Notes from the 20th Meeting of the International Upper Great Lakes Study Board

Marriott Fallsview Hotel, Niagara Falls, Ontario

7-9 June 2011

Day 1 -

1. **Welcome/ Attendance:**
   Study Board: Gene Stakhiv, Ted Yuzyk, Jim Bruce, Dave Powers, John Boland (Days 1 and 2), Don Burn, Allan Chow, Jonathan Bulkley, Jim Bredin (Days 1 and 2), Jon Gee
   Study Managers: Tony Eberhardt, Syed Moin
   TWG Reps: Bill Werick, David Fay, Jacob Bruxer, Wendy Leger (Days 2 and 3), Bryan Tolson (Day 2)
   Communications & Administration: John Nevin (Day 3 by phone)
   IJC: Chairman Lana Pollock (Days 1 and 2), Mark Colosimo

Agenda was approved and is Attachment 1.

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

2. **Debriefing on Restoration (Gene Stakhiv):**
   a. Two webinars held on June 6th (presentation distributed):
      i. PIAG (10:00 am): About half of PIAG members participated
      ii. Gov't. (11:00 am): About 10 government officials participated – follow-up questions from Town of Ajax on how restoration might impact new Lake Ontario regulation plan. Reply will be prepared.
   b. Peer Review comments: Overall, the review was good and group was supportive. Suggested adding comments on Chicago impacts and diversion. Info on turbines was added – Canadian National Research Council investigating and report will be available by the end of June. Stressed to IPR Group that this and other measures are being done as "exploratory" investigations. Group felt the environmental sections were strong.
   c. Issue will come back during discussion of multi-lake regulation.
   d. Media and public webinar on Friday, June 10th at 10:00 am.
   e. Report will be available on the Study website by June 10th. It will also be posted on the American Society of Civil Engineers (ASCE) website.

3. **Superior Regulation Plans (David Fay):**
   a. Families of plans being tested: 77A derivatives (includes, 77B, 122, 123 to 130 types, PFN3), Pre-project-based, others.
   b. Common elements:
      i. monthly regulation decision,
      ii. all (except PP) have a minimum flow limit,
      iii. Forced at least pre-project flow, if gates are approaching overtopping.
   c. Plan 77A
      i. Based on Superior and MH balancing normalized levels equation.
      ii. Forecast supply triggers based on Lake Superior levels.

iii. After averaging five months out forecasted outflows, resulting flow is tested against outflow limits.

d. Plan 77B - developed to improve ecological impacts in the rapids.
    i. Same as 77A, except monthly flow changes in rapids less than 330 cms (less spillage, also benefit for hydro).
    ii. Max flow from May through November are different due to winter max flow limit and limited monthly flow change
    iii. All other limits and criteria are applied
e. Plan 122 – developed in Levels Reference Study (1993)
    i. Same as 77A except:
        1. Lake Superior level variability parameter is relaxed in balancing, which reduces variability of MH.
        2. 50% supplies are always used in flow forecasts.
        3. Maximum, minimum and monthly flow changes are different.
        4. Slight modification of balancing equation.
        5. All other limits and criteria are applied
    ii. Cannot be implemented without a change in the Orders of Approval.
f. Plans 122c, 123 to 130: Criterion (c) is applied at different thresholds.
g. Plan PFN3:
    i. No winter max flow or monthly flow change limit
    ii. No limit on monthly flow updated parameters to 2008
    iii. Uses a naïve 3-month forecast
    iv. Other limits and Criterion are applied.
h. Pre-project: 1887 stage discharge relationship. No limits or criteria are applied.
i. Nat 60: Starts with pre-project equation, adjusts flow based on deviations of Superior and Michigan-Huron levels from target.
j. Bal25: Scores for departure from target Sup and MH levels and flows.
k. Plan 1955 modified rule of 1949: plan used between 1955 and 1972, prior to 1977. Only considers Superior levels.
l. Discussion:
    i. Orders are based on hydropower benefits
    ii. No discretionary authority is part of present plan. IJC must approve deviations from plan. Request made under special circumstances; e.g., sea lamprey experimental project during summer 2011.
    iii. Presently only one US and one Canadian member on the Control Board. If deviation authority is given to the Board, representation should be expanded.
m. Net Basin Supply sets:
    i. Wide range of plausible NBS sequences to test the robustness of plans – 109-year sequences (12 scenarios).
    ii. Discussing the plausibility of some sequences.
    iii. Historically, there appears to be a downward trend during recent decades on Lake Superior, no discernable trend on Lakes Michigan-Huron, and upward trend on Erie. None are statistically significant.

