

communities, tribal and subsistence communities, and island communities, that may be impacted by ocean acidification;

(v) identifies impacts of changing ocean carbonate chemistry on the communities described in clause (iv), including impacts from changes in ocean and coastal marine resources that are not managed by the Federal Government;

(vi) identifies gaps in understanding of the impacts of ocean acidification on economically or commercially important species, particularly those which support United States commercial, recreational, and tribal fisheries and aquaculture;

(vii) identifies habitats that may be particularly vulnerable to corrosive sea water, including areas experiencing multiple stressors such as hypoxia, sedimentation, and harmful algal blooms;

(viii) identifies areas in which existing National Integrated Coastal and Ocean Observation System assets, including unmanned maritime systems, may be leveraged as platforms for the deployment of new sensors or other applicable observing technologies;

(ix) is written in collaboration with Federal agencies responsible for carrying out this chapter, including representatives of—

(I) the National Marine Fisheries Service and the Office for Coastal Management of the National Oceanic and Atmospheric Administration;

(II) regional coastal observing systems established under section 3603(c)(4) of this title;

(III) regional ocean acidification networks; and

(IV) sea grant programs (as defined in section 1122 of this title); and

(x) is written in consultation with experts, including subsistence users, academia, and stakeholders familiar with the economic, social, ecological, geographic, and resource concerns of coastal communities in the United States.

## **(B) Form of report**

### **(i) Initial report**

The initial report required under subparagraph (A) shall include the information described in clauses (i) through (viii) of that subparagraph on a national level.

### **(ii) Subsequent reports**

Each report required under subparagraph (A) after the initial report—

(I) may describe the information described in clauses (i) through (viii) of that subparagraph on a national level; or

(II) may consist of separate reports for each region of the National Oceanic and Atmospheric Administration.

### **(iii) Regional reports**

If the Subcommittee opts to prepare a report required under subparagraph (A) as separate regional reports under clause (ii)(II), the Subcommittee shall submit a

report for each region of the National Oceanic and Atmospheric Administration not less frequently than once during each 6-year reporting period.

## **(C) Appropriate committees of Congress defined**

In this paragraph and in paragraph (5), the term “appropriate committees of Congress” means the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Natural Resources of the House of Representatives.

## **(5) Monitoring prioritization plan**

Not later than 180 days after the date of the submission of the initial report under paragraph (4)(A), the Subcommittee shall transmit to the appropriate committees of Congress a report that develops a plan to deploy new sensors or other applicable observing technologies such as unmanned maritime systems—

(A) based on such initial report;

(B) prioritized by—

(i) the threat to coastal economies and ecosystems;

(ii) gaps in data; and

(iii) research needs; and

(C) that leverage existing platforms, where possible.

(Pub. L. 111–11, title XII, § 12404, Mar. 30, 2009, 123 Stat. 1437; Pub. L. 116–271, title I, § 109, Dec. 31, 2020, 134 Stat. 3341.)

## **Editorial Notes**

### **AMENDMENTS**

2020—Subsec. (c)(4). Pub. L. 116–271 added par. (4).

## **Statutory Notes and Related Subsidiaries**

### **CHANGE OF NAME**

Committee on Science and Technology of House of Representatives changed to Committee on Science, Space, and Technology of House of Representatives by House Resolution No. 5, One Hundred Twelfth Congress, Jan. 5, 2011.

## **§ 3704. Strategic research plan**

### **(a) In general**

Not later than 2 years after March 30, 2009, the Subcommittee shall develop a strategic plan for Federal research and monitoring on ocean acidification that will provide for an assessment of the impacts of ocean acidification on marine organisms and marine ecosystems and the development of adaptation and mitigation strategies to conserve marine organisms and marine ecosystems. In developing the plan, the Subcommittee shall consider and use information, reports, and studies of ocean acidification that have identified research and monitoring needed to better understand ocean acidification and its potential impacts, and recommendations made by the National Academy of Sciences in the review of the plan required under subsection (d).

### **(b) Contents of the plan**

The plan shall—

(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;

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

(10) make recommendations for research to be conducted, including in the social sciences and economics, to address the key knowledge gaps identified in the Ocean Chemistry Coastal Community Vulnerability Assessment conducted under section 3703(c)(4) of this title.

#### (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 acidifi-

cation 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.

(6) Research to understand the combined impact of changes in ocean chemistry and other stressors, including sediment delivery, hypoxia, and harmful algal blooms, on each other and on living marine resources, including aquaculture and coastal ecosystems.

(7) Applied research to identify adaptation strategies for species impacted by changes in ocean chemistry including vegetation-based systems, shell recycling, species and genetic diversity, applied technologies, aquaculture methodologies, and management recommendations.

#### (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, tribal governments, and subsistence users. 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; Pub. L. 116–271, title I, § 110(a)–(c), Dec. 31, 2020, 134 Stat. 3343.)

#### Editorial Notes

##### AMENDMENTS

2020—Subsec. (b)(10). Pub. L. 116–271, § 110(a), added par. (10).

Subsec. (c)(6), (7). Pub. L. 116–271, § 110(b), added pars. (6) and (7).

Subsec. (e). Pub. L. 116–271, § 110(c), inserted “, tribal governments, and subsistence users” after “groups”.

#### Statutory Notes and Related Subsidiaries

##### REVISED STRATEGIC RESEARCH PLAN

Pub. L. 116–271, title I, § 110(d), Dec. 31, 2020, 134 Stat. 3343, provided that: “Not later than one year after the

date of the enactment of this Act [Dec. 31, 2020], the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council shall submit to Congress a revised strategic research plan under section 12405 of the Federal Ocean Acidification Research And Monitoring Act of 2009 (33 U.S.C. 3704) that includes the matters required by the amendments made by this section.”

### § 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;

(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 8931 of title 10; and

(4) includes an ongoing mechanism that allows industry members, coastal stakeholders, fishery management councils and commissions, non-Federal resource managers, community acidification networks, indigenous knowledge groups, and scientific experts to provide input on monitoring needs that are necessary

to support on the ground management, decision making, and adaptation related to ocean acidification and its impacts.

#### (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; Pub. L. 115–232, div. A, title VIII, § 809(k)(2), Aug. 13, 2018, 132 Stat. 1843; Pub. L. 116–271, title I, § 111, Dec. 31, 2020, 134 Stat. 3343.)

### Editorial Notes

#### AMENDMENTS

2020—Subsec. (a)(4). Pub. L. 116–271 added par. (4).

2018—Subsec. (a)(3). Pub. L. 115–232 substituted “section 8931 of title 10” for “section 7901 of title 10”.

### Statutory Notes and Related Subsidiaries

#### EFFECTIVE DATE OF 2018 AMENDMENT

Amendment by Pub. L. 115–232 effective Feb. 1, 2019, with provision for the coordination of amendments and special rule for certain redesignations, see section 800 of Pub. L. 115–232, set out as a note preceding section 3001 of Title 10, Armed Forces.

### § 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, observation, and monitoring of ocean acidification and its impacts, including—

(1) impacts on marine organisms, including species cultured for aquaculture, and marine ecosystems;

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

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

(4) impacts of multiple stressors on ecosystems exhibiting hypoxia, harmful algal blooms, or sediment delivery, combined with changes in ocean chemistry.

#### (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; Pub. L. 116–271, title I, § 112, Dec. 31, 2020, 134 Stat. 3344.)

### Editorial Notes

#### AMENDMENTS

2020—Subsec. (a). Pub. L. 116–271 amended subsec. (a) generally. Prior to amendment, text read as follows: