Summary of Responses to
Peer Reviewer Comments Regarding
Low Water Submission
by the Coastal Zone Technical Working Group

Prepared: May 6, 2011

Note: Responses are provided below in red.

Manuscript: Incorporating Impact Assessment for Low Water Conditions on the Great Lakes

Author(s): Coastal Zone Technical Working Group

Name of Reviewer: Peer Reviewer 1

Overall Comments

In summary, the report does an adequate and thorough job in reviewing the literature that could be applied to the economic assessment of implications for low water conditions on the Great Lakes. I would support the overall thrust of the report which recommends the use of the hedonic pricing method (HPM). My comments on the report make some suggestions how the report could be improved to make this case even stronger. For example my comments in the paragraph beginning "Also the effect …", and comments on pages 9, 51, and 54 are intended to strengthen the analyses and conclusions. I also make a recommendation that Contingent Value studies be undertaken at all sites as a check to the HPM results. I understand that this may not be supported by the study budgets that are in place. I would support sharing my comments here and within the attachment with the authors.

Specific Comments

The Peer Review Report (page 76) stated that the hedonic pricing method (HPM) will likely not work to estimate shoreline damages over the range of extreme events. This comment assumed that climate change scenarios would be investigated. The HPM method analyzes property value changes relative to lake level events that have occurred historically. The consideration of climate change would consider lake level scenarios that would be outside of this historical range. This would make it difficult to apply the HPM method.

> RESPONSE: The authors concur with this point of clarification raised by the peer reviewer and acknowledge the potential limitation in applying the HPM for extreme (unobserved) conditions. Further clarification has been added in the text of the low water summary (Section 4.2, page 14) to specify the potential issue of applying the HPM outside the historical range.

It appears from the Summary report that the perspective of the studies will be to investigate the implications of low water events that have been experienced. In this case, the methods investigated in the report (except benefit transfer) are all suitable candidates as economic models to address the implications of low water on shoreline property and activities. The Summary Report recommends the use of the HPM in a number of test sites. The HPM model does have merit and potential for this application, and the overall working group report provides useful background information for the development of an HPM model.

RESPONSE: No specific response required.

The principal comment on the use of HPM relates to the discussion on pages 157 through 163. The test model estimated in the "Simplified HPM Approach" (page 157 and 158) section found no significant impact of water level and the unemployment rate on sales price of property. This is likely due to a limited time series data set long enough to capture these effects.

RESPONSE: The authors concur with the suggestion that the time series data set used in the "simplified HPM approach" may not be long enough to capture the expected effects. This has been noted in the low water summary text in Section 4.6, page 18.

On pages 161 and 162, the discussion of the "Time Series Analysis Method" concluded that there is not a strong relationship between home prices and lake levels from 2001 to 2010. An average price trend masks the mix of the types of home sold during each period. This is exactly what the HPM model does, as it incorporates the effects of a changing mix of housing types and characteristics.

RESPONSE: The authors acknowledge that assumptions used in the initial "Time Series Analysis Method" including the use of average price trend may influence the outcome of the results. However, as identified by the peer reviewer, some of these assumptions may be better addressed in a HPM model. Since the Study Board and Coastal Zone TWG have agreed to move forward in testing a HPM, the peer reviewer's comment does not change the overall conclusions within the report. If anything, they provide further support for the decision to continue testing a quantitative method. The limitation of the initial test in terms of predicting the applicability of the HPM has been noted in the text in Section 5.0, page 19.

Also the effect of changing economic conditions should be included in a time series HPM model. The time series model that was estimated did not take changing economic conditions into account in explaining the housing sales price trend. The unemployment rate as suggested in the model of pages 157 and 158 would be suitable for this purpose, and perhaps the 30 year mortgage rate might also be important in affecting sales price over time. The recommendation is to recalibrate the model on pagers 157 and 158 on a time series basis, including lake level, the unemployment rate, and the 30 year mortgage rate. Some investigation should be made to ensure that the 30 year mortgage rate is appropriate for recreation property.

RESPONSE: The authors concur that changing economic conditions should be included in a time series HPM model. This was identified in the low water submission under Section 5.0 where general economic conditions and those of the overall housing market were highlighted as items requiring further consideration. Since work has been initiated on the HPM model for test sites, the peer reviewer's suggestion for testing the unemployment rate and long-term mortgage rates will

be incorporated into that effort (as opposed to modifying the simplified approach tested and discussed in Appendix G).

