

Calendar No. 749

110TH CONGRESS }
2d Session }

SENATE

{ REPORT
{ 110-339

FEDERAL OCEAN ACIDIFICATION RESEARCH
AND MONITORING ACT OF 2007

R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND
TRANSPORTATION

ON

S. 1581



MAY 22, 2008.—Ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE

69-010

WASHINGTON : 2008

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

DANIEL K. INOUE, Hawaii, *Chairman*

TED STEVENS, Alaska, *Vice-Chairman*

JOHN D. ROCKEFELLER IV, West Virginia	JOHN McCain, Arizona
JOHN F. KERRY, Massachusetts	KAY BAILEY HUTCHISON, Texas
BYRON L. DORGAN, North Dakota	OLYMPIA J. SNOWE, Maine
BARBARA BOXER, California	GORDON H. SMITH, Oregon
BILL NELSON, Florida	JOHN ENSIGN, Nevada
MARIA CANTWELL, Washington	JOHN E. SUNUNU, New Hampshire
FRANK R. LAUTENBERG, New Jersey	JIM DEMINT, South Carolina
MARK PRYOR, Arkansas	DAVID VITTER, Louisiana
THOMAS CARPER, Delaware	JOHN THUNE, South Dakota
CLAIRE McCASKILL, Missouri	ROGER F. WICKER, Mississippi
AMY KLOBUCHAR, Minnesota	

MARGARET CUMMISKY, *Staff Director and Chief Counsel*

LILA HELMS, *Deputy Staff Director and Policy Director*

JEAN TOAL EISEN, *Senior Advisor and Deputy Policy Director*

CHRISTINE KURTH, *Republican Staff Director and General Counsel*

PAUL J. NAGLE, *Republican Chief Counsel*

MIMI BRANIFF, *Republican Deputy Chief Counsel*

Calendar No. 749

110TH CONGRESS }
2d Session }

SENATE

{ REPORT
110-339

FEDERAL OCEAN ACIDIFICATION RESEARCH AND MONITORING ACT OF 2007

MAY 22, 2008.—Ordered to be printed

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

R E P O R T

[To accompany S. 1581]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 1581) to establish an interagency committee to develop an ocean acidification research and monitoring plan and to establish an ocean acidification program within the National Oceanic and Atmospheric Administration, having considered the same, reports favorably thereon with amendments and recommends that the bill (as amended) do pass.

PURPOSE OF THE BILL

The purpose of S. 1581, the Federal Ocean Acidification Research and Monitoring Act of 2007, is to establish a coordinated Federal research program on ocean acidification, and to authorize appropriations for fiscal year (FY) 2009 through FY 2013.

BACKGROUND AND NEEDS

Over the past 200 years, human activities have contributed to increases in atmospheric carbon dioxide and other greenhouse gases. There is scientific consensus that these emissions are altering the Earth's climate and ocean carbon chemistry. Approximately one half of the carbon dioxide released by burning fossil fuels has been absorbed by the oceans, helping to mitigate the effects of global climate change. However, the increase in atmospheric carbon dioxide has already caused significant changes to ocean carbon chemistry and pH. This disruption in ocean carbon chemistry causes the pH to decrease, a phenomenon identified as ocean acidification. According to the National Oceanic and Atmospheric Administration

(NOAA), ocean hydrogen ion concentration (a measure of acidity) has increased 30 percent since industrialization. Studies have also projected that, by the end of the century, carbon dioxide emission scenarios could result in the lowest levels of ocean pH in 20 million years.

The potential impacts of ocean acidification are diverse and far-reaching, and may include adverse impacts on marine ecosystems, food webs for many fish and marine mammals, and the economies of many coastal states that rely upon the seafood industry and coastal and ocean tourism. Increasing acidity and changes in ocean chemistry are corrosive to corals and shell-forming plankton, a major food source for baleen whales and commercially important fish species such as salmon, mackerel, herring, cod, and others. Some studies have also suggested that ocean acidification could be detrimental to shellfish including scallops, clams, and lobsters. Evidence shows that calcification growth rates will decrease and carbonate dissolution rates will increase for these calcifying organisms, potentially leaving them unable to compete ecologically, perhaps even threatening them to the point of extinction.

Shallow water corals face similar threats due to decreased growth rates and increased shell corrosion. Corals comprise some of the richest habitats on earth. According to NOAA, about 4,000 species of fish, including approximately half of all federally-managed fisheries, depend on coral reefs and related habitat for a portion of their life cycles, and they estimate that the value of U.S. fisheries from coral reefs exceeds \$100 million. Juvenile fish may face physiological challenges including respiratory stress and acidosis associated with increased ocean acidification. Deep sea corals and other animals are also threatened by changes in ocean chemistry and may find parts of the deep ocean uninhabitable by the end of this century.

