

**2.2 North American Carbon Budget and Implications for the Global  
Carbon Cycle  
Public Review Collation  
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## **General Comments**

### **Anderson, Lamont-Doherty Earth Observatory**

2.2 looks like it is on track. My only suggestion is to ensure that the *Purpose* of the document is stated up front. Perhaps that is intended, but it does not appear in the outline of the report. The success of the document will be judged on the basis of how well it fulfills its purpose. Therefore, I would recommend that the first section of the report be dedicated to providing a concise statement of purpose.

### **Richard T. Conant, Colorado State University**

First General: I think that the prospectus is quite reasonable and your outline of how the work will be carried out looks really good. The intended use and questions to be addressed look appropriate to me.

Second General Comment: It seems to me that this report will ostensibly try to address stakeholder needs, but will also try to explain why C cycle science might be important to some who don't yet realize it (in terms of the missed-opportunity matrix, this is the unsophisticated users box). I'm sure you recognize that there are some push versus pull challenges there. The SOCCR will be pushing information to the unsophisticated (potential) users while trying to pull information from more sophisticated users, but you won't be immediately able to tell who is who. Anything you could do to broaden participation in the stakeholder meetings will help address this issue.

Third General Comment: Reviewing the available information is a great step. Attaching uncertainty is a huge next step. I expect this issue will be a focus of the authors workshop, but it definitely needs some refinement.

Fourth General Comment: I'm sure you recognize that addressing the last question listed in section 1.5 will require either facilitated interaction between the authors and stakeholders or sure guidance by you and the rest of the lead authors. This will be a real challenge.

Fifth General Comment: Re: the outline. Looks very comprehensive and well thought out. Chapters 2-4 seem sound and I think you'll be able to reach consensus and review should go well. However, chapter 5 may be a challenge. First, stakeholder participation here will be crucial. Second, discussion here could easily devolve into a discussion about measurement methods, accuracy, etc. Given four authors you may get four different perspectives for the issues likely to be dealt with in this chapter.

Sixth General Comment: Finally, the chapter authors you've selected are appropriate. I'd like to volunteer to help out with the grassland chapter. I published a review on grassland soil C a couple of years ago and have been tracking the literature in a database here at

CSU. Ron Follett (ARS here in Ft. Collins) would be another good choice for that chapter. He edited a book on the subject. Tom Boutton (TX A&M) or Rob Jackson (Duke) would be good leads for the other/shrubland chapter.

### **Dilling, University of Colorado, Boulder**

It is unclear from the prospectus for SAR 2.2 how the comments generated by the final stage of review (the NSTC) will be handled. The Guidelines state that these comments will be “addressed by the CCSP Interagency Committee”. This statement must be clarified in the SAR 2.2 prospectus. The Strategic Plan for the CCSP, of which the SAR 2.2 is an official product, stresses that credibility and transparency is paramount. In fact, the transmittal letter for the Strategic Plan, signed by Secretaries of Energy and Commerce and the Director of the Office of Science and Technology Policy, states that “the program described in this strategic plan will meet the highest standards of credibility and transparency to support public evaluation of climate change issues.”

In order to meet the highest standards of both credibility and transparency all stages of the review process must be clear. This includes the final stage of NSTC review. In order to meet standards both of credibility and transparency, the process of addressing NSTC comments must involve the authors of the SAR 2.2. First, with their names and expertise, the authors bring their scientific credibility to the SAR 2.2, and so in order for the SAR 2.2 to meet the “highest standards of credibility,” they must have a role in addressing comments pertaining to their own work. Second, to meet “highest standards of transparency,” comments generated by the NSTC and how they were addressed should be made public, just as the earlier public comments and expert review comments will be.

Therefore, I recommend that the SAR 2.2 include specific text that clarifies this process. This text is adapted from the approved Prospectus for SAR 1.1 with some modifications, and outlined below in Part III, Specific Comments.

### **EPA, Leggett**

EPA’s Office of Atmospheric Protection appreciates the opportunity to comment on “Prospectus for Synthesis and Assessment Product 2.2: North American Carbon Budget and Implications for the Global Carbon Cycle [also known as the Prototype State of the Carbon Cycle Report (SOCCR) focused on North America].” Overall, we think that the SOCCR can provide an important, needed summary of current understanding of the carbon cycle, with special attention to what is known and less known with regard to North America. We do, nonetheless, have concerns about the outline and its consistency with what is described in the Prospectus, as well as the “fit” of this report with the broader body of work underway in the CCSP Strategic Plan and the Climate Change Technology Program, as well as other well established organizations. We summarize these concerns below, with some proposed solutions, and are available for further discussion or elaboration as the Carbon Interagency Cycle Working Group or the Coordinating Team of the SOCCR may desire.

Before moving on to our concerns, we would like to express our particular support for the following aspects of the Prospectus for SAR 2.2:

- An emphasis on quantification of CO2 emissions and uptake with explicit characterization of uncertainties.
- Characterization comprehensively of recent trends in CO2 and methane emissions and removals (both anthropogenic and biogenic)
- Excellent description of the drafting and review processes
- Significant improvements in the potential redundancy within the outline, compared to what we had previously seen.

### **1. Overlap with other Synthesis and Assessment Reports (SAR) of the CCSP and the Climate Change Technology Program**

It is our perception that the proposal to examine the questions of emissions and “options and measures that could significantly affect the carbon cycle” potentially overlaps with several other SARs. To the degree that this is true, it poses several challenges, not least of which is how best to corral the time and wisdom of the experts on the topics of fossil fuel emissions and projections, and of mitigation technology characteristics and economics, and projections. (It also risks not being able to capture sufficient attention of those in agencies who might peer review and/or use the SOCCR products.) Another risk is that multiple reports, all “scientific” and “peer reviewed” will produce conflicting “state of the science” reports in a short period of time, creating confusion and reducing the value of any individual effort.

We draw particular attention to the bullet point on page 2 of the prospectus which has a very substantial overlap with the “Scenarios” SAR (2.1). We strongly doubt, given our experience with the difficulty of this task, that the SOCCR will be able to add value to that work. Nor are we aware that the SOCCR team is well engaged with the scientists, economists and modelers who comprise the strongest expertise, even to summarize the available research and controversies on this topic.

Beyond our concern about duplication and little value-added, potential conflict on the topic of projections, technologies and economics, we fear, based on our experience with these topics, that attempting to cover these broad topics will mire the entire SOCCR report in debate and distract from the very important contribution that this SAR could provide.

As a point to note, we are aware that the Climate Change Technology Program (CCTP) is also now reviving its work to project technologies and their characteristics. While the timeframe may be shorter than the timeframe for the SOCCR projections (although we did not see this identified), it presents another possible competing product from the agencies and the science community. Also, the Energy Modeling Forum, run through Stanford University and engaging many important analysts, is also preparing technology, projections and economic assessments. These same experts are also committed to contribute in varying capacities to the IPCC Working Group III report. While the potential for drawing in these experts in the future is good, it may be extremely difficult over the next year or two to attract them to yet another forum producing substantially similar assessment.

