

111TH CONGRESS
1ST SESSION

S. 173

To establish an interagency committee to develop an ocean acidification research and monitoring plan and to establish an ocean acidification program within NOAA.

IN THE SENATE OF THE UNITED STATES

JANUARY 8, 2009

Mr. LAUTENBERG (for himself, Mr. INOUE, Mr. ROCKEFELLER, Ms. CANTWELL, Ms. SNOWE, Mr. KERRY, Mrs. BOXER, and Mr. REED) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To establish an interagency committee to develop an ocean acidification research and monitoring plan and to establish an ocean acidification program within NOAA.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Federal Ocean Acidifi-
5 cation Research And Monitoring Act of 2009” or the
6 “FOARAM Act”.

1 **SEC. 2. PURPOSES.**

2 (a) PURPOSES.—The purposes of this Act are to pro-
3 vide for—

4 (1) development and coordination of a com-
5 prehensive interagency plan to—

6 (A) monitor and conduct research on the
7 processes and consequences of ocean acidifica-
8 tion on marine organisms and ecosystems; and

9 (B) establish an interagency research and
10 monitoring program on ocean acidification;

11 (2) establishment of an ocean acidification pro-
12 gram within the National Oceanic and Atmospheric
13 Administration;

14 (3) assessment and consideration of regional
15 and national ecosystem and socioeconomic impacts
16 of increased ocean acidification; and

17 (4) research adaptation strategies and tech-
18 niques for effectively conserving marine ecosystems
19 as they cope with increased ocean acidification.

20 **SEC. 3. DEFINITIONS.**

21 In this Act:

22 (1) OCEAN ACIDIFICATION.—The term “ocean
23 acidification” means the decrease in pH of the
24 Earth’s oceans and changes in ocean chemistry
25 caused by chemical inputs from the atmosphere, in-
26 cluding carbon dioxide.

1 (2) SECRETARY.—The term “Secretary” means
 2 the Secretary of Commerce, acting through the Ad-
 3 ministrator of the National Oceanic and Atmos-
 4 pheric Administration.

5 (3) SUBCOMMITTEE.—The term “Sub-
 6 committee” means the Joint Subcommittee on
 7 Ocean Science and Technology of the National
 8 Science and Technology Council.

9 **SEC. 4. INTERAGENCY SUBCOMMITTEE.**

10 (a) DESIGNATION.—

11 (1) IN GENERAL.—The Joint Subcommittee on
 12 Ocean Science and Technology of the National
 13 Science and Technology Council shall coordinate
 14 Federal activities on ocean acidification and estab-
 15 lish an interagency working group.

16 (2) MEMBERSHIP.—The interagency working
 17 group on ocean acidification shall be comprised of
 18 senior representatives from the National Oceanic
 19 and Atmospheric Administration, the National
 20 Science Foundation, the National Aeronautics and
 21 Space Administration, the United States Geological
 22 Survey, the United States Fish and Wildlife Service,
 23 and such other Federal agencies as appropriate.

24 (3) CHAIRMAN.—The interagency working
 25 group shall be chaired by the representative from

1 the National Oceanic and Atmospheric Administra-
2 tion.

3 (b) DUTIES.—The Subcommittee shall—

4 (1) develop the strategic research and moni-
5 toring plan to guide Federal research on ocean acidi-
6 fication required under section 5 of this Act and
7 oversee the implementation of the plan;

8 (2) oversee the development of—

9 (A) an assessment of the potential impacts
10 of ocean acidification on marine organisms and
11 marine ecosystems; and

12 (B) adaptation and mitigation strategies to
13 conserve marine organisms and ecosystems ex-
14 posed to ocean acidification;

15 (3) facilitate communication and outreach op-
16 portunities with nongovernmental organizations and
17 members of the stakeholder community with inter-
18 ests in marine resources;

19 (4) coordinate the United States Federal re-
20 search and monitoring program with research and
21 monitoring programs and scientists from other na-
22 tions; and

23 (5) establish or designate an Ocean Acidifica-
24 tion Information Exchange to make information on
25 ocean acidification developed through or utilized by

1 the interagency ocean acidification program acces-
2 sible through electronic means, including informa-
3 tion which would be useful to policymakers, re-
4 searchers, and other stakeholders in mitigating or
5 adapting to the impacts of ocean acidification.

