

**SAP 5.3 “Decision support experiments and evaluations using seasonal to interannual forecasts and observational data.”**

**Response to Public Comments**

**Public Comment Period: 18 March through 2 May 2008.**

**Public Reviewers**

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Note: These comments are written solely from an individual, and do not present positions of the University or any other institution.

Area of Expertise: Water law, climate applications in Colorado

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## GENERAL PUBLIC COMMENTS

### **John D. Wiener**

The following comments are provided in the requested format following general comments. The general comments make it possible to be considerably less repetitive and more concise in the other comments.

(1) This is a remarkable synthesis which is strongly commended and appreciated, and which will be a valuable reference. The comment below omits a large number of remarks such as “yes!” in appreciation for points made. [Thanks!](#)

(2) The remaining task after consideration of comments and editorial revisions may be preparation of a longer summary or appendix which would refer to each case study used for illustration and the lessons drawn from it, to provide an intermediate access between the executive summary and the lengthy document which may have the appearance of excess length for users for whom the salience of the issues and the value of more careful study is not yet apparent.

[A case study summary table now appears in Chapter 1 for easier reference.](#)

(3) It would also be possible to extend discussions in the full length version with more treatment of the relevance and linkage of many social science discourses, but such extension may be unwise without considerable contraction of other parts of the synthesis, and it may be too late in the process to make such changes. Were they possible, however, I believe they would make an even stronger case for the recommendations of both the NRC review of the SARP (for the most part) and the recommendations in the SAP itself.

[See #2 above.](#)

(4) Many of the comments in the requested format refer to several basic arguments about what will be described as “missionary work”, “co-discovery”, and “persistence”, as short-hand for the following positions. “Missionary work” is a loose characterization of outreach efforts which are directed toward potential users of climate (and weather) information who have not yet understood the potential of climate variation and change and the potential of climate information applications. However described, it is important in the competitive arena of water resources in private property water rights states (using prior appropriation of regulated permitting systems which establish transferable rights of use) to understand that there are strategic interests in asymmetry of information about climate and climate impacts as well as other aspects of water resources. The SAP’s observations about the importance of factors which affect use of climate information are under-applied, in my opinion, to issues of rejecting the science for various reasons and under various efforts at persuasion or discrediting.

“Co-discovery” is not explicitly mentioned as often as it might be in the SAP, and is short-hand for the process of not only co-production of knowledge which is aimed in decision-support to answering questions for management choices, but also for the

preceding process of often insight-based recognition of potential applications for climate (SI and long-term) information as well as weather information. This relates to the central ideas of persistence in interaction, and sustained contact, and to the goal of going beyond facilitating or improving decisions which are already made, into enabling new management that has not previously been developed. (Short treatment of this was provided in the CPASW 2008 workshop, presentation by the author; longer treatment is available in forthcoming project reports to NOAA and manuscripts in progress.) New ideas of high value may appear years after initial consideration.

“Persistence” is short-hand in these comments for the position that effective introduction of climate applications may require long-term efforts to establish useful relationships, particularly where there is disbelief in the science of climate change or where there is significant asymmetry of access to information and other resources, and especially where there is a history of adverse impacts from previous changes. The idea is that “presence, participation and persistence” are the distillation of several strands of social science work and analyses concerning change agents and facilitators where there is no history of successful interactions. Using available channels or information pathways is strongly recommended (the author’s position, supporting argument and citations were stated in 2004, 2005 and 2006 CPASW workshops, available on-line). Presence refers to being accessible to the group, and to interacting freely so that personal knowledge can be gained on both sides. Participation refers to offering what assistance is possible in related issues and efforts; researchers almost by definition have access to different resources and sets of information, and may be appreciated for their contributions to efforts which are not directly linked to climate information. Offering such assistance may contribute to development of credibility and legitimacy. Persistence refers to the need for sustained interactions, which the SAP rightly recognizes at several points. The “Three Ps” claim is a little larger, and relates more directly to the importance of the context of the interactions and the establishment of a basis in which contributions may be made and effectively explained.

John D. Wiener

[See responses to individual-related questions below.](#)

## **SPECIFIC PUBLIC COMMENTS**

### **EXECUTIVE SUMMARY**

ES, Li 203: Guidance about how to use others’ experiences is a large topic which might be usefully noted along with disciplinary approaches used elsewhere, and sectoral traditions.

John D. Wiener

[We have included others’ experiences throughout the text. A larger discussion is not warranted in the Executive Summary.](#)

ES, Li 360: See: Morren, G., 1983, "The Bushmen and the British", in Hewitt, K., Ed., 1983: Interpretations of Calamity: From the Viewpoint of Human Ecology. London: Allen and Unwin.

John D. Wiener

As this is the Executive Summary, we did not add new sources.

ES, Li 338-408: Very good paragraph (not the only one, but especially appreciated).

John D. Wiener

No comment necessary.

ES Li 468-501: May be best location to add emphasis on lack of support for agencies and forecast producers to respond with additional staff and funding where user proposals warrant effort; it may be impolitic but I believe there is greater will to engage in these interactions than can be realized under budgetary stress and excessive staff pressure.

John D. Wiener

The Executive Summary is a summary of the Product content.

ES, Generally: Very good. Please see general comment about additional material suggestion.

John D. Wiener

No comment necessary.

## **CHAPTER 2**

CH 2, following table at Li 1454: Please consider additional emphasis on co-discovery of applications (as in general comment above).

John D. Wiener

The following paragraph was added:

More generally speaking, the use of climate data and SI forecast information in support of water resources decision-making has been aided by efforts to develop programs focused on fostering sustained interactions between data and forecast producers and consumers in ways that support co-discovery of applications (e.g. see Miles et al., 2007).

CH 2, Li 1900: Might add note about importance of sublimation and its variability and difficulty of modeling in realistic fashion because of interactions with cloudiness, sequences of conditions affecting crust, internal snow dynamics, vegetation, and windiness as well as temperature.

John D. Wiener

New text added:

“Additional forecast errors in snowmelt river basins can arise from the inability to accurately predict the sublimation of snow, a complex process that is influenced by cloudiness, sequences of meteorological conditions (wind, relative humidity as well as temperature) affecting crust, internal snow dynamics, and vegetation.”

