

**Summary Minutes of the
U.S. Environmental Protection Agency (EPA)
Science Advisory Board (SAB)
Committee on Valuing the Protection of Ecological Systems and Services (C-VPES)
Public Meeting – October 25-26, 2005**

Committee Members: (See Roster – Attachment A)

Scheduled Date and Time: From 9:00a.m. to 5:30 p.m. (Eastern Time) on October 25, 2005; and from 8:30 a.m. to 3:00 p.m. (Eastern Time) on October 26, 2005. (See Federal Register Notice, Attachment B)

Location: Woodies Building, 1025 F Street, N.W., SAB Large Conference Room, Room 3705, Washington, DC 20004

Purpose:

1. to reach agreement on “Document Zero,” the initial committee report calling for an expanded and integrated approach for valuing the protection of ecological systems and services;
2. to reach agreement on how to revise Chapters 3 and 4 of the draft Methods Report;
3. to refine plans for the SAB Workshop, Science for Characterizing Ecological Benefits for EPA's Environmental Decisions and Programs, scheduled for December 13-14, 2005; and
4. to discuss what additional report(s), including an “Applications Report,” the committee will prepare.

All of these activities are related to the Committee's overall charge: to assess Agency needs and the state of the art and science of valuing protection of ecological systems and services, and then to identify key areas for improving knowledge, methodologies, practice, and research.

Attendees:

Acting Chair:	Dr. Barton H. (Buzz) Thompson, Jr.
Acting Vice-Chair:	Dr. Kathleen Segerson

Committee Members:

- Dr. William Louis Ascher
- Dr. Gregory Biddinger
- Dr. Ann Bostrom (October 26, 2005 only)
- Dr. James Boyd
- Dr. Terry Daniel
- Dr. A. Myrick Freeman
- Dr. Dennis Grossman
- Dr. Robert Huggett
- Dr. Douglas E. MacLean
- Dr. Stephen Polasky
- Dr. Joan Roughgarden
- Dr. Mark Sagoff
- Dr. Paul Slovic

C-VPES Consultant: Dr. Joseph Arvai

SAB Staff Office: Dr. Angela Nugent, SAB Staff Office, Designated Federal Officer (DFO)
Dr. Holly Stallworth, SAB Staff Office, Designated Federal Officer (DFO)
Dr. Vanessa Vu, Director of the SAB Staff Office
Dr. Anthony Maciorowski, Associate for Science, SAB Staff Office

Meeting Summary

The discussion generally followed the Proposed Meeting Agenda (See Meeting Agenda - Attachment C), except where noted below.

Opening of Public Meeting

Dr. Angela Nugent, Designated Federal Officer (DFO) for the SAB Committee on Valuing the Protection of Ecological Systems and Services, opened the public meeting at 9:00 a.m.

Dr. Vu welcomed members and recognized Drs. Thompson and Segerson in their new roles as Acting Chair and Vice-Chair of the committee. She noted that October 2005 marks the third year of C-VPNESS work and expressed her appreciation for the committee's work on the draft "Document Zero" and Methods Report. She also emphasized the EPA's Administrator's continuing interest in C-VPNESS efforts and underscored that the task before the committee was important to the Agency and the Administrator, who she hopes will attend part of the workshop planned for December 13-14, 2005. She expressed her full support for the committee's efforts to communicate its findings to the Agency and the scientific community and asked to be informed of ways she could facilitate discussions and exchange.

Dr. Thompson thanked members for their hard work on the two documents and the progress made to date. He suggested, and the committee agreed, to ask the SAB Staff Office to draft a letter of thanks for his signature and that of Dr. Segerson's to the outgoing chair, Dr. Domenico Grasso, for his two years of leadership of the committee.

Dr. Thompson reviewed the four main purposes of the meeting, as described in the agenda. He also noted two additional points made by Dr. Vu in conversation prior to the C-VPNESS meeting: that the committee author a short report designed for a non-technical audience, specifically for policy makers and the public; and that the committee either as a whole or as working groups, coordinated with the knowledge of the Chair, Vice-Chair, and SAB Staff Office, seek opportunities to publish components of the C-VPNESS work as peer-reviewed articles. He asked members to think about those ideas.

Dr. Thompson noted that his goal was to facilitate C-VPNESS work so that the committee can make rapid progress. His plan is to reserve committee meetings for substantive discussions requiring the whole committee, to use working groups to address more specialized issues, and to address editorial issues through email or other modes of communication.

He also noted that his special concern about the relevance of the committee's advice to the Agency and that he wished to keep the question "What can EPA do with this?" before the committee.

Introduction to draft document, *Valuing the Protection of Ecological Systems and Services: An Expanded and Integrated Approach*, and summary of substantive issues received from C-VPESS Members

Dr. Segerson opened the discussion with a brief description of the process for developing and revising the draft document, informally dubbed "*Document Zero*." She reiterated the plan to use agenda time to address significant issues that need full committee attention. The purpose of the discussion was to resolve those significant issues and describe the process for addressing editorial comments so that a revision will result in a document that expresses a major message with which all committee members can agree. She noted that the four substantive issues to be addressed were: usage of terms, the role of ecological science, expanding the discussion of ecosystem services, and development of a preliminary set of findings and recommendations.

