

Comments on Draft Report from the SAB Committee on Valuing the Protection of Ecological Systems and Services (C-VPES) "Valuing the Protection of Ecological Systems and Services" (Draft Report 09/24/07) – Comments from Committee Members (Alphabetical Order)

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Comments from Dr. Ann Bostrom

Dear Angela,

Here are just a few written comments, as I am running up against the deadline for submitting these to you. In general, my reaction is that the report does an admirable job of synthesizing and presenting the committee's thoughts (thanks especially to you, Kathy and Buzz).

There are various small typos that came to my attention - will send notes on some of those separately. There are also several places where there are missing references and one place at least where there is missing text, as you are undoubtedly aware (decision analysis).

Best,
Ann

Page 16 line 37 - change "researchers have argued" to "researchers have demonstrated"

Page 22 - lines 5-6 and later in the paragraph - this suggests that those with experience are not subject to manipulation or bias, which I am not sure there is evidence to support in the strong form presented here. Is there? Might add references to support this if so.

Page 23 and elsewhere - need some sensitivity still to becoming captive to the idea that scientists just need to educate the public. Maybe switch the order of involvement an public education on line 4. On page 44, line 8 - edit "educating the public" to read "increasing and augmenting public discourse about"

Page 55 line 3-4 and elsewhere (e.g., page 190 lines 23-26) there is a little lack of clarity regarding EPA providing value information versus eliciting values. Need to be careful

with this wording to clarify this.

Page 78 line 4 and the rest of this paragraph - preferences for ecological states and changes, not just changes?

Page 79 line 5 delete "specially selected" (nothing about the methods requires or presupposes this - mental models studies have been carried out with random samples as well as convenience samples)

Page 191 line 6 - add to this sentence (...of the ecological changes)"from the policy in question."

Comments from Dr. Terry Daniel

I ran across a number of small typos etc in my reading, but I will pass these along later. Also, I saw things in my own writing here and there that either were poorly crafted in the first place, or lost their intended meaning when lifted and dropped into their current locations in the text. I hope there will be an opportunity to "tune-up" this text before it goes much further. As requested, the following is limited to more "substantive" issues or to places where the intended meaning of a text seems to be unclear.

P 45

23 These include challenges associated with
24 understanding and modeling the relevant ecology, clearly identifying the relevant
ecosystem
25 services, and mapping ecological changes into changes in the ecosystem services ~~of~~
~~interest~~ likely to be affected by targeted stressors and Agency actions.
[Just trying to take advantage of an opportunity to get the "stressor" idea in, and to
further define "of interest."]

50-1 Figure 4

[We should add "aesthetics" or "sense of place" to the examples in this figure of services
to better represent the range of "cultural services."]

P 64

16 EPA actions. The report card approach is a possible method for characterizing
contributions
17 to human well-being for the purposes of Circular A-4 when economic benefits ~~of~~
ecological
18 services cannot be readily adequately monetized.
[A fine point, perhaps, but such values are almost never "readily" available.]

P 71

25 information. The intent is not to provide an exhaustive treatise on any given method,
nor are these descriptions intended to be a cook-book for applying the methods.

P 80

5 economic benefits. This is viewed by many as a drawback of this approach to defining value in the context of determining public policies.

P 86, Table 3, Conservation Value Method, row 1 column 3

• Use as a means of quantifying biophysical impacts when they cannot be quantified monetized (as required by the OMB Circular A-4)

P 118 figure 6

[I do not recall this model being presented in the CAFO documents that we reviewed and critiqued. My understanding was that a “conceptual model” at this level of detail was not developed until after the CAFO benefits assessment was essentially concluded. My concern is that if this figure is taken by the reader to be from the CAFO analysis (especially if it was developed and used early in the process), it may call into question some of the criticisms and recommendations that we present earlier in our report.]

P 143 -144

[The NEBA process introduction and text box would be better moved to P 160, line 23, or to p 163, line 21. As currently placed, it interrupts the presentation and “flow” of the site-specific case examples. And, it fits better later, where it is called upon more specifically.]

P 148 line 24

[The text boxes for the individual site-specific cases work better when each is presented nearer their introduction into the discussion (exact locations suggested below).]

P 150 text box

21 the environment. The cleanup and restoration plan called for most remaining wastes
22 to be consolidated on site and secured with a protective material where needed, and
covered by a

23 thick cap of soil and vegetation known as a cap.

24

25 Front Royal is located in close proximity to the Appalachian Trail, the Shenandoah
26 National Park and George Washington National Forest, as well as a number of
significant Civil War sites, making it a major tourist

27 center for the Blue Ridge Mountains.

[This first item is just picky texting, but the second change is needed to make sense of a later reference to the possible role of “historians” as part of the interdisciplinary team working on the site assessment.]

P 152, line 33

The Charles George Landfill text box would go well about here.

P 152

37 community, the health and safety concerns were addressed. Although the Record of
38 Decision was published over 20 years ago, the site is still a fenced off no-man’s land
and the potential for ecosystem services remains

39 untapped.

P 153

1 By contrast, the remediation and redevelopment of the DuPage County landfill site,
2 ~~now known as the Blackwell Forest Preserve~~ [text moved below] appears to have been
motivated largely by the
3 need to address existence values (e.g., the presence of hawks and other rare birds) and
4 recreational values (e.g., hiking, bird watching, boating, camping, picnicking,
sledding). The
5 remediation effort succeeded, ~~and the site is now known as the Blackwell Forest
Preserve~~. Listed as a Superfund site in 1990, “a once dangerous area is
6 now a community treasure, where visitors picnic, hike, camp, and take boat rides on the
7 lake.”

[The DuPage Count Landfill text box would fit well about here.]

P 153, line 28

[The Avtex Fibers text box fits well about here.]

P 154

~~3 Defining the ecosystem services that matter to people requires a carefully constructed
4 and systematically implemented program that integrates the use of multiple methods to
fairly
5 and faithfully reflect the perspectives of multiple stakeholders. There is no simple
recipe for
6 accomplishing this task and no simple algorithm for calculating values and summing
them up
7 to make a decision.~~

[In the current context, this text/platitude (which is close to something I wrote for another time and place) adds little to the discussion.]

P 154, line 15

[The Leviathan Mine text box fits nicely here.]

