

Working Draft prepared for C-VPES by a C-VPES Writing Group f -- DONOT CITE OR QUOTE -- 4/5/05
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1 Insert Date. 2005

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4 EPA-SAB-ADV-05-00?

5
6 Mr. Stephen L. Johnson
7 Acting Administrator
8 U.S. Environmental Protection Agency
9 1200 Pennsylvania Avenue, NW
10 Washington, DC 20460

11
12 Subject: Advisory Review of EPA's Draft *Ecological Benefit Assessment*
13 *Strategic Plan*; An Advisory by the SAB Committee on Valuing the
14 Protection of Ecological Systems and Services

15
16 Dear Mr. Johnson:

17
18 The SAB would like to commend the Agency for preparing the draft *Ecological Benefit*
19 *Assessment Strategic Plan* and for providing it to the SAB's multi-disciplinary Committee on
20 Valuing the Protection of Ecological Systems for review. The Board strongly supports efforts to
21 strengthen the science and analysis supporting decisions protecting ecological resources.

22
23 The Board sees merit in many of the specific recommendations in the draft plan. The
24 effort to array issues across EPA's national program offices and identify potential actions
25 important to all of them shows impressive collaboration and information sharing. Indeed, many
26 of the recommendations in the draft plan, especially in the area of ecological assessment, are
27 innovative and creative.

28
29 More important, however, than any specific issues or actions, is the need for the Agency
30 to develop an expanded new framework for evaluating ecological effects of policies and linking
31 them to methods for measuring the economic benefits and non-economic considerations in
32 evaluating these policies. It is also important to develop a strategy for implementing this
33 framework and communicating its implications to Agency personnel and the general public. On
34 January 25, 2005, the Committee on Valuing the Protection of Ecological Systems and Services
35 was informed that the goal of the draft plan was "to advance EPA's ability to identify, measure,
36 value, and communicate the ecological benefits of its actions in order to improve EPA decision-
37 making at the national, regional and local levels." The SAB believes that it is a priority to assess
38 the benefits of ecological protection because life depends on the benefits ecosystems provide.
39 The Board believes that improvements in ecological benefit assessment are essential for the
40 success of EPA's Strategic Plan, where protecting "healthy communities and ecosystems" is one
41 of EPA's five major goals.

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NOTICE

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3 This report has been written as part of the activities of the EPA Science Advisory Board (SAB),
4 a public advisory group providing extramural scientific information and advice to the
5 Administrator and other officials of the Environmental Protection Agency. The SAB is
6 structured to provide balanced, expert assessment of scientific matters related to problems facing
7 the Agency. This report has not been reviewed for approval by the Agency and, hence, the
8 contents of this report do not necessarily represent the views and policies of the Environmental
9 Protection Agency, nor of other agencies in the Executive Branch of the Federal government, nor
10 does mention of trade names of commercial products constitute a recommendation for use.
11 Reports of the SAB are posted on the EPA website at <http://www.epa.gov/sab>.

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1. EXECUTIVE SUMMARY

(Text to be inserted after full report is completed)

2. INTRODUCTION

2.1. Background

On January 25, 2005, the SAB Committee on Valuing the Protection of Ecological Systems and Services met to receive a briefing on an EPA draft document, *Ecological Benefit Assessment Strategic Plan* (EBASP or "the plan") and to provide an advisory review of that plan. The plan was authored by a cross-Agency workgroup, under the direction of an Agency steering committee. The stated goal of the plan was "to improve EPA's ability to identify, quantify, and value the ecological benefits of its activities, in order to provide decision-makers with a better basis for choosing among environmental policy options."

The Agency requested that the SAB committee address six charge questions:

Charge Question 1: "Given the audience¹ described in Section 1.4., does the Plan adequately address the objectives described in Section 1.1.?"²

Charge Question 2: "Are the issues described in Section 4 the most important ones that EPA should address to improve its ability to identify, quantify, and value the ecological benefits of its activities? If not, what issues should be added?"

Charge Question 3: Are there actions in Section 4 that are the most important for EPA to undertake at this time to improve its ability to conceptualize, identify, quantify, and value the ecological benefits of its activities? Do the actions respond to the identified issues? Are there actions that are missing?

Charge Question 4: Are there other actions you would recommend?

Charge Question 5: Are there specific research approaches, or research projects, on which the Agency should focus?

