

Source	Affiliation	Main Points	General and Specific Comments
Brad Udall	NOAA-RISAs	add goal for applying scientific knowledge; coordinate among agencies; develop interagency communication strategy; foster stakeholder involvement; utilize social science; provide decision support; provide regional info	The CCSP Strategic Plan is mandated by the Global Change Research Act of 1990 (GCRA) requires new plans every 10 years, and revisions every three years. The proposed revisions such revisions since the current plan was issued in 2003. The GRCA contains very specific I about what the plan should include. Pertinent to our comments are Section 102 which establ Committee on Earth and Environmental Sciences and requires the committee to 'consult with potential users of the results of the Program to ensure that such results are useful in develop and international policy responses to global change.' Section 104 describes the Research PI that it shall include...'Focused research initiatives to understand the nature of and interactor physical, chemical, biological, and social processes related to global change.' In addition, Se says that 'The Plan shall provide recommendations for collaboration within the Federal Gove among nations to ...combine and interpret data from various sources to produce information usable by policymakers attempting to formulate effective strategies for preventing, mitigating
			In 2003 the Climate Change Science Program created vision and mission statements, five st goals and four core approaches, all of which are strongly influenced by the language of the C CCSP vision statement reads: <i>A nation and the global community empowered with the scien knowledge to manage the risks and opportunities of change in the climate and related envirc systems</i> . The CCSP mission statement reads: <i>Facilitate the creation and application of know the Earth's global environment through research, observations, decision support, and comm</i> . (Emphasis added.) While the existing CCSP vision, mission, goal statements, and core appr important, we believe the existing focus and emphasis are incomplete. Specifically, the missi statement for the CCSP mentions both the creation and <b>application</b> of scientific knowledge. CCSP's goals only Goal 5 applies to the application of the generated scientific knowledge, a to apply only indirectly. The application of knowledge requires an understanding of the econc cultural, legal and physical context in which information can be used, the right decision supp

		<p>We also believe that relegating communication, mentioned specifically in the top-level mission statement to a core approach is inadequate. Communication is critical for the success of many aspects of the climate change problem and communication should have its own top level goal. Aside from the statements in the mission, vision, goals and approaches, the CCSP 2003 plan makes it abundantly clear that providing relevant information to society is critical. The plan says, 'This strategic plan reflects the President's direction that climate change research activities be accelerated to provide the maximum possible scientific information to support public discussion and decision making on climate-related issues.' It also says that the CCSP was launched to coordinate and direct research 'to reduce uncertainties in climate science, improve global observing systems, develop science-based information resources to support policymaking and resource management, and communicate findings broadly among the international scientific and user communities.' It goes on to say, 'This Strategic Plan for the Climate Change Science Program describes a strategy for developing knowledge of variability and change in the Earth system.'</p>
		<p>As noted by the 2007 NRC Report, Evaluating Progress of the U.S. Climate Change Science Program: Methods and Preliminary Results, the Climate Change Science Program has made progress in many aspects of its mission. That document, however, identified many shortcomings of the CCSP including lack of support for decision-making, lack of regional and local information, lack of understanding of impacts on humans and natural systems, and lack of engagement with stakeholders. These are precisely the areas in which the RISAs work, albeit with limited budgets and limited geographic coverage. The NRC report notes that 'only a small fraction of the CCSP budget is devoted to support resources and communication.' Specifically, only \$30m of the \$1.7 billion CCSP budget is devoted to decision resources, and this includes the \$6.6m spent annually on the RISAs. The report also notes that 'if the program is to achieve its vision of producing information that can be used to formulate strategies for preventing, mitigating, and adapting to the effects of climate change, adjustments must be made in the balance between science and applications.' Our comments below address these issues.</p>
		<p><b>Specific Comments</b> We strongly believe that in order to be successful, the CCSP must perform the following actions: 1. Coordinate Between Agencies; 2. Develop an Interagency Communication Strategy; 3. Foster/Promote/Enable Early Stakeholder Involvement and Co-production of Knowledge; 4. Utilize Social Science to Understand Decision Environments; 5. Provide Useful Decision Support; 6. Provide Usable Regional Information. The first two goals relate to overall CCSP leadership and the remaining four goals, which are interlinked, are needed to improve decision support. For example, stakeholder involvement generally leads to the use of social science to understand decision environments, interest in suitable decision support tools, and usable regional information. A finding of the 2007 NRC report was that, 'Our understanding of the impact of climate changes on human beings and vulnerabilities is much less developed than our understanding of the natural climate system.' This comment implies the need for attention to these four actions.</p>

		<p>1. Coordinate Between Agencies: The broad impacts of climate change ignore federal (and state) agency boundaries and hence interagency cooperation will be critical to finding effective adaptation strategies. The GRCA and 2003 CCSP Research plan both describe an interagency effort with substantial coordination and cooperation. However, the CCSP still appears to be a veneer of separate agency plans without true integration or coordination. For this program to really "support policy-making, planning, risk reduction and adaptive management," the various CCSP elements from observations to modeling to decision support, need to coordinate, cooperate, and communicate effectively with each other. Management of the nation's water resources, for example, is supported by the Department of Commerce (NOAA National Weather Service), USDA (NRCS), the Environmental Protection Agency (drinking water, clean water act), the Department of Defense (flood control), and the Department of Interior (Reclamation and USGS). In our experience, even separate agencies within the same federal department have not consistently interacted and communicated about how to coordinate.</p>
		<p>2. Develop an Interagency Communications Strategy: The current research plan devotes little to interagency communications. In general, the chapter is well thought out but it has never been implemented effectively. The 2006 and 2007 <i>Our Changing Planet</i> reports discuss communications and the creation of an interagency working group yet little seems to have been accomplished. The 2007 report acknowledges these shortcomings by saying, '<b>Progress in communicating CCSP research is inadequate.</b>' CCSP must design and implement an integrated communications plan among federal agencies supported by the necessary resources. As noted above, there is a glaring disconnect between the mission statement of the CCSP, which specifically includes communication, and the strategic goals which nowhere explicitly discuss the subject. Communication is left to an appendix which is clearly inadequate given the central role of communication. The Revised Plan mentions communication in many places, yet without an overarching plan, resources and interagency coordination are still not in place. Goals, while stated, are not clearly defined, and the plan remains largely unimplemented.</p>
		<p>3. Foster/Promote/Enable Early Stakeholder Involvement and Coproduction of Knowledge: The NRC evaluation of the CCSP found that: '<b>Discovery science and understanding of the climate system are proceeding well, but use of that knowledge to support decision making and management of risks and opportunities of climate change is proceeding slowly.</b>' It also said that: '<b>Progress in... engaging stakeholders is inadequate.</b>' The NRC Report further says that the climate community is one of the only organized efforts within the CCSP to engage stakeholders. We believe that for regional science to be truly effective, stakeholders must be brought into the knowledge generation process early in order to forge meaningful dialogues and develop familiarity of each discipline and cultures. Knowledge becomes more effective when it is co-produced between the science community and the decision-making community. Years of experience have taught us that a top-down 'push' of results generates little use of products, and poor usability of decision-support tools. Products must consider the interactions between policy, institutions and science. Stakeholders must be engaged early and often.</p>

