

**Calendar No. 514**

108TH CONGRESS }  
*2d Session*

SENATE

{ REPORT  
108-263

**ABRUPT CLIMATE CHANGE RESEARCH  
ACT**

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 1164



MAY 13, 2004.—Ordered to be printed

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

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### ABRUPT CLIMATE CHANGE RESEARCH ACT

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Mr. MCCAIN, from the Committee on Commerce, Science, and  
Transportation, submitted the following

### R E P O R T

[To accompany S. 1164]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 1164) to provide for the development and coordination of a comprehensive and integrated United States research program that assists the people of the United States and the world to understand, assess, and predict human-induced and natural processes of abrupt climate change, having considered the same, reports favorably thereon without amendment and recommends that the bill do pass.

#### PURPOSE OF THE BILL

The purpose of this legislation, as reported, is to authorize the Secretary of Commerce to establish a scientific research program on abrupt climate change within the Office of Oceanic and Atmospheric Research of the National Oceanic and Atmospheric Administration (NOAA).

#### BACKGROUND AND NEEDS

According to the National Academy of Sciences (NAS), abrupt climate change is technically defined as when the climate system is forced to cross a threshold, triggering a transition to a new state at a response rate that is faster than the rate of cause of the event itself. It also is defined as climate change that takes place so rapidly and unexpectedly that humans or natural systems have difficulty adapting to it.

In May 2002, NAS completed a review of the current state of knowledge on abrupt climate change at the request of the United States Global Climate Research Program (USGCRP) and issued a

report entitled, *Abrupt Climate Change: Inevitable Surprises*. According to the NAS report, recent scientific evidence shows that major and widespread climate changes have occurred in the past with startling speed. One of the best known examples is the Younger Dryas cold interval. It was, according to evidence found in ice cores from Greenland and biological data found in terrestrial sediments, a nearly global event that began about 12,800 years ago when there was an interruption in the gradual warming trend that followed the last ice age. According to the NAS, the data indicates that cooling into the Younger Dryas occurred in a few prominent decades—long steps, whereas the warming at the end of it occurred primarily in one especially large step of about 8 degrees Celsius in about 10 years and was accompanied by a doubling of snow accumulation in 3 years. The event ended abruptly about 11,600 years ago. Greenhouse warming and other human alterations of the climate may increase the possibility of large, abrupt, and unwelcome regional or global climatic events. The abrupt changes are not fully explained yet, and climate models typically underestimate the size, speed, and extent of those changes.

The report included the following recommendations to the USGCRP:

- NAS should improve the fundamental knowledge base related to abrupt climate change.
- Improve modeling focused on abrupt climate change.
- Improve paleoclimatic data related to abrupt climate change.
- Improve statistical approaches.
- Investigate “no-regrets” strategies to reduce vulnerabilities.

The NAS report also states that a new paradigm of an abruptly changing climatic system has been well established by research over the last decade, but this new thinking is little known and scarcely appreciated in the wider community of natural and social scientists and policymakers. However, policymakers are actively looking at the issues as evidenced by the Committee’s hearings and the Administration’s July 2003 Strategic Plan for the Climate Change Science Program which calls for research to address the potential for future changes in extreme events and uncertainty regarding potential rapid or discontinuous changes in climate. The program will build upon existing United States strengths in climate research and modeling.

In January 2004, NAS completed a review of the Administration’s strategic plan. NAS called for urgent action to implement the activities described in the plan. The plan also called upon the Administration to secure the financial resources necessary to ensure the success of the plan.

#### LEGISLATIVE HISTORY

S. 1164 was introduced on June 2, 2003, by Senator Collins. Senators Murray, Jeffords, Cantwell, and Snowe were co-sponsors of the legislation. S. 1164 was referred to the Committee on Commerce, Science, and Transportation on June 2, 2003. The provisions contained in S. 1164 were approved by the Senate as part of a larger climate science package included in the Senate passed energy bill (H.R. 4). The Committee held hearings on climate change on January 8, 2003, May 7, 2003, October 3, 2003, and March 3, 2004.