*Proposed solution:*

- Drop or edit the current text in the Prospectus to “options and measures that could significantly affect the carbon cycle,” to make clear that this would, at most, be a general discussion of principle technologies and their effects, rather than an in-depth evaluation.
- Identify and draw on other summaries that are publicly available at the time of writing, as necessary, rather than producing some original analysis.
- Ensure that key experts in the scientific, technological, economic and policy worlds are available to help avoid duplication, and to ensure consistency with other CCSP and CCTP products. (Although we have great respect for Adam Rose, we do not see any proposed chapter authors with comparable expertise on any of the many areas the current outline would require.)

**2. Difficulty in attracting needed expertise outside of natural sciences**

We do not see any authors in the list of candidate authors who have the expertise we believe is requisite to cover the projections, technology assessment, economic and policy items in the proposed outline. In particular, the outline and assessment should recognize that there are co-emissions of CO<sub>2</sub> with methane and other pollutants, and that technological, economic and policy analysis responsibly must be taken into consideration of these joint effects. Assessing these will require engaging with experts who are well versed in the technologies and in the economic and policy processes that may influence the co-emissions in the baselines and any mitigation assessment. (We are reticent to nominate any at this time, as these experts are generally already over-committed to existing processes and their research, and would require funding to provide any new effort the requisite attention.)

*Proposed solution:* This will be largely resolved if the ambitions of the report on the topics of technologies, projections, economics and policy analysis are scaled back dramatically. If funding is available for experts, we could discuss possible nominations depending on how the outline is modified.

**3. Ensure that the SOCCR is drawing on the best available information, which may sometimes come from (peer-reviewed) programmatic information, and not just peer reviewed journals.**

We commend the description in the Prospectus that acknowledges that many data sets and peer-reviewed research are available that may not appear in scientific journals. EPA/OAP has long had a concern that excellent scientific, peer-reviewed material developed for policy or programmatic purposes by, for example, US or State agencies, is generally not noticed or regarded favorably to research published in peer-reviewed journals. While this is a broader issue than the CCIWG, it is closely related to the question of what the scope of research will be on which the SOCCR is based. For example, the US National Greenhouse Gas Inventory is developed based on the best scientific information available and goes through extensive expert and public review, yet too often it is not used for reports like the SOCCR. The same will be true for many government reports concerning emission projections, technologies and economics. To the degree to which the SOCCR covers these issues and is not tied into the community producing such reports, that linkage would be very important to establish. If it isn't, the

SOCCR authors may not find the state-of-the art data, credibility, and utility to the policy community that it could otherwise have.

*Proposed solutions:*

-- Depending on changes in the outline, the “marketing plan” for the report needs to incorporate better understanding of how to reach the technologies, projections, economics and policy communities. It is not sufficient to advertise on the SOCCR website, as the experts in these fields will not look there, even if pointed to it.

**4. The Audience may be too broadly defined**

Under “Audience,” the set of stakeholder groups is very broad and we wonder whether this description of the clientele is too broad, and will miss the opportunity to be more effective by targeting the report to a narrower set of key users. To the degree that the “primary users” of SAR 2.2 are likely to be, *inter alia*, policy-making officials, how is the CCIWG and the scientific Coordinating Team identifying and engaging this community to identify their needs and appropriate media for communicating with them? We are now aware of the 1 October 2004 and the 15-16 November 2004 stakeholder meetings and at the AGU meeting in December, but we are unaware of who the participants were, how they were selected, and what the results were. Given the great breadth of the SOCCR outline and of the intended audience, we suspect that the information covering any of these may be more anecdotal than representing the views and needs of all of those communities on all outline topics. Perhaps further engagement on this will clarify our view of this.

*Proposed solution:*

- Substantially narrow and refine the potential audience. This will require much soul-searching and market-research analysis to understand the niche that this report can fill without duplication, as well as whether the organizers will have the means to communicate effectively with the desired audience.
- Engage with a significant sampling of the desired audiences (1 or 2 is not sufficient) to understand the likelihood, and under what conditions, the SOCCR can help fill their needs.

**5. We are unclear how the Coordinating Team will be able to coordinate with “national programs” in Mexico.** It is not apparent that there is an established “national program,” although a strong start has been launched by the Fall 04 workshop of the NACP. Many of those experts, however, will also be strained by activities similar to those of US experts: federally commissioned analyses (i.e. their Third National Communication), the IPCC and their own on-going research, as well as lack of funding.

*Proposed solution:* EPA could provide some useful contacts at the appropriate time, as could DOE and USAID. However, we would like to see a more detailed outline and list of experts before adding more suggestions.

**6. Historical analysis is not specified in the outline**



Especially in section III, analysis of historical data and estimation of past emissions and uptake would be very helpful. The US EPA can provide detailed analysis of all anthropogenic emissions through the US National Greenhouse Gas Inventory, from 1990 to the present. Estimates before then, and especially related to land use and change, would be particularly useful to assess in the SOCCR as a complement to what is already produced and thoroughly reviewed through the interagency GHG Inventory process. (We also note issues of definitional consistency among different inventories, within the US and globally, and the importance of not interpreting those as “errors.” (Similar data for the same time period and definitions are available for Mexico as well, although the uncertainty will be greater for some sectors.)

*Proposed solution:* Add to the outline. Provide analysis back as far in time as is supported by high quality data.

**7. Omission of carbon emissions from cement and industry, and as methane and VOC in the outline**

Although the Prospectus notes that methane will be included in the inventory, we do not see it specifically mentioned in the outline. Moreover, if it is included, then the source categories identified in the outline are not complete. The same holds true to the degree that C emitted as VOC or CO are not specified. Although these are small, the SOCCR would be incomplete without accounting for them.

**8. No need to include discussion on Global Warming Potentials**

We wonder why the report will use GWPs. These are a useful tool for policy analysis, but perhaps are not the strongest measure to use in a science report. In particular, we would prefer to see contributions to radiative forcing or temperature change used as a better measure. We also would be concerned to have a discussion of GWPs in this report (which we do not believe is necessary), without significant engagement of the community for whom GWPs are most useful – i.e. the policy analysis and program community.

*Proposed solution:* Drop discussion of GWPs. Use, instead, contributions to radiative forcing over some time period. Do not attempt to provide costs per unit of emission reduction across gases (as these would be heavily depending on the model and assumptions used, and highly variable anyway).