		<p>4. Utilize Social Science to Understand Decision Environments: Decision makers are constrained by many factors including laws, economics, public perceptions, environmental considerations, and infrastructure limitations. A science program which aims to provide climate services but does not consider these constraints may be useless to decision makers. The involvement of economic experts, lawyers, engineers, sociologists at an early stage in the creation of knowledge enhances the production of useful products. To date, the CCSP has focused heavily on physical scientists to the exclusion of other disciplines, even though understanding of social processes is explicitly listed in authorizing legislation (GCRA section 104). The RISA community is one of the only CCSP programs that utilize a wide variety of experts to make science usable and useful for decision making. For example, one critical social science area is in the perception of risk as it relates to decision making. The past few decades have seen a considerable increase in the quality and quantity of social science research on the risks of technologies, economic activities, and natural hazards. The research has produced a</p>
		<p>5. Provide Useful Decision Support Tools: Decision Support is defined by CCSP's 2003 Plan as having three components: scientific syntheses and assessments, adaptive management resources, and methods to support policy making. The 2007 NRC study found that the CCSP's overall objectives are sound but the activities reported by the CCSP focused on finding uses of existing observational data and research products rather than <b>'defining a research agenda to support the three types of decision making.'</b> The NRC further found that efforts were skewed towards products that were being developed. It said, <b>'an exception is research programs in which stakeholder interests are a part of the research design, such as the RISAs and DMUU centers. Although increasing the usefulness of research products is important, it should neither replace nor eclipse the engagement in stakeholder-driven research, an expressed but not demonstrated priority of the CCSP.'</b> Concerning syntheses and assessments, the NRC said that progress on the SAPs was inadequate and that one of the three SAPs specifically related to decision making was in need of revision. Under</p>
		<p>6. Provide Usable Regional Information: The 2007 NRC evaluation of the CCSP found that <b>'improving our understanding and predicting climate change has improved more at global, continental, and ocean basin scales than at regional and local scales.'</b> In our experience, regional decision makers across the US want climate projections at a scale suitable to local decisions. Existing global climate models have been shown to properly reproduce climate on global, continental and, increasing regional scales, albeit at coarse spatial resolution. In the short term, statistical and dynamical downscaling of global climate models is being used to provide useful information. However, in the longer term, we need better observations to improve and validate these regional calculations, along with upgraded climate models run at enhanced resolutions suitable for regional decision making. In the core of the West, such resolution is vastly different from the current generation of models. Increasing resolution will require substantial investments in climate modelers, computers, and associated personnel. In addition, many stakeholders are more concerned about information in the 30 to</p>

			<p><b>Concluding Comments</b> The RISA Centers have been working for approximately 10 years to provide information to decision makers with a wide variety of climate information. Because our stakeholders are vulnerable to climate on many time scales and because robust decision making requires information on all scales, we have provided a wide variety of information and tools ranging from paleoclimate reconstructions of streamflow, to seasonal agricultural forecasts, to projections of future water availability, hydropower production, and fire risks. We are now actively working to communicate and coordinate the applications of climate-change related information to eager stakeholders. We strongly believe that our research provides valuable insights to inform the CCSP Research Plan revision.</p>
			<p>The existing CCSP effort guided by the 2003 Research Plan is a laudable effort to help prepare for the significant impacts of climate change. Unfortunately, as indicated by the 2007 IIR and by this letter, the current CCSP efforts to provide information for decision making have significantly lagged the production of (necessary) basic earth science information. Active engagement of and motivated stakeholders by regionally focused science teams would rectify many of the current program problems. Addressing these shortcomings would have the added benefit of making the entire program more successful by building public support for other key elements of the plan including enhanced observations, modeling, and the basic science which is so critical to scientific progress.</p>
			<p>Comment in Footnote 3: It is symptomatic of the lack of stakeholder engagement within the CCSP that the NRC Committee on Strategic Advice on the US Climate Change Science Program contains 12 members, 12 of whom are from academia and research institutions; of the 3 members from climate change in academia and research, only one truly represents a stakeholder.</p>
Rick Piltz, Anne Polansky	Climate Science Watch	Endorses CBD comments; should have cited deadlines and court decision in summary; restructure program; decision support; specify planned stakeholder engagements; needed emphasis on Goals 4&5 an understatement	<p><b>General Comment #1.</b> Climate Science Watch wishes to associate itself with and endorse the comments submitted separately by Shaye Wolf and Kassie Siegel of the Center for Biological Diversity.</p>

		<p>General Comment #2. It is now well-established that the US Global Change Research Program, renamed the Climate Change Science Program under the Bush Administration (hereafter referred to as the USGCRP/CCSP), since 2000 has consistently failed to meet the existing statutory requirements of the Global Change Research Act of 1990 (GCRA), primarily by failing to revise its Research Plan in 2004 and failing to produce a scientific assessment of global change impacts every five years (Sec. 104). Climate Science Watch submitted a formal declaration in support of the lawsuit filed jointly by the Center for Biological Diversity, Greenpeace, and Friends of the Earth (Case No. 06-1101) on November 14, 2006 to compel the USGCRP/CCSP to comply with the GCRA. The court sided with the plaintiffs by issuing a decision on August 21, 2007 requiring the USGCRP/CCSP to publish a revised proposed Research Plan in the Federal Register no later than March 1, 2008, and to submit the proposed Research Plan itself to Congress no later than 90 days thereafter (Center for Biological Diversity, et al. v. Brennan, et al.) There is no mention of these court-ordered deadlines in the proposed Research Plan.</p>
		<p>General Comment #3: Climate Science Watch recognizes that the overall structure and current functioning of the USGCRP/CCSP makes it difficult for the USGCRP/CCSP programs and the USGCRP/CCSP Office to meet current demands for useful information on adaptation and mitigation. With no real control over participating agency and department budgets, a high degree of vulnerability to political tampering and censorship from the highest levels of the Bush administration (well-documented on our website, www.climate-science-watch.org), and a lack of commitment from the White House to address the climate change problem openly, honestly, and directly, the USGCRP/CCSP Office's efforts have been tied. Moreover, many of the basic scientific questions embodied in the IPCC Working Group II have been the main focus of the US climate science programs and have now been fairly well addressed. Climate Science Watch recognizes the high value that the US programs have added to the global climate process and to overall scientific understanding of the climate system. However, Working Group II issues (impacts, adaptation, and mitigation) are in desperate need of focused, expert attention.</p>
		<p><b>General Comment #4:</b> A strong need exists for meaningful, timely, relevant, usable, and useful information and decision support and other assistance to state and local governments, businesses, and individuals to support their attempts to prepare for and ultimately adapt to global climatic disruption; and to provide technical, and economic analysis of greenhouse gas emissions reduction (<i>i.e.</i> mitigation) opportunities. On its face, the summary Research Plan summary essentially acknowledges this need. However, the USGCRP/CCSP does not acknowledge that the USGCRP/CCSP, as it is currently configured and managed, has proven to be simply not able to meet current needs for climate change impacts assessments, and the decision is needed to enhance national preparedness to cope with and adapt to, as well as to mitigate, future climate change impacts. In more terse terms, federal climate science in the US has been largely disconnected from the rest of society. This disconnect must be repaired if we are to manage and cope effectively with the hardships that climate disruption threatens to impose. In this proposed summary, there is no recognition of the Program's fundamental structure as it relates to Program effectiveness, an</p>

