

**MINUTES from the
US Environmental Protection Agency Science Advisory Board
Quality Review Committee for the Draft ReVA Report
Public Teleconference Meeting
1:00 pm - 3:00 pm (Eastern Time)
September 8, 2005**

Meeting Location: Room 3700 USEPA Woodies Building,
1025 F Street NW, Washington, DC 20004

Participation was by telephone call in only

PURPOSE: The EPA Science Advisory Board Quality Review Committee (QRC) met by telephone conference call to review the draft SAB Panel report, *Advisory Report on EPA's Regional Vulnerability Assessment (ReVA) Program* on September 8, 2005. Attachment A is the Federal Register notice announcing the meeting (70 FR 48705, August 19, 2005). A meeting agenda is included as Attachment B, a QRC Roster as Attachment C, the draft review report is Attachment D, the charge to the QRC is given in Attachment E and written comments by QRC members are in Attachment F.

LOCATION: Participation in the teleconference was via phone for all.

PARTICIPANTS: The Members listed in the meeting roster (Attachment C) participated in this meeting. Ms. Betsy Smith participated in the call for the Agency and Dr. Thomas Armitage participated as the ReVA Panel DFO. Dr. Ken Cummins participated as the review panel Chair.

MEETING SUMMARY: The Teleconference followed the agenda (Attachment B). A summary of the Teleconference follows.

Convening the Meeting: Mr. Thomas Miller, Designated Federal Officer (DFO) for the Board opened the meeting at 1:00 pm and took a roll-call of the members, followed by an introduction of others. Mr. Miller gave an overview of teleconference procedures and then outlined the purpose of the meeting. Mr. Miller noted that the meeting was being conducted consistent with FACA requirements.

Review of the Draft Report: Dr. Lauren Zeise, QRC Chair, welcomed participants and noted the activity for consideration during the meeting and the possible outcomes. She then introduced Dr. Cummins who chaired the SAB ReVA panel.

Dr. Cummins noted his appreciation to the ReVA QRC committee and the Agency for their excellent engagement during the review. He noted that the activity was in fact an Advisory and not a peer review *per se*. He described ReVA as a tool kit that provided a framework for analysis but also a process for communicating eco-risk issues for analysts, planners and decision makers. He stated that the Panel though it made

substantial critical comments about ReVA, and particularly emphasizing the need for transparency and increased documentation. The panel believes that the ReVA has great promise, and that it should be given additional support because of its potential usefulness. He suggested that the process might be helped if it could be linked to the SAB EPEC (Ecological Process and Effects Committee) eco-risk framework.

Dr. Twiss of the QRC asked for a clarification of an Advisory vs. a Review. An Advisory was noted to be similar in content to a Review but in time it occurs during the development of a process or document and it is intended to evaluate whether a need exists to make mid-course corrections in the activity. Reviews are considered as evaluations that are done on finished products to note their scientific soundness.

Dr. Zeise asked QRC members to provide their reactions to the draft report.

a) Dr. Virginia Dale stated that the report was responsive to the charge and that it provided adequate details. She noted that she had some edits to send as well. Please refer to Attachment F for her written comments.

b) Dr. Cathy Kling referred to her comments as taking a different approach to ReVA than other QRC members. She considered the limitations that were noted in the draft report and posed the question of why, with significant limitations, the effort should go forward. She stressed that her comments did not reflect a desire that ReVA not be continued, rather they were to bring attention to the need for serious consideration of the level of activity, staff, and research needed in order for ReVA to achieve its ultimate goal. She offered several examples. See her written comments in Attachment F.

Betsy Smith of EPA noted that ReVA is a framework that brings into play different factors and different types of analysis/scientists for different places and issues. She noted that it is not intended to answer all questions that can arise as EPA decides on priority issues to pursue.

Dr. Kling left the call for a short term to deal with a “tornado warning” in her local area. When she returned she stated that the ReVA Panel should consider her written comments and revise the draft as they are helpful in editing the report. Her intent is not to stop the report.

c) Dr. Robert Twiss noted his agreement with the draft report, but highlighted three points from Dr. Kling’s concerns –

- 1) Whether the SAB actually knows enough about the issue to make recommendations for continued development of ReVA. To this he noted that the SAB does know enough to make such recommendations, that the Panel recommendations are in the spirit of mid-course corrections, and that the ReVA does have considerable promise.