¹ Agency Description of Audience for Strategic Plan (Section 1.4)

- EPA managers and analysts who devote time or other resources toward basic or applied research in areas of ecology, related natural sciences and economics relevant to ecological benefit assessment.
- EPA analysts developing action plans to guide future investments in ecological benefits assessment.
- Researchers in academia, other federal agencies and members of public -- to inform about EPA's need and objectives

² Agency Statement of Objectives (section 1.1)

- Describe technical and institutional issues that prevent the Agency from conducting accurate and comprehensive ecological benefit assessments.
- Direction for future research, data collection and development of analytical tools.
- Propose activities to foster increased collaboration and coordination among Agency's ecologists, economists, and other analysts in ecological benefits assessment.
- Propose institutional mechanisms to facilitate adaptive implementation of plan and adjustment to reflect scientific progress.

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1 Charge Question 6: Is the proposed implementation plan adequate?
2

3 **2.2. Process for Developing this Advisory and the Structure of this Report**

4 The committee discussed the six charge questions at its face-to-face meeting on January
5 25, 2005. After the meeting a sub-committee of the full committee (writing group) developed a
6 draft document based on committee discussions and preliminary written comments provided by
7 members of the committee. The writing group prepared a draft for full committee discussion at a
8 public meeting held on April 13, 2005.
9

10 Because much of the advice provided by the committee pertained to multiple charge
11 questions, the structure of this report does not strictly mirror the six charge questions initially
12 presented to this committee. Instead, section 3, "Principal Recommendations" addresses charge
13 question 1 and parts of charge questions 2 and 3 as they pertain to prioritization of issues and
14 actions. Section 4, "Recommendations Regarding Proposed Issues and Actions," discusses
15 charge question 2, 3, 4 and 5 as they pertain to specific issues and actions discussed in the plan,
16 and additional issues and actions, including research projects, that the committee advises be
17 addressed. Section 5 addresses implementation issues raised in charge question 6. Appendix A
18 contains specific suggestions for changes in the text to strengthen the plan.
19 .

3. PRINCIPAL RECOMMENDATIONS

3.1. Identify More Clearly the Role of Ecological Benefits Assessment in Agency Decision-Making

The plan should recognize the importance of ecological benefits assessment in a variety of EPA decision contexts, including both national regulatory analysis as well as in the review and evaluation of local and regional environmental planning. The key question that needs to be addressed here is: why is it important to assess the benefits of protecting ecological systems and services? Section 1.2 focuses almost exclusively on its role in Benefit-Cost Analysis to support national rulemaking, and Section 1.4 (Intended Audience) reflects this focus. However, the importance of ecological benefits assessment goes well-beyond this, and the committee urges the Agency to think more broadly about how information about ecological benefits might be used to improve decisions in a variety of contexts. In addition, some decision contexts (e.g., regulatory analysis) require that benefits be expressed in dollar terms, while in other contexts having a single aggregate dollar value of benefits may not be appropriate or necessary. A broader recognition of the various contexts in which benefits information might be useful and the differing needs within those contexts would expand the plan's relevance and usefulness.

The plan should also reference the importance of benefits assessment in realizing goal three (healthy ecosystems and communities) of the *2003-2008 EPA Strategic Plan; Direction for the Future* (EPA, 2002). It should provide the reader with a clear discussion of the need for identifying, quantifying, and valuing changes in ecosystem services. The committee advises the Agency to communicate through the plan the importance of ecological benefits and to convey the goal and the key elements of the plan in positive, direct terms. Rather than emphasizing historical and methodological hurdles, the message should be that the benefits of ecological protection are important to quantify, that life depends on some of the services of ecosystems, and that one of EPA's goals is to protect ecological resources.

In addition, the Committee advises that the Agency clarify that the scope of the plan is intended to include not just research, but also broader institutional and organizational changes needed to make progress in ecological benefit assessments. There is also a need to revise the plan to clarify that the scope was not limited to national benefit assessments and to state clearly that EPA regional needs for benefit assessments are to be addressed in the plan. It will be important to specify that regional analysts and managers are a potential audience for the plan and to involve them in future revisions and discussions about implementation.

Finally, the committee advises the Agency to clarify early in the structure of the report how the term "benefits" is used, and the types of benefits that are the focus of this effort. The recent Millennium Assessment report can provide guidance to the Agency on definitions. In addition, the committee recommends that a revised draft use the recent NRC report, *Valuing Ecosystem Services* (2004), as a source and a model for acknowledging the kinds of value that are amenable

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1 to capture through economic valuation methods (the focus of much of this report) and the types
2 of values that are not.
3

4 **3.2. Revise the plan so it serves as a "roadmap" that links actions to the objectives of the** 5 **plan**