			<p><b>General Comment #5:</b> Through the proposed summary, references are made to encourage comment, engaging stakeholders, and informing decision makers. However, aside from public information about draft Synthesis and Assessment Products in the Federal Register, we are aware of any future planned activities designed specifically to involve, inform, or engage stakeholders, policymakers, or the non-scientific community. Are any such activities planned, and if so, were they not mentioned in the summary?</p>
			<p><b>Specific Comment #1: Emerging Priorities, page 5, third full paragraph.</b> Climate Scientists take issue with the statement regarding the 21 planned Synthesis and Assessment Products, only four of which have been completed and published to date. The SAPs, should they remain completed before the current administration ends, will help to “integrate many related scientific findings. But we disagree with and can find no substantiation for the following statement: “These assessments [the SAPs] have had a significant influence on the broader climate policy community, and have helped shape external dialogues and to frame the new questions that face policymakers.” Conversely, based on our understanding and experience that very few policymakers – in the US Congress, in state legislatures and governor’s offices, in local governments, and in the NGO and environmental community – are using these assessments to aid in the decision making process. Many policymakers have not even heard of these assessments. We agree generally with the subsequent statement (which we view as an understatement) that “discussions within the user community have already been taking place.”</p>
			<p><b>On page 9, first full paragraph,</b> the summary states: “The coming years will see substantial increased need for CCSP to accelerate progress on Goals 4 and 5...” and “This is an important opportunity for potential growth for CCSP.” Given that there are only 10 months remaining in the current administration, we would encourage the USGCRP/CCSP to choose a few top priorities for focus, with strong input on developing those priorities, and work to make any information produced relevant to the policy-making process at the federal and state level. For example, better understanding of likely precipitation and drought patterns in various regions could enable provision of useful, relevant, and valuable information to water managers across the US.</p>
			<p><b>Specific Comment #2: Research and Programmatic Plans, page 6, second full paragraph.</b> The summary provides an insufficient explanation of just how the USGCRP/CCSP intends to fulfill the requirement of Section 5 of the GCRA and the court-ordered scientific assessment due on May 31, 2008. The only text states that “The current Scientific Assessment is under development” and that “it will integrate findings from many sources,” including the 2003 Strategic Plan, the SAPs, this Research Plan, and public comments on this summary. The SAPs provide a potentially useful source for an assessment of the science of their delinquency, and their disparate nature, it is still unclear just how the USGCRP/CCSP intends to comply with the court order and to satisfy the relevant Congressional oversight committees.</p>

			<p><b>Specific Comment #3: Research and Programmatic Plans, page 7, first paragraph.</b> We the Center for Biological Diversity's comment that the statement in the research plan summary "investment in and progress towards CCSP Goals 1 through 3 has been greater than that for and 5" is a severe understatement. Only one of seven planned SAPs under Goal 4 has been completed ("Effects of Climate Change on Energy Production and Use in the United States") and not all three planned SAPs under Goal 5 has been completed.</p>
			<p>For example, both the western states and the southeastern US have been suffering from severe drought conditions that have been linked to climate change. On page 10, third full paragraph the summary states: "The need to provide information to water resource managers and other stakeholders on issues related to how climate affects water availability, drought, and water quality has been a component of CCSP activities, and the global water cycle is one of CCSP's identified elements." There is emerging scientific indication that the Arctic ice melt may be linked to precipitation deficits in southeastern states, and that the drought in this region could be long-lasting. (Dr. I MacCracken made this point in a presentation at the National Council on Science and the Environment annual conference on "Climate Change: Science and Solutions" in January 2008). However USGCRP/CCSP has not, to our knowledge, addressed this troubling possibility directly, by, for example, querying existing federal or international research facilities or gathering scientific experts to determine the current state of our knowledge as it might pertain to this question. The September 2007 draft</p>
Shaye Wolf, Kassie Siegel	Center for Biological Diversity	"enshrine in the research plan the need for a single, coherent, usable national assessment"; greater emphasis on ocean acidification; greater focus on mitigation; recommendations for data development, compatibility, transfer for prevention/adaptation/mitigation; list of specific research topics	<p><b>General Comment:</b> The Summary of the Revised Research Plan is extremely brief and general. A more detailed and thorough summary would allow commenters to provide more detailed and more useful feedback.</p>



