

Calendar No. 206

117TH CONGRESS }
2d Session }

SENATE

{ REPORT
117-74 }

BLUE GLOBE ACT

R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND
TRANSPORTATION

ON

S. 140



FEBRUARY 15, 2022.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

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FEBRUARY 15, 2022.—Ordered to be printed

Ms. CANTWELL, from the Committee on Commerce, Science, and Transportation, submitted the following

R E P O R T

[To accompany S. 140]

[Including cost estimate of the Congressional Budget Office]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 140) to improve data collection and monitoring of the Great Lakes, oceans, bays, estuaries, and coasts, and for other purposes, having considered the same, reports favorably thereon with an amendment (in the nature of a substitute) and recommends that the bill (as amended) do pass.

PURPOSE OF THE BILL

S. 140 would promote data collection, analysis, synthesis, and sharing, monitoring, and exploration of the Great Lakes, oceans, bays, estuaries, and coasts to advance science and operational decision making.

BACKGROUND AND NEEDS

NOAA WORKFORCE

In 2001, the Government Accountability Office (GAO) identified acquiring and developing a skilled workforce at the National Oceanic and Atmospheric Administration (NOAA) as a high-risk area for mismanagement.¹ The absence of mission-critical skills impede agencies' abilities to fulfill their tasks and achieve results in the

¹GAO, *High Risk Series: An Update*, GAO-01-2683, 2001 (<https://www.gao.gov/products/gao-01-263>).

most cost-efficient manner.² The lack of resources for recruiting, retaining, and developing staff caused decreased capacity in NOAA's Workforce Management Office and a hiring backlog for the National Weather Service (NWS) in 2013.³ Unfilled vacancies in the NWS led to managers and staff needing to perform additional tasks to ensure that life-saving forecasts and warnings were issued.⁴

In addition to hiring backlogs, other NOAA workforce issues include the lack of workforce diversity. In October 2016, NOAA developed its Diversity and Inclusion Strategic Plan, as required by Executive Order 13583—Establishing a Coordinated Government-wide Initiative to Promote Diversity and Inclusion in the Federal Workforce.⁵ To promote diversity and inclusion, NOAA identified three goals as part of its plan: (1) recruit a diverse, highly capable workforce; (2) build a work environment that promotes inclusion; and (3) build sustained leadership commitment to a diverse and inclusive NOAA through accountability, data, and education. Though NOAA has experienced increased participation rates among minority groups over the years, the rates are still lower than expected. NOAA continues to remain committed to examining barriers limiting a diverse workforce.⁶

ELECTRONIC MONITORING

Electronic monitoring (EM) can be a more accurate, efficient, and timely method to record fish catch and effort data compared to paper-based logbooks. There are multiple ways to implement electronic monitoring systems, for example by using cameras and sensors (e.g., GPS receivers, sensors to detect activities, control box to record data).⁷ The system then can record fish species, fishing time and location, catch handling, number of bycatch, and catch counting.⁸ In 2015, EM was fully implemented in the Atlantic and Gulf pelagic longline fishery to observe bluefin tuna bycatch.⁹ Starting in May 2021, fishers in the groundfish fishery can opt to deploy EM systems to replace human at-sea monitors. Differences in fishery dynamics, target species, vessel sizes, and fishing gear all require specialized EM systems. Despite the potential benefits of EM, there are still numerous challenges in the design and implementation of EM. For example, data storage and access can be very costly, and human data and video review can be costly and untimely. To scale up EM usage in different fisheries, these challenges need to be addressed.

² GAO, *National Weather Service: Actions Have Been Taken to Fill Increasing Vacancies, but Opportunities Exist to Improve and Evaluate Hiring*, GAO-17-364, 2017 (<https://www.gao.gov/assets/gao-17-364.pdf>).

³ *Ibid.*

⁴ *Ibid.*

⁵ National Oceanic and Atmospheric Administration, Office of Inclusion and Civil Rights, *NOAA Diversity and Inclusion Implementation Plan—Workforce Diversity*, 2017 (https://www.eo.noaa.gov/d&i/diversity_inclusion_strategic_plan.html).

