

**Summary Minutes of the
U.S. Environmental Protection Agency (EPA)
Science Advisory Board (SAB)
Committee on Valuing the Protection of Ecological Systems and Services
Advisory Meeting
June 14-15, 2004, Science Advisory Board Conference Center, 1025 F Street, NW
Washington, DC, 20004**

Committee Members: (See Roster – Attachment A)

Date and Time: 9:00 a.m. – 5:45 p.m., June 14, 2004; 8:00 a.m. - 4:00 pm June 15 2004
(See *Federal Register* Notice - Attachment B)

Location: Science Advisory Board Conference Center, 1025 F Street, NW, Suite 3705, Washington, D.C. 20004.

Purpose: The purpose of the meeting was for the Committee to hold panel discussions, briefings, break-out groups focusing on an example of benefit analysis supporting EPA regulations, and planning sessions. 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:

Chair:	Dr. Domenico Grasso
Committee Members:	Dr. William Louis Ascher
	Dr. Gregory Biddinger
	Dr. Ann Bostrom
	Dr. James Boyd
	Dr. Robert Costanza
	Dr. Terry Daniel
	Dr. A. Myrick Freeman
	Dr. Geoffrey Heal
	Dr. Robert Huggett
	Dr. Klaus Lackner
	Dr. Douglas E. MacLean
	Dr. Harold Mooney
	Dr. Stephen Polasky
	Dr. Paul G.Risser
	Dr. Holmes Rolston
	Dr. Kathleen Segerson
	Dr. Paul Slovic
	Dr. Robert Stavins
	Dr. Valerie Thomas
	Dr. Barton H. (Buzz) Thompson, Jr.
SAB Staff:	Dr. Angela Nugent, Designated Federal Officer

Dr. Anthony Maciorowski, Associate
Director for Science, SAB Staff Office
Mr. Eric Harkness, SAB Staff Office, Intern

Meeting Summary: June 14, 2004

The discussion generally followed the issues and as presented in the Workshop Agenda, (See Workshop Agenda - Attachment C). One public comment was provided for the Committee.

Introductions, Welcome from the SAB Staff Office, and Chair's Orientation to the Meeting

Dr. Angela Nugent, Designated Federal Officer (DFO) for the Committee on Valuing the Protection of Ecological Systems and Services, called the meeting to order at 9:00 a.m. and welcomed Committee members, Agency staff, and members of the public to the workshop. She informed the audience that the Committee was by law and EPA policy subject to the Federal Advisory Committee Act and that Committee members conformed to ethics regulations applicable to them as Special Government Employees.

Dr. Anthony Maciorowski, Associate Director for Science in the SAB Staff Office, thanked members, presenters at the workshop and SAB Staff. He noted the progress the Steering Group and the Committee has made in developing a strategy for this challenging project (Attachment D). He expressed appreciation to partner offices at EPA -- especially the Office of Policy Economics and Innovation, which provided key information about the history of economically significant rules, the National Center for Environmental Economics, which provided the SAB Staff Office with background documents and status information related to the draft Ecological Benefits Strategic Plan effort, the Office of Air and Radiation, and especially EPA's Office of Water, provided information and staff support for the Committee's planned example exercise on the "Confined Animal Feeding Operations" benefit assessment.

The Chair introduced himself and asked Committee members and attending members of the public to introduce themselves. He then noted that the meeting would focus on several overarching issues for the Committee and then on science issues related to the Agency's needs for benefit assessments supporting regulations. He linked the agenda activities 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. He thanked the Steering Group, which includes Dr. A. Myrick Freeman, Dr. Harold Mooney, Dr. Kathleen Segerson, and Dr. Valerie Thomas, for its efforts in planning the meeting and in building on Committee members' suggestions at the April 2004 meeting to generate the Draft Project Strategy (Appendix D). He noted that the heart of the strategy is development of science advice to support four kinds of Agency needs related to "valuing ecological systems and services:"

1. Needs for benefit assessments supporting regulations
2. Regional needs for assessing and communicating the value of protecting ecological systems and services

3. Needs for assessing and communicating the value of EPA's programs protecting ecological systems and services under the Government Performance and Results Act to Congress, the Executive Branch, and the public
4. Need for communicating generally to the public the value of protecting ecological systems and services for communication products accompanying EPA decisions and for communication products encouraging environmental stewardship

He noted that future meetings of the Committee would focus on needs 2-4 listed above.

Discussion of Draft Paper from Committee Steering Group: "On Valuing Ecological Systems And Services: Paradigms And Methods."

Dr. A. Myrick Freeman provided an introduction to the draft paper. He began by providing a context. His primary focus was on definitions that would help EPA and the Committee focus on national rules and scientific assessment and quantified measures most useful for them. He chose the term "paradigm" in part because the Millennium Ecosystem Assessment, which had also distinguished between intrinsic and instrumental values, had used the term. He emphasized the importance of agreeing on concepts, rather than how they fit together as taxonomy, which may be a matter of taste.

He then discussed the concept of instrumental values. He noted that "substitution" is part of what defines instrumental values. Substitutability can help define the value of a particular policy. A utilitarian or economic approach is relevant here. Such an approach is related to increased well being of individuals, which is understood in "short-hand" as willingness-to-pay. Such an approach is based on individual preferences and includes use values, non-use, and passive use values.

Another approach to instrumental values involves a different concept of welfare. This approach takes community preference as providing the values for policy choices. Values are identified through a social or community process that may involve a consensus process.

Dr. Freeman then turned to a discussion of intrinsic values. Many of the definitions of intrinsic values express rights of other species to exist. He noted that the Millennium Assessment provides detail on cultural and religious precepts relating to intrinsic values.

Dr. Freeman then addressed the category identified in the draft paper as "Other." He noted that there are references to such ecological values as biodiversity and ecological health, which do not fit into the intrinsic or instrumental categories.

Dr. Freeman then briefly mentioned the draft paper's discussion of methods. Some methods relate to economic and utilitarian values are drawn from the choices most people make; other methods related to those values are stated preference methods that ask people to respond to hypothetical questions. He noted that other methods are available that elicit community-based deliberative values.

He closed his presentation by noting that establishing "values" from an economic standpoint is difficult because of a key assumption. Economic values presume that changes in

ecosystem services can be known. In reality, stressors have multiple endpoints, many of which are unknown; there is the potential for irreversible effects, convexities, and chaotic effects. All these factors make it difficult for economists to establish instrumental values.

Dr. Klaus Lackner then provided a summary of Committee members' written comments received prior to the meeting, and some of his own comments as an engineer and physicist. He began by noting that the major "step forward" provided by the draft paper was the clear focus on evaluating changes in ecological effects or an ecosystem, not the total ecosystem. This is important – a change might not be very large. Under the "Clear Skies" proposal, a change may be in visibility for 50-60 days or nearly zero.

He also noted that the term "value" is intrinsically confusing. It is different from the notions of "cost" and "price." He noted that the definition of value is not necessarily monetary. It might involve a ranking of things, but, to be reasonable, the ranking must be done in a multi-dimensional space. Diamonds might be more valuable than water in some senses, but not in others. The notion of supply and demand and markets can confound the understanding of values and perhaps then possibly confound a decision.

A key attribute of "value" is that it is a property humans give to things. The concept of instrumental value is useful. If there is a substitute for something, that substitution can help establish the value for that thing. An intrinsic value, or "value as an end," however, is something that cannot be derived from something else. He noted the comment that community values were not just instrumental. A community might make an ethical choice, just as an individual might do so. He noted the importance of the "other" category as representing a variety of approaches people have developed for valuing animals, ecosystems, and environments. He also noted that he suspected that there was a fourth category, not mentioned, that might be characterized as the "*status quo* preferred." If one considers happiness or well being a measure of value, then the removal of some thing may remove happiness, well being or satisfaction, or create a feeling of "being wronged" or "committing a wrong."

A key comment received is that one cannot separate the reasons why individuals or groups attach values to a thing: well being, morals and esthetics are all combined. Any given measure, for example, "willingness-to-pay," may measure all of those reasons or none of them. An alternative approach might be to measure strength of attitude.

He concluded his summary and comments with the conclusion that, in his view, decision makers establish values, and that aesthetic, moral, and instrumental considerations are all built into those decisions. Making those decisions and establishing those values are an exercise of power. Discussions of taxonomies of values are academic discussions, not useful for decision-making. In actual decisions, there are many different parameters by which one can make a decision, and decisions need to be made in a multi-dimensional space, with independent parameters. It is a question of power to determine one metric that rules. The argument becomes circular when the science just reflects decision makers' prior decisions. In his view, it is important to identify dimensions of value important to and practical for decision makers and quantify those. That task is difficult in itself. Building a single over-arching measure will not serve the decision maker.

The Committee then began a general discussion of the draft paper. One member raised a question about the relationship of instrumental values and substitutability. Although sometimes a substitution is valued only as a means to a single end, at other times a substitution is valued as a means toward several ends. In the latter case, substitutions cannot be taken as the mark and measure of instrumental value.

Another member noted that the term "value" has multiple meanings. One meaning is quantitative and numeric. Another meaning is value as an intrinsic quality. He asked whether there was a term the Committee could use as alternative to "valuing." He asked whether the committee is focused on assigning numbers to assess changes in systems or whether its job was to clarify the values of ecological systems and services for decision and communication purposes.