		<p><b>Introduction, Page 1, Lines 9-34:</b> The Global Change Research Act of 1990 (“GCRA”) req Climate Change Science Program (“CCSP”) to prepare, and submit to Congress, not less fre every 3 years, a Research Plan that “shall contain recommendations for national global char research” and shall establish “the goals and priorities for Federal global change research wh effectively advance scientific understanding of global change and provide usable information base policy decisions related to global change.” 15 U.S.C. § 2934. In addition, the CCSP mu not less frequently than every 4 years, a Scientific Assessment which: (1) integrates, evaluat interprets the findings of the Program and discusses the scientific uncertainties associated w findings; (2) analyzes the effects of global change on the natural environment, agriculture, er production and use, land and water resources, transportation, human health and welfare, hu systems, and biological diversity; and (3) analyzes current trends in global change, both hur [induced] and natural, and projects major trends for the subsequent 25 to 100 years. 15 U.S.</p>
		<p><b>Emerging Priorities, Page 5, Line 12:</b> While “ocean acidification and its consequences” is i this section on a list of emerging priorities, the Research Plan fails to explicitly include ocean at any point in the Research and Programmatic Plans section. Ocean acidification is one of t significant threats to marine ecosystems. As ocean waters absorb anthropogenic carbon dio: emissions, the acidity of these waters increases, and the availability of carbonate ions for cal shell-building organisms, decreases. Ocean pH is now changing more rapidly than it has in 6 years. If anthropogenic greenhouse gas emissions continue unabated, at some point in the f organisms such as clams, mussels, oysters, starfish, lobsters, and perhaps most importantly phytoplankton and zooplankton at the base of the foodchain, will become unable to build or r shells, with potentially catastrophic consequences. The Earth’s oceans cover over 70% of its submerging the planet’s tallest mountains and deepest valleys, and supporting the majority c earth. The Research Plan should place a far greater emphasis on ocean acidification.</p>
		<p><b>Research and Programmatic Plans, Page 7, Lines 6-8:</b> The CCSP states that “[i]n the fou the release of the Strategic Plan, investment in and progress towards CCSP Goals 1 throug greater than that for Goals 4 and 5.” This is a great understatement. As we have commentec the CCSP since 2000 has focused on basic science to the near exclusion of mitigation and p concerns. In other words, the CCSP under the Bush administration is funding climate chang but not funding steps to actually address the problem. It is not just simply common sense the should focus more on mitigation in the Research Plan: the CCSP has a statutory obligation t</p>
		<p>The Research Plan must contain recommendations for collaboration within the Federal Gove among nations to (1) establish, develop, and maintain information bases, including necessar management systems which will promote consistent, efficient, and compatible transfer and u (2) create globally accessible formats for data collected by various international sources; anc combine and interpret data from various sources to produce information readily usable by po <u>attempting to formulate effective strategies for preventing, mitigating, and adapting to the eff global change.</u> 15 U.S.C. § 2934(d) (emphasis added).</p>

			<p>The Bush administration has opposed mandatory greenhouse pollution controls for the past. It is apparent that the politics of this opposition have impacted the CCSP's Research Plan because it lacks any emphasis on actually helping policy makers formulate effective strategies for preventing, mitigating, and adapting to climate change as required by the GCRA. The CCSP must revise its Research Plan to ensure that more is done in this regard. Specific suggestions for doing so are listed in the relevant sections below.</p>
			<p><b>Research and Programmatic Plans, Page 8, Lines 36-39:</b> One of the most important tasks the CCSP is, as stated here, to "improve methods to integrate our understanding of potential effects of different atmospheric concentrations of greenhouse gases and to develop methods for aggregating and comparing potential impacts across different sectors and settings." One of the primary reasons this task is so important is that it will inform both mitigation strategies, e.g., the regulation of greenhouse gas emissions, and adaptation strategies, e.g. changes in agency management of protected public lands. The Research Plan should make this link explicit, and give greater emphasis to this critically important task.</p>
			<p><b>Research and Programmatic Plans, Page 9, Lines 10-12:</b> While it is certainly important to "study carbon cycling and climate change in high latitude regions," because, as the CCSP admits, "high latitude regions are among the most rapidly-changing areas of the planet," the CCSP should place a greater emphasis on helping decision makers select policies to slow the rate of change in the Arctic and Antarctic. As demonstrated by the record low minimum Arctic summer sea ice extent in September 2007, the situation in the Arctic has reached a critical threshold. The CCSP must place greater emphasis on polar research that addresses important policy-relevant data gaps or that directly address measures to prevent or delay the onset of a seasonally ice-free Arctic.</p>
			<p><b>Research and Programmatic Plans, Page 9, Lines 22-24 and Page 10, Line 48 to Page 11, Line 10:</b> We applaud the CCSP for deciding, albeit belatedly, to place "an increased emphasis on the development of an early warning system for the possibility of abrupt climate change to assist and decision-makers in planning for sea level rise and other potential rapid changes..." In carrying out this task, the CCSP should be mindful of the fact that certainly with regard to Arctic sea ice and other indicators of climate change is already upon us. The CCSP should focus on ways to slow and then reverse the effects of rapid changes, as well as ways to avoid other extreme and catastrophic events. The CCSP has a moral and statutory obligation to do much more in this regard. To blithely state that the CCSP will "turn its attention to the "possibility of abrupt climate change," when such change is already being manifested in the Arctic sea ice melt, is to greatly understate the nature and scale of the problem.</p>

			<p><b>Research and Programmatic Plans, Page 10, Lines 4-17:</b> Black carbon, or soot, is one of important greenhouse pollutants, particularly in the Arctic. Because black carbon has both a warming impact and a short atmospheric lifetime, controlling black carbon presents a critical mitigation opportunity, especially for the Arctic. The Research Plan currently discusses aerosols generally, but does not treat black carbon with any specificity. Much greater emphasis should be placed on black carbon. On November 5-7, 2007, the Norwegian Institute for Air Research hosted a series of Short-lived Pollutants and Arctic Climate Workshops (<a href="http://nilfheim.nilu.no/spac">http://nilfheim.nilu.no/spac</a>). The workshop held January 8-9, 2007 at NASA's Goddard Institute for Space Sciences (GISS) in New York (<a href="http://www.giss.nasa.gov/meetings/arctic2007/">http://www.giss.nasa.gov/meetings/arctic2007/</a>). The portion of the summary from the workshop pertaining to black carbon makes it clear that the science clearly supports implementation of a hemisphere black carbon reduction strategy with an emphasis on reducing black carbon from sources that deposit in the Arctic particularly in the winter and spring, as a mitigation strategy (<a href="http://r">http://r</a></p>
			<p><b>Research and Programmatic Plans, Page 11, Lines 14-28:</b> Either in the ecological forecasting initiative or elsewhere as appropriate, the CCSP should incorporate the knowledge gaps and priorities identified by the IPCC in Working Group II of the Fourth Assessment Report:</p>
		Uncertainties:	<ul style="list-style-type: none"> <li>• inadequate representation of the interactive coupling between ecosystems and the climate system, and furthermore, of the multiple interacting drivers of global change. This prevents a fully integrated assessment of climate change impacts on ecosystem services;</li> </ul>
			<ul style="list-style-type: none"> <li>• major biotic feedbacks to the climate system, especially through trace gases from soils in ecosystems, and methane from labile carbon stocks such as wetlands, peatlands, permafrost, and yedoma;</li> </ul>
			<ul style="list-style-type: none"> <li>• how aggregation within current DGVMs with respect to the functional role of individual species and the assumption of their instantaneous migration biases impact estimates;</li> </ul>
			<ul style="list-style-type: none"> <li>• the net result of changing disturbance regimes (especially through fire, insects and land-use change) on biotic feedbacks to the atmosphere, ecosystem structure, function, biodiversity and ecosystem services;</li> </ul>
			<ul style="list-style-type: none"> <li>• the magnitude of the CO<sub>2</sub>-fertilisation effect in the terrestrial biosphere and its components</li> </ul>
			<ul style="list-style-type: none"> <li>• the limitations of climate envelope models used to project responses of individual species to climate changes, and for deriving estimations of species extinction risks;</li> </ul>
			<ul style="list-style-type: none"> <li>• the synergistic role of invasive alien species in both biodiversity and ecosystem functioning</li> </ul>
			<ul style="list-style-type: none"> <li>• the effect of increasing surface ocean CO<sub>2</sub> and declining pH on marine productivity, biogeochemistry and ecosystem functioning;</li> </ul>
			<ul style="list-style-type: none"> <li>• the impacts of interactions between climate change and changes in human use and management</li> </ul>

