

Coastal Elevations and Sea Level Rise Advisory Committee

Minutes of the 5th Meeting: Wednesday, July 30, 2008, 9:30 am
Conference Call

Committee Members:

Present: Margaret Davidson (Chair), Rebecca Beavers, Mark Crowell, Andrew Garcia, Carl Hershner, Julie Hunkins, Mark Monmonier, William Nechamen, Sam Pearsall, Tony Pratt, Greg Rudolph

Absent: Alan Belenz, Harvey Ryland, Mark Mauriello, Gwynne Schultz

Quorum present? Yes

Others Present:

Designated Federal Officer (DFO): Jack Fitzgerald

Others: Jim Titus, Rob Thieler, Don Cahoon, S. Jeffress Williams, Eric Anderson, Steve Gill, Rebecca Feldman, Rona Birnbaum, Alan Cohn, Mike Salmon, Skip Stiles, Paul Buttner, Julia Wyman, Robert Stroik, Jonathan Clough, Patty Glick, Dan Trescott, Chuck Herrick, Beth Scherer, Nicole Kalas

Proceedings:

The meeting was called to order at 9:30 am by Margaret Davidson, Chair.

The roll was called and meeting participants in addition to the Committee members were noted for the record.

Jack Fitzgerald opened the meeting with an overview of the status of the Climate Change Science Program (CCSP) Synthesis and Assessment Product (SAP) 4.1 and a review of the Agenda (see Appendix A) for the 5th meeting of the Coastal Elevations and Sea Level Rise Advisory Committee (CESLAC). The purpose of the meeting was to comment on the Draft *Coastal Elevations and Sea Level Rise Advisory Committee: Summary of Committee Deliberations* (Committee Report). He briefly reminded the Committee of its mandate and outlined the anticipated SAP 4.1 publication schedule.

- ▶ ~ October 15, 2008: last CESLAC meeting in Washington, DC (face-to-face) (6th CESLAC Meeting) [the meeting has since been changed to October 16, 2008]

- ▶ The primary focus of the October meeting will be the Committee Report , but Chapter 1 of SAP 4.1 will also be discussed.
- ▶ If necessary, another meeting can be held by conference call before the meeting in mid-October.
- ▶ To date, the Committee has reviewed and commented on all but Chapter 1 of SAP 4.1, Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region Report. Chapter 1 will become available to the Committee in late September.

Jack Fitzgerald noted that the opportunity for major rewrites has passed. He added that the process was in its final stages and reminded the Committee that in its report it should not only comment on the content and overall structure, but note whether all issues had been properly addressed, whether the report was technically sound and appropriate, and whether the report provided useful and sufficient information for decision makers. He asked the Committee to carefully review the questions it had been asked to address. Jack Fitzgerald added that the draft dated July 30, 2008 included comments made by Sam Pearsall and Mark Mauriello.

Comments on SAP 4.1

Rona Birnbaum provided additional details of the publication schedule for SAP 4.1. She said that the authors were working hard to respond to all comments and revise the final draft. The National Climatic Data Center (NCDC) is currently doing the scientific editing of the entire report with the exception on Chapter 1. They are making sure that the document meets requirements set forth by the Data Quality Act and are also checking references. The authors will decide after this meeting if additional changes will be necessary. USGS is the lead on the revised Chapter 1. Chapter 1 will be provided to the Committee for review by September 30. Final editing will take place in early October. The delivery of SAP 4.1 to CCSP is scheduled for the end of October.

Jack Fitzgerald asked the Committee if everyone was clear on the timeline.

Margaret Davidson invited questions about SAP 4.1 from the Committee.

Mark Monmonier inquired what the final format of SAP 4.1 was going to be and how the report was going to be disseminated. He also wanted to know if larger color, fold-out illustrations could be included in the hardcopy version of the report. Rona Birnbaum responded that SAP 4.1 had to adhere to the standard CCSP format. She said that it was going to be a full-color report, but was not sure if it was possible to include fold-outs. It might be too costly to do so on a large scale. She thought it would be worth exploring to include the illustrations with the accompanying materials instead. She said she would inquire about the costs associated with this option and find out how long it would take the NCDC to do the layout. With regard to the publication process,

she mentioned that the final report would be posted by CCSP and released with remarks from CCSP and all participating agencies. This would be followed by a series of briefings for stakeholders and Congress. She added that the Communications Plan was still under development and would follow CCSP guidelines.

Margaret Davidson wanted to know if the CESLAC's perspectives and recommendations were going to accompany SAP 4.1 when it went for interagency and CCSP review.

Rona Birnbaum explained that the Committee Report would not be included in the printed version of SAP 4.1 or the accompanying materials. She pointed out that the would be a stand-alone document and would be available online. She reiterated that Chapter 1 of SAP 4.1 would be provided to the Committee in late September.

Jack Fitzgerald asked if the Committee could expect to receive Chapter 1 by September 30, 2008. Rona Birnbaum confirmed that this was the goal. Chapter 1 will be ready for interagency review in early September and a near final draft will be submitted to CESLAC by September 30.

Margaret Davidson asked if the authors were also reviewing Chapter 1 for cascading effects on the rest of the document. Rona Birnbaum responded that this process was already underway, and might continue into September.

Margaret Davidson initiated discussion of the Committee Report and drew attention to the documents the Committee had received by e-mail on the previous day. She reiterated that the opportunity for making major course corrections and substantive changes was limited. The report summarizes Committee thoughts about the scope, clarity, strength and weaknesses of SAP 4.1, and should identify technical issues that have not been addressed adequately and that reviewers should be aware of. The Committee Report should also identify additional areas of study, data access, policy considerations, and research.

Margaret Davidson invited the Committee to briefly discuss any issues pertaining to SAP 4.1 before embarking on the discussion of the Committee Report.

Rebecca Beavers inquired if it was still possible to submit editorial comments on SAP 4.1. The authors responded affirmatively and Margaret Davidson urged the Committee to submit any additional comments as soon as possible. Jack Fitzgerald reminded the Committee that all comments had to be publicized, and to copy him and Alan Cohn on any e-mails. To expedite the process, authors can be copied on these e-mails.

Mark Monmonier said that there had been significant changes between the February 2008 and July 2008 versions of the report. He expressed concern about the removal of maps that showed areas susceptible to sea level rise and wanted to know if enough maps and other spatial materials were going to be included in the report to make it helpful to policymakers.

Margaret Davidson agreed that this was a major point of concern and that an integrated approach to digital elevation models was needed. She said that the Committee should include this in its recommendations. This should be a keystone recommendation, because such data are necessary to inform policymaking. Margaret Davidson said that the lack of this data constituted a major limitation of SAP 4.1. She added that the Committee should call for a more integrated approach for gathering elevation data nationwide. The maps that were included in SAP 4.1 were based on linear models and removed because of concerns about their technical accuracy. They may not have accurately reflected changes in coastal elevations in accord with newer data.

Mark Monmonier asked if the authors could at least include a few illustrative examples based Light Detection and Ranging (LiDAR) to suggest what can be done with good data. He suggested using examples of areas for which very good elevation data exists. He understood their hesitancy with regard to numerical data, but thought that a range approach might be of value. For example, estimates of the best and worst case scenarios and associated uncertainties.

Margaret Davidson noted that SAP 4.1 faced two profound challenges. For one, it uses outdated scenarios and secondly, it faces a paucity of elevation data. SAP 4.1 was constrained by an IPCC scenario that is conservative and outdated. Its worst case is probably more like a best case scenario in upcoming reports. As a result, the report is limited in its ability to make cogent statements about the aerial extent and nature of impacts and associated changes in the elevation of water levels.