**9. Section IV on options and measures risks duplication and less than state-of-the-art assessment**

We have already outlined our concerns about the ability of the SOCCR to do just to these topics. Moreover, the lack of detail in points B, C, D and E reflects a simplistic view of what it will require to attack these topics, such as very challenging issues of discount rates, joint benefits, appropriate baselines, policy influences, etc. We strongly believe that it would be inappropriate for the SOCCR to get into discussion, in particular, of policy measures (taxes, cap and trade, regulations, voluntary information, etc.) Section D is seriously over-reaching in a similar regard. This section alone is sufficient for an entire book, and would still be controversial. And implementation issues are well outside the

domaine, as we understand it, of the North American Carbon Program and the research it supports.

*Proposed solution:* Drop or substantially cut back on what is implied. At most, a general review of principle technologies available now or foreseen in the coming decades would be sufficient. This kind of information is widely available in IPCC, DOE and EPA reports, as well as some research publications.

#### **10. PART II seems redundant with Part I**

We do not understand how Part I can be addressed without going over the same information that it implied in Part II. There is, however, too little information in the outline for us to understand this. In addition, all of our previous comments apply as well to Part II.

*Proposed solution:* Ideally, Part II would be folded into Part I. Alternatively, the outline needs to clarify how Part II would address these questions without being redundant with, and potentially confusing, Part I.

#### **Gurney, Colorado State University**

Not to sound myopic (vis a vis my own area of work) but I think an individual from the inverse community would be an important addition to the collection of authors. This approach is a key contributor to regional net exchange estimates.

#### **Hultman, Georgetown University**

This Prospectus should include explicit guidelines on the final review procedure: who makes the final decisions, what their affiliations should be, and what their area of expertise is. These items are not delineated explicitly in the current Guidelines for Producing CCSP Synthesis and Assessment Products. Specifically, Guideline 16 does not state explicitly who will evaluate the products for final release, nor the criteria that they shall use in deciding. However, these Guidelines do not prohibit individual Prospectuses from including more specific information to reassure their authors that the final product will be allowed to circulate either as a CCSP product or as a separate publication. I strongly recommend adding more specific guidelines in the Product 2.2 Section 8 that addresses the process of final review to allow for public release.

#### **King, Oak Ridge National Laboratory**

The prospectus for Synthesis and Assessment product 2.2 should be more specific and precise in its description of the review process and mechanism, and how the review of SAR 2.2 will follow the Guidelines for Producing CCSP Synthesis and Assessment Products. Accordingly, the prospectus for 2.2 should, in stating its own review process, clarify the existing ambiguities in the CCSP Guidelines concerning the drafting/reviewing and the approving, producing, and releasing of products, especially the NSTC review of the third draft. Ambiguities in the Guidelines regarding the process of the NSTC review (and consequently the review of product 2.2 in adherence to those Guidelines), especially the involvement of product authors in addressing comments generated during the NSTC review, have generated questions and concerns among the

science community and others about the mechanism, purpose, and even intent of the NSTC review. Authors and sponsors of the report need to know that they will be consulted at all stages of the review process, including the NSTC review, so that they are confident they can stand behind the product that they have produced and for which they are ultimately responsible. The prospectus for product 2.2 should address and resolve those ambiguities and concerns. The prospectus for product 2.2 should minimally adopt wording like that in the approved final prospectus for product 1.1, which states that “Comments generated during the NSTC review will be addressed by the CCSP Interagency Committee in consultation with the lead and supporting agencies and the lead authors”. The final prepositional phrase represents a small change in wording from the Guidelines but an important clarification in the process and outcome of the NSTC review. It is a small change making explicit the normal expected mechanism of consultation and dialogue with the authors of such a report.

### **MacCracken, Climate Institute**

First General Comment: As indicated in a number of the specific comments provided, the consistency of the entire CCSP product development process (as provided for in its guidelines) with the Federal Advisory Committee Act (FACA) merits careful review. It would be unfortunate for so much scientific work to become entangled in procedural difficulties if indeed FACA applies, as would seem to me to be the case based on my experience with the setting up of the US National Assessment and its various components.

Second General Comment: It is particularly important that the review process for the various CCSP products be independent and transparent. Making sure that in addition to all incoming comments being compiled and posted, the responses of the authors to these comments need to be made publicly available. In addition, having the National Research Council instead of the Agency Executive Committee actually in charge of choosing the reviewers and running the review process would certainly be preferable.

### **NCASI, Miner and Vance**

1) There is a critical need in all of the SAPs for a discussion of how they intersect. For instance, SAP 2.1 will include models that address trajectories of sources and sinks associated with land use and land use change but there is no indication that the output of SAP 2.2 will serve as the input for that analysis.

Likewise, SAP 2.2 deals with questions about how and why fossil fuel emissions are changing, but this will clearly be a central element of the work being done under SAP 2.1.

There should be some introductory wording in each SAP outline that identifies those areas where the SAP will serve as the primary assessment and those areas where the information is to be drawn from other SAPs. Such coordination is critical, both to ensure consistency among SAPs and to inform the reader.

2) The prospectus addresses many aspects of this important assessment product. My major criticism concerns the organization and clarity of the outline as a whole. I have three general comments related to this:

(1) The introductory portion of the prospectus does not adequately describe the relationship among the different sections of the analysis and how the budget assessment will be done. In particular, are carbon sources and sinks from the various sectors (e.g., forestry, transportation, energy agriculture) to be combined in the budget analysis or will they be individually assessed?

(2) Sections II and III in the outline appear largely redundant. The questions are “How do North American carbon sources and sinks relate to the global carbon cycle?” and “What are the primary carbon sources and sinks in North America, how are they changing, and why?” Many of the same categories are contained in each section. One option is to combine these into (a) a brief overview of the natural carbon cycle, (b) how the carbon cycle is changing, (c) a breakdown of each component (e.g., fossil fuel, terrestrial vegetation and soils), (d) a sector-specific analysis (e.g., forestry, transportation), and (e) a cross-sector analysis of knowns and uncertainties.

(3) More problematic is Part II, “The Systems and Activities that Control the Carbon Budget in North America,” which is a curious mixture of general sources (e.g., emissions from fossil fuels), economic sectors (e.g., agriculture), biomes (e.g., boreal forests, wetlands) and geographic components (e.g., coastal management). It would be useful to analyze both within and among sectors but it’s not clear how or whether this will be done, based on the outline.

#### **Pacala, Princeton University**

I have been on the potential author’s list from the beginning. I am happy to contribute if the review process is transparent. I will not contribute my time if the authors do not have final control over the content of the report.