		<p>Research Priorities:</p> <ul style="list-style-type: none"> <li>• Identify key vulnerabilities in permafrost–soil–vegetation interactions at high latitudes, and potential feedback to the biosphere trace-gas composition. Recent estimates suggest that permafrost contains more than 1,000 PgC, which is increasingly emitting CO<sub>2</sub> and more important methane (e.g., Walter et al., 2006; Zimov et al., 2006). The implications of this for abrupt and climate forcing are significant (e.g., Schellnhuber, 2002; iLEAPS, 2005; Symon et al., 2005; Pielke, 2006; Zimov et al., 2006).</li> </ul>
		<ul style="list-style-type: none"> <li>• More robust modelling of interactions between biota and their geophysical environment using independently developed <i>DGVMs</i> and Earth-system models. Validation (Price et al., 2001) through model intercomparisons is required, especially also with respect to the methane cycle. The goal is to narrow uncertainties relating to the vulnerability of the carbon sequestration potential of ecosystems including more realistic estimates of lagged and threshold responses (e.g., Schellnhuber, 2001; iLEAPS, 2005).</li> </ul>
		<ul style="list-style-type: none"> <li>• More emphasis on precipitation projections (e.g., Handel and Risbey, 1992) and resulting vegetation effects. These should emphasise interactions between vegetation and atmosphere, including fertilisation effects, in mature forests in the Northern Hemisphere, seasonal tropical forests, and semi-arid grassland and savannas (e.g., Jasienski et al., 1998; Karnosky, 2003).</li> </ul>
		<ul style="list-style-type: none"> <li>• Improved understanding of the role of <i>disturbance regimes</i>, i.e., frequency and intensity of events (drought, fire, insect outbreaks, diseases, floods and wind-storms) and that of alien species invasions, as they interact with ecosystem responses to climate change itself and pollution (e.g., Osmond et al., 2004; Opdam and Wascher, 2004).</li> </ul>
		<ul style="list-style-type: none"> <li>• Development of integrated <i>large spatial-scale remote sensing with long-term field studies</i> (Kasisumi et al., 2000; Morgan et al., 2001b; Osmond et al., 2004; Opdam and Wascher, 2004; Pielke et al., 2005, p. 1019) to better address scale mismatches between the climate system and ecosystems (Root and Schneider, 1995).</li> </ul>
		<ul style="list-style-type: none"> <li>• Studies on impacts of rising atmospheric CO<sub>2</sub> on <i>ocean acidification</i>, and warming on coral reefs and other marine systems (Coles and Brown, 2003; Anonymous, 2004), and widening the range of ecosystems for which CO<sub>2</sub>- fertilisation responses have been quantified (e.g., Bond et al., 2002).</li> </ul>
		<ul style="list-style-type: none"> <li>• Validating species-specific <i>climate envelope models</i> by testing model projections against the range shifts observed in nature (e.g., Walther et al., 2001; Chapter 1).</li> </ul>
		<ul style="list-style-type: none"> <li>• Advances in understanding the relationship between <i>biodiversity</i> and the <i>resilience</i> of ecosystem services at a scale relevant to human well-being, to quote Sir Robert May (1999a): “The rudimentary state of ecological science prevents us from making reliable predictions about the biological diversity we can lose before natural systems collapse and deprive us of services upon which we depend.”</li> </ul>

			<ul style="list-style-type: none"> <li>• Improve identification of environmental key factors influencing ecosystem structures that de functionality and provisioning services of ecosystems together with quantitative information c <i>impacts</i> (including implications for adaptation costs – Toman, 1998a; Winnett, 1998; Kremen Symon et al., 2005, e.g., p. 1019).</li> </ul>
			<ul style="list-style-type: none"> <li>• <i>Integrative vulnerability</i> studies on adaptive management responses to preserve biodiversi conservation and reservation management) and ecosystem services in relation to pressures use change and climate change (Kappelle et al., 1999; Lorenzoni et al., 2005; Stenseth and 2005; Symon et al., 2005). (Above from Fischlin, A., G.F. Midgley, J.T. Price, R. Leemans, E Turley, M.D.A. Rounsevell, O.P. Dube, J. Tarazona, A.A. Velichko, 2007: Ecosystems, their goods, and services. <i>Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribut Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Clima M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambri University Press, Cambridge, 211-272:249.)</i></li> </ul>
John M. Balbus	Environmental Defense	greater involvement of key stakeholders, esp public health community	<p><b>First general comment:</b> Environmental Defense supports the revised vision and mission of Research Plan, which builds upon progress in climate science over the last few years. We d believe, however, that this revised plan places sufficient emphasis on research into human h welfare impacts of climate change. The NRC in its review of the CCSP noted the poor progr the areas of human health and societal impacts. Despite this, there is very little indication of focus or commitment to these areas. Climate change is a serious public health concern. Alo potential environmental and economic costs, climate change will have (and is already having parts of the world) a significant effect on human lives, bringing about greater risk of death an to heat waves, extreme weather events, infectious diseases, and air pollution. Given the ser these outcomes and others, which will place a considerable burden on vulnerable population should make climate-related health consequences a greater focus and a priority in the revise Plan.</p>
			<p><b>Second general comment:</b> More specifically, Environmental Defense notes that Goal 4 of Research Plan, which discusses the need to understand the sensitivity and adaptability of dii ecosystems and human systems to climate change, has been identified as an area of greate for the CCSP. While we understand that public health concerns are included in “human syst note that the word “health” does not appear within Goal 4 nor within the expanded discussior This suggests inadequate attention and focus on health concerns. We recommend that a se related to human health and welfare concerns be created. This goal should address not only and potential benefits to public health posed by climate change, but also the potential risks a to public health that arise out of the various technologies and other measures initiated to miti adapt to climate change. Examples of the latter would include food security and land use im levels in people. Burying human health concerns within a goal devoted broadly to ecosystemer</p>

