



**TESTIMONY OF  
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**BEFORE THE  
COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION  
OF THE  
U.S. SENATE**

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Chairman Inouye, Ranking Member Stevens, and members of the Committee, and in particular Senator Snowe: thank you for your invitation to address the Committee today on the important topic of “A Time for Change: Improved Federal Climate Research and Information Program.”

I am Richard H. Moss, and I currently serve as Vice President and Managing Director, Climate Change, for the World Wildlife Fund. From May 2000 to February 2006 (a period spanning both the Clinton and Bush Administrations) I served as the Director of the Office of the U.S. Global Change Research Program (GCRP) and, as it was subsequently renamed, the U.S. Climate Change Science Program (CCSP). The USGCRP/CCSP involves 13 federal agencies conducting and overseeing Earth system observations, scientific research, computer simulations, and evaluation of possible adaptation and mitigation actions to address climate change. Since 1993, I have served in a number of capacities with the Intergovernmental Panel on Climate Change (IPCC), including Director of the Technical Support Unit of the Working Group on Impacts, Adaptation, Vulnerability and Mitigation (from 1993-1998), the coordinating lead author (with Dr. Stephen Schneider of Stanford University) of the first IPCC guidance document on characterizing and communicating uncertainty, and as lead author or editor of a number of IPCC reports related to impacts, adaptation, and mitigation. I currently chair several IPCC task groups related to the preparation and use of scenarios and other climate information.

WWF is the largest private conservation organization working internationally to protect the world's wildlife, rich biological diversity and the ecosystems upon which they depend. We currently sponsor conservation programs in more than 100 countries, thanks to the support of 1.2 million members in the United States and more than 5 million members worldwide. We seek to address the threat of climate change through our work in field programs that stretch from the Arctic to Antarctica; our work with corporations seeking to transform their business practices; our work with communities throughout the world attempting to maintain their livelihoods; and our work with governments in the

U.S. and abroad in shaping policies for reducing greenhouse gas emissions and strengthening resilience and adaptive frameworks.

At the outset, I want to thank Senators Kerry and Snowe for their longstanding leadership on addressing the need to improve our scientific understanding of climate change, which is so critical in shaping the policy decisions with which Congress is now grappling. In particular, I applaud their leadership for introducing S. 2307, the Global Change Research Improvement Act of 2007. This bill tackles the important issues of amending the Global Change Research Act, establishing a national climate service, and establishing initiatives to address technology-related aspects of climate-change.

My testimony today provides my views about the current state of the Climate Change Science Program, its milestones, and how the program needs to be improved and amended in light of current knowledge and events. My testimony also offers my thoughts specifically on S. 2307 in terms of addressing those needs, along with some recommendations for further improving S. 2307. My comments are drawn from the specific perspective of my experience as Director of the Office of the GCRP and CCSP under two Administrations, as well as my experiences with the IPCC, particularly related to characterization and communication of scientific uncertainty.

## **I. Background:**

**I.1. The Global Change Research Act of 1990 is in need of significant updating.** Our understanding of climate science has progressed significantly since 1990. The IPCC has concluded that there is better than a 9 in 10 probability that these changes are the result of human activities. Research to project future changes in climate and their potential implications is also advancing. Perhaps more importantly, our view of how to conduct problem-oriented research on global change has also evolved towards a model in which researchers and users of research information interact more closely in defining research questions and applying the results. This approach is essential for more rapidly incorporating knowledge into decision making. Finally, our understanding of how to effectively run an interagency science program like the GCRP has improved, given our

experiences with the program over the past 17 years. Our different understanding of what constitutes effective research and specific lessons about how to manage the program provide a basis for changes that must be incorporated into the amended Global Change Research Act.

**I.2. A multi-agency approach to research is still appropriate.** The multi-agency organization of the GCRP makes sense because essential capacities for research are widely distributed across a number of government agencies. Each agency has different specialized capabilities, networks and relationships with the external research community that enable it to conduct focused research and activities at greater depth than would be the case in a single program attempting to cover all facets of global change. Moreover, it would be counterproductive to attempt to consolidate these different capabilities in one specialized climate research agency. We would lose a great deal of time that we don't have to waste.