2) The letter to the Administrator and the body of the report are inconsistent, i.e., the letter is supportive and the body provides significant criticism of ReVA. In this regard, Dr. Twiss has come to the recognition that such seeming inconsistency may actually reflect more a desire on the part of the Board to provide helpful, critical comments on needed improvements in something the Agency has drafted and at the same time “not pull the rug out from under” an important piece of work that the SAB supports as being important to accomplish over time.

3) The statement in a footnote in the Appendix that it may not reflect the full Panel’s advice – He asked if that meant that the Panel disagreed with the Appendix or if it meant something else. Dr. Cummins noted that it was more an indication that the Appendix was very technical, focused on one specific statistical issue, and that it mostly reflected the work of one Panel member. The Panelists agreed that the detailed explanation of the points by the member should be transmitted to EPA but as an Appendix.

d) Dr. Terry Young noted that she had a similar reaction to the report as Dr. Dale – the charge is adequately addressed. She found the Panel report clear, noting that the report used “terms of art” in the field of ecology and ecological risk assessment, and indicating that the clarity for her is a function of her familiarity with the language of ecology that is embedded throughout the report. She believes that EPA will understand the message of the Panel report. She thinks the conclusions and recommendations are well supported and she has offered a number of edits for the Panel Chair to consider. She did note that in the document ReVA is referred to as a “process” which she believes to be an odd word for what might be taken as a “methodology.”

Dr. Cummins responded that the Panel was reflecting its opinion that ReVA is not a “cookbook” to use in deriving clear decisions on all issues. The Panel wanted to distinguish this from a methodology that usually refers to something more specific and limited. ReVA implementation is less fixed and its specific application varies with situations and locations where it would be applied. Dr. Young agreed that explaining the issue of ReVA as other than a “cookbook” would clarify the issue sufficiently.

Dr. Young also asked about the term “conceptual model” and asked for clarification of what it implied in the ReVA context. Dr. Cummins agreed to clarify the term in the sense of the Panel’s use.

Dr. Young noted that one’s definition of ecosystem condition and vulnerability was critical to use of ReVA. When one uses such “processes” you then need to deal with the data set you have versus the data set you would like to have. The difference between the two are gaps in our knowledge that must be dealt with. How these “blanks” are dealt with once you use the approach is very important to the results you get from the approach. These need to be considered and the uncertainty of having “blanks” in significant parts of the data set need to

be acknowledged transparently by EPA when it makes a decision. The draft report needs to highlight this issue. Dr. Cummins agreed with this need.

e) **Dr. Zeise** noted that she had found some editorial changes that are needed in the report and highlighted the need for clarifying which points in the Executive Summary are findings and which are recommendations.

Dr. Zeise noted that this highlights certain SAB report formatting and draft report review issues that the Board itself needs to consider.

Dr. Vu stated that at its upcoming September meeting, the Board would be discussing general format and review process issues for draft reports. She suggested we defer this discussion until that time and that this report be edited as best as can be done quickly and then forwarded to the Board for its final consideration as a precursor to that discussion. It is likely that many of the same issues mentioned by the QRC will be raised by the full Board and thus their resolution will be incorporated into the Board's final instructions on this draft report.

Dr. Zeise then summarized the outcomes of the meeting. The QRC consensus was that the Panel report required relatively minimal editing. Members agreed that the charge has been addressed, that when the draft is edited with their comments taken into account it will be sufficiently clear, and that the conclusions and recommendations will also be sufficiently supported when those edits are accomplished. The QRC approved the report for moving to the Board after their suggested edits are considered and incorporated as best as can be done given the time available. The report will be sent to the Board by September 22, 2005.

The meeting was adjourned.

Respectfully submitted

/ S /

Thomas O. Miller
Designated Federal Officer

Certified as True

/ S /

Dr. Lauren Zeise, Chair
EPA Science Advisory Board
QRC-ReVA

Attachment

Attachment F

Compilation of Panelists' Comments on "Advisory Report on EPA's Regional Vulnerability Assessment (ReVA) Program"

1. Dr. Virginia Dale:

In response to your questions on the ReVA review:

- (i) The original charge questions to the SAB review panel were adequately addressed.
- (ii) The report is clear and logical.
- (iii) The conclusions and recommendations are supported by the information in the review.

In particular, I thought that the examples of applications (p. ix) were a useful way to show the strengths of the approach. The list of ways to improve the use of ReVA by decision makers (p. x) should also be useful.

The report had a nice balance between encouraging the use, development and testing of ReVA and cautioning against over interpretation for decision making. I definitely agree with the call for better documentation of ReVA. The many references provided in the review should be useful to EPA.