CH 2 Li 1950: Add location information (state of example)  
John D. Wiener

‘Montana’ added to text and figure.

CH 2 Li 2015-2052: Cross-reference between increased importance of observational/monitoring support with need for antecedent soil moisture information here? May be valuable to establish linkage early for “fast look” readers.  
John D. Wiener

Added ‘future’ to text; for a more detailed discussion, see Section 2.4.2

CH 2 Li 2059: Reference Milly et al. 2008 and also earlier USGCRP Sectoral and some regional reports less poetically making the point about stationarity; even earlier AWRA symposia, etc. might be noted, to establish early recognition of importance. Adams, B., Ed., 1999, Potential Consequences of Climate Variability and Change to Water Resources of the United States. Herndon, VA: American Water Resources Association. Herrmann, R., Ed., 1992, Managing Water Resources During Global Change: An International Conference. Herndon, VA: American Water Resources Association.  
John D. Wiener

Citations to Milly et al. (2008), Gleick et al (2000), and Herrmann (1992) added.

CH 2 Li 2491-2492: Add point that basic observational equipment is declining, according to some claims, perhaps refer to SAP 4.3 for reference. (My information is inaccessible at time of writing; apologies!)  
John D. Wiener

SAP 4.3 does not provide an analysis for trends in the state of hydrologic observing systems. Instead it highlights the fact that hydrologic observing systems are fragmented, poorly integrated, and were not designed for monitoring the effects of climate change.

CH 2 Li 2464: Please add note about high value of soil moisture for many land management activities, including range management as well as other agricultural use, and drought forecasting. These are noted elsewhere but once the format is into this structure, use of fragments of the document may be expected, rather than careful reading of the whole, and the level of cross-reference and duplication may have to increase to avoid loss of important connections where users will not review the whole. This is certainly not a new idea to the authors, so this comment and similar are recommendations made with respect for the editorial considerations already evident.  
John D. Wiener

Revised opening sentence in this paragraph to read: “Similarly, long-term soil-moisture measurements have been relatively uncommon until recently, yet are of potentially high value for many other land management activities including range management, agriculture, and drought forecasting.”

CH 2 Li 2582-2586: One study funded by and reported to NOAA (Howe et al., “Exploratory Investigation of the Potential for Improved Water Management... Through Increased Use of Climate Information”, reported wide support for “now versus normal versus last year” form of reporting. Normal, now, would require careful and explicit limitation, but still has value as reference to conditions in which most current managers learned their craft and in which operations were institutionalized or codified. Also reported in Proceedings, Climate Diagnostics Workshop, 2000, Wiener Extended Abstract, pp 231-234, and American Meteorological Association Annual Meeting presentations, 2002, 2003, 2004.

John D. Wiener

The following text was added to the Product: For example, Wiener (2000) describes research finding wide support for a "now versus normal versus last year" form of characterizing hydrologic and climate forecasts. Such qualitative characterizations would require careful and explicit caveats, but still have value as reference to conditions in which most current managers learned their craft and in which operations were institutionalized or codified. While “normal” is increasingly problematic, “last year” may be the best and most accessible analogue for the wide variety of relevant market conditions in which agricultural water users (and their competitors) operate.

Cited as: Wiener, J.D., C.W. Howe, D.S. Brookshire, C. Nunn Garcia, D. McCool, and G. Smoak, 2000, Preliminary Results from Colorado for An Exploratory Assessment of the Potential for Improved Water Resources Management by Increased Use of Climate Information in Three Western States and Selected Tribes, pp 231-234 in Proceedings, Twenty-Fifth Annual Climate Diagnostics and Prediction Workshop, Palisades, NY, 23-27 October 2000, Silver Spring, MD: NOAA.

CH 2 Li 2626 et seq: Very good summary here on C and B.

John D. Wiener

No comment necessary.

CH 2 Li 2760: Thank you for the soil moisture note.

John D. Wiener

No comment necessary.

CH 2 Li 2926 et cetera: Discussion of forecast value should include a note about the importance of the lack of a strong signal; this can be important information. Consider the different uses of information in the weather derivatives enterprises compared to others,

and the increasing uses of climate information for commodity futures (especially recently) and the implications of financial community uses versus agricultural uses, especially at the smaller scale (which is the huge majority of land management as well as farm families, though not actual sales). Markets are using this information, and farmers are concerned with the forecast for their competitor producer regions, as well as their own forecast.

John D. Wiener

These are excellent suggestions but given the length of this Product, we opted to limit these discussions.

CH 2 Li 3004: Please clarify reference to union approval.

John D. Wiener

Upon further reflection, this reference is not germane to the discussion so the reference has been deleted.

### **CHAPTER 3**

CH3 Li 3433: Point here about range and complexity of water decisions applies to individuals and irrigation organizations as well as government agencies, and the institutional rigidities severely constrain private interests, as discussed at great length elsewhere (e.g. Western Water Policy Review Advisory Commission) etc.

John D. Wiener

Additional text was added to address this issue.

CH 3 Li 3456: Discussion of equity here is much appreciated; could be more noted in the ES also. As will be noted below, it is misleading to disregard the equity problems in the US; they are not limited to other places.

John D. Wiener

Additional text added.

CH3 Li 3502 and near: Please include “user-centric” information requests as well.

John D. Wiener

Added this phrase to text.

CH 3 Li 3541: Here, the centrality of private water management is an important point to emphasize. More than 80% of western US water consumption is by private users, whose decision-making is clearly important and largely underserved (perhaps due to NOAA policy and private-sector interests facing poorly-developed markets for this information). (CPASW 2006 argument made on this.)

John D. Wiener

This argument is actually embedded in one of the reports cited in the Hutson (2004) citation at the end of this sentence, and does not need to be repeated here.

CH 3 Li 3584: Rather than a culture of innovation, much of western US water management and allocation takes place in a competitive private market in which winners may well be against innovation and wider application of climate information (argument considered in presentations and extended abstracts to US Committee on Irrigation and Drainage 2006, forthcoming 2008; Universities Council on Water Research 2007 annual meeting available on request or in proceedings volumes).