#### **Randerson, UC Irvine**

I like the way the report has a chapter (chapter 2) that places the North American budget in a global context. Also, I think the chapter that focuses on trajectories and mitigation measures (chapter 4) will be important to many stakeholders. Although these are important, I think there is a gap that if filled, could substantially enhance the value of the report to stakeholders within the U.S. government. Specifically, I would argue that we consider adding a chapter with the following title: 'How do North American carbon sources and sinks compare with those from other regions'. I do not believe it is easy for many stakeholders to find accurate emission estimates from different countries and regions. What are recent trends, for example, in fossil emissions from other U.S. trade partners? What are the factors that are driving these trends? For which countries and regions do we have the most confidence in the emission estimates and natural sink estimates? Where do we have the least confidence and why? Where in the report will there be critical analysis of other recently published regional budgets, for example, those

recently put together for Europe or Australia from the perspective of U.S. scientists? Does the U.S. scientific community unequivocally accept any published report of a sink or source from another region, or does this report represent a chance to provide a critical, balanced analysis of these other studies? Perhaps not in SAR 2.2 but in the next one, it is relevant to consider assessing, in addition, what countries were able to change their emissions (e.g., in response to the recently ratified Kyoto Protocol) and how much the approaches cost. Even if the U.S. does not chose to participate in Kyoto, an analysis of the successes and failures of those countries who are attempting to (or claiming to) meet their commitments would be of immediate use in designing effective policy in this area. An assessment of the uncertainties of recently published regional budgets from other regions would be an important step in this direction.

I appreciate that some of the latter questions described above could be addressed in chapter 4, section C. However, the way chapter 4 is set up now it involves future approaches: 'options and measures that can enhance sinks' Also, in chapter 2, section F there may be some room for this, but it is not clear from the outline if the authors had these types of questions in mind. A chapter focusing on a comparative analysis of existing trends in emissions and existing natural sources and sinks from different regions, in my opinion, would be of similar value to policy makers as the existing chapters 2 and 4.

**Sarmiento, AOS Program, Princeton**

As a scientist who works on the carbon cycle, I would be glad to participate in preparing the SOCCR report if the scientists are responsible for the final contents of the report and the process of review is transparent. The present plan calling for a final review by the National Science and Technology Council makes me extremely uneasy in this regard.

**Sundquist, USGS**

Introduction and First General Comment: I recently reached the very difficult decision to withdraw from my position as lead author and lead for scientific content of the report described in this draft prospectus. The following comments include concerns that led to my withdrawal, and reflect the experience I accrued during the several years that I contributed to the development of the State of the Carbon Cycle Report (SOCCR). I've expressed my continuing respect to those who are still working on the SOCCR/SAR2.2. I know that many others share concerns similar to those expressed below. I hope that questions motivated by these concerns will be clarified soon, and that improvements can be made to assure the scientific independence and quality of the report.

Second General Comment: The SOCCR is envisioned as a government-authorized report that will express the independent scientific judgment of its authors in a manner that is policy-relevant but not policy-prescriptive. The inherent difficulty of this task has been multiplied by the need to adapt to protracted and ongoing implementation of governmental oversight. For example, during the last two years, the SOCCR has been subject to a succession of six different governing documents: the SOCCR Terms of Reference (June 2003), draft Climate Change Science Program (CCSP) report guidelines (March 2004), a draft prospectus (May 2004), a second draft prospectus (September

2004), final CCSP guidelines (December 2004), and the third draft prospectus now posted for comment. Adjustments have also been necessary to adapt to a convoluted proposal process (see **Specific Comment** regarding Page 4, lines 26-30) and to accommodate the evolving relationship between the funding agencies and the CCSP. A year and a half after the submittal of the first SOCCR proposal, not a word of the report has been written. The work of producing the SOCCR has become so encumbered that its original vision may be unattainable.

The writing of the report would be greatly streamlined if its authors were explicitly given full responsibility for its contents. The broad responsibilities now exercised by government entities make the report vulnerable to vagaries of interagency cooperation (and lack of cooperation), and ultimately open the door to the criticism that particular programs or policies are favored. Government oversight of Synthesis and Assessment Products should be limited to straightforward requests for proposals, award of funds through peer review, and subsequent monitoring of progress in the manner generally applied to government-supported scientific studies.

**Third General Comment:** In December 2004, the CCSP Office released a new set of guidelines for the preparation and review of CCSP Synthesis and Assessment Reports. These guidelines include a process of final review and approval at the highest level in the Federal Executive branch. Consideration at this level is testimony to the expected impact of the SOCCR and other CCSP reports. Inevitably, many potential authors and reviewers of the SOCCR have expressed concerns about the purpose and nature of the government review and approval process. For example, during the December 2004 meeting of the American Geophysical Union, questions about government review were the primary topic of discussion at an open Town Hall Meeting held to discuss the SOCCR. I understand that similar concerns were voiced in discussion at the February 2005 meeting of the American Association for the Advancement of Science. Reasonable questions have been raised, and clarification is needed to assure the objectivity, integrity, and utility of the approved report.

Most of the questions that have been raised address fundamental principles of scientific review. Will the scientists who are the authors retain control over changes made throughout the review and approval process? What review criteria will be applied? Will the review and approval process be timely? Under what circumstances could approval be denied? If the report is not approved, what happens to it? These questions are routinely answered in the information provided by publishers to authors of scientific books and articles.

Information published by the Federal government is subject to the Data Quality Act. However, the new guidelines for CCSP reports specify that the final top-level government review and approval will be conducted after the reports have already been certified for conformance to the Data Quality Act. It is not clear what additional requirements will be considered in final review and approval.

### **Tans, NOAA**

The lead authors, responsible for the scientific content and for a proper representation of the state of the science, completely lose control during the last review step. The NSTC comments will be handled by the managers of the CCSP Interagency Committee, not the

lead authors. Furthermore, every member of the NSTC has an effective veto over the final product. The possibility exists that one or more lead authors may not approve of the final product, although their names are associated with it. It is clear that politics, not science, has the upper hand in the production of the report. If this power is abused, it could seriously detract from the value (and ostensible purpose!) of the report.

### **Wickland, NASA**

First General: The section labelled "6. Review" does not describe the final interagency / U.S. government review process. All this prospectus says is that the "Guidelines" will be followed. A more explicit description of these last steps is recommended, perhaps adopting or adapting the language already developed in the approved prospectus for SAR 1.1. I have received many expressions of concern that a process that is admirably transparent at all other stages is neither transparent nor accountable at the last step (NSTC clearance). Authors, and the lead and supporting agency representatives, need to be assured that they will be consulted concerning any substantive actions taken at this final stage and that the report will not be published/released without their full knowledge and concurrence as to its content.

### **Specific Comments**

Page 1, line 6: It is not clear how there can be three lead agencies. For legal and other purposes, the agency that really has the primary responsibility should be listed, with others perhaps listed as "co-lead agencies."

### **MacCracken, Climate Institute**

Page 1, Line 35-36: Product 2.2 has been conceived as a precursor to a report on the global carbon cycle. The prospectus states "subsequent reports will expand in geographic coverage and/or in depth and breadth of analyses". This statement implies that Product 2.2 will be relatively narrower and shallower in analysis than subsequent reports. Yet these CCSP Assessments are also to be written and disseminated to a wide variety of decisionmakers and stakeholders. Starting the carbon cycle assessments with one of the most politically charged regions (US), and doing it in a relatively narrower and shallower way, seems hazardous. Given that the project will undoubtedly be carried out via the predetermined schedule, I would at a minimum suggest a careful review of this wording.

