

**Calendar No. 122**

111TH CONGRESS }  
*1st Session* }

SENATE

{ REPORT  
111-57

WEATHER MITIGATION RESEARCH AND DE-  
VELOPMENT POLICY AUTHORIZATION ACT  
OF 2009

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 601



JULY 22, 2009.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

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### WEATHER MITIGATION RESEARCH AND DEVELOPMENT POLICY AUTHORIZATION ACT OF 2009

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JULY 22, 2009.—Ordered to be printed

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

### REPORT

[To accompany S. 601]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 601) to establish the Weather Mitigation Research Office, and for other purposes, having considered the same, reports favorably thereon with an amendment (in the nature of a substitute) and recommends that the bill (as amended) do pass.

#### PURPOSE OF THE BILL

The purpose of S. 601 is to develop a national cooperative Federal and State program of weather mitigation research and development.

#### BACKGROUND AND NEEDS

Weather mitigation refers to the intentional or unintentional modification of atmospheric processes by human activities. Intentional weather mitigation efforts, such as cloud seeding or hail suppression, have periodically attracted interest due to their potential for increasing water availability, enhancing snowfall, and reducing damage and loss of life from extreme weather events, including hurricanes. Unintentional weather mitigation research focuses on understanding the impacts of human activities, such as air emissions, on atmospheric processes at scales ranging from local precipitation patterns to global climate.

Intentional weather mitigation has focused on altering precipitation events such as rainstorms, snowfall, or hail. Research on the

topic has been the subject of numerous expert studies. According to a 2003 National Research Council (NRC) report, *Critical Issues in Weather Modification Research* (“NRC report”), “there is still no convincing scientific proof of the efficacy of intentional weather modification efforts.” Despite the lack of scientific proof and the paucity of weather modification research programs, many weather modification ventures are operating nationally and internationally. The NRC report found that “because an entire suite of new tools and techniques now exist [sic] that could be applied to this issue, the Committee recommends that there be a renewed commitment to advancing our knowledge of fundamental processes that are central to the issues of intentional and inadvertent weather modification.”

The 2003 NRC Committee recommended “a renewed commitment to advancing our knowledge of fundamental atmospheric processes that are central to the issues of intentional and inadvertent weather modification.” It also recommended that a coordinated national program be developed to conduct sustained research efforts in the areas of cloud and precipitation microphysics, cloud dynamics, cloud modeling, and cloud seeding, with a balanced approach of modeling, laboratory studies, and field measurements designed to reduce key uncertainties.

#### SUMMARY OF PROVISIONS

S. 601 Substitute Amendment would establish a national cooperative Federal and State program of weather mitigation research and development. The legislation would establish a Weather Mitigation Research Program (Program) within the National Science Foundation (NSF) and authorize a research and development program to improve the understanding of processes relating to planned and inadvertent weather mitigation. The Program would establish a Working Group consisting of representatives from states and the scientific community to make recommendations to the Program on administration, research, and other matters relating to weather mitigation research. The Program, in consultation with the Working Group, would develop a 10-year plan to establish and coordinate a national research and development program that provides for goals and priorities for research, describes specific activities required to achieve the goals and priorities, including funding of competitive grants, and other activities. The Program would also conduct a research and development program to improve the understanding of processes pertaining to weather mitigation. The legislation would authorize \$25 million per year for each of the fiscal years 2010 through 2014.

#### LEGISLATIVE HISTORY

The Weather Mitigation Research and Development Policy Authorization Act of 2009 (S. 601) was introduced by Senator Hutchison on March 16, 2009, and referred to the Senate Committee on Commerce, Science, and Transportation. On May 18, 2009, the Committee considered the bill in an open Executive Session. Senators Hutchison and Rockefeller offered an amendment in the nature of a substitute. The Committee, without objection,

adopted the substitute and ordered S. 601 be reported with the 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:

JUNE 2, 2009.

Hon. JAY D. ROCKEFELLER IV,  
*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. 601, the Weather Mitigation Research and Development Policy Authorization Act of 2009.

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

Sincerely,

DOUGLAS W. ELMENDORF.

Enclosure.

#### *S. 601—Weather Mitigation Research and Development Policy Authorization Act of 2009*

Summary: S. 601 would authorize the appropriation of \$25 million for each of fiscal years 2010 through 2014 to establish a Weather Mitigation Research Office within the National Science Foundation (NSF). The new office would coordinate studies and provide grants to universities, state agencies, and nonprofit organizations to explore methods to reduce the impact of severe weather.

CBO estimates that implementing S. 601 would increase discretionary spending by \$88 million over the 2010–2014 period and by \$37 million after 2014, assuming appropriation of the necessary amounts. The bill also would authorize NSF to collect and spend donations from nonfederal sources, but CBO estimates that any new offsetting receipts and associated direct spending would be minimal and would have no net effect on the federal budget.

The bill contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of S. 601 is shown in the following table. The costs of this legislation fall within budget functions 250 (science, space, and technology) and 800 (general government).

|  | By fiscal year, in millions of dollars— |      |      |      |      |           |
|--|---|------|------|------|------|-----------|
|  | 2010                                    | 2011 | 2012 | 2013 | 2014 | 2010–2014 |
| CHANGES IN SPENDING SUBJECT TO APPROPRIATION |   |      |      |      |      |           |
| Estimated Authorization Level .....          | 25                                      | 25   | 25   | 25   | 25   | 125       |
| Estimated Outlays .....                      | 2                                       | 17   | 22   | 23   | 24   | 88        |

Basis of estimate: For this estimate, CBO assumes the bill will be enacted near the end of 2009 and that the authorized and necessary amounts will be appropriated each year. Estimated outlays

are based on historical spending patterns for NSF research programs. In addition to the amounts specifically authorized to be appropriated, CBO estimates that the Office of Science and Technology Policy would require less than \$500,000 over the 2010–2014 period to help coordinate federal weather mitigation research and report to the Congress on those activities.

