Analysis of the President’s FY 2015 Budget Request for Biological Sciences Research and Education

A Report from the AIBS Public Policy Office
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Summary

On 4 March 2014, President Obama released his proposed budget for fiscal year (FY) 2015. The plan would provide $1.014 trillion for discretionary spending, the same level agreed to in the December 2013 Ryan-Murray budget accord.

Most federal science agencies would receive a small budget increase if the President’s budget request were enacted. The administration proposes $135.4 billion for federal research and development, an increase of 1.2 percent relative to the FY 2014 enacted level. This is less than the anticipated 1.7 percent increase in inflation, but higher than the 0.2 percent increase proposed overall for discretionary spending.

An additional $56 billion is sought for a Growth, Opportunity, and Security Initiative. The Initiative would direct $5.3 billion in additional funds for science and technology, including $1 billion for a climate resilience fund, $552 million for the National Science Foundation, $970 million for the National Institutes of Health, and additional funding for other federal science programs. Congress seems unlikely to support the supplemental request because it exceeds the budget caps that have bipartisan support and because the initiative lacks viable budget offsets.

The White House once again proposed a reorganization of science, technology, engineering, and mathematics (STEM) education. The “fresh” proposal would consolidate some STEM programs within agencies, but would not transfer programs to other agencies, as was proposed and soundly rejected in the FY 2014 budget request.
Agency Budget Summaries

Department of Energy Office of Science

- Department of Energy request: $27.9 billion (+$715.6 million)
- Office of Science request: $5.1 billion (+$44.8 million)
- Biological and Environmental Research request: $628.0 million (+$18.3 million)

The Department of Energy Office of Science is slated to receive a 0.9 percent increase in the President’s budget request. Funding for Biological and Environmental Research would grow at a rate of 3.0 percent.

The Biological and Environmental Research program supports fundamental research and scientific user facilities to inform our understanding of complex biological, climatic, and environmental systems as they relate to energy.

Biological systems science would receive $299.9 million, a cut of $11.9 million. Most of this reduction would come from research on the radiological sciences. Funding for the metabolic synthesis and conversion program would decline by $3.2 million. Most other programs would be flat funded, including foundational genomics research, computational biosciences, bioenergy research centers, and structural biology infrastructure.

The Climate and Environmental Sciences program would benefit from an increase of $30.2 million, for a total of $328.1 million. The largest increase would be directed to climate model development and validation (+$29.0 million), which would incorporate finer resolution (less than 10 km) scale physics into climate models. The terrestrial ecosystem science program, which supports research on Arctic and tropical ecosystems, would lose nearly a million dollars (-2.1 percent). Subsurface biogeochemical research would increase by 5.9 percent.

The President’s budget request would provide $2.5 million for graduate research fellowships. This level would support an additional 30 awards. The computational sciences graduate fellowship would be eliminated (-$8.7 million).

Environmental Protection Agency (EPA)

- EPA request: $7.9 billion (-$310.0 million)
- Science and Technology request: $763.8 million (+$4.6 million)

Spending at EPA would decline by nearly 4 percent in the proposed budget. The anticipated staffing level is 14 percent lower than a decade ago. Funding for science and technology programs would increase by 0.6 percent.
Within the Office of Research and Development, funding for research for sustainable and healthy communities—a program that includes some ecosystem research—would decline to $144.1 million (-7.0 percent). EPA proposes to repurpose $7.8 million in funding from ongoing, but unspecified, research to develop decision-support tools for communities on the issues of ecosystem services, contaminated sites, pollution and environmental justice, and beneficial use of sustainable materials. An additional $1.3 million is proposed for development of tools to examine the impacts of climate change adaptation on ecosystem goods and services in at-risk communities. A savings of $4.4 million is projected from workforce attrition and other programmatic efficiencies.

Research on safe and sustainable water resources would increase by 2.8 percent. Despite an overall increase in this programmatic area, some research programs would have less funding in FY 2015. One area targeted for reduction is water quality research on combined sewer overflows and wastewater systems. Additionally, $1.3 million would be saved by reducing ocean monitoring activities through “strategic targeting” of ocean dumpsites.

A proposed $4.3 million increase would allow the EPA to expand its work with the Department of Energy and United States Geological Survey to understand the potential impacts of hydraulic fracturing on water quality and aquatic ecosystems. The agencies are currently studying the impact of hydraulic fracturing on drinking water.