Jeffress Williams pointed out that the rewrite of Chapter 1 will include a sequence of data sets at different resolutions and compare results based on DEM (Digital Elevation Model) at 30 meters vs. high resolution LiDAR. He said that they would discuss the differences between DEM and LiDAR maps and point out limitations. Chapter 1 is essentially about elevations, which are fundamental to this discussion. It also includes maps and tables and will provide a useful sense of spatial variation and vulnerability. Chapter 1 will address the current methodology and hopefully make a statement about the need for a more comprehensive and integrated approach for coastline elevation characterization in the U.S. than is currently available.

Mark Monmonier said that this was encouraging and asked the authors if they could share an outline for Chapter 1. Jeffress Williams responded that the outline was not yet available. Margaret Davidson inquired if the outline could be shared with the Committee when it became available. Rona Birnbaum said that this was appropriate and will to ask the agencies for the outline once it was finalized.

Margaret Davidson inquired if the Committee had any more questions about SAP 4.1. There were no more questions and the Committee proceeded to review the Committee Report. The final Committee Report will be submitted to the Office of Science and Technology Policy, an interagency body in the Executive Office of the President (EOP). Margaret Davidson said that

the Committee will need to flesh out various sections of its report, but that no consensus is needed for the general recommendations. Minority statements are allowable.

Discussion of Committee Report (CR):

Margaret Davidson explained that Section 4 of the July 30, 2008 draft CR was compiled by an EPA contractor (Stratus Consulting) and included substantial comments made by Committee members and materials submitted for consideration by the Committee as a whole. A work group was tasked with the review of certain sections of the draft CR. In addition to herself, work group members included Sam Pearsall, Julie Hunkins, Mark Mauriello, Carl Hershner and Mike Salmon. Margaret Davidson thanked the work group members for their input. She said that she would incorporate all Committee comments and develop a revised draft. A complete first-order draft will be ready in September for Committee review before the next and final meeting. She also stated that she had prepared a two-page summary of her own comments (dated 8/9/08) for consideration in Section 4 of the Committee Report.

Margaret Davidson suggested that the Committee discuss her comments and decide if and where they should be included in the report. She wanted to go through the front end quickly and mainly focus on Sections 4 and 5 during this meeting. The Committee will review a “zero order” draft and comments from this meeting will help inform and focus a first order draft for Committee deliberation. Substantive comments will be provided, while Chapter 1 is being finalized, so that by the October meeting the deliberations can be finalized as well.

Sections of Committee Report (CR)	
<i>1</i>	<i>Introduction</i>
1.1	Background
1.2	Objectives and Scope of Committee Activities
1.3	Members
<i>2</i>	<i>Process</i>
2.1	Workgroups
2.2	Records
<i>3</i>	<i>Summary of SAP 4.1 Objective and Processes</i>
<i>4</i>	<i>Overall Response to SAP 4.1</i>
4.1	Specific Issues to be addressed in SAP 4.1
4.2	Appropriate Technical Approaches
4.3	Information Relevant to Decision Makers
4.4	Content of the Final Report
<i>5</i>	<i>Observations, Insights, Recommendations, and Outcomes</i>
5.1	Specific Issues in SAP 4.1
5.2	Technical Approach
5.3	Usefulness to Policy Makers
5.4	Content of the Final Report
<i>6</i>	<i>Recommendations for the Future</i>

CR Section 1. Introduction

1.1 Background.

No comments.

1.2 Objectives and Scope of Committee Activities.

No comments.

1.3 Members.

Table 1. Correction: Association of *State* Flood Managers

CR Section 2. Process

2.1 Workgroups.

Margaret Davidson suggested that Table 3 include information on a 4th workgroup, led by Carl Hershner. This workgroup did not produce a report because of a lack of peer reviewed literature. The lack of available data prevented the group from making proper recommendations.

CR Section 3. Summary of SAP 4.1 Objectives and Process

Based on Committee discussions, changes to draft language are indicated in mark-up text, below.

Correction: *The SAP 4.1 report was intended to address ten primary sets of questions, outlined below.*

1. Which lands are currently at an elevation that could lead them to be inundated by the tides without shore protection measures?

Mark Monmonier questioned whether the report actually answers Question 1. Carl Hershner pointed out that Jim Titus has done extensive research on this section which has been removed. He found this ironic because the report was initially aimed at answering exactly this question. Margaret Davidson and Rebecca Beavers thought that this was a “key irony” and “very disappointing,” given the importance and urgency of the issue. Margaret Davidson also noted that a standardized methodology did not exist. Carl Hershner argued that without a clear characterization of inundated lands, the report “really fails.” In Monmonier’s view, the report addresses issues related to Question 1, but stops short of providing answers.

Carl Hershner said that there wasn’t an answer to this question at any level of resolution. Andrew Garcia added that the Committee needs to explore why this happens. He said that there was no centralized mission to map and identify vulnerable areas. Government agencies have limited mission assignments and don’t share their data. Margaret Davidson indicated that different agencies have different mission requirements and thus use different methodologies. But this shouldn’t be an issue anymore due to the availability of LiDAR. Data for DEMs was collected at the local level. What was lacking, though, was an integrated, intergovernmental collaboration, capable of providing data for a comprehensive, nation-wide assessment.

Margaret Davidson thought the Committee should mention in Section 4 that the planned scope of the report was ambitious, but that SAP 4.1 was hampered by a lack of data and did not meet expectations.

Carl Hershner said that SAP 4.1 ended up where it did because of pervasive adoption of the precautionary principle, an unreasonable fear of uncertainties and letting available information

inform policy. The government was paralyzed by the inability to deal with uncertainty in an effective manner and still provide policy relevant information. He thinks this is a problem since information removed from SAP 4.1 would still have added value for decision making. Margaret Davidson requested that Carl Hershner summarize this concern in Section 4. While agreeing substantially with Hershner, Tony Pratt suggested that there was a credibility issue, too, in the past with presenting numbers that haven't been solid. So as a result, appropriations might not be forthcoming. Bill Nechamen said that the government expresses reluctance to act in absence of certainty, but nonetheless acts in the absence of certainty in a lot of areas, e.g., FEMA floodplain map revisions have been criticized because they are based on historical data. Uncertainties associated with past records are being addressed by peer review. The authors could make a statement that uncertainties exist, recognizing that decisions will have to be made because the failure to act will have significant adverse impacts.

Margaret Davidson noted that Section 4.1 of the Committee Report blended into 4.2 on the issue of appropriate technical approaches. While the level of technical sophistication has improved over the past five years, scientific and engineering groups still worry about "getting it right," whereas policymakers need something that is "good enough." The Committee should address the tension between getting it right and supporting decisions in Section 4.1.

CR Section 4. Overall response to SAP 4.1

Margaret Davidson said that in this section the Committee should describe how SAP 4.1 falls short of original ambitions. She proceeded to propose a structure for this section.

4.1 Specific issues to be addressed in SAP 4.1. (Note: The group conducted a line-by-line review of the draft Committee Report. Committee changes are highlighted in red mark-up in the italicized sections that follow below).

The group had no comments on the draft text.

4.2 Appropriate technical approaches.

The group had no comments on this section.

Margaret Davidson stated that the section should comment on technical approaches used throughout SAP 4.1. Davidson also commented that time spent trying to perfect technical approaches may actually be conflicting with the need to get information to decision makers.

4.3 Information relevant to decision makers.

SAP 4.1 represents a starting point for technical information for decision makers who will manage coastal areas subject to sea level rise (SLR). The report provides preliminary guidance

with regard to who needs to be part of sea level rise-related decision processes, ... However, it should be made clear that the report is not a “be all and end all” with respect to sea level rise planning; and does not provide clarity on determining what will be inundated, what will erode, and will/should be protected over time. There are far too many variables to be that definitive and the level of uncertainty evident in currently available research on this subject precludes the ability to accurately model and precisely predict outcomes...

