.

Another issue addressed by PFEG was the need for a shorter list of criteria. The idea was that the current list of over 59 criteria could be grouped according to management objectives. For example, one of the grouped criteria could be to minimize the frequency, severity and duration of high levels on Lake Ontario and

the St. Lawrence River that can prevent access to beaches, cause flooding and erosion damage to shore properties, water and wastewater treatment plants, marinas and ports, or cause ships to reduce speeds to prevent erosion caused by ship wake. All the specific levels provided by the various TWGs for high water levels would be used as measures for this criterion. A list of 14 criteria was presented to the Study Board for comment at the March workshop.

A number of performance indicators were submitted by the TWGs for inclusion in the SVM in late February and early March. PFEG did all they could to include as many as possible. By the March workshop, some performance indicators were available for all TWGs except commercial navigation, which are expected soon.

The March workshop proved to be extremely beneficial in working through the decision process, allowing everyone to view the plan results using the Shared Vision Model, exchanging ideas, and providing input to the process.

4.9.1 The Shared Vision Model

Since September, PFEG has developed a new SVM using a STELLA® simulation model that receives and sends information to two Excel® models (see report cover). The model's calculations of water levels and flows have been tested and certified by Environment Canada as correct. Model users can formulate new plans by adjusting controls in the model or can import releases from plans developed in other models. The model simulates 101 years of water supplies and releases in about a minute; during that time the success of the plan at meeting the Orders of Approval and the new, suggested criteria are calculated, as well as the performance of the plan on municipal water, recreational boating, environmental, hydropower, and coastal performance indicators. The model also develops comparison of plan outputs, including an incremental cost analysis showing the amount of economic benefits that must occur to produce a given amount of an environmental benefit. Economic benefits are measured in terms of willingness to pay; environmental benefits are generally measured in terms of the area of habitat or the population of a species.

4.9.2 Plan Ranking and the Necessary Trading of One Type of Benefit for Another

It is unlikely that one plan will be designed that is superior to all other plans on every measure of performance. If all of the impacts could be measured in dollars, plans could be ranked according to the sum of their benefits, but ranking plans solely by this measure would not address the Board's commitment to avoid disproportionate harm to any party (equity). In fact, the "translation" of environmental impacts to dollars would be at best controversial and most likely the uncertainty and error involved in those estimates would outweigh the utility of the numbers. The Board has decided to rank plans using both economic and non-economic metrics, a widely accepted practice that reflects the idea that sustainable natural resources decisions must balance economic and

environmental consequences and must be equitable. Dr. Frank Lupi of Michigan State University is providing expert assistance in that work. At the March 2004 workshop, Dr. Lupi observed the practice-decision process, interviewed all Board members, and surveyed all participants including experts and members of the PIAG to see how non-economic values were being used in ranking plans. He will work with the Board throughout the rest of the Study to help design a clear and defensible approach that reflects the values people assign to various levels of different types of non-economic impacts.

PFEG developed detailed work plans and schedules showing how research from the TWGs will be integrated into the SVM and used in decision making.

5. COMMUNICATIONS

During the reporting period, the communications team assisted the PIAG in developing a budget for year four of the Study.

The website was used to encourage public input into the performance indicators, and a publicity campaign was launched to make the public aware of this opportunity. The LOSL Discussion Forum was redesigned for ease of use and better monitoring.

Study brochures were distributed to libraries and Chamber of Commerce offices in counties along the Lake Ontario and the St. Lawrence River shoreline in the United States and at five Ontario Sailing Association boat shows in Canada. The U. S. Coast Guard Auxiliary volunteered to distribute the Study brochures again this year at boat shows throughout New York State. The brochure was also translated into Mohawk and broadcast on the Akwesasne radio station, CKON.

The communications team continued to coordinate outreach activities with Mohawk communities in Kahnawake and Akwesasne. Contact was initiated with Mohawks from Tyendinaga. The U.S. Study database was updated to reflect changes in elected officials.