Increased funding would be available for research addressing climate change and improving air quality (+$7.0 million), including an additional $1.0 million for research on the environmental and human health impacts of biofuels.

Within the area of chemical safety and sustainability, $2.5 million in new funding would be used to apply novel methods to monitor chemical stressors in the Great Lakes and to increase research on the environmental fate and transport of nanomaterials. A savings of $1.2 million would be achieved by delaying planned activities to develop biological systems to test the effects of chemicals on human health without using animal models.

The budget would be zeroed out for EPA’s Science to Achieve Results graduate fellowships and Greater Research Opportunities undergraduate fellowships. The proposed $11.1 million decrease would facilitate the Administration’s consolidation of STEM education programs.

The budget for environmental education would once again be eliminated, however, EPA asserts that it is not ending the program. Instead, the agency would pursue a decentralized approach “in order to focus limited resources on integrating environmental education activities into existing environmental programs.” The education program was funded at $8.7 million in FY 2014.

The EPA Science Advisory Board would receive an additional $1.0 million (+19.7 percent) to conduct peer reviews and host meetings.
National Aeronautics and Space Administration (NASA)

- NASA request: $17.5 billion (-$185.9 million)
- Earth Science request: $1.8 billion (-$55.7 million)

The FY 2015 budget for NASA includes $5.0 billion for science, a 3.5 percent decrease. Funding for Earth science would decrease by 3.1 percent.

NASA’s Earth Science program supports several satellites that observe and track global-scale changes in climate, weather, natural hazards, and the biosphere. The program also engages in research on the role that humans play in global changes.

The Earth System Science Pathfinder for Venture Class Missions supports competitively selected projects that are relatively low-cost and small-scale. The frequent flight opportunities mean that scientific investigations can be developed and flown in five years or less. The program would receive $266.1 million in FY 2015 (+50.6 percent above FY 2013; no program budget was specified in FY 2014).

A $27 million increase—relative to FY 2013—is proposed for earth science research. This 6.4 percent increase would support research on climate variability and change, atmospheric composition, carbon cycle and ecosystems, water and energy cycle, and weather. More than 200 new three-year research awards are anticipated. A new field study will focus on developing novel approaches for optically characterizing key marine ecosystem properties by coordinating airborne and ship measurements.

The agency seeks spending reductions from Earth Systematic Missions (-$30.0 million). Within this programmatic area, the global precipitation measurement mission is expected to be fully operational in FY 2015. The Soil Moisture Active and Passive mission is also anticipated to launch in 2015.

The $88.9 million designated for education at NASA is 23.8 percent less than in FY 2014. Nearly all of that reduction would come from the Aerospace Research and Career Development Program. NASA plans to “reduce fragmentation” of STEM programs by consolidating education activities of mission directorates, offices, and centers.

National Institutes of Health (NIH)

- NIH request: $30.1 billion (+$200.0 million)

The President’s budget proposes a 0.7 percent increase for NIH. About half of the budget would go towards research project grants ($16.2 billion; +$119.5 million). Intramural research would receive $3.4 billion, a 1.2 percent increase.

One hundred million (+$60 million) is proposed for the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. This multi-agency initiative, which is in its second year, seeks to accelerate the development and application of tools
to construct dynamic pictures of the brain that reveal how brain cells and neural circuits interact in real time to produce human behaviors. Funding for another overarching initiative, the Big Data to Knowledge initiative would roughly double to $88 million.

Funding for Research Project Grants (RPGs) would increase by 0.7 percent. The number of new RPGs would increase by 329 over last year (+3.7 percent). At the proposed funding level, the funding rate would not change from the current rate of 17 percent. The average size of grants would decrease by 6.6 percent. According to NIH, the decline is due to the anticipated award of several very large grants this year; in FY 2015 these grants will become non-competing and tie-up a larger share of funding.

Training programs would increase slightly. Stipend rates would grow by two percent. The proposed $767 million funding level would support 108 additional full-time positions.

NIH plans to save $2 million by holding more virtual peer review meetings. The agency estimates that it has saved $13 million a year by holding more electronic meetings, using NIH conference space instead of rented space, and other cost saving measures.

