



5 December 2022

To: Drs. Kris Ebi and Jerry Melillo (co-chairs) and the
NAS Committee to Advise USGCRP
From: Wayne Higgins, Chair, Subcommittee for Global Change Research
and the USGCRP Strategic Plan Executive Steering Committee (ESC)

On behalf of the Subcommittee for Global Change Research (SGCR) and the U.S. Global Change Research Program (USGCRP), I want to thank the National Academies of Sciences, Engineering, and Medicine's Committee to Advise USGCRP for its thoughtful and thorough review of the Second-Order Draft of the 2022-2031 USGCRP Decadal Strategic Plan. We greatly value the work of the Committee – performed under a tight deadline (20 May - 31 August 2022), while juggling many other professional commitments – as all members are recognized leaders in the many relevant disciplines that comprise global change research. We appreciate both the statements made about the Plan overall and the detailed analyses of where we could further clarify and/or improve the Plan. The ESC, and the SGCR, took the comments very seriously and extensively revised the Plan prior to submitting a Third-Order Draft for a final interagency review (7-21 October 2022) and ultimately a Final Draft for clearance with the Program's sponsor, the Office of Science and Technology Policy (OSTP) within the Executive Office of the President.

The ESC prepared short responses to the 10 broad recommendations found in the consensus study report. For the sake of brevity, we do not include responses to the line-by-line comments provided as Appendix D of the NAS report; however, each line-by-line comment has been considered and addressed.

Four Pillars

Recommendation 1: Reorder the sequence of the pillars to strengthen the interconnections between advancing science and engagement as Advancing Science, Engaging the Nation, Informing Decisions, Collaborating Internationally.

Response: The ESC agreed to reorder the Pillars as recommended, as it improves the logical flow of the document and the increased emphasis now placed on engagement.

Recommendation 2: In the Advancing Science Pillar, (1) strengthen recognition of the urgency of global change issues, (2) define tangible outputs from this work, (3) make stronger connections to other pillars, and (4) increase the number and breadth of social and environmental indicators of global change, including for adaptation and resilience.

Response: Text has been added throughout the Advancing Science pillar to emphasize the urgent nature of global change issues, including those beyond climate change. Additional specificity has been provided in the "Complex, Interconnected Systems" and "Social Drivers, Impacts, and Responses" subsections via bulleted lists of research issues, and more explicit connections have been made within six of the 10 Advancing Science subsections to better integrate content across the pillars. The Informing Decisions pillar also added prose to convey the urgency of timely science to inform pressing decisions, and now includes language to highlight the importance of social science to better understand the context within which many decisions are made. A conceptual diagram was added to the Section 3 chapeau to graphically depict synthesis and pillar integration. In keeping with ESC's view that incomplete lists would need to focus on near-term deliverables, and with a desire to highlight a vision for the full

decade, the text instead reflects participating agency research emphases rather than attempt to define specific research outputs. Finally, though important, a list of indicators would quickly date the Plan since there are many efforts underway, with establishment of new indicators likely completed even before the triennial update.

Recommendation 3: Include in the Engagement Pillar recognition of (1) new audiences for the DSP and mechanisms for engagement with them; (2) people- and place-based research to further deeper recognition of global change, associated risks, and effective and timely interventions; and (3) topics that would benefit from a sustained assessment process.

Response: The Plan states that new audiences, inside and outside of the Federal government, need to be engaged so that USGCRP research and products can be better targeted to meet the needs of decision making at various scales and in various settings. The Committee's helpful comments have led to several improvements regarding strategic engagement by the USGCRP. First, in addition to inviting agencies not covered by the Global Change Research Act (GCRA) into the Program's activities and being responsive to their stakeholders' needs, the USGCRP intends to enhance efforts to invite, manage, prioritize, and respond to those seeking information and resources; this approach will serve as an input and feedback mechanism to the Program's research development and prioritization processes. Second, USGCRP will improve its collaboration with regional scientific organizations (NOAA RISAs, USDA Hubs, and USGS CASCs) to elevate the visibility of their integrative activities, and to support cross-learning between organizations, geographies, and sectors. Finally, to stress the cross-pillar nature of the activity, the Assessments material was moved from the Informing Decisions pillar and will be placed as a free-standing box spanning the Engaging the Nation and Informing Decisions pillars during design and layout. It is recognized that, e.g., the National Climate Assessments (NCAs) are synthesis products and draw from all four pillars described in the Plan. Additional text has been added within the Engaging the Nation pillar to reflect that rapid- and sustained-assessments represent important means for the Program to integrate emerging challenges into planning activities, while providing actionable scientific information to affected communities.

Recommendation 4: Expand on successful USGCRP efforts related to climate information products by providing specific outputs to assess progress and extend efforts to other global change issues.

