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Biological and Ecological Sciences in the FY 2003 Budget

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INTRODUCTION

Biological and ecological science programs covered in this chapter focus on studies of the natural world. Biomedical research is excluded from this analysis. These programs are found within several federal agencies. Most of the competitively awarded extramural biological and ecological research is found at the National Science Foundation (NSF), the U.S. Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). Much of both the intra- and extramural research in the biological and ecological sciences supported by these and other agencies provides the scientific information needed to help manage the nation's natural resources and maintain quality of life for its citizens.

HIGHLIGHTS

- **NSF:** The Biological Science Activity (BIO) would increase by $17.2 million in FY 2003 to $525.6 million. Within Biology, Environmental Biology is slated to receive to receive $99.7 million, a slight decrease of 2.7 percent.

- **U.S. Geological Survey (USGS)-Biological Resources Division (BRD):** The $160.5 million request for BRD represents a cut of 6 percent.

- **USDA:** USDA's competitive grants program for investigator-initiated research, the National Research Initiative (NRI), is slated to double. The USDA also encompasses the Forest Service, which would receive a net increase of $1.9 million.

However, redirection of $35.9 million for Administration priorities would force the termination of 15 percent of the research funded in FY 2002.

- **EPA:** The Administration's budget would zero out the Star Graduate Fellowship Program, shifting these funds—a primary source of competitive grants for graduate students in applied ecology—to the NSF.

NATIONAL SCIENCE FOUNDATION (NSF)

NSF remains the principal federal supporter of academic, non-medical research in biology and ecology. The Administration proposes a 5 percent increase for this agency. However, when proposed transfers to NSF from other agencies are excluded, NSF's real increase would amount to a modest 3.4 percent. Under the President's budget proposal, NSF's Geosciences (GEO) Directorate would be the recipient of several agency transfers. The Environmental Protection Agency's $9 million Environmental Education Program and the $62 million National Oceanic & Atmospheric Administration's Sea Grant Program are slated to be transferred to NSF. So, too, is the U.S. Geological Survey's Toxic Substances Hydrology program, which, in addition to being transferred to NSF would be downsized to $10 million. More information on NSF can be found in Chapter 7 of this report.

NSF's Biological Science Activity (BIO) would grow by approximately 3 percent, while within that directorate Environmental Biology would decline by about 3 percent (see Table II-7). In an experiment to foster broader-scoped research, a new so-called "virtual" Division within BIO would seek proposals that are multi-disciplinary in nature and fall outside any of the current research categories. National activities supported through BIO include the National Center for Ecological Analysis and Synthesis, which promotes studies of complex ecological questions, and would remain funded at $3 million. The 21 Long Term Ecological Research Sites, which support long-term analysis of ecological phenomena—both natural and human influenced—would receive $18 million of NSF support.

NSF has brought back its request to start up a National Ecological Observatory Network (NEON), a proposal which last appeared in the agency's FY 2001 budget request but failed to gain final approval in the

federal budget. NEON has gone through peer review, with the National Science Board recommending its funding. Through its Major Research Equipment budget area, NSF is requesting $12 million to launch NEON prototype sites. With NEON, NSF hopes to improve scientific understanding of complex ecosystem dynamics and to enhance the ability to predict the effects of changes from such trends as climate change. Because of its ultimately wide network across the nation, NEON would have the potential to detect threats ranging from invasive species to chemical or biological terrorist activities. The agency continues to highlight its Biocomplexity in the Environment initiative, which would increase by $21 million and would add two new focal areas relevant to biosecurity: the ecology of infectious disease and microbial genome sequencing.

U.S. GEOLOGICAL SURVEY (USGS)

The U.S. Geological Survey is facing a proposed decrease of $55.2 million (6 percent) from FY 2002. For the Biological Resources Division (BRD), most of the proposed $6.1 million cut comprises FY 2002 congressional add-ons. These include $0.5 million added by Congress in FY 2002 to the BRD's existing amphibian research and monitoring program, which would continue, but at slower pace. A $0.5 million FY 2002 appropriation for ballast water research, which studies ways to prevent the introduction of non-native invasive species through ballast water, would be eliminated. Also targeted for reduction is $180,000 for research on Yukon River chum salmon, $50,000 for Atlantic salmon research, and $748,000 for a mining study on the Mark Twain National Forest. The single largest cut would transfer $2.8 million in fire science research funding to a Wildland Fire Management account in the Bureau of Land Management budget. Placing research funding under the control of a management agency could make it more difficult for the USGS to access funding for the fire research priorities identified by USGS.