Break (11-15 — 11:45 am)

4.4. Content of the final report.

CESLAC recognizes the difficulty the authors faced in presenting the complexity of the subject matter in a comprehensive manner digestible to a diverse audience. The Committee appreciates efforts made to the challenge of presenting such technical material in a logical, readable, structure. CESLAC uniformly agrees that policy-makers will need to tap additional resources to make informed decisions with regard to sea level rise.

Carl Hershner thought the above sentences should be deleted as they weakened the overall message of the Committee. Sam Pearsall said that he was not aware of any major discord. The Committee agreed and Margaret Davidson excised the sentences.

Carl Hershner thought there was a disjunct in specificity between the opening paragraph and the closing set of comments. So Margaret Davidson suggested moving the mapping comments to the appropriate part of Section 5.

Finally, the Committee made several recommendations regarding the use of maps and figures. If additional resources were available, it would be helpful if the report were modified to include maps designed to be viewed in black and white and/or color, and if consistent coloring were used throughout the document.

CR Section 5. Observations, insights, recommendations, and outcomes.

Section 4 provided a brief summary of the overall impressions of the Committee with regard to SAP 4.1. Given the time and resource constraints, there are several areas that could be improved were additional resources to become available. Structured as outlined below, this section provides a more detailed look at Committee comments.

5.1 Specific issues in SAP 4.1

Margaret Davidson suggested listing the ten questions of Section 3. here, and evaluating whether they have been adequately addressed.

Question 1: Which lands are currently at an elevation that could lead them to be inundated by the tides without shore protection measures?

Carl Hershner said that the report succeeded in identifying issues involved with answering the questions, yet stops far short of providing the type of “spatially explicit” answers needed by decision makers. Margaret Davidson asked how this could be adequately addressed if time and funding were available. He suggests that 1) the information that is available and was originally developed should be included, accepting the uncertainties, but that these uncertainties needed to be highlighted; or 2) commit to a national program to develop comprehensive, highly-resolved, well-vetted coastal topography coverage. Sam Pearsall supports 2). But added that such a program could be prohibitively expensive.

Question 2: How does sea level rise change the coastline? Among those lands with sufficient elevation to avoid inundation, which land could potentially erode in the next century? Which lands could be transformed by related coastal processes?

Margaret Davidson pointed out that Gwynne Schultz had submitted comments on this issue. Carl Hershner noted that the report stopped short of being clear with regard to the open ocean coast. All the processes were appropriately characterized and exhaustively explained in the report, but the real impacts-which are the actual focus of the report remain unclear. Tony Pratt added that the process discussion was thorough and solid, but what the report did not address, was what we should expect if we didn't do anything different. Tony Pratt also commented the guidance for the reports' application was not strong. He added that a discussion of anthropogenic reactions was missing. He also said that documented natural feedback processes to rising seas were dependent upon sediment cycles and availability. This is lacking in the report and should be pointed out. Tony Pratt wondered if deficiencies in the mapping of inundation had been identified, and how inundation information might be utilized in the context of planning and appropriation. Rebecca Beavers emphasized that this was important for the National Park Service (NPS), and that it really needed the answers, especially as regards potential erosion, but that they weren't really there. There is pressure from the public to implement land protection measures, not just to protect NPS lands, but adjacent properties as well. The background information is there, but the report needs to elaborate on the details more for it to be useful to land managers. It is important to nail down the information about potential erosion. The report begins to approach some of this information, but is not clear enough to support decisions.

Question 3: What is a plausible range for the ability of wetlands to vertically accrete, and how does this range depend on whether shores are developed and protected, if at all? That is: will sea level rise cause the area of wetlands to increase or decrease?

Margaret Davidson noted that Sam Pearsall and Carl Hershner had commented on this question. Sam Pearsall has written extensively about the issue of accretion and prefers the expression “transformation of wetlands,” rather than “migration” or “accretion.” Margaret Davidson asked Sam Pearsall to comment on whether the report adequately addressed this issue. Sam Pearsall said that he doesn’t know whether the report adequately describes the processes. When he read the last draft he had some reservations and expressed these in writing. But he hasn’t yet had a chance to review the revisions and doesn’t know whether his extensive comments on the previous SAP 4.1 have been addressed in the current version. He had wondered about the plausible range for wetland accretion. He is not sure whether this issue has been addressed in the current version of the report. Carl Hershner commented that the report has adequately reviewed available information on wetland vertical accretion capacity, and includes a discussion about the need for wetlands to be able to migrate across the landscape and how such migration can be influenced by development. But he feels the report does not answer the second part of the question: whether sea level rise will cause wetland areas to increase or decrease. Carl Hershner shared his written comment on this aspect of the report: ...”the chapter lacks the kind of concise clarity that might actually make it useful for managers.” Sam Pearsall added that he had been concerned that the report did not adequately recognize the punctuated way in which ecosystems respond to sea level rise. It doesn’t seem to have been addressed in the current version either.

Margaret Davidson expressed concern regarding the chapter’s treatment of the degree to which the migration of wetlands is dependent upon historical rates of sediment supply, the degree to which sediment supply to the coast has been dramatically altered over the last one hundred years with dams and sand mining, and the fact that we don’t have any idea of sediment budgets along and to the coast. Tony Pratt pointed out that this was really the crux of the issue: we don’t understand the full system, there are many complexities interplaying.” Carl Hershner added that even in the absence of any sea level rise or sea level change, we are probably not at the point where we could adequately instrument the coastal areas

Question 4: Which lands have been set aside for conservation uses so that wetlands will have the opportunity to migrate inland; which lands have been designated for uses requiring shore protection; and which lands could realistically be available for either wetland migration or coastal development requiring shore protection?

Margaret Davidson said that this chapter purports to identify where we still have opportunities for habitat migration and where we are already locked into development and associated shore protection. Does the report adequately represent the scope of the aerial extent of what’s available for conservation versus shore protection? Carl Hershner said that most of this material has been

excised from the report. The report currently contains the background necessary to craft this analysis, but lacks the type of spatially explicit information needed to inform management.

Question 5: What are the potential impacts of sea level rise on coastal floodplains? What issues would FEMA, coastal floodplain managers, and coastal communities face as sea level rises?

Mark Crowell provided written comments on this issue. According to him, given the available data, the report adequately reviews sea level rise and its impacts on the National Flood Insurance Program (NFIP). It should be emphasized that FEMA is in the process of conducting a study of the impacts of climate change on the NFIP and is improving coastal floodplain mapping. So with that study we should be able to provide better, more resolved answers to these questions. But given the currently available data, he is satisfied with the information presented in SAP 4.1. Bill Nechamen said that it needs to be made explicit that until now, FEMA's mapping guidance and procedure is to map floodplains based on historic data. So this is really the first time that FEMA is explicitly investigating looking forward and this is a positive development.

Question 6: What are the population, infrastructure, economic activity, and value of property within the area potentially inundated by rising sea level given alternative levels of shore protection?

Margaret Davidson observed that this is an area seriously constrained by the lack of data. Other than data on population, much was missing: transportation infrastructure, water and sewer infrastructure at risk, and the value of property. Julie Hunkins said that there was a lack of information and that she didn't see anything in SAP 4.1 above and beyond what has been published in previous reports. Margaret Davidson noted that property value is not always the value of property insured and asked Mike Salmon to comment. Mike Salmon said taxing authorities can characterize the investment in real estate, and that property casualty numbers are fairly reliable. But when it comes to municipal or local government infrastructure, he is unsure if that information is in a good accessible condition. State departments of environmental regulation might have some data as a result of their interest in the same questions, but he doubts that it would be in as good a condition as the taxing authorities' data. In any case, Salmon believes that gross values could have been computed. Margaret Davidson stated that the report did not capture such information, and Salmon agreed.

