

110<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

# H. R. 4174

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## AN ACT

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 2008” 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. Definitions.
- Sec. 4. Interagency subcommittee.
- Sec. 5. Strategic research plan.
- Sec. 6. NOAA ocean acidification activities.
- Sec. 7. NSF ocean acidification activities.
- Sec. 8. NASA ocean acidification activities.
- Sec. 9. Authorization of appropriations.

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

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

9 (1) The oceans help regulate atmospheric chem-  
10 istry by acting as the largest sink for carbon dioxide.

11 (2) The rapid increase in atmospheric carbon  
12 dioxide is overwhelming the natural ability of the  
13 oceans to absorb this gas.

14 (3) The influx of carbon dioxide into the atmos-  
15 phere and the subsequent absorption by the oceans  
16 is changing surface ocean carbon chemistry and low-  
17 ering the pH. These changes in ocean chemistry are  
18 detrimental to organisms including corals, which  
19 support one of the richest habitats on Earth, marine  
20 shellfish, and many other organisms that form the

1 base of the food chain for many fish and marine  
2 mammals.

3 (4) The rich biodiversity of marine organisms is  
4 an important contribution to the national economy  
5 and the change in ocean chemistry threatens tour-  
6 ism, our fisheries, and marine environmental quality,  
7 and could result in significant social and economic  
8 costs.

9 (5) Existing Federal programs support research  
10 in related ocean chemistry, but gaps in funding, co-  
11 ordination, and outreach have impeded national  
12 progress in addressing ocean acidification.

13 (6) National investment in a coordinated pro-  
14 gram of research and monitoring would improve the  
15 understanding of ocean acidification effects on whole  
16 ecosystems, advance our knowledge of the socio-  
17 economic impacts of increased ocean acidification,  
18 and strengthen the ability of marine resource man-  
19 agers to assess and prepare for the harmful impacts  
20 of ocean acidification on our marine resources.

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

23 (1) development and coordination of a com-  
24 prehensive interagency plan to—

1 (A) monitor and conduct research on the  
2 processes and consequences of ocean acidifica-  
3 tion on marine organisms and ecosystems; and

4 (B) establish an interagency research and  
5 monitoring program on ocean acidification;

6 (2) assessment and consideration of regional  
7 and national ecosystem and socioeconomic impacts  
8 of increased ocean acidification; and

9 (3) research on adaptation strategies and tech-  
10 niques for effectively conserving marine ecosystems  
11 as they cope with increased ocean acidification.

12 **SEC. 3. DEFINITIONS.**

13 In this Act:

14 (1) OCEAN ACIDIFICATION.—The term “ocean  
15 acidification” means the decrease in pH of the  
16 Earth’s oceans and changes in ocean chemistry  
17 caused by chemical inputs from the atmosphere, in-  
18 cluding carbon dioxide.

19 (2) SECRETARY.—The term “Secretary” means  
20 the Secretary of Commerce, acting through the Ad-  
21 ministrator of the National Oceanic and Atmos-  
22 pheric Administration.

23 (3) SUBCOMMITTEE.—The term “Sub-  
24 committee” means the Joint Subcommittee on

1 Ocean Science and Technology of the National  
2 Science and Technology Council.

3 **SEC. 4. INTERAGENCY SUBCOMMITTEE.**

4 (a) DESIGNATION.—The Joint Subcommittee on  
5 Ocean Science and Technology of the National Science  
6 and Technology Council shall coordinate Federal activities  
7 on ocean acidification.

8 (b) DUTIES.—The Subcommittee shall—

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

13 (2) oversee the development of—

14 (A) an assessment of the potential impacts  
15 of ocean acidification on marine organisms and  
16 marine ecosystems; and

17 (B) adaptation and mitigation strategies to  
18 conserve marine organisms and ecosystems ex-  
19 posed to ocean acidification;

20 (3) facilitate communication and outreach op-  
21 portunities with nongovernmental organizations and  
22 members of the stakeholder community with inter-  
23 ests in marine resources;

24 (4) coordinate the United States Federal re-  
25 search and monitoring program with research and

1 monitoring programs and scientists from other na-  
2 tions; and

3 (5) establish or designate an Ocean Acidifica-  
4 tion Information Exchange to make information on  
5 ocean acidification developed through or utilized by  
6 the interagency ocean acidification program acces-  
7 sible through electronic means, including informa-  
8 tion which would be useful to policymakers, re-  
9 searchers, and other stakeholders in mitigating or  
10 adapting to the impacts of ocean acidification.