Two non-research aspects of the USGS budget would affect the research program. First, the proposed budget would continue to erode programs by absorbing part of the "uncontrollables," which consist of inflationary costs such as salary increases. For FY 2003, BRD is being asked to absorb 54 percent of these costs in its budget for Biological Information Management and Delivery. A $21,000 reduction in travel and transportation costs will further limit the ability of BRD scientists to participate in scientific meetings. Second, the USGS budget includes a

$6 million reduction for management reform, although the specifics of this reform had apparently not been developed at the time of the budget release. The management savings apparently entail, in part, the establishment of target goals for reduction in staffing. It is not known if the staffing reduction effort mandated by the competitive sourcing process—a key element of President Bush's management agenda—will include research positions. Whether or not research positions will be subject to competitive sourcing, the establishment of an *a priori* target suggests that the real goal is actually staff reduction, rather than (as claimed) an improvement in performance. It cannot be assumed that a program will lose to an outside competitor, so there is no basis for setting a target for staff reductions.

The FY 2003 budget request has a number of positive attributes. Specifically, the BRD would retain several increases from FY 2002, including the $3.4 million allocated for priority research for the U.S. Fish and Wildlife Service. Funding increases in FY 2002 for the National Biological Information Infrastructure and the GAP Analysis program are also retained.

It is worth noting that the budget proposes a reduction in the Water Resources Research Institutes of $6 million, which would eliminate all federal support (a match of one federal dollar for $2 from non-federal sources) for the 54 State Water Resources Research Institutes. A quick perusal of the 200 projects funded in 2001 reveals that this program has a strong biological component. Studies on key phenomena of ecological systems, such as hydrodynamics, salinization, and eutrophication, along with research on soil and water microorganisms, plants, and other biota typify the interdisciplinary nature of this program. And while the Toxic Substances Hydrology program focuses on the fate and effect of toxic substances, these biogeochemical investigations have strong biological and ecological components, and are critical components of biological restoration programs such as those in the Everglades and the CALFED Bay Delta. This program would be transferred to NSF, where it would be reduced from $14 million to $10 million. A transfer to NSF raises concerns because, among other things, NSF grant duration is much shorter than the duration of a study of the transport and fate of toxic substances and there is no assurance that the funds will remain segregated at NSF for this research. Similarly, the proposed $5.8 million reduction to the National Water Quality Assessment Act, which will result in the elimination of 6 of 42 study units, will result in a decrease

in this program's collection of data on stream habitat and aquatic life. (For more information on USGS, see Chapter 17.)

U.S. DEPARTMENT OF AGRICULTURE (USDA)

The largest part of USDA-funded biological 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). The other significant biological research programs are found in the Forest Service (FS).

The overall research account for USDA would drop by about 9 percent in FY 2003, largely due to elimination of R&D earmarks and one-time emergency anti-terrorism funds (see Table II-13). For the coming fiscal year, research in the agency would reflect a new focus on research related to biosecurity issues such as food protection. For more information on USDA, see Chapter 11.

USDA's competitive grants program for investigator-initiated research, the National Research Initiative (NRI), would double from $120 million to $240 million. This increase would partially make up for the Administration's decision to block the $120 million mandatory budget expenditure of the Initiative for Future Agriculture and Food Systems. NRI is administered through CSREES. CSREES partners with the nation's land grant and non-land grant higher education institutions to facilitate extramural research, higher education, and extension activities related to agricultural productivity and natural resource management.

As the Department's principal in-house research agency focused on natural and biological sciences, the proposed budget for the Agricultural Research Service (ARS), would discontinue all projects earmarked by Congress in 2001 and 2002. The agency proposes increased funds for research of exotic animal diseases ($8 million) and exotic plant diseases ($5.4 million), reflecting the new priority of national security. In addition, ARS would receive $6.5 million for global climate change research, coordinated with other federal agencies.

