

Notes from the 17th Meeting of the International Upper Great Lakes Study Board

IJC Great Lakes Regional Office, 100 Ouellette Ave., 8th Floor, Windsor, ON N9A 6T3
30 November – 2 December 2010

Day 1 -

1. Welcome/ Attendance:

Study Board: Gene Stakhiv, Syed Moin (Acting Co-Lead), Jim Bruce, Jonathan Bulkley, Don Burn, Allan Chow, Jon Gee, Dave Powers (joined Day 2)

Study Manager: Tony Eberhardt

PFEG, AMG and associates:

Bill Werick (Days 1 & 2), Wendy Leger (Days 1 & 2), David Fay, Bryan Tolson (Day 1), Jacob Bruxer (Day 1), Doug Brown (by phone, Day 2), Mike Donahue (by phone, Day 2)

Communications Advisors: John Nevin, Jeff Kart (Days 2 & 3)

IJC Liaison: Mark Colosimo, Paul Pilon

Commissioners: Lana Pollock (Days 1 & 2), Sam Speck

Saad Jasim, Director of the IJC Windsor Office, provided a welcome to the Study Board.

Agenda was approved and is Attachment 1.

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

2. Review of Status of Action Items from Minutes of Meeting #16 (Tony Eberhardt):

- a. **Regarding short paper asking questions of IJC Legal Advisors, Bill Werick still has to complete.**
- b. All other items listed are complete or in progress.

3. Restoring options:

- a. Steps toward addressing the IJC Directive (Syed Moin):
 - i. Study the impacts of restoration (10, 25, 40, 50 cm) on water levels and flows in the lakes and connecting channels by adjusting MH outflows.
 - ii. Evaluate impacts on the six interests with the SVM.
 - iii. Match physical works from previous studies to the evaluation of restoration desired with 2010 costs where available.
- b. Restoration Basics (Jacob Bruxer):
 - i. Defined as fixed, non-adjustable effect on water levels and flows.
 - ii. Structural types considered in the past:
 1. Training walls and dikes: reduce cross section, could extend into Lake Huron or reduce channel cross-section. But are expensive, visually obtrusive and could have possible impacts on navigation and increased erosion.
 2. Secondary channel flow obstructions: partially or fully restrict flow around Stag Island, Fawn Island or certain channels in the St. Clair Delta. Detrimental to navigation and environment (but could be designed to enhance ecosystems). Visually obtrusive. Stag Island

obstruction (restricting flow around east side of Stag Island) could be most economical, but that notion is based on very early estimate (1931).

3. Submerged weirs: “speed bumps” on channel bottom. Effective, low capital costs, minimum impact of navigation and environment, visually unobtrusive. Could be constructed in various locations. Studies in the past have looked at providing up to 25 cm of restoration using submerged weirs; greater than 25 cm may be possible but would need to be evaluated.
 - iii. Costs of these three structural types: The specific dimensions of various structures will be incorporated in USACE cost estimation software. **Gene Stakhiv will facilitate obtaining the software.**
 - iv. Other measures:
 1. In-stream turbines: Would have some potential benefit by generating energy from velocity of the river current, but likely have minimal impacts on upstream levels.
 2. Existing Diversions: Changes could be made to provide restoration or regulation, but effectiveness is limited, and associated costs (including costs to various interest groups affected) would be large. But impacts would not provide permanent restoration. Information will be drawn from reports completed in the 1980s on “Emergency Measures to Alleviate Problems associated with the 1985-86 Great Lakes-St. Lawrence River Basin high levels”.
 3. Inflatable double-hinged gates: For raising Lake Michigan-Huron levels, a series of such gates could restrict flow in St. Clair and Detroit River channels without affecting navigation. Such a double-hinged gate could rise to restrict flow in connecting channels, but such would have an immediate impact in lowering levels downstream.
 4. Past studies of structures in the Niagara and St. Lawrence Rivers (Int. Lake Erie Regulation Study) were also described.
 - v. Costs from Levels Reference Study of structures to provide additional lake level management: S-MH-E-O \$5.3 to \$10.3 B; S-E-O \$353M to \$3.2 B.
 - vi. Inflatable Rubber Weirs are not likely feasible for large (Great Lake) channels; no example found of required magnitude and function.
 - vii. Options for restoring up to 25 cm have been looked at in the past, but 40-50 cm would need more Study.
 - viii. Previous findings from Levels Reference Study - Michigan/Huron regulation is not possible without Lake Erie regulation and excavation due to upstream and downstream impacts.
- c. Impacts of Restoration (Bryan Tolson):
- i. Model considers changing the $y_{m_{sc}}$ (bottom level) term in the St. Clair conveyance equation to restore upstream levels. It also considers static and dynamic regulation plans for Lake Superior.
 - ii. Raising levels by 50 cm results in a higher frequency of levels exceeding the maximum in the historic (1860-2005) base case (16 of those 146 years would be “record” breaking).
 - iii. The new flow regime in the St. Clair River would take about 10 to 15 years to become stable.

