



CHAPTER CONTENTS

The Need for Effective Communication

Dissemination of Credible and Reliable Research Findings

Communication with Diverse Audiences

Coordination and Implementation

This chapter describes how the Climate Change Science Program (CCSP) will improve communication of federal government climate change science research. It highlights current CCSP communication activities and outlines a series of future steps.

The Need for Effective Communication

The CCSP has a responsibility for credible and effective communications with stakeholders in the United States and throughout the world on issues related to climate variability and climate change science. Effective communication is not always straightforward, however, as climate science is complex and rapidly evolving, and respected scientists can sometimes disagree in their interpretations. The economic and policy dimensions of the issue can give rise to even greater disputes among individuals with different policy views. Professional, institutional, and cultural perspectives can also impede the flow of information.

At the same time, the public investment in understanding, mitigating, and adapting to climate variability and change is substantial. As an essential part of its mission and responsibilities, the CCSP will enhance the quality of public discussion by stressing openness and transparency in its

scientific research processes and results, and ensuring the widespread availability of credible, science-based information.

The CCSP and individual federal agencies generate substantial amounts of authoritative scientific information on climate variability and change. While public and private sector interests have made progress in generating valuable climate science information, efforts to improve public access to this information have not always kept pace. Research findings are generally well reported in the scientific literature, but relevant aspects of these findings need to be reported in formats suitable for use by diverse audiences whose understanding and familiarity with climate change science issues vary.

To further its commitment to the effective communication of climate change science information, the CCSP has established the following goals:

- Disseminate the results of CCSP activities credibly and effectively
- Make CCSP science findings and products easily available to a diverse set of audiences.

In addition to CCSP efforts, individual federal agencies have relationships with stakeholders, and they disseminate science-based climate information. Efforts include activities in which agencies respond directly to inquiries from the public and other stakeholders; maintain websites and listservs; produce and distribute hardcopy documents and multimedia products; conduct or sponsor briefings, lectures, and press conferences; testify before Congress or other

government bodies; finance scholarships, fellowships, and internships; support museum exhibits and other public displays; sponsor, participate, or otherwise contribute to meetings attended by stakeholders; provide scientifically sound content for K-12 education activities; and fund communication efforts managed outside the federal government. Working with the agencies' climate science communications activities will be a key component of CCSP communications efforts.

The CCSP acknowledges that in seeking to strengthen its ongoing communications with diverse constituencies—ranging from international, national, and regional policymakers to academic researchers, adaptive management technical experts, the media, and concerned citizens—it faces the challenges of constrained resources and institutional fragmentation. CCSP's ongoing communications efforts will build on existing resources and explore new communications and information-sharing opportunities.

Dissemination of Credible and Reliable Research Findings

Responding to the direction of President Bush that the best available scientific information be developed to support decisionmaking on global climate change issues, CCSP has developed its strategic planning and public review processes to facilitate “credible fact finding” on (a) key climate science issues, (b) comprehensive climate and ecosystem observing and data management systems, and (c) the development of decision support resources.

Transparency and Comprehensiveness

CCSP will undertake a number of approaches for ensuring that research plans, reports, and related activities are prepared in an open fashion. Approaches will include early and ongoing review of draft and final work products by stakeholder communities; reporting of key assumptions, methodologies, data, and uncertainties; the use of a variety of decision support tools discussed in Chapter 11 that relate research findings to policymakers and technical experts involved in adaptive management decisions; and web-based information that is freely available to all users.

To maintain credibility among users of the CCSP analyses and projections, CCSP draft and final plans, reports of findings, and projections of future outcomes will be posted on publicly accessible websites, and all comments communicated by interested stakeholders also will be posted for public review. CCSP will aim to make its analyses comprehensive (i.e., covering a range of plausible policy options) within the limits of the resources available for analysis. Moreover, whenever possible and practical, CCSP will facilitate comparisons with other relevant studies.

The CCSP public workshop held in December 2002 set a high standard of open proceedings. The workshop presented the current state of climate change science and gathered comments from both scientists and public stakeholders on defining a strategy for climate observations and research. All elements of the strategic

planning process, including the *Discussion Draft Strategic Plan*, all of the workshop proceedings, and all public comments received after the workshop are openly available at the CCSP website, <www.climate-science.gov>.

Reports on the Basis for Findings and Levels of Confidence

CCSP aims to describe the basis for each of its key findings and projections, with sufficient detail to allow independent reviewers to replicate the underlying analyses. Evaluation and communication of uncertainty and levels of confidence is also a crucial issue. Uncertainties can arise from lack of knowledge; from problems with data, models, terminology, or assumptions; and from other sources, creating room for misunderstanding.

Because uncertainty can never be completely eliminated, CCSP will develop systematic approaches for evaluating levels of confidence and uncertainty and communicating this information. This will enable users of the information to understand the uses and limits of the information they are seeking to apply. Where appropriate, “confidence level” descriptions will be used to communicate these characterizations. The introduction of uncertainty is not intended to imply a basis for inaction. In cases where the uncertainty of analyses or projections is so large as to make the discrimination between options impractical, this finding will be reported directly.

