

**Panel comments on GISST Report that were not addressed in the
revision – additional input needed**

1. The report uses the term "screening" numerous times, such as "screening level evaluations" or "screening process. In the report, and in GISST, the term is used in a vague way. Sometimes the text seems to equate screening with initial or broad level assessment like scoping and other times speaks of "detailed or screening level" assessments. We should be consistent in how we mean this. In fact, the report should define "screening" (or a substitute term) at the beginning. (Stoms)
2. The GISST manual, and the review report (such as on page 1), make reference to "decision making". I found that to be a source of vagueness in both documents. I recommend that our report identify, very explicitly, the types of "decisions" that GISST can assist in. This clarification should probably relate explicitly to the NEPA requirements and the EPA role in reviewing projects and environmental documents prepared by others. Further, I think our report should recommend that the user manual also be more explicit about the types of decisions GISST supports. This would also make the case studies/applications of GISST in the manual clearer because they could be related to the specific types of decisions. Off the top of my head, the decisions include a) what impacts are likely to be significant (scoping process), b) have impacts been adequately addressed in an environmental document and c) which alternative appears to have the least impact. Without this clarification, one might get the impression that the EPA regional administrator actually "decides" what alternative to select, where in fact the decision maker for that aspect is the proponent, either another agency or a private party. (Stoms)
3. Comment on the executive summary discussion of the GISST algorithm: There is a considerable amount of inconsistency in our treatment of weighting. In some places we call for it, in other places we state that the selection of data sets (or aggregate of datasets) weights the decision, or in other places we state that weighting does occur in the scaling. Probably need to define what "weighting" means up front, and then be consistent in application. (Thompson)
4. Comment on the following statement on page vii of executive summary: **“In addition, to be mathematically legitimate, criteria scores used in the algorithm must be measured on scales that reflect the operations effected by the algorithm.”** This statement is ambiguous. I am not sure what we mean to imply here. Recommend discussion and modification. (Thompson)
5. Comment on the following statement on page vii of executive summary: **“The criteria used in the algorithm should be weighted according to their relative importance to decision makers in order to express acceptable tradeoffs.”** – I am not sure I know what that means. (Fernandez)
6. Comment on impact templates: “Impact templates” referred to on page ix of executive summary and elsewhere lacks specificity. What are these? Recommend

discussion. (Thompson). *DFO note: I did add some additional text indicating that these templates could identify the kinds of impacts that might be associated with particular project types and the key criteria relevant to evaluation of those impacts.*

7. Comment regarding statements in the report identifying the need for statistical analyses to minimize redundance of the criteria (page ix, line 23) and description of the data sets: Another inconsistency is the application of criteria vs. data analysis. I don't readily see how a statistical examination of criteria would reduce the number of redundant measures. Need a more specific recommendation. Also, the underlying datasets are not criteria – we currently imply that throughout the document. What I think is intended here is the application of scaling or rating factors to the data themselves. (Thompson)
8. Comment on consistency: There are places where we say an aggregate score (ie, mathematical operations) is not appropriate, and we say it is appropriate (e.g., within more limited groups like say hydrology). (Thompson) *DFO note: The report states that it may not be appropriate to equate the scales of different summed criteria values.*
9. Comment on spatial dependence: I did not see spatial dependence discussed anywhere in the main body of the report. (Thompson) *DFO note: Spatial dependence is discussed on page 17 in the response to charge question 2.1.*
10. Comment regarding the following statement on page 4: **“In addition, to be mathematically legitimate the scores themselves must also be measured on scales that reflect the operations effected by the formula (i.e., addition with averaging).”** - The group highlights several mathematical issues in the report. This sentence implies scale. Others reflect assignment of ordinal vs. cardinal values. Consistency needed. (Thompson)
11. Comment Regarding the following statement on page 4: **“Thus, some measure of uncertainty of consequences should be added to the GISST algorithm if it is to be used to determine the potential for significant risk. Such a modification would not be necessary if the GISST is intended to identify the potential for significant impacts.”** - Consider whether this is an appropriate recommendation. We state that the GISST should not be used as a decision tool, but as an aid to decision making. Uncertainty in a quantitative sense (“added to the algorithm”) would potentially be an unnecessary and cumbersome addition. “Significant” implies a statistical term and/or confidence. I believe we should recommend that a different term be used. (Thompson)
12. Comment on the following statement on page 4: **“Other possible integrative techniques should be provided in the GISST User’s Manual.”** - Can we suggest specific examples? While agreed that other techniques may aid GISST, without a recommendation this is not a helpful suggestion. (Thompson)

13. Comment on the following statement on page 5: **“System or landscape-level dynamics are not addressed in the GISST algorithm and should be considered. For example, the beginning of a highway construction project may cause a big disruption of urban lives and affect wildlife but things may improve after a period of time (e.g., there are now black panther “underpass ramps” in the Florida Everglades).”** - These are time-scale, not landscape dependent issues. (Thompson)
14. Comment on digital elevation models (page 10): DEMs are not needed in order to evaluate erosion, runoff, and/or non-point pollution. We might recommend that GISST may want to incorporate some elements of erosion and non-point, but not DEMs *per se*. (Thompson). *DFO note: removed reference to digital elevation models.*
15. Comment on the following statement (page 11): **“The Panel questions whether all of the criteria should always be scored with a maximum value of 5. It seems that a score of 5 assigned to any criterion should “raise a red flag” and be indicative of a problem. A score of 5 may not be appropriate for criteria that are less important in an evaluation.”** - An example is needed here or the suggestion is not helpful. (Thompson).
16. Comment on the following statement (page 11): **“It is not clear whether the GISST 1-5 scores are ordinal since they appear to be used as numerical bins rather than simple rank order scores. However, if the criteria scores are indeed ordinal values, averaging them is not appropriate because ordinal numbers have only transitive relationships. Multiplication of ordinal values is also not valid.”** - Should explain this distinction better. The argument re.ordinal, cardinal, or rank-order scores and the subsequent treatment of those is not clearly spelled out here, nor is what SAB recommends. (Thompson)
17. Comment on the following statement (page 12): **“The weighting of GISST criteria has been discussed above. Typically this is accomplished by developing specific weighting factors (e.g., multiplying by 1, 2, 3, etc.).”** - This is typically done in conjunction with the planners, decision makers and stakeholders. Perhaps we might suggest that while a template would be useful, each template should be modified by the specific end user, where then weights could be assigned. (Thompson)
18. Comment on the following statement (page 13): **“Some layers may be correlated or have compound or inverse relationships.”** - Provide examples...(Thompson)
19. Comment on the following statement (page 14): **“The summing of criteria scores has many statistical complexities and dangers that should be investigated.”** - Better definition needed here. What complexities, what dangers? (Thompson)
20. Comment on the following statement (page 14): **“Natural breaks in the information were used to develop the GISST scoring system based on a software decision algorithm. That approach might not be as effective or desirable as using an expert opinion-based ranking system.”**- This also relates to weighting factors – by

allowing the end user and/or stakeholder groups the opportunity to set break-points, in effect have a built-in weighting system. Having said that, given the number and shear size of some of the data sets, this might be too cumbersome for many review purposes. (Thompson)

21. Comment on the following statement (page 14): **“The Panel recommends that EPA Region 6 staff explore the use of expert opinion solicitation methods, pattern recognition techniques, and visualization tools to revise the criteria scoring process.”** - This is good. Can we suggest a particular system and/or reference they should look at? (Thompson).