

Notes from the 22nd Meeting of the International Upper Great Lakes Study Board

Hilton Garden Inn, Toronto
29-30 November, 1 December 2011

Day 1 –

1. Welcome/ Attendance:

Study Board: Gene Stakhiv, Ted Yuzyk, Jim Bruce, John Boland, Don Burn, Allan Chow (Day 2 and 3), Jonathan Bulkley, Jim Bredin (Day 1 and 2), Jon Gee (Day 1 and 2), Dave Powers (Day 1 and 2)

Study Managers: Tony Eberhardt, Syed Moin

TWG Reps: Bill Werick, David Fay, Jacob Bruxer, Wendy Leger, Jen Read (by phone on Day 2)

Communications & Administration: Jeff Kart, John Nevin (by phone on Day 2), Tom Shillington (by phone on Day 2)

IJC: Paul Pilon, Mark Colosimo

Others: Tim Feather, CDM (Day 2 and 3) and Mark Kohlberg, Baird (Day 2)

Agenda was approved, but items were shifted to accommodate Board members that would not be present on Day 3. **Agenda is included as Attachment 1.**

Action Items are displayed as bold and summarized in Attachment 2. For the 21st meeting, the only outstanding action item was on Casey Brown's Hydroclimatic Synthesis Report which was just received.

2. Review of Regulation Plan – Superior 2012 (Bill Werick):

- a. Suggested name: Natural S2012
- b. No plan would prevent extreme high water levels on Lake Superior in two cases:
 - i. If the onset of high levels is rapid (high Superior stochastic trace) – need to start max release 18 months before the peak to meet 183.86 m level
 - ii. If Michigan-Huron is also very high (high Michigan trace) – violates the balancing objective
 - iii. The Board started the development of an emergency response plan (this is a four-tiered study of the control structures tied to dam safety) for high levels at the Soo which will serve as a legacy action of the Study
- c. Although future ecology and economies are unknown, the plan is robust enough to still perform well compared to the alternatives evaluated.
- d. Uncertain/ possible futures and Nat64D performance:
 - i. Stationary climate – in the next three decades. Nat64D performed best
 - ii. Climate change will affect Great Lakes water supplies in some unknown way. Nat64 finished within the top four of plans tested
 - iii. Climate change may already be occurring on the Great Lakes. Nat64D finished within the top four of plans tested
 - iv. GL water supplies are cyclical – levels were low, high levels will return. Nat64D finished first

- e. The natural plan release equation is based on the pre-project flow relationship adjusted by Superior and Michigan factors applied depending on deviations from target levels that vary throughout the year.
- f. Tolson applied his method to optimize the Nat64D parameters leading to NatOpt, NatOpt2 & NatOpt3. NatOpt2 was consistently best according to the eight criteria the Board has been using.
- g. New “C” :
 - i. Propose that the real intent is to keep the frequency of low levels on Lake Superior no greater than pre-project. Propose the low level threshold change from 183.40 m, which is an above average level, to 182.76 metres
 - ii. Consistent with the basic notion of the Treaty that structures can’t make things worse for interests.
 - iii. Although it’s by a small amount, NatOpt2 often fails this test described above. But NatOpt3 passes this test.
- h. In terms of all tested NBS (109-year sequences), NatOpt3 consistently performs best.
- i. Discussion:
 - i. Should focus comparison on historic supplies; the additional scenarios should be used as additional robustness tests. The parameters developed by Bryan Tolson are optimized for the historic traces. This should be reflected in the write up on plan evaluation.
 - ii. We’re going back to “nature” and it’s proving to be a better flow procedure.
 - iii. Could say that another plan, like Bal26, or tweaking of the new plan, may provide better conditions in a possible future extreme case. The Order could be written to include this type of contingency – guidance could be ready to go in an emergency action plan – linked to adaptive management. May suggest a possible future violation of basic principles – helping Lake Michigan-Huron at the expense of Lake Superior.
 - iv. The Board is comfortable with endorsing Plan NatOpt3. **White Paper will be written about the selected plan including its possible tweaking for future conditions and capturing the Board discussion (Bill Werick, David Fay and Wendy Leger with the Study Team).**