P 156

10 chosen by the committee. Both the DuPage County Landfill and the Aztex Fibers
cases appear to have at least qualitatively considered ecosystem services, with
commendable results. These examples ~~did, however, provide~~ illustrate how more formal
11 assessments using ecological models and production functions could influence site-
specific remediation and redevelopment efforts
12 ~~results~~ in a positive manner.

p 191

18 **parameterized to the ecosystems. Second, EPA must identify the ecosystem
services
19 that are of public importance, while still being watchful for services that the
public should appreciate but may not be aware of.**

[This may not be the best way—but we need to remind the Agency somewhere in here of the other important edge of the public value sword.]

P 194

24 the role of citizen rather than the role of consumer. Various deliberative and assisted
25 methods assume that many **people do not have well formed values (monetary or
otherwise)** for ecosystem
26 services and that accurate valuation requires experts to actively assist people in
constructing
27 and determining **their values**.

P 223, Column 2, row 1

Quantitative indices of attitudes ,
preference rankings, or
behavioral intentions toward
~~depicted~~ **represented** environments or
conditions

Column 3, row 2

Public concerns, attitudes, values,
beliefs, and behavioral intentions
related to specific trade-offs among
attributes **of policy options**

p 283

2 found either way, it seems reasonable to assume that ~~individual narrative interviews~~
focus groups have not been important components of EPA decision
3 making processes. Certainly the qualitative nature of the information provided by ~~both~~
focus groups ~~and individual interviews~~, and the

P 317

11 These differences necessitate the need for trade-offs—the **third step** in a valuation by
decision-aiding process—across the attributes to
[This section starts off by referring to a two-step process. Does the writer mean
something like “what might be construed as a third step” (in a 2-step process)?]

In several places in the report we refer to “qualitative assessments” and then
illustrate/define that with something like “high, medium, and low” classifications. It is
perhaps a fine point (and perhaps not even considered in “hard sciences”), but such
classifications would probably be termed “ordinal scale measures” (even if rather
imprecise) or as “lexicographic” scales (where “measures” are more roughly ordered and
are presented only with words, and not with numbers). This is not worth wholesale
editing, but perhaps a short footnote early on could acknowledge the particular variation
of the term used in this report.

Also, in several places in the report we use the term “psycho-social” and in other places
we use “socio-psychological” to mean the same thing. Either will work fine, but we
probably should be consistent.

Comments from Dr. A. Myrick Freeman

C-VPESS Report - Comments by Freeman

Chapter 3

By and large, this is a good chapter. My only comment is that I think that a little more should be said about how ecosystem dynamics and non-linearity can make prediction of changes in ecosystem services very difficult. There is only one sentence about this now (p. 53, lines 4-5) I suggest a paragraph that describes the problem in a little more detail, provides some examples, and cites Partha Dasgupta and Karl-Goran Maler, eds., The Economics of Non-Convex Ecosystems, Dordrecht: Kluwer Academic Publishers, 2004.

Kathy has a query on p. 65 that I can shed a little light on. The passage at the top of the page (lines 1-4) is clearly based on Barbier (2001). So the cite should be changed from Hoagland and Jin to Barbier. See the last paragraph of his paper. The one change should be in line 3, “non-monetary” rather than “non-market.” I have only looked at the abstract of H&J. It might be relevant somewhere. It is about the need for good ecological AND economic modeling in the valuation of the green crab invasion. Perhaps whoever wrote this section can suggest what to say about this paper (if anything) and where it should go (if anywhere).

C-VPESS Report - Comments by Freeman - SECOND INSTALLMENT

Overall Comments:

1. There are two things that struck me while reading this draft of the Report after being “away” from the project for several months:

- We devote a lot of space to the more general topic of how to structure and carry out policy evaluations rather than sticking to the narrower question of how to go about valuing ecosystems and services. This is especially the case in Section 2.2.3 on the CAFO case.

- There is a lot of repetition of points, especially about the need for an “integrated and expanded framework,” etc. This is true within Section 6.1 as well as between Section 6.1 and the Conceptual Framework and between Section 6.1 and the discussion of the CAFO analysis.

All of this makes the Report longer than it needs to be. And I am afraid that it will blunt the impact of the Report and obscure the valuable things that it has to say about ecosystem valuation. It is no doubt too late to do anything about this now. But we should anticipate some criticism of the Report on these grounds when it goes to the Charter Board and the wider public.

2. If the Agency accepts our recommendations, especially regarding the “integrated and expanded framework” and greater public involvement, it will need a lot of resources. I think that we need to acknowledge this. If additional resources are not forthcoming, do we believe that the Agency should divert existing resources from other activities? If so, which ones? If not, can we indicate what initial steps might be undertaken within available resource constraints? There is some discussion of this issue on p. 197, lines 5-11. But do we have more to say on this?

Comments on Recommendations/Conclusions:

1. I think that one of our major conclusions should be something like this: Many Agency actions affect not only ecosystems and ecological services but also other things that matter to people (affect human well-being), for example human health, and on the cost side, incomes and the prices of goods and services. In these cases, valuation methods that focus solely on ecological effects will necessarily provide an incomplete picture of the consequences of the action. The Agency should strive to use valuation methods that capture information on the widest possible range of effects of the Agency’s actions.

2. p. 192, lines 17-30: We say that one of the critical gaps regarding the third step (how ecosystem services are affected) is difficulty in prediction. But this is also true of the first step- predicting changes in basic ecosystem characteristics.

3. P. 193, lines 9-10: This speaks of “assessing the value of changes ...[emphasis added]” But there are multiple concepts of value. Change this to something like “assessing the various forms of value of changes ...” See also p. 193, line 25. Change this to “values.”

4. P. 193, lines 19-21: We speak of “those methods that have already been validated by substantial research ...” But there is very little discussion of the validity of the methods described in Appendix B. The one example is the discussion of validity of stated preference methods on p. 271. So what advice can we give the Agency about which methods have been validated.? By validity, I mean “.... the degree to which [a method] measures the theoretical construct under investigation (Mitchell and Carson, 1989).”

I think that there are two things that need to be done one this. The first is to add discussions of validity tests for each of the major methods discussed in Appendix B with summaries of the results of any such efforts. The second is to recast this recommendation in light of whatever comes out of the discussions of validity in Appendix B.

This same point applies to a statement on p. 36, lines 15-16: “ ... only those methods that meet accepted scientific standards of precision and reliability ...” I assume that reliability and validity are refer to essentially the same idea. What are the “accepted scientific standards”? What do we know about which methods meet these standards? Can we agree on the validity of stated preference methods? What about the validity of citizen juries? We know that Constructed Preference Methods and Decision-Science methods can be influenced by the facilitator; so what does that say about the validity of

measures developed using these measures? And so on.

See also the entry for Individual Narratives in Table 3 on p. 87 (“can provide reliable and valid quantitative assessments ...”)