2. Dr. Cathy Kling:

In reading the letter to the Administrator and conclusions of the Advisory, I am left with the message that ReVA has the potential to be a very useful tool and that EPA should continue and even increase support for its development and implementation. However, statements from the report appear to indicate that there are deep and fundamental problems with definitions of vulnerability, goals, data, statistical methods, integration approaches, and perhaps most problematically, the usefulness of the results to the intended audiences. If the latter statements are to be taken at face value, they suggest that there is little hope for this approach to ever be effectively implemented and additional resources should probably not be put towards the effort.

I am guessing that the committee was severely hampered by the lack of documentation provided to them. This may have in fact made it difficult for them to ascertain whether there are fundamental shortcomings in the design and execution of the ReVA or whether there is simply inadequate documentation for a reasonable assessment.

Specifics r.e. the letter to the Administrator:

1. Line 15-17: "In ReVA, predictive tools and methods are used to estimate future ecosystem vulnerability and illustrate trade-offs associated with alternative environmental and economic policies."

This claim is not supported by the report; on the contrary, it is my reading of the report that this is not true. Statements such as "...ReVA is not well suited for use as a priority setting tool to target areas for more focused risk assessment" (line 35-36, p. viii) appear directly at odds with this. How can trade-offs be assessed if one cannot even use the tool as a method for targeting areas for move in-depth study? Further, no economic

information is provided in the ReVA data and the report raises fundamental questions about the environmental information that ReVA summarizes and presents. While this statement may represent the goal intended for some future system, it appears that this is not an accurate description of ReVA in its current form.

2. Line 24-25: “The SAB finds that the suite of tools in ReVA can assist local and regional resource managers in assessing current and future conditions.”

The “limitations” identified on pages 10-11 suggest that this may not be true for most ecosystems.

3. Line 33. the SAB calls on EPA “...to develop overarching conceptual models for ReVA...”

The call for development of “overarching conceptual models” is made several times in the report. But I do not understand what type of conceptual model they are seeking; a model of an ecosystem? of an integrated ecological-economic system? Some type of formal decision model (maximize expected intertemporal net benefits) etc.? I think the committee could help the ReVA developers by being more specific here.

4. Line 33-34 continues: “... and to provide a framework and indicators to assess ecological conditions.”

This statement is confusing. If ReVA does not provide indicators to assess ecological conditions what does it do?

Executive Summary

1. p vii, lines 13-15. “Integrative and visualization tools incorporated into ReVA can be used to illustrate the trade-offs associated with alternative environmental and economic policies in the context of dynamic stakeholder values.” This sounds to me like I could use ReVA to run a series of landuse scenarios where for example, I could stipulate the counties I am interested in, and ask what the consequences of two different zoning policies are likely to be on future development patterns, water quality, biodiversity, and economic growth of the region. But, from reading the report, it does not sound like ReVA can provide such analysis. Also, I am also not sure what “in the context of dynamic stakeholder values” means.

Perhaps the issue relates to the distinction between what the current or near-term capability of ReVA is vs. what the long term goal or desired outcome of the process might eventually be. ??

2. p viii. Line 22-23. “Outside reviewers cannot discern what ReVA is from information that is currently available.” Lines 28-33 indicate that there is a lack of documentation of ...what ReVA is, the main objectives of ReVA, and the main questions being asked in ReVA....”

With such a major lack of information, does the SAB really know enough to make recommendations to EPA r.e. continued development of this program? Would it be unreasonable to await such information before an SAB report is completed?

3. p. viii, line 35-42. "...ReVA is not well suited for use as a priority setting tool to target areas for more focused risk assessment.... The SAB notes that EPA should use caution when ReVA is applied to aggregate individual stressors into a single map or value. While such aggregations are useful in identification of areas for more focused risk assessment, the underlying statistical methods for aggregating and/or integrating multiple stressors into a single value are still in their infancy."

I find this statement unclear; the first part seems to say that ReVA cannot be used to prioritize areas (even for additional study), but the final line indicates that aggregations can be useful for such prioritization.

4. p. xi, line 42. What is a "hind-cast?" The call for field validation of single biophysical model to a single or multiples location is a major research program in and of itself. Or do the authors mean something else by the use of "field validation?"

5. p. x, line 6-9. "By scenario analysis the SAB means the articulation of future contexts which could plausibly, not necessarily probably develop contexts defined by variations in present-day natural and social processes that together could lead to ecological vulnerability and management priorities different from those likely to occur under a continuation of present-day patterns and processes." I don't understand this statement

6. p. x. lines 40-42. As an economist, I would define "efficiency" as achieving a given level of vulnerability reduction at the lowest possible resource use (or cost).