⁶ National Oceanic and Atmospheric Administration, *Management Directive 715: Equal Employment Opportunity Program Status Report, FY 2017* (<https://www.noaa.gov/sites/default/files/legacy/document/2020/Sep/MD715-FY%202017-Final.pdf>).

⁷ National Marine Fisheries Service, "Electronic Monitoring in the Northeast" (<https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/electronic-monitoring-northeast#how-electronic-monitoring-works>) (accessed May 18, 2021).

⁸ *Ibid.*

⁹ EDF, *Electronic Technologies and Data Policy for U.S. Fisheries: Key Topics, Barriers, and Opportunities*, July 2020 (<https://www.edf.org/sites/default/files/documents/EDFWhitePaper%2CElectronicTechnologiesAndDataPolicyForU.S.Fisheries%2C6-22-20.pdf>).

BLUE ECONOMY

Over 40 percent of all Americans currently live in coastal regions, and these regions account for nearly half of total economic productivity in the United States,¹⁰ with 3.2 million employees working in 152,000 businesses in the ocean and Great Lakes economies, earning \$128 billion in wages as of 2015.¹¹ In 2015, employment in the ocean economy added 97,000 jobs, an increase of 3.2 percent, compared to the national average employment growth of 2.1 percent.¹² In 2018, America’s blue economy contributed \$373 billion to the Nation’s gross domestic product (GDP) and grew faster than the Nation’s GDP as a whole.¹³ The top five sectors that contributed to the marine economy were: tourism and recreation (\$143 billion), National Defense and public administration (\$124 billion), offshore minerals (\$49 billion), transportation and warehousing (\$25 billion), and living resources (\$13 billion).¹⁴

ADVANCED RESEARCH PROJECTS AGENCY—OCEANS

The Defense Advanced Research Projects Agency (DARPA) was established over 60 years ago and has continued to make pivotal investments in technological development for United States national security. Working with innovators inside and outside the Government (academic, nonprofit, and for-profit) has led to groundbreaking innovations, such as the internet, automated voice recognition, and Global Positions System (GPS) receivers small enough to embed in consumer devices.¹⁵ In 2007, following a report by the National Academies, Congress passed the America COMPETES Act, which authorized the creation of the Advanced Research Project Agency Energy (ARPA-E). ARPA-E was modeled after DARPA to maintain the United States’ advantages in science and technology, and to advance high-impact and high-potential energy technologies that are too early for private-sector investment.

There has been an interest in examining the potential need for an ARPA entity for the advancement of oceans technology. There are several Federal entities that currently conduct ocean research. For example, in December 2017, DARPA announced the creation of the Ocean of Things program to enable persistent maritime situational awareness through a low-cost distributed sensor network. Each sensor would contain a suite of commercially available sensors to collect environmental data as well as activity data about vessels, aircraft, and marine mammals. The floats housing sensors would transmit data periodically via satellite to a cloud network for storage and real-time analysis.¹⁶ Additionally, NOAA’s Oceanic and Atmospheric Research (OAR) line office “provides the research

¹⁰ NOAA Digital Coast, “Socioeconomic Data Summary” (<https://coast.noaa.gov/data/digitalcoast/pdf/socioeconomic-data-summary.pdf>) (accessed May 22, 2018).

¹¹ National Oceanic and Atmospheric Administration, Office for Coastal Management, *NOAA Report on the U.S. Ocean and Great Lakes Economy*, 2018 (<https://coast.noaa.gov/data/digitalcoast/pdf/econ-report-2015.pdf>).

¹² *Ibid.*

¹³ NOAA, “Marine Economy in 2018 Grew Faster Than U.S. Overall,” press release, June 2, 2020 (<https://www.noaa.gov/media-release/marine-economy-in-2018-grew-faster-than-us-overall>).

¹⁴ *Ibid.*

¹⁵ Defense Advanced Research Projects Agency, “About DARPA” (<https://www.darpa.mil/about-us/about-darpa>) (accessed July 13, 2020).