6 (c) REPORTS TO CONGRESS.—

7 (1) INITIAL REPORT.—Not later than 1 year
8 after the date of enactment of this Act, the Sub-
9 committee shall transmit a report to the Committee
10 on Commerce, Science, and Transportation of the
11 Senate and the Committee on Science and Tech-
12 nology and the Committee on Natural Resources of
13 the House of Representatives that—

14 (A) includes a summary of federally fund-
15 ed ocean acidification research and monitoring
16 activities, including the budget for each of these
17 activities; and

18 (B) describes the progress in developing
19 the plan required under section 5 of this Act.

20 (2) BIENNIAL REPORT.—Not later than 2 years
21 after the delivery of the initial report under para-
22 graph (1) and every 2 years thereafter, the Sub-
23 committee shall transmit a report to the Committee
24 on Commerce, Science, and Transportation of the
25 Senate and the Committee on Science and Tech-

1 nology and the Committee on Natural Resources of
 2 the House of Representatives that includes—

3 (A) a summary of federally funded ocean
 4 acidification research and monitoring activities,
 5 including the budget for each of these activities;
 6 and

7 (B) an analysis of the progress made to-
 8 ward achieving the goals and priorities for the
 9 interagency research plan developed by the Sub-
 10 committee under section 5.

11 (3) STRATEGIC RESEARCH PLAN.—Not later
 12 than 2 years after the date of enactment of this Act,
 13 the Subcommittee shall transmit the strategic re-
 14 search plan developed under section 5 to the Com-
 15 mittee on Commerce, Science, and Transportation of
 16 the Senate and the Committee on Science and Tech-
 17 nology and the Committee on Natural Resources of
 18 the House of Representatives. A revised plan shall
 19 be submitted at least once every 5 years thereafter.

20 **SEC. 5. STRATEGIC RESEARCH PLAN.**

21 (a) IN GENERAL.—Not later than 2 years after the
 22 date of enactment of this Act, the Subcommittee shall de-
 23 velop a strategic plan for Federal research and monitoring
 24 on ocean acidification that will provide for an assessment
 25 of the impacts of ocean acidification on marine organisms

1 and marine ecosystems and the development of adaptation
2 and mitigation strategies to conserve marine organisms
3 and marine ecosystems. In developing the plan, the Sub-
4 committee shall consider and use information, reports, and
5 studies of ocean acidification that have identified research
6 and monitoring needed to better understand ocean acidifi-
7 cation and its potential impacts, and recommendations
8 made by the National Academy of Sciences in the review
9 of the plan required under subsection (d).

10 (b) CONTENTS OF THE PLAN.—The plan shall—

11 (1) provide for interdisciplinary research among
12 the ocean sciences, and coordinated research and ac-
13 tivities to improve the understanding of ocean chem-
14 istry that will affect marine ecosystems;

15 (2) establish, for the 10-year period beginning
16 in the year the plan is submitted, the goals and pri-
17 orities for Federal research and monitoring which
18 will—

19 (A) advance understanding of ocean acidi-
20 fication and its physical, chemical, and biologi-
21 cal impacts on marine organisms and marine
22 ecosystems;

23 (B) improve the ability to assess the socio-
24 economic impacts of ocean acidification; and

1 (C) provide information for the develop-
 2 ment of adaptation and mitigation strategies to
 3 conserve marine organisms and marine eco-
 4 systems;

5 (3) describe specific activities, including—

6 (A) efforts to determine user needs;

7 (B) research activities;

8 (C) monitoring activities;

9 (D) technology and methods development;

10 (E) data collection;

11 (F) database development;

12 (G) modeling activities;

13 (H) assessment of ocean acidification im-
 14 pacts; and

15 (I) participation in international research
 16 efforts;