**I.3. The single most important management challenge for the future is balancing the need for greater central political authority to achieve programmatic and budgetary integration with the need to ensure the actual and perceived independence of the program's research and assessment reports from political influence.** While a distributed program taps the strengths and research capacity of powerful Federal agencies, it makes it more difficult to integrate program plans and budgets. Each agency responds to the requirements of its own mission and stakeholders, and makes program and budget decisions through different processes, and according to somewhat different schedules. Thus it is essential to provide for effective administrative and budgetary authority to ensure that agencies coordinate their plans and work to eliminate gaps and overlaps in program. Sufficient central authority is also required for implementation of program-wide activities that require coordination, such as a national assessment. While it would initially appear that a logical place to centralize this authority is within the Executive Office of the President (EOP), specifically the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB), giving an increased role to the EOP also opens the door to political influence in the reporting of research results. The failure to disseminate the findings of the US National Assessment of

the Consequences of Climate Variability and Change is a prime example of this sort of political influence on the work of the GCRP agencies. This central tension between the need for centralized authority and freedom from political influence must be better managed if the GCRP is to succeed in its mission.

**I.4. A comprehensive approach for providing integrated information on energy use/emissions, climate system response, impacts, adaptation, and assessment of mitigation potential is required to cope with changing future conditions.** Climate change and measures to respond to it will touch many aspects of the environment, society, and the economy. The decisions we make in the coming decades will determine the extent of future climate change and the degree to which we successfully adapt. A comprehensive national global change research enterprise that provides for climate and global change science, a climate service, technology assessment, and development of measurement and monitoring technologies and standards is needed to identify the highest priority threats and opportunities, to deliver useful information in a timely fashion, to compare the relative strengths and weaknesses of different response options, and to provide vital information for implementation of responses. WWF looks forward to working with Congress to further refine this comprehensive approach to ensure that it is capable of informing tradeoffs and realizing synergies between adaptation and mitigation options.

**I.5. It is vital to pay more attention to the needs of decision makers and to improve approaches for interacting with stakeholders.** There is increased public concern about the consequences of climate change and thus a significant demand for data, information, models, and tools to help decision makers and resource managers cope with the increased risks. The CCSP's Synthesis and Assessment Products (SAPs) were intended to meet a particular set of information needs identified by Bush Administration decision makers, and they will constitute a valuable resource when completed. They were never, however, intended to constitute a "national assessment" of consequences of climate change for the United States. Technical planning for the next such assessment should be undertaken by the program as soon as possible. The CCSP strategic plan calls for development and use of research-based tools to support "adaptive management." In developing these resources,

GCRP agencies have built, to some extent, on the legacy of the previous national assessment. NOAA's Regional Integrated Sciences and Assessment (RISA) Program is an excellent example of a program that has successfully integrated sustained interaction with stakeholders into a research framework. Ensuring that stakeholders have continued access to research teams has led to improved communication of scientific results and improved sensitivity of research agendas to the evolving needs of decision makers attempting to incorporate climate change into management and planning. But there is an unprecedented opportunity to build on the GCRP's past accomplishments and to significantly improve and increase the Federal research effort to provide "decision support" to resource managers and other stakeholders around the country.

**1.6. There must be balance between the need for increased attention to the information demands of the public and decision makers, and the need to allow researchers to define a research agenda that addresses what they believe to be the most important scientific uncertainties.** While a consensus about human-caused climate change has emerged, investigator-driven research is required to make progress on many issues, including abrupt climate change, extreme events and climate change, regional manifestations of climate variability and change, and climate-carbon-cycle interactions, to name a few key areas.

**1.7 The GCRP must adequately support needed observations, climate research, and resources for decision making.** No amount of good management can compensate for inadequate resources. While the Bush Administration should be given credit for maintaining resource levels during its first term, even in the wake of increased security spending following the 9/11 attacks, recent budgets have fallen short, especially in light of the increased demands on the program to accelerate research, complete the SAPs, and provide additional decision support products. Additional funding must be provided so that the preparation and provision of needed science is not jeopardized.

## **II. Analysis and Recommendations**

**II.1. S. 2307 is a tremendous step forward in revitalizing our nation's global change research capacity.** I commend Senators Kerry and Snowe for their leadership. During my testimony I point to what I consider the strengths of the bill, as well as to opportunities where it can be further strengthened. I am an extremely enthusiastic about the legislation, and my suggestions for improvement in no way indicate a lack of support. With that in mind, here are my recommendations.