He noted the importance of the key issue of measuring the value of changes, rather than totals. He remarked that this distinction was important and cited the work of Kahneman and Tversky in prospect theory. People do value utility not in terms of total value, but in terms of changes in utility. This research also raises some important questions about the nature of the baseline (e.g., does it frame the issue to include history or restoration to a past state? This is important because restoration is valued more than improvement). Kahneman and Tversky's research show that valuing changes can lead to all sorts of non-rational inconsistencies. Another member noted, in addition, that the size of a loss also makes a difference in people's perceptions.

Yet, another member emphasized that the definitions and concepts are means towards the Committee's goals of providing advice. He saw a need to clarify the terms "value" and "valuation." He did not see a hard distinction, or a particularly useful distinction, between instrumental and intrinsic values. Sometimes a value (i.e., biodiversity) is associated with both means and ends. He preferred to view intrinsic values as goals, as things that need to be highly valued or reserved. Other things are instrumental in getting toward those goals. In addition, goals themselves are not independent of each other; they are related (e.g., cultural values, world views).

Dr. Lackner responded that identifying the goals is the prerogative of decision makers and should be left to them. If technical analysts take on that task, they would be making decisions about values other people have. That should be avoided. Another member noted that individuals or communities pursue some goals or "ends" but view them as less intrinsically valuable than other goals or "ends."

Another member emphasized that EPA needs to make recommendations and decisions regarding regulations. For that purpose, it is important, when ever possible to express benefits in dollar terms. The Agency needs to clarify what can be monetized and what cannot. Information on willingness-to-pay and perhaps willingness-to-accept can provide this baseline. Another member seconded this view and emphasized the importance of providing guidance to EPA to assist them with the central question of how to meet statutory requirements and requirements from the Office of Management and Budget for benefit assessments. He suggested that the Committee might usefully think about what makes ecological systems and services especially difficult to value and what the Committee can suggest to address those difficulties. The DFO noted that the Agency wished to come to the Committee's September 2004 meeting to give a

briefing on how it was planning to improve benefits assessments for the 316(b) Cooling Water Tower rule, where more adequate characterization of ecological benefits were a major concern.

Several members addressed the question of why and whether ecological systems and services were especially difficult to value. One stated that the difficulty was due to tremendous diversity of views on the issue of ecological protection and that these different views were related to deeply held beliefs and feelings. Another member emphasized that actual decisions and the tradeoffs and choices involved with them are based on feelings. People don't actually need the numbers to make tradeoffs; they make decisions based on feelings all the time. Other members responded with concern that the category of "Other" was important, needed to be more fully developed (e.g., to include bioassessments, perceived quality of life, sustainability), needed to remain on the table, included in analyses presented to decision makers, and not relegated to an appendix.

Dr. Lackner provided a final comment to the general discussion. He saw merit in the distinction between means to an end vs. ends or goals and expressed the view of the group that all value cannot be expressed in a single number. He also saw merit in developing the "Other" category of values mentioned in Dr. Freeman's paper and saw the value of a multi-faceted, quantitative approach.

The Committee expressed the need for a clear process for revising the draft paper and incorporating it into the report of the Committee. The Chair asked a subgroup with diversity of views and disciplines to take on the task of building on Dr. Freeman's initial paper, incorporating the Committee's discussion summarized above, and revising and reworking the paper into a report chapter on an ongoing basis as the Committee pursues its work over future meetings.

The Chair asked Drs. Bostrom, Costanza, MacLean, Lackner, and Polasky to work together and with the DFO to revise the paper with the goal of holding a teleconference in late August.

Recent Inter-Disciplinary Efforts to Improve Approaches for Valuing Ecological Services and Their Relevance for EPA. Brief Presentations and Committee Discussion.

Dr. Grasso introduced the next three presentations by Committee Members, who have been engaged in exploring the question of inter-disciplinary efforts to improve methods for valuing ecological systems and services. He noted that their presentations would be followed by a general group discussion.

Dr. Harold Mooney provided an overview of "The Millennium Ecosystem Assessment—A Work in Progress." He described its organization, governance, and the status of its work. He viewed it as a multi-disciplinary scientific group, similar to the SAB Committee on Valuing the Protection of Ecological Systems and Services, with a charge to provide information useful for implementing several international conventions. He noted that the Committee is scheduled to post second drafts of regional assessments during the week of June 21, 2004 and he invited members of the Committee to serve as reviewers of those drafts. He described the nature of the multi-scale assessment (occurring at global, regional, national, and local scales). Technical chapters examine current status and trends of ecosystem services across ecosystem types.

Assessments will allow analysis of scenarios that will provide foresight regarding consequences of a range of potential decisions.

He also related the SAB's Committee's discussion of the draft paper *On Valuing Ecological Systems And Services: Paradigms And Methods* to Chapter 6 of *Ecosystems and Human Well-being, A Framework for Assessment; A Report of the Conceptual Framework Working Group of the Millennium Ecosystem Assessment*. In that Chapter, the Working Group developed four major categories of services that people obtain from ecosystems: provisioning, regulating, cultural, and supporting services. He noted that supporting services were similar to the "Other" category described in the draft paper. The Working Group then mapped ecosystem services to constituents of human well being and provided a discussion of relevant analytical methods.

When Dr. Mooney completed his presentation, one member asked whether the Millennium Assessment included psychologists and anthropologists and nature writers. Dr. Mooney responded that an outreach group chaired by David Suzuki includes internationally recognized nature writers, television producers, and playwrights to "market" the assessment's report. He also noted that a multi-disciplinary approach is being used to integrate local knowledge at regional levels into the scientific analysis. It is a challenge for the project overall to integrate local knowledge into peer-reviewed scientific assessments.

Dr. Geoffrey Heal provided a perspective on the work of the National Research Council (NRC) Committee on Valuation of Aquatic Ecosystems, which he chairs. He noted that the Committee's report is in peer review and that his comments were personal observations based on his two-year effort with the Committee. He informed the group that the NRC focus was on ecosystem services on aquatic and related terrestrial ecosystems.

His Committee was charged with assessing the economic value of changes in ecosystem services. The Committee acknowledge non-economic values, but doesn't address it directly. It specifically acknowledges that value is multi-dimensional and that some values are economic and some are not. It notes a range of ethical sources of value, such as "intrinsic value" or Kantian imperatives, and their importance for legislation and policy (e.g., the Endangered Species Act is motivated by Kantian imperatives), but the NRC work and forthcoming report focuses on Total Economic Values. Total Economic Values, as defined, however, is fairly broad and includes use values (direct and indirect) and non-use values (biodiversity, cultural heritage, resources for future generations).

He noted that it is rare to use market methods for valuation of ecosystem services. Chapters of the report evaluate different non-market methods and the types of ecosystems and services that could be evaluated using those methods. He noted that willingness-to-pay is used more often than willingness-to-accept. He noted that willingness-to-accept was chosen when someone has a right to a service and that this method might be used more often.

In his view, the biggest problem for benefit analysis was linking economic and ecological analysis. He found that ecologists tend to focus on ecosystem structure and function, not on ecosystem services to humans. He saw a need to stimulate research in ecology that was focused on human needs. Overall, he contended that economic valuation of ecosystems isn't different from valuation of health. If research in ecosystem services and production functions were

stimulated, ecological benefit analysis would improve.

Dr. Stephen Polasky, who also serves on the NRC Committee, provided an overview of the case studies examined by the Committee. He noted three challenges presented by those cases: 1) expressing ecosystem services in qualitative and quantitative terms; 2) expressing the economic values of ecosystem services; and 3) linking ecology and economics. In his view, the biggest problem was linkage. It is difficult to take available information on ecosystem structure and functions and derive information on ecosystem services to derive ecological production functions. Key questions are: do we know how services are produced?; do we know if and how they are altered?; do we know in what quantities?; do we know if these quantities are valued?; what methods are used to assess and value them?; are these methods reliable? And what's left out.

He reviewed for the committee case studies of different kinds of complexity and scale. A single ecosystem service example, such as the Catskills Watershed, is useful for decision makers, but the danger of such studies is mistaking a single service value for the entire ecosystem value. He gave the Columbia River Basin as a contrasting example of multiple ecosystem services, which raised different problems for ecologists and economists concerning one ecosystem service (salmon) and complex issues when a mix of ecosystem services and tradeoffs are considered. He noted that ecosystems produce multiple ecosystem services, many of which are closely interconnected. The interconnections make it difficult to analyze one service in isolation and to analyze the policy choices that may involve a tradeoff among services. For the most comprehensive assessments, such as the Natural Resource Damage Assessment of the Exxon Valdez, existence values were among most challenging to estimate and the ecological effects of oil spill were very difficult to assess.

Reviewing the case studies has convinced him that while, in one sense, attempting to value all ecosystem services is the correct approach, trying to attain "the value of everything" can not be done successfully. Dr. Polasky stated his view that valuation is most useful when there are specific questions to be addressed or very specific decisions to be made, and not to address general issues of the value of an ecosystem or ecosystem impact.