John D. Wiener

This has, on occasion, been exacerbated by the growth of competitive water markets that sometimes discourage innovation in favor of short-term economic gain, and has been seen, for instance, in adoption of irrigation water conserving techniques, even crop rotation. (Added reference in text by Weiner, 2008; Upendram and Peterson, 2007)

CH 3 Li 3602: Linkage between who receives benefit from federal resource projects (especially in water) and who pays and who bears costs has always been weak; one review is in Wiener, J.D., 1996, Research Opportunities in Search of Federal Flood Policy. Policy Sciences 29(4): 321-344. There is a great deal of scholarship on this issue. For a single reference, see: Wahl, Richard W., 1989, Markets for Federal Water: Subsidies, Property Rights and the Bureau of Reclamation. Washington, D.C.: Resources for the Future; Johns Hopkins U. Press.

John D. Wiener

Added citation by Wahl.

CH 3 Li 3842 and near: Agricultural investments and breeding for both livestock and crops reflects multi-year and sometimes multi-decadal expectations (Howe et al. Report, "Exploratory Investigation of Potential for Improved Water Management... Through Increased Use of Climate Information"). Also reported in Proceedings, Climate Diagnostics Workshop, 2000, Wiener Extended Abstract, pp 231-234, and American Meteorological Association Annual Meeting presentations, 2002, 2003, 2004.

John D. Wiener

Reference added to text.

CH 3 Li 3931-3941: Good paragraph but could cite substantially more literature on multiple causation of negative outcomes, social buffers, and related topics. It is important that readers realize that there is a great deal more social science supporting the positions taken than can be presented here. In the larger sense, there is always a great deal of rediscovery and re-naming when a new group with no disciplinary roots undertakes tasks which have been previously tried by others, whose language is effectively foreign to the newcomers. (Consider disciplinary histories, such as Harris, M., 1968, The Rise of Anthropological Theory; New York: Thomas Y. Crowell; or Harris's 1979 Cultural Materialism; New York: Random House, for examples.)



The context for this point is important. In academics, there is incentive to appear novel and to be making a new contribution, much more than there is incentive to present a new application of an old idea which no longer commands the enthusiasm it did in an earlier generation. But in larger context, the result may be merely misleading, as in a case noted below regarding “decision calendars”, or it may be failure to present the full strength of a case and the frequency with which it has been made. Economic anthropology, in particular, as study of development, significantly strengthens the case made here, with decades of work.

John D. Wiener

It is not practical to review this here (e.g. highlights of the work of the Society for Economic Anthropology, e.g. Partridge, W.L., Ed., 1984, Training Manual in Development Anthropology. Washington, D.C.: American Anthropological Association, and Society for Economic Anthropology; Bennett, J.W. and J.R. Bowen, Eds., 1988, Production and Autonomy. Lanham Md.: University Press of America; Rubinstein, R.A., 1986, Reflections on action anthropology: some developmental dynamics of an anthropological tradition. Human Organization 45(3): 270-279; Smith, S. and E. Reeves, Eds., 1988, Human Systems Ecology. Boulder: Westview; Attwood, D.W., T.C. Bruneau and J.G. Galaty, Eds., 1988, Power and Poverty. Boulder: Westview Press.; Plattner, S., Ed., 1985, Markets and Marketing. Lanham, Md.: University Press of America; Ortiz, S., Ed., 1983, Economic Anthropology. Lanham, Md.: University Press of America.... ), to say nothing of the literature of economic development itself. But, it is important to note that climate prediction applications developments are not taking place in a vacuum of scholarship any more than in a vacuum of history and social structure. A short summary of some antecedents is available in American Meteorological Society 2002 Annual Meeting Preprints, Wiener extended abstract; available on request). Chances for better support may increase when there is wider appreciation of how mainstream much of this thinking really is.

[Added selected, recent references.](#)

CH 3 Li 3979 and near, also Glossary and other mentions. Discussions of vulnerability would be stronger with reference to the important literature on the subject, including Hewitt 1983, cited above (Interpretations of Calamity, London: Allen and Unwin), referencing work from 1976 on, itself grounded in development economics and anthropology, and later classic restatements and expansions including Blaikie, P., T. Cannon, I. Davies, and B. Wisner, 1994, At Risk: Natural Hazards, People's Vulnerability, and Disasters. London: Routledge; and Hewitt, K., 1997, Regions of Risk: A Geographical Introduction to Disasters. Harlow, U.K.: Addison Wesley Longman Ltd.

John D. Wiener

[Added selected, recent references.](#)

CH 3 Li 4167: Please drop the idea of bio-fuels as mitigation of anything. (Some notes on the issues were presented at CPASW 2007 meeting; and see USDA Economic

Research Service reports on ethanol impacts on the US agricultural economy (Westcott, P., 2007, U.S. Ethanol Expansion Driving Changes Throughout the Agricultural Sector. Amber Waves (USDA): Sep 2007; Accessed last 28APR08 <<http://www.ers.usda.gov/AmberWaves/September07/PDF/Ethanol.pdf>>).  
John D. Wiener

Deleted

CH 3 Li 4130-4205: Please add reference to fire hazard as threat to water quality, perhaps by cross-reference to later mentions (e.g. Li 4890, and others.)  
John D. Wiener

Added citation.

Also, around Li 4166, please add note about secondary impacts of climate variation through increased intensity of precipitation affecting soil erosion, sedimentation, etc. (see Soil and Water Conservation Society 2003 report) and additional perhaps secondary and perhaps tertiary impacts of over-grazing or change grazing due to climate variation effects on vegetation as well as location of grazing, affecting soil erosion, sedimentation, etc.  
John D. Wiener

Added note on this.

CH 3 Li 4458: Thank you for discussion of equity issues. These are especially important here with the problem of private competitive markets in water and very asymmetric access to information and capital.  
John D. Wiener

ok

CH 3 Li 4566: Also, thank you for discussion of importance of long-term interactions.  
John D. Wiener

Ok

CH 3 Li 4749: Please add reference to population growth and land use change.  
John D. Wiener

Added

CH 3 Li 5080: Ceara case discussion is good. Please add note that building social capital is very important for many other purposes, and climate information applications may serve as useful catalysts and rationale for change agents and facilitators. The broad range of issues and activities addressed by US Co-operative Extension is the model.  
John D. Wiener

[Added](#)

CH 3 Li 5086: “Decision calendar” is an adaptation of traditional ethnographic practice dating far back in anthropology and geography. NOAA-sponsored use may have begun with the Howe et al. study noted above, which pre-dated the RISA program, but it would be embarrassing to claim originality. Following earlier meetings with many people in and out of NOAA, in the 2000 Climate Diagnostics Meeting, for example, another presentation by the author (proceedings, pp 231-234) uses several terms for this kind of compilation and avoided implications of novelty. It would be wiser to note the successful use of the approach, and take credit for adapting proven and cost-effective methods, which are well-known to a large share of social scientists in many fields.