7. p. xi. Lines 12-18. The recommendation is that the ReVA should not just provide info on vulnerability of a resource, but also "should identify geographic areas of highest 'value'." This is an enormously tall order, particularly given the issues of scale and aggregation described elsewhere in the report. Regardless of one's views on the adequacy of economic and other methods for valuing environmental resources, there is little doubt that the value of a resource, say a 100 acre pristine wilderness, will be different depending on what it's adjacent land use is, what happens to other pristine wilderness areas in the region, the size of the human population living in the vicinity, etc. It will almost never be possible to identify some independent, innate value associated with a specific ecosystem, independent of the context.

Body of the Report

To my read, there is an inconsistency between the favorable recommendations r.e. ReVA and discussions in the body of the report. I will try to highlight some of the places where it seems to me that the report suggests there are fundamental problems with ReVA.

1. p 4, lines 10-19. These "limitations" sound quite fundamental and raise question in my mind as to whether there really is any point in recommending that EPA proceed full power ahead with ReVA. How can the approach ever be useful in the absence of ecosystem-specific data? or good indicators of ecological condition? Or with the "complete lack of calibration, verification and sensitivity demonstrations on the ReVA summary indicator models..."? Perhaps most damning is the fifth bullet that indicates that ecological conditions cannot be adequately described without temporal information and dynamics. **Can a system like ReVA, with our current knowledge and technologic capabilities do this for a wide variety of ecosystem types and regions at the same**

**time making this information transparent and user friendly for lay audiences?
Perhaps it is a decade or two too earlier to develop such a system?**

2. p. 5. The conclusion that ReVA is a “process” is difficult for me to understand. According to EPA ORD documentation:

“The goal of ORD’s Regional Vulnerability Assessment (ReVA) Program is to develop approaches to quantifying regional ecological vulnerabilities so that risk management activities can be targeted and prioritized.” (executive summary “The US EPA’s Regional Vulnerability Assessment Program: A Research Strategy for 2001-2006”
<http://www.epa.gov/reva/reva-strategy.pdf>)

Based on this, I assume that ReVA is meant to be a set of quantification tools, not a process.

3. p 7. The conclusion that ReVA has limited use as a priority setting tool is another example of an apparent inconsistency between the report and the final recommendation to support the tool. If ReVA cannot even aid in prioritizing areas for more detailed assessment, what is its value?

4. p. 7. The discussion of correlation vs causation and the summing of correlation coefficients raises all kinds of red flags in my mind about the validity and value of ReVA. While I do not know anything about “adjacency and reachability” matrices, I question whether they can solve the problem of not being able to infer causation from correlation. The need for “expert” judgment and the possibility of program users providing such judgment raises another red flag. Few potential users are going to have the expertise to provide such judgment; indeed, users will generally be coming to ReVA to get information from the experts, not provide it themselves.

5. p. 8. The report notes that the “concept of ‘valued resources’ in ReVA is simplistic.” Isn’t this a fundamental problem? Can it be overcome with additional effort?

6. p. 8, lines 17-23. It is not clear how these alternative definitions of vulnerability and risk relate to ReVA. Does ReVA provide only one of these three pieces of information, but the committee believes it should provide all three?

7. p. 10. The discussion of the need for significant amounts of judgment in the application of ReVa is valuable, but the suggestion that Bayesian belief networks will somehow solve the problem of “chronic discord” among users with different judgments seems optimistic. Using tools to integrate and display differences in professional judgments such as Bayesian networks does not change the underlying issue that judgment is an integral part of the process and many potential users may not have good bases upon which to make such judgments.

8. p. 10. lines 25-37. I do not understand the statement that “...priority setting, if done properly, should be tailored to the following available information:...” Shouldn’t information be tailored to the needs of priority setting, not vice versa?

9. p. 12. Is the term “mechanistic” model well understood? I am unfamiliar with the term, though I suspect it just refers to quantitative modeling of biophysical, hydrological, and/or ecological systems.

10. p. 14, line 12-13. The committee concludes that “EPA should be careful to include strong cautions against using the interface tool for actual decision making.” This is a strong statement and again raises the question of whether the tool should continue to be developed, particularly given the committee’s earlier statement that the computing power needed is not likely to be available any time soon. If it can’t aid decision making, what is its purpose?

11. pg 14, line 34-35. The “environmental decision making space-time intelligence system” sounds right out of star trek. I don’t know what a “space-time intelligence system” is.