4. Robustness Discussion (Bill Werick):

a. Factors to consider: hydrologic attributes, monetized external effects and non-monetized external effects

b. Plans are fairly consistent at suppressing high levels.
c. Monitoring is important so that if a plan fails in the future, a new or modified plan can be implemented.
d. As plans impose criterion C at lower levels, plans fail under dry supply sequences.
e. There are differences in plans on Lake Superior, but not much difference on Lake Michigan-Huron.
f. Plan ranking: Plans generally perform the same, but some have very good months and others very bad months. Need to decide what's really important to society. 77A and Natural 60 seem to perform best (good candidates), but depends on the metric.
g. Questions for the Board:
    i. Are the numbers sound, plans comparable?
    ii. Have we missed an important test NBS?
    iii. In a close competition, what is the tie-breaker criterion for the Board? For the IJC?
    iv. Are the PIs good enough for this purpose?
    v. What about secondary PIs, like flow reliability?
    vi. How will we summarize this for the summer meetings? Need to show at least four plans and these can be "fence post" plans studied earlier (illustrative).
    vii. Possible improvements/ tweaking:
        1. Simplifying the "code" of 77A
        2. Modify outflows in June to assist with sea lamprey capture/ elimination
        3. St. Marys flow to encourage Sturgeon spawning – at least once in five years
        4. Relax winter maximum outflow limit somewhat (based on Dr Shen's study results)
        5. Review actions proposed in 1986 and 1993 Emergency Measures report (Peter Yee is doing this).
        6. Demonstrate the recent levels in Georgian Bay were lower (due to GIA) than the historic low levels of the 1960s **– Jacob to prepare a graphic based on this determination by Chuck Southam.** Although regulation can't provide assistance, this is information that can be shared with Georgian Bay so that adaptation measures can be implemented.
    viii. Need to demonstrate the "balancing" concept clearly at public meetings. Develop it around what occurred in 1986. Tie it to NBS and TBS.
    ix. **PFEG should draft a description of all the modelling that's been done – a summary – for Board comment to assist with summer meetings.**

5. **Report on IERM (Jim Bredin):** Need to determine if the PI within the IERM satisfactorily captures wetland issues around Georgian Bay (**need to clarify through Scudder Mackey discussion with Pat Chow Fraser**).

6. **Robustness and Climate Uncertainty (Don Burn):**
    a. Plans should perform under a number of plausible conditions.
    b. Need to develop a set of metrics to evaluate robustness.
    c. Decide which NBS sequences should be used to test robustness.

d. Paleo analysis implies a wider range in lake levels than the historic record, but no probability can be placed on these extremes.
e. Eight operational simulations of the Canadian Regional Circulation Model which are adequate for assessing robustness of plans.
f. Change point analysis of components for the lakes shows the linkages between NBS, precipitation and evaporation.
g. Plot comparing work by Angel and Kunkel, MacKay and Seglenieks, and Lofgren indicates a trend to drier conditions. However, the results are biased since much of the results are from GCMs using various starting conditions and it's not clear if results are unique by an investigator or duplication. Recommend that this display not be demonstrated at public meetings since it may be misleading.
h. Debate on whether Seidou-Ouarda stochastic NCEP model driven by GCM outputs should be used as a test of plan robustness. Decision will be made after comments come back from IPR Group.
i. Board agreed with implications related to existing messages on climate change proposed by the Hydroclimatic TWG:
    i. Future changes in lake levels may not be as extreme as previous studies predicted.
    ii. However, impacts may be increasing due to:
        1. Amplified seasonality of lake levels
        2. Loss of winter lake ice cover and warmer surface water temp.
        3. Loss of connecting channel ice cover
        4. Increased spring storminess
        5. Increased wind speed.