6 As a strategic plan, the plan needs to address the following three questions: (i) what is
7 the current state-of-the art in ecological benefits assessment at EPA? (ii) what are the most
8 important current gaps in knowledge or institutional/procedural obstacles that limit the Agency's
9 ability to do effective ecological benefits assessment, and (iii) how is the Agency planning to fill
10 the knowledge gaps or overcome the institutional/procedural hurdles over the next five or so
11 years? The draft report addresses these three questions to some extent. However, the committee
12 notes that the links between these questions are not clearly identified in the plan. Chapter 3 is a
13 brief introduction to the state-of-the-art in ecological and economic assessments, which ends
14 with a call for an integrated benefits assessment process. Thus, the main "gap" identified in this
15 review is the lack of integration between ecological and economic assessment. The committee
16 agrees that this is a key gap. While this gap provides justification for some of the issues/actions
17 in Chapter 4, many of the issues/actions in Chapter 4 are unrelated to it. As a result it is not clear
18 how the implementation of the plan will help to address the gap. In addition, the commitment to
19 a multi-disciplinary approach in Chapter 3 is largely undone in Chapter 4, where ecological and
20 economic assessments are once again described as if they are activities that can be undertaken
21 separately. Most importantly, Chapter 4 provides a list of issues and possible actions, not a
22 roadmap. The most important action, "develop guidelines for planning and conducting
23 ecological benefits assessments," is buried in Section 4.2.1. This statement of a goal, rather than
24 a listing of issues and possible actions, should be the purpose of the strategic plan.
25

26 The committee advises the Agency to review the current state-of-the-art in ecological
27 benefits assessment for the purpose of explicitly identifying the primary knowledge gaps or
28 obstacles (beyond the lack of integration), and then to link these gaps or obstacles to specific
29 issues/actions. This overview would allow readers to clearly see the relationship of planned
30 actions to desired objectives and needs. It is especially important to recognize the relationship
31 between planned research activities and improved capacity for conducting benefit assessments.
32 Such a roadmap will promote understanding of how components of the plan relate to its
33 objectives and also provide the basis for marking the Agency's progress in meeting its
34 objectives.
35

36 **3.3. Adopt, Communicate, and Help Implement a New Integrated Framework for** 37 **Assessing the Benefits of Ecological Protection**

38 The committee appreciates the ambitious scope of the draft plan. However, the plan would
39 be more effective as a document for its intended audience and as a guide to implementation if it
40 were organized more consistently around a comprehensive framework for benefits assessment

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1 Thus, the committee advises the Agency to build on the draft by adopting, communicating, and
2 implementing a framework for assessing the benefits of protecting ecological systems as
3 integrated units as well as the identifiable services they provide. Considering ecosystem impacts
4 in this way is expected to offer complementary strategies for assessment and to assure that
5 interdependencies across components of ecosystems are recognized.

6
7 The draft plan does include Figure E-1, "Stylized representation of an integrated
8 ecological benefit assessment," which is a starting point for such a framework. The committee
9 sees a need, however, for EPA to improve this figure so that it can serve as a guide for
10 implementation and as a communication tool for the intended audiences (i.e., EPA managers and
11 analysts engaged in planning research and analysis supporting EPA decisions and researchers in
12 academia, other federal agencies and members of public). The Figure displays roles for both
13 economics and ecology in the assessment process at various stages and the title includes the
14 word "integrated". However, the descriptions in the individual boxes are confusing. They do
15 not provide sufficient indication of the integration of the disciplines that is needed at the various
16 stages of the assessment process. The boxes seem to imply that management decisions
17 concerning both the character of endpoints to be considered in the assessment and the strategies for
18 addressing them are made early in the process (before the benefit assessment is complete) and
19 that activities associated with quantifying the "valuation" information enter the process at the
20 end, after the physical impacts have been assessed. What is needed instead is an explicit
21 recognition that the first stages of the benefits assessment process (the selection of assessment
22 endpoints) requires ecologists, economists and other social scientists to work together to identify
23 not only the set of impacted ecological endpoints (i.e., physical impacts) but also those that are
24 most important to society. Valuation can play a role not only in estimating the value of changes
25 in goods and services that would result from a given action (as depicted in Figure E-1), but also
26 in informing the strategic decisions associated with the design of the overall benefits assessment.
27 The activities associated with identifying the ways changes in ecosystem services require
28 compensating tradeoffs can provide general information on which ecological goods and services
29 seem to be most important to people and hence likely to be highly valued.

30
31 The Committee thus calls for a framework that: a) integrates ecological, economic and
32 other related assessments throughout a project; b) depicts the complexity and potential for
33 interaction effects in the process of benefits assessment; and c) identifies how stakeholders relate
34 to the ecological benefit assessment process. There are a number of existing frameworks that
35 could provide the basis for an approach that could be adopted here. Recent studies focusing on
36 ecological benefits assessment include the Millennium Assessment ((Millennium Ecosystem
37 Assessment Board 2003), details in footnote) and the recent report by the National Research
38 Council on ecosystem valuation ((National Research Council 2004) and details in footnote).