5. P. 193, line 30 +: This is a separate idea. This should be the start of a new paragraph.

6. On p. 26, lines 8-16, we speak of the problem that the Information Collection Request poses for getting new value information. I think that this should also be brought up in the Recommendations/Conclusions section.

Comments on Appendix A - Special Terms:

The definition of “benefits” has been removed. I think that it should be put back, especially in light of the discussion on pp. 14-15 and the fact that the term is not always used consistently in the Report (for example, p. 33, line 21). \

Specific Comments - Section by Section:

Section 1:

p. 9, line 7: we say, “The Committee will offer advice on several approaches to characterizing ... values ...” I am hard pressed to say what that advice is, other than be open to a variety of different methods. Can we summarize this advice in the Recommendations/Conclusions section?

Section 2:

1. p. 36, lines 24-26: we say “... the use of multiple methods to characterize the same underlying value can ...” This is technically correct. But the opportunities for doing this are quite limited, for example as between revealed preference and stated preference economic methods, but not as between economic methods and surveys of attitudes, etc.

2. p. 42, lines 6-22: I think that this paragraph oversells deliberative processes. In any case, it is out of place in a section on “Implementation.” So cut it.

Section 4:

1. Table 2, p. 74 : Entry for Referenda, Column on “Who Expresses Value? Should be “People who vote on the issue.”

2. P. 77, line 26: It says “ ... econometric benefit transfer analysis, which is a monetary weighting technique.” I am not sure what this is supposed to mean. Couldn’t we just say “ ... economic valuation methods.”?

3. Section 4.1.6: When will we see this material?

4. Table 3, p. 88: I still don't think that Focus Groups is a valuation method. It is a useful tool. And this is how it is described on p. 81. The same comment applies to pp. 281-283.

5. P. 91, line 13: Regarding benefits transfer, I think that "uniformly negative" is too strong. Another reference would be:

"Testing a meta-analysis model for benefit transfer in international outdoor recreation,"

Ram K. Shrestha and John B. Loomis, Ecological Economics, 39(1): 67-83.

Abstract

The economic values of outdoor recreation are estimated using a benefit transfer approach in which one applies existing consumer surplus measures to value the resources at a new site. In this article, a benefit transfer study was conducted based on meta-analysis of existing research in outdoor recreation use values of the United States from 1967 to 1998. The meta-analysis method was used to estimate a meta-regression model, resulting in a benefit transfer function that could be applied to estimate a wide range of recreation activity values in other countries. The estimated meta-model was tested using original out-of-sample studies from countries around the world for international benefit transfer purposes. The tests reveal that there is mixed evidence in using meta-analysis of existing studies in outdoor recreation in the United States to value the recreational resources in other countries that are used by tourists. In the best case, 18 correlation coefficients between meta-predicted and out-of-sample values were positive and significant at the 5% level or greater, but nine of the 18 t-tests indicated a significant difference between the two sets of values at the 10% level. However, the absolute average percentage error of the meta-predictions was 28%, which may be acceptable for many benefit transfer applications.

6. Section 4.2: Somewhere here (perhaps p. 98?), we should mention the Environmental Valuation Reference Inventory (EVRI), a searchable data base of environmental valuation studies. EPA has supported the creation of this data base.

Section 5:

1. P. 109, lines 9-23: This paragraph is out of place. It is more about how to communicate information to respondents in a survey to elicit values.

2. Section 5.2.3: This section should be integrated into section 5.1 on uncertainty.

Section 6:

1. P. 126, lines 20-22: “Few studies provide national level value estimates ...” Is this accurate? Other than the CAFO recreation values based on Mitchell and Carson, none come to mind. So, “few” might be an overstatement.
2. P. 128-129, Re: Kathy’s Queries: I think that most of this material came from Kerry Smith. So the questions should be directed to him.

Appendix B - The Conservation Value Method:

1. In the first paragraph (p. 200), there is reference to “environmental, social, and economic values,” followed by the statement: “The Conservation Value Method (CVM) is a scientific process to map these values across the landscape ...” By my understanding of the CVM, it is limited to mapping those things that are related to the goal of biodiversity conservation and does not include social and economic values.
2. P. 202, lines 14-15: Regarding the sentence about integrating conservation values with socio-economic and other data: Is this a part of the CVM? Or does it represent a potential extension of framework developed by the CVM to make use of additional data? the outputs
3. P. 203, line 9-10: How could the CVM be used to predict ecological impacts?
4. P. 205, the 3rd item in the list of “The Method’s Strengths”: It can’t be a single benefits number as we have defined benefits. What is the single number that is arrived at by aggregation? And is this done commonly? How about some examples.
5. P. 205: What is a surrogate dataset”?

Appendix B - Energy and Materials Flows:

p. 212, lines 9-11: The blue crab spawning sanctuary does not seem to me to be an example of the ecological footprint of the blue crab population, especially given the much wider distribution of the blue crab population throughout the Bay during the summer. .

Appendix B - Surveys:

pp. 235-238: Why is Text Box 13 in this section rather than in the economic methods section?

Appendix B - Group Processes:

p. 279, for Referenda, “Issues involved in Implementation”: I don’t understand this entry.

Appendix B - Deliberative Processes:

1. pp. 305-310: I still don't think that mediated modeling is a valuation method. Mediated modeling is a process for reaching consensus on a wide variety of analytical issues. To the extent that it is used to deal with valuation issues, how does it differ from deliberative processes more generally? In the South African fynbos example (pp. 306-307), where did the values listed in Table 1 of Higgins, et al., (1997) come from? Was there a deliberative process? Was this a form of benefits transfer? The unit value of wildlife harvest might have been simply a market price.
2. P. 309: Please explain the "atelier approach" and "open space techniques."
3. P. 319, under "Strengths and Limitations": Isn't one limitation the fact that the resulting value is or at least can be influenced by the facilitator?

Comments from Dr. Dennis Grossman

Dennis Grossman
10/11/2007

VPSS Draft Report

Overview Comments:

Chapter 2.

[Page 10] There is a very quick jump from the discussion of ecosystems to that of ecosystem services and then values. I suggest that the **An Overview of Key Concepts** (2.1) section would make more sense if the first sub-section were The Concept of Ecosystems: Their Processes and Functions. Everything that follows is predicated upon this hierarchy of concepts, so we should lay out the information here to provide a strong foundation.

[Page 13, lines 20-23] I would not use the example using the tradeoff between a species and money. It is a volatile subject and could take people away from the point that you are trying to make.

[Page 18, line 31] the use of the term "actually generated" refers to a subset of the values. For example, the ecological systems did not 'actually generate' biodiversity values.