**II.2. The establishment in Section 102 of Title I of the Committee on Global Change Research provides a good foundation for the program.** The proposed structure of a senior-level interagency committee with representatives of sufficient authority to allocate budgetary resources to meet program needs is appropriate. However, a stronger mechanism for budgetary coordination and integration needs to be identified.

**II.3. S. 2307 helpfully formalizes the existing informal program office to help manage the program and achieve budgetary coordination.** The program office should be staffed by individuals with expertise in the key research areas being addressed by the program and should be tasked with leading interagency coordination to prepare a draft strategic plan, annual program plans, reports, and budgets. It should report to the senior interagency committee responsible for overall decision making. It is important to consider whether placing the program office within the Office of Science and Technology Policy of the White House is the best option. While this may give the office greater authority to manage and coordinate the program across the agencies, it increases opportunities for political influence and thus potentially reduces the perceived credibility of research reports and assessments produced by the program.

**II.4. Beyond this, further clarification is required regarding the structure of the program and its top-level management to ensure that the tension between needed programmatic authority and scientific integrity is well managed.** Because of the need for unbiased, credible research information, it is essential to carefully consider what management structure will most effectively create needed central authority while also protecting actual and perceived political independence of the program. The legislation

should call for a study of options for organizing government-sponsored research in a multi-agency setting that creates adequate authority for program and budget integration but that also ensures scientific integrity. Such a study could examine the potential role of OMB, OSTP, the proper location of the integrated program office, and the establishment of incentives that reward interagency cooperation, among other issues. The National Academy of Public Administration and an appropriate panel of the National Research Council could be called upon to collaborate on such a study. A public review period would be essential and would provide researchers and other stakeholders with an opportunity for input. Ideally, the panel should report its findings 6-9 months after enactment of the legislation. Assuming the legislation passes this year, the panel's report and public review comments will then be available for the use of transition teams and ultimately by the next Administration.

**II. 5. The legislation should propose creation of a high-level, independent, non-partisan oversight mechanism.** Section 113 of Title 1 (“Scientific Communications”), which calls for agencies to adopt policies that ensure scientific independence of their investigators, will not be sufficient to guard against political influence in program-wide activities and products such as a national assessment. The National Academy of Sciences (NAS) has successfully provided guidance to the GCRP/CCSP, reviewed specific reports, and commented on the quality of research plans and products developed by the program. It has not been asked, nor is it particularly well placed, to serve as a “watchdog” of the independence of the program from political influence. Financial support for the NRC’s activities should be provided outside of direct grants from USGCRP agencies to minimize perceived or actual exertion of influence over NAS reviews. One possible model for the Committee to consider is that of the independent commission. The rationale for establishing independent commissions includes the assumptions that (1) long-term appointment of commissioners would promote stability and develop expertise, (2) independent status would insulate them from undue economic and political pressures, and (3) commissioners with different political persuasions and interests would provide diverse viewpoints. WWF would be eager to work with the Committee members and staff to help develop an appropriate structure.



**II.6. Given the need of decision makers for information, especially in light of continuing and in some cases irreducible uncertainties, it is appropriate for S. 2307 to launch a national climate service.** The proposal for a national climate service recognizes the importance of climate variability and change for public safety, the environment, natural resources, human health, and even national security. Information on the state of the climate through such a service can improve decisions so long as it is accompanied by information about associated uncertainties and technical guidelines for the proper uses and limits of the information. The approach will bring needed focus among disparate programs and seems workable provided that the research program and climate service mandate a close link between the climate service and the GCRP. Research must inform the activities of the climate service, and user-driven questions and information needs should be used to stimulate scientific exploration and discovery. The relationship between the activities of the climate service and decision support programs within the GCRP (such as the national assessment and development of tools for adaptive management) will need to be clarified.

**II.7. S. 2307 effectively balances the tension between the needs of the public and decision makers for research information and the opportunities for scientific discovery afforded by a research agenda defined by the science community.** Section 108 of Title I establishes a provision for supplemental research grants to priority areas not being adequately addressed by the participating Federal agencies. This is an excellent addition to the program that can be further strengthened by specifying that disbursement of these funds should be determined by an interagency committee of senior science program managers, with review by the senior interagency committee, and with administration of the funds by one of the participating Federal Agencies. This is similar to an approach to funding employed in the National Oceanographic Partnership Program. Paragraph 3A and B of Section 108 call for administering these funds through the Science and Technology Policy Institute. According to the Institute's website, <http://www.ida.org/stpi/index.html> , the Institute is part of the Institute for Defense Analyses, which has no obvious expertise or experience in global change, and thus may not be the most appropriate choice.

