

## Biological and Ecological Sciences in the FY 2009 Budget

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### INTRODUCTION

The biological sciences inform, impact, and improve human society, and are a foundation for innovation and discovery. This chapter focuses on fields of biology pertaining to the natural world, including: botany, zoology, microbiology, ecology, taxonomy, basic molecular and cellular biology, and agricultural/natural resource sciences.

Biological and ecological research is conducted and supported by many federal departments, including largely intramural research at mission-driven agencies. In addition to their intramural research efforts, agencies such as the Environmental Protection Agency (EPA) and National Oceanic and Atmospheric Administration (NOAA) also fund extramural research programs that provide the foundational understanding that underpins the research conducted by government scientists. The primary federal funding source for basic, non-medical biological research is the National Science Foundation (NSF), which funds roughly 67 percent of fundamental biology research at universities and other nonprofit research institutions.

Overall, biological and ecological research in the FY 2009 budget request would not benefit from the investments promised by the American Competitiveness Initiative or the America COMPETES Act. When adjusted for inflation, the FY 2009 request for NSF's Biological Sciences Directorate is comparable to the FY 2003 and 2004 levels.

### HIGHLIGHTS

- **NSF:** The Biological Sciences Directorate has prioritized restoring core program areas to FY 2007 levels.

- **EPA:** A proposed 1.3 percent cut to EPA's R&D would put its research portfolio at a level comparable to 1985 funding levels.

#### **NATIONAL SCIENCE FOUNDATION (NSF)**

NSF is the primary federal funding source for the non-medical biological sciences, providing 67 percent of federal funding for this research. As stated in NSF budget documents, investments in fundamental science advance discovery and spur innovation. Further, "issues of national importance related to the environment, economy, agriculture, and human welfare require an understanding of how complex living systems function and interact with non-living systems." Research supported by the Biological Sciences Directorate (BIO) drives this understanding. As the physical, computational, mathematical, and engineering fields increasingly use living systems to address major questions in their areas, a robust investment in the biological sciences is required. Yet, the President's budget request for BIO is once again marginal. In contrast to other fields, the proposed budget for BIO, when adjusted for inflation, provides flat funding.

The proposed budget would provide BIO with a \$63.0 million (10.3 percent) increase over the FY 2008 estimated appropriation and \$66.5 million more than the FY 2007 actual appropriation (see Table II-7). If enacted as proposed, BIO would receive \$675.1 million in FY 2009. The central priority for BIO in FY 2009 is restoration of funding for core program areas to FY 2007 levels. The number of research grants awarded by BIO decreased by 5 percent in FY 2008, with the average research grant funding rate dropping to 15 percent—well below the agency-wide average.

Two organizational changes are proposed for BIO programs in the budget. First, the Plant Genome Research program (\$101.2 million, a 3.4 percent increase over FY 2008) would be moved into the Integrative Organismal Systems program, which would receive a total budget of \$216.3 million (8.2 percent increase from FY 2008). Second, although the FY 2008 budget request included Major Research Equipment and Facilities Construction (MREFC) funding for the National Ecological Observatory Network (NEON), in FY 2009 NEON has been removed from the MREFC account. NEON is now slated to receive \$26 million from BIO in FY 2009, with \$16 million from the Emerging Frontiers

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program area and \$10 million from the Division of Biological Infrastructure. (For more on the NSF budget, please see Chapter 6.)

### **U.S. DEPARTMENT OF AGRICULTURE (USDA)**

The Forest Service's (FS) proposed budget for FY 2009 would drop by 8 percent to \$4.1 billion. This would continue the agency's downward trend, the negative impacts of which are increasingly evident. One such toll is the loss of temporary employees who collect long-term data for the FS.

The Forest and Rangeland Research budget would follow suit. Slated for an 8 percent decrease to a proposed budget of \$263 million, funds under this appropriation are split among program areas including: inventory and monitoring, fish and wildlife R&D, invasive species, and fire and fuels, all of which would decline by 13 to 16 percent. However, the Forest Inventory and Analysis (FIA) Program would be fully funded. FIA is a census of America's forests, which includes assessing tree species, size, and health, as well as soil erosion, and is intended to inform forest management.

The agency's costs for protecting people and property from forest fires continue to grow. In 2001, FS fire suppression costs were at \$600 million; by 2007 they were nearly \$1 billion. These costs contribute to the chipping away of the agency's R&D funding.

The FY 2009 FS budget includes new funding for proposed Ecosystem Services Demonstration Projects intended to advance market-based conservation. Up to five projects are proposed to restore, enhance, and protect ecosystem functions on National Forest System lands.

Also within USDA, the National Research Initiative (NRI) would receive \$257 million for FY 2009, up from the FY 2008 mark of \$191 million (see Table II-13). Administered through the Cooperative State Research, Education, and Extension Service, NRI seeks to attract research scientists from across the country to compete for funding to increase knowledge related to agriculture, food, and the environment. USDA proposes to redirect its \$45 million Integrated Research, Education, and Extension (Section 406) program to NRI, which would administer these activities. (For more on the USDA budget, see Chapter 10.)