¹⁶ Defense Advanced Research Projects Agency, “Ocean of Things Aims to Expand Maritime Awareness Across Open Seas,” December 6, 2017 (<https://www.darpa.mil/news-events/2017-12-06>).

foundation for understanding the complex systems that support our planet,” which includes a substantial investment in ocean research.¹⁷

SUMMARY OF PROVISIONS

If enacted, S. 140, the BLUE GLOBE Act, would do the following:

- Direct the Under Secretary of Commerce for Oceans and Atmosphere to conduct a study through the National Academy of Sciences on scientific workforce and develop a workforce development program to address workforce issues identified;
- Accelerate innovation at NOAA cooperative institutes by focusing on emerging technologies;
- Establish a program to improve data collection and synthesis on blue economy industries related to the Great Lakes, oceans, bays, estuaries, and coasts;
- Direct the Under Secretary of Commerce for Oceans and Atmosphere to enter into an agreement with the National Academy of Sciences to conduct a comprehensive assessment on the need for and feasibility of an Advanced Research Projects Agency–Oceans (ARPA–O) within NOAA.

LEGISLATIVE HISTORY

S. 140, the Bolstering Long-Term Understanding and Exploration of the Great Lakes, Oceans, Bays, and Estuaries Act or the BLUE GLOBE Act, was introduced on January 28, 2021, by Senator Whitehouse and was referred to the Committee on Commerce, Science, and Transportation of the Senate. On March 2, 2021, Senator Murkowski was added as a cosponsor, and Senators Merkley and Portman became cosponsors on March 9, 2021. On May 12, 2021, the Committee met in open Executive Session and, by voice vote, ordered S. 140 reported favorably with an amendment (in the nature of a substitute).

116TH CONGRESS

A similar act, S. 933, was introduced on March 28, 2019, by Senator Whitehouse (for himself and Senator Murkowski) and was referred to the Committee on Commerce, Science, and Transportation of the Senate. On July 22, 2020, the Committee met in open Executive Session and, by voice vote, ordered S. 933 reported favorably with an amendment (in the nature of a substitute).

A related bill, H.R. 3548, the BLUE GLOBE Act, was introduced on June 27, 2019, by Representative Suzanne Bonamici (for herself and Representative Don Young) and referred to the Committees on Natural Resources; Science, Space and Technology; and Education and Labor in the House of Representatives. Seven additional cosponsors were later added.

ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget

¹⁷NOAA, Oceanic and Atmospheric Research, “About Us” (<https://research.noaa.gov/>) (accessed on July 31, 2020).

Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, January 18, 2022.

Hon. MARIA CANTWELL,
*Chair, Committee on Commerce, Science, and Transportation,
U.S. Senate, Washington, DC.*

DEAR MADAM CHAIR: The Congressional Budget Office has prepared the enclosed cost estimate for S. 140, the BLUE GLOBE Act. If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Robert Reese.

Sincerely,

PHILLIP L. SWAGEL,
Director.

Enclosure.

S. 140, BLUE GLOBE Act			
As reported by the Senate Committee on Commerce, Science, and Transportation on December 17, 2021			
By Fiscal Year, Millions of Dollars	2022	2022-2026	2022-2031
Direct Spending (Outlays)	0	0	0
Revenues	0	0	0
Increase or Decrease (-) in the Deficit	0	0	0
Spending Subject to Appropriation (Outlays)	1	6	not estimated
Statutory pay-as-you-go procedures apply?	No	Mandate Effects	
Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2032?	No	Contains intergovernmental mandate?	No
		Contains private-sector mandate?	No

S. 140 would require the National Oceanic and Atmospheric Administration (NOAA) to contract with the National Academy of Sciences (NAS) to complete two studies and report the results to the Congress. One study would assess the supply of skilled labor in the federal, private, and nonprofit sectors for oceanic and atmospheric research. The other would assess whether a new advanced oceanic research agency is needed within NOAA.