In reviewing the Baird Low Water Theme Report, it appears that there are two general types of low water impacts on shoreline property. Regions with shallow inshore bathymetry will experience negative effects for property values as for example boat docks become inoperable and mud flats appear. Regions with steep near shore conditions can result in wider beaches and positive effects for shoreline property. The study sites chosen (page 156) appear to embrace both conditions. The Saginaw Bay and Canadian (Windsor) sites would appear to be candidates for the first group, and the Holland and Saginaw Bay sites for the second group. The hypothesis would be that lake levels would result in a negative impact on property values for the first group, and a positive impact for the second group.

RESPONSE: Some modification has been made to the test sites as part of the HPM work recently initiated. The primary sites right now are Duluth (Lake Superior), Wayne and Macomb Counties on Lake St. Clair, and a portion of southeastern Georgian Bay. The selected sites continue to address the hypothesis identified by the peer reviewer, specifically that areas with shallow bathymetry may be more sensitive to low water conditions.

It is also recommended that a Contingent Value (CV) study be undertaken at all sites as a check and balance to the HPM model results. CV study has the theoretical advantage that the method is able to estimate consumer's surplus, the value of housing services above market price, and the method is able to capture the impacts experienced by people who do not own shoreline property. It is proposed that photographs of "normal" and episodes of low water events be used in interviews with respondents to assess willingness to pay to achieve normal conditions for first group sites, and willingness to accept compensation to achieve normal conditions for second group sites.

RESPONSE: At the moment, there are limited study funds or time available to undertake a CV study at the HPM test sites. However, the approach may be possible within an adaptive management framework for follow up work to the study. The results from the HPM test sites are recognized to cover only a small section of shoreline and given the interest in this issue from shoreline property owners, the Coastal Zone TWG should highlight opportunities for future research in this area. The potential for a CV method to consider shoreline users who do not actually own property along the shoreline (as identified by the peer reviewer) would be a helpful addition to the low water impact analysis. At the moment, the priority remains the testing of a HPM. Should the HPM prove to be inadequate empirically, and the stakeholders feel that further insight into how the public values low water events is still needed, then CVM could be recommended as a follow up to the study.

It should be noted the Coastal Zone TWG members had considered a CV approach as part of the initial methodology assessment. At the time, such an approach was rejected as a stand-alone method because there was concern that property owner's identified consumer's surplus may not reflect actual responses under such conditions (i.e. a property owner may indicate a much different willingness to pay than is reflected in the actual transaction data). However, there may be merit for pursuing such an approach in the future as a comparison to the HPM results.

The specific comments below are focused upon the content of the overall working group report.

Page 6

Concur with the report conclusions and conclusions for Appendix H that benefit transfer would not provide reliable estimates for shoreline impacts for the Great Lakes. It is unlikely that the match between existing studies and the wide variety of shoreline conditions on the Great Lakes would be a good one. If benefit transfer was considered, there would be large costs associated with studying shoreline conditions both at the existing study sites and potential Great Lakes sites contemplated for benefit transfer.

RESPONSE: No specific response required.

Page 9

The scope of work outlined in points (1) to (4) should be modified to developing a time-series oriented HPM model as outlined above.

RESPONSE: The comment will be incorporated into the HPM test site analysis currently being undertaken.

Page 51, Application of the Hedonic Price Method

Other neighborhood characteristics that could affect the selling price of home include socio-economic status of the neighborhood such as income level and occupational profile.

RESPONSE: The suggestions have been added to the text in the 'Application of the Hedonic Price Method' within Appendix A. It is expected that location and time-related market impacts will come into play through the HPM and the contractor will have to control accordingly. This can be done through sampling, or stratifying the population.

Page 54, Issues and Limitations (Hedonic Price Method)

"the housing market may be affected by outside influences, like taxes, interest rates, or other factors." The HPM model specification could test for the influence of taxes and interest rates directly. Other outside influences should be determined through research on the community development from say local newspapers and contacting real estate agents about any unique issues affecting the property market during the period of investigation.

RESPONSE: No specific changes have been made to the text but the suggestion from the peer reviewer will be incorporated into the HPM test site analysis. It is expected that location and time-related market impacts will come into play through the HPM and the contractor will have to control accordingly. This can be done through sampling, or stratifying the population.

