Notes from the Eighth Study Board Meeting

Embassy Suites Fallsview
Niagara Falls, Ontario
17-18 September 2008

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1. **Welcome/Attendance:**
   Board Members:
   John Boland, Jim Bredin, Jim Bruce, Jonathan Bulkley (Day 2), Don Burn, Allan Chow, Kay Felt, Jon Gee, Gene Stakhiv, Ted Yuzyk
   Managers:
   Tony Eberhardt, Syed Moin
   IJC Advisors:
   Paul Pilon
   PIO:
   Tom Black, John Nevin
   TWG & TT Leads:
   Wendy Leger (Day 2), Jim Nicholas, Bill Werick
   Others:
   Commissioner Sam Speck

Note: Action Items are displayed as bold and summarized in Attachment 2.

The Board welcomed new member Dr. John Boland, natural resources and environmental economist from Johns Hopkins University. On Day 2, it was noted that this was the first occasion when the full Board membership was present.

Requested changes on agenda – add under "Other Business" discussion of ASCE-EWRI Conference/ IAGLR Conference abstracts/ papers. Discussion of IJC scope of study (relationship between results of St. Clair investigation and Lake Superior regulation plan options) and issues related to mitigation of both tasks will be discussed on Day 2. (Agenda is attachment 1).

2. **Review Status of Action Items from Minutes of Meeting #7**: Tony Eberhardt
   a. Item #1 – **need to clarify the wording in meeting #7 minutes regarding the work of Dave Holtshlag.**
   b. Item #6 – scope of work for hiring of a Logistics Coordinator still being defined.
   c. Item #7 – determining Study guidelines will require further discussion at the next Board meeting.

3. **Updates from the Directors**: Ted Yuzyk
   a. Hydroclimatic Workshop Report provided to independent Peer Review.
   b. IPR Group Response on the Hydrology and Climate Modelling Strategy Report – good working relationship with both organizations (ASCE and CWRA) – IPR Group felt it was an impressive effort. Diagram of process very comprehensive. Gave good advice and direction on water balance. Found areas that needed further consideration. Recognized that there is a great deal of uncertainty and the Study needs a framework for quantifying uncertainty. Hydroclimatic TWG has responded to their comments and is awaiting the

IPR Group reply. Issue brought up by Jim Bruce: How are we going to know the hydroclimatic impact from 1998 to present? Should be easy to compile data. Ted Yuzyk: This issue will be covered under uncertainty analysis which will be discussed on Day 2.

4. **Report of the St. Clair Task Team**: Syed Moin
    a. Preliminary results:
        i. Conveyance seems to have changed from 1971 and 2000:
        ii. There appears to be no change between 2000 and 2007.
        iii. No inference can be drawn on when the change occurred – gradual or episodic or not at all.
        iv. The head difference of water levels between the lakes is smaller now than in 1971 because of a combination of factors.
        v. Emerging factors:
            1) Conveyance change primarily in the Algonac to Black River reach
            2) Reduced NBS to Lakes Michigan-Huron.
            3) Differential supplies to Lakes Huron-Michigan (lower) and Lake Erie (higher).
            4) Local scour changes (in vicinity of large objects sinking).
            5) Glacial Isostatic Adjustment (of the order of 6 to 8.8 cm since 1860) between benchmarks (Harbor Beach and Cleveland).
    b. Specific studies:
        i. Modelling Strategy (Tasks 1-3):
            1) Comparative hydrological modelling: Fortin, Lofgren, DeMarchi and McKay.
            2) There are significant differences between residual and component results. NBS- underestimates spring runoff, overestimates evaporation.
            3) Thermal expansion does have an impact on residual water levels.
            4) NBS, overlake precipitation, lake evaporation, basin runoff consistently available between 2003 and 2008
            5) Direct observations of lake evaporation – Blanken, Spence and Hedstrom:
                a) Greatest sensitivity of data is at a 1.43 kilometer radius around the Lake Superior site.
                b) Additional site is being investigated for Lake Huron for 2009.
        ii. Modelling Strategy (Tasks 4-5):
            1) Statistical analysis – Bayesian change point detection, trend analysis.
            2) Teleconnections – climate signals and water balance.
            3) Stochastic analysis – new or from LOSLR (Laura Fagherazzi – Hydro Quebec, 1900 - 2006).
            4) Integration – define uncertainty.
            5) Work by Taha Ouarda – trends detection regarding NBS.
        iii. Modelling Strategy (Tasks 4 and 6):
            1) Global and regional climate modeling meeting – Oct. 15-16.
            2) Comparative analysis of models.
            3) Selection of IPCC IV climate scenarios.