12. p. 15, line 20-24 The statement that “...ReVa is an important EPA initiative, andit is applying 20th century methodologies and technology with considerable skill and insight.” appears inconsistent with statements scattered through the document such as earlier on the page (lines 3-4) “The SAB notes that the credibility of the ReVA toolbox and toolkit needs to be addressed.” And (Page 13. line 19) “The SAB believes that the statistical integration methods developed and used in ReVA have not been demonstrated to be statistically sound.”

13. p. 17-18 , lines 33- 46 and 1-9. This is another discussion that raises serious question to me concerning the value of the ReVA process/tool. The committee seems to be saying that a lay person cannot use this tool since a basic understanding of multivariate statistics is necessary. The committee recommends that simple conceptual explanations of the procedures using metaphors be provided. Expecting users to be able to understand the standardizations described at the bottom of p 17 and top of p. 18 and to even be able to analyze and develop their own is just unrealistic for most potential users. Who is the target audience for this? Is it large enough to make this investment worthwhile?

14. p. 18. The statement is made that “The ReVA presentation of vulnerability appears to be indifferent to some important qualities of ecosystem vulnerability as defined by Cairns...” and they proceed to describe inconsistencies between the ReVA usage with this apparently standard definition. This suggests that they do not even have the basic definition of what they are trying to measure correct. If that is what the committee means, shouldn’t we be calling to stop this program or at least demand a major overhaul?

15. p. 22, lines 44-46. The committee requests that ReVa provide identify geographic areas of “highest value.” As noted earlier, value is very context specific; there is no unique value associated with a particular ecosystem or region independent of what happens to other ecosystems/regions. This is not a reasonable request.

Appendix A

The footnote indicating that this appendix “may not” represent the full panel’s view is odd to say the least. What’s going on with this?

3. Dr. Twiss

I do not have any comments on the report itself -- it more than meets all of our charge questions in my opinion (but I'm looking forward to other comments).

4. Dr. Young

The following are my comments regarding the ReVA report. Please forward them to the appropriate parties. Thank you.

The report answers the charge questions well, and conclusions are well supported by explanatory material.

There are a few sections in the body of the report where the language could be clarified. Many of these sections also appear in the Executive Summary and/or the letter.

Page 3, lines 23-27 are awkwardly written.

Page 4, line 6. "Processes" seems like an odd word here, because the reader (or at least this reader) thinks of ecological processes rather than the ReVA methodology. This use of the term process pervades the report and seems to have been part of the presentation. Substituting the word methodology might be preferable.

Page 4, line 27. This is not what I think of as a conceptual model, but rather a description of a methodology

Page 7, lines 2-3. I suggest striking the "but can assist..." portion of this sentence, since it is confusing to me and redundant with the previous sentence. The same sentence appears on page 10, lines 20-24, with the same problem.

Page 16. Does most of this discussion also apply to other charge questions as well? If so, you might want to cross-reference it.

Page 21, lines 23-29. This paragraph contains an internal inconsistency.

As you can see, these are small editorial problems. The content of the report appears solid, detailed, and useful to the Agency as it continues to refine this tool.

5. Dr. Zeise

i) The original charge questions to the SAB review panel have been adequately addressed. The Executive Summary of the report could be clearer in this regard. The report would be improved by distinguishing in the Executive Summary recommendations from the key findings with respect to the charge questions. In a few cases the Executive Summary does not convey key committee findings discussed in the body of the report.

The SAB panel finds that the ReVA promising but clearly in need of considerable more work to be fully developed. It points out significant limitations in the data integration and prediction methodologies (e.g., statistical techniques are too simplistic, mechanistic models have yet to be validated), so much so that it cautions against using ReVA tools for priority setting and prediction. However it finds some components (e.g., graphical tools) useful. Thus the Panel it points out some products being produced that may find use in the short term, while to meet the laudable long-term goals of the project

considerable resources, greater in-house expertise and careful analytic work is needed. The Panel seems enthusiastic that with adequate resources the Agency is up to the task. This enthusiasm may be reflected in the Panel's cautious summary statements (e.g., last paragraph p. xi and p. 24) in not pointing out the methodological problems it has found.

ii) The report for the most part is clear and logical. In a few cases concepts presented are not entirely clear (e.g., why scenarios are useful but not predictive). A bit of wordsmithing is needed in several places, some sentences are confusing and contradictory (e.g., p.10, L20-22; p. 17, L42-44). These could be identified and corrected by a careful editorial read through the document.

iii) The conclusions and recommendations are supported by the body of information in the report.