39
40 In addition, the committee notes that ecological benefits assessment faces a challenge
41 similar to that faced by health scientists, economists, and other scientists after publication of *Risk*
42 *Assessment in the Federal Government* (NAS 1983), the NAS study of human health risk
43 assessment known as *The Redbook* and used at EPA. There is need for a similar framework or
44 overarching concept to provide an organizing logic to rationalize and organize the available
45 information on ecological benefits. This assessment metaphor could also be a catalyst in

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1 motivating action on addressing the components of the research where information is not
2 available. Although the plan refers to the Agency's *Guidelines for Ecological Risk Assessment*
3 (EPA 1998) and derives much of figure E-1 from the basic paradigm in the *Guidelines*, it states
4 that "ecological risk assessments are designed to address different questions than those posed
5 ecological benefits assessments" (p.19) While the questions driving the assessments may be
6 different, the need for an integrated and logical approach to assessment is the same in both
7 contexts. One example is the problem formulation stage, during which ecologists, economists,
8 and other scientists need to consider jointly the strategy that will be used for ecological
9 assessment and measurement endpoints and the metrics for valuation. The same is true in risk
10 assessments. For example in the case of risk assessments the activity is defined in terms of
11 characterizing the processes that give rise to different types of risks and identifying how policy
12 would alter one or more constituent elements of those processes. This logic has allowed
13 economic assessment to consider the tradeoffs people would be willing to make to realize
14 comparable risk changes. While the strategy is far from perfect (e.g., the definitions of the
15 events at risk and the interdependencies among them have not been structured in ways that
16 facilitate measuring tradeoffs for interrelated sequences of activities) it has allowed greater
17 coordination in activities associated with preparing regulatory impact assessments and in
18 designing research that attempts to address the limiting assumptions of current methods.
19

20 In calling for the Agency to develop a revised framework, the Committee also notes the
21 need for broader involvement by a variety of disciplines, whose expertise, methods, and data can
22 inform both the problem formulation stage and the economic valuation stage. Figure E-1
23 provided in the Agency's draft plan is bi-disciplinary in orientation, focused only on ecological
24 and economic assessment. There is need to acknowledge that a fuller range of sciences may be
25 necessary to assess the full range of values relevant to decision making. A framework that
26 allows for contributions from bio-physical, natural resource, health, psychological, social, and
27 political sciences is needed.
28

29 **3.4. Develop and Implement a Process for Prioritizing Issues and Actions.**

30 Given the advice summarized above concerning the need to develop an integrated
31 framework for benefit assessment and to clarify consistently the need for ecological benefits
32 assessment, the committee did not respond directly to charge questions two and three regarding
33 its view of priority issues and actions. Instead, the Committee advises the Agency itself to
34 develop criteria and a process for prioritizing the 27 issues and 47 actions described in the draft
35 document. Such a process will be essential for implementing a revised strategic plan.
36

37 The committee noted that the draft plan described a history of meetings and workshops
38 focused on ecological benefits, where experts identified issues and recommended solutions to the
39 problems raised. These interactions, however, do not substitute for a focused effort in the
40 Agency to set priorities. Although such meetings and workshops are essential to solicit broad
41 input from the various professional communities, their findings are not sufficient to establish an
42 organization's priorities in a strategic plan. The plan, apparently deliberately, stops short of
43 setting any priorities. The current draft identifies "considerations for prioritizing Agency

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1 actions” in Chapter 5 on Implementation, but states that it has not outlined a specific set of
2 priorities. Without this, however, the plan does not offer what is claimed -- a “roadmap for an
3 incremental and sustained effort” to improve ecological benefits assessment. If the plan is to be
4 a roadmap and provide direction (for future research or resource allocation), then considerations
5 for prioritization should drive the discussion of issues/actions rather than follow it. Rather than
6 identifying a wide range of possible actions that might be of interest (a “wish list”), it needs to
7 identify the gaps/issues/actions that are most crucial in advancing the Agency’s ability to
8 conduct meaningful ecological benefits assessment. This does not mean that the plan must
9 specify priorities within program offices, but rather that it should set broad priorities that would
10 provide guidance to specific program offices when setting program-specific priorities.

