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Biological and Ecological Sciences in the FY 2008 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, basic molecular and cellular biology, agricultural sciences, and taxonomy.

Biological and ecological research is conducted and supported by many federal departments, including largely intramural research at mission-driven agencies, such as the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). However, these agencies also support extramural research programs that ultimately provide the foundational understanding that underpins the research conducted by federal scientists in these agencies. The primary federal funding source for basic, non-medical biological research is the National Science Foundation (NSF), which funds roughly 68 percent of this research at universities and other non-profit research institutions.

Overall, biological and ecological research in the FY 2008 budget request would not benefit directly from the investments promised by the American Competitiveness Initiative or some proposals currently being considered on Capitol Hill. Indeed, when adjusted for inflation, the FY 2008 request for NSF's Biological Sciences Directorate is comparable to the 2003 funding level. According to recent data, only 14 percent of BIO research grant applications are funded, below the agency-wide rate of 21 percent.

HIGHLIGHTS

- NSF: The Biological Sciences Directorate would receive a 4.1 percent increase, below the proposed 8.7 percent agency-wide increase.

- EPA: Ecosystem research at the agency would be severely curtailed.

NATIONAL SCIENCE FOUNDATION (NSF)

NSF is the primary federal funding source for the fundamental (non-medical) biological sciences, providing 68 percent of federal funding for this research. The proposed budget for FY 2008 would provide a 4.1 percent ($25.2 million) increase over FY 2007 for the Biological Sciences Directorate (BIO; see Table II-7). If enacted as proposed, BIO would receive $633 million in FY 2008. Six program areas constitute the core of biology funded by NSF. These programs, along with the requested FY 2008 budget, and the percentage change from the FY 2007 request, are: Molecular and Cellular Biosciences $116.4 million (4.6 percent increase); Integrative Organismal Systems $105.4 million (4.7 percent increase); Environmental Biology $114.7 million (4.6 percent increase); Biological Infrastructure $96.1 million (11.9 percent increase); Emerging Frontiers (a cross-discipline, "virtual" directorate) $99.2 million (0 percent increase); and Plant Genome Research $101.2 million (0 percent increase). Of note, the Integrative Organismal Biology program has been renamed the Integrative Ogranismal Systems program to reflect BIO's scientific themes of theoretical biology, systems biology, and biology and society.

The budget would provide $24 million for the National Ecological Observatory Network (NEON), of which $15.9 million would come from Research and Related Activities (RR&A) funds. The remaining $8 million would be provided from the Major Research Equipment and Facilities Construction (MREFC) account.

U.S. DEPARTMENT OF AGRICULTURE (USDA)

The Administration has proposed a $66 million increase from the FY 2007 final budget for the nation's premier competitive research program for fundamental and applied agriculture research. The National Research Initiative (NRI) would receive $257 million if the proposed budget is enacted by Congress (see Table II-13). The request for NRI also includes

significant funds transferred from formula funding programs, which provide infrastructure support to land grant institutions. Administered through the Cooperative State Research, Education, and Extension Service (CSREES), NRI seeks to attract research scientists from across the country to compete for funding through this program to increase the knowledge base related to agriculture, food, and the environment.

The future organization of USDA research is somewhat uncertain. The Administration has released its plans for reauthorization of the Farm Bill, and some in Congress have proposed initiatives that could reorganize USDA's agricultural research operations. Thus, depending upon whether significant changes are included in the next Farm Bill, future funding streams and priorities could be different than those in the FY 2008 budget request.

Also within USDA, the Forest Service's (FS) Forest and Rangeland Research budget would receive $263 million in FY 2008, a decrease of roughly $14 million from the FY 2006 level and $17 million from the estimated FY 2007 funding level. R&D funding has been eroding as FS expenditures for fire suppression have increased over the past decade, and the FS has sought to meet deficit-cutting targets while increasing investments in security-related initiatives. A portion of this year's proposed budget cuts would result from staff reductions, with a proposed elimination of 173 full-time equivalents. The budget request does support the Service's long-range goal of increasing support for extramural research.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

As Table II-17 shows, the agency's R&D portfolio would decline by 3 percent in the proposed FY 2008 budget. Of particular concern is the proposed 4.7 percent cut that is slated to the Human Health & Ecosystems Program. This would result in nearly complete elimination of the extramural ecosystem program.

Furthermore, a $5.8 million cut is proposed to the Environmental Monitoring and Assessment Program (EMAP), of which some $0.8 million that has funded long-term surface water (lakes and streams) monitoring in the Northeast and Mid Atlantic for some 20 years would be completely deleted. These sites were set up to monitor ecosystem response to acid precipitation reductions mandated by the Clean Air Act

and to discover new environmental challenges. Termination of these monitoring programs would diminish the federal government's ability to assess how ecosystems in the Northeast and Mid-Atlantic states are faring.