**National Oceanic and Atmospheric Administration (NOAA)**

- **NOAA request: $5.5 billion (+$174.1 million)**

Under the President’s budget, funding for NOAA would increase 3.2 percent. Although the trend of escalating procurement costs for weather and climate satellites continues, funding would also rise for many research and natural resource management activities.

The Office of Oceanic and Atmospheric Research would see a sizeable increase next year. At $462.2 million, the budget request represents a 7.4 percent increase. The largest increase would be directed to climate research. Research on ocean acidification would jump 148 percent. Proposed cuts include 7.6 percent from ocean, coastal, and Great Lakes research and a 6.7 percent cut from the National Sea Grant College Program, funds that previously supported competitively awarded research.

The FY 2015 budget proposes increased funding for the National Ocean Service (+2.9 percent). In addition to supporting new investments in coastal management, a large increase is proposed for competitively awarded research to address coastal ocean issues including harmful algal blooms, hypoxia, and coastal ecosystem management (+$6.0 million).

Funding for the National Marine Fisheries Service would decline by $79.5 million (-8.0 percent). Protected species and fisheries research and management would benefit from small increases in funding.

NOAA proposes to make a smaller contribution to education programs. Competitive education grants would be terminated (-$3.6 million), as would regional watershed education programs (-$7.2 million). NOAA would contribute $2 million in new funding to
help NSF and the Department of Education to translate NOAA science into educational materials and strategies.

**National Science Foundation (NSF)**

- **NSF request:** $7.3 billion (+$83.1 million)
- **Research and Related Activities request:** $5.8 billion (-$1.5 million)
- **Major Research Equipment and Facilities Construction request:** $200.8 million (+$0.8 million)
- **Education and Human Resources request:** $889.8 million (+$43.3 million)
- **Biological Sciences Directorate request:** $708.5 million (-$12.8 million)

The President’s budget request for NSF would provide a 1.2 percent increase over the FY 2014 appropriation.

The proposed funding increase would be directed to education activities and agency operations. Each of these budget accounts would increase by about $40 million, resulting in a 5.1 percent increase for Education and Human Resources and a 13.5 percent increase for Agency Operations and Award Management. NSF requested the increase for operations to support the agency’s forthcoming headquarters relocation.

Funding for the Research and Related Activities account, which includes funding for the various disciplinary directorates, would be cut by $1.5 million, resulting in $5.8 billion for research. The agency’s funding rate for grants is expected to remain at 22 percent.

Major Research Equipment and Facilities Construction would also remain essentially flat; $96.0 million is proposed for the continued construction of the National Ecological Observatory Network.

Since growth in research funding is constrained, funding for many NSF-wide activities would decline. The Science, Engineering, and Education for Sustainability Initiative would lose $22.8 million (-14.1 percent). Cuts of a similar magnitude are proposed for several cyber initiatives. The exception is Cognitive Science and Neuroscience; funding for this initiative would more than double to $29.0 million.

NSF would continue its support for graduate students. The Graduate Research Fellowship program would award 2,000 new fellowships—700 fewer fellowships than the agency had hoped to award last year. The stipend level would increase from $32,000 to $34,000. NSF Research Traineeships would continue for a second year; funding would be included to support continuing grants for the program it replaced, the Integrative Graduate Education and Research Traineeship (IGERT).

Several programs are recommended for cuts and consolidations totaling $26.5 million. The Science of Learning Centers, which are partially supported by the Biological Sciences Directorate, would be terminated at the end of FY 2015 when the last two centers are planned to sunset.
NSF’s Biological Sciences Directorate (BIO)

The proposed $12.8 million reduction for Biological Sciences Directorate (BIO) is the largest cut among all of NSF’s directorates. Two other directorates are facing cuts on the order of 0.1 to 0.3 percent. Three directorates would receive increases of 0.1 to 6.0 percent. BIO provides about 66 percent of federal funding for non-medical, basic life sciences research, including environmental biology, at academic institutions.

The number of BIO research grants awarded would increase slightly from the FY 2014 level, although median award size would remain the same. The funding rate across the BIO directorate is expected to decrease from 22 percent to 21 percent.

