

Congress of the United States

House of Representatives

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

2321 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6301

(202) 225-6371
www.science.house.gov

MEMORANDUM

TO: Committee on Science, Space, and Technology Members and Staff
FROM: Science, Space, and Technology Committee Staff
DATE: May 16, 2014
RE: Full Committee Markup

The Committee on Science, Space, and Technology will meet on Wednesday, May 21, 2014, at 2:00 p.m. in Room 2318 of the Rayburn House Office Building to consider the following:

- S. 1254, the “Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2013”; and
- H.R. 4186, the “Frontiers in Innovation, Research, Science, and Technology Act of 2014”

S. 1254, the “Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2013”

Background

A harmful algal bloom (HAB) is a bloom, or rapid overproduction of algal cells, that produces toxins, which are detrimental to plants and animals. These outbreaks are commonly referred to as “red” or “brown” tides. Blooms can kill fish and other aquatic life by decreasing sunlight available to the water and by depleting the available oxygen in the water, causing hypoxia. The produced toxins accumulate in shellfish, fish, or through the accumulation of biomass that affect other organisms and alter food webs. In recent years, many of the Nation’s coastlines, near shore marine waters, and freshwaters have experienced an increase in the number, frequency, duration, and type of HABs.

Legislative History

In 1998, Congress passed the Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA, Public Law 105-83), which established an Interagency Task Force to develop a national HABs assessment and authorized funding for existing and new research programs on HABs. These programs involve federal, state, and academic partners and support interdisciplinary extramural research studies to address the issues of HABs in an ecosystem context.

In 2004, HABHRCA was reauthorized in Public Law 108-456. The reauthorized Act required assessments of HABs in different coastal regions and in the Great Lakes and included plans to expand research to address the impacts of HABs. The law also authorized research, education, and monitoring activities related to the prevention, reduction, and control of harmful algal blooms and hypoxia. The 2004 HABHRCA authorized funds to conduct research and reduce HABs and hypoxia in U.S. marine waters, estuaries, and the Great Lakes. In its role as a task force participant, the Environmental Protection Agency (EPA) has signed memorandums of understanding to fund competitive research in these areas.

The reauthorization expired in 2008, however, the Consolidated Appropriations Act of 2008 (P.L. 110-161) provided an authorization of appropriations through FY2010. NOAA continues these activities under existing general authorities.

S. 1254 was reported, without amendment, out of the Senate Committee on Commerce, Science, and Transportation on July 30, 2013. The bill passed the Senate, with amendment, by Unanimous Consent on February 12, 2014.

The bill was received in the House and referred to the Committee on Science, Space, and Technology on February 18, 2014.

Major Provisions of S. 1254

The Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2013 would:

- Streamline and coordinate existing HAB/Hypoxia activities at NOAA and at other Federal agencies, prioritizing:
 - An action strategy to help communities understand, predict, control and mitigate freshwater and marine HAB and hypoxia events
 - Event response and infrastructure programs
- Provides for development of Comprehensive Research and Action Plans to identify regional, state, and local needs in prioritizing research and developing products and tools to aid decision making;
- Promote the transition of research products into implementable actions for regional, State, and local governments to predict, prevent, monitor, and mitigate HAB and hypoxia events and to minimize any resulting economic, ecologic, and human health impacts in their communities; and
- Provide for research and monitoring of freshwater HABs, including the Great Lakes.

Appropriations: The bill authorizes \$20.5 million to NOAA from 2014 to 2018. Recent authorizations for NOAA's HABs and Hypoxia programs have been \$23.5 million (FY 2005), \$24.5 million (FY 2006), \$25.0 million (FY 2007), \$30.0 million (FY 2008), \$30.0 million (FY 2009), and \$30.0 million (FY 2010).

H.R. 4186, the “Frontiers in Innovation, Research, Science, and Technology Act of 2014”

Background and Need

Federal policies that focus on scientific and technological advancement have been a recurring subject of congressional attention since the founding of the United States. Among the major post-World War II legislation in this area are the National Science Foundation Act of 1950 (P.L. 81-507) and the Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480).

The *Frontiers in Innovative Research, Science, and Technology Act of 2014* (FIRST Act) reauthorizes the National Science Foundation, the coordination of federal STEM education programs, the Office of Science and Technology Policy, and the National Institute of Standards and Technology. In addition, the FIRST Act addresses technology transfer and information technology research and development.