The Clean Air Status and Trends Network (CASTNET) would receive a $1 million cut, which amounts to about a 25 percent reduction in the entire program and will translate into the closure of sites. Because EPA contributes a portion of its CASTNET budget to the multi-agency National Atmospheric Deposition Program (NADP), this will also negatively affect that program, potentially causing shutdowns of sites.

The budget proposed for the agency's Science and Technology Fellowship programs is only approximately half of the funding level enacted in FY 2006. These fellowships include Science to Achieve Results (STAR), Greater Research Opportunities (GRO), and Environmental Science and Technology (EST) fellowship programs. Funding for STAR is proposed at $5.9 million, a $1.8 million cut from FY 2007 appropriations. GRO would remain at the FY 2007 level of $1.5 million, while the EST fellowships are proposed at $1.5 million, a $2.8 million decrease from the FY 2007 budget.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

In a surprise twist of the enacted 2007 budget, NOAA's core R&D programs received an unexpected infusion of funding, thanks to cancelled earmarks. However, the Administration's FY 2008 proposal of a 9.5 percent cut would continue NOAA's downward trend (see Table II-13). 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."

At a proposed budget of $368.7 million, the agency's Office of Oceanic and Atmospheric Research—which supports the majority of the agency's research—would stay essentially flat since its FY 2005 budget when it was just over $400 million.

NOAA is seeking slight increases over the FY 2007 request for its Climate Research, Weather and Air Quality Research, and Ocean, Coastal and Great Lakes research programs. Within the Ocean, Coastal,

and Great Lakes research portfolio, invasive species reduction efforts—such as managing the venomous Lionfish and developing ballast water technologies—would decline by $1.5 million.

The National Ocean Service (NOS), one of the agency's mission-driven units, would fare slightly better than last year's budget request, increasing by $53 million to $468 million in FY 2008. However, NOS continues its decrease in funding since fiscal year 2005. Charged with managing the nation's coastal areas, NOS' role is of increasing importance as 165 million people are expected to inhabit U.S. coastlines within the next 10 years.

Responsible for management and conservation of marine organisms, the National Marine Fisheries Service (NMFS) would see a $45 million increase to its budget, bringing it nearly back to where it was in FY 2006, but reflecting no marked change since FY 2003.

DEPARTMENT OF ENERGY (DOE)

As one of the agencies targeted for a significant budget boost via the President's American Competitiveness Initiative, DOE's Office of Science would fare well (15.4 percent increase) in the proposed FY 2008 budget (see Table II-11). The Office of Biological and Environmental Research (BER) would also benefit from this proposed boost, although the requested amount is actually lower than the FY 2006 request. 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.

For FY 2008, BER would receive $532 million, a 10 percent increase over the enacted 2007 budget. As Table II-11 shows, most of the increase would be devoted to the life sciences portion (mostly in genomics) of BER (up 18.9 percent) while climate change research would receive only a 2.4 percent increase and environmental remediation would stay flat-funded. One programmatic change would be that the FACE (Free Air Carbon Dioxide Enrichment) experiments would no longer be funded as user facility operations but as distinct experiments at their respective sites in Wisconsin, Nevada, North Carolina, and Tennessee. These team experiments elevate levels of carbon dioxide to assess the response of ecosystems.

U.S. GEOLOGICAL SURVEY (USGS)

USGS is the science agency for the Department of the Interior, providing natural science expertise to inform the conservation and management of biological species, inform ecosystem management, and assess the spread of economically significant invasive species. Through the Cooperative State Research Units program, USGS biologists play an important role in the education and training of natural resource professionals, and provide public and private sector resource managers with technical assistance and scientific information.

For Biological Resources Division (BRD) programs, the budget would provide $181.1 million, an increase of roughly $2.5 million over the FY 2006 appropriation and $8.5 million more than the FY 2007 appropriation (see Table II-16). From the "new" funding included in the budget, BRD would allocate $5 million to Interior's "Healthy Lands" initiative. A notable inclusion in the budget is $4.7 million to begin repair and rehabilitation work at Patuxent Wildlife Research Center, a facility shared with the U.S. Fish and Wildlife Service. The budget would also provide funds to pay for fixed cost increases, an expense that has not been fully budgeted in recent years. To the extent that these initiatives can be considered "new" funding, the resources have primarily been reprogrammed from research program cuts and eliminations. (For information on other USGS activities, see Chapter 16; for more on Interior R&D, see Chapter 12.)