Mark Crowell points out that the report cites Crossett¹ data which says that 53% of the U.S. population live in a coastal county. Given that this is a report on coastal elevations and sensitivities to sea level rise, the Crossett population data is misleading because it is a watershed

1. Crossett, K.M, T.J. Culliton, P.C. Wiley, and T.R. Goodspeed, 2004: Population Trends along the Coastal United States 1980-2008, Coastal Trends Report Series, NOAA National Ocean Service, Special Projects Office, September 2004

based definition. Carl Hershner said that there was some discussion in SAP 4.1 about the limitation of this dataset. Mark Crowell acknowledged that there was a discussion, but that some key findings and tables still referenced the Crosset dataset. Crowell thought this issue recalled the Committee's earlier discussion of data availability and quality versus the need to support decision making. "If this is all the data that was available on the issue, do you or don't you use it to answer policy questions?" Jeffress Williams wanted to know if there were better data. Mark Crowell said that he had published an editorial in the Journal of Coastal Research on that issue and that he was working on a paper on population impacted by coastal flooding. He said that the authors were welcome to use the numbers published in his editorial. He also added that earlier versions of the chapter did not have references to the Crosset population data and that he did not think that adding this data made the report better. Jeffress Williams thought that it was important to include the numbers, because sea level rise, inundation, and erosion are going to affect population, so it is important to discuss population and to assess potential impacts using data from published literature. Mark Crowell agreed to send a copy of the paper to Williams. He also noted that his comments referred mainly to Chapter 6. Jim Titus noted that for the main thrust of the chapter the authors used an overlay of U.S. Census data.

Question 7: How does sea level rise affect the public's access to — and use of — the shore?

Andrew Garcia thought that the key topic was "public access." He said that the issues were well described, but pointed out that this was an evolving process, not static. But whether the public will have more or less access and use of the shore seems to be as much a policy issue as a scientific or environmental issue. Carl Hershner thought that the chapter did a reasonable job in highlighting the issues and explaining them, but said that a spatial analysis was needed. Tony Pratt praised the chapter's treatment of "hard" and "soft" solutions. The chapter discussed that hard solutions can restrict access and soft solutions may actually increase access.

Question 8: Which species depend on habitat that may be lost due to sea level rise given various levels of shore protection and other response options?

Carl Hershner thought that the authors did an adequate job on this chapter, given limited availability of data. Sam Pearsall agreed.

Question 9: Which decisions and activities (if any) have outcomes sufficiently sensitive to sea level rise so as to justify doing things differently, depending on how much the sea is expected to rise?

Carl Hershner suggested that the report addresses this question at length, but observed that relevant information is spread over multiple chapters, forcing readers to "dig" to find all the answers. Margaret Davidson said the Committee may want to request the authors to be more explicit about kinds of decisions that can be illuminated through current data and tools. Margaret

Davidson asked Carl Hershner whether Part 3 was one of the areas where the information came together well enough to begin to understand the relationship of sea level rise, shoreline protection, wetland migration, and infrastructure development. Carl Hershner replied that even though all the information was there, he wished that it could be distilled so that answers were more clear and distinct.

Jim Titus explained that one of the problems the authors encountered was that there weren't very many formally published cost-benefit studies, and they had to try to string together the best argument they could with the limited amount of information available. Authors tried to present illustrative issues with the purpose of prompting readers to think about whether it's time to act. He was not sure if trying to distill the information would make it clearer, and was concerned that it might appear that more is known on the issue than the data support. Margaret Davidson suggested that a better organization of the information would help to highlight what we do and don't know. Carl Hershner said that he understood the authors' concern, but added that this was one of the areas of the report of greatest interest to managers and planners. He thought that anything that could help frame and prioritize issues would be useful. He suggested employing an expert panel to review options discussed in the chapter. Margaret Davidson said that this might be an excellent recommendation which should be included in the summary of the Committee deliberation, but also noted that the ability to convene an expert panel within the next month is constrained. Jim Titus pointed out that many assessments were currently underway, and that the authors of these studies (NAS, NOAA, FEMA, etc.) might be interested in the Committee's observations. Margaret Davidson reiterated that these are truly profound issues worthy of consideration as the Committee moves forward.

Question 10: What adaptation options are being considered by specific organizations that manage land or regulate land use for environmental purposes? What other adaptation options are being considered by federal, state or local governments? What are the specific implications of each option? What are the institutional barriers to preparing for sea level rise?

Margaret Davidson began by citing lack of information, lack of will, and lack of money. Carl Hershner noted that there was a separate SAP on this issue, and that he had served on a Committee that looked at this question with regard to federal lands. Rebecca Beavers confirmed that there was a separate SAP that looked at NPS, NOAA, the Forest Service, and other management agencies. Margaret Davidson said the Committee may want to point out that there are a number of reports that relate to federally managed lands, both under SSCP and in response to a GAO report that pointed out that agency resource policies did not consider climate change. There was also concern how federal agencies would go about obtaining pertinent information from state and local governments without inducing bias into the sample. But they realize that outside of direct resource management responsibilities at the federal and state level, it is actually local government that regulates land use decisions for the most part. Margaret Davidson wanted to know if the Committee wants to mention that while there is a good body of information with

regard to developing federal management practices and adaptation options, the literature is less robust when it comes to state and local governments. The Committee agrees with this statement.

Jim Titus noted that the chapter also discusses that there is even less information on what private entities are doing. Carl Hershner thought that the chapter does a good job, but is frustrated that the really critical point which the chapter makes about the need for people to start making decisions is buried. In this case, inaction will be as bad as making bad decisions, a point which seems hidden. Carl Hershner would like to see this point underscored in the CR. Margaret Davidson added that it should also be included in the recommendations section. Bill Nechamen noted that he worked with local communities a lot and that state and local government had a conflict of interest. They depend heavily on coastal development for tax revenue, so they look negatively at anything that would restrict development along the coast. Recognizing what is being discounted into the future by way of deficits or ecological and economic problems is something that has to be dealt with now. Margaret Davidson said that she feels very strongly about this as well, especially when one starts to think about the lifecycle for coastal infrastructure projects. There are things that are now being considered by local planners in terms of maintenance, upgrades, or expansion of existing physical infrastructure. This will have profound impacts on future adaptation capabilities.

Margaret Davidson said she knew that many shared her frustration with the lack of connectivity between a number of the SAPs. At least in the coastal environments, near-term decisions regarding physical infrastructure will have profound implications for later efforts to promote green infrastructure. That is one of the things Davidson would like to underscore in the Committee's comments on the report, as well as more broadly in the recommendations. The synthesis product tries to look across the SAPs and make broad statements, but some things fall between the cracks of the different SAPs which are far more troubling than some of the connections made in the USP.

At this point the discussion briefly shifted to Section 6 to give Sam Pearsall and Mark Crowell, who would have to leave the meeting early, an opportunity to share comments.

This completed the discussion of Section 5.1. Margaret Davidson provided a brief overview of the remaining sections. She reiterated that the draft discussed in this meeting was a compilation of minutes from previous meetings and comments that have been submitted. She invited comments from Sam Pearsall and Mark Crowell on how to approach Section 5, specific issues and concerns, technical approaches, usefulness to policymakers, content of the final report as well as Section 6, Recommendations for the Future.