7. Hydropower (Jonathan Bulkley):

a. Need to evaluate the developed regression equations by running the independent 2009-10 data from the three hydro power plants to compare the predicted power output obtained from the regression equations (KW/day) with the recorded power output. It must be recognized that the data from the three plants utilized to develop the regression equations varied from 10 years of daily data to 3.3 years and 3.5 years. All the data used to develop the regression equations only goes through 2008.
b. There is very significant and inherent uncertainty in projecting hydropower pricing predictions into the future. To attach the uncertainty of future hydropower pricing to the uncertainty of the regression equations compounds the potential errors.
c. Prefer to use the hydropower energy produced rather than increasing uncertainty even further with projected future pricing.
d. **Will meet with David Fay for further clarification.**
e. Gave the overall PI a tentative thumbs-up provided that the focus is on the energy production (KW/day) rather than the projecting the prices for the hydropower into the future.

8. Stamps of Approval (Bill Werick):

a. Navigation – John Brown of USACE, Buffalo will run his model and compare it to what occurs in the SVM
b. M&I – TWG leads are looking at SVM

c. Coastal – want to be sure the short hand SVM matches the more complicated models
d. Rec. Boating – request for statistics on uses of slips. Not being used in the SVM; instead using the number of times levels are within the design range.

9. Peer Review (Syed Moin):

a. Sub-product reviews: 8 of 9 have been provided to IPR Group.
b. Hydroclimatic report is delayed but will be provided on Friday, June 10th.
c. Multi-lake and Restoration Chapter (8) will be removed from the list of final report chapters that will go to the IPR Group.
d. Final report will be complete in the December 2011 – January 2012 timeframe.

Day 2 -

10. Overall Confidence in the Board's Decision – Ranking of Options (John Boland):

a. Problem: many competing plans, multiple stakeholders, hydrologic attributes, etc.
b. Hydrologic attributes:
    i. Robustness – range of possible conditions: adequate performance, how it's measured?
    ii. Reliability – percentage of time the system performs adequately
    iii. Vulnerability – average severity/ magnitude of economic losses due to failure
    iv. Resilience – ability of a system to return to adequate performance after failure
c. Regulation plan attributes:
    i. monetized external effects: market and non-market measures
    ii. non-monetized external effects
d. Overview: attributes measured on cardinal and ordinal scales or not at all.
e. Multi-attribute Ranking: conjunctive dominance, disjunctive dominance.
f. Simple ranking:
    i. critical issue approach: eliminate less important attributes or those with variation across plans within the range of measurement uncertainty
    ii. exclusion criteria approach: exclude plans which don't meet specific criteria; e.g., eliminate a plan that is not beneficial to hydropower
g. More variants: critical issue approach, non-critical issues.
h. Weighted objective function:
    i. weights should reflect tradeoffs
    ii. only cardinal measures can be weighted
i. Decision needs to be reached on which NBS sequences should be used, resolving inconsistencies in coping zones, listing attributes (determining which should be kept and which should be eliminated)
j. Proposed procedure: apply critical issue and exclusion criteria, rank by conjunctive dominance, determine expected benefits, and continue iteratively.
k. Discussion:
    i. To help to define the ranking process: what is driving the study? The concerns were those raised by the Georgian Bay community and also consideration of climate change.
    ii. Should we consider a plan that does well given historic supplies (not unlike 77A) but also can handle extreme hydrology or seek the best which handles

uncertain futures as the primary goal? Why pretend that we're going to come up with something other than 77A?

iii. Does the Board want a plan that balances the levels between Lakes Superior and Michigan-Huron differently? Since MH riparians have adapted to conditions since 1962, perhaps balancing should remain as it is.

iv. Ranking the criteria established by the Board is a key step.

v. There may be plans that can be eliminated.