Dr. Mooney commented that the current focus in ecological research will make great improvements in ecological assessments possible within 10 years and that these improvements will allow ecologists to compare changes more effectively with baseline conditions. He also viewed probabilistic methods as useful tools for helping ecologists predict changes in the future. Progress in both these areas will enable ecologists to provide economists with information needed for valuation studies.

Members of the Committee spoke of the need for the group revising the draft paper "On Valuing Ecological Systems And Services: Paradigms And Methods" to incorporate insights from the Millennium Assessment and NRC Reports into the new draft. One member noted the importance of addressing how "intrinsic values" and "non-use" values are expressed. He predicted that over time market values will decline as engineering alternatives provide potential technological substitutions for ecosystem services. Expressing non-use values will become more important over time. Another member focused on the default assumption that willingness-to-pay was the most acceptable measure because it was conservative; he noted that it often seemed to underestimate ecological values. Yet another member noted that economic methods for

identifying values might not be the most appropriate way to identify values. It may not provide all the options, all the information that a decision maker needs.

The Committee discussion then ranged on a variety of topics related to the three presentations and how ways to identify and enhance the assessment of ecological values could be enhanced. One member asked if the SAB Committee included an anthropologist. The DFO responded that it did not, but an anthropologist might be appropriate to add for the September meeting, which will focus on regional decision-making. The Committee talked about whether and how to include analyses of community preferences in their discussion. The Committee briefly discussed how framing questions and uncertainties affect the result of revealed preference studies. One member asked if, in the face of great uncertainties, one should discard his or her analysis. Dr. Polasky responded that in his judgment, in several cases, the methods were reliable. The assessments of non-use values, however, had such varied quality of the information that the numbers were not useful. Dr. Heal observed that, given the analytical options available for non-use values, it would be just as meaningful for affected people to vote on values, as to use the currently available analytical results.

The Committee adjourned for lunch at 12:15 and resumed discussions at 1:15.

Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules.

Prior to the meeting, members of the Committee were given a list of final EPA rules over the period 1996 to 2003 that met the Office of Management and Budget (OMB) trigger for "economically significant rules" under Executive Order 12866. Three members presented remarks to stimulate discussion on these rules related to the following questions:

1. What kinds of ecological values were identified, characterized, and measured in EPA rules in the recent past? What kinds of values might be missing?
2. How were ecological values identified, characterized, and measured in these rules?
3. How would discussion/assessment of these values compare with discussions/assessments used elsewhere for comparable purposes?
4. Are there suggestions for improving the use of data, approaches and methods in the short term?
5. Looking at these rules as a whole, are there recommendations for research?

First to present, Dr. Gregory Biddinger, thanked SAB Staff Office for developing the document. He then outlined several broad but notable features of the rules. He pointed out that the majority of the rules (22/41) focused on air issues, 5 of the rules related to water issues, and 6 related to hazardous waste. He observed that many of these rules addressing the same ecological issues relied on the same data sets (e.g., there was repeated use of data sets related to visibility studies and forest damage by ozone.) With this in mind, he then raised the question of whether one can look at the benefits of any one rule without the context of previous rules. He inquired, for instance, with so many air rules, would a "surplus of benefits," or disbenefits, arise that would offer a diminishing rate of returns on enforcement and investment expenditures after the desired benefits had been captured by preexisting rules? He asked if EPA has a control in place

that accounts for the aggregate benefits of its rules. To solve this problem, he suggested EPA should keep a running tally to estimate when benefits have been captured.

Dr. Biddinger continued with several other observations about the rules. He noted that OMB in its annual reports of cost and benefit analyses provided narrative comment on only 4 out of the total 41. He asked whether EPA or anyone else is studying the impact of non-significant rules, which might have significant ecological impact. Dr. Biddinger said the Committee has no way of knowing whether the background document provided to the committee is truly representative of all EPA rulemaking. He then commented on his feeling that the rules do not provide a strong link between changes in ecological systems and services and economic impacts. For example, in its water rules EPA used non-sophisticated metrics such as total suspended solids and connected these metrics with designated uses. He questioned whether these measures were the most appropriate to use as inputs to economic models. In addition, he noted that the use of the water quality ladder by EPA as a measurement system establishes certain thresholds of benefits, but he pointed out this method does not focus on many aquatic endpoints and is therefore not very strong.

In his conclusion, Dr. Biddinger commented that this list of rules rarely touched on non-use values and lamented that non-use issues important to the public are dealt with too lightly and are hard to understand, as presented. He noted that rule summaries themselves are very difficult text to read. He also suggested that EPA use rulemaking analyses to examine whether previous rules are still strategically beneficial and should develop benefits assessments within the context of analysis toward goals set in EPA's strategic plan and mark progress made by previous rules. From a Research and Development perspective, he recommended that EPA should identify core objectives—what systems it is trying to protect, how rules will protect them, how will actions in the rules benefit humans and the ecosystem, as well as how the results can be measured. He ended his talk by focusing on the different approaches commonly taken by ecologists and economists, and proposed incorporating environmentalists into this discussion. He said economists are focused on the derived well-being of ecosystems, whereas ecologists are more concerned with the structure and flow of an ecosystem. Ecologists, in his view, would not assume that change in the system is bad. Yet, environmentalists might want things to remain stagnant. Thus, in reality, to get a full understanding of ecosystem values, environmentalists may need to join the discussion.

Several members of the Committee then commented on Dr. Biddinger's remarks. They recognized the need for economists and ecologists to work together to establish better methods of valuation. Some went further to say that values of the "experts" should not be the only ones considered. Members expressed the sentiment that EPA has very little flexibility in choosing the rules to develop; many of the Agency's rules are mandated by Congress. Dr. Biddinger replied that implementation guidelines may allow more flexibility at the local levels, where benefits tests may be useful. The Chair of the Committee asked whether Dr. Biddinger saw any case where ecological benefits, if calculated in a different way, could have influenced a final rule to have been fundamentally different. Dr. Biddinger said he didn't think so. But by providing more detailed information to the public, even if only qualitative at first, this would push the public discourse in the right direction to develop a heightened awareness of the importance of protecting ecological systems and services.

After this brief discussion, Dr. James Boyd, the second discussant, provided his

observations on the rules selected for discussion. He acknowledged the difficulty inherent in monetizing benefits, and stated, "You cannot conduct a good regulatory analysis according to a formula." Yet, he maintained that monetization is a valuable tool that offers the best presently available illustration of value. He went on to say that if monetization is impossible, the analyst should explain why and present other available quantitative information. Likewise, if the analyst can't quantify effects, it is appropriate to inform the reader why those effects cannot be quantified and provide a qualitative analysis of the subject matter. He stressed that the content of the regulations being discussed failed to follow this approach. He saw the need for improvement in this area and a need for EPA to do a better job defending the difficulty and limits of monetary assessment. He noted that the text of OMB Circular A-4, "Regulatory Analysis," issued September 17, 2003, was pragmatic and articulated limits to monetization and a procedure for agencies to follow, which EPA did not follow in most of the rules examined. He suggested that it would be informative to research the "return letters" available as part of the record of the rulemaking process to understand more fully the interactions between EPA and OMB as they relate to implementation of the Circular.

Dr. Boyd drew a caricature of the current EPA regulatory process: "First economists study the value of an ecosystem service related to the proposed rule. Then they present their findings and adjust them to fit the issue. Finally, they acknowledge that many other benefits exist, but they cannot be monetarily assessed." He exhibited several problems associated with this approach. He said the vast share of analytical resources goes into the monetization exercise, which provides a narrowly focused analysis. Also, EPA misses several opportunities: to benchmark and quantify actual effects; to communicate sources of ecological value, things that limit and enhance that value, and to communicate the economic principles involved.

Dr. Boyd then presented two ideas that might help EPA in its valuation methods: (1) get economists to help better argue the difficulties of monetization and (2) improve the qualitative analysis of ecological benefits and tradeoffs. He also reiterated prior SAB advice from the report *Underground Storage Tanks (UST) Cleanup & Resource Conservation & Recovery Act (RCRA) Subtitle C Program Benefits, Costs, & Impacts (BCI) Assessments: An SAB Advisory*: "We strongly encourage EPA to develop quantitative indicators of ecosystem service benefits. Quantitative landscape analysis, using GIS tools, can be used to derive indicators of preserved ecosystem service benefits." He ended by emphasizing that benefit monetization should not be the only way economists respond to EPA's needs.

Following Dr. Boyd's presentation, two Committee members responded. One agreed that if quantification of effects were highlighted in these reports, they would be profoundly more credible documents. The other mentioned that by monetizing what one can, quantifying what can't be monetized, and telling the rest of the story, EPA can provide a more solid picture of its regulatory goals and why its chosen rule offers the best avenue to success.

The third discussant, Dr. Bill Ascher, then offered his thoughts on the selected rules. He began his assessment by offering three premises. First, since the perception of the aim of the analysis is that it seeks to support the rule in question, these reports will be perceived as promotional documents, whether intended or not. Second, he asserted that no firm boundary between a "guess" and an "estimate" exists. The general wisdom is that while a guess would increase cost/benefit analysis error, an estimate would decrease error. Yet, in practice, distinguishing between the two is very difficult. Including uncertain information will not

necessarily degrade analyses and leaving information out of analyses can also introduce uncertainty. Third, he noted that direct economic costs are easier to estimate than the benefits of environmental improvements. Therefore, the bias of excluding uncertain estimates reduces net benefits for ecosystem protection. Additionally, this bias detracts from the final analysis because it does not highlight the need for data to value ecosystem protection properly.