The sixth and seventh volumes of "Ripple Effects" were published and distributed. The communications team began the planning and creation of communications products, such as panel displays, for the summer public meetings.

Audio files were attached to the PIAG year-three presentation. It was broadcast on a public television station in western Monroe County, and a broadcast is being planned for a local cable station in Brockville, Ontario.

6. BUDGETS AND TIMELINE

The year-four budget was finalized during the 28 January 2004 Board teleconference. The table below shows the distribution of funds among the various Study groups. For comparison purposes, the table also gives the amounts and distribution among the various Study activities as they were proposed in the retooling of the Plan of Study (POS) document provided to the Commission on 3 January 2003. While some variations from the retooled Plan of Study estimates have taken place, the Board fully expects to deliver its mandate consistent with the intent of the Plan of Study. Although a shortfall is shown, the Study Board is confident that it can be eliminated. One measure is to conduct conference calls rather than face-to-face meetings when possible. Other measures will continue to be investigated.

| | U.S. (\$US) | | Canadian (\$Cdn) | |
|------------------------|----------------------|--|----------------------|------------------------------------|
| | POS Retooling 1/3/03 | Approved during 1/28/04 Conf. Call (1) | POS Retooling 1/3/03 | Approved during 1/28/04 Conf. Call |
| Environmental | 200,000 | 245,410 | 825,000 | 750,000* |
| Rec. Boating | 50,000 | 120,000 | 40,000 | 40,000 |
| Coastal | 50,000 | 200,000 | 80,000 | 80,000 |
| Com. Navigation | 42,000 | 42,000 | 45,000 | 40,000 |
| Hydroelectric | 0 | 0 | 22,000 | 0 |
| Water Uses | 19,000 | 20,000 | 15,000 | 62,000 |
| H&H | 80,000 | 60,000 | 110,000 | 60,000 |
| PIAG | 270,000 | 250,000 | 340,000 | 300,000 |
| PFEG | 125,000 | 340,000 | 240,000 | 430,000 |
| Info. Management | 55,000 | 50,000 | 143,000 | 75,000 |
| Board & Management | 300,000 | 260,000 | 340,000 | 324,000 |
| Other (2) | 0 | 98,128 | 0 | 100,000 |
| IJC | 0 | 25,000 | 200,000 | 197,000 |
| Grand Total | 1,191,000 | 1,710,538 | 2,400,000 | 2,458,000 |
| Available Funds | | 1,675,135 | | 2,368,000 |
| Shortfall | | 35,403 | | 90,000 |

(1) U.S. Expected Available Funds include \$364,135 US from Canadian IJC.

(2) For the U.S., this amount includes funding to LTI and ATFE. For Canada, this amount is partial reimbursement for U.S. Coastal TWG work.

The Canadian Environmental TWG budget is nominal, subject to submission and approval of a work plan/budget package expected by early April 2004.

A Gantt chart, provided in Attachment 3, has been developed to map the progress of activities through Study completion. At this point, all activities are on schedule.

Respectfully submitted,

EUGENE STAKHIV
U.S. Co-Director

DOUGLAS CUTHBERT
Canadian Co-Director

FRANK QUINN

ANDRE CARPENTIER

PETE LOUCKS

LYNN CLEARY

FRANK SCIREMAMMANO

IAN CRAWFORD

SANDRA LeBARRON

STEVE RENZETTI

JAMES SNYDER

HENRY LICKERS

DANIEL BARLETTA

MARCEL LUSSIER

ANTHONY EBERHARDT
U.S. General Manager

ED ERYUZLU
Canadian General Manager

Attachment 1

Attendance at Board Meetings and Participation in Conference Calls

December 2-3, 2003 - Akwesasne, NY

Eugene Stakhiv
Dan Barletta
Frank Quinn
Sandy LeBarron
Jim Snyder
Tony Eberhardt

Douglas Cuthbert
Andre Carpentier
Ian Crawford
Marcel Lussier
Henry Lickers
Stephen Renzetti
Ed Eryuzlu