### **Nathan Hultman, Georgetown University**

Page 1, line 44: The use of the word "impacts" is, it appears, not being used in a manner consistent with the word's definition on page 196 of the CCSP Strategic Plan, where the word is defined as "(Climate) Impacts: Consequences of *climate change* on natural and *human systems*" (parentheses and italics in original) and then goes on to further expand. This product, it would appear, is focusing on the implications of only the changes in the CO<sub>2</sub> concentration and not of climate change, for if the product is really going to cover all types of impacts for "the United States and the rest of the world" caused by the changes to the carbon cycle and resulting climate change, a level of effort more equivalent to that of IPCC Working Group II will be required.

As a second aspect of this comment, it needs to be made much more clear the extent of analysis of impacts on the ocean that will be covered. Will this report consider not only the changes in carbon loading, but also the changes in acidity and their impacts on marine life, including coral, and changes in the condition of the ocean (so CO<sub>2</sub>-induced changes in temperature, currents, overturning time, and so on? A much more careful explanation of the boundaries of this study is needed—what will be covered and what will not.

**MacCracken, Climate Institute**

Page 1, lines 45-46: This statement is incredibly broadly stated, and could be interpreted to include not only all that the IPCC does under all three Working Groups, but also analysis of a host of issues within the United States. Much more detailed and careful phrasing of what will be done is needed.

**MacCracken, Climate Institute**

Page 2, Lines 2 and 3: This section discusses “natural reservoirs and sequestration” and “effects of purposeful carbon management,” but does not mention ongoing natural resource management-related issues such as managed forests.

**Eric D. Vance, NCASI**

Page 2, line 10: This task needs to also include providing the “current best estimates” (quoted from line 17) of the items cited. It is not at all useful to just have an indication of “uncertainties” without having an indication of the best estimate value. Thus change phrasing to “Quantify current best estimates and uncertainties” or something similar.

**MacCracken, Climate Institute**

Page 2, Lines 10-13: Providing estimates from CO<sub>2</sub> emissions from fossil fuels in North America is not in any way sufficient, as is implied, to “quantify current uncertainties related to the buildup of CO<sub>2</sub> and methane in the atmosphere”. I would suggest “For example, it will provide estimates of CO<sub>2</sub> emissions, and associated uncertainties, from global fossil fuel use, and provide specific information about North America’s role in this fossil fuel usage.”

**Nathan Hultman, Georgetown University**

Page 2, Lines 14-15. Please describe what criteria you will use to define a “best” projection. Also, rephrase line 15 to “including uncertainties in projected fossil fuel emissions”.

**Nathan Hultman, Georgetown University**

Page 2, lines 14-16. Any discussion of projections of the future North American carbon budget should be limited to 2030 or earlier. This is the furthest into the future that such projections can be made with any accuracy, as is evidenced by the fact that the IEA’s World Energy Outlook will only make projections to 2030 and the EIA’s projections are only made to 2025.

**O’Keefe, Marshall Institute**



Page 2, Line 29. Suggested modification: “using clear graphics that to depict the carbon cycle in ways that are easily understandable but maintain scientific accuracy.”

**Nathan Hultman, Georgetown University**

Page 2, lines 35-38: An additional audience that needs to be mentioned is the international community. They will be watching very carefully and it will be important that the product be of such a high standard that the entire world community (especially foreign leaders) will find it credible.

**MacCracken, Climate Institute**

Page 2, line 42: To make the statement slightly less presumptuous, rephrase to say “information to be provided will be designed to be understandable by the planned audience.”

**MacCracken, Climate Institute**

Page 3, line 5: The use of the word “impacts” is, it appears, not being used in a manner consistent with the word’s definition on page 196 of the CCSP Strategic Plan, where the word is defined as “(Climate) Impacts: Consequences of *climate change* on natural and *human systems*” (parentheses and italics in original) and then goes on to further expand. This product, it would appear, is focusing on the implications of only the changes in the CO<sub>2</sub> concentration and not of climate change, for if the product is really going to cover all types of impacts for “the United States and the rest of the world” caused by the changes to the carbon cycle and resulting climate change, a level of effort more equivalent to that of IPCC Working Group II will be required.

**MacCracken, Climate Institute**

Page 3, lines 5-6: It is not made clear whether the phrase “United States and the rest of the world” includes the oceans. This should be clarified.

**MacCracken, Climate Institute**

Page 3, lines 28-34: These questions do not seem to encompass all of the points made in section 1.4. In particular, there is no question focused on the “impacts upon the United States and the rest of the world” that are mentioned on page 3, lines 4-5. And even if the word “impacts” is changed, as suggested elsewhere, there is no question really focused on the *implications* of the CO<sub>2</sub> change itself on vegetation, ocean chemistry, coral, and so on.

**MacCracken, Climate Institute**

Page 3, Line 32. It is unclear if you mean “options and measures [implemented in N. America and/or implemented elsewhere] that could significantly affect the carbon cycle in North America” or “options and measures [implemented in N. America and/or implemented elsewhere] that could significantly affect the global carbon cycle in the world”

**Nathan Hultman, Georgetown University**

Page 3, line 33. Please consider adding the following question: 'How do carbon sinks and sources from North America compare with those from other regions?' I think this is a fundamentally different question than question 2, 'how do North American sources and sinks relate to the global carbon cycle'.

**J. Randerson, University of California, Irvine**

Page 4, lines 26-30: This approach to provide independence between the CCSP and CENR leaders and the author team is commendable. It would be helpful to clarify the policies of the various agencies with regard to ensuring the independence of the review and publication process in order to confirm that the arrangement meets the provisions of the Federal Advisory Committee Act.

**MacCracken, Climate Institute**

Page 4, lines 26-30: The proposal process was more complicated than that described in the draft prospectus. Months before the publication of the SOCCR Terms of Reference, Lisa Dilling and I contributed to a SOCCR "concept paper" that was circulated to interested scientists and program managers. Our interest in the SOCCR had resulted from our participation in Federal carbon-cycle science planning activities. In October 2003, Lisa and I submitted to DOE and NASA a formal proposal to develop the SOCCR. A few weeks after we submitted our proposal, we were told that it was "on hold" pending guidance from the Climate Change Science Program (CCSP) Office. At about the same time, we were informed by scientists at Oak Ridge National Laboratory (ORNL) that they were preparing a SOCCR proposal "in response to encouragement from DOE." In May 2004, Lisa and I were asked by DOE, NASA, and NOAA to merge our proposal with a draft proposal that had been prepared by Tony King and others at ORNL. We were also asked to adapt the proposal to meet the terms of a new draft prospectus and draft guidelines for Synthesis and Assessment Reports under the CCSP. The merged proposal was submitted in July 2004 and approved for funding at more than \$1M in August 2004.