- iv. Downstream (Detroit & Niagara), there is an initial substantial drop in levels about two years after the upstream conveyance change. Thereafter, the levels gradually increase back to status-quo after about 10 to 15 years.
- v. An option would be to have a more gradual (say, 20 year) restoration, which eliminates most immediate (2 year low levels resulting from a one-time restoration) downstream impacts.
- vi. Timing of restoration is critical.
- vii. Jacob Bruxer was asked to conduct a hydraulic analysis and think about mitigation in a staged way particularly the Stag Island options and include an uncertainty analysis.
- viii. **Report on this work will be provided to the Study Board by Jan. 10th.**

4. Multi-lake Regulation Options (Bryan Tolson):

- a. Current structures on St. Marys and St. Lawrence Rivers and new structures on the St. Clair and Niagara Rivers – optimizing operating rules with various NBS scenarios.
- b. Optimization approach:
 - i. Optimize releases directly and develop a regression analysis to arrive at operating rules which would be a function of elevation, NBS and a downstream condition (shortage or surplus).
 - ii. Iteratively adjust operating rules.
 - iii. Objectives:
 - 1. Maintain levels of all lakes at base case.
 - 2. Maintain levels within coping zones A and B.
 - 3. Use a coping zone-based penalty function, $f(i, t)$.
 - 4. Spread out the benefits and costs across stakeholders and lakes – quantify tradeoffs.
 - iv. Essence of optimization modelling by end of January with final model and results by end of May 2011.

5. Board decision for path forward (All):

- a. What further work do we need to have done for the Study Board to make a decision in February – May?
 - i. Need more information regarding downstream economic and ecosystem impacts resulting from upstream restoration, although acquiring this is unlikely given time and funding limitations.
 - ii. Bryan Tolson will provide many runs under optimization for various hydrologic scenarios which will allow a future assessment/ development of policy for considering links between multi-lake regulation and restoration by the Board.
 - iii. Issue: How far should we push restoration (10 cm, 50 cm)? Technically feasible, but politically acceptable?
 - a. Not enough information to make a decision – premature. Stage-frequency curves will be developed. More information on sensitive spawning areas.
 - b. Based on information provided, some felt 40-50 cm restoration too extreme. But even with these extreme cases, staged restoration can reduce downstream impacts. However, even ecosystems have adjusted to the current regime and restoration of these higher

amounts could have extreme consequences during high water level periods.

- c. Some restoration measures can be eliminated – focus on submerged weirs. However, measures like training walls would not impact fish transits, so could also be a valid option.
- d. If you consider 40 and 50 cm restoration, it would be more appropriate to consider multi-lake regulation which not only could restore levels, but also considers possible climate change cases.
- e. Consensus was that restoration will only specifically consider 10 and 25 cm. Further substantiation of this position will come after the February Study Board meeting.
- f. Need an expert to provide an assessment of ecologically critical areas that could be impacted by restoration structures – white paper identifying risks. **Scudder Mackey will be contacted as a possible investigator for this work (done). Link discussion of the paper to the Institutional Workshop being proposed by the AMG for the first week in February. (Action Item for Tony Eberhardt).**
- g. **Jon Gee will identify AOC reports for the St. Clair that characterize ecosystem issues for the River.**