11. Lake Superior Regulation Discussion (Gene Stakhiv):

a. Is the Board willing to accept losses compared to 77A if the losses still leave interests better off than pre-project? Yes, 77A should be the basis of comparison.

b. Most plans minimize disproportionate losses.

c. Plans should be able to respond to unusual or unexpected conditions.

d. Screening criteria include such goals as no harm to hydro and navigation and the range that is most beneficial to interests.

e. IJC Directive:

   i. Is there a need to change the orders or the regulation plan?

   ii. Need to decide if there are contemporary and emerging needs that require a change.

   iii. If there is a need, decide on alternatives.

f. Plan culling based on hydrologic attributes and monetized and non-monetized external effects:

   i. Of seventeen alternatives developed, 77A, PP, 77B, 129 and Nat60 all perform OK (a value judgment) on HA and essentially have positive external effects and are worth keeping.

Summary of plans that should move forward for further improvement/ consideration:

Alternative**	Hydrologic Attributes		Monetized External Effects			Non-monetized External Effects	
	Superior	MH	Hydro	Nav.	Shore Pro. (overall/ helped)	Sup 01 & Sup 02 (Wilcox PI)	Normalized St. Marys
77A	OK	OK	0	0	-	0.85	1.00
PP	OK	OK	0.05	-0.77	3%/ 23%	1.00	1.04
77B	OK	OK	0.04	0.16	-10%/ 46%	0.94	1.12
129	OK	OK	0	-0.29	6%/ 82%	0.87	1.36
Nat60	OK	OK	-0.05	0.26	-1%/ 53%	0.89	1.00
PFN3*	OK	OK	-.09	0.30	-2%/ 42%	0.69	1.36
Bal25			-.14	0.41	-19%/ 50%	0.94	1.34

*Has no winter limitations and it may fall out once these are included.

**A simple matrix pair-wise comparison could be used to rank the plans (Bal25 ranked highest if all attributes and effects are weighted equally).

The following ranking was displayed by one Board member, but further refinement is necessary:

	77A	*77B*	*129*	*Nat60*	*PFN3*	*Bal25*
77A	*X*	*4*	*3*	*2*	*2*	*4*
77B	*1*	*x*	*2*	*2*	*2*	*3*
129	*1*	*4*	*X*	*2*	*1*	*3*
Nat60	*2*	*3*	*3*	*X*	*2*	*4*
PFN3	*3*	*2*	*3*	*3*	*X*	*3*
Bal25	*3*	*2*	*4*	*3*	*4*	*x*
Total	*10*	*15*	*15*	*12*	*11*	*17*
Rank	*5*	*2*	*2*	*3*	*4*	*1*

ii. 55 Mod 49 does well in terms of high and low levels on Lake Superior (suppression) and could be improved further.
iii. PFN3 and Bal25 show some promise, but need refinement.
iv. Goals are to:
    1. Include the balancing equation
    2. Have plans that compress the levels on Lake Superior
    3. Plans different than 77A
    4. Reduce need for shoreline protection
    5. Address low water impacts
    6. Consider in more detail the results of the IERM
    7. Consider flows during ice conditions
    8. Incorporate isostatic adjustment in terms of shoreline interests
v. 12 NBS series will be shown for each alternative. Seasonality is somewhat covered in the climate change sequences.
vi. What things are troubling the Board?
    1. Are we too concerned with very small economic values?
    2. Have we missed unique types of plans?
    3. If water levels are trending downward are we considering plans that can respond to these low levels?
    4. Are we so worried about low levels, that we're missing opportunities for reducing high levels?
    5. Should we consider some condition where the balancing rule doesn't apply? (Reverting to pre-project flows or Criterion C triggered by conditions on both Lakes Superior and Michigan-Huron).
    6. Making sure that we know what's in the SVM. If not clear, decision would have to based on the weight of the evidence.
    7. Would like to have a more structured discussion regarding the alternatives; less minute details. Some attributes less important.
    8. Do we need to change 77A? Where is the evidence for the need?
    9. Need to be sure we're addressing emerging needs. A matrix might help identify performance.