S. 140 also would direct NOAA to evaluate the benefits of using emerging technology to support oceanic research and monitoring within several programs. The bill would require NOAA, in coordination with the Bureau of Economic Analysis, to periodically study the value and effects of industries related to the Great Lakes and other major bodies of water in the United States and to report those findings biennially to the Congress. Finally, the bill would require NOAA to establish a competition to develop fisheries monitoring equipment and data analysis tools.

The bill states that no appropriations are authorized to implement the requirements. However, using information on similar activities, CBO expects that NOAA would require seven additional

full-time-equivalent employees as well as additional equipment and funding to service the NAS contracts and award prizes under the new competition. Using information on the duration of and awards given out for recent prize competitions administered by NOAA, CBO expects prizes would total about \$600,000 and would be awarded in 2026.

On that basis, CBO estimates that implementing S. 140 would cost \$6 million over the 2022–2026 period; such spending would be subject to the availability of appropriated amounts.

The CBO staff contact for this estimate is Robert Reese. The estimate was reviewed by H. Samuel Papenfuss, Deputy Director of Budget Analysis.

REGULATORY IMPACT STATEMENT

Because S. 140 does not create any new programs, the legislation will have no additional regulatory impact, and will result in no additional reporting requirements. The legislation will have no further effect on the number or types of individuals and businesses regulated, the economic impact of such regulation, the personal privacy of affected individuals, or the paperwork required from such individuals and businesses.

CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

SECTION-BY-SECTION ANALYSIS

Section 1. Short title.

This section would provide that the bill may be cited as the “Bolstering Long-term Understanding and Exploration of the Great Lakes, Oceans, Bays, and Estuaries Act” or the “BLUE GLOBE Act”.

Section 2. Purpose.

This section would provide that the purpose of the bill would be to better facilitate science and operational decision making of the Great Lakes, oceans, bays, estuaries, and the coasts.

Section 3. Sense of Congress.

This section would highlight the sense of Congress that agencies should optimize data collection, management, and dissemination to maximize the impacts, among other things, on science and policy-making with respect to the Great Lakes, oceans, bays, estuaries, and coasts.

Section 4. Definitions.

This section would define the terms “Administrator” and “Indian Tribe”.

Section 5. Workforce study.

This section would amend the America COMPETES Reauthorization Act¹⁸ by requiring the Under Secretary of Commerce for Oceans and Atmosphere to request the National Academy of Sciences to conduct a study on the scientific workforce in the areas of oceanic and atmospheric research and development. The study would, among other things, investigate: (1) whether there is a shortage in the number of individuals with technical or trade-based skillsets for careers in the oceanic and atmospheric field; (2) workforce diversity and actions the agency can take to increase diversity; and (3) actions the agency can take to shorten the hiring backlog for this workforce. The report would be submitted to Congress within 18 months of enactment of this Act.

Section 6. Accelerating innovation at Cooperative Institutes.

This section would direct the Administrator to evaluate whether to include advancing: (1) applied use and development of advanced genetic technologies (e.g., eDNA); (2) deployment and improvements to advanced unmanned vehicles; and (3) supercomputing and big data management, as part of the goals of NOAA's Cooperative Institutes.

Section 7. Electronic Monitoring Innovation Prize.

This section would direct the Administrator, in consultation with the heads of relevant Federal agencies and nongovernmental partners, to establish the Electronic Monitoring Innovation Prize.

Section 8. Blue Economy valuation.

This section would direct the Administrator, in collaboration with the heads of relevant Federal agencies, to prioritize the collection, aggregation, and analysis of data to measure the value and impact of industries related to the Great Lakes, oceans, bays, estuaries, and coasts. This section would also list what Blue Economy industries include.

Section 9. Advanced Research Projects Agency–Oceans.

This section would direct the Administrator to request the National Academy of Science to conduct a comprehensive assessment of the need for and feasibility of establishing an Advanced Research Projects Agency–Oceans (ARPA–O) that operates within NOAA. This report would include an assessment of how an ARPA–O could help overcome the long-term and high-risk technological barriers in the development of ocean technologies and evaluation of the organizational structures under which an ARPA–O could be organized.