11
12 Committee members discussed a variety of possible criteria for the Agency to use in
13 setting priorities across actions and several possible processes to use. In addition to those
14 suggested in Text Box 3 of the draft plan (p. 61), other possible criteria suggested by the
15 Committee include the extent to which the proposed research would reduce uncertainty and
16 whether the proposed actions would contribute substantially to the Agency’s ability to assess
17 non-use benefits. Whatever criteria and process the Agency chooses, the committee advises that
18 the Agency describe them explicitly in a revised strategic plan, so that the reader can understand
19 how and why the decisions were made.
20

21 **3.5. Design parallel tracks to ensure short-run results and plan for long-run research**

22 The committee advises the Agency to retain a dual focus in the strategic plan: 1) actions
23 designed to make short-term progress where there is ability to integrate information on the value
24 of ecosystem services and to have that information appear quickly in Regulatory Impact
25 Analyses or other documents supporting Agency decisions, and 2) actions that contribute to a
26 long-term research agenda to build over time the knowledge needed for comprehensive benefit
27 assessments. Although a dual focus is challenging, members saw benefits in selecting near-term
28 priority actions, where success could be measured and build enthusiasm for longer-term efforts.
29 Members note that EPA's air and water legislation impose a schedule for revisiting regulations
30 within certain timeframes. This schedule could impose a structure for ongoing planning for
31 integrated ecological benefits assessment at the national and regional scales that would have
32 practical results for improving high-priority benefit analyses and advance the science in general.

33 **3.6. Summary of responses to charge questions addressed in this section**

34 Charge Question 1: Given the audiences described in Section 1.4., does the Plan
35 adequately address the objectives described in Section 1.1.?"

36 Response: The plan partially addresses the objectives, although there is a need: 1) to
37 identify more clearly the role of ecological benefits assessment in Agency decision-making; (2)
38 to revise the plan so it serves as a “roadmap” that links actions to the objectives of the plan; (3)
39 to adopt, communicate, and help implement a new integrated framework for assessing the
40 benefits of ecological protection; (4) to develop and implement a process for prioritizing issues

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1 and actions; and (5) to design parallel tracks to ensure short-run results and plan for long-run
2 research.

3
4 Charge Question 2: Are the issues described in Section 4 the most important ones that
5 EPA should address to improve its ability to identify, quantify, and value the ecological benefits
6 of its activities? If not, what issues should be added? Charge Question 3: Are there actions in
7 Section 4 that are the most important for EPA to undertake at this time to improve its ability to
8 conceptualize, identify, quantify, and value the ecological benefits of its activities? Do the
9 actions respond to the identified issues? Are there actions that are missing?

10 Response: The committee does not identify priority issues and actions in this report and
11 instead advises the Agency itself develop criteria and a process for prioritizing the many issues
12 and actions that will be described in the draft document.

1 **4.2. Articulate more clearly the role for alternative methods as part of an integrated**
2 **approach**

3 Given that some sources of value cannot be captured through economic valuation, and the
4 practical issues that make it difficult to quantify and to monetize even those values amenable to
5 capture through economic methods, the committee supports the plan's call for further
6 investigation of what are termed "supplemental" methods in the report. At this point in time, the
7 committee is still discussing the nature, scope, relative utility, and possible contributions of such
8 methods, and intends to provide guidance on the use of these methods in a future committee
9 report.

10
11 At this stage, the committee advises the Agency not just to pilot and evaluate
12 supplemental or hybrid approaches alone, as described in section 4.7 of the draft plan, but rather
13 consider their role as part of an information package. The committee advises the Agency to
14 include an action that will call for the use of ecological, economic and other methods to support
15 decision making and a systematic evaluation of the usefulness and limitations of those methods
16 as part of the analytical information provided to decision makers. Results from each method or
17 class of methods that measure different concepts should be identified separately to avoid
18 confusion that might arise from the close parallels in the labeling of the underlying
19 methodologies. The committee noted that a specific action might be needed to explore how to
20 package multiple kinds of information in an understandable package for managers that would
21 "get the most out of the information we have" and appropriately characterize the limitations of
22 the data and knowledge available.

23
24 The committee also advises the Agency to be more precise in the draft plan in discussing
25 the limits of current data, methods, and knowledge. The draft plan currently states that data
26 limitations constrain what can be done or that more data are needed on particular issues (p.12,
27 line 33, page 13, line 4, and *passim*). However, these terms seem to be used both to refer to
28 situations where data are inadequate and where knowledge or understanding is lacking. These
29 situations are very different. In the case of a lack of knowledge or understanding, new research
30 is needed to advance the science. There is no guarantee that a certain investment in research will
31 provide the needed new understanding. This certainly is the case with regard to some of the
32 challenges related to ecological benefit assessment. However, in other cases, there may be
33 adequate understanding and methodologies, but the Agency does not have adequate data for the
34 systems of interest. It could be relatively straightforward in these cases to collect new data. The
35 committee advises the Agency to distinguish between these two very different situations in the
36 discussion of limits of methods and data.

