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111TH CONGRESS }
2d Session }

SENATE

{ REPORT
111-193

ARCTIC OCEAN RESEARCH AND SCIENCE
POLICY REVIEW ACT OF 2009

R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND
TRANSPORTATION

ON

S. 1562



MAY 24, 2010.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

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ARCTIC OCEAN RESEARCH AND SCIENCE POLICY REVIEW ACT OF 2009

MAY 24, 2010.—Ordered to be printed

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

R E P O R T

[To accompany S. 1562]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 1562) to provide for a study and report on research on the United States Arctic Ocean and for other purposes, having considered this bill, 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. 1562, the Arctic Ocean Research and Science Policy Review Act of 2009, is to provide for a study and report on research in the United States Arctic Ocean and to authorize the National Oceanic and Atmospheric Administration (NOAA) to develop an aerosols research, modeling, and monitoring program.

BACKGROUND AND NEEDS

United States Arctic Ocean Research

Scientific studies have shown that the Arctic region is experiencing climate changes at a faster pace than anywhere else on the globe. These changes include warming air and ocean temperatures, diminishing and thinning sea ice, coastal erosion, thawing permafrost, and ocean acidification. Within the region, these changes could directly impact communities and their livelihoods, the distribution of living resources and habitats, and critical infrastructure. Arctic climate change could also have a global impact due to

the significant influence the Arctic has on weather and climate patterns, ocean circulation, and sea level.

The Arctic Ocean is the least understood of the world's oceans. Detailed knowledge of its role in global processes is limited due to its extreme environment and the lack of logistical support for interdisciplinary scientific studies. Greater understanding of environmental changes in the Arctic requires increased research on Arctic marine ecosystems, marine life, ocean circulation, and ocean acidification. Several research institutions, organizations, and Federal agencies are conducting critical research in the U.S. Arctic. Improved coordination of research activities and objectives would leverage the limited resources available to these endeavors and make sure that the research activities and programs are filling gaps and fostering a stronger understanding of the region as a whole.

To facilitate the coordination of research activities within the U.S. Arctic and throughout the entire Arctic region, the legislation would require the Secretary of Commerce to request the National Research Council (NRC) to conduct a study and provide a comprehensive plan to coordinate, integrate, and synthesize Arctic Ocean research, both within the U.S. and across the entire Arctic. The bill would require the Secretary of Commerce to report back to Congress on the findings of the study, the recommendations of the NRC, and a research plan for the United States Arctic Ocean.

Black Carbon and Other Aerosols Research

Discussions about climate change and its effects on the Arctic region often focus on greenhouse gases; however, emerging information reveals that tiny airborne particles called atmospheric aerosols, which contain nitrates, sulfates, carbon, and other matter, disproportionately contribute to Arctic climate change.

Aerosol particles generally reflect incoming solar radiation and cool the planet, which offsets the warming association with greenhouse gases. Black carbon, an aerosol that results from the incomplete combustion of biomass and fossil fuels, however, absorbs solar radiation and can contribute to localized atmospheric warming. In addition to black carbon's direct warming effect on the atmosphere, it also accumulates on snow and ice, darkening the surface, reducing its ability to reflect sunlight, and increasing melt rates. This, in turn, can result in an additional warming effect because there is less surface area covered with reflective snow and ice once it melts. This effect is prominent in the Polar regions, where black carbon appears to be a major contributor to melting. Recent studies suggested that black carbon may be responsible for 30 to 50 percent of observed warming in the Arctic, and may be the second largest contributor to climate change, after carbon dioxide.

Understanding regional and global climate change requires improved scientific knowledge of the radiative effects of aerosols, their cloud-nucleating properties, and their effects on precipitation. This bill would provide direction for NOAA's research on the effects of aerosols on climate and air quality and strengthen the agency's research in this area of climate science.

SUMMARY OF PROVISIONS

Title I—United States Arctic Ocean Research

S. 1562 would direct the Secretary of Commerce to request the NRC to conduct a study on the existing research and research advisory entities operating in the Arctic Ocean of the United States. It would require such study to: (1) review the breadth, relationship, and overlap of existing research programs and advisory entities engaged in U.S. Arctic Ocean research; (2) assess the gaps in such research and in the coordination, integration, and synthesis of research activities and data; (3) assess existing scientific information and identify additional information necessary, including local and traditional knowledge, to improve the scientific basis for Federal Agency environmental reviews; and (4) provide a comprehensive plan for long-range U.S. Arctic Ocean research and monitoring and for coordination, integration, and synthesis of U.S. Arctic Ocean research. The bill would direct the Secretary of Commerce to provide a report to Congress that describes the findings of the study and the recommendations of the NRC, along with a prioritized and scalable research plan for the United States Arctic Ocean.

Title II—Black Carbon and Other Aerosols Research

S. 1562 would direct NOAA to develop a plan to research, monitor, and model black carbon and other aerosols in coordination with other Federal agencies and in support of the United States Global Change Research Program (USGCRP). This plan calls for NOAA to, among other things, analyze gaps in scientific methods and research and identify Federal research priorities on black carbon and other aerosols to understand their role in climate change and air quality; develop a framework for modeling and methods that identify the source of the aerosols; evaluate the global and regional climate-forcing properties of atmospheric aerosols, and their effects on climate change and on the loss of sea ice; and, identify observation systems, needs, and assets necessary to develop and implement a program with NOAA.