John D. Wiener

[Added reference to this in text](#)

CH 3 Li 6738 -6751: Change over time in discovery of potential climate information applications, as noted above in general comments as co-discovery, takes place within the larger set of multiple stressors and opportunities and the discussion here approaches that. The larger goal is not climate information applications alone but successful outcomes, which will require effective adaptation to faster-changing conditions than previously experienced (in time scales relevant to development of current traditional craft knowledges and practices). The development of effective applications must be part of the larger development of new adaptive capacity, and may be a valuable catalyst and supportive beginning if things are done well (the Ceara case is most clearly described in these terms, but there are hints in other cases as well, in my opinion, such as the florescent watershed management movement).

John D. Wiener

[Added text.](#)

CH 3 Li 6667-6688: This is the best description of “boundary organization” so far, and might be moved to an earlier location as well as more referenced to the earlier literatures on such ideas.

John D. Wiener

[Added definition to earlier part of text.](#)

CH 3 Li 6677-6688: This is an important paragraph because it shows, though not yet as clearly as it will with a little revision, how the “translation” idea has been smeared into the “loading dock” idea, which is actually the idea not of a loading dock per se but that the loading dock from science is just outside the door of the lab, rather than somewhere many steps closer to users. The earlier question was “Where is the loading dock?” Short-hand creep, one supposes.... The last sentence is the message that must be heard, and perhaps linked to just-previous (Li 6757) and later discussion of “process as product” and in a better world, some of the literature on that from many fields.

John D. Wiener

No response needed.

#### **CHAPTER 4**

CH 4 Li 6772-6886: This does not go as far as it should in recognizing what is described above as the “missionary” function of climate information applications developers and processes. (See general comments above).

John D. Wiener

More material added.

CH 4 Li 6949: The presumption of unified social goals in water use and water re-allocation is incorrect and may have misled thinking about equity issues in many situations where there are sharply differing consequences from allocations and re-allocation and large disparities in costs and benefits, and the distribution of costs.

John D. Wiener

No comment necessary.

CH 4 Li 6974: Again, missionary role is important where substantial investments have been made in anti-science and anti-public-understanding campaigns.

John D. Wiener

Added Weiner reference.

CH 4 Li 7092-7099: Yes! This could very well be at the beginning the report, in my opinion.

John D. Wiener

Thanks, text remains.

CH 4 Li 7211: A good illustration of missionary role.

John D. Wiener

No comment necessary.

CH 4 Li 7282: Credibility and legitimacy are critical for those intended users who have no means to independently verify information. Ironically, those who can do their own verification on a scientific (rather than “cry wolf”) basis are those who least need assistance (and are most likely to have it).

John D. Wiener

No comment necessary.

CH 4 Li 7319: This section (4.3.7) understates the importance for agriculture and land management of long-term forecasts and predictions, and useful integrations of

information. Earlier work reported to NOAA, in Howe et al. and later studies showed interests at all time scales, for everything from safety and threats awareness to long-term breeding programs and major capital investments. In the middle terms, one should note, there are also interests and decisions which are particularly sensitive to financial support needs and effective use of credit, which in turn is increasingly affected by new information that may and soon usually will include climate predictions.

John D. Wiener

[Disagree – this section \(Murray-Darling case\), and the others incorporate case material where this is discussed, particularly earlier discussion of time-scales in chapter 3 – added one note at line former lines 7585 & 6.](#)

CH 4 Li 7624: Again, the missionary role is important in support for monitoring needs.

John D. Wiener

[No comment necessary.](#)

CH 4 Li 7941: Equity discussion would be better with note of problems from negative externalities imposed by poor land and water resource management, often quite significant problems for public interests and the environment. And, there are serious equity failures in lack of access to public-funded and public-servant-generated climate and weather information. Not to be coy, I explicitly despise the NOAA policy regarding discontinuation of agricultural weather services; this affects management of the majority of the surface of the United States as well as the well-being of people who paid their share for the development of this science. If the private sector can add value, it is free to do so. Discontinuing agricultural weather was a bad mistake that should be undone.

John D. Wiener

[Comment added in text.](#)

CH 4 Li 7969-7977: Thank you for going beyond the thin Rogers (Everett, Diffusion of Innovations leading scholar) sense of the issues; it is useful but not sufficient. Economic status of decision-makers is much more valuable and broader.

John D. Wiener

[No comment necessary.](#)

CH 4 Li 7979-7986: Access to information as equity issue is especially important in private competitive markets, where there is little market information and great asymmetry in access to scientific information.

John D. Wiener

[Comment added to text.](#)

CH 4 Li 8005-8006: Role of context cannot be overstated. In agriculture, very mixed effects of multiple stressors and opportunities is the rule. Government actions usually

attract the most attention but individual responses in the aggregate can have surprising effects. User situations can be remarkably varied in close proximity, and the “financial, regulatory and management contexts” can severely constrain capacity to use information, and may even constrain capacity to access and interpret information where local applicability requires technical assistance. Added to the problem of anti-science and anti-public understanding campaigns, contextual understanding is critical. This point as made in the text seems limited to organizational and governmental responses, but it certainly applies to all.

John D. Wiener

[Text added to this section.](#)

## **CHAPTER 5**

CH 5 Li 8691-8698: Yes! The more difficult for the potential user to evaluate the technical information, the more important the personal evaluation of the messengers will be; a good analogy is use of medical doctors and their diagnoses and prescription. Additional note on the co-discovery process would be warranted here, also.