Section 10. No additional funds authorized.

This section would ensure that no additional funds are authorized to carry out this Act.

¹⁸ 33 U.S.C. 893c(a).

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new material is printed in italic, existing law in which no change is proposed is shown in roman):

AMERICA COMPETES REAUTHORIZATION ACT OF 2010

[33 U.S.C. 893c(a)–(d)]

* * * * *

TITLE III—NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

* * * * *

SEC. 303. WORKFORCE STUDY.

(a) IN GENERAL.—The **Secretary of Commerce** *Under Secretary of Commerce for Oceans and Atmosphere*, in cooperation with the Secretary of Education, shall request the National Academy of Sciences to conduct a study on the scientific workforce in the areas of oceanic and atmospheric research and development. The study shall investigate—

(1) whether there is a shortage in the number of individuals with advanced degrees in oceanic and atmospheric sciences who have the ability to conduct high quality scientific research in physical and chemical oceanography, meteorology, and atmospheric modeling, and related fields, for government, nonprofit, and private sector entities;

(2) *whether there is a shortage in the number of individuals with technical or trade-based skillsets or credentials suited to a career in oceanic and atmospheric data collection, processing, satellite production, or satellite operations;*

[(2)](3) what Federal programs are available to help facilitate the education of students hoping to pursue these degrees, *skillsets, or credentials;*

[(3)](4) barriers to transitioning highly qualified oceanic and atmospheric scientists *or highly qualified technical professionals and tradespeople* into Federal civil service scientist career tracks;

[(4)](5) what institutions of higher education, the private sector, and the Congress could do to increase the number of individuals with such post baccalaureate degrees, *skillsets, or credentials;*

[(5)](6) the impact of an aging Federal **scientist** workforce on the ability of Federal agencies to conduct high quality scientific research**;** *and*, *observations, and monitoring;*

[(6)](7) what actions the Federal government can take to assist the transition of highly qualified scientists **into** Federal career scientist positions and ensure that the experiences of retiring Federal scientists are adequately documented and trans-

ferred prior to retirement from Federal service.], *technical professionals, and tradespeople into Federal career positions;*

(8) *workforce diversity and actions the Federal Government can take to increase diversity in the scientific workforce; and*

(9) *actions the Federal Government can take to shorten the hiring backlog for such workforce.*

(b) COORDINATION.—The [Secretary of Commerce] *Under Secretary of Commerce for Oceans and Atmosphere* and the Secretary of Education shall consult with the heads of other Federal agencies and departments with oceanic and atmospheric expertise or authority in preparing the specifications for the study.

(c) REPORT.—No later than 18 months after [the date of enactment of this Act] *the date of the enactment of the Bolstering Long-term Understanding and Exploration of the Great Lakes, Oceans, Bays, and Estuaries Act*, the [Secretary of Commerce] *Under Secretary of Commerce for Oceans and Atmosphere* and the Secretary of Education shall transmit a joint report [to each committee of Congress with jurisdiction over the programs described in 4002(b) of the America COMPETES Act (33 U.S.C. 893a(b)), as amended by section 302 of this Act] *to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Natural Resources and the Committee on Science, Space, and Technology of the House of Representatives*, detailing the findings and recommendations of the study and setting forth a prioritized plan to implement the recommendations.

(d) PROGRAM AND PLAN.—The [Administrator of the National Oceanic and Atmospheric Administration] *Under Secretary of Commerce for Oceans and Atmosphere* shall evaluate the National Academy of Sciences study and develop a workforce program and plan to institutionalize the Administration’s Federal science career pathways and address aging workforce issues. The program and plan shall be developed in consultation with the Administration’s cooperative institutes and other [academic partners to identify and implement programs and mechanisms to ensure that—] *academic partners*.

(1) sufficient highly qualified scientists are able to transition into Federal career scientist positions in the Administration’s laboratories and programs; and

(2) the technical and management experiences of senior employees are documented and transferred before leaving Federal service.

* * * * *