Chapter 6: Hydroclimatic Conditions and Patterns – E. Loucks Comments and Study Response

Specific comments:

The objective is clear but the manner in which the analysis responds to the science question is not clear.

> The Chapter has undergone major structural changes and addressed in a more comprehensive manner the core science and auxiliary questions. During the summer months a major re-analysis was undertaken to focus on the period of interest, rationalizing the decline in water levels to a potential suite of causal factors and their relative magnitude. This re-analysis, along with some further analyses has greatly helped to improve this Chapter.

Similarly, the methods are appropriate and sufficient but the Chapter does not present a logical progression of results leading to a specific answer to the science question. Section 6.1.3 should be rewritten to accomplish this. It should probably precede section 6.1.2 as the issue of uncertainty in the supplies should not affect the approach. Figure 6-1 should be in the NBS section. Section 6.1.3 is too preoccupied with technical issues rather than how the available data and models will be used to answer the science question.

> As noted above, concerns of the reviewers, such as these, were the drivers in redesigning and re-writing of the new Chapter 7 in the final report. The Chapter provides more logical framework for address the key science question. Chapter 6 of the draft report was renumbered to chapter 7 in the final report and addresses the point raised above on the use of available data to answer the hydroclimatology contribution to the decline water levels.

The question is clearly answered and well-supported for the 1996-2005 period, but this is not the stated objective. Isn't the real answer that the M-H to Erie Fall varies with Climate and is reduced during dry periods? Any change in the relationship between climate and fall would have to be physical and would have been covered in chapters 4 and 5.

> The revisions now focus on both periods, the full period to isolate the impact of conveyance changes and the more recent period (1996 to 2005) to highlight the effect of hydroclimatic factors on the recent water levels in Lake Michigan-Huron. The Study threaded through four chapters, sediment, hydraulics, GIA and hydroclimatology to quantify and apportion the decline to these key contributing factors.

Results are presented in terms of both residual and component NBS. Is one better than the other or are they equally valid within measurement and estimation uncertainty? Should a bold decision be made to select one or to use their average to cut down on confusion? The differences could be quantified in the uncertainty analysis.

> Some of the analysis from this part of the Study is intended to be carried into the next part of the Study. The challenge for the Study is the size of the lakes and basin; it becomes necessary to converge on analysis from a number of different postulations. The Study is of the opinion that unless and until we have a good basis of observations that are complimented with the new tools in modelling, there is need to continue on rationalizing the differences between the residual and component methods. The Study has invested in using RCM to help understand the inter-connections, the impact of recycling of water budget within the catchment, etc. Further, residual-based calculations are the basis for the stochastic analysis that will be critical in the next part of the Study.

Analysis is very difficult to follow due to the lack of a roadmap to the analysis.

> The major rewrite of the chapter has addressed this issue.

Figures generally informative and useful but there are many inconsistencies in format particularly with regard to NBS. Figure 6-3 is in units of mm while 6-7 and 6-9 are in cms. The introduction in Section 6.1.2 states that NBS in expressed in cms-months. There are too many significant figures shown in the equations of Figure 6-9 and the data in Table 6-6. Table 6-4 and Figures 6-14 and 6-15 are also inconsistent in their units of measurement. In Figure 6-12, the content of the blue boxes is not explained. Table 6-1 contains the unclear labels HGB, MHG and MIC.

> All final figures and tables' quality have been changed to publication standard. The display of units has been standardized and all acronyms are defined when first mentioned in the text.

Some organizational improvements would greatly improve quality.

> The major rewrite has greatly improved the flow and readability of this Chapter.