Within the request for BIO, funding would be allocated among five divisions accordingly:

- Molecular and Cellular Biosciences: $128.6 million (-0.9 percent)
- Integrative Organismal Systems: $218.2 million (+1.1 percent)
- Environmental Biology: $137.5 million (-1.0 percent)
- Biological Infrastructure: $136.7 million (+3.3 percent)
- Emerging Frontiers: $87.6 million (-16.3 percent)

Within BIO, three major activities are emphasized: 1) increased investment in basic research on neural circuitry and activities that underlie cognition, behavior, and thoughts; 2) continued investment in the Biological, Mathematical, and Physical Sciences program, which seeks to discover fundamental knowledge at the intersections of math, biology, physical sciences, and engineering; and 3) support for infrastructure, such as NEON, digitization of biological collections, field stations, and synthesis centers.

BIO would increase contributions to CAREER grants by $410,000 and funding for Research Experiences for Undergraduates by $1.1 million.

The Long-Term Ecological Research sites would receive $27.6 million (+1.0 percent). Funding for the National Ecological Observatory Network operations would increase to $38.0 million.

Support would continue for digitization of scientific information associated with biological specimens held in U.S. research collections. The Advancing Digitization of Biodiversity Collections would be transferred from Emerging Frontiers to Biological Infrastructure; funding would remain at $10 million a year. The Division of Environmental Biology would sustain the second year of a program to link long-term planetary biodiversity data with specimen/collections data.

Smithsonian Institution (SI)

- Smithsonian Institution request: $850.9 million (+$45.9 million)

Federal support for the Smithsonian Institution would increase by 5.7 percent. The SI is also funded by private donations and a trust fund. The budget includes an increase of
$1.8 million to digitize collections and make them accessible online. Preservation of collections would increase by $2.4 million, resulting in the restoration of the Collections Care and Preservation Fund to its pre-sequestration level. This funding level would allow Smithsonian to address deficiencies, implement recommendations made by the Smithsonian Inspector General, and improve accessibility of collections currently at risk of loss or damage.

The budget request includes an additional $10 million for STEM education as part of the proposed government-wide reorganization of education programs. Smithsonian would work with federal agencies to identify and disseminate content that “takes advantage of each agency’s unique assets; create complementary materials and avoid duplication of effort; and share a centralized portal for the broad dissemination of our engagement offerings,” according to budget documents.

Several Smithsonian facilities used for research and curation of scientific collections would be renovated under the proposed FY 2015 budget. The National Museum of Natural History would receive $22.9 million for revitalization work. A $2.5 million dollars investment would be used to construct a collections storage facility. Funding for exhibits maintenance would increase by $600,000.

The operating budgets for the Smithsonian Environmental Research Center and Tropical Research Institute would be flat. Moreover, no additional funding is proposed for Smithsonian research in the budget request.

United States Department of Agriculture (USDA)

- Department of Agriculture request: $23.7 billion (-$971 million)
- Research, Education, and Economics request: $2.7 billion (+$64 million)

The proposed budget for research, education, and economics is 2.4 percent more than the FY 2014 level.

The National Institute of Food and Agriculture (NIFA) partners with extramural academic institutions to conduct research, education, and extension activities. NIFA would receive $1.3 billion (+4.6 percent). The increase would be directed to research and education activities.

Within NIFA, the Agriculture and Food Research Initiative (AFRI) would receive $325 million for competitive extramural research grants. At this level, AFRI would receive a 2.8 percent budget increase. Major initiatives include research on climate change and proliferation of invasive species and diseases that affect crops and livestock; water resources; and sustainable bioenergy. The budget would also continue foundational research in priority areas and support for interagency collaborations.

Three new Innovation Institutes would be funded at $25 million each. Pollinator health, antimicrobial resistance, and a national network for bioproducts manufacturing innovation would be the foci of the institutes.
The Agricultural Research Service (ARS) conducts intramural research in the areas of natural and biological science. It would receive $1.1 billion in FY 2015, $18 million less than FY 2014. Funding for seven of the eight research areas would be cut; human nutrition is the only research mission that would receive a small increase. Research in support of environmental stewardship would be trimmed by 0.5 percent to $200 million. Support for research on pollinator health and prevention of colony collapse disorder would increase by $4 million.

The ARS budget would reallocate $44 million to develop more climate resilient agriculture production systems. Reallocated resources would also be used to support new investments in the development of new plant breeds and strains that better adapt to climate change, drought, and disease while increasing nutritional value and reducing environmental impact.