			<p><b>Third general comment:</b> We strongly support the emphasis on producing decision support smaller, local, and regional scales. We note, however, that public health providers are never as critical users of such information. It is essential that a natural science dominated program CCSP identify early, and at a high level of their planning, user communities from the social science disciplines, in order to ensure that decision support tools and scaled-down projector effectively developed for those users.</p>
			<p><b>Fourth General Comment:</b> CCSP should take steps to more actively involve key stakeholders including the public, nonprofit organizations, and state and local officials, in developing and c the Research Plan. The public health community, in particular, can play a crucial role in climate adaptation and mitigation efforts. Health experts, policymakers, and professionals have already demonstrated significant concern about climate change, and many recognize that promoting communities and lifestyles can simultaneously help protect against global warming. This spring American Public Health Association is dedicating National Public Health Week to the health climate change, and the World Health Organization is organizing World Health Day around the theme. Given this demonstrated initiative, CCSP should take greater steps to engage the health improving its outreach and providing scientific support and direction. The health community partner on the issue of climate change, and it can help deliver messages to the public and to policymakers on the benefits of climate change adaptation and mitigation.</p>
Lynn Best	Seattle City Light	regional and watershed scales for modeling; extreme events; publish agency research plans as part of CCSP research plan, and address how they are balanced; explicitly reference stakeholder engagement and include particular partnerships not just workshops; creation and maintenance of databases	<p><b>First General Comment:</b> Planning for a hydroelectric utility requires information that is specific watershed. Global models have been improving, and it is time to focus more attention on how results relate to a regional and even watershed level. There is a need to bring together climate and hydrology models and to incorporate information on climate-induced changes in glaciers consequences for seasonal river flows and temperature. There is also a need to understand likelihood and size of extreme events. Hydroelectric providers are affected by any change that endangered fish species or the potential for flooding, and these impacts are of concern to us more direct consequences related to our ability to generate power.</p>
			<p><b>Second General Comment:</b> We urge that the research plans and priorities of each of the member agencies be published as part of the CCSP Research Plan revision process. Further, believe the CCSP Research Plan should account for how those individual agency plans and be balanced to produce a cohesive federal research strategy on climate change.</p>

			<p><b>Third General Comment:</b> The goals of the CCSP should include an explicit reference to communicating with practitioners to solicit their input in framing research priorities and in disseminating the results of CCSP research so that research products are both relevant and utilized. In particular, the CCSP should cultivate partnerships with the hydroelectric utility sector given the responsibilities that utilities have for providing a key service that may be disrupted by climate change, the sector's involvement in climate research and the sector's understanding of key research and information needs that need to be addressed to better prepare and adapt to the impacts of climate change.</p>
			<p><b>Fourth General Comment:</b> The creation and maintenance of databases should be emphasized as much as conducting more research. Database maintenance is critical because if there is not enough data with enough time series or from geographically representative sites then it is difficult to develop models that will accurately replicate the real world or to assure planners that the results are within realistic bounds. There is a need for systematic assessment of data collection related to river water and air temperatures, snowpack and glacier activity on a watershed basis.</p>
			<p><b>Fifth General Comment:</b> We are commenting here on the "Summary of Revised Research Plan for the US Climate Change Science Program" but we have not seen the actual Research Plan which document presumably summarizes. Does a full Research Plan exist and, if so, is it available?</p>
			<p><b>Page 3, Lines 32-34:</b> The CCSP should hold more workshops such as the one mentioned to ensure that the user community is an active participant. The attendee list from this workshop was extensive but it is apparent that only a small percentage of the attendees represented hydroelectric utilities, even though utilities have a practical need for decision support tools. Broad utility attendance and participation in such events would help insure that the research and work CCSP support is applied and less academic.</p>
			<p><b>Page 6, Lines 21-22:</b> We recommend that the CCSP rely not just on public input that results in the publication of this Summary but also create partnerships with specific sectors, such as the hydroelectric sector, to create mechanisms for ongoing engagement and discussion.</p>
			<p><b>Page 8, Lines 44-50:</b> Please specify what additional studies CCSP will foster and what the goals and milestones will be for these studies.</p>
			<p><b>Page 10, Line 34:</b> To be useful to hydroelectric resource managers, the end-to-end hydrologic projection discussed on page 10 will require development of a modeling framework that can be applied at a regional or local watershed scale.</p>
			<p><b>Page 10, Line 40:</b> Insert changes to glaciers and river flooding into the list of issues affected by climate change. Water quality must include water temperature.</p>

Diane VanDe Hei	Association of Metropolitan Water Agencies	Need for decision-relevant info, decision support tools for mitigation/adaptation; drinking water quality/quantity	First General Comment: AMWA is committed to the collection and exchange of scientific and information to support competitive utility operations, effective utility leadership, safe and secure supplies and effective public communication on drinking water quality. Water utilities need decision-relevant information from the Climate Change Science (CCSP) Program in order to best perform essential jobs of providing safe water to the public.
			Second General Comment: AMWA supports a strong research plan that will help the water sector (drinking water, wastewater and stormwater) utilities respond to the impacts of global climate change upon the nation's drinking water supplies. A comprehensive, unified, and coordinated federal program is essential for developing decision support tools, adaptation and mitigation strategies helping utilities access better information on the impacts of climate change on drinking water quantity and quality. AMWA encourages EPA, the National Oceanic and Atmospheric Administration, and the National Science Foundation to support such a program.
			Third General Comment: AMWA concurs with the comments submitted by the Water Utility Climate Alliance (WUCA). WUCA is comprised of eight metropolitan drinking water utilities, seven of which are also AMWA members. AMWA is collaborating with the WUCA to leverage resources to assist utilities in responding and adapting to the impacts of climate change on their ability to provide safe water to millions of American homes and businesses.
			Fourth General Comment: Scientific research has found that warming temperatures are likely to alter the hydrological cycle and threaten drinking water supplies in the United States in a number of ways, including increased evaporation reducing water storage capacity, rising sea levels threatening coastal water supplies, changes in seasonal rainfall patterns, reduced mountain snowpack, and increased contamination as a result of heavier storm intensity and increased turbidity and sedimentation. Water utilities must begin planning now for their expected water supply needs and water availability.
			Fifth General Comment: AMWA encourages the CCSP to address, or support the ability to address, the following issues that are pertinent for water sector utilities. Several of these issues were also addressed in the comments submitted by WUCA:
			<ul style="list-style-type: none"> <li>• Global climate change models that address precipitation changes and other issues pertinent to water quantity. These models need to be refined and downscaled to reduce uncertainty in the model projections.</li> </ul>
			<ul style="list-style-type: none"> <li>• Assessments to determine the vulnerability of different regions and watersheds to the likely impacts of climate change over different timeframes. Water utilities need this information to ensure they have secured adequate water supplies as they plan ahead for the needs of the next 20-50 years.</li> </ul>
			<ul style="list-style-type: none"> <li>• Improved quality and accessibility of regionally resolved information regarding climate impacts, including temperature, precipitation patterns, hydrology, water quality, extreme events and ecosystem health.</li> </ul>