[Page 19, Lines 12-26] I find this paragraph confusing. Valuation is not seeking to measure the value of an impact, nor is valuation providing a comparison of predicted outcomes. These are 3rd and 4th order analyses following our ability to value components of the ecosystems and their services. We are too far ahead of our story here, and it will probably confuse other readers.

Chapter 3.

I would suggest that we review the utility and transferability of the ‘economic production function’ concept for use in ‘ecological production functions’. Economic production functions represent human decisions to provide input in different quantities that result in a desired function or service. Ecosystem services are based on ‘outputs’ from complex ecosystem components and interactions over which humans have a variable ability to control. I know that it resonates with some as it provides a nice parallel structure to economics, but it has never made complete sense to me.

[Page 48, Lines 15, 17; Page 49, Line 8] The word ‘stressor’ pops up here with no context and setting forth a narrower vision than warranted. Like ‘impact’, ‘stressor’ is only looking at one side of the change spectrum, so we should use a broader term that encompasses both positive and negative changes to a system.

[Page 49, Lines 18-24] This part does not work. It may be helpful to first introduce ecological endpoints, which is a difficult concept unto itself and specifically related to EPA practice. Asking the reader to relate ecological endpoints to ecological production functions without definition and context is expecting too much. All of these concepts must be simply explained before asking the reader to understand their application and interrelationships in the context of VPES.

Chapter 4.

[Page 76, Line 22] The Biophysical Ranking methods are not “based on GIS technology”, that clause needs to be deleted. These methods can benefit by the use of GIS, but the methods are independent of the technology and we do not want to confuse or misdirect the reader.

Comments from Dr. Harold Mooney

Chapter 2

Pg 6, line 18 Streams “inhabit” is probably not proper usage

Pg 7, line 18. Is it good form to use a foundational quote and then calling attention to an error (sic)

Pg 11, Lines 14-23. This could be simplified greatly by saying that Boyd and Banzhaf do not include supporting services (indirect) in their definition of ecosystem services but only include direct services, i.e, provisioning, regulation and cultural.

Pg 13. Line 23. This is probably not the best example since the ESA considers the economic value of species loss as infinite (you can’t mitigate against or substitute for the loss)

Pg 15. Line 9. Biophysics is normally utilized as a single word, at least in the any university catalog and scientific journals.

Pg 16 as one example, and in general for this introductory chapter. I think this chapter is of course very important but it makes very heavy reading as an introductory chapter particularly since it is so filled with material showing the contradictory, diverse and even contentious nature of the valuation field. I would imagine a practitioner concluding that if the experts don't agree on how to go about this challenge (see pg 20, lines 21-22) there is not much reason for my reading further in the document. It might be hard to get agreement on this from the committee but another way would be to just lead with how the committee has utilized these concepts, or the ones they think are most valuable for EPA's work, and leaving the bulk of the nature of the field and all of the different views to another appendix. It would certainly make for easier reading.

Pg 30. Second paragraph. It might be good to give a little clarity here. We talk elsewhere about the first step is to develop a conceptual model of all of the interactions in order to make sure all of the impacts are included in the analysis, then the second step is to utilize whatever quantitative models are available as discussed in this paragraph.

Chapter 3.

Pg 46. Line 15. This is taken from rather than adapted from unless a graphics person is going to change this.

Pg 50. Line 8, 9, 13. "Kremen" not Kremens

Pg 54, line 8, insert comma after "among"

Pg 57, line 19. After "once" insert "in a particular analysis"

Pg 62. Line 17-18. Redo first two sentences to read, "Figure 5 illustrates metrics that can be utilized at different levels of ecological organization that indicate intermediate contributions to ecological services. One of the ecosystem organization levels contributing to ecosystem services is functional groupings." (It is crucial that the proper figure (which is forever being lost) be used here which shows the arrows going upward from biodiversity to services.). (If the group wants to delete this figure and this concept no problem. It adds a valuable (in my opinion) but not essential point given the earlier text.

Pg. 64. Lines 7-9 show that many indicators of ecosystem services are somewhat qualitative, eg. "quality" "integrity is why I have added Fig 5 which gives a different type of indicators that can be measured objectively, eg. Ecosystem service inputs at different levels.

Pg. 65. Lines 4-6. I don't know this particular study and do not have it available.

Pg 67. Line 6-9. It is a shame that the committee didn't discuss further the suggestion by the OMB staff person of pushing for a Bureau of Ecological Data comparable to the Bureau of Standards. It is frustrating to see the wealth of data available from FAOstat and the Division of Agricultural Statistics where it is so easy to see trends and to realize that nothing comparable is available for economists-ecologists from which to work.

Comments from Dr. Louis Pitelka

Overall the report is well written and accurately reflects my understanding of the information and advice the committee wants to provide to EPA. However, I did find a number of instances where the text was confusing or seemed inconsistent with statements made elsewhere in the report:

Page 13-18. I found this discussion of values difficult to follow and sometimes confusing and wonder how useful the section will be to EPA.

Page 30, lines 3-16. It is not clear here whether the discussion pertains to the conceptual model that was developed to describe the system or the mathematical/computer models that were used to estimate quantitatively the ecological effects of the rule. For instance, on lines 6-7, the sentence is addressing the conceptual model (mentioned in the prior sentence), but later in the paragraph reference is made to "opportunities to quantify effects precisely", which is not what a conceptual model is for. The last sentence of the paragraph starts with "Developing integrated models of relevant ecosystems..." and it is not clear whether this refers to the conceptual or the quantitative models.

Pg. 100, line 2-5. This is potentially confusing because I presume the "three analytic steps" mentioned here are the same as the 3 steps discussed in Chapter 3. However, the second one here, "predicting behavioral reactions to these outcomes" sounds very different from "predicting the effects of these outcomes on ecosystem services valued by people" (my wording).

Pg. 104, line 12. I wondered about this statement because a few years ago I worked with Granger Morgan on an expert elicitation in which we developed subjective probability distributions for all the questions that experts answered. While Granger was responsible for that part, it did not seem "difficult" to me. I am no expert on expert elicitations but wonder why "translation into probabilities is difficult"? I suggest adding to the sentence "but can be done." If a reference is needed one option is the paper from the project I worked on with Granger:

Morgan, J.G., L.F. Pitelka, and E. Shevliakova. 2001. Elicitation of expert judgments of climate change impacts on forest ecosystems. *Climatic Change*, 49:279-307.