Dr. Ascher then discussed the process of rulemaking. Working backward from the point of decision, he sees the following decision steps influencing the work of the analyst:

1. Rules are either adopted or rejected. This is done on the basis of both public interest and political considerations.
2. The analysis that accompanies the rule proposals are assessed by decision makers according to two criteria: the credibility and plausibility of the conclusion that benefits outweigh the costs, or vice versa; and the assailability by those opposing the rule.
3. The analysts conduct valuations on those potential benefits and costs for which sufficient evidence exists for the analysis to meet some threshold of credibility and plausibility. They intuit the subsequent steps and the criteria of acceptability, to protect their credibility in order to preserve their own professional standing as well as to comply with instructions from higher-level officials.
4. The analysts have to determine which effects to include, which value (or value range) to use in the analysis, and the right balance in conveying how much uncertainty is entailed in the estimates.

He noted that analysts often find themselves in a predicament whereby they need to maintain their own credibility and reputation, but are faced with unsatisfactory quantities of data on ecological benefits. He speculated that if analysts believe that the evidence to support a rule is strong enough without adding additional, more difficult-to-estimate considerations, they will eliminate those elements from the formal analysis, but may mention them as “icing on the cake.” He noted that this cut-off point of inclusion seems to be what benefits are most easily demonstrated. He asserted that if more items could be monetized, EPA might very well propose different rules.

He ended his talk by raising several questions:

1. What is the threshold of certainty for accepting a particular method?
2. Who decides on this threshold?
3. Who decides on the threshold of certainty for an estimate?
4. How is uncertainty conveyed?
5. Are stronger rules adequately considered?

Upon the conclusion of Dr. Ascher’s remarks, the Committee commenced its general discussion. One member noted that an irony exists in some of the examples—the concerns that may have precipitated the formation of a rule can end up at the end of a report in an appendix. He suggested this irony stemmed from an inability to value the “value” prompting need for the rule in the beginning. Consequently, the rule does not address people’s concerns as it emphasizes something else, and thereby losses credibility with the public. Another member pointed out that general dissatisfaction with rules comes partly from the uncertainty inherent in the rule. The uncertainty comes in two flavors: because an analyst didn’t have enough facts, or because the analytical problem is particularly elusive. Either way, he said uncertainty will affect

public perception of the rule. Yet another member noted that there could be considerable uncertainty surrounding costs as well as benefits.

Members discussed the need for a more coherent rhetorical approach toward addressing ecological benefits supporting rulemakings. One member noted that what might be needed would be a framework for discussing ecological benefits so they would be easy to convey and relevant to decision makers and the audience for such documents. Another member noted that the decision rule was not simple; decisions are not made at the point in which marginal costs equal marginal benefits. Some decisions will need to be screening-level assessments of benefits, while others will need to be more complete evaluations. A member noted that more complete analysis of benefits will allow identification of ancillary benefits that will allow better rule design and more multi-media problem solving.

To develop such a framework, one member suggested that the Agency might start with a list of ecosystem services (perhaps using the Millennium Assessment's four categories of ecosystem services, and then listing ecosystem services as identified by Gretchen Daily, David Pimentel, and Bob Costanza); then look at the ecosystem system services most valued by potential users (by reviewing the work of Jim Boyd and others). For a given rule, the Agency would use that list to identify what can be monetized, what services can be quantified, and for which services it needs to "tell the story."

Yet another member sensed a danger in establishing a holistic, standardized valuation approach given different cultures, religious beliefs, etc. She cautioned scientific understandings of ecosystem services can change over time, as well as public understandings of value. Another member raised a concern that by focusing on ecological services the Committee's work will be anthropocentric. Another member agreed, saying that a "service" implies something marketable. He much preferred using the terms ecological values and systems, noting there is a biasing element to the word 'service.' A different member offered his sense that "service" in the sense of this SAB project is an intrinsic value of an ecosystem.

After a short break, a member voiced his opinion that perhaps the Committee should offer two-tiered advice. On one level, the Committee should recommend methods and ideas that fit into the current rulemaking regime. Then on a higher level the Committee should suggest a new paradigm that would better capture the overall complexities of valuation. Supporting this approach, another member suggested pursuing an innovative, dynamic, approach to the Committee's report that wouldn't "get caught in the tyranny of text or tables," and instead suggest a web of linking decision points as we learn more about science and decision points. A member suggested that the Committee follow the work of the National Research Council Committee evaluating the contributions of behavioral science to decision making.

The Committee then closed discussion on this matter. The Chair identified next steps. Drs. Biddinger, Boyd, and Ascher will work together and with the DFO to integrate their comments and group discussion on the "Background Document for Discussion of Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules" into a draft chapter of the Committee's final report. They will prepare a draft for review prior to the Committee's September 2004 meeting.

“Values and Process in a Democratic Society: Lessons Learned from the Risk-Assessment Battlefield.”

Dr. Paul Slovic provided a presentation focusing on issues associated with implementation of risk assessment approaches and his observations of lessons that could be learned from that experience that could benefit implementation of new methods for valuing ecological systems and services.

Dr. Slovic noted that the word “risk” had many different meanings (potential adversity, hazard, probability, consequences). He observed that there were similar terminological problems associated with the concept of “values” and “valuation” that cause problems for scientists and policy makers.

He said that while danger is real, people invented the concept of risk to deal with the dangers and uncertainties of life. Assessing risk involves politics, science, and emotion and all three elements need to be addressed and dealt with. The measures used to characterize risk can influence how one understands and communicates about risk and so is an exercise of power. He closed his presentation with the following observation: “Recognizing interested and affected citizens as legitimate partners in the exercise of risk assessment is no short-term panacea for the problems of risk management. But serious attention to participation and process issues may, in the long run, lead to more satisfying and successful ways to manage risk.”

Dr. Robert Huggett was the first of three discussants to address Dr. Slovic’s presentation. He began by providing some history of risk as a scientific and technical activity, defined by the 1983 NAS Red Book as only one part of the risk management process. The human health risk assessment paradigm developed as a single-chemical, single-species, and single-endpoint approach with humans and cancer as the species and endpoint of interest.

The framework and guidelines for ecologic risk assessment followed in 1992 and 1998. Those documents emphasized the importance of problem formulation. It emphasized the importance of stakeholder and multi-disciplinary scientific involvement in defining the ecological endpoints of importance and the metrics to be used to measure what's important. Only when problem formulation is complete, can assessors do their work and risk management options be developed.

He acknowledged the need for more formal guidelines for problem formulation and risk management. He suggested that such a document was needed by EPA programs and regions and would be a major contribution.

Dr. Ann Bostrom served as the second discussant. She noted that valuation was a socio-political process like risk, but had not been studied like risk assessment. Risk assessment involves interdisciplinary collaboration, just as valuation of ecological effects involves such collaboration. Both processes involve a choice of endpoints and a temporal and spatial scale. She noted that analytical issues arising in the risk domain are similar to those arising for valuing ecological effects. Issues about how to frame risk-related questions are similar in both domains. Research shows that experts conceptualize problems differently from lay people, and that framing willingness-to-pay or willingness-to-accept questions evoke different responses than attitudinal questions regarding negative effects. In her view, these similarities indicate that

inclusive and deliberative processes are needed to improve the quality of analyses of the value of protection of ecological systems and services.

Dr. A. Myrick Freeman served as the second discussant. He noted that he was expressing views provided to him by Dr. Kathleen Segerson, who could not attend the current session. He shared her viewpoint and provided their comments. He noted that he was in agreement with the major points in Dr. Slovic's paper, but did not see the relevance to the Committee's work. He wondered what was the alternative to technical analysis. He did not view a structured, deliberative process as a substitute or complement to technical analysis. Although it might be possible to infer from deliberative processes something about preferred option, structured deliberative process may lead to different choices and outcomes, depending on how the deliberative process is facilitated. He questioned "how far down this road we want to go."

Dr. Slovic responded that the relevance of the paper relates to the role of the expert. Valuation, like risk assessment, tends to be structured by experts, who interject certain kinds of assumptions into the analysis. Experts choose the data and the models to be run. Dr. Slovic stated that such an approach was dangerous, when analyses are important and decisions need to be politically and morally acceptable to people. In the case of ecological benefits analyses that are complex and multi-dimensional, there is a need for diverse inputs.

Dr. Bostrom suggested that it would be helpful to articulate the appropriate interface between analysis and public processes. At the local level, such processes could take place along the lines pursued by Dr. Joseph Arvai or Dr. Robin Gregory. At the national level, EPA engages multi-stakeholder groups for different processes. Why shouldn't there be an appropriate role for a public process on ecological benefits for national rulemakings.

Another member acknowledged Dr. Slovic's presentation as a cautionary tale, suggesting that a larger participatory approach is needed and that the results of ecological benefit analyses need to be communicated clearly. Dr. Huggett echoed this view. He saw a role for the public in ecological valuation in the problem formulation phase. The public could help what's important and what metrics are appropriate, but the analysis needs to be done by technical people.

