

CHAPTER 30

SUSTAINED ASSESSMENT: A NEW VISION FOR FUTURE U.S. ASSESSMENTS

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A primary goal of the U.S. National Climate Assessment (NCA) is to help the nation anticipate, mitigate, and adapt to impacts from global climate change, including changes in climate variability, in the context of other national and global change factors. Since 1990, when Congress authorized the U.S. Global Change Research Program (USGCRP) through the Global Change Research Act¹ and required periodic updates on climate science and its implications, researchers from many fields have observed significant climate change impacts in every region of the United States. The accelerating pace of these changes (for example, the recent rapid reductions observed in the extent and thickness of Arctic sea ice), as well as scenario-based projections for future climate changes and effects, is articulated in this third NCA.

Based on recommendations stemming from the National Research Council (NRC), USGCRP in its most recent strategic plan² identified the rationale and benefits of implementing a sustained assessment process. In response, a vision for a new approach to assessments took shape as the third NCA report was being prepared. The vision includes an ongoing process of working to understand and evaluate the nation's vulnerabilities to climate variability and change and its capacity to respond. A sustained assessment, in addition to producing quadrennial assessment reports as required by law, recognizes that the ability to understand, predict, assess, and respond to rapid changes in the global environment requires ongoing efforts to integrate new knowledge and experience. It accomplishes this by: 1) advancing the science needed to improve the assessment process and its outcomes, building associated foundational knowledge, and collecting relevant data; 2) developing targeted scientific reports and other products that respond directly to the needs of federal agencies, state and local governments, tribes, other decision-makers, and end users; 3) creating a framework for continued interactions between the assessment partners and stakeholders and the scientific community; and 4) supporting the capacity of those engaged in assessment activities to maintain such interactions.

Contributions of a Sustained Assessment Process

A sustained assessment process will not only include producing the quadrennial assessment reports required by the 1990 GCRA, but it also will enable many other important outcomes. A well-designed and executed sustained assessment process will:

1. Increase the nation's capacity to measure and evaluate the impacts of and responses to further climate change in the United States, locally, regionally, and nationally.

To provide decision-makers with more timely, concise, and useful information, a sustained assessment process would include both ongoing, extensive engagement with public and private partners and targeted, scientifically rigorous reports that address concerns in a timely fashion. A growing body of assessment literature has guided and informed the development of this approach to a sustained assessment.^{3,4,5}

The envisioned sustained assessment process includes continuing and expanding engagement with scientists and other professionals from government, academia, business, and non-governmental organizations. These partnerships broaden the knowledge base from which conclusions can be drawn. In addition, sustained engagement with decision-makers and end users helps scientists understand what information society wants and needs, and it provides mechanisms for researchers to receive ongoing feedback on the utility of the tools and data they provide.

An ongoing process that supports these forms of outreach and engagement allows for more comprehensive and insightful evaluation of climate changes across the nation, including how decision-makers and end users are responding to these changes. The most thoughtful and robust responses to climate change can be made only when these complex issues, including the underlying science and its many implications for the nation, are documented and communicated in a way that both scientists and non-scientists can understand.

This sustained assessment process will lead to better outcomes for the people of the United States by providing more relevant, comprehensible, and usable knowledge to guide decisions related to climate change at local, regional, and national scales. Additional details about the components of the sustained assessment process are provided in "Preparing the Nation for Change: Building a Sustained National Climate Assessment Process," the first special report of the National Climate Assessment and Development Advisory Committee.⁶

2. Improve the collection of assessment-related critical data, access to those data, and the capacity of users to work with datasets – including their use in decision support tools – relevant to their specific issues and interests. This includes periodically assessing how users are applying such data.

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3. Support the creation of the first integrated suite of national indicators of climate-related trends across a variety of important climate drivers and responses.
4. Catalyze the production of targeted, in-depth special assessment reports on sectoral topics (for example, agriculture), cross-sectoral topics (for example, the connection between water and energy production), regional topics, and other topics that will help inform Americans' climate choices about mitigation and adaptation. These reports will generate new insights about climate change, its impacts, and the effectiveness of societal responses. In addition, a second report category, referred to as foundational reports, will focus on improvements to specific aspects of the process (for example, scenarios and indicators) to reinforce the foundation for the overarching, but necessarily more constrained, quadrennial assessment reports.
5. Facilitate the creation of, support, and leverage a network of scientific, decision-maker, and user communities for extended dialog and engagement regarding climate change.
6. Provide a systematic way to identify gaps in knowledge and uncertainties faced by the scientific community and by U.S. domestic and international partners and to assist in setting priorities for their resolution.
7. Enhance integration with other assessment efforts such as the Intergovernmental Panel on Climate Change and modeling efforts such as the Coupled Model Intercomparison Project.
8. Develop and apply tools to evaluate progress and guide improvements in processes and products over time. This will support an iterative approach to managing risks and opportunities associated with changing global and national conditions.