Pages 116-135. These pages of section 6.1 ostensibly are about national rule making, but the text actually is a general discussion of the committee's advice for all three contexts of EPA decision-making. CAFO and national rule making are mentioned very little in these

pages, and in most cases, where they are mentioned, you could replace them by referring to “all EPA decision-making”. Thus, there are 19 pages of text with little analysis or advice specific to the national rule making context. Thus, the entire section, while clear and well-written, seems redundant with earlier sections of the report. In contrast, the two major sections that follow (6.2 and 6.3) on site-specific and regional decision making are quite focused on unique aspects of those two decision-making contexts. It seems odd that pages 28-31 of the report and Text Boxes 2 and 3 represent the actual analysis of the CAFO process (more along the lines of what is done in 6.2 and 6.3) but are either elsewhere in the report or relegated to text boxes. Section 6.1.3 Conclusions (pages 132 to 135) summarizes the prior 16 pages and yet takes three pages to do so. Thus, the summary is redundant with the prior 16 pages, which are redundant with other parts of the report.

Page 117, line 9 – page 120, line 32. This discussion seems to be ambivalent about the active involvement of the public or publics in the development of the conceptual model. For instance, on page 117, lines 9-10 and page 118, lines 18-20, the text seems to state that the conceptual model should be developed by the experts without direct public involvement. This is in contrast to what we say in other places in the report where we strongly recommend direct public involvement. On page 118 the text acknowledges that it is important to consider what ecosystem features are valued by the public but says that “This can be gleaned from a variety of research approaches” rather than stating that the public, or relevant publics, should be involved in the process. On page 119, lines 8-20 the potential involvement of the public is included in two of the three bullets, but even here there is a sense that the experts need to find out what the public cares about but not necessarily involve them in the process of developing the conceptual model. On page 120, lines 11-20 there is finally mention of “a more participatory process”, but it is presented as an option, rather than being the clear recommendation of our committee. Is the national rule-making process different enough to make public involvement less critical or more difficult? If so, perhaps that should be stated more clearly so that the approach discussed here does not seem inconsistent with what we say elsewhere.

Page 121, lines 4-5 and 12-13. This discussion of ecological production functions does not reflect the definition that was settled upon in recent discussions and so should be made consistent. The ecological production function is the translation of changes in ecosystem properties and processes into effects on services that people care about, and does not cover all of what is mentioned in these two sentences.

Page 124, lines 11-13. I am not sure what this means. This makes it sound as though there is a methods manual for applying the concept of functional groups. It really is not that straightforward. For one thing, how species are divided into functional groups depends on what criteria are used and so is arbitrary. Plant species A and B could both have wind-dispersed seeds and be grouped in the same functional group with regard to seed dispersal. But A might be a nitrogen-fixing herb and B a conifer tree. They would be in different functional groups with regard to growth form or their roles in nitrogen cycling.

Page 191, lines 16-17. This seems to be putting the cart before the horse. This is calling for the application of ecological models before the conceptual model is developed. For instance, the term “predict” sounds too quantitative. I think the concept here is that the experts should identify and describe in qualitative terms how the EPA action could affect the ecosystem. This can be done without “using ecological models that are scaled and parameterized to the ecosystems.” We are simply advocating a box and arrow conceptual model. The application of appropriately scaled and parameterized models would happen later when the time comes to quantify the effect on ecosystems, determine how that affects ecosystem services that matter to people, and value those changes.

Page 191, lines 26-33. The term “biophysical” is used fairly commonly in the report, but this paragraph now makes we wonder if there are different concepts of what it means. How are biophysical properties different from ecological properties? In this paragraph, what is the difference between “experts in both relevant biophysical aspects of the modeling” and “ecologists, who know what biophysical changes can be measured”? This seems to be calling for the involvement of ecologists twice but under different names. Maybe a little rewording would solve this.

Minor Comments, Word Changes, and Typos

Page 22, lines 7-8. Is something missing here? It appears to be an incomplete sentence and an incomplete parenthetical remark – there is no closing parenthesis.

Page 24, line 12. Change “impact” to “benefits”, and change “from” to “after” so that it reads: “...could be enhanced by ecological valuation that could demonstrate the potential benefits of ecological services after site redevelopment.”

Page 24, line 14. Change to “other governmental and non-governmental organizations where...”

Page 70, lines 19-22. Linked to what?

Page 80, line 8. Insert “and” after “...revealed preference methods)”

Page 80, line 9. Delete “In contrast,”.

Pg. 112, line 17. Is “animation” different from “visualization” and “interactivity” discussed a couple of pages earlier? If not, to avoid confusion I would use “visualization”.

Page 175, lines 30-32. This does not make sense as stated. In particular, location would be important for any of these recreational activities. I think something like the following might be what is meant: “Ecological models would be necessary to calculate effects of

preserving open space on some recreational activities (e.g., fishing, hiking or bird watching), while others (e.g., walking in the park) could be estimated more simply.”

Page 181, line 9. Delete “s” at end of “Applications” and change “are” to “is”.

Page 183, line 7. Change “find” to “identify”

Page 183, line 8. Add “practices” after “management”, i.e., “more effective watershed management practices”.

Page 183, lines 25-29. Need to use semicolons and commas, or parentheses, to distinguish the items in the list of monetized benefits from explanatory phrases about specific benefits.

Page 185, lines 28-29. This statement is unclear. It sounds as though the framework is saying that 43% of the land area of the 8 states should be protected, but that would seem to be a very unrealistic and thus not very useful recommendation. Or does it mean that 43% of some sub-category of land should be “protected and managed for specific contributions to human well-being.”?

Page 187, lines 15-27. Use of identical bullet symbols for two different levels of bulleted items is confusing here. The three items in lines 18-27 are “sub-bullets” to the first bulleted item. Use a different symbol here. Normally, MS Word does that automatically, so I don’t know how this happened.

Comments from Dr. Mark Sagoff

Dear Angela:

Thank you for sending the materials for the teleconferences October 15 and 16.

Anyone who reads the current draft report must be impressed with the effort that went into it. I am grateful to you, Buzz Thompson, Kathy Segerson, and everyone who has contributed to such a carefully conceived and thoroughly thought-through document.

If I were to hazard a comment other than to express appreciation, it would be this. The Report deals with two quite different ways that ecosystems services may be threatened or diminished. The CAFO example well illustrates the first -- pollution. When manure and other pollutants run off feedlot operations and percolate through the groundwater and into streams, these effluents of course cause damage. The Report ably discusses examples of this kind of economic harm.