4) Climate assessment – adaptive management plan.
5) Installation of flow gauges:
    a) Three ADVM gauges to be installed: St. Marys (downstream of the hydropower plants), St. Clair (downstream of the Blue Water Bridge) and Detroit Rivers (near the Ambassador Bridge). **Jim Nicholas will provide an explanation of why the NOAA St. Clair River gauge is unsuitable and therefore the need for a new gauge.** Jim Bredin mentioned that there are concerns being expressed by public that we are moving the gauge downstream of the problem area to prove our point. These should be addressed in the Jim's response..
    b) Installation starting on September 22, 2008.
    c) Evaluation of Niagara River gauge is in progress.
6) Comparison of data sets 1971-2007 and 2000-2007:
    a) When comparing sets, refer to "survey change" rather than "deposition" and "erosion". If bathymetric changes have occurred, they are within the survey error.
    b) The "tongue" features are not migrating, but may be growing.
    c) Change in distribution of bed material may be the result of propeller action of ships
7) Rating Curve analysis – Univ. of Illinois, Urbana-Champaign:
    a) Different techniques used for determining flow: 8 panels (late 1950s/ early 1960s), 17 panels (mid 1980s), ADCP (late 1990s/ early 2000s).
    b) Greatest error bar around the GLERL data.
    c) Further clarification required by Art Schmidt.
8) Hydraulic Modelling:
    a) 1-D HEC-RAS results: Simulated water level at Fort Gratiot for various years for a constant flow of 5680 cms indicates a declining level.
    b) RMA2: Increase in conveyance from 1971-2007
    c) Thierry Faure developing Telemac model of St. Clair River - Lake St. Clair - Detroit River - Lake Erie
9) Combined multi-beam echo sounder (MBES) by USGS-Woods Hole – 250 million data points in upper reach of St. Clair River: high resolution bathymetry, grain size. Side scan sonar – depth to bedrock; total sediment thickness; thickness of fluvial material.

c. Recommendations/ Decisions:
    i. Detroit River gauge be designated as an international station with associated protocols – **done**.
    ii. Initiate process to continue monitoring lake evaporation at Stannard Rock and a site on Lake Huron beyond the mandate of the Study – **done and on-going**.
    iii. Provide funding to Art Schmidt on the rating reviews for the St. Clair & Detroit River – used to generate revised connecting channel flows – pending as noted below in item (iv).

iv. Approval is sought to **establish a task force to oversee the flow revision process** for it has wider implications in closing the mid-lakes water balance – **approved** (item (iii) above approval depends on recommendations of this task force – Hydraulics TWG with additional members). Task force will include an outside expert.

v. Request for funds for extra work by Dr. Dave Bennion for analysis and comparison of multi-beam echo sounder data with earlier work to establish erosion and deposition – **approved**

5. <u>Report from PIAG</u>:

a. <u>PIAG Meeting Report</u>: Kay Felt and Jim Bruce:

i. A group on the Western side of Michigan is very concerned that any action to slow the flow of the St. Clair River could exacerbate flooding and property loss during high water events.

ii. 3-D modelling still coming up (scripted questions).

iii. PIAG noting they need at least 60 days (some want 90 days) for review of the Phase 1 Report.

iv. Public Meetings – John Nevin

1) Duluth – small group.
2) Thunder Bay – also small group.
3) Sturgeon Bay – similar issues as Georgian Bay.
4) Muskegon – regulate water levels around the mean.
5) Five meetings around Georgian Bay with the same questions being asked at each meeting: Why is the Study not using 3-D modelling? Why is Baird & Associates not involved in the work? Etc. However, meetings did generate a lot of favorable press.