The bill also would direct the Administrator of NOAA to establish and maintain a black carbon and other aerosols research and monitoring program that combines observations, research, monitoring, and modeling activities. The program shall be consistent with the plan required by the bill and support the USGCRP.

LEGISLATIVE HISTORY

Senator Begich introduced the Arctic Ocean Research and Science Policy Review Act, S. 1562, on July 29, 2009. The Black Carbon and Other Aerosols Research Act, S. 1538, was also introduced by Senators Begich, Rockefeller, Cantwell, Inouye, and Nelson on July 29, 2009. Both bills were referred to the Committee on Commerce, Science, and Transportation. Several hearings of the Committee on Commerce, Science, and Transportation during the first session of 111th Congress addressed the need for improved climate science research and for additional research and monitoring in the Arctic Ocean. On December 17, 2009, the Committee met in open executive session, and by a voice vote, ordered S. 1562 reported with an amendment in the nature of a substitute.

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:

JANUARY 6, 2010.

Hon. JOHN 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. 1562, the Arctic Ocean Research and Science Policy Review Act of 2009.

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

Sincerely,

DOUGLAS W. ELMENDORF.

Enclosure.

S. 1562—Arctic Ocean Research and Science Policy Review Act of 2009

Summary: S. 1562 would authorize the appropriation of \$20 million a year over the 2010–2015 period for a National Oceanic and Atmospheric Administration (NOAA) program to research and monitor aerosols (fine particles of organic or inorganic materials in the atmosphere). The bill also would authorize the appropriation of \$2 million in 2010 to assess existing research programs focused on portions of the Arctic Ocean off the coast of Alaska.

Assuming appropriation of the authorized amounts, CBO estimates that implementing S. 1562 would cost \$89 million over the 2010–2014 period and \$33 million after 2014. Enacting the legislation would not affect direct spending or revenues.

S. 1562 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. 1562 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—					
	2010	2011	2012	2013	2014	2010–2014
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Aerosol Research and Monitoring Program:						
Authorization Level	20	20	20	20	20	100
Estimated Outlays	10	17	20	20	20	87
Assess Arctic Ocean Research:						
Authorization Level	2	0	0	0	0	2
Estimated Outlays	1	1	0	0	0	2
Total Changes:						
Authorization Level	22	20	20	20	20	102
Estimated Outlays	11	18	20	20	20	89

Basis of estimate: For this estimate, CBO assumes that the legislation will be enacted early in calendar year 2010 and that the au-

thorized amounts will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for similar NOAA programs.

S. 1562 would authorize the appropriation of \$20 million a year over the 2010–2015 period for a NOAA program to research and monitor the presence of aerosols, particularly black carbon (a light-absorbing aerosol resulting from the burning of fossil fuels), in the atmosphere. Of those amounts, NOAA would receive \$10 million a year to administer the program and \$10 million a year to fund grants aimed at reducing the impact of aerosols on the global climate. Assuming appropriation of the authorized amounts, CBO estimates that implementing the program would cost \$87 million over the 2010–2014 period and \$33 million after 2014.

S. 1562 also would authorize the appropriation of \$2 million in 2010 for NOAA to fund a National Research Council study to assess existing research programs focused on portions of the Arctic Ocean off the coast of Alaska. Upon receipt of the completed study, the Secretary of Commerce would be required to submit a report to the Congress describing the council’s findings and recommendations, including a research plan for those portions of the Arctic Ocean. Based on information from the National Research Council, CBO estimates that conducting the study would cost about \$1 million a year over the 2010–2011 period.

Intergovernmental and private-sector impact: S. 1562 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: Jeff LaFave; Impact on state, local, and tribal governments: 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

S. 1562 would authorize an assessment and report of existing research programs focused on the United States Arctic Ocean and direct NOAA to develop a plan and program to research and monitor aerosols. The reported bill would not authorize any new regulations and therefore would not subject any individuals or businesses to new regulations.

ECONOMIC IMPACT

The bill would authorize the appropriation of \$2 million in fiscal year 2010 for the United States Arctic Research Study and \$20 million each year for fiscal years 2010 through 2015 for NOAA’s program to research and monitor aerosols.

PRIVACY

The reported bill would not have any adverse impact on the personal privacy of individuals.

PAPERWORK

The reported bill would not increase paperwork requirements for the private sector.

CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

SECTION-BY-SECTION ANALYSIS

Title I—Arctic Ocean Research*Section 101. Short Title.*

This section would provide that Title I may be cited as the Arctic Ocean Research and Science Policy Review Act of 2009.

Section 102. Findings.

This section would provide the findings of the Act.

Section 103. United States Arctic Ocean Defined.

The section would define the term “United States Arctic Ocean” for the purposes of the study required in section 104. The term means the United States zone of the Chukchi and Beaufort seas north of Cape Prince of Wales, Alaska, and adjacent marine environments.