National Science Foundation (NSF)

The National Science Foundation (NSF) is the primary source of federal funding for non-medical basic research and a significant contributor to many fields of scientific endeavor. Through more than 11,700 annual competitive awards, chosen through a merit-review process,, NSF supports the work of an average of 326,000 scientists, engineers, educators and students at universities, laboratories and field sites across the U.S. and internationally.

NSF’s research and education activities can be divided into six major funding areas:

- Research and Related Activities (RRA) comprises the majority of the Foundation’s activities and budget by funding research in biological sciences, computer and information sciences, engineering, geosciences, mathematics, physical sciences, and the social sciences. Additional research activities include international and integrative activities and the U.S. Arctic Research Commission.
- Education and Human Resources (EHR) supports the preparation of the STEM workforce and a STEM-literate citizenry through investment in research and development on STEM education and learning.
- Major Research Equipment and Facilities Construction (MREFC) is responsible for funding the construction of large research facilities, ranging from ground-based telescopes to research ships. Funding for the design, operation and management of these major user facilities is included in the RRA budget.
- Agency Operations and Award Management (AOAM) funds all internal operations of NSF.
- National Science Board (NSB) is responsible for establishing policies for NSF and for providing national science policy advice to the President and Congress.
- Office of the Inspector General (OIG) conducts and supervises audits and investigations of NSF programs, evaluates allegations of research misconduct, and issues reports to the NSB, Foundation, and Congress regarding problems, corrective actions, and progress towards improving the management and conduct of NSF programs.

Coordination of Federal STEM Education Programs and Activities

The federal government spends nearly \$3 billion across thirteen federal agencies on STEM education programs each year. These programs are found primarily at NSF, the Department of Education and the Department of Health and Human Services. Unfortunately, American students still lag behind students of other nations when it comes to STEM education. According to the Organisation for Economic Co-operation and Development's 2012 Programme for International Student Assessment results, American students rank 26th in math and 21st in science.

The 2010 COMPETES Act (P.L. 111-358) included a number of requirements for the review and coordination of federal STEM programs. The Act required the National Science and Technology Council, an interagency group led by the White House Office of Science and Technology Policy, to form a Committee on STEM (CoSTEM) to develop and implement a 5-year strategic plan. CoSTEM released an inventory of federal STEM programs in December 2011; the final Strategic Plan was released in May 2013.

Office of Science and Technology Policy (OSTP)

The National Science and Technology Policy, Organization, and Priorities Act of 1976 authorized the establishment of the Office Science and Technology Policy (OSTP) to advise the President on science and technology policy issues. OSTP also leads interagency efforts to develop and implement science and technology budgets and to coordinate science education efforts.

The mission of OSTP has three aspects: "first, to provide the President and his senior staff with accurate, relevant, and timely scientific and technical advice on all matters of consequence; second, to ensure that the policies of the Executive Branch are informed by sound science; and third, to ensure that the scientific and technical work of the Executive Branch is properly coordinated so as to provide the greatest benefit to society."

National Institute of Standards and Technology (NIST)

NIST is a non-regulatory agency within the Department of Commerce. Originally founded in 1901 as the National Bureau of Standards, NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST is an industry-recognized provider of high-quality information to the private sector.

NIST operates two main research laboratories in Gaithersburg, Maryland, and Boulder, Colorado, as well as radio stations in Hawaii and Colorado. NIST also maintains partnerships with the Hollings Marine Labs in Charleston, South Carolina, the Joint Institute for Laboratory Astrophysics (JILA) with the University of Colorado in Boulder, and the Center for Advanced

Research in Biotechnology (CARB) and the Joint Quantum Institute with the University of Maryland.

NIST currently operates six laboratory units which conduct research and development for measurement science, standards, and technology: the Material Measurement Laboratory (MML); the Physical Measurement Laboratory (PLM); the Engineering Laboratory (EL); the Information Technology Laboratory (ITL); the Center for Nanoscale Science and Technology (CNST); and the Center for Neutron Research (NCNR). In addition to the NIST laboratories, NIST manages several extramural programs that support industry.