b. <u>Issues from public meetings and other related items</u>:

i. Letter from Environment Canada Minister. Baird to GBA (Mary Muter) was discussed along with Mary's response back to the Baird letter

ii. <u>Jim Bruce</u> – need to connect with professional organizations like the International Association for Great Lakes Research (IAGLR) and the American Society of Civil Engineers (ASCE). Major Foundations around the Great Lakes should be kept informed.

iii. <u>Jon Gee</u> – with the draft report coming up soon, should prepare key people in advance.

iv. "Circle of Influence" session with Native/ Tribal Groups tentatively planned for November.

v. Issues raised by PIAG

1) <u>Kay Felt</u> - will be writing a letter to Dave Holtshlag regarding his comments about being misquoted by Mary Muter regarding his support for 3-D modelling.
2) <u>Ted Yuzyk</u> – Raised policy issue regarding attendance at Task Team meetings. Board reaffirmed the limitation of two PIAG (one per country) at Task Team meetings and that it is on rotational basis.

vi. Board was supportive of initiating a dialogue with Baird & Associates and their possible involvement in the St. Clair River analysis.

6. **Communication Strategy**: John Nevin
    a. Proposal to create an International Water Level Information Network (IWLIN) – outreach only.
    b. Public Meetings assessment - only go to the public when you have something to show them.
    c. Website assessment – Knight Center for Environmental Journalism at MSU establish a Water Levels News Bureau with a focus on revamping the web page with high quality information.
    d. Communication objectives – In February 2009, host two-day water levels symposium in Detroit to present the science. Follow-up with presentations at the IAGLR conference in Toledo in May 2009.
    e. **Further discussion by the Board before the entire strategy is approved**. Comments: Who is going to manage the entire enterprise? Suggestion: John Nevin and Tom Black will send the proposal to Kay Felt and Jim Bruce for their review. A teleconference will be held with the PIAG leads and the Study Team within the next two weeks to discuss further. After the call, the PIAG will also be asked to provide comments. After the review, the Board will be apprised of the plan and comments. Implementation is tentatively planned for November 1, 2008.

7. **Mitigation within Study Context**: Gene Stakhiv
    a. Mitigation/ Compensation/ Remediation – definitions given ("The conventional usage is that ***'mitigation'*** is generally used to denote some form of compensation for **a proposed, or future actions that result in adverse impacts**. '***Remediation'*** is a term to be used for measures that **compensate for past damages or adverse changes** to the environment. '***Compensation'*** is a term similar to 'remediation', and perhaps more appropriate in our IUGLS usage, referring to any indemnity or reparation for an acknowledged loss or damage.")
    b. Questions: Does dredging contribute to on-going (if occurring) erosion? What is the temporal starting point? What is the comparative historical baseline? What are the physical thresholds for determining "significant" changes? What types of compensation measures?
    c. Discussion: Define the purpose of all the studies and then define required actions. The POS calls for accommodations within a new regulation plan for possible climate change impacts and possible remedial measures in the St. Clair River. Unless info about conveyance changes is definitive, no justification for considering compensation in the St. Clair River. Uncertainty analysis will not offer unambiguous, deterministic results. Unless "on-going erosion" and conveyance changes can be directly linked to 1962 dredging, the governments will have to give further direction. "Significant change" in conveyance should be defined in statistical terms, with degrees of confidence.
    d. Action: Board wants more clarity on what should be discussed in terms of compensation. **Bill Werick will provide a first draft document. Gene will write a Scope of Work for a contractor to describe possible mitigation structures in the St. Clair River. The cost of the contract should not exceed $25,000.**

8. **Strategy for Including Uncertainty Analysis**: Don Burn and Bill Werick
    a. Workshop held Aug 6–7; follow up meeting on September 9.