Page 59, Issues and Limitations of the Travel Cost Method (TCM)
The TCM cannot be used for issues where travel is not directly involved. The TCM is useful at sites at which daily or weekly visitation is involved, such as open access beaches or shoreline parks. It cannot be used for owner occupied shoreline property. The TCM could work for nonresidents who occupy shoreline homes on a rental/seasonal basis. The TCM method also does not capture the full consumer's surplus of a trip to a site. Travel and trip costs are a minimum value of the recreational experience.

RESPONSE: These items have been added within the last bullet of "Issues and Limitations of the Travel Cost Method (TCM)" within Appendix A.

Page 65, advantages of the Contingent Valuation (CV) Method
The CV Method measures consumer's surplus associated with use value. The HPM and TCM do not capture consumer's surplus.

RESPONSE: These items have been added within the last bullet of "Advantages of the Contingent Valuation (CV) Method" section within Appendix A.

Page 110
"Given the vast geography and range of shoreline conditions (e.g. geology, near shore slope, and wave exposure) it is possible that the impacts of low water on property values will vary throughout the system." Concur. The results of the HPM studies at four sites may be able to be indicative of damages in other regions only after careful consideration of similarity of site characteristics, and as well community characteristics and economic conditions.

RESPONSE: A further comment has been added in Section 4.6, page 18 of the summary text noting that the test sites are mainly to test methodologies and the results cannot be extrapolated to other shoreline areas without careful consideration of shoreline conditions.

Page 111
"..further studies should focus on a wide range of shore types and land uses throughout the study area." Following the comment for page 110, if an assessment of the range of shore types is completed, this would provide guidance to future HPM studies to address unique circumstances not captured at the initial four sites.

RESPONSE: As part of the current test site HPM analysis, an effort is being made to identify lessons learned. Part of this effort will include the identification of

critical shoreline features based on the HPM that could be used for further assessment and classification of the shoreline to allow generalization of results.

Page 119 and 120 – Real Estate Professionals Survey

These two pages provide very useful guidance in developing variables to quantify the feature behind the value of shoreline property, in the calibration of an HPM. For example, a home on a cliff is less valued than one on beach, and the quality of view. These will provide clues and starting points for variable selection at the four study sites.

RESPONSE: These will be incorporated into the HPM analysis currently underway.

Manuscript: _Incorporating Impact Assessment for Low Water Conditions on the Upper Great Lakes.

Author(s): _None Listed_____

Name of Reviewer: Peer Reviewer 2

Comments (limit responses to one paragraph for each question; reference pages, charts, and data. Please distinguish if responses are of major or minor concerns.)

A. What is the best/most unique part of the analysis?

The best part of the analysis is the observation that the study should consider only the relative changes in water levels that result from the implementation of an alternative management plan, and that those changes will be very small in any case.

RESPONSE: No specific response required.

B. What is the most critical aspect of the study/analysis? Why?

The most critical aspect of the analysis is the decision not to conduct a hedonic study of property values. The rationale offered is that such a study faces data limitations and would take too long to complete. I concur that such a study is unwarranted if any changes in management plans will have barely-measureable effects on water level outcomes. Concerning the hydrologic outcomes, I am taking at face value the author's claims. This report does not document the hydrologic analyses.

RESPONSE: A detailed review of the hydrologic analysis within the International Upper Great Lakes Study is beyond the scope of this summary. However, the authors acknowledge that further demonstration of the 'expected' water level conditions as a result of water level regulation is warranted as the information is critical for informing choices made by the Coastal Zone TWG. The text of the summary has been modified using select of water level regulation plan options relative to the baseline plan to illustrate the potential impacts of regulation.

C. Which aspect of the analysis/modeling is weakest? Why? How can it be improved?

The absence of an empirical investigation is the weakest aspect of the study. If the hydrologic forecasts of minimal effect are true, I do not think this shortcoming requires remedial work.

RESPONSE: No specific response required. However, the authors note that a further empirical study is currently being undertaken to test the development of a hedonic price model at specific test sites.

D. Are there any other suggestions that are related to how this analysis may be used more effectively or the results explicated in a more understandable manner?

The analysis would be more compelling if the hydrologic analyses and their findings were summarized in slightly more detail here in support of the claim that little is to be gained from a hedonic study.

RESPONSE: As noted under item B above, a detailed review of the hydrologic analysis within the International Upper Great Lakes Study is beyond the scope of this summary. However, the authors acknowledge that further demonstration of the 'expected' water level conditions as a result of water level regulation is warranted as the information is critical for informing choices made by the Coastal Zone TWG (and in turn, supporting the peer review assessment of the work). The text of the summary has been modified using a selection of water level regulation plan options relative to the baseline plan to illustrate the potential impacts of regulation.

