

**Calendar No. 749**

110TH CONGRESS  
2D SESSION

**S. 1581**

**[Report No. 110–339]**

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.

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IN THE SENATE OF THE UNITED STATES

JUNE 7, 2007

Mr. LAUTENBERG (for himself, Ms. CANTWELL, Mr. KERRY, Mr. STEVENS, Ms. KLOBUCHAR, Ms. SNOWE, Mr. NELSON of Florida, and Mrs. BOXER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

MAY 22, 2008

Reported by Mr. INOUE, with amendments

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**A BILL**

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.

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

1 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

2 (a) SHORT TITLE.—This Act may be cited as the  
3 “Federal Ocean Acidification Research And Monitoring  
4 Act of 2007” or the “FOARAM Act”.

5 (b) TABLE OF CONTENTS.—The table of contents for  
6 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Findings and purposes.
- Sec. 3. Interagency committee on ocean acidification.
- Sec. 4. Strategic research and implementation plan.
- Sec. 5. NOAA ocean acidification program.
- Sec. 6. Definitions.
- Sec. 7. Authorization of appropriations.

7 **SEC. 2. FINDINGS AND PURPOSES.**

8 (a) FINDINGS.—The Congress finds the following:

9 (1) The oceans help mitigate the effects of glob-  
10 al warming by absorbing atmospheric carbon diox-  
11 ide. About a third of anthropogenic carbon dioxide  
12 is currently absorbed by the ocean.

13 (2) The rapid increase in atmospheric carbon  
14 dioxide is overwhelming the natural ability of the  
15 oceans to cope with human-induced carbon dioxide  
16 emissions.

17 ~~(3) The emission of carbon dioxide into the at-~~  
18 ~~mosphere is causing the oceans to become more~~  
19 ~~acidic. The increase in acidity and changes in ocean~~  
20 ~~chemistry are corrosive to marine shells and orga-~~  
21 ~~nisms that form the base of the food chain for many~~  
22 ~~fish and marine mammals including the skeletons of~~

1 corals which provide one of the richest habitats on  
 2 earth.

3 (3) *The emission of carbon dioxide into the at-*  
 4 *mosphere is changing surface ocean carbon chemistry*  
 5 *and lowering the pH. These changes in ocean chem-*  
 6 *istry are corrosive to marine shells, and are detri-*  
 7 *mental to organisms that form the base of the food*  
 8 *chain for many fish and marine mammals, and to*  
 9 *corals, which provide one of the richest habitats on*  
 10 *Earth.*

11 (4) The rich biodiversity of marine *and fresh-*  
 12 *water* organisms is an important contribution to the  
 13 national ~~economy~~ *economy*, and the change in ocean  
 14 chemistry threatens our ~~fisheries and marine envi-~~  
 15 ~~ronmental quality~~; *fisheries, marine environmental*  
 16 *quality, and tourism*, and could result in significant  
 17 social and economic costs.

18 (5) Existing Federal programs support research  
 19 in related ocean chemistry, but gaps in funding, co-  
 20 ordination, and outreach have impeded national  
 21 progress in addressing ocean acidification.

22 (6) National investment in a coordinated pro-  
 23 gram of research and monitoring would improve the  
 24 understanding of ocean acidification effects on whole  
 25 ecosystems, advance our knowledge of the socio-eco-

1        nomic impacts of increased ocean acidification, and  
 2        strengthen the ability of marine resource managers  
 3        to assess and prepare for the harmful impacts of  
 4        ocean acidification on our marine resources.

5        (b) PURPOSES.—The purposes of this Act are to pro-  
 6        vide for—

7            (1) development and coordination of a com-  
 8        prehensive interagency plan to monitor and conduct  
 9        research on the processes and consequences of ocean  
 10       acidification on marine organisms and ecosystems  
 11       and to establish an ocean acidification program  
 12       within the National Oceanic and Atmospheric Ad-  
 13       ministration; ~~and~~

14           (2) assessment and consideration of regional  
 15       and national ecosystem and socio-economic impacts  
 16       of increased ocean acidification, and integration into  
 17       marine resource ~~decisions~~; *decisions; and*

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

21       **SEC. 3. INTERAGENCY COMMITTEE ON OCEAN ACIDIFICA-**  
 22       **TION.**

23       (a) ESTABLISHMENT.—

24           ~~(1) IN GENERAL.~~—There is hereby established  
 25       an ~~Interagency Committee on Ocean Acidification.~~

1           (1) *IN GENERAL.*—*The President shall establish*  
 2           *or designate an interagency committee on ocean*  
 3           *acidification.*

4           (2) *MEMBERSHIP.*—The ~~Committee~~ *committee*  
 5           shall be comprised of senior representatives from the  
 6           National Oceanic and Atmospheric Administration,  
 7           the National Science Foundation, the National Aero-  
 8           nautics and Space Administration, the United States  
 9           Geological Survey, the United States Fish and Wild-  
 10          life Service, the ~~Environmental Protection Agency,~~  
 11          the ~~Department of Energy,~~ and such other Federal  
 12          agencies as the ~~Secretary~~ *President* considers appro-  
 13          priate.