			<ul style="list-style-type: none"> <li>• Decision support tools for planning, decision-making and policy-making that can accommodate uncertainty and the potential for abrupt climate change.</li> </ul>
			<ul style="list-style-type: none"> <li>• The collection, maintenance, and accessibility of data and key databases with attention to making the data more useful for decision-making purposes.</li> </ul>
			<ul style="list-style-type: none"> <li>• Coordination with research and findings being developed internationally, particularly in regions of the world that are experiencing and responding to the effects of climate change now, such as Australia.</li> </ul>
			<ul style="list-style-type: none"> <li>• Enabling better access by stakeholders to regional climate information and technical expertise through the Regional Integrated Sciences and Assessments (RISA) and other programs.</li> </ul>
			<p>Sixth General Comment: In November 2005, the CCSP held a workshop to discuss the role of decision support activities with regard to assessments and the use of climate information. An agreement with several of the recommendations that are detailed in the summary of that workshop (<a href="http://www.climate-science.gov/workshop2005/finalreport/default.htm">http://www.climate-science.gov/workshop2005/finalreport/default.htm</a>) and encourages the CCSP to include in its revised research plan how it intends to incorporate these recommendations in order to better support decision-making by local governments, such as water sector utilities.</p>
			<p>Specifically, AMWA concurs with the suggestion that the CCSP frame its assessments with "input and involvement to increase salience, legitimacy, and trust. This dialogue should begin when an assessment is initiated to maximize opportunity for input from stakeholders and increase uncertainty of the assessment process. Regarding the utilization of climate information, one of the most important themes was that the information must be communicated in a way that stakeholders and decision-makers can understand and respond. This process should encourage the role of intermediaries and organizations to work with users to help them develop the capacity to use the information effectively and in part through relating the information to their unique decision-making approaches."</p>

			AMWA urges the CCSP to work develop partnerships with water sector organizations to improve communication and input between the CCSP organizations and the water sector.
			Page 3, Lines 12-15: AMWA concurs with the comments submitted by the Water Utility Climate Alliance and reiterates its comment specific to the “importance of the CCSP reaching out to the user community with regard to the cross-cutting elements and working groups mentioned here in order to develop partnerships.”
			Page 3, Lines 32-34: AMWA concurs with the comments submitted by the Water Utility Climate Alliance and reiterates its comment specific to the importance of the CCSP holding more workshops that encourage attendance by water sector (drinking water, wastewater and stormwater) utilities and stakeholders. Water sector needs decision support tools that will help drinking water, wastewater and stormwater utilities address impacts of climate change on drinking water quantity and quality. Water sector participation in such events would help insure that the research and work CCSP supports is relevant.
David Behar	Water Utility Climate Alliance	Need for regionally-resolved information, decision support tools, lowered uncertainty, data continuity, international cooperation, access to information & expertise	general manager level to assess and improve our individual and collective response to the climate change-related challenges our agencies face. In that process, we have identified several key and information needs that would improve the water industry’s ability to identify potential impacts of climate change and develop appropriate adaptation strategies. Because climate change information needed on a national or even global perspective, municipalities are not well-suited to meet their own change information needs on their own. This situation requires strong federal participation in the needs of municipalities for research and information related to climate change. These needs include:
			o Improving the quality and accessibility of regionally-resolved information regarding climate temperature, precipitation patterns, hydrology, water quality, extreme events and ecosystem health.
			o Reducing uncertainty in projections of how the climate may change by improving and refining GCMs and downscaling techniques used to project climate changes.

			o Developing decision support tools for planning, decision making and policymaking that can accommodate deep uncertainty and the potential for abrupt climate change.
			o Enhancing the collection, maintenance, and accessibility of data and key databases and making data more useful for decision-making purposes.
			o Coordinating international research and cooperation, particularly with regions of the world that arguably experiencing the effects of climate change now, such as Australia. o
			Ensuring that water utilities throughout entire U.S. have access to regional climate information and technical expertise that is currently provided through federally-sponsored programs such as
			EPA report, the drinking water sector will need to invest \$277 billion by 2023 to "install, upgrade, and replace equipment in order to deliver safe drinking water and protect public health." While water treatment systems are typically financed and managed at the local level, federal leadership in climate change research is required if the nation is going to have a credible and timely response to the challenges of climate change. Investments in drinking water infrastructure must be informed by climate change projections that are as accurate as possible. These projections will be key inputs into decision support systems currently being developed to cope with climate change effects. More accurate climate
			Second General Comment: It is unclear to what extent the CCSP is a program with the requisite authority, both institutional and budgetary, to coordinate, prioritize and establish the federal government's climate research priorities across thirteen agencies. The Revised Research Plan notes that €
			Research Plan revision process. Further, we believe the CCSP Research Plan should account

			<p>Third General Comment: The goals of the CCSP should include an explicit reference to engage communicating with practitioners to solicit their input in framing current and emerging research and in disseminating the results of CCSP research so that research products are both relevant and utilized. In particular, the CCSP should cultivate partnerships with the water utility sector give responsibilities water utilities have for providing a key service that may be disrupted by climate the sector's ongoing involvement in climate research and the sector's understanding of key research information gaps that need to be addressed to better prepare and adapt to the impacts of climate</p>
			<p>Fourth General Comment: The maintenance of databases should be emphasized as much as a more research. For the purposes of this comment, database maintenance includes added at data collection stations, web access to data sets, landsat thermal band data, and clear state the caveats to various data sets. Database maintenance is critical because if there is not sufficient with enough time series or from geographically representative sites then it is difficult to create that will accurately replicate the real world or to assure water managers that the results are within realistic bounds. Understanding trends in real time has high importance to water resource planning</p>
			<p>Fifth General Comment: We are commenting here on the "Summary of Revised Research Plan US Climate Change Science Program" but we have not seen the actual Research Plan which document presumably summarizes. Does a full Research Plan exist and, if so, is it available</p>
			<p>Page 3, Lines 12-15: We reiterate the importance of the CCSP reaching out to the user community regard to the cross-cutting elements and working groups mentioned here in order to develop partnerships.</p>
			<p>Page 3, Lines 32-34: The CCSP should hold more workshops such as the one mentioned here ensure that the user community is an active participant. The attendee list from this workshop but it is apparent that only a small percentage of the attendees represented water utilities, even utilities have a practical need for decision support tools. Broad utility attendance and participation events would help insure that the research and work CCSP supports is more applied and less</p>
			<p>Page 5, Lines 43-44: We strongly support the recognition of the critical role of robust partnerships urge the CCSP to make the development and cultivation of these partnerships a top priority</p>