January 28, 2004 – Teleconference

Eugene Stakhiv
Dan Barletta
Frank Quinn
Jim Snyder
Sandy LeBarron
Tony Eberhardt

Douglas Cuthbert
Andre Carpentier
Stephen Renzetti
Lynn Cleary
Marcel Lussier
Ian Crawford
Henry Lickers
Ed Eryuzlu

Attachment 2

**INTERNATIONAL
LAKE ONTARIO – ST. LAWRENCE RIVER STUDY BOARD
TECHNICAL WORKING GROUPS**

(Highlighted names are new members proposed or new TWG - Leads)

| COASTAL PROCESSES | | |
|-------------------|---------------|--|
| Last Name | First Name | Remarks |
| BENDER | Tom | US Lead, USACE, Buffalo, NY |
| POPE | Joan | USACE, ERDC |
| KLEIN | David | TNC (US member) |
| WOODROW | Donald | Hobart & William Smith, Menlo Park, CA |
| O'NEILL | Chuck | SUNY College, Brockport |
| SHEARER | Robert | NYSDEC |
| THIEME | Scott | USACE, Detroit |
| MOULTON | Ralph | Canadian Lead, EC, Ontario |
| LABUDA | Teresa | HALTON Conservation |
| CANTIN | Jean-François | EC, Quebec Region |
| BOYD | Ala | MNR, Ont. |
| | | |
| SCIREMAMMANO | Frank | BOARD LIAISON |
| McKENNA | Anthony | PIAG CONTACT |
| STEWART | Henry | |
| STREIBEL | Max | |

| COMMERCIAL NAVIGATION | | |
|-----------------------|--------------|--|
| Last Name | First Name | Remarks |
| HABERLY | Roger | US Lead, USACE, Buffalo |
| LAVIGNE | Thomas | SLSDC, Massena |
| ROBINSON | Dennis | USACE |
| LEFEBVRE | Luc | Canadian Lead - St. Lawrence Seaway |
| DUMONT | Stéphane | Canadian Coast Guard, Quebec |
| BÉDARD | Jean-Luc | Port of Montreal |
| D'AGNOLO | Flavio | CCG –Nav. Services |
| ERYUZLU | Ed | BOARD LIAISON |
| McAUSLAN | Tom | PIAG CONTACT |
| HUDON | Marc | |

| ENVIRONMENT | | |
|--|--|------------------------------|
| Last Name | First Name | Remarks |
| HAYNES | James | SUNY College, Brockport |
| KLEIN | David | TNC (US member) |
| SCHIAVONE | Albert | NYSDEC |
| WILCOX | Douglas | USGS |
| LAPAN | Steve | NYSDEC |
| MASON | Doran | GLERL |
| ATKINSON | Joseph | US Lead, U of Buffalo |
| DAVIS | Jack | USACE, ERDC |
| MANNO | Jack | SUNY-ESF |
| RANSOM | Jim | Akwesasne Mohawk Terr. |
| PARKER | Brad | Canadian Lead, |
| HUDON | Christiane | EC, CSL |
| DE LAFONTAINE | Yves | EC, CSL Montreal |
| LEHOUX | Denis | EC, CSL Montreal |
| MINGELBIER | Marc | Faune & Parc, Quebec |
| PATTERSON | Nancy | Cdn Wildlife Services |
| MINNS | Ken | DFO, Burlington |
| BARKO | John | USACE, Vicksburg, Miss. |
| LeBARRON STAKHIV CUTHBERT CLEARY | Sandra Eugene Doug Lynn | BOARD LIAISON |
| CARPENTER HALL HUDON KENNEDY LAWN WEISS | Bruce John Marc Elaine Sandra Stephanie | PIAG CONTACT |

| POWER GENERATION | | |
|------------------|----------------|-------------------------------|
| Last Name | First Name | Remarks |
| CHING | John | OPG |
| LAVEAN | Cindy | NYPA |
| ROBERT | Sylvain | Canadian Lead, H. Que. |
| FENLON | Brian | NYSDEC |
| OSINSKI | John | US Lead, NYPA |
| | | |
| CRAWFORD | Ian | BOARD LIAISON |
| FINNEGAN | Paul | PIAG CONTACT |