b. Mock "bucket" model: 1948-2002 monthly component NBS, diversion data, calculates flows and water levels.
c. Real Uncertainty Model – details in flux. However, could use MIDLAKES model, NBS, uncertainty software. Framework includes: Art Schmidt's HPG Rating Curves, Frank Quinn's Reverse Routing Model, Coordinated Routing Model, GLERL Mid-Lakes Routing Model, and Deterministic Mid-Lakes Routing Model.
d. Time and money: Srikanta Mishra, Art Schmidt ($2500), Jason Giovannettone, Jacob Bruxer, total of $100,000. Method review by October 2009.
e. International scientific terminology and standards, such as ISO, should be used.
f. Rob Nairn could be included as part of the team or at the "results generated" level, role yet to be determined.
g. **Need to revise the SOW working with Dr. Mishra. Bill Werick will follow through. Strategy approved by the Board.** Need to represent impacts as a "pie chart". Find a better descriptor for issues related to scientific uncertainty.

9. **<u>Report of the Lake Superior Regulation Task Team</u>**: Tony Eberhardt & Wendy Leger
a. Principles and Guidelines – maximize economic and environmental benefits, minimize losses, equity and social wellbeing
b. Lake Superior Regulation decision making:
i. Design a plan for using stochastic present climate rather than 30-year "transient climate hydrology".
ii. Conduct sensitivity analysis around future scenarios to determine how potential future changes might affect the decision.
iii. Build a formal adaptive management plan to help react to all these uncertain future needs.
iv. Focus on current conditions, try to accommodate climate change, try to consider adaptive management.
v. For Ecosystem TWG contact Saginaw Bay – study director, Craig Stowe (NOAA), proposal to deal with water quality problem (circle of influence – Dave Powers). Mike Wiley, Muskegon River basin (Jon Bulkley).
vi. For Water Uses TWG, ask drinking water companies to provide info on consumptive uses.

10. **<u>Plan Evaluation Group</u>**: Bill Werick & Wendy Leger
a. Several of the TWGs will consider representative sample areas.
b. Performance Indicator:
i. Depends on decision criteria.
ii. Using impact curves would mean that the PIs need not be economic-based, but they would identify key things? of value.
iii. Approach would not allow for direct tradeoffs, but would identify the critical issues and the critical trigger levels and flows in areas we know are fairly sensitive to water level changes.
c. Circle of Influence meetings:
i. First nations in Canada.
ii. Native Americans in the U.S. (Dan Tadgerson).
iii. Port Huron – Possibly October.

iv. Georgian Bay – before November.
v. Sault Ste Marie – Jan/ Feb timeframe.
vi. Sarnia/ western shore of Lake Huron with stewardship/ conservation organizations – Nov/ Dec timeframe.

d. Contextual Narratives:
i. All TWGs working on. First draft by March 2009.
ii. Assistance from Doug Cuthbert and Frank Lupi.
iii. Coordinators will also cover cross-cutting issues.

e. Geospatial Data Management:
i. Appoint a small group of GIS standards – representatives from Coastal, Ecosystem, Rec. Boating and PEG
ii. Establish GIS standards.
iii. Ensure Meta data.
iv. Near-term: Dec. 2009; Proposed budget: $10 to $15K.
v. Beyond near-term: additional funding.
vi. Funding from IM budget (Canadian), but US funding to cover US participation (travel). **Approved by the Board.**

f. Model Development:
i. Limited development of IERM, FEPS.
ii. Commercial Navigation model (David Grier, IWR also to be contacted).
iii. Shared Vision Model to be pursued.

g. Summary of Proposed Study Direction:
i. Concentrate effort on present economic and environmental state using 100-year historic and stochastic water supply sequences.
ii. Use climate change scenarios to identify the potential impacts on water levels.
iii. Determine how changes in regulation could reduce negative impacts from climate change.
iv. Begin working on an adaptive management strategy for the upper lakes ASAP:
1) Short-term when approaching extreme conditions.
2) Long-term when considering climatic changes.
v. Attempt to identify "triggers" that would signal a change in regulation plans was appropriate.
vi. Share information with other managers more capable of adapting to shifted climate.
vii. Board approved the "revised" direction.

