Chapter 5: St. Clair River Hydraulic Regime – Dr. B. Barkdoll Comments and Study Response

The study is well done overall considering the lack of historical data involving many various types of analysis. The limitations of each approach are given. The following points need to be addressed.

Page 107. Change "AVM technology is still relatively new, and a meter recently installed in the St. Clair River in 2008." to "AVM technology is still relatively new, and a meter was recently installed in the St. Clair River in 2008."

> The text has been revised.

In Section 5.3.1 nothing is said about conveyance changes in Reaches 2, 3, and 5. Why wasn't conveyance analyzed in these reaches?

> Statistically significant conveyance change was noted in the reaches identified. Reaches 3 and 5 did not show statistically significant changes in conveyance. Reach 2 was not explicitly analyzed by Holtschlag, *et. al*., but they did analyze reaches 2.1 and 2.2 that are sub reaches of reach 2 and noted conveyance change.

Comment on why conveyance increased in some reaches but decreased in others.

> Determination of whether the conveyance increased or decreased in particular reaches was made based on the sign of the slope (change in water level fall) of the reach. No speculation as to the cause of the conveyance change was provided by the investigators.

Page 110. Change "This lake level fall analysis used water levels recorded at the Harbor Beach. MI (HB) on Lake Michigan-Huron, St. Clair Shores, MI (SCS) on Lake St. Clair, and Cleveland, OH (CLE) on Lake Erie." to "This lake level fall analysis used water levels recorded at the Harbor Beach, MI (HB) on Lake Michigan-Huron, St. Clair Shores, MI (SCS) on Lake St. Clair, and Cleveland, OH (CLE) on Lake Erie."

> The text has been revised.

In Section 5.3.2 it is unclear what the difference was between the two datasets used by Bruxer (2009). The italics is only in part of the word "measurements" and there is no corresponding italics in the sentence describing Dataset 2. In addition there is no mention of discharge values for Dataset 2.

> The italics have been amended. There is intentionally no mention of discharge values in Dataset 2.

P. 114. It seems that the statement "Bennion found that the volumetric analysis results, however, did not exceed the error threshold associated with the dataset comparisons, and so

these can be used only anecdotally and not as any firm measures of change." contradicts itself since not exceeding error threshold would make the data more accurate and therefore usable.

> Because the change in volume computed by Bennion did not exceed the change in volume that would be computed using only the error in the bathymetry surface, they are insignificant. A change in volume that is greater than what would be computed using the error thresholds in the dataset is significant.

Throughout the chapter, capitalize the word 'section' if it refers to a specific section, such as Section 5.3. Do not capitalize otherwise.

> Further editing of the document has removed these types of inconsistencies.

Figs. 5-9 and 5-10 seem to contradict the well-known secondary current the form on a bend in which the near-surface velocity is towards the outside of the bend and dives downward along the outside river bend inducing erosion, and back along the riverbed. Please check and explain.

> These are plots of raw velocity data. In Figure 5-9, the velocities are accelerating towards the centre of the channel due to the funneling (transition) of the water from Lake to River. Figure 5-10 begins to show some of the secondary current. Figures 12 shows the secondary flow patterns the reviewer is referring to.

Please describe the uncertainty analysis in more detail, such as the assumed probability distributions and analysis procedure.

> Additional detail can be found in the project report by Bruxer and Thompson (2009).

P. 135. Change "The HPG-based flows generally are higher than the presently coordinated by the ad-hoc Coordinating Committee on the Great Lakes Hydraulics and Hydrology (Figure 5-19), particularly when water levels on Lake Michigan-Huron are low." to "The HPG-based flows generally are higher than those presently coordinated by the ad-hoc Coordinating Committee on the Great Lakes Hydraulics and Hydrology (Figure 5-19), particularly when water levels on Lake Michigan-Huron are low."

> Text has been revised.

Page 139-140. The last parenthesis is not balanced in the sentence: "The apparent effects of GIA result from using water levels recorded at gauges on a lake located away from the lake's outlet (i.e., Harbor Beach-Cleveland) versus gauges located at or very close to the outlets that is, Lakeport-Buffalo)."

> Text has been revised.

In Section 5.6.5, change "Based on four pairs of gauges, it appears that the Parry Sound, ON area is uplifting at a rate of 80.6 cm (31.7 in) a century with respect Cleveland, while

difference between Milwaukee, WI and Buffalo is the shallowest at 16.3 cm (6.4 in) a century." to "Based on four pairs of gauges, it appears that the Parry Sound, ON area is uplifting at a rate of 80.6 cm (31.7 in) a century with respect to Cleveland, while difference between Milwaukee, WI and Buffalo is the shallowest at 16.3 cm (6.4 in) a century.".

Page 148. The sentence "Depending upon the relative uplift or subsidence of the Buffalo gauge with respect to the Lakeport gauge on account of GIA could be offsetting as much as 1.4 cm (0.6 inches), or contributing up to 0.9 cm (0.4 inches) of the reduction in the head difference between Lake Michigan-Huron and Lake Erie head difference since 1962." is unclear. There seems to be something missing.

The points noted in this peer review for Section 5.6 on Glacial Isostatic Adjustment (p139) are addressed in the new Chapter 6 of the final report as GIA required its own Chapter. All the points raised in the peer review are acknowledged and the text in the Chapter reflects the suggestions made in the review.