Please indicate any confidential comments to the Co-Chair(s) of the Independent Peer Review Group in the space below. Comments for transmission to the author(s) should be on a separate sheet attached.

I found the report generally disorienting:

1. *No authors are named*

   RESPONSE: Authors have been identified.

2. *The report presumed contextual knowledge of other aspects of the IUGLS, particularly the analysis of management alternatives and their implications for lake levels*

   RESPONSE: The authors acknowledge the concern raised by the peer reviewer regarding a lack of contextual information. The low water analysis is only a sub-component of the overall water level regulation analysis within the IUGLS and the first resource based peer review product. Documentation of many aspects of the study including a summary of expected water level management options was not available at the time of the low water peer review submission. However, further effort should have been placed on the context of the low water analysis. The text of the introduction has been modified slightly to help with this context. In addition, an attempt has been made to address the specific concern regarding the lack of information on the management alternatives by adding a brief overview of select of water level regulation plan options relative to the baseline plan to illustrate the potential impacts of regulation.

3. *The report consists mainly of appendices; the body of the report is very short*

   RESPONSE: The body of the report was intended to highlight the overall strategy and key decisions of the Coastal Zone TWG related to low water with the appendices representing the overall body of information framing the TWG decisions. While unorthodox, the reporting strategy was undertaken to allow the peer reviewers full

access to the technical guidance supporting the activities. That way, the reviewers could determine whether the approach and information on which the Coastal Zone TWG developed its recommendations was adequate and in turn, whether the overall decisions of the TWG regarding low water impacts are substantiated by the available information.

4. *The appendices seem redundant and add little of substantive importance; they seem designed to document lots of billed hours rather than to provide cogent analysis of the matters at hand.*

   RESPONSE: The body of the report was intended to highlight the overall strategy and key decisions of the Coastal Zone TWG related to low water with the appendices representing the overall body of information framing the TWG decisions. While unorthodox, the reporting strategy was undertaken to allow the peer reviewers full access to the technical guidance supporting the activities. That way, the reviewers could determine whether the approach and information on which the Coastal Zone TWG developed its recommendations was adequate and in turn, whether the overall decisions of the TWG regarding low water impacts are substantiated by the available information.

5. *While I do not think much more time should be spent on this report, I also believe it would benefit from reorganization:*

   a. *Brief statement of the problem at hand and purpose of this report*
   b. *Brief history of work done to date*
   c. *Succinct description and assessment of valuation methods*
   d. *Brief summary of the conclusions and how this report contributes to the broader effort*

   RESPONSE: The authors have reorganized a portion of the report to address the comments from the reviewer. The introduction has been expanded slightly to provide further context of the low water problem being consider within the overall IUGLS regulation plan evaluation. In addition the statement of the problem has been emphasized. Further clarification on the work done to date is provided based on a revision to Section 3 and a description and assessment of the primary valuation methods is provided in Section 4.1 using information from the contractor reports. Finally, a conclusions section has been added which briefly addresses how this report contributes to the broader IUGLS regulation plan evaluation effort.

Comments for Transmission to Authors

It would be useful to have both general comments and specific comments for major and minor revision. Please use additional sheets should they be required.

1. The report might benefit from the following observation: The value of a durable asset, such as real estate, may be thought of as the present value of a stream of expected future services. Due to both intrinsic and extrinsic factors, those future services may be stochastic. Variation may influence the value of the asset. (On pp. 8&9, there are bolded passages indicating that real estate professionals agrees with this premise.) Two assets with identical expected services may be valued differently because one varies less from year to year than the other. Two otherwise-identical homes – one on a shallow-water beach that expands or contracts very significantly with level fluctuations, the other on a more steeply-pitched shoreline with ample depth and modest changes in beach width – may be valued differently.