37 **4.3. Uncertainty and expert elicitation**

38 The committee provided comments related to section 4.2.3 in the draft plan, "Addressing
39 Uncertainty in Ecological Benefits Assessment." The committee suggested that the section
40 would benefit from the discussion in the NRC report on judgment and uncertainty and that
41 several additional action items might be suggested by that report. Committee members also
42 suggested that the revised plan include an activity to explore what role expert elicitation might

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1 play in addressing uncertainties associated with ecological benefit assessments at EPA. Some
2 members limited this suggestion to expert elicitation interactions where economists and
3 ecologists would be asked to respond to a set of technical questions (e.g., dose-response
4 relationships) for which there was high uncertainty in benefit assessments. Experts would
5 provide a sufficient number of responses to document the degree of certainty in their reported
6 judgments. The results of these types of exercises can be analyzed statistically to check for
7 certain consistency parameters. This approach would use experts for a certain limited set of
8 questions for which their technical knowledge and judgment were sought. Other members
9 suggested that it might be appropriate to elicit experts' knowledge and value judgements on
10 highly uncertain questions related to ecological value, along with the knowledge and value
11 judgments of lay persons, as background for decision makers. These cases should be
12 distinguished from technical expert elicitations. The processes need to identify whether experts
13 are summarizing their technical judgments based on the "science" --be it ecological, economic,
14 or other relevant science, versus personal assessments of value, where there is no basis in the
15 literature for their judgments.

16 **4.4. Build on existing efforts where possible; don't start new ones**

17 In discussing the actions identified in the draft plan, the committee emphasized the
18 importance of utilizing and building upon existing data collection and analysis efforts. The
19 committee commended the Agency for the action item (p. 32) to increase coordination of long-
20 term, large scale data collection efforts within the Agency. Members, however, identified
21 several additional actions they believe should be included in a revised plan. The committee
22 advised the Agency to evaluate the data provided by Environmental Monitoring and Assessment
23 Program (EMAP) and the Agency's related Regional Vulnerability Assessment (ReVA) Tool.
24 The plan should include an action to determine the utility and potential of these data to address
25 the benefits of ecosystem services.

26
27 The committee noted the need for actions to make use of data collected outside EPA.
28 Coordination of long-term, large scale data collection efforts is a topic that has received
29 enormous consideration, both in the scientific literature and in the organization of research
30 programs of other agencies, e.g. Agriculture, Interior, National Science Foundation, and
31 Department of Energy. The committee advises the Agency to note the extent of the information
32 already available and include an action committing the Agency to evaluate its potential use of
33 these data. The committee specifically advises the Agency to benefit from the 20-year and
34 continuing NSF-sponsored Long-Term Ecological Research (LTER) program with its long-term
35 databases and its focused work on regional data and to explore the potential for using data to be
36 generated by the National Ecological Observatory Networks (NEON) for assessing ecological
37 benefits.

38
39 The committee also advised that the plan include actions to build not just on the data, but
40 also on the analytical work conducted outside the Agency. Specific areas where EPA could
41 benefit in an ongoing way from interactions with other organizations include: development of
42 generic ecological endpoints for benefits assessments; design of monitoring programs;
43 assessment of existing monitoring program; and identification of ecosystem processes most

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1 relevant to assessments. The committee advises the Agency to benefit from the ongoing work of
2 the Millennium Ecosystem Assessment and the Heinz Foundation and not to duplicate their
3 efforts.

4 **4.5. Specific advice regarding issues and actions related to analyzing ecological changes**

5 The committee noted that section 4.5 of the draft plan was very well written and
6 thorough. Members noted that the issues selected were the most important and the actions were
7 appropriate, and some quite innovative. Additional suggestions noted below provide some
8 additional advice for actions to be considered for inclusion in a revised plan.

9
10 The committee notes action items calling for a catalog of population models (section
11 4.5.2, p. 45) and a catalogue of ecosystem process models (p. 47). It agrees that a catalog or
12 annotated inventory of models would be a reasonable beginning step. But it emphasizes the
13 importance of constructing a decision framework for deciding the applicability and limitations of
14 existing models for specific use in ecological benefit assessment and for developing and
15 applying new models. The committee advises the Agency to include in its revised plan an action
16 to identify a decision algorithm for deciding on proper models for different decision contexts and
17 testing their appropriateness.

18
19 The committee noted that some of the actions identified related to new research are
20 general and not linked to specific needs. Further guidance to units that will develop Requests for
21 Proposals and fund research is needed.