Assessments facilitate the collection of different kinds of information that can be integrated to yield new and useful scientific insights. The vision for the sustained assessment process is to continue to build knowledge about human and natural systems and their interactions to better understand the risks and opportunities of global change at multiple spatial and temporal scales. The sustained assessment process also can help define the range of information needs of decision-makers and end users relative to adaptation and mitigation, as well as the associated costs of impacts and benefits of response actions. Moreover, it is by its very nature a continuous process, uniquely positioned to support an iterative, risk-based approach to adaptation.

Finally, although a sustained assessment process allows for ongoing improvements in products and processes, it also requires underlying support systems. These can include access to observational data sources, support networks, and information management systems such as the Global Change Information System (GCIS; see section on "Data Collection, Access, and Analysis"). Other fundamental support for assessments includes various types of integrated and vulnerability assessment models, climate model intercomparison projects, data streams (for example, emissions data and socioeconomic data), processes for building scenarios and deploying them at critical junctures in the assessment process, and evaluation approaches.

Assessment Capacity

Scientific assessments require substantial scientific expertise and judgment, involving skills atypical of those required for routine research.^{4,5} Assessment capacity includes engaging knowledgeable and experienced people, developing networks to promote interactions, identifying and mentoring new scientific talent, and building in-depth understanding of a variety of economic, technical, and scientific topics. Building and maintaining capacity through all of these approaches is therefore critical to the smooth and efficient functioning of the assessment process.

Sustained interactions among scientists and stakeholders have consistently been shown to improve the utility and effective-

ness of assessment processes and outcomes⁵ and to facilitate the development of decision support tools.⁷ A sustained assessment provides the necessary coordination and infrastructure needed to maintain an ongoing dialog among producers and users of information so that decision-makers can manage risks and take advantage of opportunities more efficiently. This provides the capacity and flexibility to react to, and take advantage of, rapidly advancing developments in decision and climate science and changing conditions to inform robust decision-making and improve the utility and timeliness of future quadrennial assessment reports.

Data Collection, Access, and Analysis

Credible scientific information is needed on an ongoing basis to support fundamental understanding of the climate system and its interactions with ecological, economic, and social systems – and for the development of adaptation and mitigation strategies. Improved systems for data access can more

effectively meet the requests of stakeholders for accessible, relevant, and timely information. An ongoing process can build a more complete information base relevant to climate change related impacts and vulnerabilities, and it can result in more sophisticated scientific analyses that support the mandated

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quadrennial assessment reports in a more efficient and effective manner. Selecting which data to collect and analyze is a critical component of assessments of change. In addition, for certain assessment-related purposes, use of traditional knowledge may be appropriate and require different analytical approaches.

The sustained assessment process will facilitate the development and maintenance of a web-based assessment informa-

tion discovery, access, and retrieval system that facilitates easy access to a range of information for those who need it, in a timely and authoritative manner (the GCIS of the USGCRP). A major short-term goal is to provide transparent and highly-linked access to the data used to support conclusions in the third NCA report, but this is only the first step in a much larger effort. Initially targeted audiences include assessment practitioners across various sectors and governmental levels.

Indicators

Indicators are measurements or calculations that represent important features of the status, trends, or performance of a system (such as the economy, agriculture, natural ecosystems, or Arctic sea ice cover). Indicators are used to identify and communicate changing conditions to inform both research and management decisions.⁸ The NCA indicator system is intended to focus on key aspects of change – as well as vulnerabilities,

impacts, and states of preparedness – to inform decision-makers and the public. In the context of ongoing assessment activities, these indicators can be tracked to provide timely, authoritative, and climate-relevant measurements regarding the status, rates of change, and trends of key physical, ecological, and societal variables.

Special and Foundational Reports

As currently envisioned, the sustained assessment process also paves the way for additional types of assessment-related reports that can help inform local, regional, and sectoral mitigation and adaptation activities and provide a foundation for more useful and more comprehensive quadrennial assessment reports. Completing in-depth assessments of national or regional importance and providing a constantly improving foundation for the quadrennial assessment reports provides for significant flexibility and enhanced policy relevance. Special topical assessment reports can investigate emerging issues of concern or help decision-makers understand the tradeoffs

among different courses of action. Moreover, these types of assessments can encompass a more holistic, multi-disciplinary, and integrated approach that considers various types of data analyses that may not have been previously attempted. These more focused reports that emerge from ongoing assessment activities can blend the objectives of incorporating the latest science with responding relatively quickly to the most pressing stakeholder and government needs. Finally, foundational reports also can be produced on scenarios of climate change, sea level rise, demography, land-use change, and other issues critical to the assessment process.