3. Orders of Approval (David Fay):

- a. NatOpt3 does not meet the existing Orders, so at least some changes would be necessary
- b. Revisions are suggested to cover operational concerns such as ice management, peaking and ponding, emergency deviation authority, and maximum rate gates are opened. The IJC lawyers will make the final revisions.
- c. Condition 6 (probability of exceeding 183.86 m) – change is not required.
- d. Criterion (a) – update from 1976 to 2008.
- e. Criterion (b) – modify to have a dam safety over-ride.
- f. Criterion (c) (to guard against low levels in Lake Superior) – revise to reflect change from a monthly flow limit to a design criteria requiring no greater probability of Lake Superior being below 182.76 m (rather than 183.40 m) than 1887 relationship. NatOpt3 met both 183.40 and 182.76 m thresholds.
- g. Figure shown demonstrated that Nat64D (refined as NatOpt3) given high water of 1980-90, stores 10 cm of water on Lake Superior in one year, lowering the Michigan-

Huron peak by 5 cm that year compared to 77A maintaining the balancing principle. Other years have different effects.

- h. **White Paper will be written around these and other suggested changes explaining all implications (David Fay).**

4. Peer Review Summary (Syed Moin):

- a. Have responded to eight out of nine projects. Only “stochastic hydroclimate” peer review comments remain to be responded to by TWG leads.
- b. **Need to send all products (report, comments, report revisions and response to reviewers) to Board liaison (Syed Moin & Tony Eberhardt).**

Additional Information Item: Structural Evaluation of St. Marys River Project Structures (Syed Moin):

- a. Preliminary review and evaluations done by Frank Quinn and Peter Yee.
- b. More detailed work in contract:
 - i. Literature search
 - ii. Physical survey
 - iii. Risk and stability analysis
 - iv. Dam safety analysis – likely done after the Study by the Advisory Board

Day 2 –

5. Adaptive Management (Wendy Leger):

- a. Post-study Board:
 - i. Previous Advisory Board was created by a 1977 Reference (1979-1983)
 - ii. Function as a permanent Board reporting directly to the IJC and with direct linkages to the Boards of Control (strongest option).
 - 1. Need to determine how this could be funded after the Study
 - 2. Some funding is available from the Study to formalize a plan of study for the proposed Board
 - 3. Need to show some connection to a public outreach function or linked to existing activities of agencies. Could be covered by having public representation in committees of the Board.
 - 4. Include a Water Quality element as it has a connection to water quantity.
 - iii. Suggested name: GLSLR Levels Advisory Board. This will be brought forward to the IJC for their endorsement.
 - iv. Two workshops:
 - 1. Small workshop with senior officials from key agencies – end of January/ early February – invitation would come from the IJC chairs.
 - 2. Larger workshop (tentatively March 7-8) with broader agency participation.
 - v. These workshops and the proposed Board structure will be brought up with the IJC by the Study Team on Dec. 14th at their Executive Session.
 - vi. **Update AM White Paper and provide further details on the role of the IJC – (Wendy)**

6. Data Ring Project (Tim Feather, CDM and Mark Kohlberg, Baird):

- a. Flood Tool: Excel-based to evaluate potential flooding damages
 - i. Water level input (time series)
 - ii. Calculate historic surges from hourly water level gauges
 - iii. Wave input – WIS hindcast data (1956-87)
 - iv. Parcel data
 - v. Wave attenuation – from flat to extreme (33,600 COSMOS runs)
 - vi. Damage algorithm – inundation and contents; waves
 - vii. Plans can be compared to show the damages that could be expected at a particular location subjected to hydrologic conditions
 - viii. Scenarios run comparing 55M49 to NatOpt3 with historical (HI) and high Superior (HS) at Duluth (175 parcels)
 - ix. Additional sites will include Lake St. Clair and Georgian Bay
 - x. Tool will be available for use after the Study
- b. Low Water Impact Analysis:
 - i. Determining the impact of low lake levels on home values: Duluth (not impacted), Wayne/Malcomb Counties (yes, worth less), Georgian Bay (not sure)
 - ii. Based on hedonic pricing models
 - iii. Property attribute data
 - iv. Model regression results at Duluth: based on year built, square footage, distance from Lake Superior – model indicated that low water does not have a big impact on property value
 - v. Model results near Lake St. Clair: considering the same parameters as Duluth, property values appear to be impacted negatively (7%) by low water levels