Ocean acidification is an emerging issue and scientific experts have testified to the need for increased research and monitoring. There is significant uncertainty as to the rate and magnitude of change that will occur in the ocean due to the continued increase of carbon dioxide in the atmosphere. National investment in a coordinated program of research and monitoring could improve understanding of ecosystem responses, assess the socio-economic impacts due to increasing ocean acidification, and provide marine resource managers the information they need to develop strategies for the protection of critical species, habitats, and ecosystems. The Administration's Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council highlighted ocean acidification as a research priority in their 2007 report, *Charting the Course for Ocean Science in the United States for the Next Decade: An Ocean Research Priorities Plan and Implementation Strategy*. The report explains that ocean acidification and other physical and biogeochemical changes may irreversibly alter ecosystems. Sustained ocean observations, process research, and modeling are recommended in the report as necessary tools to help determine changes over time and to help identify and quantify ecosystem impacts.

SUMMARY OF PROVISIONS

The Federal Ocean Acidification Research and Monitoring Act would establish or designate an interagency committee, chaired by NOAA, to develop and provide Congress with a strategic research and implementation plan on ocean acidification and to coordinate activities across Federal agencies. The bill also would establish an ocean acidification program within NOAA to implement activities consistent with the strategic plan, including research and long-term monitoring, education and outreach, and development of adaptation strategies and techniques for conserving marine ecosystems.

S. 1581 would authorize annual appropriations of \$10,000,000 for FY 2009, \$15,000,000 for FY 2010, \$20,000,000 for FY 2011, \$25,000,000 for FY 2012, and \$30,000,000 for FY 2013 to carry out the purposes of the Act.

LEGISLATIVE HISTORY

S. 1581 was introduced by Senator Lautenberg on June 7, 2007, with Senator Cantwell as an original cosponsor. Senators Stevens, Kerry, Snowe, Klobuchar, Nelson (FL), and Boxer subsequently signed on as cosponsors. The bill was referred to the Senate Committee on Commerce, Science, and Transportation. On May 10, 2007, the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard held a hearing on the effects of climate change and ocean acidification on living marine resources. H.R. 4174 is a companion bill that was introduced by Representative Thomas Allen in the House of Representatives on November 14, 2007.

On December 4, 2007, the Committee considered a manager's amendment to S. 1581 in an open executive session. The Committee, by voice votes, ordered S. 1581 to be reported favorably, as amended. Committee staff assigned to the bill include Ann Zulkosky, Democratic Professional Staff, Todd Bertosen, Republican Senior Counsel, and Mike Conathan, Republican Professional Staff.

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:

MARCH 3, 2008.

Hon. DANIEL K. INOUE,
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. 1581, the FOARMAM Act.

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

Sincerely,

PETER R. ORSZAG.

Enclosure.

S. 1581—FOARAM Act

Summary: S. 1581 would authorize appropriations totaling \$100 million over the 2009–2013 period to establish a program within the National Oceanic and Atmospheric Administration (NOAA) to conduct research and public outreach on ocean acidification. Funding also would be used to establish an interagency committee to coordinate such research across the federal government. Assuming appropriation of the specified amounts, CBO estimates that implementing S. 1581 would cost \$84 million over the 2008–2013 period. Enacting this legislation would not affect direct spending or revenues.

S. 1581 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no cost on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of S. 1581 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—				
	2009	2010	2011	2012	2013
CHANGES IN SPENDING SUBJECT TO APPROPRIATION					
Authorization level	10	15	20	25	30
Estimated outlays	6	12	17	22	27

Basis of estimate: S. 1581 would authorize the appropriation of \$100 million over the 2009–2013 period for NOAA and other federal agencies, including the National Science Foundation (NSF), the United States Geological Survey (USGS), the National Aeronautics and Space Administration (NASA), and the Fish and Wildlife Service (FWS), to conduct research and public outreach on ocean acidification and its impact on U.S. marine resources. At least 50 percent of such funding would be used for competitive grants to nonfederal entities. CBO estimates that, under its current authority, NOAA spent about \$5 million for activities related to ocean acidification in 2007.

The bill also would establish an interagency committee to coordinate research on ocean acidification across the federal government. The committee would be chaired by NOAA and would include representatives from NSF, USGS, NASA, and FWS.

Based on historical spending patterns for similar research conducted by those agencies, CBO estimates that implementing S. 1581 would cost \$84 million over the 2009–2013 period. This estimate assumes that the bill will be enacted by the end of fiscal year 2008 and that the amounts authorized by the bill will be appropriated for each fiscal year.

Intergovernmental and private-sector impact: S. 1581 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no cost on state, local, or tribal governments.