A Network to Foster Partnerships, Encourage Engagement, and Develop Solutions

The USGCRP has long recognized the importance of partnerships, effective two-way communication, and ongoing and meaningful engagement.² The five NRC *America's Climate Choices* reports published in 2010 and 2011 also underscore the essential nature of this engagement (for example, NRC 2010⁹). Partnerships and engagement strategies among federal and non-federal participants are needed to: 1) communicate effectively about the assessment, including its products and processes and their relevance as actionable information;¹⁰ 2) encourage participation and knowledge sharing; 3) create opportunities for meaningful engagement of end users and public and private decision-makers to inform the substance of the assessment; and 4) offer opportunities for input, direction, review, and feedback.

An important component of the new sustained assessment vision is NCAnet: a “network of networks” that helps to foster engagement in the NCA process and communicate products to a broader audience (for additional details about NCAnet, please see Appendix 1: Process). This network of partner organizations, including private sector, government, non-governmental organizations, and professional societies, leverages resources and facilitates communication and partnerships. By its first meeting in January 2012, NCAnet consisted of over three dozen partner organizations. Much of the network's subsequent growth to over 100 partner organizations (as of fall 2013) has been driven by the partners' own outreach and interest in building a community around the practice of assessment. NCAnet can assist in developing and supporting diverse science capabilities and assessment competencies within and outside of the Federal Government.

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Evaluation of the Process

Ongoing evaluation of assessment processes and products, as well as incorporating the lessons learned over time, is a specific objective of the USGCRP Strategic Plan.² Evaluation efforts are considered integral to enabling learning and adaptive management of the assessment process, measuring the ability to meet both legally required objectives and strategic goals, maintain-

ing institutional memory, and improving the assessment process and its contributions to scientific understanding as well as to society. Ongoing improvements in the assessment process also will support an iterative approach to decision-making in the context of rapid change.

Recommendations on Research Priorities

The GCRA requires regular evaluations of gaps in knowledge and assessments of uncertainties that require additional scientific input. A sustained assessment process provides for regu-

lar updates on science needs to the USGCRP's annual research prioritization process, as well as to the triennial and decadal revisions to its research plan.

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PHOTO CREDITS

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SUPPLEMENTAL MATERIAL

TRACEABLE ACCOUNTS

Process for Developing Key Messages:

Planning for the sustained assessment process, and for including a description of the process in a chapter of the third NCA report, began as soon as the report process was launched. Mechanisms for creating and implementing a sustained process were included as key discussion points in early NCA process workshops.¹¹ Prior to the formation of the chapter author teams, the need for a sustained assessment was described in the NCA Strategy Summary.¹² The amended charter for the National Climate Assessment and Development Advisory Committee (NCADAC) specifies that the NCADAC is “to provide advice and recommendations toward the development of an ongoing, sustainable national assessment of global change impacts and adaptation and mitigation strategies for the Nation.”¹³ To that end, the NCADAC formed a working group on sustained assessment, and the USGCRP Interagency National Climate Assessment Working Group (INCA) made this topic a priority in their regular meetings. The USGCRP also established “conduct sustained assessments” as one of four programmatic pillars in its recent Strategic Plan.²

The sustained assessment author team drew on a wide variety of source materials in framing the need for a sustained assessment process, including calls for sustained assessment in both previous National Climate Assessment reports¹⁴ and in several publications from the National Research Council^{5,9,15} that focused specifically on the National Climate Assessment. The author team also considered a rich literature on assessments in general (for example, Farrell and Jäger 2005 and Mitchell et al. 2006⁴). In developing the chapter describing the sustained assessment process, the author team first worked with the NCADAC, especially the initial NCADAC working group on sustained assessment, and the INCA to develop a vision for sustained assessment and a list of activities required to implement this vision. They then collected feedback from each of the chapters’ convening lead authors, agencies, chairs of other NCADAC working groups, and targeted stakeholders. Drawing on these comments and the knowledge bases cited above, the author team came to consensus on the objectives and categories of activities provided in the chapter through teleconference and email discussions. The NCADAC formed a new author team to produce a longer special report on the sustained assessment process. The report was completed in the late summer of 2013.⁶