The first topic to be addressed was expanding the discussion of ecosystem services. The committee agreed that additional text should be added to the beginning of the document about the importance of EPA's mission to protect ecosystems and ecological components and to describe the kinds of natural ecosystems the Agency should protect (e.g., forests, streams, wetlands, deserts). The committee discussed the differences among the laws that EPA administers, the Agency's role as a convener of environmental decision makers, and EPA's 2003 *Strategic Plan*, which discusses EPA's mission to protect the environment beyond specific legislative requirements. The committee discussed how valuation of protection of ecological systems and services can be important for several reasons. Sometimes the Agency is held to the "performance test" of benefit/cost analysis. Valuation can help the Agency make better decisions or understand how if and how it is doing a good job. Where EPA is not constrained as to particular valuation methods, it can be experimental in its approach to valuation. Drs. Grossman and Roughgarden agreed to work with Dr. Segerson to draft an introduction to "Document Zero" and to rework section 1.2.0 to reflect group discussion. Dr. Thompson agreed to contribute text describing EPA's legislative mandates, the EPA mission for protecting ecosystems and ecological components more generally, and how valuation relates to them.

The committee discussed also the need to retain and condense the discussion of the Agency's economic and ecological analysis for the Combined Animal Feeding Operation rule as an example of the current limits of ecological valuation.

Discussion of key terms

Dr. Segerson introduced the second substantive issue for discussion: the usage of key terms. She explained that the purpose of the draft proposal provided to C-VPESS members at the meeting (See Attachment D) was not to define terms fully, but to inform readers about how terms were to be used in the context of C-VPESS documents. She proposed that the C-VPESS adopt "usage" that would be consistent across all C-VPESS documents.

Dr. Segerson asked committee members to note the distinction between values and benefits. The term "values" includes everything that the committee has discussed to date, including non-anthropocentric values. The term "benefits" is somewhat narrower, refers to contributions to human well being and is consistent with the OMB circular. She also noted that the term "monetary valuation" was not to be equivalent to "economic valuation."

The committee decided to generally retain the proposed "usage" description for ecosystems and develop introductory text in "Document Zero" to describe the natural ecosystems of most interest. The

committee discussed and agreed to the proposed usages with several suggested changes (see Attachment E). The following members agreed to provide revised or additional language quickly to Dr. Segerson:

- Dr. MacLean will submit a shorter version of the usage description for the term "value"
- Dr. Biddinger will work with the C-VPESS ecologist working groups to provide language for the term "Ecosystem/ecological valuation," clarifying that several ecological levels and components (not just ecosystems) are of interest.
- Dr. Daniel will provide a description of the usage of the term "social-psychological valuation" that will parallel the description of "economic valuation."
- Drs. Boyd and Biddinger will provide usage language for "Ecosystem Services" to clarify that services are characteristics (not processes or functions) of systems that produce intermediate products and end products for humans. Functions and processes are valuable, but are not services in themselves.

Dr. Segerson agreed to circulate the revised "usage of terms" decisions made by the committee.

Discussion of current ability of ecological science to characterize and quantify the effects of EPA protective actions

The committee had a working lunch, where Dr. Roughgarden presented an overview of current capability of ecological science and ecological modeling to identify key ecological processes. In the discussion that followed, members noted the significance of the issue of transferring ecological knowledge from one site to another for EPA, which is responsible for national rulemaking. One member noted that EPA generally approaches this issue by trying to identify the most vulnerable system and assuming that an action protective for that system will be protective for all. The committee discussed the view that ecological events are fairly predictable if ecosystems are studied well, and how often there is a "myth" that ecology is so complex that it can't be studied and predicted like other natural and social systems. Dr. Maciorowski noted that EPA is generally not knowledgeable about the ecological modeling capabilities at other federal Agencies, such as the U.S. Fish and Wildlife Service. The group also discussed whether there are "tipping points" involving phase changes that are difficult to predict and have major effects. One view is that such "phase changes" are not that common. The group also discussed the importance of clearly identifying ecological services. Once those are identified (a process which is a social science issue, not an ecological issue), ecologists can model ecological systems to understand the processes and outputs related to those services.

This discussion was followed by a formal presentation by Dr. Biddinger summarizing discussions of ecologists on two questions that had arisen in comments received on "Document Zero"¹ (See Attachment F). The committee reiterated the view that ecological science can provide production functions, but that often information on ecological services is not well developed (lakes were mentioned as an exception). One committee member noted that ecologists can't predict the impact of EPA actions on human behavior; others acknowledged the need to be clear that there is an important linkage between regulations and actions of private and public individuals affected. A member noted the importance of

¹• What is the degree to which ecological science is capable of characterizing and quantifying the effects of various governmental actions? Ability of ecological science to make necessary predictions to support valuation exercises?

interdisciplinary dialogue and the involvement of social scientists in designing valuation exercises and ecological modeling that supports them.

Dr. Maciorowski noted that the SAB has recently conducted several reviews of EPA landscape analysis. He observed that there will be considerable interest in the kinds of quantitative and predictive models that the C-VPESS was discussing

Members then discussed the issue of how to address valuation of an end-product vs. valuation of an intermediate product or the process that results in the end product. Members cautioned about double counting -- endpoints and process. Other members emphasized the importance of valuing processes in valuation of endproducts, e.g., people value dolphin-safe tuna over tuna caught by other means. Members spoke of the importance of clearly identifying the good or service being valued.