11 (c) REPORTS TO CONGRESS.—

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

19 (A) includes a summary of federally fund-  
20 ed ocean acidification research and monitoring  
21 activities, including the budget for each of these  
22 activities; and

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

1           (2) BIENNIAL REPORT.—Not later than 2 years  
2 after the delivery of the initial report under para-  
3 graph (1) and every 2 years thereafter, the Sub-  
4 committee shall transmit a report to the Committee  
5 on Commerce, Science, and Transportation of the  
6 Senate and the Committee on Science and Tech-  
7 nology and the Committee on Natural Resources of  
8 the House of Representatives that includes—

9           (A) a summary of federally funded ocean  
10 acidification research and monitoring activities,  
11 including the budget for each of these activities;  
12 and

13           (B) an analysis of the progress made to-  
14 ward achieving the goals and priorities for the  
15 interagency research plan developed by the Sub-  
16 committee under section 5.

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

1 **SEC. 5. STRATEGIC RESEARCH PLAN.**

2 (a) IN GENERAL.—Not later than 2 years after the  
3 date of enactment of this Act, the Subcommittee shall de-  
4 velop a strategic plan for Federal research and monitoring  
5 on ocean acidification that will provide for an assessment  
6 of the impacts of ocean acidification on marine organisms  
7 and marine ecosystems and the development of adaptation  
8 and mitigation strategies to conserve marine organisms  
9 and marine ecosystems. In developing the plan, the Sub-  
10 committee shall consider and use information, reports, and  
11 studies of ocean acidification that have identified research  
12 and monitoring needed to better understand ocean acidifi-  
13 cation and its potential impacts, and recommendations  
14 made by the National Academy of Sciences in the review  
15 of the plan required under subsection (d).

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

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

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

25 (B) improve the ability to assess the socio-  
26 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           (2) 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           (3) 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           (4) consider and utilize, as appropriate, reports  
23           and studies conducted by Federal agencies, the Na-  
24           tional Research Council, or other entities;

1           (5) 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           (6) 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           (7) 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           (8) 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 response 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 The Secretary shall conduct research and monitoring  
10 activities and may establish a program on ocean acidifica-  
11 tion within the National Oceanic and Atmospheric Admin-  
12 istration consistent with the strategic research plan devel-  
13 oped by the Subcommittee under section 5 that—

14 (1) includes—

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

19 (B) the establishment of a long-term moni-  
20 toring program of ocean acidification utilizing  
21 existing global and national ocean observing as-  
22 sets, and adding instrumentation and sampling  
23 stations as appropriate to the aims of the re-  
24 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 pro-  
4 cess 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 **SEC. 7. NSF OCEAN ACIDIFICATION ACTIVITIES.**

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

15 (1) impacts on marine organisms and marine  
16 ecosystems;

17 (2) impacts on ocean, coastal, and estuarine  
18 biogeochemistry; and

19 (3) the development of methodologies and tech-  
20 nologies to evaluate ocean acidification and its im-  
21 pacts.

22 (b) **CONSISTENCY.**—The research activities shall be  
23 consistent with the strategic research plan developed by  
24 the Subcommittee under section 5.

1 (c) COORDINATION.—The Director shall encourage  
2 coordination of the Foundation’s ocean acidification activi-  
3 ties with such activities of other nations and international  
4 organizations.

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

6 (a) OCEAN ACIDIFICATION ACTIVITIES.—The Ad-  
7 ministrator of the National Aeronautics and Space Admin-  
8 istration, in coordination with other relevant agencies,  
9 shall ensure that space-based monitoring assets are used  
10 in as productive a manner as possible for monitoring of  
11 ocean acidification and its impacts.

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

17 (c) COORDINATION.—The Administrator shall en-  
18 courage coordination of the Agency’s ocean acidification  
19 activities with such activities of other nations and inter-  
20 national organizations.

21 **SEC. 9. AUTHORIZATION OF APPROPRIATIONS.**

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

25 (1) \$8,000,000 for fiscal year 2009;

- 1           (2) \$12,000,000 for fiscal year 2010;
- 2           (3) \$15,000,000 for fiscal year 2011; and
- 3           (4) \$20,000,000 for fiscal year 2012.

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

- 7           (1) \$6,000,000 for fiscal year 2009;
- 8           (2) \$8,000,000 for fiscal year 2010;
- 9           (3) \$12,000,000 for fiscal year 2011; and
- 10          (4) \$15,000,000 for fiscal year 2012.

Passed the House of Representatives July 9, 2008.

Attest:

*Clerk.*



110<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

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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.