John D. Wiener

[Comments were included in the chapter.](#)

CH 5 Li 8727, Sec 5.2.3: Strongly agree that additional targeting may be needed for some sectors and sub-sectors and perhaps even places where use of available information is especially difficult, or ability to use information is limited in other ways. Widening gaps is a policy choice often made by default. It is important that climate service designers understand that this set of issues related to equity in access and usefulness of information is sharply present within the US as well as outside. The case of agriculture is especially important because of its enormous resource impacts for better or for worse, and affecting extremely long terms (some detail in CPASW 2007 presentation). Please also consider adding a note that poor resource management can result in high externalized costs borne by the public, as well as degradation of assets held by individuals. The public interest in resource issues and environment is hard to value but known to be very high, as shown in the recent efforts to value ecosystem services, and other efforts to assess costs of response to environmental problems (e.g. clean water act problems, superfund toxic situations, and so forth).

John D. Wiener

[Comments were included in the chapter and presentation cited.](#)

CH 5 Li 8894 and near: The novelty of the idea of “science citizenship” may need additional development. It might be accompanied by a note on the idea of public interests and long terms.

John D. Wiener

We decided not to increase the discussion about science citizenship. Although we agree it is important, we took out a much longer discussion in the draft reviewed by the NAS who felt we were straying from our central focus. We did, however, add a note about the long term.

CH 5 Li 8920-8982, Sec 5.2.5: Comment on section as a whole: The premises of adaptive management and integrated water resource management and other careful approaches to climate responsive management are unfortunately difficult to work with where in law and institutions there is neither flexibility nor incremental definition in property rights or in private investment. The premise of iterative adjustment, reversible decisions, and adjustment is hard to reconcile with strenuous efforts to manage by assignment of transferable rights. The classic example is the extreme difficulty to adjustment of stocking levels on grazing permits, allotments and leases on public lands. Therefore, I suggest that these recommendations be tempered with a caution that the level of public retention of authority and ability to operate in these ways is a serious problem not even partly addressed in many places and cases. Significant progress in these areas may require investments which are on the one hand trivial compared to foreign invasions and occupations, but which are on the other hand massive compared to traditional investments in management of natural resources.

John D. Wiener

Additional text has been added.

CH 5 Li 9005: The lurking problem is, “whose priorities?” In Colorado, for example, the drought response and water transfer issues have been a high priority while climate response has been left to talk radio until quite recently. These are different priorities. While it is better to have drought response rather than no climate-related response, drought response can call for increased storage while climate response may relate to the problem of re-timing of flows and increased ET. Progress can be hard to measure.

John D. Wiener

No response required.

CH 5 Li 9059: Strongly agree that there is value in additional research into perceptions of climate and risks, and in addition, basic understanding of the science, and I would urge also study of perceptions of the credibility and reliability of different sources of information and dis-information, and study of public understanding of the funding and motives of different sources of information and dis-information. The extent of strategic dis-information and distortion and deception is astounding and underestimated.

John D. Wiener

Some text has been added, however, while the suggestions are excellent, the committee’s purview and charge is too narrow and specific to be wholly responsive.

CH 5 Li 9136: Please add to this point that private investments are also strongly path-dependent, and in fact, the smaller the financial capacity, the more path-dependent and fragile the process may be.

John D. Wiener

[Additional related text has been added.](#)

CH 5 Li 9153-9172: Among the barriers are strategic behavior in competition, as in western water markets, and use of inequities in access to and interpretation of scientific information. One approach was recommended in CPASW 2008: increased use of information wholesalers – intermediaries playing the role of advisors and working within the boundary organizations that this report uses as a dominant explanatory metaphor (superseding information pathways etc). Many more agency staff should be helped with tutorials and guidance visits and liaisons, where there is interest and will to use information. This may be a much larger group than is apparent under current political conditions.

John D. Wiener

[No response is necessary.](#)

CH 5 Li 9256: Agree but suggest that missionary work may be especially important where institutional change lags with adverse effects unevenly distributed.

John D. Wiener

[Good point about missionary work, but we see no need for further elaboration here.](#)

CH 5 Li 9297: Please add emphasis on wildfire and secondary impacts.

John D. Wiener

[Text added.](#)

Final comment: I strongly caution against the temptation to over-emphasize transferability of knowledge gained from efforts in these areas. In a more homogenous world and species, that would be of greater value, but in the one we have, there are inherent limits on the generalization of experience which is intended to address unique cases. The exclusion of the unique and difficult is itself a form of inequity, which is opposed to the impulse for increasing cost-effectiveness of limited investment. A middle way should involve additional smaller experiments in which sustained interactions are supported without in all cases using a large group. One might consider these satellites of RISAs, extension efforts associated with Climate Services, and ultimately they should be supported by many more agencies and interests.

John D. Wiener

[Additional text has been added.](#)



In the long term, there will be much more interest on the part of potential users in their own self-education, and greater basic education in at least some training courses, but in the near term the missionary role is necessary, carrying the message farther than might seem fairly due.

John D. Wiener

No response needed.

I restate my thanks for the painstaking work here and offer congratulations on a great job of synthesis.

Thanks.

## GENERAL USG COMMENTS

### **Samuel P. Williamson NOAA/OFCM**

The words “report” and “product” are both used throughout the document to refer to SAP 5.3. For the next iteration of SAP 5.3, please consider consistently referring to SAP 5.3 as either a “report” or a “product.” Also, consider consistently capitalizing or not capitalizing the word “report” or “product.”

Samuel P. Williamson, NOAA/OFCM

Changed throughout.

### **Jerry Elwood DOE**

The assessment is way too long. DOE suggests removing the general CCSP jargon and get right to the heart of the matter. The report needs to be more succinct for it to be of any useful value.

We have added a summary table in Chapter 1 of the case studies which we believe will help the reader.

It is not entirely clear what the end-purpose of report is. From the title it seems to be an assessment of best practices as learned from seasonal to interannual (SI) forecasting. But for what purpose: long-term (i.e. greater than SI timescales) water resources from the long-term hydrologic projections or SI hydrological forecasts? So when references, e.g., Schaake and Peck are mentioned, the reader assumes SI hydrologic forecasts, but then there is discussion on hydrologic climate change projections so the reader is somewhat confused. Both are extremely important topics but the authors should determine what their focus is. The focus could be SI hydrological forecasts in a changing climate; the title Decision support experiments and evaluations using seasonal to interannual forecasts and observational data suggests that this should be the focus but the report goes beyond this without any clear message.

We have added more explanation – so there is a more clear intent.