Members also discussed the need to address the importance of identifying the geospatial scale at which production functions operate. Production functions can be studied at the level of the Mississippi watershed or a small ecological footprint, and there is a need to reconcile the ecological spatial analysis with economic scale of willingness to pay.

Dr. Biddinger agreed to work with the ecologists' working group to draft text encapsulating some of the discussion into section 3.2.1 of Document Zero.

The meeting adjourned at 5:30 p.m. on October 25, 2005.

Discussion of findings and recommendations in "Document Zero"

The committee reconvened at 8:30 a.m. on October 26, 2005 to discuss conclusions for the draft document. Dr. Segerson opened the meeting by describing her intentions to shorten the conclusions, to group findings and recommendations in some way, and to prioritize a small set of recommendations to highlight. The committee then focused on the set of conclusions to highlight. One conclusion concerned the need for greater transparency and clearer communication about ecological valuation, including the strengths, limits, and uncertainties associated with valuation analyses. The second major recommendation was for the Agency to experiment with new methods to seek opportunities to validate them and to capture a broader suite of benefits. The committee also agreed that there may be more scope for stepping somewhat outside the scope of the committee's direct charge to call for EPA assuming a greater leadership role for ecological protection (with valuation in aid of that goal) in the cover letter to the C-VPESS report, rather than in the report itself. The committee envisioned that such a conclusion in Document Zero would be linked logically to the chapter on uncertainty planned for the Methods Report.

The discussion included many suggestions for editorial changes (e.g., how to address local expertise) to the list of conclusions circulated before the meeting. The discussion concluded with a request that members send Dr. Segerson any remaining comments by November 2, 2005. One member suggested that Dr. Segerson consider presenting findings and conclusions in a tabular form and to categorize them in some way. Another member asked that the revised document be carefully reviewed to check that usage of terms conforms to agreements about those usages and that the committee flag any unusual usages in the text that may not be clear to readers.

Discussion of central graphic for use in "Document Zero" and the Methods Report

Dr. Polasky presented a proposed graphic developed by him and Drs. Daniel and Roughgarden (Attachment G). The group discussed how to represent the relationship between policy options and

values; how to represent problem formulation; how to simplify the diagram; how to label the arrow that connects "Ecosystems" directly to "Values;" whether to retain that arrow at all; whether "ecosystem services" can encompass all the values under consideration; and the meaning of the "socially informed" and "ecologically informed" labels. Drs. Polasky, Daniel, and Roughgarden agreed to revise the diagram for inclusion in both of the committee's documents, and to work with Drs. Arvai, Costanza, and Segerson to draft text for Chapter 1 of the Methods Report to explain the diagram and foreshadow the structure of the Methods Report. Dr. Polasky agreed to suggest ways a revised graphic can be related graphically to figure 4.1 in current Methods Draft and to other graphics in a revised Methods Report.

Introduction to Methods Report and approach for deliberations and revisions

Dr. Thompson opened the discussion of the Methods Report by asking what should be added or changed in chapter 3 and how the ecological modeling section of chapter 4 should be altered. Dr. Biddinger provided a brief introduction to this issue. The committee agreed that:

- There is a need to link Document Zero to the methods document (and the new proposed revisions of section 1.2 will provide this linkage)
- Chapter 3 should be revised to discuss ecological production functions at different levels of ecological organization
- Chapter 3 should include a subsection on landscape ecology, possibly linked to biodiversity.
- Chapter 3 should include a section on ecological production functions; which should be written carefully because discussion of social/psychological methods for ascertaining services appears afterward, in Chapter 4
- Chapter 3 should include research recommendations, especially those related to ecological modeling.

Dr. Biddinger agreed to work with the ecologists' working group to draft text to distribute before the February meeting.

Discussion of Chapter 4 of draft Methods Report

Dr. Thompson then began a more general discussion of the structure and contents of chapter 4. The group generally agreed that there should be a new section in chapter 4 or a new chapter devoted to methods for presenting quantified information if valuation is not possible. This section or chapter could include discussion of quantitative methods for describing a production estimate, an impact, or a consequence. Such a section could help EPA "transition to greater capacity" for characterizing values in the future. The committee also discussed the possibility of moving the discussions of spatial representation of biodiversity and conservation value and ecosystem benefit indicators to the chapter on decision making.

After the committee considered several alternatives for restructuring Chapter 4 and general comments about the need to provide discussions of EPA application of methods discussed, Drs. Thompson and Segerson agreed to develop a proposal for restructuring the chapter and guidance for specific questions to be addressed in each method discussion. They plan to consult with authors of sections of the current draft Methods Chapter individually about how their text would fit the proposed revision.

Dr. Thompson then summarized next steps related to the Methods Report. He identified leads for revising current sections of the report not discussed at the October meeting. He identified Drs. Polasky and Arvai as responsible for revisions to Chapter 2 (Decision Making and Valuation); Drs. Daniel and

Freeman as responsible for Chapter 5 (Common Methodological Issues); Drs. Ascher, Costanza, and Stavins as responsible for Chapter 6 (Uncertainty). He asked members to provide comments to Dr. Nugent (or cc: her on email communication to the responsible committee members) within a month.

