

National Council for Science and the Environment

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**Testimony of the
NATIONAL COUNCIL FOR SCIENCE AND THE ENVIRONMENT
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**To the
UNITED STATES SENATE
Committee on Appropriations
Subcommittee on VA, HUD and Independent Agencies**

**Regarding the
NATIONAL SCIENCE FOUNDATION and
EPA STAR FELLOWSHIP PROGRAM
FY 2004 Budget Request**

April 30, 2003

Summary

The National Council for Science and the Environment (NCSE) urges Congress to appropriate the funds necessary to implement the National Science Foundation Authorization Act of 2002. The Act authorizes a doubling of the NSF budget over five years, as championed by Senators Bond and Mikulski. In FY 2004, NCSE supports the authorized NSF funding level of \$6.39 billion. In addition to increasing the total NSF budget to the authorized funding level, NCSE urges Congress to provide strong support across NSF's entire portfolio, including its environmental research and education portfolio.

The NSF budget request for FY 2004 falls far short of the funding level authorized. Senator Christopher Bond expressed his views on the NSF budget request as follows: "To say I am very disappointed that the President's FY 2004 budget request only provides a 3 percent increase over FY 2003 would be a drastic understatement."

Federal investments in R&D and science education are essential to the future well-being and prosperity of the nation and deserve the highest priority of Congress. The long-term prosperity of the nation and the maintenance of our quality of life depend on a steady and growing commitment of federal resources to science and technology. Environmental R&D is a critical component of the nation's R&D portfolio and the National Science Foundation plays a pivotal role in supporting environmental R&D. We encourage Congress to explore the role of environmental R&D in homeland security and counterterrorism.

NCSE encourages Congress to strongly support full and effective implementation of the National Science Board (NSB) report, *Environmental Science and Engineering for the 21st Century: The*

Role of the National Science Foundation, within the context of efforts to double the budget of the NSF. The NSB report calls for significant improvements in the way that NSF supports environmental research, assessment and education, and proposes that the Foundation invest an additional \$1 billion per year in these areas, to be phased in over five years. NSF has taken many steps to implement the NSB report and deserves full support from Congress.

NCSE emphasizes the need for increased funding for NSF's Priority Area on Biocomplexity and the Environment. In addition, we recommend full funding for two large projects—the National Ecological Observatory Network (NEON) and EarthScope—which would create unprecedented opportunities for environmental research.

NCSE urges Congress to restore full funding for the Environmental Protection Agency's (EPA) Science to Achieve Results (STAR) graduate fellowship program. The FY 2004 budget request for EPA would cut funding for the EPA STAR fellowship program by 50 percent, from \$9.75 million in FY 2003 to \$4.875 million in the FY 2004 budget request.

NCSE commends the Chairman and Ranking Member of the Senate Appropriations Subcommittee on VA, HUD, and Independent Agencies for their bipartisan leadership on science for the nation's future. No other Appropriations Subcommittee has a greater impact on the future of environmental science.

Introduction

The National Council for Science and the Environment thanks the Senate Appropriations Subcommittee on VA, HUD, and Independent Agencies for the opportunity to provide testimony on the National Science Foundation budget request for FY 2004.

NCSE is a nonprofit, nonpartisan organization that has been working since 1990 to improve the scientific basis for environmental decisionmaking. Our work is endorsed by nearly 500 organizations, ranging from the U.S. Chamber of Commerce to the Sierra Club, including the National Association of Attorneys General, National Association of Counties, some 300 colleges and universities, and more than 80 scientific and professional societies. As a neutral science-based organization, NCSE promotes science and its relationship with decisionmaking but does not take positions on environmental issues themselves.

Federal Investments in Environmental R&D

Federal investments in R&D and science education are essential to the future well-being and prosperity of the nation and deserve the highest priority of the Congress. The long-term prosperity of the nation and the maintenance of our quality of life depend on a steady and growing commitment of federal resources to science and technology.