The Administration has requested $254 million for FS Forest and Rangeland research, a net increase of $1.9 million over FY 2002. However, five new initiatives comprise $37.8 million of this funding,

meaning that $35.9 million (15 percent) of existing research would be terminated. Specific reductions include termination of 16 research work units (12 percent of the total), workforce reduction of 275 employees, closure of the Coweeta Hydrologic Laboratory in North Carolina (which is also an NSF-funded Long-term Ecological Research site), elimination of three labs that conduct research on longleaf pine ecology, management, and restoration, and the elimination of another dozen programs in Vegetation Management and Research and Wildlife, Fish, Water, and Air Research across the country, along with a half-dozen projects in Resource Valuation and Use Research. The redirects would fund forest inventory ($20 million); decision-support software known as Sim Forest, a graphics program that shows the public and decision-makers what future forests may look like under alternative management scenarios ($5 million); and development of technologies to manage, harvest, and utilize wood fiber to produce energy and high-valued products ($5 million). Another $2 million would go to climate change research ($0.5 million to estimate carbon stress in forest trees, soil, and wood products) and climate change technology development ($1.5 million). Competitive sourcing reductions are also anticipated; it is possible that research positions could be among those eliminated by virtue of this effort.

The Animal and Plant Health Inspection's Wildlife Services 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 2003 request is $16.9 million, an increase of $5 million over the FY 2002 appropriation.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA's Office of Oceanic and Atmospheric Research (OAR) conducts a wide range of environmental studies. The most significant change proposed for this year entails the transfer of the entire Sea Grant program to the National Science Foundation, together with a funding cut of $5.4 million from the FY 2002 appropriation of $62.4 million. How the transfer would affect Sea Grant, which comprises national and state competitive research programs along with extension and education programs, is unknown. The Administration has instructed NSF and Sea

Grant administrators to plan for the transfer, and presumably, these issues will be addressed in those plans. It is also uncertain how NSF will accommodate the Sea Grant competitive research program, which is based on the needs of marine industry, government, resource managers and the public, resulting in a portfolio of applied research projects and technology development.

Biological research is funded primarily by the Oceans and Great Lakes (OGL) program and the National Marine Fisheries Service (NMFS). For OGL, the Administration has requested $54.2 million, which represents a decrease of $83.5 million. The Sea Grant transfer comprises $62.4 million of that decrease. In NMFS, the requested $237.7 million requested for fisheries research and management (a $7.2 million increase) would pay for stock assessment biologists and support staff and data acquisition, while research on highly migratory shark species would be eliminated ($1.5 million), along with Oregon Groundfish Cooperative Research ($2 million) and Northeast Consortium Cooperative Research ($5 million). The NMFS request also proposes a decrease of $5.2 million for protected resources research and management ($103.9 million requested). Some portion of the $27.5 million requested for coral reef programs would go to research. (For more information on NOAA, please see Chapters 15 and 16.)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA's science programs would be reduced by $8.2 million under the FY 2003 request. The proposed changes include a $1.5 million decrease in research for ecosystem assessment and restoration. The most significant change would be the elimination of funding for Science to Achieve Results (STAR) Fellowship program. STAR grants fund a wide range of applied environmental research, including biology. Although the NSF science education budget is increased by approximately this same amount in the proposed budget, it is not known if the STAR fellowship itself would be instituted at NSF.

DEPARTMENT OF ENERGY (DOE)

Environmental research is supported through DOE's Biological and Environmental Research (BER) program and conducted at national laboratories, universities and private institutions. Focal areas include fundamental research on carbon sequestration and environmental and

climate change research. The Free-Air Carbon Dioxide Enrichment (FACE) field experiments, for example, have led to discoveries about ecosystem responses to future increases in atmospheric carbon dioxide levels resulting from fossil fuel combustion. BER's Ecological Processes research area, which focuses on such studies, would grow by 12.2 percent under the Administration's budget. DOE's BER program (along with NOAA, NSF, and USDA) is slated to participate in the Administration's new Climate Change Research Initiative (CCRI), focusing on the carbon cycle of North America. (For more information on CCRI, please see Chapter 15.)