7. Comprehensive Regional Adaptive Management Study (Wendy Leger):

- a. Development of Plan of Study:
 - i. Identify problems
 - ii. Establish base case
 - iii. Formulate alternatives
 - iv. Evaluate possible solutions using:
 - 1. Risk analysis at site locations – Building on Data Ring Project
 - 2. System-wide ecosystem analysis – IERM
 - 3. Monitoring/ modeling shoreline processes at locations – bathymetry/ shoreline topography
 - 4. Determine extent of shoreline modifications – protection/ dredging
 - v. Assess benefits/ costs
 - vi. Estimated cost approx. \$1M/yr for 3-5 years
- b. Multi-Lake Study:
 - i. Great Lakes-St. Lawrence River to Trois Rivières
 - ii. 18 months at \$500K (est.)
 - iii. Assess completeness of multi-lake options
 - iv. Update optimization analysis
 - v. Assess acceptability of multi-lake options
 - vi. Update construction costs
 - vii. Compare multi-lake costs with other measures

Note: See item 9.k.iv.4 below regarding Board's decision on this activity

- c. IJC has committed \$100K Canadian for AM, this may be used to follow-up on missing archived data beyond 31 March 2012. Suggestion made to prioritize items most important post-Study.

8. PIAG Message and Chapter 10 (Jeff Kart):

- a. PIAG Report covers activities from Dec. 2009-late 2011
- b. PIAG history, etc.
- c. Synthesis of public comments received on Phase 2
- d. Conclusions:
 - i. Comments heavily weighed by geographic area
 - ii. Important to maintain future involvement
- e. Recommendations:
 - i. Stresses the need to fund AM measures
 - ii. Supports creation of an advisory board
 - iii. Continue dialogue
 - iv. Develop a curriculum (K-12)
 - v. Consider PIAG experiences when setting up future public meetings
 - vi. First recommendation should relate to their position on a new regulation plan
- f. Disagreements:
 - i. Preserving key wetlands in the lakes (most members endorse)
 - ii. Flap gate option (only 3 or 4 PIAG members favor)
- g. Remaining projects for Jeff Kart:
 - i. **White paper on “lessons learned”**
 - ii. **Categorizing comments and posting general responses on website**
 - iii. **Coordinating responses to more technical and detailed comments**
 - iv. **Article addressing “myths”**

9. Final Report Outline (Ted Yuzyk):

- a. Chapters 1 (Intro) and 3 (Key Interests) are essentially complete
- b. Chapter 2 (Study Framework) is being refined by Syed Moin
- c. Chapter 4 (Hydroclimate) is progressing
- d. Chapter 5 and 6 (Plan Formulation and Evaluation) have just been received and are being refined
- e. Chapter 7 (Restoration) is with the peer reviewers
- f. Chapter 8 (Multi-lake) is to be reviewed by Study Board after a rewrite
- g. Chapter 9 (AM) is complete and is being refined based on peer review
- h. Chapter 10 (Public Consultation) - PIAG Report is being prepared by Jeff Kart and it will be condensed for this chapter
- i. Chapter 11 (Recommendations) to be developed
- j. Study Team will write a stand-alone summary (February 2012)
- k. Six Key Chapters:
 - i. Chapter 4 themes– closing the water balance, representativeness of historic series, climate change outlook, NBS forecasting
 - ii. Chapters 5 and 6 – selection of a regulation plan, suggested changes to the Orders of Approval
 - iii. Chapter 7 – no recommendations