Day 2 -

6. Briefing of the Study Board on the IJC Appearances (Gene Stakhiv):

- a. International gauges and monitoring beyond the Study related to adaptive management:
 - i. Continuation of river gauges:
 - 1. St. Marys River at Sault Ste Marie
 - 2. St. Clair River at Port Huron
 - 3. Detroit River at Fort Wayne
 - 4. Niagara River at Fort Erie
 - ii. Continuation of evaporation gauges:
 - 1. Stannard Rock on Lake Superior
 - 2. Spectacle Reef on Lake Huron
 - iii. The more complete data collection requirements will be discussed at the FIRM Workshop being held in Burlington on December 8-10.
 - iv. IJC has asked for a white paper on adaptive management that provided guidance on the role of the IJC. *The paper was prepared by the AM TWG and distributed to the Study Board.*
- b. Legal direction:
 - i. Employment of water supply sequences different than those in the Orders of Approval.
 - ii. Continued dialogue as plan formulation and evaluation proceeds.
- c. Restoration of water levels:
 - i. Exploratory level of analysis.
 - ii. Recommendation that the investigations of restoration be produced as a separate report, but highlights be included in the main report.
- d. Peer review (Syed Moin):
 - i. December 6th product review for Low Water Impact Report.

- ii. Hydropower pricing product review is scheduled for January 5th .
- iii. Several product reviews are planned for February 2011, but the date may change slightly due to the number of reviews and identification of reviewers.
- iv. For the St. Marys project, Dr. Mark Bain will be the lead for the product.

7. Restoration Options:

- a. Non-structural options, “adaptive management white paper” (Wendy Leger):
 - i. Flood management, shore protection permitting, dredging, low water land management – working with agencies.
 - ii. Outreach activities underway – GLC, Great Lakes State Climatologists, Conservation Authorities, GL Bi-national Executive Committee, GL Cities Initiative, etc.
 - iii. Concentrating on four locations: Duluth, Chicago, Macomb County area on Lake St. Clair, and southern Georgian Bay.
 - iv. IJC contribution:
 - 1. Pursue start-up funds
 - 2. Scientific and policy leadership role
 - 3. MOUs with participating agencies
 - 4. System-wide bi-national perspective
 - v. Comments back from the Study Board by COB, Friday, December 3rd for submittal to IJC. IJC emphasis is on forecasting and monitoring of impacts after implementation of a new regulation plan.
 - vi. Institutional analysis – two white papers relative to changing the regulation plan and to building new structures are being developed by Doug Brown. Regarding the “new structure” paper:
 - 1. 20-30 years to implement any structural measure.
 - 2. No major hydraulic works project constructed within the Great Lakes System without a significant economic driver.
 - 3. Paper should include a description of what roles the IJC has played in the past and speculation on how they may be involved in the future.
 - 4. Paper will be provided to Syed along with supplemental documents.
 - vii. Non-structural measures institutional analysis - white paper being developed by Mike Donahue.
 - viii. Institutional Workshop tentatively scheduled for February 1-3 in Windsor. Board will be invited to attend.
- b. Board Responses to Restoration (Bill Werick):
 - i. Help form a basis for decision making.
 - ii. Need to decide on whether information is provided at public meetings on how Board has responded to IJC on restoration.
 - iii. Other forums with groups like Ducks Unlimited may also provide an opportunity for dialogue.
 - iv. Need to determine Board’s role in reducing impacts – further studies beyond IUGLS, position on restoration.
 - v. Steps regarding position:
 - 1. The board finds the staff research is sound –approves the reports
 - 2. Board adds their impression and evaluation of the reports and what else is needed

3. Board gives consideration of input from the public (should PIAG convey message?)
4. Board identifies criteria to be used to decide whether to do more.
- vi. Position of the Study Board has not changed from that described in the Phase 1 report – remediation not to take place at this time. Mitigation measures in the St. Clair should be addressed in terms of climate change within context of multi-lake regulation. However, response to the IJC request regarding investigating various levels of restoration should be made in some manner.
- vii. It was noted that any action to respond to the restoration question is the responsibility of the two governments, not the IJC, since IJC has no authority to implement actions – only advise the two governments.
- viii. Decision on approach and PIAG involvement needs to be addressed now, since the next Board meeting includes a joint session with PIAG. Debate on relative restoration approaches may be scheduled at the next PIAG meeting between Roger Smithe of Lake Michigan shoreline and Chris Baines of Georgian Bay, both of which would have differing views.
 1. Need more information on climate change to make a decision on how to proceed in terms of restoration and regulation. However, departing from option 1 departs from the intent of the IJC letter.
 2. Need public response to the science that can be conveyed back to the IJC. Also need responses regarding measures that provide restoration.
 3. PIAG members could involve their constituents with discussion which could be conveyed back to PIAG and the Board through pre-public meetings.