Yet another member saw value in structured processes for eliciting community preferences, goals, and community values that could inform analyses. One could ask individual willingness-to-pay or study the role of emotions in decision-making. He cited the Robert Frank book *Passions within Reason* as a useful source. Another member noted that humans may not have been prepared by evolution to deal with major, global risks like global warming.

Other members of the Committee took a different view. One member noted that participatory processes are very open to manipulation. Another noted that economists already realize that "framing matters" for stated preference research. When such research is done well, focus groups are held to help researchers determine how questions should be framed. Yet another member asked how deliberative processes would work in a rulemaking context. What did it imply for the Committee and its advice for the Agency in this regard? A member of the Committee responded that if there were a public good that was a "non-use" value not amenable to monetization, it would be appropriate for a group process. He encouraged the Committee to look at Robert Frank's work as a potential practical way of addressing this problem. He saw the Committee's charge as inviting new ways to approach problems.

Another member of the Committee emphasized that Dr. Slovic's presentation did not advocate substituting group processes for technical analysis. Instead, it cautioned against assuming that community views would come to the same conclusion as technical experts. He stated the importance of gathering information about public understandings of the value of ecological protection: "in our society it is not sufficient to say we don't care. We need to justify and rationalize these types of decisions. If we can't justify or convince the public that a decision is in their best interest, decisions won't fly."

A member of the Committee noted that the type of deliberative process being described in the presentation seemed different from other kinds of public input for decision making. The results of economic valuation should express the preferences of the public. The question, to him, seemed better framed as "do economic valuations reflect how the public want their preferences to be communicated?"

The Chair concluded the discussion by asking Drs. Bostrom, Freeman, and Huggett to write up a short summary of their views on how the how the risk paradigm and our experience using it has utility for value discussions. He asked them to include similarities and differences in their summary. He asked Dr. Slovic to integrate this text for the Committee's consideration for the final report.

Discussion of Plans for Second Day

Dr. Grasso provided a review of the purpose of the "Example Exercise" planned for June 15, 2004 and the process to be followed by the Committee's break out groups. He noted that the goal of the example exercise was to: "to provide a vehicle to help the Committee identify approaches, methods, and data for characterizing the full suite of ecological 'values' affected by key types of Agency actions and appropriate assumptions regarding those approaches, methods, and data for those types of decisions." Two break-out groups were each to focus on the Agency document, "Environmental and Economic Benefit Analysis of Final Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations" and address 11 discussion questions.

Leaders of the break-out groups will report back in a plenary session and then work with the DFO to draft a combined report from the break-out sessions that will be a component of the Committee's final advisory report.

The Committee adjourned at 5:30 p.m.

Meeting Summary: June 15, 2004

Opening of Second Day of Advisory Meeting

The DFO opened the meeting and distributed briefings on the "Example Exercise" for the Break-Out session.

Briefings on “Example Exercise” Process and Orientation to Example

Dr. Christopher Miller of EPA’s Office of Water provided an overview of the major endpoints and methodological approaches used by the Agency in the benefit analysis for the final rule. Throughout his presentation, Dr. Miller took questions from members of the Committee. One member of the committee asked whether analysts had any sense of the significance of the categories that they couldn't monetize. Dr. Miller responded that the Agency's analysis was driven by what could be monetized. The Agency focused on endpoints for which data were available on the baseline and the changes expected. The Agency then itemized what it knew it couldn't monetize.

Committee members asked whether the Agency chose to calculate benefits up to some target, perhaps where benefits exceeded costs. Dr. Miller responded that the Agency did not take such an approach. Instead it identified likely benefit categories, by reviewing previous studies, precedents, and brainstorming what could be done. The primary constraint on the thought process was the caution not to blow benefits out of proportion. The benefits and cost analyses are run in parallel. He emphasized that in the case of the CAFO rule, the Executive Order drove the cost-benefit analysis, not the statutory requirements.

In response to questions, Dr. Miller reported that the benefit analyses took two years of solid effort (1997-98) for the 2000 proposal, for which benefits were developed for major options and the preferred options. The Agency then took another year to collect data, take public comment, and run new options. The final assessment was published in 2003. He estimated that water quality modeling cost about \$250-300,000 dollars. Approximately one million dollars was spent overall on contract support for the benefit assessment. Internally at EPA an inter-agency team that included economists and environmental scientists in the Office of Water, Office of Air and Radiation, Office of Policy Economics and Innovation, and Office of Research and Development worked on the rule. Dr. Miller noted that his division budget has funds earmarked for extramural funds for contractor support of benefits analyses for different effluent guidelines. Dr. Miller noted that the rule was developed in partnership with the U.S. Department of Agriculture. Some studies of the implementation for the rules were conducted by the regulated industry.

A Committee member asked whether the Agency plans to evaluate rule performance. Dr. Miller responded that the Clean Water Act requires that the effluent guidelines be reviewed and evaluated periodically.

Another member asked whether the Agency considered providing benefits in terms of physical measures. Dr. Miller responded that the initial focus was on changes in loads and changes to water quality. After that, the over-riding concern was identifying effects that could be monetized. He noted that the fact sheet for the rule emphasizes the pounds of pollutants reduced and impairments prevented by the rules.

In response to a question about the development process for the rule, Dr. Anthony Maciorowski noted that the Agency has a process for developing analytical blueprint for significant rulemakings. Dr. Miller noted that often the blueprint process is not as useful as it might be in developing a plan for supporting a rulemaking.

Reports from Break-Out Groups and Committee Discussion

Dr. Buzz Thompson and Dr. Terry Daniel provided reports from break-out groups assigned to address 11 questions identified in the *Notes For 'Example Exercises' On Valuation Of Ecosystems And Services* (Attachment F). Their reports are included in these minutes as Attachment E. Drs. Daniel and Thompson will work with the DFO to develop a consolidated draft report from the break-out groups, and will circulate this report to the Committee before the September meeting.

Discussion of Next Steps

Dr. Grasso thanked members for their participation. Dr. Angela Nugent provided Members a copy of the June 15, 2001 report of the EPA Task Force on Improving EPA Regulations. Dr. Grasso and Dr. Nugent summarized the Action Items from the meeting:

1. Drs. Bostrom, Costanza, MacLean, Lackner, and Polasky will work together and with the DFO to revise the Draft Paper from Committee Steering Group: *On Valuing Ecological Systems And Services: Paradigms And Methods* with the goal of holding a teleconference in late August.
2. Drs. Biddinger, Boyd, and Ascher will work together and with the DFO to integrate their comments and group discussion on the *Background Document for Discussion of Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules* into a draft chapter of the Committee's final report. They will prepare a draft for review prior to the Committee's September 2004 meeting.
3. Drs. Bostrom, Freeman, and Huggett will write up a short summary of their views on how the how the risk paradigm and our experience using it has utility for value discussions. This summary should include a discussion of similarities and differences. Dr. Slovic will integrate this text for the Committee's consideration for the final report.
- 4.. Drs. Daniel and Thompson will work with the DFO to develop a consolidated draft report from the break-out groups, and will circulate this report to the Committee before the September meeting.

Dr. Grasso informed the Committee of upcoming Steering Group Planning teleconferences during the week of June 28th. Nugent then reviewed the tentative plans for the Committee's September meeting to be discussed by the Steering Group. Possible ideas for agenda items include:

1. Several follow-up items from the June meeting, including:

- a. the "Paradigms and Methods" discussion, which will also be specifically addressed in an August teleconference call
- b. the discussion of *Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules*
- c. the consolidated report from the break-out sessions on the CAFO example exercise
- d. the potential lessons from the "risk wars"
2. Several regulatory-related activities
 - a. review of the Agency's *Draft Ecological Benefits Assessment Strategic Plan*
 - b. briefing from EPA's Office of Water on plans for Phase 3 Regulation of Cooling Water Towers under Section 316b of the Clean Water Act
3. Regional science issues related to valuing the protection of ecological systems and services
 - a. panel discussion and review of a survey of regional science needs, work-products, and activities
 - b. briefings from Region 9 and potentially other regions
 - c. break out groups focusing on a set of regionally oriented example exercises
4. Field trip focusing on an issue related to valuation of ecological systems and services in the region.

The Workshop adjourned at 4:00 p.m.