Section 104. Study of the United States Arctic Ocean.

This section would require the Secretary of Commerce to request the NRC to conduct a study on the existing research and research advisory entities working in the U.S. Arctic Ocean. The study would provide a long-range comprehensive plan for U.S. Arctic Ocean research and monitoring that coordinates, integrates, synthesizes, and prioritizes research and monitoring activities. The Committee recognizes that many Federal agencies have responsibilities in the Arctic region and the Arctic Ocean. This legislation is not intended to revise or affect the current authority or responsibilities of any other agency. The Committee intends the study to provide a coordinated and comprehensive research and monitoring plan to enable all agencies to better carry out their missions. As such, this section would direct the Secretary to consult with the heads of other agencies and departments of the United States with appropriate Arctic science expertise or regulatory responsibilities in preparing the specifications for the study. Lastly, the section requires the Secretary to evaluate the study and develop a long-term strategy to implement its recommendations for the Department of Commerce and NOAA.

Section 105. Reports to Congress.

This section would require the Secretary of Commerce to submit a report to Congress, within 18 months after the date of enactment of the Act, on the study. The report would include the findings of the study, the recommendations of the NRC, and a prioritized and scalable research plan for the U.S. Arctic Ocean.

The Committee recognizes that many Federal agencies have responsibilities in the Arctic region and the Arctic Ocean. This legislation is not intended to revise or affect the current authority or responsibilities of any other agency. The Committee intends the study to provide a coordinated and comprehensive research and monitoring plan to enable all agencies to better carry out their missions. As such, the Committee expects the Secretary to consult with all other relevant agencies in preparing the specifications for the research plan required by this section.

Title II—Black Carbon

Section 201. Title.

This section would provide that Title II may be cited as the Black Carbon and Other Aerosols Research Act of 2009.

Section 202. Purposes.

The section would establish that the purpose of the Act is to develop a research plan to measure, monitor, and model black carbon and other aerosols, and to establish a black carbon and other aerosols monitoring and research program within NOAA.

Section 203. Definitions.

This section would define the terms: “Administrator,” “Black Carbon,” and “Other Aerosols.”

Section 204. Black Carbon and Other Aerosols Monitoring and Research Plan.

This section would direct the Administrator of NOAA to develop an observation, monitoring, modeling, and research plan for black carbon and other aerosols in support of the U.S. Global Change Research Plan that includes: (1) an analysis of gaps in scientific methods and research and identification of Federal research priorities relative to climate change and air quality; (2) a framework for modeling; (3) appropriate methods that identify the source, anthropogenic versus natural, of the aerosols as well as increase understanding of atmospheric concentrations and deposited forms; (4) a comparative evaluation of the global and regional climate-forcing properties of these aerosols and their effect on climate change as well as on the loss of sea ice; and (5) observation systems, needs, and assets necessary to develop and implement the program with NOAA.

This section would establish an Advisory Panel that would assist in the development and implementation of the plan. In addition, the Administrator shall submit a report to Congress describing the plan no later than 270 days after the enactment of this Act.

Section 205. Black Carbon and Other Aerosols Research and Monitoring Program.

This section would authorize a black carbon and other aerosols research program that is consistent with the plan required by section 204. This program would include: (1) coordinated activities to improve understanding of these aerosols and how they impact the climate; (2) strategic modeling activities; (3) educational opportunities within the scientific community and between the scientific community and the public; (4) public outreach; (5) coordination of

monitoring research activities with other relevant government agencies, private entities, and others; and (6) an assessment of the role that black carbon and other aerosols have in climate change and air quality. In conducting the program, the Administrator may execute and perform such contracts, leases, grants, or cooperative agreements as may be necessary to carry out the purposes of this Act.

This section would authorize a grant program to provide extramural grants for critical research that will improve the ability to measure, monitor, model and assess black carbon and other aerosols. The Administrator shall consult with the Advisory Panel established under section 204(b) and work cooperatively with the National Institute of Standards and Technology, the National Aeronautics and Space Administration, and other Federal agencies to establish criteria for such research and projects.

This section would require the Administrator to coordinate with the National Institute of Standards and Technology and other relevant Federal agencies when developing the research plan under section 204 and the program as described in section 205(a).

The U.S. Global Change Research Program coordinates and integrates Federal research among thirteen departments and agencies on changes in the global environment and their societal implications. The Committee recognizes the extensive Federal research effort by numerous agencies, including the National Aeronautics and Space Administration and the National Institute of Standards and Technology, on black carbon and other aerosols. As such, the Committee does not intend for the provisions in this Act to supersede or alter existing authorizations with respect to Earth science research on black carbon and other aerosols research. The Committee directs the Administrator to coordinate the plan and program required under this title with the Office of Science and Technology Policy and other relevant Federal agencies.

Section 206. Authorization of Appropriations.

This section would authorize annual appropriations for each of fiscal years 2010 through 2015. The section would authorize \$10,000,000 for extramural grants under section 205(b), and \$10,000,000 to NOAA to carry out the provisions of this Act.

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.