Communication with Diverse Audiences

The Audience

Section 102 of the 1990 Global Change Research Act (P.L. 101-606) requires CCSP to “consult with actual and potential users of the results of the Program to ensure that such results are useful in developing national and international policy responses to global change.” As described in Chapter 11, CCSP is responding to this charge within the framework of three decisionmaking categories: (1) public discussions and evaluations based on available state-of-science syntheses; (2) operational adaptive management decisions undertaken by resource managers; and (3) support for policy formulation.

Each of these decisionmaking categories has a unique set of stakeholders. Stakeholders are individuals or groups whose interests (financial, cultural, value-based, or other) are affected by climate variability, climate change, or options for adapting to or mitigating these phenomena. CCSP stakeholders range from members of Congress to those involved in the development of state and regional drought action plans, to those managers of agricultural operations, water resource systems, fire, and fisheries, to the general public.

Interactive Communication

CCSP will actively seek to *learn from* its constituencies through ongoing dialogue and feedback mechanisms. The CCSP will aim to improve dialogue with public and private sector constituencies with



Figure 14-1: Two-way communications. The CCSP plan encourages input from specific constituent groups and from the public at large. Here, Janine Bloomfield of Environmental Defense, a participant in the CCSP Planning Workshop for Scientists and Stakeholders, comments in a session on Resource Management Decision Support (4 December 2002). Source: Nick Sundt, CCSP.

the end result of providing stakeholders with adequate opportunities to help frame important scientific research activities. This dialogue is an essential component of the development of decision support discussed in Chapter 11 (see Figure 14-1).

Where practical and effective, CCSP will communicate through professional, civic, and other membership organizations representing key constituency groups, and through the news media. In this way, CCSP can leverage those organizations' and institutions' information dissemination capabilities.

CCSP will initiate a series of pilot projects that will serve as a basis for longer term sustained efforts to improve two-way communications with a wide range of interests. This effort will reflect a commitment to learn from those same interests, and incorporate feedback received regarding successes and shortcomings. The initial pilots will be modest in scope and will likely involve expansion of existing partnerships—for instance, an initiative to coordinate information access and linkages among existing climate change science-related websites. The pilot projects, as is the case with ongoing communications efforts, will include an evaluation phase to determine the design and implementation of subsequent communication activities.

Accessibility of Science Information for Diverse Audiences

The American public is making a sizeable financial commitment to improving scientific understanding of climate variability and change. In turn, the American public has a right to expect ongoing access to high-quality scientific assessments and evaluations.

Figure 14-2: *Our Changing Planet*. Issued annually by CCSP, this report summarizes the program's recent accomplishments and near-term plans. Published in hardcopy and in digital format, *Our Changing Planet* is a primary source of information about federally funded research on global change.

There are many channels of communication that are available to CCSP, including:

- Peer-reviewed scientific publications and science summaries for diverse audiences
- The CCSP website
- The media
- Other outreach materials.

Publications

Most of the information produced under CCSP sponsorship is in the form of peer-reviewed, published scientific articles and reviews.



These articles and reviews are the products of specific agency program efforts and are the working base of scientific knowledge. In addition to the core research publications, CCSP will produce interagency reports that integrate and synthesize information from nationally and internationally sponsored climate science activities. One of these reports will address climate change issues framed in a practical, real-life perspective for the concerned, general public.

As described in Chapter 2, CCSP will focus interagency attention on the ongoing development of synthesis and assessment products. These products will support both policymaking and adaptive management. The synthesis and assessment products take account of the need for assessments on the full range of issues spanning all CCSP objectives and will provide a “snapshot” of knowledge of the climate, environmental, and socioeconomic aspects of climate variability and change. The products will support specific groups or decision contexts across the full range of issues addressed by CCSP, and where appropriate, the Climate Change Technology Program (CCTP).

Another CCSP publication is the *Our Changing Planet* report (see Figure 14-2), which has established itself as the authoritative guide to ongoing climate science research by federal agencies. This annual report describes the activities, budgets, and plans of the U.S. Global Change Research Program (USGCRP). The 2003 report, a supplement to the President’s Fiscal Year 2003 Budget, also describes the start-up activities of the U.S. Climate Change Research Initiative (CCRI).

The CCSP Website

CCSP’s web initiatives are a valuable tool for public education and communications. Combined, the CCSP and related websites—www.climatescience.gov, www.usgcrp.gov, and www.gcrio.org—attract roughly 1 million visitors annually (see Box 14-1). These websites provide a comprehensive reference for users seeking information on climate science structured around scientific disciplines as well as by sponsoring agency. In addition, scientists can find information on funding sources and announcements of research opportunities.

The CCSP will implement a web development strategy to improve content and delivery to diverse audiences to:

- Continue to update and improve related interagency sites
- Increase target audience familiarity with the CCSP websites and the resources available through them
- Improve processes for preparing documents for the web to ensure full accessibility

- Strengthen ties and links among CCSP interagency and agency websites
- Expand online support for interagency working groups
- Better meet the growing demand for digital images
- Foster timely interactive dialogues with stakeholders
- Solicit from users reactions on usefulness of websites and ways to make them more effective
- Produce periodic and annual summary reports documenting progress and near-term objectives.