Table 1. Environmental R&D by Federal Agency

(budget authority in millions of dollars)

Agency	Environmental R&D			Change		
	(\$ millions)			(percent)		
	FY 2002 Actual	FY 2003 Request	FY 2003 Enacted	FY02 Actual to FY03 Request	FY02 Request to FY03 Enacted	FY02 Actual to FY03 Enacted
National Science Foundation	1,062	1,164	1,177	9.7%	1.1%	10.9%
NASA	1,628	1,628	1,708	0.0%	4.9%	4.9%
Environmental Protection Agency	592	617	643	4.2%	4.4%	8.7%
Department of Energy	1,840	1,649	1,813	-10.4%	9.9%	-1.5%
Department of Defense	400	471	498	18.0%	5.7%	24.7%
Department of Commerce - NOAA	677	605	684	-10.6%	13.1%	1.1%
Department of the Interior	623	608	627	-2.4%	3.1%	0.7%
U.S. Department of Agriculture	504	473	531	-6.3%	12.3%	5.2%
National Institutes of Health	81	74	84	-7.7%	12.9%	4.1%
Department of Transportation	68	67	71	-2.1%	6.3%	4.1%
Smithsonian Institution	40	41	41	3.8%	0.0%	3.8%
Corps of Engineers	27	27	29	0.0%	8.5%	8.5%
TOTAL	7,541	7,425	7,907	-1.5%	6.5%	4.9%

Source: AAAS/NCSE estimates based on OMB data for R&D in the FY 2003 Budget, agency budget documents, and information from agency budget offices.

Environmental R&D is a critical component of the nation's R&D portfolio. NCSE estimates that federal funding for environmental R&D in FY 2003 is approximately \$7.9 billion, an increase of \$366 million or 4.9 percent relative to FY 2002 (Table 1), based on an analysis of the federal R&D budget conducted jointly with the American Association for the Advancement of Science.

The Appropriations Subcommittee on VA, HUD and Independent Agencies plays the largest role in setting funding levels for environmental R&D. It has jurisdiction over agencies that account for 45 percent of federal funding for environmental R&D.

Congress has played a crucial role in determining the level and growth rate of federal funding for environmental R&D. The President's FY 2003 budget request would have cut federal funding for environmental R&D by \$116 million or 1.5 percent relative to FY 2002. Congress restored the \$116 million cut and added an additional \$366 million above the President's FY 2003 budget request (Table 1).

In the FY 2003 enacted appropriations bills, federal funding for environmental R&D increased by 4.9 percent relative to FY 2002. However, federal funding for environmental R&D grew at approximately one-third the rate of total R&D, which increased by 13.8 percent to \$117.3 billion. Federal investments in environmental R&D need to keep pace with the growing need to improve the scientific basis for environmental decisionmaking.

The National Science Foundation plays a pivotal role in supporting environmental R&D. Environmental research often requires knowledge and discoveries across disciplinary and institutional boundaries. The NSF recognizes this and encourages multidisciplinary interactions within directorates and among directorates and programs, as well as with other federal agencies. The NSF has established a “virtual directorate” for environmental research and education. Through this virtual directorate, NSF coordinates the environmental research and education activities supported by all the directorates and programs. NSF’s Environmental Research and Education portfolio has grown from \$595 million in FY 1999 to over \$900 million in FY 2003.

Implementing the NSF Doubling Act

The National Council for Science and the Environment urges Congress to implement the National Science Foundation Authorization Act of 2002, which passed Congress on November 15, 2002 and was signed into law by the President on December 19, 2002. A central goal of the Act is to double the budget of the National Science Foundation in five years. It authorizes a budget increase of 105 percent for the NSF, from \$4.8 billion in FY 2002 to \$9.8 billion in FY 2007.

NCSE commends the Chairman and Ranking Member of the Senate Appropriations Subcommittee on VA, HUD, and Independent Agencies for their sustained leadership in a bipartisan, bi-cameral effort to double NSF's budget over a five-year period. Senator Christopher Bond (R-MO) and Senator Barbara Mikulski (D-MD) initiated a letter signed by a bipartisan majority of 54 Senators aimed at doubling the budget of the NSF in five years. They were original co-sponsors of the National Science Foundation Doubling Act of 2002. Senator Bond said, “I believe this bill underscores the critical role NSF plays in the economic and intellectual growth and well-being of this Nation,” upon introduction of the legislation.

