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Report from Sierra Club Ontario's Great Lakes section member Bill Bialkowski, an engineer with extensive professional experience dealing with flow dynamics

Summary

On May 26, 2011 the IUGLS issued its report "Options for Restoring Lake Michigan-Huron Water Levels", which was carried at the specific request of the IJC. It is based on a simulation of the upper Great lakes from Sault Ste Marie to the Port of Montreal. The report confirms that it is feasible to restore the levels of Lake MH by 10, 25, 40 or 50 cm, the four scenarios requested by the IJC, and that if the conveyance capacity could be reduced instantaneously, it would take Lake MH about 10 years to 'fill' to the required level. In the meantime there would be temporary reductions in the downstream flows, and this would have short term impacts on downstream interests. The downstream impacts can be lessened by staging the conveyance capacity reductions over time. The IUGLS chose to have five small 'projects' staged every five years, hence taking 20 years to complete.

The downstream impacts are listed in the report's Table 3-3 and include both instantaneous and staged results for all four scenarios. The results list surprising large and unexpected downstream impacts as far down as the level at the Port of Montreal, for which level reductions of 25 and 19 cm are listed. There are very large reductions in flow below Lake Ontario due apparently to the way the Lake Ontario regulation Plan 1958DD works. A careful analysis of the simulation graphs reproduced a set of equivalent level and flow results. None of the values claimed in Ref 1 Table 3-3 agree with the graphical results. All the Table 3-3 results are bigger by amounts ranging from 20% to as large as a factor of about 7. As an illustration Figure E1 below shows the level at the Port of Montreal – a graph reproduced from the IUGLS report. The values for various instantaneous and staged changes have been superimposed on the graph. Those claimed in Table 3-3 are superimposed in red, while the graphically derived values are superimposed in blue. It is quite easy to judge the relative accuracy of these results relative to the graph vertical scale (note: while the discussion is in cm, the graph is in metres, hence 0.24 means 24 cm, while 0.2 means 20 cm).

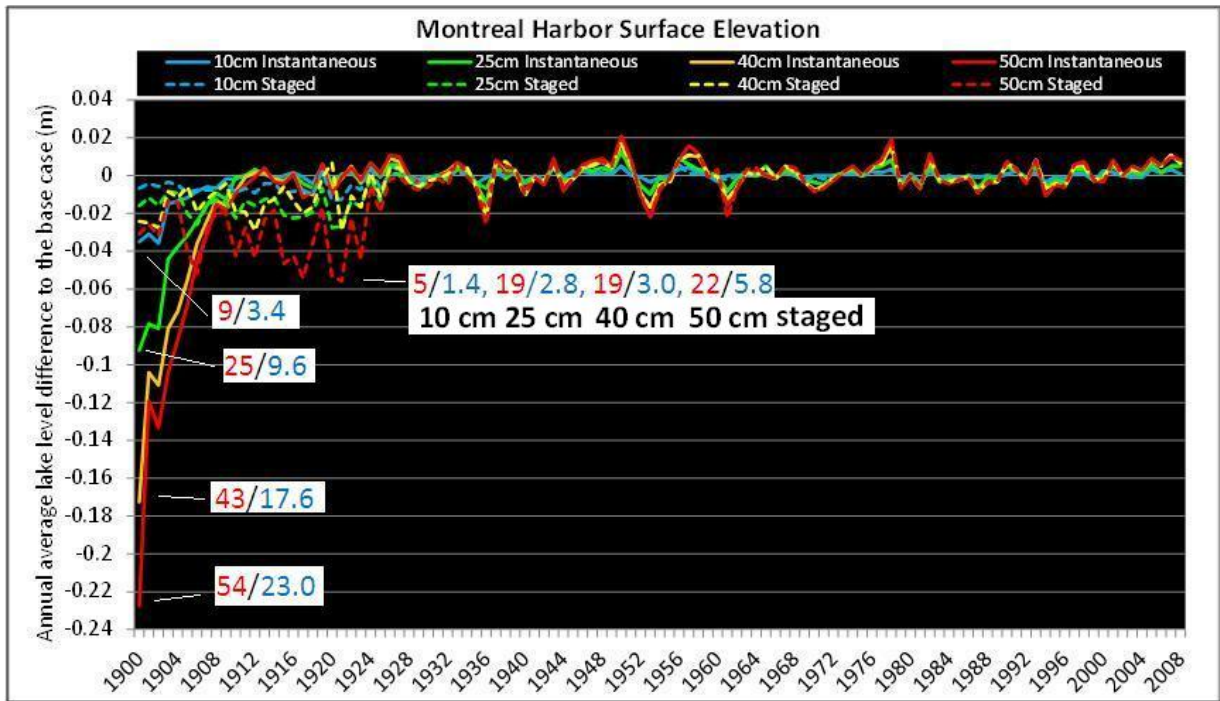


Figure E1: level at Jetty 1, Port of Montreal from IUGLS report Fig 3-12. For restoration values of 10, 25, 40 & 50 cm the Table 3-3 and independently derived graphical values are: a) instantaneous: 9/3.4, 25/9.6, 43/17.6, 54/23.0, and b) staged: 5/1.4, 19/2.8, 19/3.0, 22/5.8. Note all Table 3-3 values are higher than graphically derived values (some are actually off-scale on the graph). The 25 cm and 40 cm restoration staged results both claim 19 cm, while their graphical values of 2.8 and 3.0 cm.

The table below summarizes all of the results and claims using the same colour code: red for IUGLSB RR table 3-3 and text, and blue for actual graphical result.

Table 2 comparison of Ref 1 Table 3-3 with graphs

		Levels (cm)				Flows cms			
Restoration Scenario		LSC	LER	LON	Jett1-Mtl	SCR	DR	ER out	ON out
10 cm	Instant TBL 3-3	7	5	3	9	145	127	96	190
	from graph	5.7	4.2	0.3	3.4	114	116	88	80
	Staged TBL 3-3	2	2	3	5	55	49	29	115
25 cm	from graph	1.4	1.0	0.3	1.4	30	28	23	24
	Instant TBL 3-3	16	12	4	25	351	310	240	540
	from graph	13.7	10.5	1.6	9.6	283	269	221	208
40 cm	Staged TBL 3-3	5	4	4	19	135	119	72	392
	from graph	4.0	2.7	2.1	2.8	80	76	65	56
	Instant TBL 3-3	24	19	10	43	541	483	379	937
50 cm	from graph	21.3	16.9	7.4	17.6	436	430	358	320
	Staged TBL 3-3	8	6	6	19	214	190	116	392
	from graph	6.4	4.0	3.6	3.0	131	132	95	84
50 cm	Instant TBL 3-3	30	23	14	54	664	595	470	1157
	from graph	26.9	21.5	10.0	23.0	550	534	450	500
	Staged TBL 3-3	10	7	8	22	265	235	145	465
	from graph	8.5	5.6	4.5	5.8	165	161	126	120

The largest values are applied to the Port of Montreal and the Lake Ontario outflow. Undoubtedly, the IUGLS has a perfectly logical explanation for these differences; however, the report does not reveal this. Perhaps the IUGLS will explain this at the public meetings.