Response: The Plan states that more formal mechanisms will be explored for self-evaluation of USGCRP research and its products to better assess how information is being used, by whom, and to what degree USGCRP is informing decisions. That said, throughout the Plan, the ESC has sought to avoid illustrative lists, which are never complete and by default inadequate. The ESC instead chose to describe research activities in a general sense and provide limited representative examples as appropriate to indicate thematic priorities. In the Advancing Science pillar, for instance, bulleted lists of research issues provide detail about the topics that research outputs are anticipated to address. As requested by NASEM, additional language has been added throughout the Plan, highlighting global change issues other than climate change.

Recommendation 5: Expand the discussion of international collaboration in the DSP to highlight examples of collaborations and emerging global change issues where U.S. or other national interventions could have international consequences and where international expertise could benefit the U.S. research enterprise to enhance resilience and sustainability nationally and globally.

Response: The ESC regards this an excellent suggestion consistent with intent of the Collaborating Internationally pillar. Material has been added to the narrative accordingly.

Cross-Cutting

Recommendation 6: Maintain a strong sense of urgency throughout the DSP for meeting the challenges of global change for human and natural systems, including climate change, changes in land use and oceans, biodiversity, and the safety and security of food and water, among others.

Response: Text has been added judiciously throughout the Plan to demonstrate the urgent nature of global change issues, with qualifying phrases such as “to meet the critical and pressing needs voiced by decision makers”. Broad, sweeping statements also have been included, for example, in the Engaging the Nation pillar: “USGCRP’s scientific efforts are becoming broader and more complex as the challenges from climate and global change become more evident and urgent.” The Executive Summary and Introduction also underscore the challenges posed by global change, and that time is limited to respond to these crises. Much of the Program’s work involves foundational science that could find application far beyond the Plan’s period of performance. Where appropriate, the Plan conveys the capacity to respond to urgent emerging issues in a timely manner, while recognizing and supporting the need for/role of long-term fundamental research. Several actions in the Collaborating Internationally pillar attempt to more clearly communicate the diversity of scientific assessments in which the USGCRP will participate (e.g., biodiversity loss, changes in land use and oceans, and changes in the global nitrogen cycle).

Recommendation 7: Stress interconnections and integration among pillars, including key themes and issues common to multiple pillars, and among global change issues, with enhanced integration of social sciences and systems-based research.

Response: Language has been added to note connections across pillars, both in the narrative and by explicit cross-reference. Text has also been added to better integrate social sciences and systems-based research – for example, “increase research into the behavioral, societal, economic, and cultural aspects of global change” and “understanding culturally important practices and resources affected by global change”. In addition, a box on the NCA and sustained assessments in general now spans the Engaging the Nation and Informing Decisions pillars, to emphasize the integrative nature of those products.

Recommendation 8: Describe how USGCRP plans to strengthen coordination within, across, and beyond federal agencies within the “Advancing Science”, “Engaging the Nation”, and “Informing Decisions” Pillars, comparable to the level of specificity provided in the “Collaborating Internationally” Pillar.

Response: How engagement occurs with different entities inside or outside of the Federal Government, and whether domestic or international, needs to vary. Within the Federal Government we already have existing mechanisms that can be immediately leveraged. USGCRP member agencies will be encouraged to enhance existing (and create new) partnerships through their respective programs and networks. Within the Plan itself, text has been added to provide additional specificity regarding research coordination, including (i) work of the USGCRP Interagency Groups and (ii) by stressing active engagement and cooperation with affected communities. International collaborations have specific mandates and authority, which can be described succinctly in a representative list. Interactions within, across, and beyond Federal agencies are extremely complicated and cannot be translated or distilled into like lists. The ESC does feel that a process can be developed and described, which invites, manages, prioritizes, and responds to various types of engagements. That is what the Plan attempts to do.

Recommendation 9: Include illustrative examples of key research outputs in the DSP, where enhanced understanding of underlying science processes could advance policy and decision making on global change challenges to human and natural systems.

Response: Language has been added in the Advancing Science pillar to provide more specificity – for example, “combine scientific, stakeholder, and traditional knowledge, as illustrated by USGCRP’s efforts in Latin America and

the Caribbean”, the bullet involving NOAA’s Regional Integrated Science and Assessments (RISA) program, and the final paragraph in the Responses subsection. Further, the Informing Decisions pillar provides examples of research, assessments, and information products developed from research described in the Advancing Science pillar that would inform both adaptation and mitigation decisions.

Recommendation 10: Add an approach to evolve the research questions, needs, and outputs in response to systematic evaluation and feedback from stakeholders and to respond to programmatic and technological developments.

Response: A paragraph has been added to the Fulfilling the Vision section to describe efforts to incorporate changes in the USGCRP research directions in response to input from the public, external advisory bodies, research users, and the scientific community. The systematic evaluation of research needs and advancements in science and technology is one of the primary purposes of the triennial update to the Decadal Strategic Plan, a GCRA requirement.