			Page 6, Lines 21-22: We recommend that the CCSP rely not just on public input that results in publication of this Summary but also create partnerships with specific sectors, such as the water sector, to create mechanisms for ongoing engagement and discussion.
			Page 8, Lines 44-50: Please specify what additional studies CCSP will foster and what the timeline and milestones will be for these studies. This is another potential area for collaboration with the water sector.
			Page 10, Line 34: To be useful to water resource managers, the end-to-end hydrologic project discussed on page 10 will require development of a modeling framework that can be applied at the regional or local watershed scale.
			Page 10, Line 40: Insert urban drainage and river flooding into the list of issues affected by climate change.
			Page 10, Line 44: Insert land use into the list of elements of the Generalized Hydrological Modeling/Prediction Framework.
Thomas W. Curtis	American Water Works Association	Impacts on water quantity/quality should be a priority; consequences of biofuels, sequestration; regulatory impact, EPA	Generally supports the Revised Research Plan

			AWWA recommends that climate change impacts on relationships between water quantity and quality become a research priority for the CCSP, specifically through one of its member agencies, the Environmental Protection Agency (EPA).
			We have heard of an internal EPA Workgroup being established within the Office of Water (OW) to investigate these potential impacts from climate change, and AWWA encourages the CCSP to go outside the Agency as soon as possible to get broad stakeholder input on these potential issues. The potential impacts of climate change on water utilities are a big enough issue to warrant significant stakeholder effort by the CCSP and EPA.
			AWWA recommends that climate change impacts on relationships between water quantity and quality become a research priority for EPA. Many issues particularly relevant to drinking water deserve specific research attention and increased research funding. For example, more intense storms could produce much wider variations in turbidity which is a major challenge to drinking water treatment plants. From a regulatory perspective under the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), this could translate into a change in the treatment required ("the bin") if the average concentration of <i>Cryptosporidium</i> changes in the second round of required monitoring for <i>Cryptosporidium</i> starting in 2015. Similar changes could impact Total Organic Carbon (TOC) concentrations that are a significant factor in compliance with Disinfection By-Product (DBP) regulations. Increased sediment loads could challenge treatment plants in meeting the new, more stringent regulations. The potential impacts to drinking water reservoirs are unknown. There is a general concern about reservoirs towards eutrophication, which can increase algal blooms that increase TOC concentrations.
			All of this initial research and planning highlights the need for an increased knowledge base to help water utilities plan the way forward. More research is needed to better understand the potential impacts of climate change to water utilities (including impacts from efforts to sequester greenhouse gases).
			Research on the geologic sequestration of carbon dioxide should be done in a holistic approach.

			<p>Also, with the push toward ethanol and other renewable energy sources, transportation costs increasing rapidly, specifically in the areas of fleet vehicles capital cost and automobile fuel. The push toward geological sequestration of carbon dioxide, the cost of electricity may rise significantly to the large amount of capital investment required for the carbon capture and sequestration. In both instances, an unintended consequence may be observed, which is that these added costs deplete funds that would otherwise be reinvested in drinking water infrastructure. As AWWA's tenet of basing regulations on good science, we believe that research should be performed that addresses the potential unintended consequences of emerging environmental technologies such as biofuels and carbon sequestration. This research can then be used by EPA and other federal agencies to formulate sound drinking water regulations.</p>
			<p>In conclusion, AWWA encourages the Climate Change Science Program Office to identify research projects that address drinking water needs, such as those previously described in this letter, and include them in the final version of the Revised Research Plan.</p>
O'Malley, Robin	Heinz Center	Address additional complexities of responding to changing climate; acknowledge management of obs systems and communications as distinct from research	<p>First General Comment: As a general matter, this report fails to adequately respond to the added complexities and responsibilities that are implied in the transition from an environment in which understanding the climate system is the focus, to one focused on the effects of changing climate on environment and society. This is an activity with a larger number of more-diverse consumers and stakeholders, involves a number of agencies, observational systems, and cultures with which I have not become conversant over its lifetime (for the very good reason that it was focusing on the key climate understandings needed to support global action). The magnitude of this challenge in itself and for CCSP as an entity – is not adequately reflected in the document.</p>
			<p>Second General Comment: The draft report uses the term "research" to describe the activities undertaken. While "research" in the classic sense is needed, of course, there are several other disciplines – notably management of observation systems and communication of information that are not generally lumped under the term "research". Given that CCSP's basic mission is to change to cover these topics, it may be best to use a different term.</p>
			<p>Page 8, Line 24-39 and Page 9, lines 17-26. In these two sections, the plan provides some information on the needs of decision makers faced with adapting to a changing climate. While we understand the need for a summary treatment of this topic, to conform to a document that addresses multiple priorities, summary treatment is unsatisfying because it does not adequately describe how the program should address this new and evolving challenge. I suggest that the program should commit to undertaking a serious, long term (~12 months) strategic planning exercise to address a series of related questions.</p>

Jessica Bates	private citizen	public awareness/education/dissemination	
Luke Hall-Jordan	private citizen, attending GWU	dissemination research	
Mark Stanislaus McCaffrey	CIRES Education & Outreach, UC-Boulder	Communication/education/Increasing climate literacy	



Barstow, Dan	TERC, Inc.	K-16 education and dissemination	
Xubin Zeng	U of AZ	treatment of processes in climate system models	
Vitrone, Mark	private citizen educator	need for space research	
Kiolbassa, Terrence	private citizen	education for legal immigrants	

Ballentine, Don	private citizen	ice cores/history of warming & cooling	
Cancilla, Rich	private citizen	there is no climate change	
Kim, Do Kyun	NEU	dissemination/social intervention research	
Maibach, Edward	GMU	dissemination research	