

Manuscript: Restoration Analysis: Lake Michigan-Huron Water Levels

Author(s): IUGLS Study Team

Name of Reviewer: R. A. Halliday, P. Eng.

1. Are the objectives of the work clearly stated? 1 2 **3** 4 5
2. Are the methods employed valid, appropriate and sufficient to address the questions, hypotheses or the problem? 1 **2** 3 4 5
3. Are the observations, conclusions and recommendations supported by the material presented in the manuscript (e.g., data, model and analyses)? 1 **2** 3 4 5
4. Are the assumptions used valid and are the mathematics presented correct? 1 **2** 3 4 5
5. Is the manuscript well organized, material precise and to the point, and clearly written using correct grammar and syntax? 1 **2** 3 4 5
6. Are all of the figures and tables useful, clear, and necessary? 1 2 **3** 4 5
7. What is the quality of the overall work? 1 **2** 3 4 5

Recommendation (please circle your response)

A - acceptable

B - acceptable with suggestions for revision

C - acceptable if adequately revised

D - unacceptable

If you have selected **C**, do you wish to receive the revised manuscript for further review?

yes no

Rating (Circle the rating you would like to give this manuscript. Unacceptable work should be given a score of 40 or less.)

100 90 **80** 70 60 50 40 30 20 10 0

General

This report meets the intent of the IJC direction to the International Great Lakes Study Team aimed at providing an exploratory level of detail on options for restoring Lake Michigan-Huron water levels. As such, it does not provide recommendations. The report flows logically through restoration scenarios, effects on various interests, specific structural measures, environmental effects, and institutional matters. The following detailed comments should be taken in that context.

The report contains numerous acronyms and, although the authors are reasonably careful to define them as they occur, it would be useful to list them in the report. Some of the figures are excellent while others are marginally legible. They should be improved in the final reports. To the extent possible, the format of figures and tables should be consistent. Although the report uses SI metric units for the most part, there are occasional lapses into English only units, especially in Chapter 5.

Detailed Comments

Executive Summary – The summary seems very terse. Inclusion of a more detail. A summary table along the lines of 8.1 would be useful.

1 – Introduction. Although the introduction provides background and quotes the direction received from the IJC, it would benefit from an explicit statement of purpose for the report.

2.2.3 – Second bullet. This sweeping statement should be qualified in some way. Would all of the other methods implied count on adjusting either the depth or width of the channel? As such, they would be simply variations on a theme that is well-documented in the report. What other possibilities, if any, exist?

2.2.3 – Fifth bullet. Just to add clarity, it could be noted that the costs are overnight costs; then add the caveats.

2.2.6 – The introductory paragraph to 2.2 mentions “broader factors”, identifying two for discussion. Is 2.2.6 considered a third broader factor? Are there others that the authors could identify?

Chapter 3. The restoration modelling approach used is reasonable given the exploratory nature of this report. The authors could consider emphasizing, perhaps in 3.5, that results should not be taken to imply that any single structures may be constructed that would provide water level restoration as high as 50 cm.

3.4 – First paragraph. The references to sections 3.6.1, 3.6.2 and 3.6.3 are incorrect. Should be 3.4 etc.

Figure 3.9 – caption – Welland

4.2 – Note typos in last sentence of first paragraph – 50 RI and 50 RS.

4.4.1.2 – This section attempts to combine a discussion of permanent changes in generation at St. Marys with temporary changes downstream of Lake Erie with mixed success. Table 4.7, particularly, is problematic. One approach may be to calculate losses over a specified time period, say 30 years.

Table 4-8 – In light of the previous comment this table and other similar tables should be labeled “Annual Benefits ...” or “Total Benefits ...”, as appropriate. The units should also be indicated.

4.3.3.1 – Paragraph 3, re description of SAT. Do the 25 shoreline segments encompass the entire shoreline of the two lakes, or are they simply a sample? (Figure 4-13 implies a sample.) If they are a sample, what is the sampling methodology?

4.4.4 – The approach taken is reasonable and the findings are appropriate. As indicated in the peer review of the IERM report, however, the transition from 34 performance indicators to the Zone A, B, C methodology is not clear. If that report is revised based on the peer review, some of the changes should migrate to this report.

4.4.5 – This section is presumably based on the recreational boating report, which is undergoing peer review. Since that report describes the findings related to only 17 zones around the lakes, the authors need to be careful to avoid leaving the impression that information can be provided for all facilities on the lakes. This is particularly true, as the degree to which the 17 zones represent the entire population is not known. An explanatory comment in 4.4.5.1 would be in order.

This clarification does not affect the overall finding that water level restoration is beneficial. The text related to Figures 4-18 and 4-19 and to Table 4-20 should be revised to indicate that the findings relate only to a sample, not to the entire lakes.

5.3 – Page 79, first paragraph, last sentence. Based on the authors’ judgment, can they indicate a possible upper limit of restoration? That is, is a 50 cm restoration using a combination of structures a reasonable scenario?

5.4.1 – Last paragraph. Syntax problem in third sentence.

5.4.3 – First two sentences. Just to be clear, the sills were tested in the physical model, I assume.

5.8 – In view of the discussion earlier in the report of instantaneous and staged restoration, it might be useful for the reader if a nominal duration of construction for each of the four options were provided. It would be understood that staging the construction would extend this time.

5.10 – It would be useful to include a table indicating the approximate cost and the range of restoration/regulation provided by each of the four alternatives.

6 – There is a passing reference to effects of one project on the ice regime in section 5 of this report. Although it could be considered beyond the scope of an exploratory report, it would be useful to flag that further more detailed studies should investigate the effects of any proposed structures on the ice regime of the system. This could include changes in frazil ice generation in the St Clair River, ice jam frequency, and ice effects on structures.

6.5 – First paragraph. Several sentences are duplicated.

6.9 – Summary. A few sentences related to Lake St. Clair should be added.

7.2 – Throughout this report the term restoration has been used. This should be continued rather than using compensating. The latter term is used for the St Marys River, but so be it. There is also potential for confusion with financial compensation, *e.g.* 7.3 and 7.4.

7.4 – Last sentence. Further elaboration is needed. Provide examples of unintended benefits?

7.5.1 – Is the implication that the two federal governments could authorize a structure in boundary waters in such a way that the need for an IJC Order-of-Approval would be obviated correct? Can the authors provide an example?

7.5.2 – Page 137, last paragraph, sixth line. “likely” would be a better word than “possibly”.

7.6 – Last bullet. Would the USACE then be the legal owner of the works? Are any particular authorizations required to allow the extra-territorial construction of works?

8.6 – Table 8.1 – It’s not clear why different thresholds were used in footnotes 3 and 4. For an exploratory report, this implies much greater accuracy of estimation than one would expect and it needlessly complicates the table.