10. Concerned about time horizons (discussed 30 years to 2040). Should look at a shorter time horizon. Need to be ready to respond in a shorter timeframe.
11. We have to prepare the public for bad news – "Plan 77A is okay". Can't do much to compress levels. Develop backup plans - one that can handle very high levels and one for very low levels. Something like 77A as the recommended plan with high and low variations within an adaptive management framework. A decision tree will show the linkages. **Bill Werick will develop the tree with input from John Boland.**
12. What are the remedial measures that could be implemented in the future?
13. Animation of the system, limitations of regulation, etc., should be prepared for the summer meetings and can remain as a legacy to the Study. It could also include possible hydrologic traces.

12. Final Report project management (Ted Yuzyk):

a. 10 Chapters – timeline and responsible authors identified
b. Chapters 3 and 4 – "Great Lakes Hydrology & Climate Variability/ Change" and "Key Interests & Order of Precedence" order may change.
c. Reference will all be on line.
d. The entire draft report will be to the IPR Group at the end of November with a request for comments back to the Study Team within 3 weeks.
e. Board meetings to review the documents in various stages in December in Windsor and January 2012 location to be determined.

13. Multi-lake Regulation Findings (Bryan Tolson):

a. Points raised:
    i. Existing plans (77A and 58DD) do not perform well under extreme future hydrology (8 scenarios tested).
    ii. Structures in the St. Clair and Niagara Rivers can provide some improvement but not in the worst case.
    iii. New regulation plan release decisions with new structures improve conditions due to extreme hydrology in most cases; albeit ideally.
    iv. All lakes are weighted equally.
b. The range of acceptable levels was defined by a range of levels in simulation over the period of record, 1900 – 2008. The optimization model was developed with the 8 scenarios then tested over the entire 50,000 year stochastic series developed during the ILOSLR Study.
c. Cost varies from $6.1 to $29.4 Billion for two new structures and dredging (variation in costs is due to dredging and to improve optimization). This does not include structures needed for Montreal region.
d. Over all lakes, conditions are improved by about 60%, in terms of fewer times outside simulated historical range.
e. With unlimited funding and new structures downstream of Montreal, improvements are possible at every location and for every NBS scenario.

f. **Additional work should include structures-only on both St. Clair and Niagara and Niagara only, subject to the extremely dry scenario (warm-dry) from the ILOSLR Study by July 1st (Bryan Tolson).**
g. Need to link hydraulic considerations to specific structural and dredging requirements to address possible media and public questions about this investigation.
h. Given the economic climate in both countries, recommending additional structures in the Great Lakes will not likely be endorsed by governments. But further study of these could be recommended to handle possible uncertain futures.

Day 3 -

14. AM Plan Requirements & Discussion (Wendy Leger):

a. Elements:
    i. better coordinated monitoring and modelling
    ii. better tracking of conditions
    iii. more efficient info management/ distribution
    iv. better decision making tools
b. Closing the water budget: $400K (annual estimate)
    i. Maintenance of the International gauges will be funded through 2012 by IJC.
    ii. Difficult to say how much support will come from other groups (e.g., GLOS) and agencies (e.g., USGS)
c. Forecasting and climate prediction: $400K (annual estimate)
d. Tracking of system changes: conveyance changes ($500K /survey), GIA (covered by Coordinating Committee), on-going natural shoreline dynamics and human influences (physical changes to the system) – some recommendations will be provided, but no cost estimates as this is primarily outside the mandate of the IJC.
e. Info management and distribution: GLERL is developing a data visualization system; GLOS developing a Great Lakes "desktop" viewer. These are possible opportunities that could be built upon.
    i. Estimated annual cost: $200K.
f. Tools:
    i. Maintaining/ updating plan development and evaluation tools, etc.
    ii. Protocol
    iii. Estimated annual cost: $225K
g. Governance:
    i. Option 1: AM Committee supporting Lake Superior Board of Control – too limited
    ii. Option 2: Expand mandate of the Coordinating Committee – mixed reaction
    iii. Option 3: Create a Great Lakes Water Quantity Advisory Board
        1. Reps from each Control Board
        2. Reports to the IJC
        3. Provide on-going advice to Boards and IJC
        4. Could include reps from Coordinating Committee, Great Lakes Water Quality Board, etc.
        5. If this option is endorsed, further development will continue through March 2012 and beyond Study completion. Study Board endorsed this option with further refinement.