Sam Pearsall said that his comments had been adequately wrapped up in the summary and did not think they need to be reiterated.

With regard to Section 6, Carl Hershner requested that the Committee separate the recommendations so that there is a clear first priority, which is the acquisition of a comprehensive coastal elevation dataset. That's *the* big need. Margaret Davidson was fine with that, and said that other recommendations would cascade from that. She continued by saying that the Committee should identify first and second order recommendations.

Sam Pearsall's comment also included the suggestion that the Army Corps of Engineers (ACE) rescind nationwide 404 permits for bulkhead construction where states allow it. He further proposed that all hard armor be subject to individualized 404 and 401 analyses. Tony Pratt concurred with Pearsall's recommendation on rescinding nationwide 404 permits. Margaret Davidson added that what the Committee may wish to recommend to ACE is for climate change to be one of the attributes taken into consideration in the potential issuance of a 404 permit. Andrew Garcia clarified that the 404 language only mentions the placement of fill and dredge materials, but not bulkheads. Margaret Davidson wanted to know who was responsible for permitting bulkheads. Tony Pratt responded that these were under the authority of the ACE, but he wasn't sure which Section of the Clean Water Act. Andrew Garcia volunteered to find out.

Margaret Davidson resumed discussion of Section 5 of the CR and asked for input on Section 5.1. She said that it now contained the ten questions and addressed each one separately and that the key points the Committee wanted to make were mainly in answering the questions in Section 5.1. She wanted to know if the Committee wanted to pull out the larger, overarching issues and list them separately.

Carl Hershner thought that if the report incorporated comments captured in the minutes of previous meetings, separate recommendations might not be necessary. Margaret Davidson asked if the report was going to include appendices. Jack Fitzgerald responded that it could, but suggested that the recommendations should still be captured in the body of the report. He also said that in the July 30 draft under Additional Comments the first bullet notes equal attention should be paid to North Carolina. He wanted to highlight this because it had been an issue in the past and was wondering if it had been adequately addressed in the comments made in response to the ten questions.

Sam Pearsall noted that the wetland equilibrium question raised earlier remained unresolved and doubted that it could be resolved in the remaining amount of time. He thought that it might be a good idea to include this issue in the recommendations as well. Jack Fitzgerald asked if the Committee wanted to single out that particular issue or if it was addressed adequately in the comments on Question 10. There was consensus that the issue had been addressed adequately in Question 10.

Margaret Davidson summarized issues she highlighted under Section 5.1. Carl Hershner was wondered about the format of the recommendations and suggested to word them as "things that

are lacking, missing, or things that should have been considered.” This Committee Report would accompany SAP 4.1 through its review process. Margaret Davidson agreed and said that the recommendation should be structured carefully. She suggested the following order:

1) SAP 4.1 Issues

- ▶ Better information collection
- ▶ More research
- ▶ More cogent information and demographics and populations at risk, for example, value of real estate and infrastructure at risk

These recommendations would be in the nature of collecting, validating, and providing access to better information. Recommendations would be structured in priority order.

2) Social and Policy Considerations

- ▶ Tax codes
- ▶ Easements
- ▶ 404 permits

Margaret Davidson said that recommendations should be in the order of “impactfulness.” Comments like those listed in the “Additional Comments” section could be included. The Committee agreed with her. She asked the Committee to take time before the public comments to review Section 5.2.

At 1:15 pm the discussion of the CR was interrupted to allow for public comments. These comments are summarized at the end of the meeting minutes to facilitate comprehension of the minutes.

At 1:45 pm all public statements had been made and recorded and the Committee continued discussion of the CR.

Margaret Davidson introduced Section 5.2 and asked for input on technical issues.

5.2 Technical Approach

In general, the Committee was satisfied with the language in Section 5.2. Sam Pearsall would like to see a better definition of “protection.” The report needs to distinguish between “hard” and “soft” armor. Jim Titus asked him to clarify what he means by “soft” armor. Sam Pearsall

responded that there should be a more nuanced distinction between *all* types of protection, whether they constitute bulkheads, beach nourishment, living shores, etc. Carl Hershner suggested wording this, not as an editorial comment, but as an observation that CESLAC wants the synthesis group to emphasize the wide range of options that need to be considered in the context of shore protection.

Jack Fitzgerald noted the limited opportunity for significantly changing SAP 4.1 and suggested thinking in terms of commenting on what has been done and on what needs to be done.

Margaret Davidson added that she would work with Stratus Consulting to develop a draft for discussion among Committee members. Members of the Committee can add sections and make suggestions. The document will be set up in “track changes” so that the Committee can work on it through the early to mid-September timeframe. Margaret Davidson would like to have a draft that has been reviewed and commented on by the entire Committee well before the end of September so that there is time to finalize the draft for the October CESLAC meeting.

Margaret Davidson brought the discussion back to the need to clearly articulate regional distinctions in Section 5.2. and also noted that the discussion of the Bruun Rule needs to be caveated. The Committee didn’t have anything to add and Margaret Davidson proceeded to Section 5.3.

5.3 Usefulness to Policy Makers

Margaret Davidson introduced this section by saying it should include a discussion of the potential policy application of SAP 4.1.

The Committee suggested the following changes and agreed with the rest of the section as it stands.

- ▶ *Further, the report should emphasize that some of the data referenced and used in the report and analyses are outdated, with more recent data available for detailed, site-specific analyses. These data include, but are not limited to, land use/land cover, aerial photography, LiDAR, Census data, and updated sea level rise scenarios.*

The suggestion was made to add a statement that the document is meant to be a baseline for state and local governments to identify data needs and to inform development of work plans and not a **definitive or** a static reference.

Mark Monmonier asked if something could be added that would give policymakers a sense of a timetable. For example, how long would it take for scientists, government agencies, etc., to come up with the data necessary for a true and reliable? Margaret Davidson responded that Massachusetts has already collected data and is producing some preliminary maps for coastal

areas. It uses the maps to inform a commission it has established. The entire process happened within the past 1 – 1.5 years. However, Massachusetts does not suffer the budgetary constraints that some other states are currently experiencing. Also, there was no coherency among states.

Mark Monmonier asked how long it would take to address Question 1 [*Which lands are currently at an elevation that could lead them to be inundated by the tides without shore protection measures?*] and develop the type of maps that public commenters requested. He would like to give states that don't have LiDAR a ball park figure for legislators so that they can get a sense of how much money they will need to appropriate.

Margaret Davidson pointed out that LiDAR had limitations. While efforts to collect LiDAR on the dry side of the coast are accelerating, NOAA still has not worked out how to get the same level of resolution and cost factor for the shallow bathy, which is just as important as the elevation above water. Margaret Davidson frequently finds herself reminding local agencies that just having LiDAR without the shallow bathy is a challenge. Also, the most recent re-analysis with LiDAR in North Carolina demonstrates that the previous studies on national elevation data had overestimated the Carolina plain elevation by approximately 1 meter.

Rob Thieler raised the question of where LiDAR was really needed. There are some places where having good elevation data will be really critical in determining or understanding what happens in the future. But there are other places where it won't matter as much. It would be useful to describe where it is needed the most. Margaret Davidson noted that that might be a cogent place for agencies to work together in the new administration's approach to climate services.

5.4 Content of the final report

Margaret Davidson suggested continuing the discussion of the usefulness of SAP 4.1 to policymakers. She asked the Committee to review Section 5.4.