8. Board decision on path forward (all):

- a. Board will summarize analysis and findings from Bruxer and Tolson’s report (Study Team) by Mar 2011 – Option 1.
- b. There was general agreement that the restoration results should be exposed to some form of public input prior to release to the IJC.
- c. PIAG will determine the extent of public engagement, balancing the benefits of public consultation with limited time, resources, and scope of the technical work performed, which may involve such alternatives as PIAG reaction, mini-sessions with PIAG members and their representative groups, or public meetings.
- d. Board will present their analysis and findings at the summer public meetings.
- e. PIAG will present on the initial response from their constituency engagement at the summer public meetings.
- f. PIAG will provide a summary report to the IJC in Sept 2011 including their impressions of the Board’s analysis and findings on restoration, the preliminary response from their spring public outreach effort and on what the PIAG heard at the summer public meetings.
- g. Gene and Syed will prepare a description of this approach for the IJC Executive Session, and present to PIAG co-chairs for review (done).**

9. Coastal assessment and data integration – Data Ring (Wendy Leger):

- a. Coastal PIs:
 - i. Low water analysis will be conducted at three sites only; Chicago will not be included.
 - ii. Flooding – detailed impact assessment at four sites
 - iii. System-wide estimates of shore protection damages
 - iv. Erosion – surges and possible lack of future ice would impact these indicators. Addressing these factors by defining coping zone C. An erosion PI will be available for input to SVM, but will be site based (based on a number of erosion sites).
- b. Data Ring:
 - i. In-house assignment led by Joel Schlagel (IWR) to acquire data and include in GIS viewer at four sites (Duluth, Chicago, Macomb County and Georgina Bay)
 - ii. Consultant will do impact analysis at selected sites for low water and flooding, and will develop a strategy for future sites. AM strategy will be based on the analyses.
 - iii. IMG will lead effort to determine what it would take in terms of data sharing agreements, info management etc. to allow for data accessibility.
 - iv. Final cost to be determined once the final scope is provided (estimate 200K).

10. Financial Reports (Tony Eberhardt & Syed Moin) – formerly agenda item 16:

- a. In the US, of the \$8M provided to date, \$846,000 remains uncommitted. Of this amount, funds have been set aside for the new IERM2, paleo work by University of Massachusetts, the Data Ring project, director and manager salary, travel and Jeff Kart’s contract, leaving a balance of \$98,000 for remaining FY2011 activities.
- b. In Canada, about \$17,000 is available through March 31, 2011. In FY2011, \$1.072 M was committed and about \$980,000 was spent. Funding in the FY2012 will be used for finalizing activities and report preparation.

11. Adaptive Management & Institutional Analysis (Wendy Leger):

Non-structural & structural adaptation being addressed by Mike Donahue:

- a. Reviewing lessons learned from areas outside of the Great Lakes
- b. Examining four areas for case studies (same sites as flooding and low water impact analysis)
- c. Focusing on desired institutional arrangements
- d. Developing framework/ outline for institutional workshop
- e. Early findings/ weakness include: no single agency has mission/ authority to lead adaptive responses; adaptation generally motivated by crisis; lack of resources.
- f. Opportunity to improve response by enacting a formal bi-national agreement, staff to implement agreement, guidance on monitoring and evaluation program.
- g. Need to contact FEMA to see what their responsibility is on the Great Lakes. Identify keystone agencies that would be involved in crises.
- h. Consider the top 5 recommendations for the Study Board to act upon.

12. Board discussion (all):

- a. How will an AM plan be implemented?
- b. Is a bi-national agreement really necessary? Not likely possible with the limited mandate of AM.

