

Life Sciences in the FY 2002 Budget

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INTRODUCTION

Life sciences research is defined for the purpose of this chapter as study of the natural world. Biomedical research is excluded from this analysis. Also excluded is environmental research that is not primarily biological. Although much of this research—such as water quality, hydrology, and global climate change—has biological endpoints, it is beyond the scope of this chapter.

As defined, life sciences research is funded by several departments and agencies, although some offer little or no extramural funding. The primary sources of competitive grants for the life sciences are the National Science Foundation (NSF), the U.S. Department of Agriculture (USDA), and the Sea Grant program of the National Oceanic and Atmospheric Administration (NOAA). Although a major source of funding for life sciences research, the U.S. Geological Survey's Biological Resources Division (USGS-BRD) primarily funds research conducted by BRD's own scientific staff. Scientific research at the Environmental Protection Agency (EPA) tends to focus on the human health effects of environmental contaminants, but this research generates a great deal of information about the condition of watersheds and other ecosystems in the process.

Additional life sciences funding is provided by the National Aeronautics and Space Administration's (NASA) Office of Biological and Physical Research, which focuses primarily on low gravity research; the Department of Energy's (DOE) Office of Biological and Environmental Research; and the Department of Defense's (DOD) Environmental

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Quality Technologies program within the Science and Technology Biosystems program.

HIGHLIGHTS

- **NSF:** The budget request for the Biology Directorate is 0.5 percent below the FY 2001 enacted appropriation although Environmental Biology would receive a 1.7 percent increase; the Biocomplexity in the Environment Initiative (BE) is slated for a 5.9 percent increase (see Table II-7).
- **USGS-BRD:** The \$149.3 million request for BRD represents a cut of 8.8 percent.
- **USDA:** The National Research Initiative would be funded at the FY 2001 level of \$106 million as would the Initiative for Future Agriculture and Food Systems at \$120 million. The USDA also encompasses the Forest Service, which would receive no increase for its research program other than a 2.5 percent increase for uncontrollable costs.

NATIONAL SCIENCE FOUNDATION (NSF)

The requested 1.3 percent increase for NSF overall is considerably below the FY 2001 increase of 13 percent and, as a below-inflation increase, would result in a real-dollar decrease in the NSF budget. In the Biology Directorate, the overall \$2.3 million (0.5 percent) decrease comprises a mix of program increases and decreases, including a 1.7 percent increase for Environmental Biology (EB). The proposed \$111.7 million for EB is the principal source of federal support for academic, non-biomedical biological research and is second only to the \$149.3 million requested for the USGS-BRD, which is almost exclusively intramural funding. Included within EB are two subdisciplinary clusters—systematic and population biology and ecological studies. Among the programs funded by EB are the Long-term Ecological Research sites and computational biology research (see Table II-7).

Life sciences research is also included in NSF's crosscutting BE initiative. For FY 2002, the Administration has requested \$58.1 million, an

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increase of 5.9 percent. Of this amount, \$16.9 million is allocated to the Biology Directorate. The increases in BE are allocated to the Engineering and Social, Behavioral, and Economic Sciences Directorates. However, as the BE competitions are cross-disciplinary, projects inherently involve collaborations among scientists from different disciplines, including biology. (For more on NSF, please see Chapter 7.)

Additional funding for life sciences research is reflected in NSF's "Environmental Portfolio," which encompasses the BE and core funding in the EB programs, along with the animal behavior research covered by BIO's Division of Integrative Biology and Neuroscience; the Ecology of Harmful Algal Blooms (ECOHAB) funded by the Geoscience Directorate's Division of Ocean Sciences; and environmental social and behavioral sciences in the Directorate for Social, Behavioral, and Economic Sciences, which focuses on the interactions between human and natural systems with an emphasis on the social and behavioral processes that shape and influence those interactions. All told, the request for the nearly five dozen programs that comprise the NSF Environmental Portfolio is \$829 million for FY 2002 (an increase of 2.0 percent).

Perspective on the size of the Environmental Portfolio is provided by reference to the February 2000 report of the National Science Board (NSB).¹ The report states that environmental research, education, and scientific assessment should be "one of NSF's highest priorities... In view of the overwhelming importance of, and exciting opportunities for, progress in the environmental arena, and because existing resources are fully and appropriately utilized, new funding will be required. We recommend that support for environmental research, education, and scientific assessment at NSF be increased by an additional \$1 billion, phased in over to the next 5 years, to reach an annual expenditure of approximately \$1.6 billion." Viewed in this light, the requested \$13 million increase, even when added to the \$100 million increase in 2001, leaves the NSF environmental portfolio far below the recommended funding level.