Carl Hershner thought that it would be a good opportunity to reiterate issues about the absence of spatially explicit analyses. Mark Monmonier thought there should be a follow-on report and wondered about issues associated with scaling up the report nationwide? Mark Monmonier also asked about lessons from SAP 4.1 that could inform the next steps and lead to a more satisfactory follow-on report. Margaret Davidson said she liked the idea of outlining a way forward for the nation and a host of communities. This would also extend the usefulness to policymakers. She asked Mark Monmonier to think further about framing such a recommendation.

6. Recommendations for the Future

Margaret Davidson returned to discuss the comments she had submitted before the meeting. She identified strengths and weaknesses of SAP 4.1 in her comments. One strength is that SAP 4.1 makes a case to expand research on impacts (ecosystems, economy, infrastructure) and considers the national economic wellbeing. One of the weaknesses is the absence of datasets to support some of the issues discussed in the report and a lack of ACE and FEMA involvement in the preparation of the report. Margaret Davidson also thought that the SAP 4.1 uses IPCC prescribed methodologies that use outdated and overly conservative scenarios, likely to be updated within a few years. Jim Titus noted that the authors were not constrained by the IPCC; and used a broader approach than the IPCC suggested and that the findings were robust even for higher scenarios. Margaret Davidson withdrew her IPCC comment, but maintained that someone should go through the report and review the different scenarios. Julie Hunkins said that in the comments made about infrastructure, funding and economic impacts should be explicitly included in the recommendations.

The Committee agreed that the report needs to include a statement about the age and state of current infrastructure. In some communities infrastructure needs to be replaced and climate change should be a consideration in the design and funding of new structures. Julie Hunkins seconded this, especially for transportation infrastructure. Rona Birnbaum noted that EPA's Office of Water issued a climate change strategy that involved planning water infrastructure around climate change.

Andrew Garcia mentioned that ACE had a forthcoming report on sea level change projection and planning. Jeffress Williams said that he had received conflicting information on this issue and wanted to know if there was an ACE policy now that required consideration of sea level rise in project design. Andrew Garcia thought that the publication did include engineering guidance. This "engineering circular" would probably be published by the end of the calendar year. Margaret Davidson agreed this guidance might be worth mentioning. Mark Crowell also said that FEMA's improved floodplain mapping will consider climate change, and offered to provide an update for the Committee Report.

Margaret Davidson asked the Committee to identify additional opportunities for legislative or procedural changes or efforts underway that were in the right direction. She asked the Committee to review the entire set of recommendations and her comments and to submit any comments to her and Jack Fitzgerald within a week so that she could work on developing a more comprehensive set of recommendations. She wanted to send out a first order draft to the Committee for review before Labor Day.

Jack Fitzgerald said that the next (and last) CESLAC meeting was going to take place in mid-October.

The meeting adjourned at 2:50 pm.

Public Comments:

Jack Fitzgerald welcomed the speakers and set the order in which statements were going to be heard. He also mentioned that written statements would be included at the end of these proceedings.

Patty Glick (National Wildlife Federation)

Patty Glick is a global warming specialist at the National Wildlife Federation (NWF). She studies wildlife and natural resources impacts of climate change and adaptation. She thanked the Committee for the opportunity to comment and noted that NWF “believe[s] this report is coming at a critical time to help guide policy makers, coastal resource managers, and other relevant stakeholders in the development of meaningful strategies to minimize the adverse impacts of sea level rise on the region’s natural systems and society.”

Patty Glick expressed concern about the most recent revisions of the report. She strongly disagrees with the decision to excise the maps from Chapter 2, as well as some of the removal of references from other chapters. She asked why the maps were removed and pointed out that the original prospectus indicated that maps would be included. “This omission is a blatant disregard of the current state of the science, and it runs counter to the intent of SAP 4.1 to produce information readily usable by policymakers attempting to formulate effective strategies for preventing, mitigating, and adapting to the effects of global change” (as required under the Global Change Research Act of 1990).”

Glick thought that the mapping analysis represented the best science available to date and noted that the objective of the synthesis report was to provide critical information to planners, citizens, etc. She agreed that maps will always get better, but said that this didn’t mean that the current maps didn’t have value. She noted that more rigorous studies cost a lot and said that others were already working with less than perfect information, including the NWF Coastal Habitats program. She added that current data can help identify needs for additional, more detailed studies. She urged the Committee to restore the maps, references and statistics that had been removed or at a minimum be more transparent about why the deletions were made.

Jack Fitzgerald thanked Patty Glick for her comments and reminded her and the other commenters to submit their written statements for the proceedings. He also pointed out that CESLAC only provides comments to the authors and does not determine what is included in the report. It cannot tell the authors what to do. The decisions not to include the maps was not made by the Committee.

Margaret Davidson inquired if Patty Glick had additional comments. She did not.

Jonathan Clough (Warren Pinnacle Consulting, Inc.)

Jonathan Clough is the president of Warren Pinnacle Consulting and has done extensive modeling of the inundation of dry lands as a result of sea level rise while developing and applying the SLAMM (Sea Level Affecting Marshes Model) model. He had also been a peer-reviewer for the study on sea level rise and inundation conducted by Jim Titus.

Jonathan Clough was also “quite disappointed that the EPA elevation map project has been completely removed from the CCSP report on sea level rise” and added that “the problem of estimating the effects of sea level rise given the constraint of low resolution digital elevation maps [was] not a new one” and that “EPA has been wrestling with [this problem] for 20 plus years, especially under the guidance of Jim Titus.”

He stated that even though “the advent of LiDAR data dramatically decrease[d] the uncertainty in modeling the effects of relative sea level rise, it would be foolish to dictate that for sites where LiDAR is not available that no analysis must take place. Gathering LiDAR is expensive and many counties are unlikely to have coverage within the next decade. Public policy planners do not have the luxury of waiting before starting to act on the potential threat of sea level rise. At least, the extent of this threat should be evaluated in the interim, using the best available data set, which is precisely what the Titus & Wang study attempt[ed] to do.”

He suggested that the maps be included in the report and that the section addressing some of the uncertainties associated with the maps be expanded. He added that he understood the authors’ concern that LiDAR data would make the data sets used in the report appear obsolete. But he said that it could be mentioned and that policymakers could refer to better data for policy purposes. The existence of superior datasets can be noted and used as an indication as to the magnitude of uncertainty. He concluded by saying that the report had less utility without the maps.

Skip Stiles (Wetlands Watch)

Skip Stiles also noted that the maps would have been useful and expressed disappointment that they had been removed. He said that the maps were of great relevance for Virginia policymakers. Current policymaking is crude, the maps would have meant a great improvement, despite their shortcomings. He noted that Virginia will not get LiDAR maps until at least 2009. He pointed out that “to make this report meaningful, it needs to be pushed to as close as possible to the local level. Abstract projections of a 3-6 mm/year relative sea level rise along the Virginia coast, will not advance this issue in the policy process. Estimates of impacts on a local or regional level will get the attention of both the public and policymakers – even if the estimates are rough interpolations, bounded with error bars and conditioned by the relative crudeness of the methods.”

Dan Trescott (Southwest Florida Regional Planning Council)

Dan Trescott participated in the review of the initial prospectus and also reviewed earlier drafts of the report and gave them an overall favorable judgment. However, he noticed that the maps had been removed and thought it was a mistake to remove them. He said that he was a regional planner and that the maps were a central part of the report. He said a single map was better than a thousand words, people didn't have time to read reports. He understood, though, how the inclusion of the maps could be controversial and a sensitive issue for regulators. Yet elevation maps shouldn't be controversial. They provide basic information on vulnerabilities. Studies of sea level rise always include elevation data and inundation estimates. Dan Trescott advised the Committee to include the maps in the final version of the report. In addition, he encouraged the publication of the "good work" that is being conducted by federal agencies on the issue of sea level rise.

