Biological and Ecological Sciences in the FY 2010 Budget

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Introduction

This chapter focuses on fields of biology pertaining to the natural world. These include agricultural and natural resource sciences, botany, basic molecular and cellular biology, ecology, microbiology, integrative and organismal biology, and taxonomy.

Research in the biological sciences addresses some of society's greatest challenges—protecting the environment and human health, conserving biological diversity, improving management of the nation's natural resources, preventing infectious diseases, and forecasting the effects of global climate change.

Extramural and intramural research focused on biology of the natural world is spread throughout multiple federal agencies, six of which are highlighted in this chapter. Intramural research at agencies such as the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) provide the foundational understanding that underpins research conducted by government scientists. The National Science Foundation is the number one funder (69 percent) of extramural research in the non-medical biological sciences at universities and other non-profit research institutions.

The 2009 stimulus bill provided much needed support to NSF and will help address the backlog of excellent unfunded proposals, especially in the Biological Sciences directorate, where roughly 80 percent of applications—many of them highly competitive and potentially transformative—were rejected in 2008.

Highlights

x NSF: The Biological Research Directorate would receive an 11.8 percent increase, and would provide $20 million in new funding to expand efforts to digitize and network specimen-based scientific collections in the United States.

x EPA: After struggling to maintain their funding for years, the Temporally Integrated Monitoring of Ecosystems and Long-Term Monitoring programs, which assess lake and stream water chemistry in response to Clean Air Act amendments, would be fully funded.

x USDA: AFRI's (formerly NRI) FY 2010 budget would be flat-funded at $202 million.

National Science Foundation (NSF)

In recent years, the NSF budget request has disproportionately favored some disciplines. As a result, despite modest increases in the NSF budget, the percentage increases for biological, geological and social science research directorates were significantly smaller than increases for other research areas. The FY 2010 budget request reflects the administration's recognition that a balanced research portfolio is required to drive the development of new knowledge, advance interdisciplinary research, and identify the transformative ideas that will reinvigorate our economy and help solve society's most challenging problems.

NSF provides roughly 69 percent of support for academic biological sciences research. In FY 2009, the Biological Sciences Directorate (BIO) anticipates receiving approximately 5,585 research grant applications, while the FY 2010 projection is for roughly 6,200 grant applications. BIO anticipates an average directorate-wide grant success rate of 17 percent, with an average award duration of three years and $202,000. As such, BIO is important to the health and vitality of the biological and ecological sciences research community. The President's budget would provide $733 million to BIO, an 11.8 percent increase over the FY 2009 level.

BIO consists of five operational divisions: 1) Molecular and Cellular Biosciences (MCB); 2) Integrative Organismal Systems (IOS); 3) Environmental Biology (EB); 4) Biological Infrastructure (BI); and, 5) Emerging Frontiers (EF). The FY 2010 request would provide MCB with $128.8 million, a 6.2 percent increase from FY 2009. IOS would grow by 4.8 percent ($10.22 million) to $221.8 million. EB would increase by 13.5 million to $133.9 million and BI would increase by $13.34 million to $130.1 million, 11.2 and 11.4 percent increases, respectively. Finally, the EF program area would receive a 37.9 percent increase, placing the FY 2010 funding level at $118.27 million.

Of interest to organismal and biodiversity scientists, BIO would invest an additional $20 million, for a total of $142.5 million, in Research Resources and Centers. This program would continue efforts to digitize and network specimen-based research collections. These collections provide proper validation of species including a wealth of ancillary data such as DNA samples and environment/habitat information. These data provide the baseline for our knowledge of life on Earth. Filling these gaps is crucial to a complete understanding of the biodiversity of the planet, both in space and time, and the history of climate change.

Department of Agriculture (USDA)

USDA's proposed FY 2010 budget includes a $9 million increase for research on risks to agricultural systems from climate change, focusing primarily on water management and drought. An additional $1.8 million is slated to develop environmental service markets.

The 2008 Farm Bill transferred all authorities of the Cooperative State Research, Education and Extension Service to the new National Institute of Food and Agriculture (NIFA). NIFA administers USDA's primary competitive agricultural research program, the Agriculture and Food Research Initiative (AFRI) which was formerly the National Research Initiative. AFRI's FY 2010 budget would remain unchanged, staying at its current level of $202 million.

Also within the USDA budget, the U.S. Forest Service would see its discretionary budget increase by $474 million over 2009.

The agency's Forest and Rangeland Research budget—which makes up 5 percent of the agency's budget authority—focuses on developing the knowledge and technology needed to enhance the economic and environmental value of U.S. national forests. It is slated to receive $302 million in FY 2010, a 2 percent increase over 2009.

The agency is also proposing establishing a $282 million contingency reserve for fighting catastrophic wildfires which would be available when the appropriated 10-year average is exhausted. For years, the agency's growing costs to protect people and property from forest fires has chipped away at the agency's R&D funding.