h. Total annual cost approximately $1.5 to $2M. (based on preliminary estimates)
i. Next steps: **Continue to scope out details for each element focusing on governance option 3 and break down cost estimates for U.S. and Canada (Wendy Leger and Jacob Bruxer)**

15. PIAG Summer Meeting Handout (Ted Yuzyk):

a. Concerned that it's indicating to the public that we can actually do something.
b. Need to stress GIA.
c. Need to mention why we're not considering new structures.
d. Need to stress that there is a great deal of uncertainty regarding future water supplies – apparent trends toward lower levels – include historic as well as the ensemble of the hydrologic scenarios that have been investigated (graphic).
e. Include graphic that shows balance and bias as part of the SVM section.
f. Need comments by the first week of July.

16. Communications (John Nevin):

a. Include animation of GIA and relativity between outflows between Lakes Superior and Michigan-Huron.
b. An educational video would be helpful, but likely too costly to produce for the Study.
c. Presentation:
    i. Key messages:
        1. Here's what we can do with regulation
        2. Here are the other things we've looked at
        3. Climate change investigation and the uncertainty about further conditions
    ii. Shouldn't be more than 20 minutes
        1. 10 minutes to regulation
        2. 5 minutes each to restoration and multi-lake regulation

17. Summer Public Meetings (John Nevin):

a. June 18 – meeting with Roger Smithe, Great Lakes Coalition in Michigan. A press release will be prepared if Roger wants.
b. Week of July 18th:
    i. Door County (Sturgeon Bay near Green Bay) –Mon., July 18th
    ii. Milwaukee (UWM-Great Lakes Water Institute) – Tues., July 19th
    iii. Chicago (CZ11 Conference) – Could give a presentation at Shedd Aquarium reception on Wed., July 20th, but cost ($3,000) is prohibitive, so won't be held. Thurs., July 21st special IUGLS session including Tony, Scudder, Jen Read and Mike Shantz. No public meeting will be held in Chicago.
    iv. Study reps include Gene and Tony and could include Scudder, Bill Werick or Debbie Lee.
c. Week of July 25th – Lake St. Clair, Toledo, Sarnia, Muskegon
    i. Toledo, (7pm, Weds., July 27th)
    ii. Lake St. Clair (7pm, Thurs., July 28th)
    iii. Muskegon (10am, Sat., July 30th)
    iv. Study reps again include Gene and Tony and could also include Scudder, Bill Werick and Debbie Lee.
d. Week of August 1st – Georgian Bay (2)

i. Sarnia (7pm, Tues., August 2nd)
ii. Collingwood (7pm, Weds., August 3rd)
iii. Midland (7pm, Thurs., August 4th)
iv. Manitoulin/Kagawong (10am, Sat., August 6th)
v. Study reps include Ted and Syed and Jacob and Wendy.

e. Week of August 8th – Thunder Bay and Sault Ste Marie, Ontario and Duluth, MN.
i. Duluth (7pm, Tues., August 9)
ii. Sault Ste Marie (7pm, Weds., August 10)
iii. Thunder Bay (7pm, Thurs., August 11)
iv. Study reps Ted, Gene, Syed and David Fay.

f. Meeting publicity:
i. Postcards to constituency groups
ii. Facebook advertising
iii. Newspaper insert
iv. Newspaper ads
v. Radio advertising
vi. "Earned" media (interviews)

g. Timeline:
i. June 15th – announce meeting schedule
ii. June 30th – finalize insert/handout
iii. July 7 – 28 – insert appears in newspapers

18. Schedule of Meetings:

a. Study Team meeting: July 6-7 in Burlington
b. SVAT Meeting: August 23-25 in Burlington
c. PIAG Meeting: August 31st in Romulus, MI at Sheraton Detroit Metro Airport
d. 21st Study Board Meeting: Sept. 20-22 in Chicago, IL at Homewood Suites
e. PIAG Meeting on October 18, IJC Appearance on October 19 in Ottawa
f. 22nd Study Board Meeting: December 6-7 in Windsor

Attachment 1

Study Board Meeting #20

Tuesday, June 7, 2011 – Thursday, June 9, 2011

Niagara Falls Marriott – Room (TBC)