Intergovernmental and private-sector impact: S. 601 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. Any costs to those entities would be incurred voluntarily as a condition of receiving federal assistance.

Estimate prepared by: Federal costs: Leigh Angres; Impact on state, local, and tribal governments: Shannon Fairchild and Ryan Miller; Impact on the private sector: Amy Petz.

Estimate approved by: Theresa Gullo, 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 bill, as reported, would require the National Science Foundation to develop a national weather mitigation research and development program. The bill would not authorize any new regulations, and therefore, would not subject any individuals or businesses to new regulations.

##### ECONOMIC IMPACT

The bill, as reported, would not have an adverse economic impact on the nation's economy.

##### PRIVACY

The bill, as reported, would have little, if any, impact on the personal privacy of U.S. citizens.

##### PAPERWORK

The bill, as reported, would not increase paperwork requirements significantly for individuals and businesses. Section 6 of the Act would require the Director of the Weather Mitigation Research Program at the National Science Foundation to submit a 10-year plan to Congress and a biannual report to the President and Congress.

#### CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides the following identification of congressionally directed spending items contained in the bill, as reported:

## SECTION-BY-SECTION ANALYSIS

*Section 1. Short Title.*

This section would establish the short title of the bill as the “Weather Mitigation Research and Development Policy Authorization Act of 2009.”

*Section 2.*

This section would establish that the purpose of the bill is to develop a national cooperative Federal and State program of weather modification research and development.

*Section 3.*

This section would provide the findings of the bill.

*Section 4.*

This section would define the terms “Director”, “Program”, “Research and Development”, “Weather Mitigation”, and “Working Group.”

*Section 5.*

This section would establish the Weather Mitigation Research Program (Program) within NSF’s Geosciences Directorate. The Program would establish and coordinate the national research and development program on weather mitigation. The Program would be headed by a Director, who is appointed by the Director of the Geosciences Directorate.

This section would provide for the duties of the Program Director. These duties would include funding studies, investigations, and workshops; cooperating with other agencies; and conducting research and development activities.

The section would establish a Working Group to advise and make recommendations to the Program. The Working Group would consist of the Program Director and 11 members, appointed by the Director of the NSF, from states, institutions of higher education, and experts in scientific fields. Working group members would serve at the pleasure of the Director of the NSF with vacancies filled in the manner as the original appointment. This section would also provide the process for determining the Working Group’s leadership, meetings, and define quorum requirements.

*Section 6.*

The section would require the Director of the National Science Foundation, in consultation with the Working Group, to develop and submit a 10-year plan to Congress for the establishment of a national research and development program as required by Section 5. The report would be required within one year after the date of enactment. The plan would establish the goals and objectives for Federal research, describe the specific activities required to achieve the goals and priorities, and estimate the level of Federal funding required for research activities under the Program.

The section would identify the national research and development program activities related to weather mitigation, including: interdisciplinary research and development, and coordination of research and development activities to improve understanding of

processes related to planned and inadvertent weather mitigation; coordination of relevant organizations that engage in weather mitigation research; development through partnerships among various government and academic institutions; establishment of scholarships and educational opportunities; dissemination of information; and administration of a grant program.

The section would permit the Director of the NSF to establish a grant program for research and development projects that pertain to weather mitigation. Entities eligible for awards under this subsection shall include state agencies, institutions of higher education, or non-profit organizations that have an established background and experience in the field of weather mitigation and experience in working and coordinating with state agencies. Funding under this subsection would only be used for a research and development project that pertains to weather mitigation.

*Section 7.*

This section would require the Director to prepare and submit a report to the President, the Senate Committee on Commerce, Science, and Transportation, and the House Committee on Science and Technology that would include a summary of achievements, an analysis of progress made toward achieving goals and objectives, a copy or summary of the implementation plan, recommendations, if any, regarding additional actions that may be required to support the purposes of the Act, and a description of any potential adverse consequences of weather mitigation efforts. The first report would be January 31 of the second calendar year after enactment of this Act and every two years thereafter.

*Section 8.*

This section would instruct Federal agencies and any public or private agency or institution that receives funding from the United States, to the extent practicable, to cooperate with the Program Director in carrying out this Act.

*Section 9.*

This section would require the Office of Science and Technology Policy to identify and address relevant programs and activities of the Federal agencies and departments that contribute to the Program, to consider and use reports and studies conducted by the Federal government, weather modification organizations, and other expert scientific bodies, and to make recommendations for the coordination of program activities with weather mitigation activities of national and international organization, in accordance with relevant international agreements.

This section would require the Office of Science and Technology Policy to provide a summary of Federal agency budgets for weather mitigation research and a description of the relationship between weather mitigation research and research conducted under the Global Change Research Act of 1990.

*Section 10.*

This section would authorize \$25 million to the Program for each fiscal year 2010 through 2014 to carry out the purpose of this Act.



This section would allow the Program to accept, use, or dispose of gifts or donations of services or property.

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.