The Media

Americans obtain most of their news and information, and therefore their impressions, about climate science through the mass-circulation print and broadcast news media (see Figure 14-3). As they do in other important public policy/science issues, the news media play an essential role in informing Americans about climate change and climate variability. CCSP will help ensure that the news media are well equipped to meet the needs of their audiences by supporting distribution of timely, credible, and useful information to news media through printed and electronic means, and through participation with and support for climate science journalism training activities as appropriate.

Other Outreach Materials

CCSP will develop outreach materials on climate change science fundamentals geared to varied audiences, using formats such as Frequently Asked Questions (FAQs) and educational fact sheets.

BOX 14-1

‘E’ GOVERNMENT AND CLIMATE SCIENCE

The CCSP’s initial interagency efforts to improve communications via the web (primarily through www.usgcrp.gov, www.climatescience.gov, and www.gcrio.org) have attracted nearly 1 million visitors annually, a number that has continued to steadily increase. Additional users, including scientists, resource managers, planners, business executives, journalists, students, teachers, and others are increasing their use of the Internet. By providing outstanding content, well-designed websites can serve these diverse users.

The E-Government Strategy presented by the Office of Management and Budget (OMB) in February 2002 emphasized that “the President has made ‘Expanding E-Government’ integral to a five-part Management Agenda for making government more focused on citizens and results.” One example of a low-cost,

high-payoff opportunity for expansion is the extension of the CCSP’s web strategy to the new website of the Climate Change Technology Program (CCTP), www.climatechange.gov. Accordingly, the CCSP is cooperating with its partner program in developing the new site, and the resulting close web collaboration will continue to be an ongoing high priority of both programs. This cooperative effort, in addition to efficiently using existing interagency resources, will provide early and tangible evidence of the fundamental linkage between climate science and technology—and between the people and organizations working on different facets of the climate change issue.





Figure 14-3: A pivotal role for journalists. Because of their capability to inform large and diverse audiences, the news media are crucial to CCSP's communications efforts. Shown here is Dr. John H. Marburger III, Assistant to the President for Science and Technology and Director of the Office of Science and Technology Policy, responding to journalists' questions at the CCSP Planning Workshop for Scientists and Stakeholders (3 December 2002). Source: Nick Sundt, CCSP.

These FAQs will address particular climate science issues, including model studies, state-of-scientific-understanding reports, "If... then..." scenario analyses, and decision support resources. Each will be coordinated and produced with the involvement of the appropriate CCSP technical working groups.

CCSP also recognizes the value of collaborating with the traditional formal educational community. Working with a network of federal departments and agencies—and their own networks of partner educational interests—CCSP will develop a series of "Climate in the Classroom" educational fact sheets on climate science. These "white papers" will be written to provide the lay public with information on topics such as climate models, the role of aerosols, or the influence of oceans in shaping climate. While concise and easily accessible to a broad audience, these fact sheets will also point to additional resources that will allow individuals to get additional information. They will be disseminated electronically via the web and also will be targeted to key educational institutions and to key resource organizations for distribution to specialized constituencies. The number of fact sheets for the coming year will be determined by resource availability. At a minimum, four fact sheets will be developed and distributed over the first year.

Coordination and Implementation

In order to accomplish the goals of the CCSP communications efforts, new mechanisms for interagency coordination and implementation are needed. CCSP will:

- Formalize the interagency climate Outreach and Communications working group so that it can participate actively in the development of the CCSP master communications plan and

carry out CCSP-sponsored information dissemination and outreach activities. This group will work with the CCSP science-based and decision support working groups to ensure that the program's communications needs are met.

- Develop a comprehensive communications implementation plan and funding plan, based on an inventory of existing communications activities and building on experience from several short-term pilot projects to determine and shape ongoing effective communication strategies.

Improved Interagency Working Relationships

CCSP will formalize and engage the existing informal interagency climate Outreach and Communications group. Membership will consist of key agency professionals whose responsibilities routinely involve work with climate change science as part of their communications activities—typically through agency communication and education programs.

The Outreach and Communications working group will work with the seven CCSP science-based and separate decision support, data management, and observations and monitoring groups. It will also work with stakeholders to ensure that the information needs of public and private sector interests are understood. Efforts to improve coordination among CCSP participating agencies will capitalize on existing distribution systems and the strengths of participating agencies.

Comprehensive Communications Plan

With interagency input, the CCSP will develop a comprehensive communications implementation plan and the corresponding communications/education budget using the results of the climate science outreach and education activities inventory now underway. The inventory will describe ongoing federal agency communications and educational outreach activities related to climate variability and change science. The interagency communications plan will be based on the inventory and agency expertise and will include several short-term communications pilot projects in order to explore the effectiveness of new communication strategies.

The implementation plan will contain specific benchmarks and time tables to allow tracking of the plan's progress. It will be developed in cooperation with agency representatives and other stakeholder interests and will be completed by the end of 2003.

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