Respectfully Submitted:

/Signed/

Angela Nugent
Designated Federal Officer

Certified as True:

/Signed/

Domenico Grasso
Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by the 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 Notices
- Attachment C: Workshop Agenda
- Attachment D: Draft Project Strategy for the EPA Science Advisory Board (SAB) Committee on Valuing the Protection of Ecological Systems and Services (C-VPES)
- Attachment E: Reports from Break-Out Group

Attachment A: Roster

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

CHAIR

Dr. Domenico Grasso, Rosemary Bradford Hewlett Professor and Chair, Picker Engineering Program, Smith College, Northampton, MA

Also Member: Executive Committee
Environmental Engineering Committee

SAB MEMBERS

Dr. William Louis Ascher, Dean of the Faculty, Bauer Center, Claremont McKenna College, Claremont, CA

Dr. Gregory Biddinger, Environmental Sciences Advisor, Exxon Mobil Refining and Supply Company, Fairfax, VA

Also Member: Ecological Processes and Effects Committee

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, Vice President for Research and Graduate Studies, Office of Vice President for Research and Graduate Studies, Michigan State University, East Lansing, MI

Dr. Klaus Lackner, Ewing Worzel Professor of Geophysics, Earth and Environmental Engineering, Columbia University, New York, NY

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, Director and 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
Also Member: Environmental Economics Advisory Committee

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

Also Member: Environmental Economics Advisory Committee

Dr. 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

Also Member: Advisory Council on Clean Air Compliance Analysis

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

Also Member: Environmental Economics Advisory Committee

Dr. Valerie Thomas, Research Scientist, Princeton Environmental Institute, Princeton University, Princeton, NJ

Also Member: Environmental Engineering Committee

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

SCIENCE ADVISORY BOARD STAFF

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

Attachment B: Federal Register Notices

Science Advisory Board Staff Office; Notification of Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services

[Federal Register: June 1, 2004 (Volume 69, Number 105)]

[Notices]

[Page 30908]

From the Federal Register Online via GPO Access [wais.access.gpo.gov]

[DOCID:fr01jn04-79]

ENVIRONMENTAL PROTECTION AGENCY

[FRL-7668-5]

Science Advisory Board Staff Office; Notification of Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Environmental Protection Agency, Science Advisory Board (SAB) Staff Office is announcing a public meeting of the SAB's Committee on Valuing the Protection of Ecological Systems and Services (C-VPESS).

DATES: June 13-14, 2004.

ADDRESSES: The meeting will be held at the Science Advisory Board Conference Center located at 1025 F Street, NW., Suite 3705, Washington, DC 20004.

FOR FURTHER INFORMATION CONTACT: Any member of the public wishing further information regarding this meeting may contact Dr. Angela Nugent, Designated Federal Officer (DFO), via telephone/voice mail at: (202) 343-9981, via e-mail at: nugent.angela@epa.gov, or by mail at U.S. EPA SAB (MC 1400F), 1200 Pennsylvania Ave. NW., Washington, DC 20460. General information about the SAB can be found in the SAB Web site at: <http://www.epa.gov/sab>.

SUPPLEMENTARY INFORMATION: Background on the Committee and its charge was provided in 68 FR 11082 (March 7, 2003). The purpose of the meeting is for the Committee to hold planning sessions, panel discussions, briefings, and work in break-out groups focusing on examples of benefit

analysis supporting EPA regulations. 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.

Availability of Meeting Materials: An agenda for the meeting will be posted on the SAB Web site at: <http://www.epa.gov/sab>, prior to the meeting. Other meeting materials will be available at the meeting, and may be requested from the DFO for those persons who can not attend the meeting.

Procedures for Providing Public Comments. It is the policy of the SAB Staff Office to accept written public comments of any length, and to accommodate oral public comments whenever possible. The SAB expects that public statements presented at the meeting will not be repetitive of previously submitted oral or written statements. Oral Comments: In general, each individual or group requesting an oral presentation at a face-to-face meeting will be limited to a total time of ten minutes (unless otherwise indicated). Interested parties should contact the DFO in writing (e-mail, fax or mail--see contact information noted above) by close of business June 4, 2004 in order to be placed on the public speaker list for the meeting. 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: Although written comments are accepted until the date of the meeting, written comments should be received in the SAB Staff Office at least one week prior to the meeting date so that the comments may be made available to the panel for their consideration. Comments should be supplied to the DFO via the contact information 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 95/98 format). Those providing written comments and who attend the meeting are also asked to bring 35 copies of their comments for public distribution.

Meeting Accommodations: Individuals requiring special accommodation to access this meeting, should contact the DFO at least five business days prior to the meeting so that appropriate arrangements can be made.

Dated: May 21, 2004.
Vanessa T. Vu,
Director, EPA Science Advisory Board Staff Office.
[FR Doc. 04-12306 Filed 5-28-04; 8:45 am]
BILLING CODE 6560-50-P

Science Advisory Board Staff Office; Notification of Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services; Correction

[Federal Register: June 14, 2004 (Volume 69, Number 113)]
[Notices]
[Page 33015]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr14jn04-71]

ENVIRONMENTAL PROTECTION AGENCY
[FRL-7673-1]

Science Advisory Board Staff Office; Notification of Upcoming Meeting of the Science Advisory Board Committee on Valuing the Protection of Ecological Systems and Services; Correction

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

SUMMARY: The EPA Science Advisory Board (SAB) Staff Office published a notice in the Federal Register of June 1, 2004, announcing a public meeting for the SAB's Committee on Valuing the Protection of Ecological Systems and Services (C-VPESS) on June 13-14, 2004. The notice contained incorrect dates.

FOR FURTHER INFORMATION CONTACT: Dr. Angela Nugent, Designated Federal Officer, via telephone/voice mail at (202) 343-9981, via e-mail at nugent.angela@epa.gov or by mail at: U.S. EPA SAB (MC 1400F), 1200 Pennsylvania Ave., NW., Washington, DC 20460. General information about the SAB can be found in the SAB Web site at: <http://www.epa.gov/sab>.

Correction

In the Federal Register of June 1, 2004, in FR Doc. 04-12306, on page 30908, correct the DATES caption to read:

DATES: June 14-15, 2004. The meeting will commence at 9 a.m. and adjourn at 5 p.m. (eastern time) on each day.

Dated: June 2, 2004.
Vanessa T. Vu,
Director, EPA Science Advisory Board Staff Office.
[FR Doc. 04-13286 Filed 6-10-04; 8:45 am]
BILLING CODE 6560-50-P

**Attachment C: Agenda
EPA Science Advisory Board
Committee on Valuing the Protection of Ecological Systems and Services
Advisory Meeting
June 14-15, 2004
Woodies Building, 1025 F. Street, N.W., Suite 3700
SAB Conference Center
Washington, DC 20004**

Purpose: The purpose of the meeting is for the Committee to hold panel discussions, briefings, break-out groups focusing on an example of benefit analysis supporting EPA regulations, and planning sessions. 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.*

Monday, June 14, 2004

9:00-9:10	Opening of Meeting Welcome from the SAB Staff Office	Dr. Angela Nugent, Designated Federal Officer Dr. Anthony Maciorowski, Associate Director for Science, SAB Staff Office
9:10-9:20	Chair’s Orientation to the Purpose of the Meeting Committee Member Introductions	Dr. Domenico Grasso, Chair Committee Members
9:20-10:30	Draft Discussion Paper from Committee Steering Group: “On Valuing Ecological Systems And Services: Paradigms And Methods.” Presentation Discussant Summary of Committee Members’ Comments Committee Discussion	Dr. A. Myrick Freeman Dr. Klaus Lackner, Discussant Committee Members
10:30-10:45	Break	
10:45-12:15	Recent Inter-Disciplinary Efforts to Improve Approaches for Valuing Ecological Services and Their Relevance for EPA. Brief Presentations and Committee Discussion. <i>Millennium Ecosystem Assessment: Ecosystems and Human Well-Being</i> Experience of SAB Members on NRC Committee on Valuation of Aquatic Ecosystems	Dr. Harold Mooney Dr. Geoffrey Heal, and Dr. Steven Polasky Committee

12:15-1:15	Lunch	
1:15-3:15	Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules.	
	Discussant Comments	Discussants: Dr. Gregory Biddinger Dr. James Boyd Dr. William Ascher
	Committee Discussion	Committee
3:15-3:30	Break	
3:30-4:30	Continued Discussion: Science Issues Related to a Retrospective Look at Recent History of Ecological Benefit Analysis at EPA for Economically Significant Rules	Committee
4:30-5:30	“Values and Process in a Democratic Society: Lessons Learned from the Risk-Assessment Battlefield.”	
	Presentation Comments	Dr. Paul Slovic, Presenter Dr. Robert Huggett, Dr. Ann Bostrom
	Committee Discussion	Committee
5:30-5:45	Discussion of Plans for Second Day	Dr. Domenico Grasso
5:45	Adjourn	

Tuesday June 15, 2004

8:00-8:15	Opening of Second Day of Advisory Meeting	Dr. Angela Nugent
8:15-8:30	Comments from the Public	TBA
8:30-9:15	Briefings on “Example Exercise” Process and Orientation to Example	Dr. Domenico Grasso Dr. Chris Miller , U.S. EPA
9:15-10:30	Break-Out Groups work on Example Exercise	Break-out Group Leaders: Dr. Terry Daniel Dr. Barton H. (Buzz) Thompson
10:30-10:45	Break	
10:45-12:00	Break-Out Groups work on Example Exercise	
12:00-1:00	Lunch	
1:00-3:00	Break-Out Groups work on Example Exercise	
3:00-3:15	Break	
3:15-4:00	Reports from Break-Out Groups	Dr. Barton H. (Buzz) Thompson Dr. Terry Daniel
4:00-4:30	Committee Discussion of Break-Out Group Reports	
4:30-5:00	Discussion of Next Steps	Dr. Domenico Grasso
5:00	Adjourn	

Attachment D: Draft Project Strategy for the EPA Science Advisory Board (SAB) Committee on Valuing the Protection of Ecological Systems and Services (C-VPES)

1. Purpose of this Strategy:

The purpose of this strategy is to identify how the activities of the C-VPES, formed in August 2003, will lead to a final report that will give advice to the Agency relating to the Committee's final charge.