This picture is further complicated by the potential for correlated risks and myopic decision making. By myopic decision making, I mean that valuations rely on observations of recent water levels rather than the full hydrologic record. Myopic decision makers are likely to overvalue properties favored by recent levels (e.g., erosion-prone properties when lake levels are low; shallow-water properties when lake levels are high) and undervalue properties disadvantaged by recent levels. When the hydrologic cycle reverses, their valuations errors become apparent. By correlated risks, I mean in this case that the stochastic determinants of services are correlated over time. In the case of Great Lakes water levels, the hydrologic record is clear that extended periods of high water follow extended periods of low water (see Baird & Assoc., Low Water Theme Report, p.3). Myopic buyers of property would base their valuation on recent experience. As a result, we should expect cycles in the relative values of lakeside properties. During high-water (low-water) phases, shallow water properties property prices should be high (low) relative to erodible property prices. Such a finding would support the hypothesis of myopic decision-making.

All considered, these observations suggest the difficulty of testing the proposition that low water levels exact an economic cost in the form of reduced property values. First, such a cost probably reflects the failure of the buyer to properly assess water level risks, and pay a lesser price for the property, at the outset. Hence, what is perceived to be a cost to an individual property owner may be a penalty for poor decision making, not a cost to society. Second, while low levels may reduce the services associated with some properties, others may gain in value. The overall economic cost to society is not necessarily negative.

RESPONSE: The authors appreciate the detailed observations provided by the peer reviewer. The observations reflect real issues that need to be considered when relying on property values to indicate potential water level impacts. The fact that there continues to be demand for waterfront property along the Great Lakes despite past experiences of flooding, erosion, and low water impacts, corroborates the suggestion that it may be difficult to test the proposition that low water impacts can exact an economic cost in the form of reduced property values. The comments will be incorporated into the current hedonic price model test site analysis. As well, an abbreviated summary of the above comments have been included under Section 5.0 of the low water report as an acknowledged limitation in undertaking further analysis.

2. I'm not comfortable with the second paragraph on p. 3 (and perhaps, by extension, with P&G, 1983): a) The first two sentences seem pretty much divorced from the remainder of the paragraph; b) Why is it that EIA deals only with "direct effects" and not with property values? In fact, property values should reflect those direct effects. The more vulnerable a property is to storm surges, in principle, the less a buyer should pay for it, recognizing that it is a more costly property to own. I would agree that the direct and derivative effects should not both be included, for then there would be double-counting. But, to say that property values are not included is to undercut a major premise of this report – that the hedonic property value method would be the best way to measure the economic impact of water level changes.

RESPONSE: The P&G (1983) report notes that using direct damages (e.g. in the case of flooding) to evaluate plan options is a practical choice when it is difficult to assess National Economic Development (NED). Given the complex nature and broad geographic scale of the IUGLS, a similar framework is being utilized by focusing on direct damages to support regulation plan evaluation. This is particularly the case for high water impacts as noted in the original text under discussion here. In the context of the overall IUGLS evaluation strategy and the P&G framework, the first practical choice for evaluating plans regarding low water impacts should be a reduction in associated low water property damage. The problem is direct low water property damages have been hard to define. At a minimum, many of the concerns identified by property owners regarding low water are difficult to quantify (e.g. how do you quantify reduced shoreline access due to increased vegetation growth along a stretch of shoreline?). As a result, the Coastal Zone TWG has moved to property values as a way to bundle 'intangible' (as the P&G refers to them) impacts during low water conditions. The approach is consistent with the overall P&G framework.

Care will need to be used when considering how the HPM results are used within the overall evaluation. Further determination will need to be made as to whether the results represent an NED or a Regional Economic Development (RED) in the context of the overall assessment. However, at a minimum the results can be considered within the Other Social Effects (OSE) account, as long as it can be determined that any benefits/disbenefits identified are not already considered within the other performance metrics. The text in question (particularly the first two sentences identified by the peer reviewer) have been revised to provide further clarification on this issue. Slight modifications have also been made in the document summary to clarify this issue.

3. P. 7. What are "interest-satisfaction curves"? Do you really need to bring in this level of detail?

RESPONSE: Reference to interest satisfaction curves removed from text within Section 4.3.

4. p. 8. First para of section 4.4: ."…real estate professionals would define as PRODUCING significant shifts…"

RESPONSE: Text change made within Section 4.4 to reflect comment.

e. p. 9 Top line: ."some areas would REALIZE benefits."

RESPONSE: Text change made within Section 4.4 to reflect comment.

6. p. 11. Item 1 in list at bottom. Virtually all economists would argue that assessor data sets provide biased information and that transaction data (i.e., "realty data"are much better for valuation studies.

RESPONSE: Reference to assessor data has been removed from Section 5.0 as the authors agree with the peer reviewer that 'realty data' provide a better data source for the proposed analysis.