The Report also deals ably with a second way ecosystems services may be lost, that is, through development. The standard example, mentioned on page 83, observes that an undeveloped ecosystem may perform filtration services that a developed one may not. Similarly, when wetlands are dredged or filled for farming, their ability to absorb water

during flooding may be lost. The Chicago Wilderness example illustrates the advantages of forgoing development to protect ecosystem or natural values.

I would like to point to what I think is a conceptual and normative distinction that the report draws implicitly -- one that could be made a little more explicit -- between 1) pollution and 2) development as causes of the loss of ecosystem services. The polluter causes damage beyond the limits of his property -- and thus occasions a moral and to an extent legal concern about invasion or trespass -- that is, incursion on the property of others. Development in principle, in contrast, may not spill over beyond its own property lines -- the problem is that the land no longer may provide downstream services it once supplied. So the normative or ethical or legal question is not so clear-cut as in the case of pollution, that is, where there is a clear trespass of property rights. Instead one must ask whether the landowner is required (without compensation) to supply the ecological good in question to his or her neighbors.

In a Coasian economic analysis, of course, none of this matters -- property rights may affect the direction that compensation is paid but not the economic values to be measured or the efficient outcome to which those values would lead. Yet from a legal perspective, one conditioned by common law traditions and practices, the distinction between polluting someone else's land and developing one's own land (even if as a result it ceases to provide certain services to others) is a distinction with a difference. It is worth making explicit, I believe, especially since it runs implicitly through the document.

Congratulations on such an impressive project.

Best wishes,

Mark

Comments from Dr. Paul Slovic

To: C-VPESS Committee

From: Paul Slovic

RE: Comments on Draft Report 9/24/07

Date: October 8, 2007

I am very appreciative of the hard work that underlies this draft and the clear intent to do justice to the vast amount of information that needed to be presented and integrated. I also appreciate and respect the sincere attempt to document and consider the many diverse points of view put forth by the committee members. Thanks to all who did this heavy lifting.

However, despite the many good features of this report, I am not comfortable with it. The introduction and conceptual framework include many statements that I do agree with, regarding the complexity of the valuation task, the need for early involvement of the public, the need to consider and use multiple methods, good discussions of the

weaknesses of certain methods, the need for a fully informed public if public input is used, a strong critique of the CAFO report, and so on. What bothers me is that these important recommendations and qualifications are not consistently applied in the report. The report has an optimistic tone that implies that, despite certain limitations, we do have acceptable methods for valuation that can be taken off the shelf and used, perhaps supported a bit by other less-tested but promising methods.

I am much more pessimistic. This pessimism stems from my many years of studying judgment, preferences, and decision making. Despite lip service to the need for an informed public, and occasional mention of constructed preferences, the report clearly buys into the assumption that the public engaged by EPA will be informed about the complexities of ecosystem functioning, that they will have the well-formed and stable preferences and values required by economic methods, that the methods will be able to reliably uncover these stable values and, finally, that the values that people are discovered to hold are values that *should*, normatively, guide the policies of a regulatory agency.

Pros and cons of various methods are presented but, in my view, the cons are underweighted. Forty years of research on constructed preferences indicates that preferences for complex, unfamiliar outcomes are not well-formed but are often constructed on the spot in the context of elicitation. I am not talking about general values (e.g., biodiversity is important) but rather about the quantitative tradeoffs essential to valuation (see, e.g., p. 79, lines 22 and 23 on substitutability and tradeoffs underlying economic-valuation methods).

The report urges the use of multiple methods in order to allow diverse (valid) components of value to emerge, to round out the picture for decision makers. But the literature on preference construction informs us that the inconsistencies or conflicts that often are revealed when multiple methods are used are not merely due to the methods uncovering different components of value. Rather, these inconsistencies may be due to the fact that the values (tradeoffs) are not strongly held and are *shaped* in different directions by the methods themselves, echoing the Heisenberg uncertainty principle from physics.

Preference construction poses many serious challenges to the methods and conclusions of this report. But there is a bright side. The decision-aiding methods described briefly in the appendix (pp. 314-322) are designed to guide experts and laypersons to an informed, rational, transparent *construction* process, resulting in a defensible expression of value. Because the process is transparent, critics can debate and modify the structure. These constructions can be put before decision makers in the stages where integration, deliberation, and negotiation is addressed in more or less formal interactions with stakeholders and publics (see pg. 227, lines 18-19).

The report incorrectly states that such decision aiding produces multiple dimensions of value that cannot be synthesized into a single quantitative measure (p. 315, lines 1-5). This is incorrect. The correct view, that a single value could be constructed using multi-attribute utility theory, is presented on p. 318, lines 9-15.

A few comments linked to the text

p. 10. Here and throughout the report, ecosystem services are given far more attention than ecosystems. Perhaps the word “ecosystems” should be deleted from the title of the report.

p. 19 lines 10-11. The fact that the public may sometimes appreciate higher-level endpoints or services such as clean water does not mean they have well-formed tradeoffs among these services.

p. 19 lines 28-29. Indicates some methods are well-developed (and ready to use). I think the cupboard is quite empty when it comes to adequate methods for many forms of ecosystem valuation.

p. 20. I believe multiple methods should be required so that inconsistencies, indicative of preference construction, can be identified and dealt with. The report assumes that useful information about value is contained in inconsistent measures. Maybe not.

p. 23 lines 1-5. Urges public education. Will public agencies likely be willing and able to do this?

p. 26 lines 5-16. Given the obstacles to analysis posed by OMB, perhaps proper valuation cannot be done in some circumstances. The formal reliance on benefits transfers is appropriately criticized later in the report.

p. 36. Section 2.3.3. Sets forth criteria for using multiple values, when expanded methods meet accepted scientific standards of precision and reliability, and so on. These criteria should apply to *all* measures used. As noted above, I think few would meet these standards.

p. 55. Notes the need for finding out what is important to people, once they have been informed. Our report should make clear, early on, that every reference to public input assumes an *informed* public.

p. 68. Section 3.5. Very important observation about EPA’s limited and shrinking resources for ecological research. This may seriously constrain efforts to do valuation properly.