11. <u>Phase I Final Report & Discussion on Review Schedule</u>: Ted Yuzyk

a. Draft due in February 2009 and Final Report by June 2009
b. Chapters:
i. Chapter 1 – Background & History (Jim Nicholas and Peter Yee)
ii. Chapter 2 – Study Process (including PIAG involvement/ consultation) (Jim Nicholas & Peter Yee)
iii. Chapter 3 – Analytical Framework (Jim Nicholas & Peter Yee)
iv. Chapter 4 – St. Clair River Hydraulic Regime (Aaron Thompson, Eric Tauriainen, Syed Moin)

v. Chapter 5 – St. Clair River Sediment Regime (Peter Ashmore, Marcelo Garcia, , Ted Yuzyk)
vi. Chapter 6 – Hydro-climatology: Impacts on Lakes Michigan-Huron and Erie Water Levels (Debbie Lee, Al Pietroniro, Gene Stakhiv)
vii. Chapter 7 – Syntheses and Integration of Findings and Uncertainty (Gene Stakhiv, Ted Yuzyk, Syed Moin & Tony Eberhardt)
viii. Chapter 8 – Remediation Options (Gene Stakhiv, Ted Yuzyk, Syed Moin & Tony Eberhardt)
ix. Chapter 9 – Recommendations (Gene Stakhiv, Ted Yuzyk, Syed Moin & Tony Eberhardt)

c. Including information about specific details – for example, changes in the river like Port Huron sheet piling, aerial photos during earlier periods, etc. Linked to time periods – map of river in the 1850 period. Wendy's student will look for aerial photographs.
d. Review Period Issue –
    i. PIAG has asked for a two- to three-month review period.
    ii. Options:
        1) Stay with current schedule (June 2009)
        2) Revise the schedule to include a 3-month review (Sept 2009)
        3) Complete work on schedule, but have a broader public review after completion of the final report.
e. **Raise issue with the Commission at the October hearings, mentioning that the Study Board may be asking for an extension of two months and will know better in December and report at the Executive Session**.
f. **Don Burn will serve as outside reviewer. Search will go for a project manager for the report (Tom Shillington has been proposed)**.

12. Other Business

a. PIAG Conference call – October 22 to discuss communication strategy, etc.
b. PIAG liaison to the St. Clair Task Team for the Nov. meeting
c. Proposing a PIAG meeting sometime in January 2009
d. Send Phase I report outline to Jason Giovannettone for his part
e. IJC Hearing: Wed., October 29th at 9:00 am.
f. Next Meeting: December 10-12 in Windsor.
g. IAGLR & ASCE-EWRI Conferences: May 17-22, 2009 in Toledo, Ohio and Kansas City, Missouri – opportunities for presentations.
h. Peer review: IPR will be required of the Phase I Report.

Compiled by Tony Eberhardt and Syed Moin
October 1, 2008
Revised October 3, 2008

Study Board Meeting #8

Embassy Suite Fallsview, Niagara Falls, Ontario
Wednesday September 17 – Thursday September 18, 2008

Draft Agenda

Day 1 –Wednesday September 17, 2008

Item	Time	Topic	Lead
1	0900 - 0910	Welcome/ Review & Approve Agenda	Stakhiv / Yuzyk
2	0910 - 0930	Review Status of Action Items from Minutes of Meeting #7	Moin/ Eberhardt
3	0930 - 1000	Updates from the Directors ▪ Hydroclimatic Workshop Report ▪ IPR Group on the Hydroclimatic Modelling Strategy Report	Yuzyk/ Stakhiv
	1000 - 1015	**Health Break**	
4a	1015 - 1200	Report of St. Clair River Task Team (including hydroclimatic work) • Status of studies • Preliminary findings • Integrating results	Moin/ Nicholas
	1200 - 1300	**Lunch**	
4b	1300 - 1500	Continuation of St. Clair Task Team report • Key milestones • Timeline implications	Moin/ Nicholas
	1500 – 1515	**Health Break**	
5	1515 - 1630	Report from PIAG ▪ Report from public meetings o Meetings in June o Meetings in August ▪ Issues from public meetings o Allegations raised by GBA o Discussion regarding a meeting with Baird & Associates (Rob Nairn)	Bruce/ Felt
6	1630 - 1730	Communication Strategy • Newsletter • Brochure • Poster • Web statistics	Nevin/ Black/ Moin
	1730	**End of Day 1**	