Margaret Davidson thanked the commentators for their contributions. Written submissions of their comments can be found in Appendix B.

Appendix A: Agenda

DRAFT AGENDA*

Fifth Meeting of the Coastal Elevations and Sea Level Rise Advisory Committee

July 30, 2008

Teleconference

- 9:30 Opening Jack Fitzgerald, Designated Federal Official
- Meeting Objectives
 - Future Schedule
- 9:45 Discussion of Revised SAP 4.1 Material Chairman
- 10:45 Break
- 11:00 Resume Discussion
- 12:00 Lunch Break
- 1:00 Chairman's Summary of Morning Discussion
- 1:15 Public Statements
- 1:45 Discussion of CESLAC Report Chairman
- 3:15 Chairman's Summary and Next Steps
- 3:30 Adjourn

*Except for the opening time and the designated time for statements by the members of the public, all other times may be adjusted to fit the needs of the Committee. In particular, the meeting may be closed before 3:30 PM if the Committee's business has been completed.

Appendix B: Public Comments

National Wildlife Federation

Statement to the Coastal Elevations and Sea Level Rise Advisory Committee on the U.S. Climate Change Science Program (CCSP) Synthesis and Assessment Product (SAP) 4.1: Coastal Sensitivity to Sea Level Rise: A Focus on the Mid-Atlantic Region, July 18, 2008 Draft

BACKGROUND INFORMATION

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The National Wildlife Federation appreciates the opportunity to comment on the revised CCSP SAP 4.1 draft report, Coastal Sensitivity to Sea Level Rise: A Focus on the Mid-Atlantic Region (dated July 18, 2008). Per our comments on the previous (February 12, 2008) draft, we believe this report is coming at a critical time to help guide policy makers, coastal resource managers, and other relevant stakeholders in the development of meaningful strategies to minimize the adverse impacts of sea level rise on the region's natural systems and society.

That said, we would like to express our significant concerns about some of the revisions reflected in the current version. Specifically, we strongly disagree with the decision to eliminate "Maps and statistics quantifying the area of land close to sea level" from Chapter 1 (Coastal Elevations) and the relevant references to the chapter findings in other sections of the report. This omission is a blatant disregard of the current state of the science, and it runs counter to the intent of SAP 4.1 to "produce information readily usable by policymakers attempting to formulate effective strategies for preventing, mitigating, and adapting to the effects of global change" (as required under the Global Change Research Act of 1990).

The provision of maps as an initial vulnerability assessment and outreach tool has been identified as an important information need among local jurisdictions to assist in planning for sea-level rise (Lacko, 2007; Moser, 2005). As such, numerous public and private entities have developed maps of lands vulnerable to sea level rise (including, notably, a number of studies provided on the U.S. EPA's web site: <http://www.epa.gov/climatechange/effects/coastal/slrreports.html>).

Certainly, as coastal elevational data and spatial land use data improves, such studies will be able to provide an increasing level of detail and resolution. However, this does not mean that efforts

to date are not relevant or important in informing the public about the risks of sea level rise and helping coastal planners and other stakeholders develop strategies to ameliorate those risks. Furthermore, it is well established that government agencies must use the “best available science” when informing conservation and management issues, even where it is considered “emergent” (Sullivan, et al, 2006). The information provided in Chapter 1 is clearly credible, rigorous, peer reviewed science that is highly transparent in its presentation of methods and results, including its characterization of remaining uncertainties. As such, it should remain an important part of this assessment.

On a related issue, for the record, we would like to suggest a clarification under Section F. Chesapeake Bay, lines 1267-1271. The National Wildlife Federation study referred to in the introduction (Glick, 2008) does, indeed, cover the entire region of Delaware Bay and the Chesapeake Bay, including the ocean shores of Delaware, Maryland, Virginia, and parts of New Jersey. The three regions identified in the text as currently drafted are based on a summary version of our overall assessment. A full, technical report for our work is available at http://www.nwf.org/sealevelrise/pdfs/SeaLevelRiseandCoastalHabitats_ChesapeakeRegion.pdf.

References

Glick, P. 2008. Sea-level Rise and Coastal Habitats in the Chesapeake Bay Region: Technical Report. National Wildlife Federation, Reston, Virginia.

Lacko, L.D. 2007. “Planning for sea level rise in San Francisco Bay.” Proceedings of Coastal Zone 07, Portland, Oregon, July 22 to 26, 2007.

Moser, S. 2005. “Impact assessments and policy responses to sea-level rise in three U.S. states: An exploration of human-dimension uncertainties.” *Global Environmental Change* 15: 353-369.

Sullivan, P.J., et al. 2006. Defining and implementing best available science for fisheries and environmental science, policy, and management. American Fisheries Society, Bethesda, Maryland, and Estuarine Research Federation, Port Republic, Maryland.

Warren Pinnacle Consulting, Inc.

7/30/08

Public Comments to CESLAC

My name is Jonathan Clough and I am president of Warren Pinnacle Consulting, Inc. based in Warren Vermont. I have been modeling inundation of dry lands as a result of sea level rise for the past decade while developing and applying the SLAMM model.

I am quite disappointed that the EPA elevation map project has been completely removed from the CCSP report on sea level rise. I was a peer-reviewer for the Titus & Wang study that formed the basis for these maps so I'm quite familiar with the details of the map generation.

The problem of estimating the effects of sea level rise given the constraint of low resolution digital elevation maps is not a new one. This is a problem that EPA has been wrestling with for 20 plus years, especially under the guidance of Jim Titus.

While the advent of LiDAR data dramatically decreases the uncertainty in modeling the effects of relative sea level rise, it would be foolish to dictate that for sites where LiDAR is not available that no analysis must take place. Gathering LiDAR is expensive and many counties are unlikely to have coverage within the next decade. Public policy planners do not have the luxury of waiting before starting to act on the potential threat of sea level rise. At least, the extent of this threat should be evaluated in the interim, using the best available data set, which is precisely what the Titus & Wang study attempts to do.

The approach taken to produce the maps in Titus & Wang was particularly innovative in that it used the mean high water spring or salt boundary as a supplemental contour line with which a digital elevation map (DEM) could be improved. The SLAMM model has for years used this same salt boundary as derived from National Wetlands Inventory maps as a guide for estimating wetlands elevations below the spring high water. For the first time, the Titus & Wang study uses this boundary to reduce uncertainty when estimating the elevations of dry land above the spring high water. This supplemental contour provides important information about the elevation of land between the shoreline and the lowest contour on USGS maps, often located at five feet. By definition, this contour also serves as a representation of current oceanic inundation — an initial condition from which to evaluate future potential coastal inundation.

Simply because there is considerably uncertainty in a modeling approach does not mean that the approach must be abandoned. So long as the uncertainty is clearly acknowledged and presented, the study can have considerable utility. My experience with regional planners is that they are

quite familiar with the concept of model uncertainty and can take such caveats in to consideration within their planning.

Furthermore, the potential error of the derived dataset and inundation analysis was comprehensively evaluated within the Titus & Wang supporting study, particular within Annex 3 (Titus & Cacela). I also reviewed this document and found it to be broad in scope and extremely well thought out. It is certainly possible that the statistics and tables derived from this uncertainty and error analysis should be made more prominent within the CCSP SAP report. I am disappointed that the suppression of all inundation maps and tables within the report was the chosen as the pathway forward as opposed to a more extensive presentation of uncertainty.