### **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. As Table II-17 shows, the agency's R&D portfolio would decline by 1.3 percent in the proposed FY 2009 budget. This would put the R&D portfolio at its lowest level since 1985 in real terms.

Major programs within the R&D portfolio would decline under the proposed FY 2009 budget. These include clean air research (by \$3 million), global climate change research (by \$4 million), human health and ecosystem research (by \$6 million), and sustainability research (by \$2 million). Endocrine disrupter research would also fall under the President's budget. EPA's fellowship funding would fall by \$1 million to \$9 million. These fellowships include Science to Achieve Results (STAR), Greater Research Opportunities (GRO), and Environmental Science and Technology (EST) fellowship programs.

In contrast, the agency's homeland security related R&D would continue to fare well, increasing by \$6 million to a total of \$37 million. The program focuses on terrorist threats that would have an impact on the natural environment. Other research areas also increasing or holding steady under the budget proposal are land protection and restoration research, and pesticides and toxics research.

### **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)**

The NOAA core R&D budget would decrease slightly from an estimated \$581 million in FY 2008 to \$576 million for FY 2009. However, excluding FY 2008 earmarks, core NOAA research programs are proposed to increase by 7.5 percent in FY 2009. NOAA supports intramural and extramural 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."

With a proposed budget of \$382.6 million, the Office of Oceanic and Atmospheric Research (OAR)—which supports the majority of the agency's research—would be cut by \$15.4 million from the FY 2008

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enacted appropriation. The OAR budget has remained essentially flat since FY 2005 when it was just over \$400 million.

NOAA has requested increased funding for OAR's Climate Research and Weather, and Air Quality Research programs. However, the Ocean, Coastal, and Great Lakes Research portfolio would be cut by \$24.2 million. This cut would impact invasive species research and partnership programs.

The National Ocean Service (NOS), one of the agency's mission driven units, would decrease \$47.9 million from the FY 2008 enacted level to \$488.2 million in FY 2009. This reflects a continuing decrease in funding since FY 2005. Charged with managing the nation's coastal areas, NOS is increasingly important as 165 million people are expected to inhabit the U.S. coastlines by 2015.

Responsible for management and conservation of marine organisms, the National Marine Fisheries Service (NMFS) would be cut by \$46.8 million. If enacted, the budget would be comparable to the FY 2003 appropriation. (For more on NOAA, see Chapters 12 and 15.)

#### **DEPARTMENT OF ENERGY (DOE)**

In keeping with the American Competitiveness Initiative, the Department's Office of Science would receive a nearly 19 percent increase over the 2008 estimated appropriation to \$4.7 billion. The Office of Biological and Environmental Research (BER), which includes climate change research, would go up by about 4 percent to a total of \$569 million. BER supports research ranging from carbon sequestration to environmental remediation and seeks to understand complex biological systems in order to develop solutions to the agency's energy, environmental, and national security challenges. Within the climate change research portfolio (\$155 million), the agency plans to focus on abrupt climate change, conduct experimental studies of climatic effects on the abundance and geographic distribution of plant and animal species, and explore the potential of native switchgrass to both sequester carbon in the soil, as well as serve as a source for biofuel production.

## **U.S. GEOLOGICAL SURVEY (USGS)**

For FY 2009, \$968.5 million has been requested for the USGS (see Table II-16). This budget reflects a cut of nearly \$38 million from the FY 2008 enacted level. The request is well below the \$1.3 billion mark some USGS stakeholders are seeking for the agency. Within the FY 2009 request, the Biological Resources Division (BRD) would receive \$180.3 million. This level is roughly \$600,000 below the FY 2007 appropriation and \$458,000 above the FY 2008 estimated appropriation. The BRD is organized around three budget line items: 1) Biological Research and Monitoring; 2) Biological Information Management and Delivery; and 3) Cooperative Research Units. For FY 2009, Biological Research and Monitoring would increase by \$4 million (to \$146.3 million). Biological Information Management and Delivery, and Cooperative Research Units would be cut (net cuts of \$2.8 million and \$764,000, respectively). If enacted, the cuts to the Biological Information Management and Delivery program would actually result in a \$2.9 million cut to the National Biological Information Infrastructure program.

New or expanded initiatives of interest to biologists and natural resource managers have been proposed. One such increase is a \$1 million increase to the Birds Forever program, bringing the initiative to \$9 million. The increase would support bird monitoring through the Breeding Bird Survey and would complement an \$8.1 million U.S. Fish and Wildlife Service effort by providing new or increased research and monitoring capacity to better understand large scale drivers of migratory bird populations and habitat change. A \$6.6 million increase for Priority Ecosystem Science has been requested. Additionally, USGS has requested roughly \$26.6 million to support Global Climate Change research, which is \$19.2 million over FY 2008. This funding is largely reprogrammed funds from other areas within the budget. (For information on other USGS activities, see Chapter 16; for more on Interior R&D, see Chapter 12.)