On March 9, 2004, the Committee met in open executive session and, by a voice vote, ordered S. 1164 reported without any amendment.

#### ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

U.S. CONGRESS,  
CONGRESSIONAL BUDGET OFFICE,  
*Washington, DC, March 16, 2004.*

Hon. JOHN MCCAIN,  
*Chairman, Committee on Commerce, Science, and Transportation,  
U.S. Senate, Washington, DC.*

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for S. 1164, the Abrupt Climate Change Research Act of 2003.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Susanne S. Mehlman.

Sincerely,

DOUGLAS HOLTZ-EAKIN,  
*Director.*

Enclosure.

#### *S. 1164—Abrupt Climate Change Research Act of 2003*

Summary: S. 1164 would establish a new research program within the Office of Oceanic and Atmospheric Research of the National Oceanic and Atmospheric Administration and would authorize the appropriation of \$60 million for such a program. This new program would be responsible for conducting research on “abrupt climate change,” which the bill defines as “a change in the climate that occurs so rapidly or unexpectedly that human or natural systems have difficulty adapting to the climate as changed.” The research activities would include the development of advanced geophysical models and the testing of such models against a global database containing records of past climate changes.

CBO estimates that implementing S. 1164 would cost a total of \$60 million over the 2005–2009 period, assuming appropriation of the amount authorized. Enacting S. 1164 would not affect direct spending or revenues.

S. 1164 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act and would impose no costs on state, local, or tribal governments.

Estimated Cost to the Federal Government: For this estimate, CBO assumes that the bill will be enacted by the beginning of 2005. CBO estimates that implementing the bill would cost \$60 million over the 2005–2009 period, assuming appropriation of \$60 million in 2005. Estimated outlays are based on historical spending patterns of similar scientific programs. The estimated budgetary impact of S. 1164 is shown in the following table. The costs of this legislation fall within budget function 300 (natural resources and environment).

	By fiscal year, in millions of dollars—				
	2005	2006	2007	2008	2009
CHANGES IN SPENDING SUBJECT TO APPROPRIATION					
Authorization level .....	60	0	0	0	0
Estimated outlays .....	24	27	9	0	0

Intergovernmental and Private-Sector Impact: S. 1164 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments.

Estimate Prepared by: Federal Costs: Susanne S. Mehlman. Impact on State, Local, and Tribal Governments: Marjorie Miller. Impact on the Private Sector: Jean Talarico.

Estimate Approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

#### REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported:

##### NUMBER OF PERSONS COVERED

The Committee believes that the bill would not subject any individuals or businesses affected by the legislation to any additional regulation.

##### ECONOMIC IMPACT

This legislation would not have an adverse impact on the Nation.

##### PRIVACY

This legislation would not have a negative impact on the personal privacy of individuals.

##### PAPERWORK

This legislation would not require additional paperwork.

#### SECTION-BY-SECTION ANALYSIS

##### *Section 1. Short title*

Section 1 would entitle the bill as the “Abrupt Climate Change Act of 2003”.

##### *Section 2. Abrupt climate change research program*

Subsection (a) would require the Secretary of Commerce to establish a program of scientific research on abrupt climate change within the Office of Oceanic and Atmospheric Research of the NOAA.

Subsection (b) would identify the purposes of the research program as:

- Development of a global array of terrestrial and oceanographic indicators of paleoclimate in order to sufficiently identify and describe past instances of abrupt climate change.
- Improvement of understanding of thresholds and nonlinearities in geophysical systems related to the mechanisms of abrupt climate change.

- Incorporation of such mechanisms into advanced geophysical models of climate change.
- Testing the output of such models against an improved global array of records of past abrupt climate changes.

Subsection (c) would define abrupt climate change as a change in climate that occurs so rapidly or unexpectedly that human or natural systems have difficulty adapting to the changed climate.

*Section 3. Authorization of appropriations*

This section would authorize \$60 million for fiscal year 2003, to remain available until expended, for the research program established under section 2.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee states that the bill as reported would make no change to existing law.