Question: How do we recognize valuations that are so uncertain or flawed that they should not be used?

p. 80 line 5. Yes, income effects may be a drawback to economic methods, but issues raised by preference construction are even more serious.

p. 85 line 6. This is one of the few mentions of the cost of using a state-of-the-art valuation method. Cost is an important issue. If resources are limited, will less than state-of-the-art methods be used? Is this acceptable? Might it actually degrade decision making?

p. 90. This long and detailed critique of value transfer is excellent. Should other criticisms of economic-benefit methods be given equivalent coverage?

p. 99 Section 5.1. Most of these uncertainties pertain to statistical issues. These are perhaps less important than the uncertainties coming from the assumptions underlying the methods, which may not be met.

p. 105 Section 5.2. This section makes numerous good points about communication but it seems miscast. Dialogue with the public is not merely to educate them about the valuation analysis but to involve them integrally in the entire assessment process. That was the real message of the 1996 NAS report, *Understanding Risk*.

p. 109 lines 21-23. Says numbers will be dominated by qualitative and visual stimuli. Yes, except when these numbers are dollar values. Dollars carry special meaning that other numbers may not have. Dollars will likely dominate non-monetized dimensions of value.

p. 112 Section 5.2.4. First bullet. Iterative approach needed for elicitation of values, not just for communication.

General comment: Perhaps keep the part of Section 5 dealing with statistical uncertainties. The communication part is really more about interacting with the public in value elicitation. This fits better with the discussion of Robin Gregory's work in the decision-aiding section.

p. 191 lines 1-3. EPA should conduct (not start) any valuation by deciding what it should value . . .

p. 191 lines 18-20. What if experts disagree with the public's priorities for services?

p. 192. Certainly the public input should be respected, but what if the informed public does not wish to place much/any value on systems and services that experts believe important? This wording seems slanted too much in favor of the public's views.

p. 193. See my early criticisms regarding validity of methods and use of multiple methods of value that may disagree.

p. 194 line 6. Decision-aiding methods should be cited here.

p. 194 line 27. Concepts of non-value (or construction) may also be exposed by multiple methods.

196. line 3. Yes, communications about benefits are important but communication issues are secondary to major problems of value elicitation.

197 line 6. What if resources are lacking?

245 line 8. I disagree that the largest barriers to use of survey methods are institutional. I believe they are conceptual (lack of validity).

318. Valuation by Decision Aiding. The name for this method is misleading. The method applies multi-attribute modeling to construct values, in keeping with preference construction. Yes, it aids decisions, but that is the aim of all other methods as well. Perhaps call it Value Construction Methods.

315 line 1. No. The method can provide a specific estimate, as correctly noted on p. 318 lines 9-14.

320 line 5. All methods in this report aim to provide decision support through valuation. Yes, it may not be liked by OMB. This may reflect a deficiency in OMB's guidelines. Yes, the facilitator may influence the results. Nuances of the other methods also may influence their results. That's what preference construction implies.

Final comment: As I have noted before, it is far easier to criticize a report than to draft it. I thank all those who created this clearly written and comprehensive report on this complex topic of valuation. If my criticisms are harsh, it is because I believe the report to be very important.

Paul

To: ANGELA NOGEM

From Reverly Smith

COMMENTS on C-V PRESS DRAFT

25 pages including

cover sheet

To: Buzz Thompson And Katy Seerson
And Anella Nugent

From: Keeley Smith

Subject: Comments re C-V PRESS Draft

First of all - let me thank you

for all your hard work for the Committee
to get this presented and explained

for a handwritten set of comments. I

simply cannot type fast enough to
get this to you and don't have access
to help. So the choice for me was

nothing or handwritten comments.

I choose the latter. I have

a large number of comments - some

General and some specifics.

Rick mentioned to me questions you asked Kelly in the text and

I will try to address them.

I have an own writing screen

that may demonstrate all the rest. If we cannot address it directly in

the report and you need comments on the substance of the report

from the committee I feel it is best if I withdraw from the

committee. I cannot begin on to some of the conclusions and

Recommendations. Some of this I mentioned

to Kelly covering the case of
 the term "benefits" and the report
 attempts but does not fully address
 this issue. There are some and
 shortening of economic methods.
 So if there can't be addressed
 you can simply ignore what you
 said of the other comments and
 I will resign. I don't have time
 to prepare a minority opinion.

Send an Impact Statement / Comments

(1) For the most part the report
 seems to describe economic values
 as there are distinctions where
 values are expressed in monetary

seems. I don't agree that this is essential.

Someone wishes because somebody people make to obtain a change is something or to avoid experiencing a change is that they.

I have referred to the thing as an object of choice following the language that Kegan uses in his graduate thesis - text

What is essential is the trickery going up in amount of one thing (or seeing an amount of that thing aspects (or says they would accept) to experience as specified change is something else.

This is the course of what Mary Bohlert and a group of us explored in the paper &

circulated years ago in Environments Science and Technology.

Then appears to be an overall theme -
if it is monetary it is economics.
So if you don't like money
or you think people don't have
dollar value nothing account
in their heads -- you should
form other methods of
coming up with values and
perhaps other aspects of value.

People believe all concepts of value.
Philosophy, ecologists, psychologists
are people. The concepts they
believe do not trump
economic concepts of value
strongly because they are
not defined in monetary terms.
They are also not independent
of people -- because it is not
the recognition of something great
because it is an ecologist or
a mathematician biologist economist
or a neuro why changes in an

exception or exception arises
are important and these
factors underlying this
judgment would not be reflected
in an economic measure of
value.

The fact remains it is a person
opportunity that value.

Similarly when a person
receives reasons a person's
proprietary value a change is
more or less important and
abstracts from his or her
"personal feelings" about the
change -- it remains that
person's ~~own~~ owning part a concept
of value.

We all know this - but it is
lost in the report.

All values come from people -
rights arise for different
aspects of value for different fields

These agents are not recognized
spokes persons for their corporations.

Examples of where this has an
effect:

- (1) Page 14 lines 13-14, lines 27-30 -
give impression a person has not
attended their notes; ordinarily
page 15 lines 8-24 are
essentially comparing in this
course, page 18 lines 3-27

- (2) Characteristics of economic values -
Page 16 lines 24-27 - economic
values do not concern
people are self-interested!
They assume people know
what is best for themselves.
They are gaining entrance
well-being by giving to
Others. This is not
"self interested".
Economic values are
inferred from action or
optimal choices by people.

(3) of don't agree with
attainment both of page 18
lines 30-31 and saying to page 19
about what the committee
believes.

(4) however page 19 lines 12-26
contract attainment beyond and after
e.g.

although retention should be ignored
by best available source, IIT
retention, needs to repeat the
values that would be held
by a fully ignored general
partner not merely the
personal values or preferences
of this paragraph

Compare this to:

Recommendation page 38 lines 12-25

Recommendation page 19 lines 15-23

4 Experts characterize the value of
change in computer systems

and services to the extent possible

It is not experts' values!

Experts are trying to measure
people's values

P 193 - June 23-27

~~Other~~ when someone
measures something

provide accurate assessment
of someone's value.

or a particular change
in ecological systems and
services

Other methods may provide

who judges accurate - why
are other methods preferred
to be more accurate?