17 (4) identify relevant programs and activities of
 18 the Federal agencies that contribute to the inter-
 19 agency program directly and indirectly and set forth
 20 the role of each Federal agency in implementing the
 21 plan;

22 (5) consider and utilize, as appropriate, reports
 23 and studies conducted by Federal agencies, the Na-
 24 tional Research Council, or other entities;

1 (6) make recommendations for the coordination
2 of the ocean acidification research and monitoring
3 activities of the United States with such activities of
4 other nations and international organizations;

5 (7) outline budget requirements for Federal
6 ocean acidification research and monitoring and as-
7 sessment activities to be conducted by each agency
8 under the plan;

9 (8) identify the monitoring systems and sam-
10 pling programs currently employed in collecting data
11 relevant to ocean acidification and prioritize addi-
12 tional monitoring systems that may be needed to en-
13 sure adequate data collection and monitoring of
14 ocean acidification and its impacts; and

15 (9) describe specific activities designed to facili-
16 tate outreach and data and information exchange
17 with stakeholder communities.

18 (c) PROGRAM ELEMENTS.—The plan shall include at
19 a minimum the following program elements:

20 (1) Monitoring of ocean chemistry and biologi-
21 cal impacts associated with ocean acidification at se-
22 lected coastal and open-ocean monitoring stations,
23 including satellite-based monitoring to charac-
24 terize—

25 (A) marine ecosystems;

1 (B) changes in marine productivity; and

2 (C) changes in surface ocean chemistry.

3 (2) Research to understand the species specific
4 physiological responses of marine organisms to ocean
5 acidification, impacts on marine food webs of ocean
6 acidification, and to develop environmental and eco-
7 logical indices that track marine ecosystem re-
8 sponses to ocean acidification.

9 (3) Modeling to predict changes in the ocean
10 carbon cycle as a function of carbon dioxide and at-
11 mosphere-induced changes in temperature, ocean cir-
12 culation, biogeochemistry, ecosystem and terrestrial
13 input, and modeling to determine impacts on marine
14 ecosystems and individual marine organisms.

15 (4) Technology development and standardiza-
16 tion of carbonate chemistry measurements on moor-
17 ings and autonomous floats.

18 (5) Assessment of socioeconomic impacts of
19 ocean acidification and development of adaptation
20 and mitigation strategies to conserve marine orga-
21 nisms and marine ecosystems.

22 (d) NATIONAL ACADEMY OF SCIENCES EVALUA-
23 TION.—The Secretary shall enter into an agreement with
24 the National Academy of Sciences to review the plan.

1 (e) PUBLIC PARTICIPATION.—In developing the plan,
2 the Subcommittee shall consult with representatives of
3 academic, State, industry and environmental groups. Not
4 later than 90 days before the plan, or any revision thereof,
5 is submitted to the Congress, the plan shall be published
6 in the Federal Register for a public comment period of
7 not less than 60 days.

8 **SEC. 6. NOAA OCEAN ACIDIFICATION ACTIVITIES.**

9 (a) IN GENERAL.—The Secretary shall establish and
10 maintain an ocean acidification program within the Na-
11 tional Oceanic and Atmospheric Administration to conduct
12 research, monitoring, and other activities consistent with
13 the strategic research and implementation plan developed
14 by the Subcommittee under section 5 that—

15 (1) includes—

16 (A) interdisciplinary research among the
17 ocean and atmospheric sciences, and coordi-
18 nated research and activities to improve under-
19 standing of ocean acidification;

20 (B) the establishment of a long-term moni-
21 toring program of ocean acidification utilizing
22 existing global and national ocean observing as-
23 sets, and adding instrumentation and sampling
24 stations as appropriate to the aims of the re-
25 search program;

1 (C) research to identify and develop adap-
2 tation strategies and techniques for effectively
3 conserving marine ecosystems as they cope with
4 increased ocean acidification;

5 (D) as an integral part of the research
6 programs described in this Act, educational op-
7 portunities that encourage an interdisciplinary
8 and international approach to exploring the im-
9 pacts of ocean acidification;