Also apparently removed from the report were tables of dry land inundation given different relative sea level rises. The analysis that produced these tables estimates the distribution of land between the “known” contours so that the extent of land inundated by marginal changes in sea level rise can be estimated. By using this estimate of a cumulative distribution for elevation, this procedure can be utilized even in locations where the source-data vertical resolution is quite poor. Certainly these tables present useful information, and information that is actually subject to less uncertainty than the maps. If the maps were removed due to what was deemed to be unreasonable uncertainty, it does not necessarily follow that the tables of results should be thrown out at the same time.

Finally, I recognize that it may be a concern that, within the mid-Atlantic study area, some LiDAR and other improved data sets have come on-line since the EPA mapping project was initiated. This is inevitable given the time required to put together, write, and review a comprehensive report such as this one. The existence of superior data sets can be covered within the text of the report and does not form a basis for removing the maps completely. Such a discussion of updated datasets would likely spur policy makers to repeat the analysis with the superior dataset.

As I mentioned in my review of these documents, the presence of these superior vertical-resolution datasets also provide the study authors an additional benchmark with which to evaluate the uncertainty of their low-resolution analyses. In fact, such an analysis was already undertaken as part of the Titus and Cacela paper and used to evaluate overall model uncertainty. It is clear that the authors of this study had a solid grasp of the uncertainty within their model results and extensively presented this within their supporting documents.

Having spent considerable time examining these deleted maps and tables, in my opinion, there is a lot of information there that would be valuable to those accessing the CCSP report. Uncertainty should be extensively expressed and acknowledged within the presentation of these results, but to remove the study completely seems an error. The CCSP document as a whole has considerably less utility without their inclusion.

Thank you for your time and consideration of my comments.

Wetlands Watch

Statement to the Coastal Elevations and Sea Level Rise Advisory Committee (CESLAC) on the U.S. Climate Change Science Program (CCSP) Synthesis and Assessment Product (SAP) 4.1: Coastal Sensitivity to Sea Level Rise: A Focus on the Mid-Atlantic Region, July 18, 2008 Draft

Skip Stiles – Executive Director, Wetlands Watch

Wetlands Watch appreciates the opportunity to again comment upon the process and products coming from this much needed synthesis of information on sea level rise and impacts upon the coastal environment in the mid-Atlantic.

I would remind the members of the comments I made on this effort at the June 8, 2007, meeting in Portsmouth, VA. At that meeting I noted the need for a balance to be struck between the need to ensure technical integrity and the need for pushing the interim data and findings to as local a level as possible to speed a policy response. I noted how important this study was to assist “trailing” states like Virginia, which was then just starting to explore the issue of climate change and its impacts.

Since that time, the State of Virginia has appointed a Commission on Climate Change, to which I was appointed. This action again raises the importance of your work. And, ironically, at the same time as the CESLAC meeting on July 30, 2008, the Committee on Adaptation and Mitigation of the Virginia Commission on Climate Change is meeting to begin to assess impacts on Virginia that will need an adaptation response.

This brings me to the central point of my comments on the latest draft of the report. I note that the data and tables on potential inundation included in the last draft have been deleted from the current draft. I think that this decision needs to be reconsidered and reversed. To make this report meaningful, it needs to be pushed to as close as possible to the local level. Abstract projections of a 3-6 mm/year relative sea level rise along the Virginia coast, will not advance this issue in the policy process. Estimates of impacts on a local or regional level will get the attention of both the public and policymakers – even if the estimates are rough interpolations, bounded with error bars and conditioned by the relative crudeness of the methods

The policy process now does not need, nor can it use, inundation estimates refined to levels of high statistical significance. The rough state of the data matches the rough state of policy at the state and local level. What we need is better estimates that move us to the next level of resolution in the data on this issue. This will trigger a policy refinement and focusing that will demand and be able to use the next level of data resolution and so on.

Our experience in Virginia illustrates this. The Commission on Climate Change is looking at first order projections of impacts in order to prioritize our adaptation work. We are trying to make rough approximations of where we need to focus our efforts. The data and maps on inundation from the previous draft of SAP 4.1 are all we need to set priorities for the next iteration of data and mapping and begin a policy response.

There is also a sense of urgency in getting the best data we have out to the public. Every day, state and local government decisions along the shoreline limit adaptation options or make them more expensive. We need to begin “tapping the brakes” on development along the tidal shorelines and the maps and data in the previous draft are sufficient for that.

The estimates in the previous version are out there in other, peer-reviewed studies. In addition, my understanding is that the US Fish and Wildlife Service will be using elevation and inundation methods similar to those used in the previous draft in the upcoming reviews of wildlife refuges using the Sea Level Rise Affects Marshes Model (SLAMM) analysis.

This synthesis and assessment product has been in development for some time. Its release is needed soon to drive policy deliberations along the mid-Atlantic coast. However, without some inundation details and summaries, some concrete data, this SAP risks becoming largely irrelevant. Previously, maps and estimates of tidal wetland losses were removed from the draft that was put out for review in February 2008. Now nearly all inundation estimates are proposed for deletion.

What is left without this type and detail of information is a study that risks being found only in a federal depository library and not on the desktop of a state or local policymaker.

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Southwest Florida Regional Planning Council

My Name is Daniel Trescott, and I am [flood hazard] planner for the Southwest Florida Regional Planning Council. Rising sea level is a concern to us because of our extensive mangroves and estuaries, and because 750,000 people live in the hurricane evacuation zone. I provided comments on the prospectus for this report during 2006, and I was one of the peer reviewers who examined the expert review draft of Coastal Elevations and Sensitivity to Sea Level Rise last October. I gave the report a favorable review, because it did many good things: Assessing the risk to barrier islands, the vertical accretion of coastal wetlands, implications for coastal decisions, and providing an honest look at the institutional barriers that keep governments from preparing for sea level rise. The draft also included a few dozen maps showing both the elevation vulnerability and broad classes of future land use for each estuary or planning district.

Unfortunately, the new draft no longer has those maps. I think it was a mistake to remove the future land use maps. But as a regional planner, I can also imagine why some government agencies might find the inclusion of land use maps to be too controversial. But removing the elevation maps makes no sense:

Elevation is the first fact that people want to know when evaluating vulnerability to sea level rise. It was obvious from the prospectus and draft reports that elevation maps are a central part of the report. The report still has two maps predicting the loss of barrier islands and wetlands, which are much harder to predict than the existing elevation. How can you predict what will happen to barrier islands and wetlands if you don't even know how high the land is?

Removing the tables estimating the amount of low land makes even less sense:

Studies of sea level rise have always estimated the amount of land inundated by sea level rise. Chapter 6 has tables estimating the number of people living on the low land. How can you say how many people live below one meter if you can't even say how much land is below one meter?

So here are my recommendations to this advisory Committee:

First: You should stand up for common sense and provide a reasoned counterbalance against unreasonable tendencies by federal agencies. (I'm sure that the state and local representatives on this Committee already have experience doing that; you should advise EPA that removing the local elevation maps and tables from a report on coastal elevations and sea level rise is unreasonable. If you are not ready to do that today, [you should at least look into the matter. **YOUR REPORT SHOULD EMPHASIZE THAT THIS REPORT DEPARTS FROM THE NORMAL PROCEDURE OF USING BEST AVAILABLE INFORMATION TO ANSWER A**

QUESTION, AND INSTEAD SETS UP A STANDARD THAT CAN NOT BE MET, AND THEN USES THAT AS A JUSTIFICATION FOR FAILING TO ANSWER THE QUESTION.

Second: You should encourage the good work that people are doing. Federal agencies should publish their studies and all results potentially useful to the taxpayers who paid for it. The agencies just need to be clear that it is research, not the first step toward regulation. Those of us in state and local government should all be grateful to the federal employees who started warning us about sea level rise during the 1980s and 1990s. You should encourage their continued support.