14          (3) *CHAIRMAN.*—The ~~Committee~~ *committee*  
 15          shall be chaired by the representative from the Na-  
 16          tional Oceanic and Atmospheric Administration. The  
 17          chairman may create subcommittees chaired by any  
 18          member agency of the committee. Working groups  
 19          may be formed by the full ~~Committee~~ *committee* to  
 20          address issues that may require more specialized ex-  
 21          pertise than is provided by existing subcommittees.

22          (b) *PURPOSE.*—The ~~Committee~~ *committee* shall over-  
 23          see the planning, establishment, and ~~coordination~~ *coordi-*  
 24          *nated implementation* of a plan designed to improve the

1 understanding of the role of increased ocean acidification  
 2 on marine ecosystems.

3 (c) REPORTS TO CONGRESS.—

4 (1) STRATEGIC RESEARCH AND IMPLEMENTA-  
 5 TION PLAN.—The ~~Committee~~ *committee* shall submit  
 6 the strategic research and implementation plan es-  
 7 tablished under section 4 to the Senate Committee  
 8 on Commerce, Science, and Transportation and the  
 9 House of Representatives Committee on Natural Re-  
 10 sources.

11 (2) TRIENNIAL REPORT.—Not later than 2  
 12 years after the date of the enactment of this Act and  
 13 every 3 years thereafter, the ~~Committee~~ *committee*  
 14 shall transmit a report to the Senate Committee on  
 15 Commerce, Science, and Transportation and the  
 16 House of Representatives Committee on Natural Re-  
 17 sources that includes—

18 (A) a summary of federally funded ocean  
 19 acidification research and monitoring activities,  
 20 including the budget for each of these activities;  
 21 and

22 (B) an analysis of the progress made to-  
 23 ward achieving the goals and priorities for the  
 24 interagency research plan developed by the  
 25 ~~Committee~~ *committee* under section 4 and rec-

1           ommendations for future ~~activities.~~ *activities,*  
 2           *including policy recommendations developed as*  
 3           *part of this research.*

4 **SEC. 4. STRATEGIC RESEARCH AND IMPLEMENTATION**  
 5 **PLAN.**

6           (a) IN GENERAL.—Within ~~4 year~~ *18 months* after the  
 7 date of enactment of this Act, the ~~Committee~~ *committee*  
 8 shall develop a strategic research and implementation plan  
 9 for coordinated Federal activities. In developing the plan,  
 10 the ~~Committee~~ *committee* shall consider ~~and use~~ reports  
 11 and studies conducted by Federal agencies and depart-  
 12 ments, the National Research Council, the Ocean Re-  
 13 search and Resources Advisory Panel, ~~the Joint Sub-~~  
 14 ~~committee on Ocean, Science, and Technology of the Na-~~  
 15 ~~tional Science and Technology Council, the Joint Ocean~~  
 16 ~~Commission Initiative,~~ and other expert scientific ~~bodies.~~  
 17 *bodies and coordinate with other relevant Federal inter-*  
 18 *agency committees.*

19           (b) SCOPE.—The plan shall—

20           (1) provide for interdisciplinary research among  
 21           the ocean sciences, and coordinated research and ac-  
 22           tivities to improve understanding of ocean acidifica-  
 23           tion that will affect marine ecosystems and to assess  
 24           the potential and realized socio-economic impact of  
 25           ocean acidification, including—

1 (A) effects of atmospheric carbon dioxide  
 2 on ocean chemistry;

3 (B) biological impacts of ocean acidifica-  
 4 tion, including research on—

5 (i) commercially and recreationally  
 6 important species and ecologically impor-  
 7 tant calcifiers that lie at the base of the  
 8 food chain; and

9 *(i) species, including commercially and*  
 10 *recreationally important species, protected,*  
 11 *endangered, or threatened species, and eco-*  
 12 *logically important calcifiers that lie at the*  
 13 *base of the food chain; and*

14 (ii) physiological changes in response  
 15 to ocean acidification;