Plans for SAB Workshop planned for December 13-14 2005, Science for Characterizing Ecological Benefits for EPA's Environmental Decisions and Programs

The committee discussed the two purposes of the workshop: to showcase C-VPESS work to date and get feedback on C-VPESS work and plans for future efforts from SAB members and Agency Staff. Committee members discussed a straw agenda proposal and decided to revise it in several ways:

- to limit initial presentations to those by the Deputy Administrator and Dr. Walter Reid so that the workshop can include an expanded discussion of C-VPESS work in the morning of December 13, 2005
- to include breakout groups on the afternoon of December 13, 2005 that will allow for discussion of "Document zero" and selected methods that would be highlighted in the morning's session. A group of C-VPESS members representing a range of disciplinary backgrounds would be assigned to each breakout session. There would be a common set of issues to be addressed by each breakout session.
- to provide an opportunity on December 14, 2005 in some kind of "Round Table" format for Agency managers and senior staff to provide their views on the most useful aspects of the committee's work and ways to make the committee's advice most useful and for designated committee members to respond.

In the discussion committee members emphasized the need to focus on areas best developed and accepted by the committee as a whole and to design the workshop agenda so it does not impose an undue burden on committee members, yet advances the committee's work. The committee discussed the difficulties of using "examples," whether real or hypothetical, given the short time remaining before the workshop. The committee also discussed the value of building on the interviews conducted by Dr. James Boyd with Agency staff engaged in development of regulatory impact analyses.

The committee discussed possible methods to feature in the workshop. Dr. Ascher proposed that the Delphi Method and referenda approach might be useful to feature; another suggestion was to feature economic analyses and production function approaches.

The Acting Chair asked the SAB Staff Office to revise the draft agenda in light of committee discussion.

Discussion of proposed Applications Report and next steps

The committee briefly discussed the idea of preparing two additional reports (beyond "Document Zero" and the Methods Reports). The first would be an Applications Report; the second would be a lay-oriented summary document. Dr. Thompson proposed that he and Dr. Segerson would prepare a proposed plan for these documents for discussion at the committee's February 2-3, 2006 meeting.

The committee adjourned at 3:00 p.m.

Action Items

1. SAB Staff Office to draft note of thanks to Dr. Domenico Grasso for signature by Drs. Thompson and Segerson on behalf of the committee

2. Document Zero:
 - 2.1. Drs. Grossman and Roughgarden will work with Dr. Segerson to draft an introduction to Document Zero and revisions to Section 1.2 focusing on importance of ecosystems and ecological protection, based on Dr. Roughgarden's written comments and committee discussion.
 - 2.2. Dr. Thompson will draft text for the introduction, focusing on EPA's legal mandates and more general mission to protect ecosystems and ecological components and the role valuation may play
 - 2.3. Dr. Biddinger and the ecologist working group will draft a section (a new 3.2.1) of Document Zero based on Dr. Biddinger's power point presentation. Section will address issue of capacity and role of ecological science in valuation
 - 2.4. Usage of Terms
 - 2.4.1. Dr. MacLean will submit a shorter version of the usage description for the term "value."
 - 2.4.2. Dr. Biddinger will work with the C-VPES ecologist working groups to provide language for the term "ecosystem/ecological valuation" clarifying the term that several ecological levels and components (not just ecosystems) are of interest.
 - 2.4.3. Dr. Daniel will provide a description of the usage of the term "social-psychological valuation" that would parallel the description of "economic valuation."
 - 2.4.4. Drs. Boyd and Biddinger will provide usage languages for "Ecosystem Services" to clarify that services are characteristics (not processes or functions) of systems that produce intermediate products and end products for humans. Functions and processes are valuable, but are not services in themselves. Dr. Segerson will circulate the "usage of terms" decided by the committee
 - 2.4.5. Dr. Segerson will circulate the revised "usage of terms" decisions made by the committee.
 - 2.5. Dr. Segerson will insert the central graphic to be developed for the Methods Report (see action item 3.2 below) into Document Zero
 - 2.6. Dr. Segerson will draft a section identifying findings and recommendations based on committee discussion, grouped by type. She will select a small set of recommendations to prioritize based on committee discussion (possibly including the importance of transparency and communication of results of valuation and the need for new efforts to achieve more complete valuation of ecological benefits).
 - 2.7. Committee members are to email any further editorial issues and suggestions that do not need full committee discussion to Dr. Segerson by Thursday November 3.
 - 2.8. Dr. Segerson will provide a revised draft to the committee within a month.

3. Methods Report:
 - 3.1. Dr. Biddinger and the ecologist working group will revise Chapter 3 to incorporate the issues discussed in Dr. Biddinger's presentation (see Attachment F), which included new discussions of ecological production functions at different ecological scales.
 - 3.2. Drs. Costanza, Daniel, Polasky, and Roughgarden will work to develop a new central graphic for the Methods report. They will work with Drs. Arvai and Segerson's help to develop new language to describe the chart, to serve as a new Chapter 1
 - 3.3. Drs. Thompson and Segerson will propose a reorganization of Chapter 4 and a new general outline.
 - 3.3.1. Outline to include separate chapter or section on characterization of "impacts" or "changes" that valuation methods cannot be applied to.