2. Charge to the Committee from the SAB's Executive Committee:

The Committee will assess Agency needs and the state of the art and science of valuing protection of ecological systems and services, and then will identify key areas for improving knowledge, methodologies, practice, and research.

3. Major Approaches:

The Committee was charged by the SAB Executive Committee to conduct an original, self-initiated study.

The SAB Staff Office, the Committee Chair, and the Steering Group, formed in February 2004, have emphasized that success for this original, self-initiated study is linked to the Committee's providing advice that will relate to EPA's specific needs and that will have an impact on Agency science and use of that science for valuing ecological systems and services.

The major approaches adopted at the start of the project and endorsed by the Steering Group and Committee in general are to conduct this initiative with the goal of providing a first approximation of the advice needed by the Environmental Protection Agency. They endorsed the following major approaches under this initiative:

- 3.1. Advising the Agency on its plan to develop a "Strategic Plan for Ecological Benefits."
- 3.2. Providing advice to different offices in the Agency interested in the Committee's views on how to strengthen the data, approaches and methods used in valuing ecological consequences of environmentally related decisions or activities.
- 3.3. Hosting workshops on science-based approaches to valuing the protection of ecological systems and services used in practice by groups outside EPA: e.g., in other federal agencies, state governments, environmental groups, business entities and international organizations.
- 3.4. At the conclusion of the two-year initiative, issuing a final report assessing overall Agency needs and provide advice for strengthening the Agency's approaches for valuing the protection of ecological systems and services, their use by decision makers, and the key research areas needed to strengthen the science base

4. Specific types of EPA needs for advice relating to valuing ecological systems and services identified for focus by the Committee include:

- 4.1. Needs for benefit assessments supporting regulations protecting ecological systems and services
- 4.2. Regional needs for assessing and communicating the value of protecting ecological systems and services
- 4.3. Needs for assessing and communicating to Congress, the Executive Branch, and the public the value of EPA's programs protecting ecological systems and services under the Government Performance and Results Act
- 4.4. Needs for information/communication products to communicate to the general public about EPA regulatory decisions protecting ecological systems and services and information/communication products encouraging voluntary actions to protect ecological systems and services

5. Proposed outline/design of final report (See Table 1)

Table 1

Strawman Outline for Report of the Committee on Valuing the Protection of Ecological Systems and Services

Cover Letter

1. Executive Summary
2. Background Section
3. Concepts and Methods for Valuing
4. State of the Art and Science Within EPA and Needs at the Agency
 - 4.1. Summary of Managers' Stated Needs from October 2004 Workshop (benefit analyses supporting national Agency regulatory actions, local/regional analyses, GPRA reports, Communication/Information products)
 - 4.2. Results from review of methods/approaches used at EPA
 - 4.2.1. Review of recent benefit analyses supporting national Agency regulatory actions
 - 4.2.2. Review of local/regional analyses identified by regions
 - 4.2.3. Review of GPRA reports, EPA's use of the Program Assessment Rating Tool (PART) for ecological protection program and plans for improving the use of the PART, and the EPA's Report on the Environment from the perspective of the Committee's charge
 - 4.2.4. Review of communication/Information products used to communicate ecological decisions
 - Results from Committee's Example Exercises
 - 4.3. Conclusions after discussions with Agency about the draft Ecological Benefits Strategic Plan
 - 4.4. Committee's conclusions about Agency needs and current state of the art and science
5. Key areas for improving use of data, approaches and methods in short term -- conclusions about cross cutting issues¹ as derived from
 - 5.1. Results from Committee's example exercises
 - 5.2. Comparison of EPA methods used with State of Art in peer reviewed literature
 - 5.3. Synthesis of information from Millennium Report, NRC report
 - 5.4. Lessons to be learned from the Risk Assessment experience
6. Key areas for research
 - 6.1. Results from Committee's example exercises
 - 6.2. Recommendations for a research planning and technical transfer mechanism

6. List of Past, Planned, and Proposed Committee Activities at Meetings and Between Meetings and how they relate to parts of the Strawman Outline (See Table 2)

¹ Cross cutting issues mentioned at April 2004 meeting include: standards for acceptability of data and methods, analysis and characterization of uncertainty; institutional assumptions; assumptions about elasticity and substitutability; transferability; assumptions about the stability of ecological systems; and discounting benefits

Table 2

	Section/Part of the Strawman Outline	Committee Activities Related to that Section/Part of the Outline	Timing and Status of Activities
A	4.1. Summary of Managers' Stated Needs from October 2004 Workshop	Initial EPA Background Workshop	Workshop held October 27, 2004; Minutes to be redrafted by SAB Staff Office as component of Report
B	3. Concepts and Methods for Valuing	Presentation, discussion of written comments, and general Committee discussion	June 2004 Committee Meeting
C	4.2.1. Review of recent benefit analyses supporting national Agency regulatory actions	Review of recent benefit analyses supporting national Agency regulatory actions	June 2004 Committee Meeting
D	5.3. Synthesis of information from Millennium Report, NRC report	Panel and General Committee Discussion of Millennium Report, members' conclusions from serving on NRC Committee	June 2004 Committee Meeting; Minutes to be redrafted by SAB Staff Office as Component of Report
E	5.4. Lessons to be learned from the Risk Assessment experience	Panel discussion and general Committee discussion	June 2004 Committee Meeting
	4.3. Results from Committee's Example Exercises (as related to characterizing the State of the Art and Science and identification of EPA's Needs) 5.1. Results from Committee's example exercises (as related to identifying key areas for improving use of data, approaches, and methods in short term) 6.1. Results as related to identifying key areas for research	Example Exercise focusing on benefit assessment for EPA's Confined Animal Feeding Operations (CAFO) rule	CAFO Example Exercises to begin in June 2004 and conclude in September 2004
F	4.2.2. Review of local/regional analyses identified by regions	Briefings and Discussions of Suite of needs across EPA's 10 regions and Specific EPA Region 9 Needs	Planned for September 2004
G	4.4. Conclusions after discussions with Agency about the draft Ecological Benefits Strategic Plan	Review of EPA's "Draft Ecological Benefits Strategic Plan"	Planned for September 2004
H	4.2.3. Review of GPRA reports, Report on the environment	GPRA reports, EPA's use of PART for ecological protection programs and plans for improving the use of the PART, and the EPA's Report on the Environment	Planned for December 2004 meeting (to be scheduled)
I	4.2.4. Review of communication/Information products used to communicate ecological decisions	Briefings and Discussions of Agency needs for communication/information products, examples of current practice	December 2004 meeting (to be scheduled)
J	4.5. Committee's conclusions	Discussion of general conclusions,	March 2005 meeting (to be scheduled)

	Section/Part of the Strawman Outline	Committee Activities Related to that Section/Part of the Outline	Timing and Status of Activities
	about Agency needs and current state of the art and science	based on draft prepared by a synthesis subgroup to be identified by the Steering Group	
K	5. Key areas for improving use of data, approaches and methods in short term -- conclusions about cross cutting issues as derived from 5.2. Comparison of EPA methods used with State of Art in peer reviewed literature	Discussion of draft general conclusions ² , based on draft prepared by a synthesis subgroup to be identified by the Steering Group	March 2005 meeting (to be scheduled)
L	6. Key areas for research 6.1. Results from Committee's example exercises 6.2. Recommendations for a research planning and technical transfer mechanism	Discussion of draft conclusions regarding research, as relating to EPA needs and the "state of the art and science" discussed in meetings to date, based on a draft prepared by a research subgroup to be identified by the Steering Group	March 2005 meeting (to be scheduled)
M	Entire Report	Review of draft report, identification and discussion of issues	SAB Staff to work with Chair and Steering Group to integrate report components -Committee to review and discuss at teleconference calls and potential meeting to be planned for June 2005
		Completion of final report	August 2005

² Bibliographies to be referenced to include bibliographies attached to EPA Ecological Benefits Strategic Plan, 2001 Advisory of the Advisory Council on Clean Air Compliance Analysis, literature review to be developed by EPA's Office of Air and Radiation for ecological benefits assessment in the Second Prospective 812 Study, and other source identified by the subgroup)

Attachment E
Reports from Break-Out Groups

Terry Daniel, Break Out Group Leader

Bill Ascher
Ann Bostrom
Geoff Heal
Bob Huggett
Paul Risser
Holmes Rolston
Kathy Segerson
Valerie Thomas

Slide Presentation from Terry Daniel:

- Where are CAFO's distributed?
- Add antibiotics to pollutants list
- Maybe start with the processes that are important
- What do people value that is related to CAFO?
- Is the scale appropriate to know the effects?
- Eutrophication
- Should we specify sources, pathways and facts to fully understand?
- THM
- Changing ecosystems by putting organics into systems (birth control and other prescriptions)
- Pharmaceuticals in ground and level waters as pollutants
- Only some pollutants get monetized leaving the rest with no experiments
- In Depth studies compared and documented to validate projections (economic and ecological)
- Fish Kills
- Who cares what humans want? We should worry about the ecosystem
- Get a better represented ecological model\
- Analyze what is going in and coming out
- Inter-Generational Equity
- Representing non-monetized effects strongly and individually instead of groups (magnitude and significance)
- Take out the wording NON-MONETIZED
- Come up with default assumptions for issues
- Give future generations the same values we have today
- Examining costs and benefits beyond face value
- Giving the effects of magnitude and significance to Congress through reports
- Don't categorize things if they are monetized or not because it is obvious. Use some kind of criteria (some kind of change)
- Use of focus groups to pick what is important before things are done
- Ecologists will use a term that they know and is hard to translate back and forth
- Some kind of indicator has to be established to actually label these changes
- Biodiversity
- Establishing detailed Cost/Benefit Analysis so people understand them
- OMB Review
- PEER Review (Should be more precise)
- Government paying polluters \$20.9 Billion to clean up their own mess
- What things actually need to be peer reviewed