Estimate prepared by: Federal Costs: Daniel Hoople. Impact on State, Local, and Tribal Governments: Neil Hood. 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 reported bill would not authorize any new regulations and therefore will not subject any individuals or businesses to new regulations. The bill would have little, if any, regulatory impact.

Economic impact

The bill, as reported, would authorize annual appropriations of \$10,000,000 for FY 2009, \$15,000,000 for FY 2010, \$20,000,000 for FY 2011, \$25,000,000 for FY 2012, and \$30,000,000 for FY 2013 to NOAA to carry out the purposes of the Act. Of the funds appropriated in any fiscal year, 40 percent would be allocated to NOAA and 60 percent would be allocated to the other departments and agencies that participate in the interagency committee to carry out their responsibilities under this Act. At least 50 percent of the funds available under the Act would be allocated for competitive grants. This funding level would not be expected to have a significant impact on the nation's economy.

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. The bill would require two reports from the Federal government. The first report would be a strategic research and monitoring plan from the interagency committee to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Natural Resources, within 18 months after the enactment of this legislation. The second report would also be from the interagency committee to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Natural Resources, not later than 2 years after the enactment of this legislation, and every 3 years thereafter, on the implementation of the plan, including policy recommendations developed from the research program. The legislation also would establish a competitive grant program consistent with the strategic research and monitoring plan. Applicants to this grant program would have to file documents to apply for this program.

CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the committee provides that the bill does not contain any congressionally directed spending items.

SECTION-BY-SECTION ANALYSIS

Section 1. Short Title; Table of Contents.

Section 1 would provide that the legislation may be cited as the “Federal Ocean Acidification Research and Monitoring Act of 2007” or as the “FOARAM Act.”

Section 2. Findings and Purposes.

This section would recognize the importance of the ocean’s role in mitigating increases in atmospheric carbon dioxide, the impacts and potential consequences of increasing carbon dioxide emissions on the oceans, the need for a coordinated research and monitoring program to improve the understanding of the impacts of ocean acidification on ecosystems, the need to understand the socio-economic impact of ocean acidification and to develop ocean acidification adaptation strategies and techniques for effective marine conservation.

Section 3. Interagency Committee on Ocean Acidification.

This section would charge the President with establishing a new interagency committee or designating an existing interagency committee to address ocean acidification. The committee would be chaired by NOAA and would coordinate the planning, establishment, and implementation of an ocean acidification strategic research and implementation plan designed to improve the understanding of the effect of increased ocean acidification on marine ecosystems. It also would require the interagency committee to provide Congress with the plan, as well as a triennial report on implementation of the plan, including policy recommendations developed as part of this research.

Section 4. Strategic Research and Implementation Plan.

This section would provide details regarding the timeline and contents of the strategic research and implementation plan developed by the interagency committee for coordinated Federal activities. The plan would include goals, priorities, and guidelines for interdisciplinary research and activities to improve understanding of ocean acidification. The plan would provide an estimate of Federal funding required for research and monitoring activities, and identify and strengthen relevant programs within Federal agencies and departments that would contribute to accomplishing the goals of the plan, including recommendations for the use of observing systems and technological research and development. This section also would facilitate the committee’s ability to consult with the academic community, States, industry, environmental groups, and other relevant stakeholders.

Section 5. NOAA Ocean Acidification Program.

This section would require the Secretary of Commerce to establish and maintain an ocean acidification program within NOAA to implement activities consistent with the strategic plan, including interdisciplinary research, long-term monitoring, development of adaptation strategies and techniques, education and outreach activities, and coordination of research and monitoring with international groups. This section also would direct NOAA to use a com-

petitive, merit-based process to award grants for critical research projects relevant to the goals and priorities of the plan, and would authorize NOAA to enter into contracts, leases, grants, or cooperative agreements to carry out the purposes of the Act.

Section 6. Definitions.

This section would define the following terms used throughout the bill: (1) Committee; (2) Ocean Acidification; (3) Program; and (4) Secretary.

Section 7. Authorization of Appropriations.

This section would authorize annual appropriations of \$10,000,000 for FY 2009, \$15,000,000 for FY 2010, \$20,000,000 for FY 2011, \$25,000,000 for FY 2012, and \$30,000,000 for FY 2013 to NOAA to carry out the purposes of the Act. Of the funds appropriated in any fiscal year, 40 percent would be allocated to NOAA and 60 percent would be allocated in equal amounts to the National Science Foundation, the National Aeronautics and Space Administration, the United States Geological Survey, and the United States Fish and Wildlife Service to carry out their responsibilities under this Act. At least 50 percent of the funds made available under the Act would be allocated for competitive grants.

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.