- 3.3.2. Drs. Thompson and Segerson will check with the authors of the current methods sections to discuss each method's proper placement.
 - 3.3.3. Drs. Thompson and Segerson will also circulate points to be addressed in each method write-up to highlight how each method might be used by EPA and each method's readiness for EPA use.
 - 3.4. Drs. Bostrom and Arvai will develop a proposal for restructuring the discussion of Decision-Making and Communication that consolidates and builds on existing sections.
 - 3.5. Drs. Bostrom, Huggett, Slovic, and Roughgarden will revise existing text for a section on communication issues. Items for consideration include Arrow article, valuation characterization guidance (and consideration of Agency's existing risk characterization guidance as a possible model for valuation characterization guidance).
 - 3.6. All members to send comments on remaining current draft sections of the report (Chapters 3, 5, and 6) by November 30th to Dr. Nugent for distribution to the leads for those sections.
- 4. December 13-14, 2005 SAB Workshop:
 - 4.1. SAB Staff to poll C-VPES members quickly about their availability to attend.
 - 4.2. SAB Staff will revise agenda, based on committee discussion.
 - 5. Other Issues
 - 5.1. Drs. Thompson and Segerson will develop a plan of action for developing the Application Report and lay-oriented short publication summarizing C-VPES findings before February meeting.

Respectfully Submitted:

/s/

Angela Nugent

Designated Federal Officer

Certified as True:

/s/

Barton H. (Buzz) Thompson

Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by committee members during the course of deliberations within the meeting. Such ideas, suggestions, and deliberations do not necessarily reflect definitive consensus advice from the panel members. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.

Attachments

Attachment A	Roster
Attachment B	Federal Register Notice
Attachment C	Meeting Agenda
Attachment D	Definition of Terms (Revised 10-24-05)
Attachment E	Decisions to Revise Certain Usage of Certain Terms Discussed at 10-15-05 C-VPESS Meeting
Attachment F	Outline of Dr. Gregory Biddinger's presentation to begin discussion of "Ability of Ecological Sciences to Characterize and Quantify the Effects of EPA Protective Actions"

Attachment A: Roster

U.S. Environmental Protection Agency Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services

ACTING CHAIR

Dr. Barton H. (Buzz) Thompson, Jr., Robert E. Paradise Professor of Natural Resources Law and Vice Dean, Stanford Law School, Stanford University, Stanford, CA

ACTING VICE-CHAIR

Dr. Kathleen Segerson, Professor, Department of Economics, University of Connecticut, Storrs, CT

MEMBERS

Dr. William Louis Ascher, Donald C. McKenna Professor of Government and Economics, Claremont McKenna College, Claremont, CA

Dr. Gregory Biddinger, Environmental Programs Coordinator, ExxonMobil Biomedical Sciences, Inc, Houston, TX

Dr. Ann Bostrom, Associate Professor, School of Public Policy, Georgia Institute of Technology, Atlanta, GA

Dr. James Boyd, Senior Fellow, Director, Energy & Natural Resources Division, Resources for the Future, Washington, DC

Dr. Robert Costanza, Professor/Director, Gund Institute for Ecological Economics, School of Natural Resources, University of Vermont, Burlington, VT

Dr. Terry Daniel, Professor of Psychology and Natural Resources, Department of Psychology, Environmental Perception Laboratory, University of Arizona, Tucson, AZ

Dr. A. Myrick Freeman, Research Professor of Economics, Department of Economics, Bowdoin College, Brunswick, ME

Dr. Dennis Grossman, Vice President for Science, Science Division, NatureServe, Arlington, VA

Dr. Geoffrey Heal, Paul Garrett Professor of Public Policy and Business Responsibility, Columbia Business School, Columbia University, New York, NY

Dr. Robert Huggett, Consultant and Professor Emeritus, College of William and Mary, Williamsburg, VA

Dr. Douglas E. MacLean, Professor, Department of Philosophy, University of North Carolina, Chapel Hill, NC

Dr. Harold Mooney, Paul S. Achilles Professor of Environmental Biology, Department of Biological

Sciences, Stanford University, Stanford, CA

Dr. Louis F. Pitelka, Professor, Appalachian Laboratory, University of Maryland Center for Environmental Science, Frostburg, MD

Dr. Stephen Polasky, Fesler-Lampert Professor of Ecological/Environmental Economics, Department of Applied Economics, University of Minnesota, St. Paul, MN

Dr. Paul G. Risser, Chancellor, Oklahoma State Regents for Higher Education, Oklahoma City, OK

Dr. Holmes Rolston, University Distinguished Professor, Department of Philosophy, Colorado State University, Fort Collins, CO

Dr. Joan Roughgarden, Professor, Biological Sciences and Evolutionary Biology, Stanford University, Stanford, CA

Dr. Mark Sagoff, Senior Research Scholar, Institute for Philosophy and Public Policy, School of Public Affairs, University of Maryland, College Park, MD

Dr. Stewart Paul Slovic, Professor, Department of Psychology, Decision Research, Eugene, OR

Dr. V. Kerry Smith, University Distinguished Professor, Department of Agricultural and Resource Economics, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, NC

Dr. Robert Stavins, Albert Pratt Professor of Business and Government, Environment and Natural Resources Program, John F. Kennedy School of Government, Harvard University, Cambridge, MA

SCIENCE ADVISORY BOARD STAFF

Dr. Angela Nugent, Designated Federal Officer, 1200 Pennsylvania Avenue, NW
1400F, Washington, DC, Phone: 202-343-9981, Fax: 202-233-0643, (nugent.angela@epa.gov)

Dr. Holly Stallworth, Designated Federal Officer, 1200 Pennsylvania Avenue, NW, Washington, DC,
Phone: 202-343-9877, Fax: 202-233-0643, (stallworth.holly@epa.gov)

Attachment B: Federal Register Notice

Science Advisory Board Staff Office; Notification of an Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services (C-VPES)

[Federal Register: September 30, 2005 (Volume 70, Number 189)]
[Notices]
[Page 57293]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr30se05-88]

ENVIRONMENTAL PROTECTION AGENCY
[FRL-7977-8]

Science Advisory Board Staff Office; Notification of an Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services (C-VPES)

AGENCY: Environmental Protection Agency (EPA).
ACTION: Notice.