There are so many issues tackled in this report, including fires, hearings in Congress, paleoclimate, capacity building, adaptive management, Hurricane Katrina, etc, etc. In the end, the message and lessons learned from all this on decision making is somewhat lost to the reader because of information overload. The effort to be exhaustive but the report ends up being qualitative and the messages are unclear.

Again, new summary tables should help the reader

It is somewhat shocking (and sobering) to find results from an entire volume of Climatic Change (vol 62, Nos 1-3, 2004) dedicated to the effects of Climate Change on Water Resources in the West missing from the discussion here. Has the decision maker community no value for these ground-breaking results from climate model projections,

downscaling, etc? If not, it would be good to know why not? We would hope that decision making should be based on sound science.

Because our charge in this report is to focus on Decision-Support Experiments and Evaluations using Seasonal to Interannual Forecasts and Observational Data, we simply had to draw boundaries around issues that we would and would not cover in this product. Tackling the impacts of anthropogenic climate change is simply outside the scope of our charge, except where it directly ties into the use of SI forecasts and observational data.

## SPECIFIC USG COMMENTS

### PREFACE

This question reads: “What is the level of confidence of the product within the science community and within the decision making community, who establishes these confidence levels and how are they determined?” Please consider explaining the meaning of “the product”. Is it the SAP 5.3? Is it decision support products in general? It may seem like a trivial fix; but to a reader who has no previous context, the use of the word “product” in this instance is confusing.

Samuel P. Williamson, NOAA/OFCM

We have revised the text to consistently refer to the text as the “Product”, capitalizing so as to distinguish it from a more general term.

Preface, Page 9, Table P.1, Question # 7

This question reads: “What steps are taken to ensure that this product is needed and will be used in decision support?” Please consider explaining the meaning of “this product”. Is it the SAP 5.3? Is it decision support products in general? Removing the ambiguity of the term “this product” would add to the clarity of the document. Please consider revising the text to clearly convey the authors’ thought.

Samuel P. Williamson, NOAA/OFCM

We have revised the text to consistently refer to the text as the “Product”, capitalizing so as to distinguish it from a more general term.

Preface Page 8, line 208: Remove ‘:’ after decision support.

The motivation behind the BACKGROUND section, vis-à-vis SAP 5.3 in particular, is not clear to the reader. The Nov 2005 Decision Support Workshop discussed all the SAPs, not just SAP 5.3 Similarly the GCRA calls for assessments beyond just SAP 5.3 There is too much process description in this draft, e.g. page 11-12, P.4. Why is all that background information included here? Other SAPs don’t have this in so much detail. The report should directly get to the crux of the assessment on the topic. The questions being posed are all very good and the reader is only distracted by all the background discussion.

Jerry Elwood DOE

We have shortened the Preface and revised some text. On the other hand, other SAPs do include similar information and we felt it was necessary to include.

Preface Figure P.1: Is there any significance to the colors in the figure. Why is the top right hand quadrant red?

The figure has been deleted.

Preface Page 12, line 297: What about seasonal to interannual hydrologic forecasts under climate change projections (e.g. time-slicing experiments). Doesn't seasonal to interannual forecasting under a changing climate deserve mention here?

Jerry Elwood DOE

We provide material on this topic in **Section 2.2.3.2: The implications of decadal variability and long term change in climate for seasonal hydrologic prediction skill.** The Preface aims to guide readers to the structure of the document, and is not intended to be an executive summary, so the links between changing climate and SI forecasting is not mentioned here.

## **EXECUTIVE SUMMARY**

Executive Summary, Page 21, Line 492 - 494

The text in these lines identifies internet-based tools as a means of supporting decision-making; yet no specific example of an internet-based tool is given. A specific example of an internet-based tool (such as a matrix of probabilities that would allow the user to see how the impact of climate varies as the probabilities values of uncertainty or risk vary) would be most helpful. Please consider adding this example or another example to the text in these lines

Samuel P. Williamson, NOAA/OFCM

An example has been inserted in the text.

E.S. Page 17, line 411-412: The possible reasons for this 'disconnect' needs to be articulated. Is it institutional? If so, how can research to operations be successfully implemented?

Jerry Elwood DOE

This is a general statement, the specific case studies found in later chapters provide more information.

E.S. Page 21 line 459: 'existing hydrologic and water resource forecast approaches' Like what? It would be good to mention what these are. How different is the existing methodological approach to water resource management in the absence of the use of

seasonal to interannual forecast information? Do you mean seasonal to interannual dynamical forecasts by the latter?

Jerry Elwood DOE

Since this is the Executive Summary we did not provide this level of detail – we added a reference, in the text, to Chapter 2 for those who would like more information.

E.S. Page 23, line 508-509: ‘fostering sustained interactions between forecast producers and consumers.’ Are the authors suggesting all consumers, even if this is just the water resources sector? It would be a colossal undertaking (the text on page 23 first and some other subsequent bullets acknowledge this) to foster and sustain interactions with the consumers. Does the consumer pay or is the burden on the forecast producer? This needs to be clarified.

Jerry Elwood DOE

This is a general statement that we feel is sufficient for an executive summary.

E.S. Page 25 first bullet: What timescale are you referring to while making this statement? This statement is not true if you are just beyond the weather and entering the seasonal climate time scale. As boundary forcing becomes important, seasonal forecast skill increases with time, as a weather forecast degrades due to loss of memory of initial conditions.

Jerry Elwood DOE

This question does not align with the location identified and we could not identify the text to which the suggestion was made.

E.S. Page 25, line 559: Did you mean ‘identify’ or ‘articulate’ here. You imply a need for a decision-support experiment to identify user needs. Surely the decision maker has a well-defined problem and well-defined needs around which the tools/system have to be built.

Jerry Elwood DOE

Word has been changed.

E.S. Page 26 line 581: You talk of professional reward systems to recognize people who develop, and manage such systems. This would work if a monetary value (measuring an economic gain) could be assigned to the tool. That is the way the marketplace works. Tools should have a finite lifetime, and be sustained for as long as they have forecast value.

Jerry Elwood DOE

No response is necessary.

E.S. Page 28, line 629: Is all this (socially just outcomes, etc) achievable realistically, given the water rights laws that currently exist.

Jerry Elwood DOE

Not the assignment of this committee to determine.