16 ~~(C) identification and assessment of eco-~~  
 17 ~~systems most at risk from projected changes in~~  
 18 ~~ocean chemistry including—~~

19 (i) coral reef ecosystems;

20 (ii) polar ecosystems; and

21 (iii) coastal ocean ecosystems;

22 ~~(D) modeling the effects of pH including~~  
 23 ~~ecosystem forecasting;~~



1                   (C) *identification and assessment of eco-*  
 2                   *systems most at risk from projected changes in*  
 3                   *ocean chemistry, including—*

4                   (i) *coastal ecosystems, including Great*  
 5                   *Lakes ecosystems;*

6                   (ii) *coral reef ecosystems, including*  
 7                   *deep sea coral ecosystems; and*

8                   (iii) *polar and subpolar ecosystems;*

9                   (D) *modeling the changes in ocean chem-*  
 10                  *istry driven by the increases in ocean carbon lev-*  
 11                  *els, including ecosystem forecasting;*

12                  (E) *identifying feedback mechanisms re-*  
 13                  *sulting from the ocean chemistry changes and*  
 14                  ~~the subsequent~~ *such as the decrease in calcifi-*  
 15                  *cation rates in organisms;*

16                  (F) *socio-economic impacts of ocean acidi-*  
 17                  *fication, including commercially and*  
 18                  *recreationally important fisheries; fisheries and*  
 19                  *coral reef communities; and*

20                  (G) *identifying interactions between ocean*  
 21                  *acidification and other oceanic changes includ-*  
 22                  *ing those associated with climate change;*

23                  (2) *establish, for the 10-year period beginning*  
 24                  *in the year it is submitted, goals, priorities, and*  
 25                  *guidelines for coordinated activities that will—*

1 (A) most effectively advance scientific un-  
2 derstanding of the characteristics and impacts  
3 of ocean acidification;

4 (B) provide forecasts of changes in ocean  
5 acidification and the consequent impacts on ma-  
6 rine ecosystems; and

7 (C) provide a basis for policy decisions to  
8 reduce and manage ocean acidification and its  
9 environmental impacts;

10 (3) provide an estimate of Federal funding re-  
11 quirements for research and monitoring activities;  
12 and

13 (4) identify and strengthen relevant programs  
14 and activities of the Federal agencies and depart-  
15 ments that would contribute to accomplishing the  
16 goals of the plan and prevent unnecessary duplica-  
17 tion of efforts, including making recommendations  
18 for the use of observing systems and technological  
19 research and development.

20 *(c) CONSULTATION.—In developing the plan, the com-*  
21 *mittee may consult with the academic community, States,*  
22 *industry, environmental groups, and other relevant stake-*  
23 *holders.*

1 **SEC. 5. NOAA OCEAN ACIDIFICATION PROGRAM.**

2 (a) IN GENERAL.—The Secretary shall establish and  
 3 maintain an ocean acidification program within the Na-  
 4 tional Oceanic and Atmospheric Administration to imple-  
 5 ment activities consistent with the strategic research and  
 6 implementation plan developed by the ~~Committee~~ *com-*  
 7 *mittee* under section 4 that—

8 (1) includes—

9 (A) interdisciplinary research among the  
 10 ocean *and atmospheric* sciences, and coordi-  
 11 nated research and activities to improve under-  
 12 standing of ocean acidification;

13 (B) the establishment of a long-term moni-  
 14 toring program of ~~pH levels in the ocean~~ *ocean*  
 15 *acidification* utilizing existing global ocean ob-  
 16 serving assets and adding instrumentation and  
 17 sampling stations as appropriate to the aims of  
 18 the research program;

19 *(C) research to identify and develop adapta-*  
 20 *tion strategies and techniques for effectively con-*  
 21 *serving marine ecosystems as they cope with in-*  
 22 *creased ocean acidification;*

23 ~~(C)~~ (D) educational opportunities that en-  
 24 courage an interdisciplinary and international  
 25 approach to exploring the impacts of ocean  
 26 acidification;

1                   ~~(D)~~ (E) national public outreach activities  
 2                   to improve the understanding of ocean acidifica-  
 3                   tion and its impacts on marine resources; and

4                   ~~(E)~~ (F) coordination of ocean acidification  
 5                   *research and* monitoring ~~and impacts research~~  
 6                   with other appropriate international ocean  
 7                   science bodies such as the International Ocean-  
 8                   ographic Commission, the International Council  
 9                   for the Exploration of the Sea, the North Pa-  
 10                  cific ~~Marine Science Organization~~, *Research*  
 11                  *Board*, and others;

12                  (2) provides grants for critical research projects  
 13                  that explore the effects of ocean acidification on eco-  
 14                  systems and the socio-economic impacts of increased  
 15                  ocean acidification that are relevant to the goals and  
 16                  priorities of the strategic research plan; and

17                  (3) incorporates a competitive merit-based  
 18                  grant process that may be conducted jointly with  
 19                  other participating agencies or under the National  
 20                  Oceanographic Partnership Program under section  
 21                  7901 of title 10, United States Code.