- c. Should focus on differences between US and Canada, e.g., Canada doesn't have a FEMA and no political will to create one, but does something like the Canadian FDRP program need to be resurrected?
- d. International Watershed Initiative (IWI) linked to IJC may be a vehicle for possible bi-national agreements.
- e. Cost of annual implementation/ options should be determined.
- f. Likely recommending an adaptive management group within a revised Lake Superior Control Board.
- g. Consider possible linkages with water quality and IJC role.
- h. AMG needs to give guidance and Board needs to be thinking about what they should do with the institutional analysis recommendations
- i. **Look for funding sources like the Great Lakes Initiative (GLI) or seeking funds though the IJC as start-up mechanisms. Possible trust fund could be created based on water use. These things should be pursued by Mike Donahue in his report.**

Day 3 -

13. Status Reports from Lake Superior Regulation Task Team (Tony Eberhardt):

- a. Progress reported.
 - i. Most complete TWGs in terms of PIs, coping zones and contextual narratives are Rec. Boating and Coastal
 - ii. Need to complete work for Hydropower
 - iii. **Deadline for completion of PI and coping zone incorporation into the SVM and contextual narratives provided to Tom Shillington for Chapter 4 of the phase 2 report is December 31, 2010.**
- b. **TWG leads will be asked who, besides them, should be retained through March 2012 and a memo will be written describing the remaining responsibilities and timelines for the TWGs (Tony Eberhardt & Wendy Leger) (done).**

14. Communication Activities (John Nevin and Jeff Kart):

- a. Communication outline provided, a key goal of which is to avoid confusion between the restoration analysis and Lake Superior regulation.
- b. Information regarding restoration studies – technical report – will be provided prior to public meetings. Share with key media.
- c. Meetings were suggested around conferences, but the locations and dates will have to be adjusted since peer-reviewed reports will not be available until July-August (which was when the public meetings were expected to be held).
- d. Need to articulate key messages.
- e. A status report will be provided prior to the meetings.
- f. Suggest posting comments, but only after response can also be posted. Comments will be responded to in a timely manner. Substantive comments will be included/ reflected as revisions in the final Study report.

15. PIAG Report (Jim Bruce & Dave Powers):

- a. Discussing PIAG reports on restoration and regulation
- b. Good meeting was held in October in Thunder Bay, Ontario
- c. Teleconference being held soon to discuss the agenda for the joint meeting with the Board in February.

- d. **Security training will be required for future travel and Tony Eberhardt will provide the link prior to the February meeting to US PIAG members (done).**

16. Report Outline (Syed Moin):

- a. Outline of the Phase 2 report was provided with the list of authors identified and dates for draft completion.
- b. Report on Restoration will be included in Chapter 7 (Adaptive Management – Strategy & Legacy)
- c. Drafts will be provided to the Study Team.
- d. Other dates:
 - i. Review of chapters – May-Sept. 2011
 - ii. Final edits and layout – Oct-Dec. 2011
 - iii. Report to IJC – Feb. 15, 2012.

17. Next Meetings:

- a. February 22-24 in Windsor. The Board members will be assigned tasks to report on. Study Board meeting begins at 9:00 am on the 22nd and ends at 5:00 pm on the 24th. The meeting on the 24th will be a joint meeting with PIAG. PIAG meeting continues through February 25th.
- b. April 11-12 in DC prior to the appearance with the IJC. PIAG meeting will also be scheduled for April 13-14.
- c. June 7-9 in Niagara Falls, Ontario.

18. Roundtable:

- a. Allan Chow – concerned about ecosystem issues.
- b. Don Burn – would have liked more discussion on regulation issues. The next meetings will concentrate of these aspects.
- c. Jon Gee – concerned how the restoration studies will be portrayed. Glad to see how adaptive management is moving forward.
- d. Jonathan Bulkley – good discussions. Optimistic.
- e. Jim Bruce – more clarity of hydrologic work, climate change and forecasting.