22 **4.6. Specific advice regarding issues and actions related to estimating monetary values of** 23 **ecological changes**

24 The committee advises the Agency to provide an organizing framework for its
25 discussions in section 4.6 of the draft plan. Members suggested that Figure 7 of the NRC report,
26 which identified connections between ecosystem structure and function, services, policies, and
27 values and Table 4-1 in the NRC report, which matches valuation techniques with types of
28 valuation, could be usefully incorporated into the EPA report.

29
30 Committee members also suggested that the discussion of valuation studies in section 4.6
31 would benefit from an action calling for expanded discussion of methodologies. In addition to
32 focus groups, there are numerous approaches (formative research) to improving survey
33 methodology that would benefit the Agency, including: individual interviewing approaches;
34 verbal protocols (think-aloud, read-aloud protocols of individuals doing surveys); and combined
35 individual and group interview approaches. The committee advises the Agency to consult
36 behavioral scientists (psychologists in particular, also judgment and decision making
37 researchers), survey methodologists and organizational behavioral researchers (for firm-level
38 responses to proposed actions) in the development of questions that provide the information used
39 in methods to recover individual tradeoffs that are associated with valuation exercises and data
40 collection instruments.

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1 **4.7. Address how the public will be involved in ecological benefit assessment and improve**
2 **communication with the lay public**

3 As discussed in section 3.1 of this report, the C-VPES advises the Agency to adopt a
4 general framework and use it to implement strategic changes in the Agency's approach to
5 ecological benefit assessment. One of the elements the committee identified as important to that
6 framework is how stakeholders relate to ecological benefit assessment. The committee noted
7 that one of the key audiences and constituents in ecological benefit assessments is largely missing
8 in the draft strategic plan. Other than a brief section on page 36 focused on behavioral responses
9 to different types of regulatory strategies, there is little recognition that the interested and
10 affected public has a role to play. The committee advises the Agency to consider issues and
11 actions related to how the public may be involved in assessing ecological benefits.

12 **4.8. Address institutional issues and identify actions to improve analyses supporting**
13 **decision making**

14 Based on information provided by the Agency, the committee understands that the scope
15 of the draft plan is broader than research and is meant to encompass needed "advancements and
16 changes to make progress in ecological benefit assessments beyond the research domain." Given
17 that goal, the committee envisions the plan as necessarily providing "parallel tracks to ensure
18 short-run results and plan for long-run research," as discussed in section 3.4 above. To plan for
19 short-run results, the committee advises the Agency to revise the strategic plan to identify more
20 clearly the chief operational hurdles faced by the Agency in conducting ecological benefit
21 assessments. Issues associated with staffing limitations, human resource needs, the time
22 constraints on development of ecological benefit assessments, legal requirements and procedural
23 issues associated with Information Collection Requests and their review are several issues that
24 are relevant to the development of improved benefit assessments and need to be addressed in the
25 plan. A successful strategic plan will identify those issues and provide actions to address them

26 **4.9. Summary of responses to charge questions addressed in this section**

27 Charge Question 2: Are the issues described in Section 4 the most important ones that
28 EPA should address to improve its ability to identify, quantify, and value the ecological benefits
29 of its activities? If not, what issues should be added?

30 Charge Question 3: Are there actions in Section 4 that are the most important for EPA to
31 undertake at this time to improve its ability to conceptualize, identify, quantify, and value the
32 ecological benefits of its activities? Do the actions respond to the identified issues? Are there
33 actions that are missing?

34 Charge Question 4: Are there other actions you would recommend?

35 Charge Question 5: Are there specific research approaches, or research projects, on which
36 the Agency should focus?

37
38 Response: Overall, the committee advises the Agency to take a more integrated approach
39 to defining and presenting issues and actions. It identifies a need to explore and evaluate
40 alternative methods as part of an integrated approach. A revised plan should describe how
41 research and revised practice will evaluate alternative methods for measuring ecological benefits.

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1 The committee also identifies the need for the Agency to address the issue of uncertainty
2 associated with ecological benefits, to identify and quantify sources of uncertainty in estimating
3 benefits under different approaches, and to link this identified need to an implementation plan. It
4 emphasizes the importance of building on existing data collection and method development
5 efforts where possible, not starting new ones. It provides some specific advice regarding issues
6 and actions related to analyzing ecological changes and estimating the tradeoffs people would be
7 willing to make to assure that improvements are realized (or deterioration in services is avoided).
8 For these measures to be readily incorporated into EPA's current methods for benefit cost
9 analysis, these tradeoffs would need to be monetary values for ecological changes. It notes that
10 the plan would benefit from a strengthened discussion of how the ecological benefit assessment
11 framework would involve the lay public and communicate with it and how the Agency would
12 address institutional issues associated with improving ecological benefit assessments.