¹ National Science Board, 2000. *Environmental Science and Engineering for the 21st Century*. National Science Foundation, NSB Report 00-22.

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One omission from the NSF FY 2002 budget request worth particular mention is the National Ecological Observatory Network (NEON). This effort to organize and manage an integrated network of 10 regional research platforms of instrumentation and computer infrastructure for comprehensive, integrated measurements and analysis of ecological systems was first conceived in 1999. After a series of planning workshops, NSF requested a \$10 million increase in its Major Research Equipment account for FY 2001. Congress chose not to fund this project. For FY 2002, NSF did not request funds for NEON.

USGS BIOLOGICAL RESOURCES DIVISION (BRD)

Overall, the U.S. Geological Survey (USGS) is facing a proposed decrease of \$70 million (8 percent) from FY 2001. The actual decrease is \$93.7 million, because the Administration's budget also proposes to fund "uncontrollable costs" such as salary increases from program and research funding. The Administration states that the decrease returns USGS to FY 2000 levels, but the 7 percent increase in FY 2001 merely compensated for years of stagnant budgets at USGS. As noted in the National Research Council's 2001 report *Future Roles and Opportunities for the U.S. Geological Survey*, the agency's budget remained roughly constant during the years 1974-1999, despite substantial increases in demand for the scientific data generated by the agency.² Furthermore, the intent to peg the USGS budget at FY 2000 levels fails to account for the past two years of inflation.

The Administration's request for BRD entails a cut of \$11.3 million in program funding. Together with the proposal to fund \$2.9 million of uncontrollables from base funding, the proposed decrease for BRD comes to 8.8 percent. Although this figure does approximate the FY 2000 appropriation, adjusted for inflation, it is worth noting that BRD has never recovered from the substantial funding cuts of 1995 and 1996. Even the 15 percent increase awarded to BRD in FY 2001 left it approximately \$20 million shy of the 1994 funding level, adjusted for annual inflation of 3 percent.

² National Research Council, 2001. *Future Roles and Opportunities for the U.S. Geological Survey*. National Academy of Sciences, Washington, D.C.

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The specific programs that would be affected by the BRD cuts include:

- The National Biological Information Infrastructure (NBII), which was funded in FY 2001 at \$5 million, would be eliminated. NBII would allow scientists and natural resource and land managers to find and analyze the vast amounts of biological data cached in hundreds of databases around the world. According to the President's Council of Advisors on Science and Technology (PCAST), most of this information sits unused because of a lack of efficient means to retrieve it and derive comprehensible information from it. In 1998, PCAST recommended that NBII be funded at \$40 million a year for 5 years. Eliminating NBII would necessitate redundant data collection, more costly analyses, and would undermine the ability of resource managers to gain access to the information they need for sound decision-making.
- GAP (Gap Analysis Program) reverts to FY 2000 levels, which would slow completion of the terrestrial analysis in 8 states, delay the southwest regional GAP, and eliminate the aquatic GAP (\$3.5 million). GAP provides regional assessments of the conservation status of native vertebrate species and natural land cover types and facilitates the application of this information to land management activities. GAP analyses are considered a fundamental tool for conserving biodiversity and managing natural resources.
- The Center for Biological Informatics (CBI) would close (a reduction of \$1.5 million). CBI supports the Integrated Taxonomic Information System (ITIS), a partnership of six federal agencies jointly working with the world taxonomic community to create a widely accessible taxonomic and nomenclatural standard reference for biota; the National Park Service Vegetation Mapping Program, the Invasive Species website, and Frogweb are also services of CBI.
- Termination of funding for a principal investigator and facilities for Coast Guard-funded research on the treatment of ballast water to prevent the introduction of non-native invasive species through ballast water discharge.

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U.S. DEPARTMENT OF AGRICULTURE (USDA)

The largest part of USDA-funded life sciences research comprises two specific programs of the Research, Education, and Economics (REE) mission area. These are the Agricultural Research Service (ARS) and the Cooperative State Research, Education and Extension Service (CSREES). Other significant life sciences research programs are found in the Forest Service (FS) and the Animal and Plant Health Inspection Service's Wildlife Services Program.

ARS is USDA's intramural research program for natural and biological research (other than the FS research program), while CSREES funds projects conducted by the State Agricultural Experiment Stations, State Cooperative Extension Systems, land-grant universities, and other research and educational institutions. CSREES also administers two competitive grants programs, the National Research Initiative (NRI) and the Initiative for Future Agriculture and Food Systems (IFAFS).