NIST has three main budget accounts:

- Scientific and Technical Research and Services (STRS) encompasses NIST's Core Laboratory research programs. STRS initiatives also include advanced manufacturing; cybersecurity research, standards and education; developing measurement tools and standards for cyber physical systems; advancing broadband communications; and disaster resilience.
- Construction of Research Facilities (CRF) supports construction of new facilities and maintenance and repair of existing NIST buildings.
- Industrial Technology Services (ITS) includes the Manufacturing Extension Partnership (MEP) program. The MEP program is a public/private partnership run by Centers in all 50 states and Puerto Rico that provides technical assistance for small- and medium-sized manufacturers to modernize their operations and adapt to foreign competition.

Technology Transfer

In fiscal year 2012, the Federal Government funded more than \$131 billion in research and development (R&D) activities. Colleges and universities conduct the majority of basic research in the United States, and cumulatively receive more than half of their total research funding from federal agencies. Because of the large amounts expended by the Federal Government on basic research by universities, research institutes, and national laboratories, efforts to improve the transfer of federally-funded research are of interest to both the Federal Government and stakeholders across the nation.

Recently, there has been bipartisan support to establish a grant program within Federal Agencies that currently participate in the Small Business Technology Transfer program to support innovative approaches to technology transfer at institutions of higher education, nonprofit research institutions, and Federal laboratories. The purpose of this program is to accelerate the commercialization of federally funded research and technology by small business concerns, including new businesses.

Networking Information Technology Research and Development (NITRD)

H.R. 967, which passed the House in April 2013, is incorporated into this legislation. Originally authorized in the High-Performance Computing Act of 1991 (P.L. 102-194), the NITRD program is the main R&D investment portfolio of 15 federal participating agencies in

networking, computing, software, cyber security and related information technologies. The NITRD program supports a number of research areas, including big data, cyber physical systems, cyber security and information assurance, health technology, high performance computing and large scale networking.

Legislative History

In 2007, Congress passed the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act (P.L. 110-69). Congress passed, and the President later signed, a three-year reauthorization of the America COMPETES Act in December 2010; this authorization expired at the end of 2013, thereby necessitating a reauthorization of agencies included in this bill.

On March 13, 2014, the Subcommittee on Research and Technology met in open markup session and adopted H.R.4186, as amended, by voice vote. The Subcommittee approved nine of the fourteen amendments considered. Further, the Subcommittee ordered H.R. 4186 favorably reported to the House, as amended, by voice vote.

Major Provisions of H.R. 4186

The *Frontiers in Innovative Research, Science, and Technology Act of 2014* (FIRST Act):

- Authorizes NSF funding by directorate within the Research and Related Activities account and prioritizes basic research areas to boost future innovation and economic growth, including mathematics, physics, chemistry, biology, computer science, and engineering;
- Encourages Cybersecurity R&D and workforce development;
- Trains future scientific and technical leaders via graduate and teaching fellowships;
- Encourages NSF to fund activities related to the BRAIN initiative;
- Creates a STEM education advisory panel to assure stakeholder input in priority-setting;
- Improves technology transfer and commercialization of federally funded R&D;
- Encourages NSF and other federal science agencies to use innovative funding models for advances in research and development, such as prizes and crowd-sourcing, in addition to traditional federal grant funding mechanism;
- Requires OSTP to report on progress to reduce the cost of compliance with federal agencies' compliance regimes for federally-funded researchers;
- Addresses questions about NSF grants by requiring NSF to be transparent and accountable about its grant funding decisions;
- Requires research data created using federal research funds and used in published peer-reviewed papers to be made available to the public;
- Requires federally-funded researchers to certify that subsequent published articles are based on an accurate representation of research results, and establishes a process for investigation and adjudication when knowing misrepresentation is suspected;
- Ensures public access to the scientific research results from Federal funding, while at the same time preserving the access to and need for high quality publications using a flexible, transparent and data-driven process.

The *Frontiers in Innovative Research, Science, and Technology Act of 2014* (FIRST Act) authorizes:

- \$5,555,000 in Fiscal Year 2014 and 2015 for the White House Office of Science and Technology Policy;
- \$7,171,918,000 in Fiscal Year 2014 and \$7,279,496,770 in Fiscal Year 2015 for the National Science Foundation;
- \$850,000,000 in Fiscal Year 2014 and \$862,750,000 in Fiscal Year 2015 for National Institute of Standards and Technology (NIST).