

(1) provide for interdisciplinary research among the ocean sciences, and coordinated research and activities to improve the understanding of ocean chemistry that will affect marine ecosystems;

(2) establish, for the 10-year period beginning in the year the plan is submitted, the goals and priorities for Federal research and monitoring which will—

(A) advance understanding of ocean acidification and its physical, chemical, and biological impacts on marine organisms and marine ecosystems;

(B) improve the ability to assess the socioeconomic impacts of ocean acidification; and

(C) provide information for the development of adaptation and mitigation strategies to conserve marine organisms and marine ecosystems;

(3) describe specific activities, including—

(A) efforts to determine user needs;

(B) research activities;

(C) monitoring activities;

(D) technology and methods development;

(E) data collection;

(F) database development;

(G) modeling activities;

(H) assessment of ocean acidification impacts; and

(I) participation in international research efforts;

(4) identify relevant programs and activities of the Federal agencies that contribute to the interagency program directly and indirectly and set forth the role of each Federal agency in implementing the plan;

(5) consider and utilize, as appropriate, reports and studies conducted by Federal agencies, the National Research Council, or other entities;

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

(7) outline budget requirements for Federal ocean acidification research and monitoring and assessment activities to be conducted by each agency under the plan;

(8) identify the monitoring systems and sampling programs currently employed in collecting data relevant to ocean acidification and prioritize additional monitoring systems that may be needed to ensure adequate data collection and monitoring of ocean acidification and its impacts; and

(9) describe specific activities designed to facilitate outreach and data and information exchange with stakeholder communities.

(c) Program elements

The plan shall include at a minimum the following program elements:

(1) Monitoring of ocean chemistry and biological impacts associated with ocean acidification at selected coastal and open-ocean monitoring stations, including satellite-based monitoring to characterize—

(A) marine ecosystems;

(B) changes in marine productivity; and

(C) changes in surface ocean chemistry.

(2) Research to understand the species specific physiological responses of marine organisms to ocean acidification, impacts on marine food webs of ocean acidification, and to develop environmental and ecological indices that track marine ecosystem responses to ocean acidification.

(3) Modeling to predict changes in the ocean carbon cycle as a function of carbon dioxide and atmosphere-induced changes in temperature, ocean circulation, biogeochemistry, ecosystem and terrestrial input, and modeling to determine impacts on marine ecosystems and individual marine organisms.

(4) Technology development and standardization of carbonate chemistry measurements on moorings and autonomous floats.

(5) Assessment of socioeconomic impacts of ocean acidification and development of adaptation and mitigation strategies to conserve marine organisms and marine ecosystems.

(d) National Academy of Sciences evaluation

The Secretary shall enter into an agreement with the National Academy of Sciences to review the plan.

(e) Public participation

In developing the plan, the Subcommittee shall consult with representatives of academic, State, industry and environmental groups. Not later than 90 days before the plan, or any revision thereof, is submitted to the Congress, the plan shall be published in the Federal Register for a public comment period of not less than 60 days.

(Pub. L. 111–11, title XII, § 12405, Mar. 30, 2009, 123 Stat. 1438.)

§ 3705. NOAA ocean acidification activities

(a) In general

The Secretary shall establish and maintain an ocean acidification program within the National Oceanic and Atmospheric Administration to conduct research, monitoring, and other activities consistent with the strategic research and implementation plan developed by the Subcommittee under section 3704 of this title that—

(1) includes—

(A) interdisciplinary research among the ocean and atmospheric sciences, and coordinated research and activities to improve understanding of ocean acidification;

(B) the establishment of a long-term monitoring program of ocean acidification utilizing existing global and national ocean observing assets, and adding instrumentation and sampling stations as appropriate to the aims of the research program;

(C) research to identify and develop adaptation strategies and techniques for effectively conserving marine ecosystems as they cope with increased ocean acidification;

(D) as an integral part of the research programs described in this chapter, educational opportunities that encourage an interdisciplinary and international approach to exploring the impacts of ocean acidification;

(E) as an integral part of the research programs described in this chapter, national

public outreach activities to improve the understanding of current scientific knowledge of ocean acidification and its impacts on marine resources; and

(F) coordination of ocean acidification monitoring and impacts research with other appropriate international ocean science bodies such as the International Oceanographic Commission, the International Council for the Exploration of the Sea, the North Pacific Marine Science Organization, and others;

(2) provides grants for critical research projects that explore the effects of ocean acidification on ecosystems and the socioeconomic impacts of increased ocean acidification that are relevant to the goals and priorities of the strategic research plan; and

(3) incorporates a competitive merit-based process for awarding grants that may be conducted jointly with other participating agencies or under the National Oceanographic Partnership Program under section 7901 of title 10.

(b) Additional authority

In conducting the Program, the Secretary may enter into and perform such contracts, leases, grants, or cooperative agreements as may be necessary to carry out the purposes of this chapter on such terms as the Secretary considers appropriate.

(Pub. L. 111–11, title XII, §12406, Mar. 30, 2009, 123 Stat. 1440.)

§ 3706. NSF ocean acidification activities

(a) Research activities

The Director of the National Science Foundation shall continue to carry out research activities on ocean acidification which shall support competitive, merit-based, peer-reviewed proposals for research and monitoring of ocean acidification and its impacts, including—

(1) impacts on marine organisms and marine ecosystems;

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

(3) the development of methodologies and technologies to evaluate ocean acidification and its impacts.

(b) Consistency

The research activities shall be consistent with the strategic research plan developed by the Subcommittee under section 3704 of this title.

(c) Coordination

The Director shall encourage coordination of the Foundation's ocean acidification activities with such activities of other nations and international organizations.

(Pub. L. 111–11, title XII, §12407, Mar. 30, 2009, 123 Stat. 1441.)

§ 3707. NASA ocean acidification activities

(a) Ocean acidification activities

The Administrator of the National Aeronautics and Space Administration, in coordina-

tion with other relevant agencies, shall ensure that space-based monitoring assets are used in as productive a manner as possible for monitoring of ocean acidification and its impacts.

(b) Program consistency

The Administrator shall ensure that the Agency's research and monitoring activities on ocean acidification are carried out in a manner consistent with the strategic research plan developed by the Subcommittee under section 3704 of this title.

(c) Coordination

The Administrator shall encourage coordination of the Agency's ocean acidification activities with such activities of other nations and international organizations.

(Pub. L. 111–11, title XII, §12408, Mar. 30, 2009, 123 Stat. 1441.)

§ 3708. Authorization of appropriations

(a) NOAA

There are authorized to be appropriated to the National Oceanic and Atmospheric Administration to carry out the purposes of this chapter—

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

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

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

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

(b) NSF

There are authorized to be appropriated to the National Science Foundation to carry out the purposes of this chapter—

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

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

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

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

(Pub. L. 111–11, title XII, §12409, Mar. 30, 2009, 123 Stat. 1441.)

CHAPTER 51—CLEAN HULLS

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