| HYDROLOGY & HYDRAULIC MODELING | | |
|--------------------------------|---------------|--|
| Last Name | First Name | Remarks |
| CROLEY | Thomas | US Lead, GLERL |
| SHEN | Hung Tao | Clarkson University |
| YU | Paul | USACE, Buffalo |
| WERICK | Bill | USACE, IWR |
| FAY | David | EC Ontario |
| BELLEMARE | Jean-François | Min Env Que |
| FAGHERAZZI | Laura | Hydro Quebec |
| KLAASSEN | Joan | EC, Ontario |
| MORIN | Jean | EC, CSL Montreal |
| MORTSCH | Linda | EC, Ont. Region |
| MOIN | Syed | Canadian Lead - EC, Ont. Region |
| CAPONE | Ed | National Weather Services |
| LEE | Debbie | USACE, Buffalo, NY |
| | | |
| LOUCKS | Pete | BOARD LIAISON |
| CARPENTIER | Andre | |
| QUINN | Frank | |
| EBERHARDT | Tony | |
| | | PIAG CONTACT |
| | | |

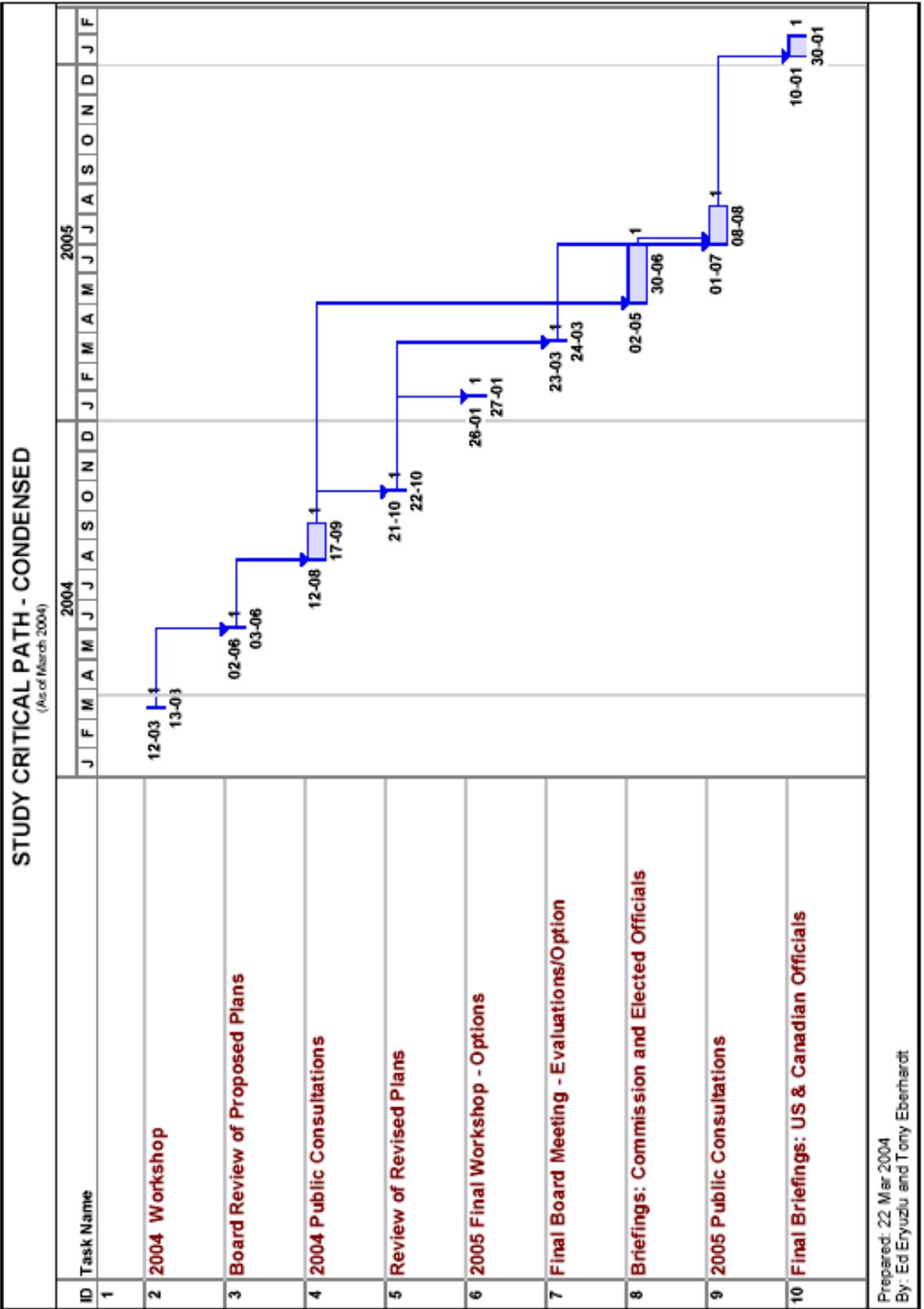
| INDUSTRIAL, MUNICIPAL AND DOMESTIC WATER USES | | |
|---|-----------------|---|
| Last Name | First Name | Remarks |
| STREPELIS | John | NYSDOH |
| SHOEMAKER | Clarence | US Lead - NYSDEC |
| GOULD | Steven | Monroe County |
| PELOQUIN | Denis | Canadian Lead – Montreal M Community |
| EBERHARDT | Tony | BOARD LIAISON |
| ERYUZLU | Ed | |
| BARLETTA | Dan | PIAG CONTACT |
| STREIBEL | Max | |