Day 2 – Thursday, September 18, 2008

Item	Time	Topic	Lead
7	0800 - 0900	Mitigation within Study Context • Discussion Paper • Scope • Direction • Invocation	Stakhiv / Yuzyk
8	0900 - 1000	Strategy for Including Uncertainty Analysis ▪ Projects completed/completing ▪ Bucket Deterministic modelling ▪ Scope for Economic & Ecologic uncertainties	Burn/ Moin/ Werick
	1000 - 1015	**Health Break**	
9	1015 –1130	Report of the Lake Superior Task Team ▪ Status of Year 2 studies ▪ Performance indicators ▪ Contextual narratives ▪ Guidance from Economic Advisors ▪ Discussion: o extent of coverage o data collection and limitations o representative sites o model development – FEPS, IERM, etc. o Plan development – hydrologic scenarios including climate change	Eberhardt
10a	1130-1200	Report from the Plan Evaluation Group ▪ Circle of Influence report ▪ Work Plan	Leger/ Werick
	1200 - 1300	**Lunch**	
10b	1300-1400	Continuation of Report from the Plan Evaluation Group ▪ Principles and guidelines ▪ Initial decision making process	Leger/ Werick
11	1400 - 1500	Phase I Final Report & discussion on the review schedule	Yuzyk/ Stakhiv
	1500 - 1515	**Health Break**	
12	1515 - 1600	Board member round table, other business and next meeting (tentatively Dec. 11-12 in Windsor)	All
	1600	**Departures**	

Action Items from 8th Study Board Meeting – Niagara Falls, Ontario

No.	Description of Action Item:	Action Lead:	Due by:
1	Clarify wording in meeting #7 minutes regarding the work of Dave Holtschlag	Tony Eberhardt	Oct. 1, 2008
2	Explanation on why we are replacing the St. Clair River gauge	Jim Nicholas	Oct. 15, 2008
3	Establish a task force to oversee the flow revision process	Eric Tauriainen, Aaron Thompson, Syed Moin, Jim Nicholas	Oct. 21, 2008
4	Scope of Work for analysis and comparison of multi-beam echo sounder data with earlier work to establish erosion and deposition – Dave Bennion	Jim Nicholas, Syed Moin, Tony Eberhardt	Oct. 15, 2008
5	Set up meeting with Rob Nairn to discuss uncertainty analyses team	Syed Moin, Ted Yuzyk	Oct. 17, 2008
6	Scope of Work for Rob Nairn's participation in uncertainty analyses.	Bill Werick	Oct. 15, 2008
7	Communications Strategy as proposed by John Nevin • Proposal to Kay Felt and Jim Bruce • Teleconference of Study Team and PIAG Leads • Proposal with possible revisions to PIAG and Board for comments	 John Nevin John Nevin John Nevin	 Sept. 30, 2008 Oct. 10, 2008 Oct. 20, 2008
8	Mitigation • Paper regarding possible measures • Scope of Work for more detailed description of measures (NTE $25,000)	 Bill Werick Gene Stakhiv	 Oct. 31, 2008 Nov. 15, 2008
9	Revise Scope of Work for Integra (Dr. Srikanta Mishra)	Bill Werick	Oct. 15, 2008
10	Fund Scope of Work for Integra's Uncertainty analysis	Tony Eberhardt	Nov. 15, 2008
11	Geospatial Data Management • Establish a group including Coastal, Rec. Boating, Ecosystem and PEG members • Fund Scope of Work for GIS proposal (NTE $15,000)	 Study Team, Wendy Leger & Bill Werick Syed Moin	 Dec. 1, 2008 Dec. 1, 2008
12	Inform Lake Superior Task Team of "new " Study direction	Tony Eberhardt, David Fay	Sept. 25, 2008
13	Phase I Final Report • Inform Commission of request for additional PIAG review time, possible delays and impacts • Solicit the services of a report production facilitator/ project manager	 Study Team Ted Yuzyk	 Oct. 10, 2008 Nov. 15, 2008