SUMMARY: The EPA Science Advisory Board (SAB) Staff Office announces a public meeting of the SAB Committee on Valuing the Protection of Ecological Systems and Services (C-VPES) to discuss a draft advisory and initial committee work on methods for valuing the protection of ecological systems and services.

DATES: October 25-26, 2005. A public meeting of the C-VPES will be held from 9 a.m. to 5:30 p.m. (eastern time) on October 25, 2005 and from 9 a.m. to 3:30 p.m. (eastern time) on October 26, 2005.

ADDRESSES: The meeting will take place at the SAB Conference Center, 1025 F Street, NW., Suite 3700, Washington, DC 20004.

FOR FURTHER INFORMATION CONTACT: Members of the public wishing further information regarding the SAB C-VPES meeting may contact Dr. Angela Nugent, Designated Federal Officer (DFO), via telephone at: 202-343-9981 or e-mail at: nugent.angela@epa.gov. The SAB mailing address is: U.S. EPA, Science Advisory Board (1400F), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. General information about the SAB, as well as any updates concerning the meetings announced in this notice, may be found in the SAB Web site at: <http://www.epa.gov/sab>.

SUPPLEMENTARY INFORMATION:

Background

Background on the SAB C-VPES and its charge was provided in 68 Fed. Reg. 11082 (March 7, 2003). The purpose of the meeting is for the

SAB C-VPES to discuss a draft advisory report calling for expanded and integrated approach for valuing the protection of ecological systems and services. The Committee will also discuss initial work on describing and assessing methods for such valuation, a topic that the Committee plans to address in a separate advisory report. These activities are related to the Committee's overall charge: to assess Agency needs and the state of the art and science of valuing protection of ecological systems and services and to identify key areas for improving knowledge, methodologies, practice, and research.

Availability of Review Material for the Meetings

The Agenda and materials for this meeting will be available from the SAB Staff Office Web site at: <http://www.epa.gov/sab/agendas.htm>.

Procedures for Providing Public Comment

It is the policy of the EPA SAB Staff Office to accept written public comments of any length, and to accommodate oral public comments whenever possible. Requests to provide oral comments at the October 25-26th meeting must be made in writing (by mail, e-mail, or fax) and received by Dr. Nugent no later than October 18, 2005.

Oral Comments: Each individual or group requesting an oral presentation at this meeting will be limited to a total time of ten minutes. Speakers should bring at least 35 copies of their comments and presentation slides for distribution to the participants and public at the meeting.

Written Comments: Written comments should be received in the SAB Staff Office by October 18, 2005 so that the comments may be made available to the committee for their consideration. Comments should be supplied to the DFO at the address noted above in the following formats: one hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat, WordPerfect, Word, or Rich Text files (in IBM-PC/Windows 98/2000/XP format)). Those providing written comments and who attend the meeting are asked to bring 35 copies of their comments for public distribution.

Meeting Accommodations

For information on access or services for individuals with disabilities, please contact Dr. Nugent at the e-mail and phone number above. To request accommodation of a disability, please contact Dr. Nugent, preferably at least 10 days prior to the meeting, to give EPA as much time as possible to process your request.

Dated: September 26, 2005.
Anthony Maciorowski,
Associate Director for Science, EPA Science Advisory Board Staff Office.
Board Staff Office.

Attachment C: Agenda

Meeting of the SAB Committee on Valuing the Protection of Ecological Systems and Services (CVPESS)

Draft Agenda -- October 25-26, 2005

Woodies Building, 1025 F Street, N.W., SAB Large Conference Room, Room 3705
Washington, DC 20004

Purposes: 1. to reach agreement on “Document Zero,” the initial committee report calling for an expanded and integrated approach for valuing the protection of ecological systems and services; 2. to reach agreement on how to revise Chapters 3 and 4 of the draft Methods Report; 3. to refine plans for the SAB Workshop, Science for Characterizing Ecological Benefits for EPA's Environmental Decisions and Programs, scheduled for December 13-14, 2005; and 4. to discuss what additional report(s), including an “Applications Report,” the committee will prepare.

All of these activities are related to the Committee's overall charge: to assess Agency needs and the state of the art and science of valuing protection of ecological systems and services, and then to identify key areas for improving knowledge, methodologies, practice, and research.