| RECREATIONAL BOATING | | |
|----------------------|-----------------|---------------------------------------|
| Last Name | First Name | Remarks |
| BROWN | Jonathan | US Lead, USACE, Buffalo |
| WHITE | David | SUNY College @ Oswego |
| DEYOUNG | Gary | 1000 Islands |
| BURNS | Rockne | Cape Vincent, NY |
| ST- MARTIN | Serge | Canadian Lead, Private, Quebec |
| BIBEAULT | Jean-François | EC –Quebec Region (CSL) |
| DONALDSON | Al | Ont. Marina Owners Asso |
| PETITPAS | Robert | Cnd Coast Guard, Auxiliary |
| ORR | David | 1000-Islands |
| DIKE | Jim | Council of Commodores, Ontario |
| BROWN | Tommy L. | Cornell U., Ithaca |
| ERYUZLU | Ed | BOARD LIAISON |
| McAUSLAN | Tom | PIAG CONTACT |
| LAWN | Sandra | |

| PLAN FORMULATION AND EVALUATION | | |
|---|----------------------------------|---|
| WERICK | Bill | US Lead, USACE |
| FAY | David | EC, Ontario Region |
| LEGER | Wendy | Canadian Lead, EC Ontario Region |
| KING-FISHER | Paul | MNR, Ontario |
| PLANTE | Andre | EC – Quebec Region |
| LEE | Debbie | USACE – Cincinnati, OH |
| LORIE | Mark | USACE, IWR |
| EBERHARDT CARPENTIER LOUCKS RENZETTI | Tony Andre Peter Steven | BOARD LIAISON |
| TRIPOLI | Scott | PIAG LIAISON |

| INFORMATION MANAGEMENT | | |
|-------------------------------|--------------|--------------------------------|
| GAUTHIER | Roger | US Lead, USACE, Detroit |
| POPE | Joan | USACE, ERDC |
| PLANTE | Andre | EC – Quebec R. |
| BARLOW | Roger | USGS - NY |
| | | BOARD LIAISON |
| HALL | John | PIAG LIAISON |

Submitted:
Ed Eryuzlu and Tony Eberhardt
March 13, 2004



Prepared: 22 Mar 2004
 By: Ed Eryuzlu and Tony Eberhardt