22                  (b) ADDITIONAL AUTHORITY.—In conducting the  
 23                  Program, the Secretary may enter into and perform such  
 24                  contracts, leases, grants, or cooperative agreements as

1 may be necessary to carry out the purposes of this Act  
 2 on such terms as the Secretary deems appropriate.

3 **SEC. 6. DEFINITIONS.**

4 In this Act:

5 (1) ~~COMMITTEE.~~—The term “Committee”  
 6 means the ~~Interagency Committee on Ocean Acidifi-~~  
 7 ~~cation~~ established by section 3(a).

8 (2) ~~OCEAN ACIDIFICATION.~~—The term “ocean  
 9 acidification” means the decrease in the pH of the  
 10 Earth’s oceans caused by the uptake of anthropo-  
 11 genic carbon dioxide from the atmosphere.

12 (1) *COMMITTEE.*—*The term “committee” means*  
 13 *the interagency committee on ocean acidification es-*  
 14 *tablished or designated by the President under section*  
 15 *3(a)(1).*

16 (2) *OCEAN ACIDIFICATION.*—*The term “ocean*  
 17 *acidification” means the change in ocean chemistry*  
 18 *that is driven by the increase in ocean carbon levels,*  
 19 *and the uptake of chemical inputs from the atmos-*  
 20 *phere, including anthropogenic carbon dioxide.*

21 (3) *PROGRAM.*—The term “Program” means  
 22 the National Oceanic and Atmospheric Administra-  
 23 tion Ocean Acidification Program established under  
 24 section 5.

1           (4) 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 **SEC. 7. AUTHORIZATION OF APPROPRIATIONS.**

6           ~~(a) IN GENERAL.—There are authorized to be appro-~~  
 7           ~~priated to the National Oceanic and Atmospheric Adminis-~~  
 8           ~~tration \$30,000,000 to carry out the purposes of this Act~~  
 9           ~~for each of fiscal years 2008 through 2012, and such sums~~  
 10          ~~as may be necessary for fiscal years after fiscal year 2012.~~

11          ~~(b) ALLOCATION.—~~

12           ~~(1) Of the amounts made available to carry out~~  
 13           ~~this Act for a fiscal year, the Secretary shall allocate~~  
 14           ~~at least 60 percent to other departments and agen-~~  
 15           ~~cies to carry out the priorities of the plan developed~~  
 16           ~~by the Committee.~~

17          ~~(a) IN GENERAL.—There are authorized to be appro-~~  
 18          ~~priated to the National Oceanic and Atmospheric Adminis-~~  
 19          ~~tration to carry out this Act—~~

20           ~~(1) \$10,000,000 for fiscal year 2009;~~

21           ~~(2) \$15,000,000 for fiscal year 2010;~~

22           ~~(3) \$20,000,000 for fiscal year 2011;~~

23           ~~(4) \$25,000,000 for fiscal year 2012; and~~

24           ~~(5) \$30,000,000 for fiscal year 2013.~~

1       (b) *ALLOCATION*.—Of the amounts appropriated to the  
 2       *National Oceanic and Atmospheric Administration* under  
 3       *subsection (a)* for each fiscal year—

4               (1) 40 percent shall be available to, and retained  
 5       by, the *National Oceanic and Atmospheric Adminis-*  
 6       *tration* for use in carrying out its responsibilities  
 7       under this Act; and

8               (2) 60 percent shall be transferred by the *Na-*  
 9       *tional Oceanic and Atmospheric Administration* in  
 10       equal amounts to—

11               (A) the *National Science Foundation*;

12               (B) the *National Aeronautics and Space*  
 13       *Administration*;

14               (C) the *United States Geological Survey*;  
 15       and

16               (D) the *United States Fish and Wildlife*  
 17       *Service*.

18       ~~(2)~~ (3) Of the amounts made available to carry  
 19       out this Act for any fiscal year, the Secretary, and  
 20       other departments and agencies to which amounts  
 21       are ~~allocated under paragraph (1)~~, transferred under  
 22       *paragraph (2)*, shall allocate at least 50 percent for  
 23       competitive grants.

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