E.S. Page 29, line 652: Not clear what is implied by ‘development of science citizenship.’  
Jerry Elwood DOE

This is a summary of text that is discussed further in Chapter 5.

### **CHAPTER 1:**

Chap 1 Page 51 line 1092: change to ‘what role such forecasts could play’.  
Jerry Elwood DOE

Wording changed accordingly.

Chap 1 Page 52, line 1123: Did the CCSPO direct the group to answer a set of questions? Hopefully that isn’t the case. Was not the prospectus developed with a set of questions, and based on the public review of the prospectus, the questions then fine-tuned?  
Jerry Elwood DOE

Text changed.

### **CHAPTER 2:**

Chapter 2, Page 116, Line 2386

It would be useful to articulate to readers the nature and scope of the “difficult and unresolved problems in data assimilation” relative to coupled ocean-atmosphere-land models. Please consider adding specificity to the discussion of these unresolved problems. It may also be useful to point out that education and expertise deficiencies contribute to these unresolved problems. The OFCM document, Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead, documents that there is a need for more students (graduating from either undergraduate or graduate schools) who have sufficient mathematics and computer science skills to engage in data assimilation work in the research and/or operational environment (see sections 3.7.3 [page 3-65] and 6.2.6 [page 6-7]). Please update the text to incorporate the role that education and expertise deficiencies contribute to the aforementioned “unresolved problems in data assimilation.” When the text is revised, the document, Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead, should be cited as a reference within this updated discussion. To be consistent with the references already cited in the SAP, the reference for the document should appear as:

OFCM, 2007: Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead, FCM-P36-2007.

Note: The link for the Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead is: <http://www.ofcm.gov/p36-isrtc/fcm-p36.htm>.

Samuel P. Williamson, NOAA/OFCM

The following paragraph has been added (along with the citation listed above).  
“Finding people with the necessary skills to carry out data assimilation is also an issue. OFCM (2007) documents that there is a need for more students (graduating from either undergraduate or graduate schools) who have sufficient mathematics and computer science skills to engage in data assimilation work in the research and/or operational environment.”

Chapter 2, Page 119, Line 2452 - 2460

The text in these lines discusses the importance of incorporating ground-water level measurements into “surface-water resource forecasts.” A statement about the importance of these networks because (a) the networks’ data support operations and research and (b) the networks’ data may be critical to some aspects of the future climate forecast program would be warranted. Please consider updating the text to reflect the importance of the U.S. Geological Survey networks which supply ground-water level measurements.  
Samuel P. Williamson, NOAA/OFCM

The following sentence has been added to the beginning of this paragraph:  
“Networks of ground-water level measurements are also important because (a) these data support operations and research, and (b) the networks’ data may be critical to some aspects of future hydrologic forecast programs.”

Chap 2 Page 61, line 1341: ‘federal agencies’ or just one agency NOAA DOC?? I thought NOAA (CPC) had the responsibility to produce the official seasonal to interannual forecast. Line 1345: It would be useful to provide examples of existing hydrologic and water resource forecasts. How useful and skillful are these other approaches?

Jerry Elwood DOE

The text has been changed from “federal agencies” to “NOAA and other agencies”. The sentence at line 1345 has been revised to:  
“There are a wide variety of climate and hydrologic data and forecast products currently available for use by decision makers in the water resources sector, ranging from seasonal outlooks for precipitation and surface air temperature to drought intensity, lake levels, river runoff and water supplies in small to very large river basins.

Chap 2 Page 64, line 1411: What is water year 1? It should be defined.

Jerry Elwood DOE

“water year1” is a typo – the 1 refers to the footnote at the bottom of this page that defines “water year”

Chap 2 Page 64, line 1427: So can one say: A skillful forecast is a necessary, but not sufficient condition to make it useful for a decision support system?

Jerry Elwood DOE

That is correct. This sentence has been revised to:

“It is also well established that an accurate forecast is a necessary, but in and of itself, insufficient condition to make it useful or usable for decision making in management applications”

Chap 2: I’m surprised to find the recent body of work by Lettenmaier on hydrological forecasting missing in the discussion and references. Hamlet & Lettenmaier(1999) is referenced several times but Hamlet & Lettenmaier (2007) that deals with flood risk in the western U.S. is missing. References that deserve to be cited include:

- Christensen NS, and Lettenmaier, D.P., 2007: A multimodel ensemble approach to assessment of climate change impacts on the hydrology and water resources of the Colorado River Basin. *HYDROLOGY AND EARTH SYSTEM SCIENCES*, 11, 4, 1417-1434 (2007)
- Hamlet AF and Lettenmaier, D.P., 2007: Effects of 20th century warming and climate variability on flood risk in the western U.S. *WATER RESOURCES RESEARCH*, 43, 6, W06427 (2007)
- Haddeland I, Skaugen T, and Lettenmaier, D.P., 2007: Hydrologic effects of land and water management in North America and Asia: 1700-1992. *HYDROLOGY AND EARTH SYSTEM SCIENCES*, 11, 2 , 1035-1045 (2007)

Christensen and Lettenmaier (2007) describe the impacts of anthropogenic climate change on hydrology and water resources in the Colorado River Basin, but do not deal with issues of SI forecasting so the article is not referenced.

Hamlet and Lettenmaier’s (2007) article is a study of trends and variations in flood risk in the western U.S., but it is also not directly linked with SI forecasting so again it is not cited.

Haddeland et al. (2007) provide an assessment of land use and water management impacts on hydrology, but again do not deal explicitly with SI forecasting so the article is not cited in this chapter.

Chap 2 Page 108 Section 2.3.2, lines 2217-2220

These are not the classic references in the literature for sources of climate forecast skill. The classic references in the field are those of Charney and the MIT group, results from the TOGA program of the 1970s and 1980s (see e.g. the special issue *The TOGA decade*, *JGR* in 1998). A more appropriate title for this section might be Sources of Climate-Forecast Skill for southwest U.S.

Jerry Elwood DOE



This discussion isn't meant to be a comprehensive treatment of all "sources of SI climate forecast skill," so to better reflect its focus the section heading has been revised to: "Section 2.3.2: Sources of Forecast Skill for North America".

Chap 2 Page 118 line 2437

It would be useful to have a peer-reviewed reference that backs this claim of 'up to ¾ of the skill' due to snow measurements.