10 (E) as an integral part of the research pro-
11 grams described in this Act, national public
12 outreach activities to improve the under-
13 standing of current scientific knowledge of
14 ocean acidification and its impacts on marine
15 resources; and

16 (F) coordination of ocean acidification
17 monitoring and impacts research with other ap-
18 propriate international ocean science bodies
19 such as the International Oceanographic Com-
20 mission, the International Council for the Ex-
21 ploration of the Sea, the North Pacific Marine
22 Science Organization, and others;

23 (2) provides grants for critical research projects
24 that explore the effects of ocean acidification on eco-
25 systems and the socioeconomic impacts of increased

1 ocean acidification that are relevant to the goals and
2 priorities of the strategic research plan; and

3 (3) incorporates a competitive merit-based proc-
4 ess for awarding grants that may be conducted
5 jointly with other participating agencies or under the
6 National Oceanographic Partnership Program under
7 section 7901 of title 10, United States Code.

8 (b) ADDITIONAL AUTHORITY.—In conducting the
9 Program, the Secretary may enter into and perform such
10 contracts, leases, grants, or cooperative agreements as
11 may be necessary to carry out the purposes of this Act
12 on such terms as the Secretary considers appropriate.

13 **SEC. 7. NSF OCEAN ACIDIFICATION ACTIVITIES.**

14 (a) RESEARCH ACTIVITIES.—The Director of the Na-
15 tional Science Foundation shall continue to carry out re-
16 search activities on ocean acidification which shall support
17 competitive, merit-based, peer-reviewed proposals for re-
18 search and monitoring of ocean acidification and its im-
19 pacts, including—

20 (1) impacts on marine organisms and marine
21 ecosystems;

22 (2) impacts on ocean, coastal, and estuarine
23 biogeochemistry; and

1 (3) the development of methodologies and tech-
2 nologies to evaluate ocean acidification and its im-
3 pacts.

4 (b) CONSISTENCY.—The research activities shall be
5 consistent with the strategic research plan developed by
6 the Subcommittee under section 5.

7 (c) COORDINATION.—The Director shall encourage
8 coordination of the Foundation’s ocean acidification activi-
9 ties with such activities of other nations and international
10 organizations.

11 **SEC. 8. NASA OCEAN ACIDIFICATION ACTIVITIES.**

12 (a) OCEAN ACIDIFICATION ACTIVITIES.—The Ad-
13 ministrators of the National Aeronautics and Space Admin-
14 istration, in coordination with other relevant agencies,
15 shall ensure that space-based monitoring assets are used
16 in as productive a manner as possible for monitoring of
17 ocean acidification and its impacts.

18 (b) PROGRAM CONSISTENCY.—The Administrator
19 shall ensure that the Agency’s research and monitoring
20 activities on ocean acidification are carried out in a man-
21 ner consistent with the strategic research plan developed
22 by the Subcommittee under section 5.

23 (c) COORDINATION.—The Administrator shall en-
24 courage coordination of the Agency’s ocean acidification

1 activities with such activities of other nations and inter-
2 national organizations.

3 **SEC. 9. AUTHORIZATION OF APPROPRIATIONS.**

4 (a) NOAA.—There are authorized to be appropriated
5 to the National Oceanic and Atmospheric Administration
6 to carry out the purposes of this Act—

7 (1) \$8,000,000 for fiscal year 2009;

8 (2) \$12,000,000 for fiscal year 2010;

9 (3) \$15,000,000 for fiscal year 2011; and

10 (4) \$20,000,000 for fiscal year 2012.

11 (b) NSF.—There are authorized to be appropriated
12 to the National Science Foundation to carry out the pur-
13 poses of this Act—

14 (1) \$6,000,000 for fiscal year 2009;

15 (2) \$8,000,000 for fiscal year 2010;

16 (3) \$12,000,000 for fiscal year 2011; and

17 (4) \$15,000,000 for fiscal year 2012.

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