The administration is once again seeking to consolidate six existing ARS research facilities. Congress rejected this proposal in FY 2014.

Six agricultural research education programs would be consolidated into the Department of Education and NSF, including graduate and postgraduate fellowship grants.

**USDA Forest Service**

- *Forest Service request: $4.8 billion (-$125.4 million)*
- *Forest and Rangeland Research request: $275.3 million (-$17.5 million)*

Funding for Forest Service research would decrease by 6.0 percent, whereas the agency’s overall budget would decline by 2.6 percent. The Forest and Rangeland Research division would lose 114 employees as a result.

Forest Service research provides scientific information and new technologies to support sustainable management of the nation’s forests and rangelands. These products and services increase basic biological and physical knowledge of composition, structure, and function of forest, rangeland, and aquatic ecosystems. The agency is currently focused on seven research priorities: forest disturbances, forest inventory and analysis, watershed management and restoration, bioenergy and biobased products, urban natural resources stewardship, nanotechnology, and localized needs research.

All research program areas are targeted for budget cuts. Six of the seven research areas would be cut by 8 percent, including invasive species; wildlife and fish; water, air, and soil; wildland fire and fuels; resource management and use; and recreation R&D. The inventory and monitoring R&D account would be cut by only 1 percent.

Some priority research programs would be continued through reallocation of funds. Research on the introduction and spread of non-native species would be supported by eliminating some research on established species. In the resource management account, research on cellulosic ethanol, urban wood waste, pinyon-juniper restoration,
and hardwood tree regeneration would be de-emphasized. Capacity for research and partnerships on wildlife and fish research would continue at a reduced level in some regions.

**United States Fish and Wildlife Service (FWS)**

- *FWS request: $1.5 billion (+$48.8 million)*

The proposed budget includes a 3.5 percent overall increase for the Fish and Wildlife Service. FWS is the only federal agency whose primary responsibility is management of biological resources. It is charged with protection of endangered species, migratory birds, marine mammals, and other fish and wildlife species.

The budget for science support for FWS activities would increase by $14.4 million to $31.6 million. Adaptive Science would increase by 40 percent to support the work of Landscape Conservation Cooperative partnerships. The increased funding would allow the agency to continue to support the best performing cooperatives, but also build the science capacity of other locations.

Science in support of decision-making for refuge management, endangered species recovery, regulatory decisions, and other needs would increase by a factor of 1.5. Examples of how the funding would be used include data management, choosing surrogate species to represent broader suites of species, and determining best management practices for combating invasive species. Another proposed increase is $1.4 million for research on the impacts and mitigation of renewable energy transmission corridors in the western United States.

**United States Geological Survey (USGS)**

- *USGS request: $1.1 billion (+$41.3 million)*
- *USGS Ecosystems Activity request: $162.0 million (+$9.2 million)*

The budget for the USGS would increase by 4.0 percent in FY 2015.

The Ecosystems activity within USGS would receive an increase of 6.0 percent. The new funding would be distributed across all six programmatic areas: Status and Trends (+2.2 percent); Fisheries (+6.6 percent); Wildlife (+0.8 percent); Environments (+3.6 percent); Invasive Species (+34.9 percent); and the Cooperative Research Units (+6.8 percent). Asian carp eradication and control would continue to be a priority. Additionally, a $2.0 million increase would support efforts to integrate ecosystem services frameworks into decision-making.

The proposed budget for the USGS includes an increase of $17.1 million above the FY 2014 enacted level for climate and land use change science. The Climate Science Centers would receive new funds for grants to support applied science on resource
management and biological carbon sequestration. An increase of $2.3 million is proposed to support coordination with other federal agencies and to make scientific results and products available online. Three million would be spent on research on drought impacts and adaptive management.

The Water Resources activity would be funded at $210.4 million (+$3.1 million). Increased funding would be directed to groundwater monitoring and the streamgage network.

What’s Next?

The President’s budget request is only a proposal; it does not have binding authority. Congress uses the President’s budget request as a starting point for their budget negotiations. Congress makes adjustments to the President’s budget, particularly if different political parties control Congress and White House, as is currently the case in the House of Representatives. Congress has already begun their consideration of the FY 2015 budget, although it will be several months before any final decisions are made.

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