**Eric Sundquist, USGS**

Page 4, line 32, through page 5, line 34: The proposed authors are all highly qualified, but it is difficult to evaluate their expertise relative to specific writing responsibilities, which are not described. Another reservation is that at least some of the proposed authors may have concerns and questions similar to those raised by others concerning the government review process. The draft prospectus lists six "lead authors" who were (except one) directly involved in the merged proposal (see above **Specific Comment, Page 4, lines 26-30**), and nine "candidate chapter authors" who were (except one) first contacted by Oak Ridge National Laboratory in 2003. At the time the draft prospectus was published, specific writing responsibilities had not yet been determined, and additional potential authors were under consideration. Candidate and other potential authors had not been engaged in substantive discussion concerning their responsibilities under the terms of the draft prospectus and CCSP report guidelines.

Public identification of proposed authors should include a more complete list of candidates linked to specific writing responsibilities. Most important, potential authors of the report should be determined through a more open process that includes extensive discussion and clarification of specific writing responsibilities and review obligations.

## **Eric Sundquist, USGS**

Page 4, line 34-40: The parenthetical clarification of the role of Adam Rose (page 4, line 39) is helpful in understanding the breadth and coverage of the lead author team. That clarification or second level of role designation should be extended, where appropriate, to the other members of the team.

### **Anthony King, Oak Ridge National Laboratory**

Page 6, lines 4-6: Clarification is needed about what is meant by the phrase “in consultation with the Agency Executive Committee” in order to evaluate whether the arrangements are consistent with the Federal Advisory Committee Act (FACA). If indeed the Agency Executive Committee has ultimate or dominant control or veto power over the selections of the authors, then it would seem that the team is really serving as an advisory committee for the agencies and FACA should apply. Either the team is set up as an independent entity controlled by the principal investigators of the contract or grant awards, or it is acting in a manner to advise the agencies, and in this case would seem to be subject to FACA. This matter really needs to be clarified in order that the rules governing the group’s functioning are clear and legal.

### **MacCracken, Climate Institute**

Page 8, lines 26-28: With respect to use of data, in that the document will be going through both an expert and a public review process, so will be peer-reviewed, the requirement should be focused on the data being generally available. Just because data has been published, or even peer-reviewed, does not make it right. With respect to process, insisting that any such use of unpublished data must be approved by the CCSP guidelines is a further indication that the authors are not able to act in an independent manner and are rather being handled in a controlled manner that should be subject to the requirements of the Federal Advisory Committee Act.

### **MacCracken, Climate Institute**

Page 9, lines 12-13: If review of the draft product is really controlled by the Agency Executive Committee rather than by author team or its institution, it is quite clear that this document is intended to be a government report, and when outside scientists are used to provide such advice for ultimate approval by the government, it would seem that the Federal Advisory Committee Act applies. This should be carefully evaluated.

### **MacCracken, Climate Institute**

Page 9, lines 13-15: It is all well and good that the comments and other feedback will be documented, but what matters is that these materials will be made public. It is also vital that changes made in response to the comments and the reasons for making or not making such changes be documented. Thus, the wording should be changed to “that the comments and other feedbacks are provided to the SAR 2.2 Coordinating Team for response, and that these comments, feedbacks, and the team’s responses indicating how the comments have been dealt with are documented and made public over the Internet.”

### **MacCracken, Climate Institute**

Page 9, lines 14-15: The text is lacking a discussion of the provisions for further review, both by the public and the agencies. The calendar on page 12 indicates that such reviews will take place, but there is no explanation here of how this will work and whether the authors have final authority on all changes. This is a very important issue as it really determines whether the process needs to be conducted under the auspices of the Federal Data Quality Act (FACA). As I read the CCSP's *Guidelines for Producing CCSP Synthesis and Assessment Products*, they are set up in such a way that the members of the panel are selected by government agencies and that they are, in my opinion, serving in an advisory manner by preparing a report that is reviewed and revised before being submitted, and finally revised by the leadership of the CCSP and CENR. While government submission of comments during a review process is acceptable, unless there is an indication that the authors have the final word and are not pressured to make changes, the finalization, approval and issuance of the product as an official CCSP report would seem to indicate that the authors are serving in an advisory capacity and so the FDQA requirements should be invoked. When First Lady Hillary Clinton took what seems to be a similar approach of involving non-government experts in the preparation of what was to become an official government report for modifying the US health care system, the courts ruled that she was in violation of the Federal Advisory Committee Act (FACA). FACA lays out a set of requirements for when government representatives are convening experts to for advice regarding a government position on a matter (see, for example, <http://www.fda.gov/opacom/laws/fedadvca.htm>). It would seem essential that the organizers of this effort carefully clear this prospectus with appropriate legal counsel, taking into consideration the requirements of FACA. Of particular concern in determining whether FACA requirements should be applied, such a review should evaluate the provisions indicating the extent to which the agency representatives are making and controlling the appointments of the authors, the content of the report, and the final review and publication process.

**MacCracken, Climate Institute**

Page 9, lines 45-46: For there to be confidence in the expert peer review process, a list of reviewers needs to be provided (as the National Academy of Sciences does). Although the name and their comments need not be associated, it will be important for the names and affiliations of the reviewers to be made public. If indeed this product is being prepared under the OMB guidelines for the Federal Data Quality Act, then OMB's guidelines about the declarations that must be made by expert peer reviewers in order to avoid conflict-of-interest situations need to be followed. This information should also be made publicly available in order to enhance confidence in the report's credibility. (I will add parenthetically that I think the CCSP could have avoided classifying these reports as being subject to the FDQA guidelines by commissioning the products as independent scientific reviews, which would only be possible if the CCSP guidelines did not provide for the final adoption of the publications by the CENR as government documents.)

**MacCracken, Climate Institute**

Page 10, line 7: Add sentence at end: Following expert review, the lead authors will revise the draft product by incorporating comments and suggestions from the reviewers, as the lead authors deem appropriate.

**Lisa Dilling, University of Colorado**

Page 10, line 9: Sections comparable to that of the current “6.2 Expert Review of First Draft” (page 9, line 26 – page 10, line 7) should be added to clarify the review process for the second and third drafts called for in the CCSP Guidelines. These descriptions should be explicit and unambiguous. The description of the review of the third draft (by the NSTC) should include words to the effect that “Comments generated during the NSTC review will be addressed by the CCSP Interagency Committee in consultation with the lead and supporting agencies and the lead authors”, adopting wording and clarification similar to that found in the approved final prospectus for Synthesis and Assessment product 1.1.