Environmental Protection Agency (EPA)

As the primary regulatory agency for the U.S. environment, more than three quarters of EPA's R&D is conducted through its laboratories. The remaining funding supports research at universities, nonprofits, industry, and state and local governments. The agency's science and technology budget would increase by 6.6 percent over FY 2009.

Reflecting some of the nation's environmental challenges, EPA proposes to focus research efforts in areas including human health, ecosystems, toxics, global change, and nanotechnology.

The agency plans to devote an additional $5 million towards understanding the tradeoffs associated with the production and use of biofuels, increase funding by $4.1 million for the Chesapeake Bay Program, address aquatic invasive species, nonpoint source pollution, and other problems facing the Great Lakes, and provide $76 million for ecosystem research focused on defining, measuring, and monitoring ecosystem services.

Two agency programs, the Temporally Integrated Monitoring of Ecosystems and Long-Term Monitoring programs which assess lake and stream water chemistry in response to Clean Air Act amendments have struggled to maintain their funding in recent years. However, FY 2010's budget requests they be fully funded at $720,000. The Clean Air Status and Trends Network program, that in prior years was repeatedly cut by $1 million each budget request, returns to a proposed funding level of $3.95 million in FY 2010.

EPA's Science to Achieve Results (STAR) competitive grants program, another program that has suffered cuts in past years, would fund some 131 new fellowships with $10.9 million in FY 2010.

National Oceanic and Atmospheric Administration (NOAA)

NOAA supports research related to its mission "to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs."

NOAA R&D activities are supported through a blend of intramural and extramural research programs which would represent approximately 12 percent of the total agency budget in FY 2010. The majority (93 percent) of the NOAA R&D budget is focused on research with the remaining

funds allocated to development activities. The majority of NOAA research (73 percent, $437 million) is conducted by NOAA scientists, while the remaining 27 percent ($131 million) is conducted through extramural grants.

The Office of Oceanic and Atmospheric Research (OAR) is responsible for 51 percent of NOAA's R&D. The balance of NOAA's R&D is distributed among the agency's operational units. For FY 2010, R&D efforts would be guided by the agency's mission goals. According to budget documents, ecosystem research would receive 32 percent of the funds, climate would be allocated 31 percent, weather and water would receive 14 percent, and commerce and transportation would receive 1 percent. Mission support would receive 22 percent for the provision of research vessels for research.

Department of Energy (DOE)

Not counting the stimulus dollars it was allocated in 2009, funding for the Office of Biological and Environmental Research (BER), would go up by about 4 percent to a total of $604 million in FY 2010. BER supports biological, climatic, and environmental research and seeks to understand complex biological systems in order to develop solutions to the agency's energy, environmental, and national security challenges. BER has restructured to combine and integrate its climate and environmental science programs (proposed at $285.7 million). Within this subprogram, BER plans to initiate an additional large-scale experiment to improve understanding of terrestrial ecosystems as sources and sinks for greenhouse gases and to learn how to manage them to enhance carbon sequestration.

U.S. Geological Survey (USGS)

Although the FY 2010 budget request is below the $1.3 billion mark sought by some USGS stakeholder groups, the President's request of $1.099 billion is an increase of $53.1 million over the FY 2009 level. Of note, the FY 2010 budget would fully fund fixed cost increases. In recent years, these expenses have not been fully funded and thus have forced some managers to reprogram funds that would otherwise have been available for research and monitoring programs. The FY 2010 request does not include the $140 million in one-time investments provided through the American Recovery and Reinvestment Act (i.e., the economic stimulus package). USGS-wide priorities in the budget request

include investments in climate change, renewable energy, and education and training programs intended to build scientific expertise among America's youth.

The budget requests $22 million in new funding to support climate change research initiatives. Within this request, $5 million would be used to expand climate change monitoring to understand Earth's response to climate change over time. An additional $5 million would be provided to the National Climate Change and Wildlife Science Center to develop regional collaborative research. Roughly $7 million would support a national assessment for geological and biological forms of carbon sequestration. The remaining $5 million would support the provision of science support to the U.S. Fish and Wildlife Service.

USGS biological research programs would receive $199.3 million if the President's request is enacted, a $13.9 million increase over the FY 2009 enacted appropriation. The Biological Research and Monitoring area would grow by $11.3 million to $157.7 million, Biological Information Management and Delivery would see a $231,000 bump to $22.1 million, and the Cooperative Research Units would see a noticeable increase of $2.3 million, bringing the program to $19.3 million.

Within the $157.7 million for research and monitoring, the USGS would continue to allocate resources to improving our understanding of how ecosystems are structured and function, with a focus on climate change and arctic ecosystems (including $4.2 million for polar bear and arctic ecosystem monitoring). Biological Information Management and Delivery would continue to provide funds to integrate information across geographic and political landscapes and biological levels of organization into the National Biological Information Infrastructure.