Study Board Meeting #17
IJC Great Lakes Regional Office
100 Ouellette Ave., 8th Floor, Windsor, ON N9A 6T3
Tuesday, November 30 – Thursday, December 2, 2010

Objectives:

- *Make the Board familiar with the restoration and multi-lake analysis*
- *Propose strawman Board findings and recommendations that defines the extent to which the Board advises the IJC and adds comments on the analytic findings*
- *Amend study product designs as needed to address the Board's preferred option*

FINAL AGENDA

Day 1 – Tuesday, November 30, 2010

Item	Time	Topic	Lead
0	1230 - 1300	Arrivals	
1	1300 - 1310	Welcome/ Review & Approve Agenda	Moin/Stakhiv
2	1310 - 1320	Review Status of Action Items from Minutes of Meeting #16	Eberhardt/Leger
3	1320 - 1445	Restoring options + IJC directive + Physical options for 10, 25, 40 and 50 cm restoration + Impacts of restoration	Moin Bruxer Tolson
	1445 - 1500	Health Break	
4	1500 - 1600	Multi-lake regulation options + Initial results	Tolson
5	1600 - 1730	Board decision for path forward (<i>in camera</i>)	Moin/Stakhiv
	1730	End of Day 1	

Day 2 – Wednesday, December 1, 2010

Item	Time	Topic	Lead
6	0830 – 0930	Briefing of the Study Board from: + the IJC Appearances	Stakhiv/Moin

		<ul style="list-style-type: none"> ✦ discussions with lawyers ✦ Peer review process 	
7a	0930 - 1115	Restoration options <ul style="list-style-type: none"> ✦ Discuss "non-structural" options to address the same issues; White paper ✦ Provide Four Board response types ✦ Present Strawman 	Leger Werick
	1000 - 1015	Health Break	
7b	1115 - 1200	Board discussion	Moin/Stakhiv
	1200 - 1245	Lunch	
8	1245 - 1415	Board decision for path forward (<i>in camera</i>)	Moin/Stakhiv
9	1415 - 1445	Coastal assessment & Data Integration	Eberhardt/Werick
	1445 - 1500	Health Break	
10	1500 - 1600	Adaptive Management & Institutional analysis <ul style="list-style-type: none"> ✦ Structural options ✦ Non-structural options 	Leger/Read Brown/Donahue
11	1600 - 1700	Board discussions	Moin/Stakhiv
	1700	End of Day 2	

Day 3 – Thursday, December 2, 2010

Item	Time	Topic	Lead
12	0830 - 0930	Status reports <ul style="list-style-type: none"> ✦ SVM ✦ Performance Indicators ✦ Coping Zones ✦ Contextual Narratives ✦ Integrating coping zones 	Eberhardt/Werick
13	0930 - 1000	Communication activities	Nevin/Kart
	1000 - 1015	Health Break	
14	1015 - 1045	PIAG Report	Bruce/Powers /Nevin
15	1045 - 1100	Report outline	Moin
16	1100 - 1130	Financial reports	Eberhardt/Moin
17	1130 - 1215	Board round table & next meeting with PIAG	Moin/Stakhiv
	1215	Departures	

Action Items from 17th Study Board Meeting – Windsor, Ontario

No.	Description of Action Item:	Action Lead:	Due by:
1	Short paper asking questions of IJC Legal Advisors	Bill Werick	Jan. 31, 2011
2	Specific dimensions of various structures will be incorporated in USACE cost estimation software.	Gene Stakhiv	Jan. 15, 2011
3	Report on Restoration to be provided to the Study Board.	Bryan Tolson	Jan. 10, 2011
4	Contact Scudder Mackey as a possible investigator to assess ecologically critical locations impacted by structures.	Tony Eberhardt	Dec. 15, 2010 - Complete ; Report at Institutional Workshop in Feb. 2011
5	Prepare a description of the approach proposed for addressing restoration.	Gene Stakhiv and Syed Moin	Complete
6	Look for funding sources for adaptive management beyond the Study.	Wendy Leger to request action by Mike Donahue	Report at Institutional Workshop in Feb. 2011
7	Completion of PI and coping zone incorporation into the SVM. Contextual narratives provided to Tom Shillington for Chapter 4 of the phase 2 report.	Tony Eberhardt direction to TWG Co-leads	Dec. 31, 2010
8	TWG leads will be asked who, besides them, should be retained through March 2012 and outline of remaining TWG responsibilities will be provided.	Tony Eberhardt and Wendy Leger	Jan. 15, 2011 - Complete
9	Security training link provided prior to the February meeting to US PIAG members.	Tony Eberhardt	Dec. 15, 2010 - Complete