October 25, 2005

9:00 - 9:10	Welcome	Dr. Angela Nugent, EPA, SABSO Dr. Vanessa Vu, EPA, SABSO
9:10 - 9:15	Introduction of members Review of agenda and approach to committee deliberations	Dr. Barton H. (Buzz) Thompson, Jr., Acting Chair Dr. Kathleen Segerson, Acting Vice Chair
9:15-9:45	Introduction to draft document, <i>Valuing the Protection of Ecological Systems and Services: An Expanded and Integrated Approach</i> and summary of substantive issues received from C-VPESS Members	Dr. Kathleen Segerson
9:45-10:45	Discussion of key terms	Dr. Kathleen Segerson Committee discussion
10:45 - 11:00	Break	
11:00 - 12:00	Discussion of current ability of ecological science to characterize and quantify the effects of EPA protective actions	Dr. Gregory Biddinger (reporting out for working group) Committee discussion
12:00 - 12:15	Summary of next steps related to draft document	Dr. Kathleen Segerson

12:15 - 1:15	Lunch	
1:15-1:30	Introduction to <i>Methods Report</i> and approach for deliberations and revisions	Dr. Barton H. (Buzz) Thompson, Jr.
1:30-3:15	Discussion of Chapter 4 of draft <i>Methods Report</i>	Committee discussion
3:15 - 3:30	Break	
3:30-5:15	Continued discussion of Chapter 4	Committee discussion
5:15-5:30	Summary and discussion of agenda for October 26	Dr. Barton H. (Buzz) Thompson, Jr.
5:30	Adjourn	

October 26, 2005

8:30-8:35	Opening of Meeting	Dr. Angela Nugent, EPA, SABSO
8:35-9:40	Discussion of Proposal for Chapter 3 and Ecological Modeling and Monitoring section of Chapter 4	Dr. Gregory Biddinger (reporting out for working group) Committee discussion
9:40-10:00	Break	
10:00-11:45	Continued discussion of Chapter 3 and 4 Issues	
11:45-12:00	Summary of next steps related to the Methods Report	Dr. Barton H. (Buzz) Thompson, Jr.
12:00-1:00	Lunch	
1:00-2:30	Plans for SAB Workshop planned for December 13-14 2005, <i>Science for Characterizing Ecological Benefits for EPA's Environmental Decisions and Programs</i>	Dr. Barton H. (Buzz) Thompson, Jr. Committee discussion
2:30-3:00	Discussion of proposed Applications Report and next steps	Dr. Barton H. (Buzz) Thompson, Jr. Committee discussion
3:00	Adjourn	

Attachment D: Definition of Terms (Revised 10-24-05)

For purposes of this report, we use the following definitions:

Ecosystem: A dynamic complex of plant, animal, and microorganism communities and the non-living environment, interacting as a unit. (modification of MA)

Ecosystem functions or processes: The characteristic physical, chemical, and biological activities that influence the flows, storage, and transformation of materials and energy within and through ecosystems. These include processes that link organisms with their physical environment, (e.g., primary productivity and the cycling of nutrients and water) and processes that link organisms with each other (e.g., pollination, predation, and parasitism). (EBASP; Hal Mooney)

Ecosystem Services: Those ecological functions or processes that directly or indirectly contribute to the well-being of human populations or have the potential to do so in the future. (EBASP; modified version of MA).

(Note to Committee: The original definition in the MA refers to the “benefits” that ecosystems provide to human populations. The above definition deliberately uses “well-being” – as in EBASP – rather than “benefits”.)

Value: This term is used broadly to include values based on utilitarian goals, social/civil norms, culturally endorsed moral or religious obligations, or personal aesthetic perceptions or spiritual connections.

Valuation: The process of expressing a value for a particular action or object. (Costanza, 2002).

(Note to Committee: EBASP has a narrower definition of valuation: “Valuation is the process of determining the worth, merit, or desirability of something. In the EBASP, the term is used more specifically to mean expressing the worth of a wide variety of environmental conditions in common units that can be aggregated and compared across alternative courses of action so that the relative desirability of the alternatives can be determined.”)

Ecosystem (or Ecological?) Valuation: The process of expressing a value for a change in an ecosystem, its components, or the services it provides. (modified from Costanza, 2002).

Valuation Method: A scientific methodology, based on theory and data, for estimating or measuring the value of a change in an ecosystem, its components or the services it provides.

Monetary Valuation: The process of expressing a value for a change in an ecosystem, its components, or the services it provides in monetary units.

(Note to Committee: EBASP equates “monetary valuation” and “economic valuation.” The above definition does not imply that the two are necessarily equivalent.)

Non-monetary Valuation: The process of expressing a value for a change in an ecosystem, its components, or the services it provides in non-monetary units.

Benefits: The contribution of ecosystems and their services to human well-being. (EBASP)

Economic Valuation: The process of estimating or measuring the value of a change by estimating or measuring the tradeoffs that individuals are willing to make in exchange for the change, i.e., how much of something they are willing to give up in exchange for more of something else.

Economic Benefits: At the individual level, the amount of money a person would be willing to exchange for a given change (in an ecosystem, its components, or the services it provides). In other words, the amount of money an individual is willing to forgo or pay to enjoy a particular positive change (willingness-to-pay) or the amount of monetary compensation a person would accept in lieu of receiving that change (willingness-to-accept). **This includes both benefits derived from both use and non-use values.** (OMB, 1996).

(Note to Committee: This definition is designed to be consistent with the specific notion of “benefits” used in conjunction with EO 12866 as articulated in Circular A-4 and the Guidelines for implementing it, which state that “The concept of “opportunity cost” is the appropriate construct for valuing both benefits and costs.”)

References:

Costanza, 2002: Farber, Costanza, and Wilson, “Economic and Ecological Concepts for Valuing Ecosystem Services,” *Ecological Economics*, 41, 2002: 375-392.

MA: Millennium Ecosystem Assessment

EBASP: EPA’s Ecological Benefits Assessment Strategic Plan (Draft, November 2004), Text Box 1, p. 4.