Draft -- 8/5/2004

- There should be multiple reviews for each project

Buzz Thompson, Break Out Group Leader

Bob Costanza
Rick Freeman
Klaus Lackner
Doug Maclean
Hal Mooney
Steve Polasky
Paul Slovic
Rob Stavins

Slide Presentations from Buzz Thimpson

Initial Thoughts on CAFO Study

- **Several factors narrow and drive analysis**
 - **Data availability – data driven**
 - **Agency silos**
- **Need more focus on planning at outset**
 - **Integrated systems model**
- **Would be useful to think ahead of common needs in rulemaking**
 - **E.g., estuaries**
 - **E.g., CAA**
- **Highly “caveated” benefits analysis**
 - **Assumptions, data gaps, benefits transfer**
- **Issues of uncertainty are too hidden**
 - **Ranges versus formal probability analyses**
- **Should use more as a “light bulb”**
 - **Uncertainty & Quality of Info**
- **Better characterize uncertainty**
 - **Describe as best as possible**
 - **Preferences in approach:**
 - **Point estimates**
 - **Point ranges**
 - **Indications of distribution (expert impressions)**
 - **Formal probability distribution**
 - **Monte Carlo analyses**
 - **Make lower limits explicit**
- **Make the level of the uncertainty clearer**
- **Evaluate and Indicate Quality of Information**
 - **Descriptors of quality?**

Identification and Analysis of Effects on Ecological Systems & Services

- **Process**
 - **Start by assembling an interdisciplinary modeling team**
 - **AFO expert**
 - **Economists**
 - **Aquatic biologists**
 - **Groundwater experts**
 - **Watershed modeler**
 - **Engineer**
 - **Air quality expert**

- Human health expert
- Systems modeler
- Decision analyst

Identification and Analysis of Effects on Ecological Systems & Services

■ Process (cont.)

■ Team responsibilities

- Develop integrated, conceptual systems model
 - Pathways, ecological effects, service outputs, values
- Identify data availability
- Identify data and submodeling needs
- Consider interrelationships to other issues
 - E.g., overfertilization of agricultural fields
- Identify effects with largest probable effects

■ Involve stakeholders?

- AFOs, fishermen, local residents

■ Model should be iterative

Identification and Analysis of Effects on Ecological Systems & Services

■ What Information To Consider

- Consider benefits and costs of additional information
- Secondary Effects
 - CAFO study does good job with primarily level effects
 - Harder to develop secondary effects, but may end up being more important
 - E.g., estuaries as nurseries, systemwide effects of eutrophication

■ How to Evaluate Effects

- More exact consideration of timing
 - E.g., episodic events
- Explicitly consider compliance/enforcement slippage

Economic Valuation

■ Biophysical Characterization Most Important Area for Improvement

■ Concerns:

- Benefits Transfer
 - Need to better consider (1) date, (2) quality, and (3) similarities
- Contingent Valuation
- Improved approaches
 - Conjoint analysis
 - Multiattribute “constructed valuation”
- Consider group valuations
- Be careful where used
 - Common experience in valuing
- More consideration of WTA
 - But be wary of greater variability in answers

Economic Valuation

■ Recommended Improvements

■ Approaches

- Greater use of historical data
- Greater use of revealed preference studies
- Travel cost & RUM studies
 - But issues involved in scaling up (BT issues, partial vs. general equilibrium)
- Need more research on this issue

■ Characterization of Uncertainty

- Facilitate “disaggregation” of analysis
 - Make assumptions, data quality, etc. more salient to readers
- Institutional Status Quo
 - Describe changes if institutional problems were corrected

What If You Cannot Derive an Economic Valuation?

- Why can’t you value?
 - Biophysical information is more problematic than economic valuation
 - Focus research here
 - Time and resource constraints more important
- Recommendations:
 - Include any information that’s available
 - Qualitative analysis
 - Descriptors
 - Tabular & visual presentation in Executive Summary
 - Type of ecosystem/service impacted
 - Indicators of “seriousness”: intensity, duration, population impacted, extent of geographic reach, public profile, irreversibility

Non-Economic Valuation

- Non-Monetized Welfare Analysis
- Potential welfare measures:
 - Health
 - Life expectancy
 - Ecosystem health
 - Subjective “well being”
 - Richard Easterling work
 - Princeton study
- Multicriteria Analysis
- Use consequences of importance

Research Recommendations

- More Integrated Modeling of Ecosystem Services
 - Identification of services from ecosystem types
- Production Functions of Ecosystem Services
 - How do services change with policy changes?
 - How do services change with specific ecosystem characteristics of relevance?
 - E.g., spatial patterns (fragmentation)
- Second Best Approaches to Uncertainty Characterization
- Value Characterization
- Group Valuation

Benefit Transfer Recommendations

- Richer Suite of Transferable Studies
- Enhance studies by including more site-specific information
- Meta-Analyses of Studies
- Better Dissemination of Benefit Transfer Methodology
- When and how to use

June 3, 2004 NOTES FOR "EXAMPLE EXERCISES" ON VALUATION OF ECOSYSTEMS AND SERVICES

PURPOSE:

The purpose of the example exercise is to provide a vehicle to help the Committee identify approaches, methods, and data for characterizing the full suite of ecological "values" affected by key types of Agency actions and appropriate assumptions regarding those approaches, methods, and data for the those types of decision.

APPROACH

1. The Committee will use the Agency's Analysis of the benefits of the CAFO standard as a starting point for the exercise. We have already been briefed on what the Agency did do with these two cases. Our objectives in the exercises will be to:

- evaluate what was done by the Agency;
- consider alternative methods and approaches for assessing the economic benefits of and other values associated with the proposed actions;
- identify alternative approaches to assessment or valuation that might be applied;
- identify data gaps;
- identify best practices relevant to this example and potentially relating to other examples of this type of decision (as they pertain to overarching issues such as: standards for acceptability of data and methods, analysis and characterization of uncertainty; institutional assumptions; assumptions about elasticity and substitutability; transferability; assumptions about the stability of ecological systems; and discounting benefits: and
- identify further research needs in the areas of ecology, economics, and other disciplines.

2. We will break out into two subgroups with a representative mix of disciplines in each group. Assignments will be made prior to the meeting. The Steering Group will name group leaders to lead the discussion and to report back to the Panel as a whole at the end of the day. An SAB staff member will act as a recorder for each group to take notes to be the basis of the report to the Panel as a whole.

Each group should proceed with the following steps:

1. Identify the source and nature of the ecological changes to be evaluated.
2. Identify the ecological resources, systems, and services that are being affected. We expect that each group will identify a broader range of affected ecological services than was actually analyzed by the Agency in its CAFO Report.
3. Identify and describe the range of economic values that are affected by the changes in question, for example, types of recreation activities, amenities, commercially valuable (marketed) commodity production, and so forth.
4. Identify and describe alternative concepts and methodologies that might be applied to the valuation of each of the ecological changes identified above.
5. For the economic values, describe the ecological data/information that must be obtained to adequately characterize the economically valuable results of the policy being evaluated. How does one obtain this information?
6. Similarly, describe the economic data/information that must be obtained to adequately characterize the economically valuable results of the policy being evaluated. How does one obtain this information? Is it time or resource-intensive to obtain?
7. For the alternative valuation concepts, describe the ecological and other data/information that must be obtained to adequately characterize the results of the policy being evaluated. How does one obtain this information? Is it time or resource-intensive to obtain?
8. Discuss the strengths, limitations, and usefulness of the alternative approaches to valuation as applied to this case. Where a particular desired approach is difficult to achieve, are there second-best approaches? To what extent are these second-best approaches biased and/or limited and to what extent are they useful approximations?
9. Identify best practices for this case relating to overarching issues such as: standards for acceptability of data and methods, analysis and characterization of uncertainty; institutional assumptions; assumptions about elasticity and substitutability; transferability; assumptions about the stability of ecological systems; and discounting benefits
10. Identify data gaps and research needs.
11. Should EPA have different purposes or audiences for this benefit assessment than those identified explicitly by the Agency? If EPA had different purposes or audiences for this benefit assessment, would that change the committee's advice for questions 1-10.

SCHEDULE

1. June meeting - devote the second day to breakout sessions for each group and to oral reports and follow-up discussion from each group on what was accomplished during the breakout session.
2. During the summer, have the two group leaders write up a more detailed report on the results of the two breakout sessions. This report should cover both areas of agreement between to the two groups and any differences in the outcomes of the two groups' work
3. September meeting - Presentation and discussion of the summary report.