### **III. Additional Recommendations**

**III.1. The timing of the preparation of the strategic plan for the Global Change Research Program and the “plan of action” for the National Climate Service should be revised.** Title I, Section 105 of S2307 amends Section 104 of the 1990 Act to require a Strategic Plan for the 10 year period beginning in 2008 and requires that the plan be submitted within 1 year of passage of the act. However, it does not make sense to have the program develop a plan under this Administration but deliver that plan to the following one. This should be changed so that the Strategic Plan covers the 10 year period beginning in 2011 and that the plan be submitted to Congress no later than 1 January 2010. This would give the incoming administration input to the plan. The current research plan, while in need of updating, can continue to provide effective guidance in research program development. The "plan of action for the National Climate Service" (p 29 of the bill) should be on a similar schedule. Instead of developing a new strategic plan at this time, the CCSP should concentrate on completing the existing SAPs and initiating technical planning for scenarios and other elements for the next national assessment.

**III.2. S. 2307 should mandate further improvements in the reporting of uncertainty of products of the research program and climate service.** A key requirement of all activities supported under S. 2307 should be a commitment to characterize and communicate uncertainty so that decision makers understand the level of confidence and explanations for why a particular piece is uncertain. Improving communication about uncertainty and its implications for decision making will require close interaction between producers and users of the information developed. While the Climate Change Science Program has endeavored to improve its approach to uncertainty, further attention is required (see SAP 5.2, “Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decision making,” <http://www.climatescience.gov/Library/sap/sap5-2/default.php>),.

**III.3. A “User Council” should be created to provide input on research needs and to create opportunities for improving interactions between researchers and users.** A “user council” or similar body should be created and empowered to provide input on

directions as well as to provide funding for user-oriented programs and products. The Council needs to involve users at the local, state, and regional levels, drawing on representatives from the private sector, non-governmental organizations, and government entities. Mission-oriented Federal agencies (e.g., USDA, DOI, etc.) should also participate in the user council. In general, the program should improve the delineation of roles between agencies that are predominantly research oriented (e.g., NSF, NASA, DOE, parts of NOAA) and those that are mission oriented and thus key user stakeholders.

**III.4 An important gap not filled by S. 2307 is to provide funding for researchers at universities, think tanks, and laboratories to participate in future assessments and decision support activities.**

In the past, many scientists and other experts have volunteered their time for these assessments. But as the need for both international and national decision support increases, failure to provide such dedicated assessment resources will have a negative impact on the quality of research and decision support. There is only so much assessment researchers can be expected to do in their free time. Providing assessment funding will enable researchers to engage graduate students and additional technical experts under their supervision. This could also contribute to training the next generation of researchers who are able to participate in decision support activities.

**III.5. The existing Act should be amended to explicitly call for development and funding for an overall communications and public education strategy for the program.**

Without an explicit mandate for such activities, it is almost impossible to obtain approval for communications and education activities in the President's budget. And without support for communications and education activities, the efficiency of transmitting climate change information to potential users throughout the nation will be seriously diminished. Section 204 of the 1990 established the Global Change Research Information Office. This bill should seek to strengthen this function through a review of communication needs and provision of mandated funding.

**III.6. Abrupt climate change should be considered within the Global Change Research Program, not in a separate program under NOAA.** Section 501 of Title V

calls for establishment of a research program on abrupt climate change with the Office of Oceanic and Atmospheric Research of NOAA. This research is closely related to other research topics in the broad area of climate variability and change and should be integrated into the overall global change research effort.

#### **IV. Conclusion**

In conclusion, Mr. Chairman and members of the Committee, I would like to again thank you for the opportunity to testify before you today on this important issue, and to commend you on your leadership in introducing and entertaining views on S. 2307. WWF stands ready to work with you and your staff on advancing this essential legislation in the coming weeks and months, and working with you on the vital efforts needed to address climate change in the years ahead.