OMB: Office of Management and Budget, Economic Analysis of Federal Regulations Under Executive Order 12866, January 11, 1996.

**Attachment E:
Decisions to Revise Certain Usage of Certain Terms Discussed at 10-15-05 C-VPES
Meeting**

Value: Dr. MacLean will submit a shorter version with aim to use plain language (e.g., well-being rather than utilitarian goal) and simplify.

Valuation: replace with the following: estimating or measuring the value of a change in an ecosystem, its components, or the services it provides.

Ecosystem/ecological valuation: Dr. Biddinger to work with ecologists to provide language clarifying that several ecological levels are of interest.

Valuation method: definition not needed.

Economic Valuation Methods: methods that focus on individuals' tradeoff preferences related to gaining or preserving benefits from the ecosystem, its components, or the services it provides. These approaches typically focus on the amount of money an individual is willing to forgo or pay to enjoy a particular positive change (willingness-to-pay) or the amount of monetary compensation a person would accept in lieu of receiving that change (willingness to accept). This includes benefits derived from both use and non-use values.

Social/Psychological Valuation Methods: Dr. Daniel to provide definition.

Ecosystem Services: Dr. Boyd to provide language that modifies the Millennium Assessment definition, language to clarify that services are characteristics (not processes or functions) of systems that produce intermediate products and end products for humans. Functions and processes are valuable, but are not services in themselves.

Social/Psychological Valuation Methods: Dr. Daniel to provide definition.

Non-monetary Valuation: Remove the word "change" and replace "units" with "terms."

Economic Valuation Methods: methods that focus on individuals' tradeoff preferences related to gaining or preserving benefits from the ecosystem, its components, or the services it provides. These approaches typically focus on the amount of money an individual is willing to forgo or pay to enjoy a particular positive change (willingness-to-pay) or the amount of monetary compensation a person would accept in lieu of receiving that change (willingness to accept).

Attachment F

Outline of Dr. Gregory Biddinger's presentation to begin discussion of "Ability of Ecological Sciences to Characterize and Quantify the Effects of EPA Protective Actions"

The Questions Raised

- What is the degree to which ecological science is capable of characterizing and quantifying the effects of various governmental actions?
 - Committee would like a clear definition of what ecological sciences can say and what it can't say?

- Ability of ecological science to make necessary predictions to support valuation exercises?
 - e.g. How ecological services would change (or not) as a result of EPA policy (or regulatory) actions

Group Discussion

Ecological science can deliver predictions of ecological change (or prevention of change) associated with effects of agency actions

Of course the Ecological group suggested that the question should be reframed in terms of levels of uncertainty in ecological models and of course in reference to uncertainty in with the complete valuation exercise.

Can connect material outputs to stocks and services if services are well defined.
(Research focus area)

Quantitative Approaches have been developed. (see sec. 3 methods report.)

- Individuals – Foraging, Energy, Physiological ecology
 - Populations – Growth function, death, birth, Maximum sustainable yield plus stability considerations
 - Communities – Species diversity, Niche-theory,
 - Ecosystems – Flux of Energy or elements, forest, desert, tundra, streams, lakes
 - Landscape Models? – Habitat, spatial indications?
 - Global Change Ecology – Cycling of CO₂, Biosphere models, Dynamic global Vegetation Models
- Ecologists do not have data available on shelf to parameterize every ecological system for EPA's use. (Research focus area)
 - Would be useful to address in context of application examples
 - Provide citation to primer on ecological theory and Modeling (Roughgarden 1998, Primer of Ecological Theory)
 - Most ecological models have been developed to satisfy research objectives not agency policy or regulatory objectives
 - Some models may have both research and policy applications; Others may be adaptable
 - Develop ‘Venn Diagram’ of research Models that are policy relevant
 - Adaptation of models should consider alignment between
 - models,
 - ecological services,
 - service providers,
 - potential injuries and
 - the stressors under agency purview
 - GAPS analysis – Map agency stressor sets and impact on services to existing models.
 - Example : Cooling water tower, entrainment, impingement
 - Larges number and mass of fish taken
 - Ecological service not discussed.
 - What models could be used to project ecological service flows
 - Issue to be resolved: Ecology as a source of value or benefit?

Managing Ecological Services ... - Kremens, C Ecological Letters (2005) 8:468-479

- Research Agenda
 - Identify “Service providers”
 - Determine aspects of community structure that influence function (including compensatory response and non-random extinction sequences)
 - Assess the key environmental factors that influence provision of service
 - Measure spatio-temporal scale of over which services are provided
- Need to link Document zero to methods document (section proposed by Joan will hopefully achieve this linkage)
- Need to create alignment between the general discussion in chapter 3 and the methods discussion
- Current version has strong discussion on levels of ecological study in chapter 3 but difficult to see how this links to methods as outlined in chapter 4.
 - Section 4.5.1 on ecological production models needs to be developed
 - Discussion in chapter 3 on Landscape Ecology might help link to Biodiversity
- Use of Examples or map to agency applications (sec. 3.4) - Current methods sections doesn't really provide examples of how the agency might apply these methods with examples. This raises the standing tension of “where and when” to introduce examples.
- Research recommendations – if so, in which report
- Tipping-point discussion?

Attachment G

Central Graphic Offered for C-VPES Discussion by Drs. Daniel, Polasky and Roughgarden on October 26, 2005