6740 Fallsview Blvd., Niagara Falls, Ontario, Canada, L2G 3W6.

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

Objectives (from Strategy except #3):

1. *Agree on a complete draft **regulation plan** position including three good plans*
2. *Agree on a draft **AM strategy***
3. *Agree on the Board's **Draft Findings on Climate Uncertainty***
4. *Outline and critically analyze a rationale for explaining restoration and multi-lake regulation vs. local adaptation for climate change adaptation*
5. *Approve content for **public meetings** and roles and responsibilities*

DRAFT AGENDA

Day 1 – Tuesday June 7th

Item	Time	Topic	Lead
0	0830-900	Arrivals	
1	0900	Welcome/ Review & Approve Agenda	Yuzyk
2	0915	Debrief on Restoration	Stakhiv
1000 - 1020		**Health Break**	
3	1020	Superior Regulation Plans	Werick and Fay
1145 – 1230		**Lunch**	
4	1230	Board Captains Reports on Superior Regulation - IERM	Bredin
5	1330	Board Captains Report on Superior Regulation – Robustness and Climate Uncertainty and peer review	Burn and Bruce
1430 - 1445		**Health Break**	
6	1445	Board Captains Report on Superior Regulation – Hydropower and peer review	Bulkley
7	1530	Other Stamps of Approval (Coastal, Navigation, M&I, Recreational Boating) and peer review	Werick
8	1615	Board Captains Report on Overall confidence in the decision	Boland
9	1700	Peer Review summary	Moin
	1730	**End of Day 1**	

Day 2 – Wednesday, June 8th

Item	Time	Topic	Lead
10	0830	Board Discussion with Study Team on Superior Regulation	Stakhiv
	1000 – 1015	**Health Break**	
11	1015	Board Meeting on Superior Regulation	Yuzyk and Stakhiv
	1145 - 1245	**Lunch**	
12	1245	Board Meeting on Superior Regulation	Yuzyk & Stakhiv
13	1400	Board Decision on Superior Regulation	Yuzyk and Stakhiv
	1445 - 1500	**Health Break**	
14	1500	Multi-lake Regulation Findings	Tolson
15	1600	Board Decision on Multi-Lake	Stakhiv and Yuzyk
16	1700	Final Report project management	Yuzyk/Moin
	1730	**End of Day 2**	

Day 3 – Thursday, June 9th

Item	Time	Topic	Lead
17	0830	IUGLS AM plan requirements & discussion	Leger & Read
18	0915	AM Board discussion	Yuzyk/Stakhiv
	1000 – 1015	**Health Break**	
19	1015	PIAG summer meeting handout	Yuzyk & Shillington
20	1115	Presentation content on public meetings	Eberhardt
	1145 - 1245	**Lunch**	
22	1245	Communications game plan for public meetings	Nevin
23	1315	Board project management discussion • Reports • Meetings • Unfinished business	Stakhiv Nevin
24	1415	Closing considerations	Yuzyk
	1500	**End of the Study Board Meeting #20**	

Action Items from 20th Study Board Meeting – Niagara Fall, Ontario

No.	Description of Action Item:	Action Lead:	Due by:
1	Prepare a graphic on GIA based on information from Chuck Southam.	Jacob Bruxer	Before summer meetings
2	Prepare description of all the modelling that's been done – a summary – for Board comment to assist with summer meetings.	Bill Werick	Before summer meetings
3	Determine if ecosystem PI captures conditions around Georgian Bay wetlands	Scudder Mackey	Before summer meetings – affirmed.
4	Clarification of hydropower pricing/ PI	David Fay to Jonathan Bulkley	TBD
5	Multi-lake regulation: Additional work to include structures-only on both St. Clair and Niagara and Niagara only, subject to the extremely dry scenario (warm-dry) from the ILOSLR Study.	Bryan Tolson	July 1st
6	Continue to scope out details for each element focusing on adaptive management governance option 3 and break down cost estimates for U.S. and Canada.	Wendy Leger and Jacob Bruxer	On-going
7	Finalize handout for public meetings	John Nevin/ Jeff Kart	June 30th
8			
9			
10			