This statement derives from the analysis of Dettinger (2007) that produced Figure 2.13. A manuscript for this work has not yet been published in a peer-reviewed journal. The citation has been added to this sentence.

### **CHAPTER 3:**

Chapter 3, Page 193, Line 4273

The word "expense" is used in this line. Did the authors intend to use the word "expensive?" Please consider revising the text to clearly convey the authors' thought.  
Samuel P. Williamson, NOAA/OFCM

Yes, corrected in text.

Chapter 3, Page 199, Line 4439

The words "event to" are used in this line. Did the authors intend to use the words "even to?" Please consider revising the text to clearly convey the authors' thought.  
Samuel P. Williamson, NOAA/OFCM

Yes, corrected in text.

Chap 3 Page 156 various bullets: The relative role of water rights in the U.S. that were formed several decades ago is not discussed. Does this have any bearing on equity issues, risk assessment of decision makers, in using the forecasts?  
Jerry Elwood DOE

Yes – added.

Chap 3 Pages 162-164: There are somewhat contradictory statements in the text. On the one hand, the text on page 162 suggests innovations have usually resulted from higher-level government entities (Federal government implied here?). On the other hand, for international cross-boundary water issues, page 164 the text states that bringing the federal Government into discussions may not be an effective way to resolve problems. In the view of the authors, what's the bottomline: should there be more or less Federal Government intervention on local water resource issues? Should the water resources problem between countries be best left to be resolved at local levels? What about water resources problems between states within the U.S.?  
Jerry Elwood DOE

Text added.

Chap 3 Page 226: Concept of decision calendar year is very good. What happens when the skill of the forecast is particularly low during a time of year when, according to the decision calendar, it's most needed? For example, we know there is a spring predictability barrier in ENSO, and it looks like that's when water managers need information on whether to release or hold water in the reservoirs. There is no discussion on mismatch between science capabilities and decision makers needs.

Jerry Elwood DOE

This is addressed in Chapter 4.

#### **CHAPTER 4:**

Chap 4 Page 319: Various case studies are described. Is there any transferability of lessons from a RISA? How many RISAs are an adequate sample for US? Any estimate?

Not a topic assigned to committee.

Chapter 4, Page 268, Lines 6117 - 6212

The text in these lines discusses hazards in coastal urban areas. The information in these lines is supported, in part, by the OFCM document, Urban Meteorology: Meeting Weather Needs in the Urban Community. Please consider adding this document to the list of references in this chapter. To be consistent with the references which are already cited in the SAP, the reference for Urban Meteorology: Meeting Weather Needs in the Urban Community should appear as:

OFCEM, 2004: Urban Meteorology: Meeting Weather Needs in the Urban Community, FCM-R22-2004.

Note: The link for Urban Meteorology: Meeting Weather Needs in the Urban Community is: [http://www.ofcm.gov/homepage/text/spc\\_proj/urban\\_met/Discussion-Framework.pdf](http://www.ofcm.gov/homepage/text/spc_proj/urban_met/Discussion-Framework.pdf). Samuel P. Williamson, NOAA/OFCEM

Citation added.

Chapter 4, Page 269, Lines 6199 – 6201

The text in these lines discusses the need to reduce vulnerability of transportation infrastructure such as roadways and airport runways. The information in these lines is supported, in part, by the OFCEM document, Weather Information for Surface Transportation: National Needs Assessment Report. Please consider adding this document to the list of references in this chapter. To be consistent with the references which are already cited in the SAP, the reference for Weather Information for Surface Transportation: National Needs Assessment Report should appear as:

OFCEM, 2002: Weather Information for Surface Transportation: National Needs Assessment Report, FCM-R18-2002.

Note: The link for Weather Information for Surface Transportation: National Needs Assessment Report is: [http://www.ofcm.gov/wist\\_report/pdf/entire\\_wist.pdf](http://www.ofcm.gov/wist_report/pdf/entire_wist.pdf).

Samuel P. Williamson, NOAA/OFCM

Citation added.

Chapter 4, Page 270, Lines 6206 – 6209

The text in these lines discusses the importance of “providing more reliable predictions of changes in frequency and intensity of tropical and extra-tropical storms. The information in these lines is supported, in part, by the OFCM document, Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead. Please consider adding this document to the list of references in this chapter. To be consistent with the references which are already cited in the SAP, the reference for the document should appear as: OFCM, 2007: Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead, FCM-P36-2007.

Note: The link for the Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead is: <http://www.ofcm.gov/p36-isrtc/fcm-p36.htm>.

Samuel P. Williamson, NOAA/OFCM

Citation included.

Chapter 4, Page 281, Lines 6527 – 6544

The text in these lines discusses “interactions among climate, fire, and watershed dynamics.” The information in these lines is supported, in part, by the OFCM document, National Wildland Fire Weather: A Summary of User Needs and Issues. Please consider adding this document to the list of references in this chapter. To be consistent with the references which are already cited in the SAP, the reference for this document should appear as:

OFCM, 2007: National Wildland Fire Weather: A Summary of User Needs and Issues, Report to the Western Governors’ Association.

Samuel P. Williamson, NOAA/OFCM

Citation included.

## **CHAPTER 5:**

Chapter 5, Page 382, Lines 9032 – 9042

The OFCM believes that weather and climate modification experiments and activities should be added to the list of “priorities [on which] the focus of attention for the foreseeable future” should be placed. Weather and climate modification experiments and activities are in progress in various countries/regions around the globe and may have a measurable impact on climate change in the future. Designating weather and climate modifications as a priority is supported, in part, by findings articulated in the 2005 Brasseur and Roeckner Geophysical Research Letter, “Impact of improved air quality on the future evolution of climate.” Please consider adding weather and climate modification experiments and activities to the list of priorities on page 382 of SAP 5.3 and add the 2005 Brasseur and Roeckner publication to the list of references in this

chapter. To be consistent with the references which are already cited in the SAP, the reference for the Brasseur and Roeckner document should appear as:

Brasseur, G.P. and E. Roeckner, 2005: Impact of improved air quality on the future evolution of climate, *Geophys. Res. Letters* 32.

Samuel P. Williamson, NOAA/OFCM

[We believe that this is outside our focus on water and seasonal interannual forecasts.](#)