**Anthony King, Oak Ridge National Laboratory**

Page 10, line 10: Section 6.3 Rename current heading of “Review dates” to “Public Review of Second Draft”

**Lisa Dilling, University of Colorado**

Page 10, line 13: Move first sentence about dates of expert review to after new sentence inserted on line 7 page 10

**Lisa Dilling, University of Colorado**

Page 10, line 13: Insert text under Section 6.3 “Public Review of Second Draft”  
Following this revision, the draft product will be released for public comment. The public comment period will begin in April 2006. Following this comment period, the lead authors will prepare a third draft of the product, taking into consideration the comments submitted during the public comment period. The scientific judgment of the lead authors will determine responses to the comments. All comments submitted during the public review will be made publicly available without attribution.

**Lisa Dilling, University of Colorado**

Page 10, Line 14?: Insert new section: 6.4 CCSP Approval and NSTC Clearance  
Once the revisions are complete, the lead agency will submit the third draft of the synthesis and assessment product to the CCSP Interagency Committee for approval. If the CCSP Interagency Committee determines that further revision is necessary, their comments will be sent to the lead agency for consideration and resolution by lead authors. If needed, the NRC will be asked to provide additional scientific analysis to bound scientific uncertainty associated with specific issues.

If the CCSP Interagency Committee review determines that no further revisions are needed and that the product has been prepared in conformance with the Guidelines for Producing CCSP Synthesis and Assessment Products and the Data Quality Act (including ensuring objectivity, utility, and integrity as defined in 67 FR 8452), they will submit the product to the National Science and Technology Council (NSTC) for clearance. Clearance will require the concurrence of all members of the Committee on Environment and Natural Resources. Comments generated during the NSTC review will be addressed

by the CCSP Interagency Committee in consultation with the lead and supporting agencies and the lead authors.

Once the revisions are complete, the Agency Executive Committee will submit the synthesis and assessment product to the CCSP Interagency Committee for approval. If the CCSP Interagency Committee determines that further revision is necessary, their comments will be sent to the Agency Executive Committee for consideration and resolution by lead authors. If needed, the NRC will be asked to provide additional scientific analysis to bound scientific uncertainty associated with specific issues.

If the CCSP Interagency Committee review determines that no further revisions are needed and that the product has been prepared in conformance with the Guidelines for Producing CCSP Synthesis and Assessment Products and the Data Quality Act (including ensuring objectivity, utility, and integrity as defined in 67 FR 8452), they will submit the product to the National Science and Technology Council (NSTC) for clearance. Clearance will require the concurrence of all members of the Committee on Environment and Natural Resources. Comments generated during the NSTC review will be addressed by the CCSP Interagency Committee in consultation with the lead and supporting agencies and the lead authors. All comments generated by the NSTC review will be made publicly available without attribution.

**Lisa Dilling, University of Colorado**

Page 10, Line 15: new section 6.4 entitled "U.S. Government Review" needs to be added. I suggest that language already approved in the Prospectus for SAR 1.1 could be adapted here:

Once the revisions are complete, the Agency Executive Committee will submit the synthesis and assessment product to the CCSP Interagency Committee for approval. If the CCSP Interagency Committee determines that further revision is necessary, their comments will be sent to the Agency Executive Committee for consideration and resolution by lead authors. If needed, the NRC will be asked to provide additional scientific analysis to bound scientific uncertainty associated with specific issues.

If the CCSP Interagency Committee review determines that no further revisions are needed and that the product has been prepared in conformance with the <http://www.climatescience.gov/Library/sap/sap-guidelines.htm> *Guidelines for Producing CCSP Synthesis and Assessment Products* and the Data Quality Act (including ensuring objectivity, utility, and integrity as defined in 67 FR 8452), they will submit the product to the National Science and Technology Council (NSTC) for clearance. Clearance will require the concurrence of all members of the Committee on Environment and Natural Resources. Comments generated during the NSTC review will be addressed by the CCSP Interagency Committee in consultation with the lead and supporting agencies and the lead authors.

**Wickland, NASA**

Page 10, lines 36-42: It seems particularly inappropriate for the CCSP to be insisting on such rigor in its process for preparing this report while at the same time indicating that it would be acceptable for unpublished (and perhaps even unreviewed) results (as this report will be) to be provided to aid in the preparation of the IPCC assessment. I would hope that IPCC will follow its guidelines, which leaders of the CCSP have pushed hard to insist be followed, and not accept such informal communications. If it is important to get these results into the IPCC, then abandon the time-consuming and cumbersome CCSP guidelines and simply support preparation of a scientific review article by a team that is wholly independent of the CCSP, and let its credibility be judged in the traditional fashion. For the CCSP to be suggesting that such informal input be accepted would open the doors to IPCC accepting a wide variety of other such informal input and thus greatly corrupt its process. If the completion of this product is too late, well then it is too late.

**MacCracken, Climate Institute**

Page 10, lines 44-46: Does the word “support” include funding to make this happen, or is just “encouragement” what is meant? Will US scientists be similarly supported financially to review the report, as would seem necessary if financial support is given to others? Finding a way to do this that assures independence and openness will be essential.

**MacCracken, Climate Institute**

Page 12, line 9-29: The dates in the Proposed Timeline should be corrected and adjusted to reflect the posting of the prospectus in February (page 12, line 15) and the end of the public comment period for the prospectus in March (page 12, line 16).

**Anthony King, Oak Ridge National Laboratory**

Page 12, line 27: Allowing for only a 45-day review period may be too limited for such an extensive and important report. Based on the experience for the US National Assessment report, there were a number of complaints about the limited time for review, and for the formal review period, 60 days were allotted based on the time period provided for review of the research plan in the Congressional Act establishing the USGCRP in 1990.

**MacCracken, Climate Institute**

Page 13-14: The outline’s distinction between “Part I: Carbon Cycle in North America” and “Part II: The systems and activities that control the CC in N. Am” is unclear. In fact, many of the topics seem to overlap. Having a summary upfront and supporting chapters following seems reasonable, but Part I seems much more like a mixture of summary and support, and Part II seems like additional support often on the same topics. I expect that this structure will be cumbersome and redundant, and would suggest (1). Reworking the outline to delineate whether each section is meant to be a “summary for policymakers” section, or a section with substantive support. For sections that are summaries, make clear in the outline where the support sections will be; (2) making the outline for Part II much more explicit, in the style of the outline for Part I, and harmonizing the topics as described above; (3) choosing less confusing titles for Parts I and II to make the distinction clearer.

**Nathan Hultman, Georgetown University**

Page 13, Line 5: The question of “why should we care” should not be a focus of this report. The connection between atmospheric CO<sub>2</sub> and climate is the topic of SAP 3.1 – “Climate Models and Their Uses and Limitations: Climate Sensitivity, Feedbacks, and Uncertainties.” The reader should be directed to that report for a discussion of the climate significance of the carbon cycle and the link should be explicitly identified in the SAP 2.2 outline. Any discussion of the carbon-climate connection in SAP 2.2 should be extremely general and should rely on material generated for SAP 3.1. To do otherwise risks creating inconsistencies between the SAPs.