- iv. Chapter 8 - If AM decides that multi-lake is viable, there would be a need for a more detailed study which would focus on:
 - 1. Comprehensive assessment of the impacts
 - 2. Detailed evaluation of the impacts on key interests
 - 3. Detailed design and costs
 - 4. Decision by Board: Support for further study of AM, but not a recommendation for more detailed multi-lake regulation studies at this time.
- v. Chapter 9 –
 - 1. revitalize an advisory board and implement an AM strategy for the entire GL-St. Lawrence River system
 - 2. strengthen hydroclimate monitoring and modeling
 - 3. initiate a regional AM study based on site studies
 - 4. pursue funding and coordinate AM effort with the LOSLR Working Group and renewal of the GLWQ Agreement

10. Financial Update (Tony Eberhardt & Syed Moin):

- a. Canadian funding will be expended by 31 March 2012
- b. All US Study funding has been provided through 30 September 2011
- c. Remaining US funds will cover installation of two new evaporation gauges and data collection through 31 December 2013
- d. Available US funds could also be used for a user manual for the SVM
- e. Available US and Canadian funds could support the development of an educational video and will also facilitate the AM workshops

Day 3 –

11. Information Management (Jacob Bruxer):

- a. Meeting held in Ottawa with the Study Team on Nov. 8-9
- b. Decision to have two versions of information and models – static and dynamic
- c. Science Depot prototype:
 - i. Decision schematic
 - ii. Hyperlinks to data and reports
 - iii. Alpha.iugls.org – live version
 - iv. Include public information maps, meetings, comments
 - v. Geographic map search
 - vi. Provide information about data stewards
 - vii. Data can be entered through a “file upload” link – have to determine who will complete this
- d. IJC is the present steward, but the Advisory Board will ultimately manage this archive.
- e. Responsibilities for development:
 - i. St. Clair River – Syed Moin & Jacob Bruxer
 - ii. Hydroclimatic – Wendy Leger & Bill Werick
 - iii. Restoration – Jacob Bruxer
 - iv. Multi-lake – Jacob Bruxer
 - v. Lake Superior Regulation – Bill Werick & Jacob Bruxer
 - vi. AM Options – Wendy Leger

- f. **Letter will be drafted by Syed Moin to researchers with Gene Stakhiv and Ted Yuzyk's signatures requesting input**
- g. Joe McIlhinney will provide a gap analysis
- h. Need a statement from the Study Board or IJC regarding "restrictive" use
- i. An estimate of required funding will be provided at the IJC meeting on Dec. 14th
- j. At some point, a teleconference will be held with the Study Board to update on data archiving status

12. Briefing of the IJC on Dec. 14th (Ted Yuzyk):

- a. Logic on the selection of NatOpt3 and revisions to the Orders (higher level discussion not "word-smithing") (1-1/2 to 2 hours)
- b. Multi-lake discussion (1/2 hour)
- c. Discussion on adaptive management – AM study, workshops, Advisory Board, data management (1 hour) – the AM "white paper" will be provided

13. Last Meeting (Ted Yuzyk):

- a. February 14 & 15 – in Ottawa linked to the IJC Executive Session
- b. Final review of the Final Report
- c. Review of numerous "white papers"
- d. Future teleconferences:
 - i. Regarding outcome of IJC briefing – Weds., Dec. 21st, 10 to noon
 - ii. Regarding final report - Wed., January 18th, 10 to noon



Study Board Meeting #22

Tuesday, November 29, 2011 – Thursday, December 01, 2011

Hilton Garden Inn Toronto Downtown

Tel: (416) 593-9200 Room Block Code: IJC

92 Peter Street, Toronto, Ontario, Canada M5V 2G5

Call in # 1-877-413-4792 Access code: 3914584#

Objectives:

1. *Final review of **Regulation Plan***
2. *Final review of **revised Orders** and next steps*
3. *Agree on the **AM strategy***
 - *Focus on composition and mandate of the **Advisory Board***
 - *Comprehensive regional assessment of climate adaptation measures (development of **Plan of Study**)*
4. ***Information Management Strategy***
5. *Status of the **Final Report***
 - *Focus on recommendations & conclusions*
6. *Preparing for **IJC briefing***

FINAL AGENDA

Day 1 – Tuesday, November 29, 2011

Item	Time	Topic	Lead
0	1230-1300	Arrivals	
1	1300	Welcome & Approval of Agenda	Yuzyk/Stakhiv
2	1315	Review of Regulation plan – Superior 2012 <ul style="list-style-type: none"> • <i>Revised Criterion 'C'</i> • <i>Elements of NatOpt3</i> • <i>Comparison of PP, 77A, NatOpt2, NatOpt3</i> • <i>Summary of impacts</i> • <i>Performance under varying climate</i> • <i>Story line</i> 	Werick/Fay
1500 - 1515		Health Break	
3	1515	Orders of Approval	Fay
4	1615	Peer Review Summary	Moin
	1645	End of Day 1	

Suggested dinner in China Town - Allan Chow

Day 2 – Wednesday, November 30, 2011

Item	Time	Topic	Lead
5	0830	Adaptive Management <ul style="list-style-type: none"> • Board structure • Leaders meeting on AM • Roundtable discussions 	Leger/Read Leger/Read Yuzyk/Stakhiv
6	0945	Data Ring	Eberhardt
	1015 - 1030	Health Break	

7	1030	Comprehensive Regional Assessment of Climate Adaptation Measures <ul style="list-style-type: none"> • Development of Plan of Study • Options for Multi-lake Study • Roundtable discussions 	Leger/Read Leger/Read Stakhiv/Yuzyk
	1200 - 1300	• Lunch	
8	1300	Information Management <ul style="list-style-type: none"> • Study data holdings • Decision support mapping/schematic • Roundtable discussions 	Moin Bruxer Yuzyk /Stakhiv
	1430 - 1445	Health Break	
9	1445	PIAG Messages and Chapter 10	Bruce/Powers/Nevin
10	1600	Update on Finances	Moin/Eberhardt
	1630	End of Day 2	

Dinner arranged at the Art Gallery of Ontario (AGO) – Ted Yuzyk

Day 3 – Thursday, December 1, 2011

Item	Time	Topic	Lead
11	0830	Focus on Report Conclusions & Recommendations	Yuzyk/Stakhiv
	1000 – 1015	Health Break	
12	1015	Final Report <ul style="list-style-type: none"> • Design and layout 	Moin/Yuzyk
13	1045	Briefing of the IJC Commissioners <ul style="list-style-type: none"> • December 12-14 in Washington 	Yuzyk/Stakhiv
14	1130	Closing Considerations and Last Board Meeting <ul style="list-style-type: none"> • February 14-15, 2012 Agenda 	Yuzyk/Stakhiv
	1215	End of Study Board Meeting #22	



Action Items from 22nd Study Board Meeting – Toronto, Ontario

No.	Description of Action Item:	Action Lead:	Due by:
1	White Paper written about the selected plan including its possible tweaking for future conditions and capturing the Board discussion	Bill Werick, David Fay and Wendy Leger with the Study Team	Jan. 13, 2012
2	White Paper written around the Orders and other suggested changes explaining all implications	David Fay	Jan. 13, 2012
3	Send all products (report, comments, report revisions and response to reviewers) to Board liaison	Syed Moin and Tony Eberhardt	Dec. 30, 2011
4	Draft letter to researchers with Director's signatures requesting input to the data site	Syed Moin	Dec. 30, 2011
5	a. White paper on "lessons learned" b. Categorizing comments and posting general responses on website c. Coordinating responses to more technical and detailed comments d. Article addressing "myths"	Jeff Kart	Jan. 13, 2012
6	All Chapters of the Final Report	Various authors	Jan. 9, 2012
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