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16

5. IMPLEMENTATION PLAN

Charge Question 6 asked the committee to address the following question: "Is the proposed implementation plan adequate?" After discussing the detailed information provided in the plan, the committee provided the advice below as a response.

5.1. Incorporate more specific discussion of mechanisms for implementation

The committee notes that the discussion of implementation mechanisms provided in the draft strategic plan was very brief and was supplemented substantially by information provided to them in a briefing by Dr. Wayne Munns on January 25, 2005. Dr. Munns noted that the Agency had envisioned that the strategic plan would be implemented through four principal mechanisms: Program Office action plans; action plans in the Office of Policy Economics and Innovation; Office of Research and Development multi-year plans; and the extra-mural grant program, Science to Achieve Results (STAR), and other collaborations. The committee advises the Agency to include a clear discussion of these mechanisms in the revised plan, so that readers can understand how responsibilities will be assigned for different actions and the time-lines associated with different actions.

The committee also asked the Agency to include a discussion in the revised draft plan of the incentives and motivations that will move the plan forward.

5.2. Vision, communication, and implementation are key

The committee emphasizes the importance of developing support for the plan and viable mechanisms for making progress on the actions identified. The committee advised that each action or set of actions should have a senior manager identified as a "Champion" to help insure that it does not get left behind or forgotten as the Agency undergoes changes. The committee views the plan as important and cautions that the coordination mechanisms described in the draft plan do not describe how decisions will be made, how conflicts will be resolved, and how priorities will be set. Establishing a forum for tracking progress on the plan will not be a sufficiently strong mechanism to achieve effective and efficient implementation without leadership support for the goals of the plan.

The committee believes that the benefits of ecological protection are important to characterize and quantify and are important to EPA's achieving its overall goal of protecting human health and the environment. Successful implementation of the plan depends in great part on effective communication about its goals and about the new framework for ecological benefits assessment that a revised plan should include.

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APPENDIX A: SPECIFIC SUGGESTIONS FOR CHANGES

Executive summary: The committee sees the need to revise executive summary to eliminate jargon and vague language.

Page 4, Text Box 1, first item. This should be revised to read “Ecosystem functions or processes”. Ecological functions or processes include much more than is mentioned here. For instance, population dynamics, plant-animal interactions, etc. The definition provided focuses specifically on ecosystem processes.

Page 4: There is no mention of time anywhere, e.g., CBA over what time frame?

Page 12, lines 19-20: Could one not estimate changes in some cases rather than measuring them?

Page 13, lines 1-2: Should one consider the potential consequences of an action on, say, a keystone species, even if one cannot measure?

Page 19, lines 21-22: Ecological risk assessment and ecological benefits are not totally different.

Page 21, Figure 2: There is no feedback or risk communications implied here, but it is implied on page 26, lines 7-8.

Figure 4: The second and third boxes should be switched. How can one assess the effects of

Page 26, line 1: There are domains other than economics such as cultural values, etc.

Page 27, lines 17-26: Redundant.

Page 28, box 2: Redundant.

Page 32, line 43: What does “signal to noise ratio” mean here?

Page 38, and elsewhere: This is really not part of a strategic plan, but rather a research plan.

Page 38, and elsewhere: This is not valuation per se.

Page 42, and elsewhere: Most of these are primarily to benefit risk characterization.

Page 55, lines 9-10: Should mention that a non-government panel (USEPA 1990-c) came up with totally different priorities.

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1 Page 44. Although any definition is theoretically possible, the term “population” is usually not
2 used to describe biomass.

3
4 Page 61. There is also a somewhat disturbing (and we believe unintended) commentary on the
5 relative “ethics” of economists and ecologists. In text box 3 the plan suggests under the heading:

6
7 “Opportunity for collaboration across disciplines:” “in view of the analytical and (sometimes)
8 ethical divide between ecologists and economists and the importance of collaboration, actions
9 that involve economists and ecologists working closely together on a particular aspect of the
10 ecological benefits assessment process are highly valued.” This statement appears to imply that
11 one of the two groups is less “ethical” in some professional sense and the other will help in
12 “policing” these lapses in ethical behavior. We don’t believe this was the intention of the
13 discussions, but it could be easily interpreted that way. We believe the intention was to note that
14 there are there are legitimate differences in ethical perspectives that sometimes lie behind
15 disagreements between ecologists and economists on some issues. Clarification of this issue
16 would be helpful.

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