**Reid A. Miner, NCASI**

Page 13, Line 5: The issue of “why should we care,” if related to the relationship between CO<sub>2</sub> and climate, should only be briefly summarized since it is the topic of SAP 3.1. A more detailed description may be appropriate if this is meant to address why the C cycle is important to understand, rather than atmospheric CO<sub>2</sub> accumulation only.

**Eric D. Vance, NCASI**

Page 13, Lines 10, 11 and 12: The section on “Accumulation of carbon in the atmosphere” should immediately follow the introductory “Brief overview....” As it is now organized, the section on carbon in the atmosphere is located between several sections that provide information on the processes that impact atmospheric carbon – i.e. sections on fossil fuel emissions and sections on other processes that impact the carbon cycle. It does not make sense to insert the discussion of atmospheric carbon between these other sections.

**Reid A. Miner, NCASI**

Page 13, Line 18: Below we suggest several specific changes for chapter III. For this entire chapter, however, it is important that the proper linkages to SAP 2.1 be made.

**Reid A. Miner, NCASI**

Page 13, Line 25: This section (B.2) should include a summary of the available information on the impacts of energy costs and of cost differences between fuels on GHG emissions intensity of industrial sectors and the US as a whole (which would be taken from SAP 2.1). This will be critical information as attempts are made to predict emissions in an environment wherein cost considerations make coal even more attractive than it is today. In addition, this section (B.2) should include a discussion of economic activity and population growth as prime drivers in fossil fuel-related emissions trends. If the intent is to deal with these issues in sections D.2 (Page 13, Line 33) and D.3 (Page 13, Line 34) instead of section B.2, this is also acceptable. All of these discussions should be linked to the corresponding material from SAP 2.1.

**Reid A. Miner, NCASI**

Page 13, Line 29: The outline lumps all “Knowns and uncertainties” into a single section. This implies that this section will address all uncertainties associated with the question posed in the Chapter title - “What are the primary carbon sources and sinks in



North America, how are they changing and why?” This has the advantage of helping ensure that all areas of uncertainty will be dealt with consistently and will allow the most important uncertainties to be highlighted. Among the issues requiring attention in this section will be the following.

- Socioeconomic factors in land use and management trends and patterns
- Uncertainties regarding the prime drivers of emissions – i.e. economic activity, population growth, and fuel prices (overall prices and relative prices of different fuels).

**Reid A. Miner, NCASI**

Page 13, Line 29: There are advantages of lumping “knowns and uncertainties” into a single section as described in the outline. However, uncertainties associated with sources and sinks for individual sectors (e.g., fossil fuel emissions, terrestrial vegetation, soils, and land use, aquatic and coastal systems) also need to be discussed as part of the descriptions of those sectors. One option would be to discuss uncertainty at two levels; (1) a more detailed discussion within individual sectors and (2) a separate uncertainties section, as proposed, that could serve as a broader comparative analysis across sectors. The former may be more important for addressing specific management, scientific, and policy questions and the latter for broader policy issues.

**Eric D. Vance, NCASI**

Page 13, Lines 31 and 32: We are pleased that the outline now includes work to describe the current understanding of the processes contributing to the large uptake of carbon over the North American land mass. This is an important enough issue that warrants explicitly mention in the outline.

**Reid A. Miner, NCASI**

Page 13, Line 37: Section IV, “What are the options and measures that could significantly affect the carbon cycle?” appears to focus on political and physical factors but ignore the all-important socioeconomic aspect.

**Eric D. Vance, NCASI**

Page 13, Part I, Section IV. I would suggest adding an explicit treatment of which policies and measures have already been tested, the degree of experience with each, and the policy driver for each (e.g. Kyoto Protocol, EU ETS, voluntary programs). In other words in addition to what appears to be a list of the theoretically possible options, I would like to see some treatment of current policy experience on the ground, besides simple isolated estimates of cost.

**Nathan Hultman, Georgetown University**

Page 13, Line 38: This links between this section (IV.A) and SAP 2.1 may be obvious to those close to the process, but it would be helpful to include an explicit link to SAP 2.1 in the outline. SAP 2.2 should contain only an overview of the findings of SAP 2.1.

**Reid A. Miner, NCASI**

Page 14, Line 1: Instead of “sink reduction and source enhancement” this line should say “source reduction and sink enhancement.”

**Reid A. Miner, NCASI**

Page 14, Line 3: We note that substitution effects are now explicitly mentioned in the outline. This is an important addition.

**Reid A. Miner, NCASI**

Page 14, Line 3: The concept of the value of sequestration as a function of time is missing from the outline, but could be addressed by adding the words “and over time” at the end of line 3 on page 13 (i.e. across options and over time).

**Reid A. Miner, NCASI**

Page 14, Line 9: From the discussions at the November stakeholder’s meeting, we assume that the intent of Part II is to give the reader an understanding of the issues in a specific sector while Part I was a cross cut across sectors for specific issues. We remain convinced that this is a useful approach. It would be helpful to explain this in the outline, however, as it may not be clear to all readers.

**Reid A. Miner, NCASI**

Page 14, Line 9 through 28: The revised outline lacks the detail for these sections that was contained in the earlier outline. The forest products sector, like all sectors, will be very interested in how these sections will be developed and we are hopeful that more detail will be made available for comment.

**Reid A. Miner, NCASI**

Page 14, Lines 13 through 26: Chapters VII through XII - Anticipating that many readers will read only those chapters that focus on their areas of interest, it would be useful for Chapters VII through XIII to begin with a short overview of terrestrial system types, aerial extent, and the major C pools and fluxes associated with each. Alternatively, the reader could be directed to the appropriate earlier section of the report. This introductory material should also discuss (at least conceptually) how market forces, regulatory policy, and socioeconomic factors can influence land use change from one type to another. Also, given the importance of urbanization to the trends discussed in these chapters, it should be highlighted as a discussion topic in each.

**Reid A. Miner, NCASI**

Page 14, Lines 15 through 18: Chapter VIII – Forests - In general, the earlier draft outline did a very nice job of capturing the needed content of the report. In our earlier comments we offered the following suggestions for your consideration.

It will be important to include a discussion of the trends in the amounts of carbon in the forest products pool and factors that influence those trends.

We suggest that the discussion of forest carbon management be extended to specifically include the entire forest carbon system, not just the forest itself.

This chapter should include a discussion of the trends, causes, and effects of deforestation and afforestation in North America.

Finally, the chapter should include a discussion of trends in forest management intensity, landowner types and priorities by region, and the carbon implications for each.

**Reid A. Miner and Eric D. Vance, NCASI**