(5) The tabular summary of

methods is misleading; in

~~fact~~ terms of summary of

the systematic and goals

Table - pages 72-75 -

extent of non-conscious -

expresses values -
but goal is people's
values;

Bottom line - (1) Reports need as if
economic values or concepts of
value are narrow, inaccurate.
(Because they are narrow or
because people cannot make
their choice) whereas other
methods have experts express
who can come from express
more accurate values for
the people than the people
could.

How do they accomplish this?
There is the observational
that it is more accurate
characteristics of people's
non-ambiguous values,
I'm not sure what this
would be given the
representative
system to

(2) Reports suggest that
everybody agrees and that

valuations are more important
 than other things EPA
 takes account of. This is
 misleading for several
 reasons.

(A) pages 190 lines 8-10 -
 most experts found a
 human health benefits -
 over 1/2 not part of
 the ecosystem - consequently
 won't a change in character of
 human species actually
 an ecosystem benefit?

(B) We don't know whether
 not automatically convertible
 value of actions (line 8) This
 argues

(C) To the extent
 economic valuations serve
 for benefit-cost analysis -
 the policy is already
 defined by some other
 process that is specified
 by the statute.

Antitrust Exemption valuation only has an effect if net benefits of a regulatory action are negative without them.

Certainly if it is a close call then one might argue counterfactuals might lead either way.

All of this raises the point that their benefit-cost is not the settlement basis of any decision.

(3) The report reads as if we don't understand the distinction between a regulatory agency and an autonomous entity. EPA must report to the states beginning how it should behave. So acknowledging the agency to have decisions on exemptions is foolish if the legislative mandate sets other objectives.

(4) The report concludes that
is almost always

• Economic value can only
be argued for changes in
something; it appears to
accept the costs & logic
for making complete transitions -
The change is all or nothing -
what is forked; in other
places it is more clear as a
reorganizing relative changes

• At least in the specific
comments a large number of
also will maintain of
This not. No about it
reflects many other
contributing.

Specific Comments

(1) Page 7 - lines 5-8 - too sweeping;
conclusion Anthropogenik interpreted conductive
of ecosystems from some services
of ecosystems. The title has been
concluded a great deal. There is
not comprehensive or interpreted

(2) Page 9 - lines 3-5 ; Other studies
have concluded man - economic
methods; EIA reversed then and
repeated the man - economic as
improbable. This conclusion is
overstated.

(3) Page 12 line 9-10 many sources of water
(leak out "types") that may be
relevant when evaluating
NOT Volung.

(4) Page 13 - not numerical values is
line 14 ability to make
tradeoffs.

Page 13 line 24-28 - distinction between

a lower bound on value and value needs to be made

(5) Page 14 lines 9-12

Repeat current text

People are about them () is one approach for evaluating the importance of ecosystems and therefore assess one added consideration.

(6) Page 14 lines 13-20 - I don't agree

Page 14 lines 23-26 - knower is

different groups value concepts - not necessarily relevant to everyone; strong misunderstanding

lines 27-31 misunderstanding need to be re-worked

P15 lines 9-10 Nature Asset on
human presence. Can be
either anthropocentric or
non-anthropocentric; this
is introduced elsewhere in
Report, does not fit
nature beyond it.

page 16 - 2 commentaries on capturing
in lines 24-36

page 18 line 22-27 - Recognizing
Report suggests a nature
seems to imply great
striving for EPA mandate -
this is not true.

page 18 line 28 - page 19 1-12 -
good impression -
can extract 10% extract
will not be relevant
change; contradictory
elsewhere in report
see line 18-19

when measuring value of a
ecosystem study (rather than a
change in value) ^{the} ^{Apple} ^{sense}
SENTENCES MAKES THE APPLE SENSE

Page 20 - lines 7-17 -

employees all measures have spent validity and studying this is not true

line 28 - estimates of

value pay a key role in

Policy decisions → NOT TRUE

Most EPA Policy does

not allow consideration of

Values; based on science

criteria

Page 21 - lines 2-5 - wrong

lines 18-21 wrong

Page 22 line 18-21 wrong states

preference - about

choices; don't force

regulators to constrain

preferences

22 line 25-27 - report to

limit relevance of

transmission methods; this

is not correct.

Page 25 - Enough of objectives of
 CAFE rule lines 6-11 are
 wrong; conclusion,
finding except benefits
desert national is wrong

Page 30 - representative and
 lines 23-30 no representative case
studies never define
what representative is
and makes little sense

Page 31 - Executive order does
 lines 26-30 not preclude EPA from
doing other analysis; but
must do benefit cost and
other does not substitute
and rules are deprived
by legislation - as
this is both main and
wrong as described
of what EPA is do

Page 33 - lines 18-23 seems to imply other rates as he included in the benefits - wrong if this means as it implies adding on - economic benefits to economic benefits;

this is one place where going to committee to discuss benefits for economic was not upheld.

Page 38 - strongly object to lines 17-25 -

Page 41 lines 7-11 - seems to contain response further not back to committee

Page 72-75 - Note notes speaks w/ people

Characteristics of Hillborn's program
or something below
among

Page 79 line 13 - economic
 values don't require
adjustments; revised preferences
 and choice just you are
 out we.

Page 80 line 2 - 6 WTA
not constrained by income
 correct

5 - 10 - WTA is
 measured not between
 ways; AD this is
 correct

Page 83. HEA is not a
 economic method; description
 lines 7 - 17 is not
 correct

Page 84 lines 15-17

Strongly disagree I cannot agree to this

Table 3 - page 87 Appendix and

Intention - sample size
spreads economic values
to monetary - don't agree

Page 88 - Hedonic measures

MARGINAL willingness
to pay

Page 89 Replenishment cost

less cost changes by
total with great care,
shouldn't be used!

Page 97 - concept of differences
including effects connected with the
with values

Page 100 - left out some

importance about outcome of Policy

Page 101

Write costs reduces transparency;

don't agree with

characteristics of method!

Page 120 why are authors

interested comments forwarded to
29-31 ecological values

lines 23-26 don't agree with

Recommendation

Page 26 topic of benefit

analysis implies requirements

for national benefits

understanding

KS question

Page 128

Robert Tompkins' work in
water resources research

Stem Boyle work for EBA
IEC report

Bryhoy - James Journal of
Applied Geomorphology
(in press)

RTI Cayo analysis 807
Smithfield experiment

Richard Coors' Elgar books
with bibliography

Page 129 - see Kinner books

Chapter 7 - I disagree
by Anthony