The President's budget proposes a 21.2 percent reduction for RRE. The largest part of this decrease is characterized as the elimination of earmarks. Otherwise, there would be increases in ARS for plant science (6.5 percent) and animal science (8.0 percent). The request also includes an increase of \$5 million (71 percent) for research on emerging and exotic diseases and pests and \$7.5 million to develop database and information analysis tools to support ARS genomics research and assess risk associated with biotech crops. The National Research Initiative would remain at the FY 2001 level of \$106 million, which was a decrease from the previous year of 10 percent. IFAFS would be funded at its authorized level of \$120 million.

Forest Service research comprises four categories under the rubric of Forest and Rangeland research: vegetation management and protection; wildlife, fisheries, and air; resource valuation and use; and inventory and monitoring. The Administration has requested \$235 million, unchanged from the FY 2001 appropriation and only a 2.5 percent increase above the FY 2000 funding level. The only increase requested this year is an additional \$6 million for uncontrollable costs. For vegetation management and protection, the request is \$105.9 million, a 3.1 percent increase from

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FY 2001; for wildlife, fisheries, and air, the request is \$51.5 million, a 2 percent increase over FY 2001.

The Animal and Plant Health Inspection Service (APHIS) receives a very small amount of research funding to support its National Wildlife Research Center (NWRC)—the only research organization in the world devoted to resolving conflicts between wildlife and human interests such as bird-aircraft collisions, crop damage, and the myriad problems resulting from overabundant white-tailed deer populations. The FY 2001 appropriation of \$8.9 million for NWRC only slightly exceeded its FY 1995 appropriation; in the interim, NWRC's budget either declined or remained flat from year to year. NWRC would receive no new funding in FY 2002, other than for uncontrollable costs. (For more information on USDA, please see Chapter 11.)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA's Office of Oceanic and Atmospheric Research (OAR) conducts a wide range of environmental studies. Life sciences research is funded primarily by the Oceans and Great Lakes (OGL) program, which is slated for a 2.5 percent overall decrease, but there would be increases for Sea Grant, which funds both national and state competitive research programs. For FY 2002, the Administration has requested \$62.3 million, a slight increase over the prior-year appropriation. NOAA has also requested \$0.5 million for research on coral reef ecosystems. Another NOAA program known as the National Estuarine Research Reserve (NERR) program would suffer a 52.7 percent cut under the President's budget. The NERR System protects and studies estuarine areas through a network of 25 reserves where research is conducted on critical issues such as polluted runoff, restoration science, invasive species, and environmental stewardship. There is also research funding requested in the National Marine Fisheries Service (NMFS) budget. The total budget request for NMFS, which covers a wide range of management and research efforts, is \$598 million in FY 2002 (7.2 percent above FY 2001). NMFS' many research efforts include cooperative research in the Southeast and Northeast, data collection on the status of fisheries, developing forecast models, Chesapeake Bay research, sea turtle and Stellar's sea lion recovery research, and South Florida ecosystem assessments. (For more on NOAA, see Chapters 16 and 18.)

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ENVIRONMENTAL PROTECTION AGENCY (EPA)

Under the Administration's budget request for FY 2002, EPA research would decrease by 6.5 percent (see Table II-17). The proposed cuts include \$3.3 million for research for ecosystem assessment and restoration and \$1.5 million for endocrine disruptor research (see Chapter 12 for more on EPA).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

In NASA's Office of Biological and Physical Research (OBPR; formerly known as Life and Microgravity Sciences), the Administration's request is \$361 million. Although this represents a \$70 million increase, it is not new funding but rather a consolidation of additional support to institutions for research and program management. After adjusting for transferred funds, OBPR would actually sustain a decrease of 4.7 percent under the President's budget request (see Table II-12 and Chapter 10).

DEPARTMENT OF DEFENSE (DOD)

DOD conducts some life sciences research in the context of its efforts to comply with environmental regulations, prevent pollution from defense facilities and operations, restore soil and groundwater contaminated by past practices, protect air and water quality, conserve wetlands and ranges essential for critical readiness training, reduce costs of cleanup and disposal, and protect wildlife from noise. As the final FY 2002 budget request for DOD was not available at the time this budget analysis was compiled, the status of funding for these research programs is unknown.

DEPARTMENT OF ENERGY (DOE)

The Office of Biological and Environmental Research (BER) stands to lose 8.2 percent, or \$39.5 million, of its FY 2001 funding (see Table II-11 and Chapter 9). Most BER life sciences research, which would decline by 6.3 percent, is focused on understanding the long-term health and environmental effects of energy use and development.