The NSF Authorization Act has strong bipartisan support in Congress. Senator Barbara Mikulski said, “with this bill, we take an important step to ensure the well-being of this nation and its citizens.”

“This is landmark legislation,” said Science Committee Chairman Sherwood Boehlert (R-NY), who championed the bill in the House. “From our nation’s students, to our economy, and to our security, the fruits of this effort will be enjoyed for many years to come.”

Rep. Nick Smith (R-MI), Chairman of the House Science Subcommittee on Research, said, “These efforts will pay off in the form of continued scientific breakthroughs that will improve our lives in ways that we can only imagine today.”

“Passage of this bill is a great achievement,” said Rep. Vernon Ehlers (R-MI). “The research results, while not clear now, will reap huge benefits in the future.”

The NSF Authorization Act of 2002 is a major milestone for the NSF, the scientific community, and the nation. In order to realize the outcomes envisioned by this legislation, Congress must appropriate the funding levels authorized in the NSF Authorization Act.

National Science Foundation Budget Request for FY 2004

The National Council for Science and the Environment urges Congress to appropriate the authorized funding level of \$6.39 billion for the National Science Foundation in FY 2004. The FY 2004 budget request would increase funding for NSF by 3.2 percent to \$5.5 billion. The FY 2004 budget request of \$5.5 billion falls far short of the \$6.39 billion budget and 15 percent increase authorized in the NSF doubling act (Table 2).

At a recent congressional hearing, Senator Christopher Bond (R-MO) expressed his views on the NSF budget request as follows: “To say I am very disappointed that the President's FY 2004 budget request only provides a 3 percent increase over FY 2003 would be a drastic understatement.”

In addition to increasing total NSF funding to the authorized level, NCSE urges Congress to provide strong support across NSF's entire research portfolio. When the NSF Authorization Act was introduced in the House of Representatives on May 7, 2002, the bill included language about the allocation of funding among “the physical sciences, mathematics, and engineering.” References to “physical sciences” as opposed to all fields of science could have negative consequences for the environmental sciences, geosciences, non-biomedical life sciences, social sciences and interdisciplinary science. On May 22, 2002, the House Science Committee passed an amendment to the NSF authorization act that replaced “physical sciences” with “sciences” and made related revisions.

The House Science Committee Report (House Report 107-488) on the NSF Authorization Act provides further guidance on the balance in the NSF's research portfolio: “While the Committee is of the opinion that the mathematical, physical, and information sciences and engineering disciplines have been significantly underfunded, the Committee also recognizes that greater science funding for other disciplines, including the non-biomedical life sciences and the social sciences is also necessary... the committee strongly believes that all disciplines for which NSF provides support should receive significant budget increases.”

NCSE supports the Science Committee's view that NSF's entire research portfolio—including the environmental sciences, geosciences, non-biomedical life sciences, social sciences, and interdisciplinary science—should receive significant budget increases. Although the FY 2004 budget request would increase NSF's total budget by 3.2 percent, several key programs that provide funding for environmental research would decline under the FY 2004 budget request.

Table 2. National Science Foundation Budget

NSF Program	Budget Authority (millions of dollars)				Percent Change	
	FY 2002 Actual	FY 2003 Enacted ¹	FY 2004 Request ²	FY 2004 Authorized ³	FY02 to FY03 ⁴	FY03 to FY04 Req. ⁵
Research and Related Activities (R&RA)	3,612	4,056	4,106	4,800	12.3%	1.2%
<i>Biological Sciences</i>	510	571	562	--	12.1%	-1.6%
<i>Computer & Info. Science & Engineering</i>	515	579	584	--	12.3%	1.0%
<i>Engineering</i>	471	531	537	--	12.7%	1.1%
<i>Geosciences</i>	610	684	688	--	12.3%	0.5%
<i>Mathematical & Physical Sciences</i>	920	1,035	1,061	--	12.4%	2.6%
<i>Social, Behavioral & Economic Sciences</i>	184	191	212	--	3.8%	10.9%
<i>Polar Programs</i>	301	319	330	--	6.1%	3.4%
<i>Integrative Activities</i>	106	147	132	--	39.0%	-9.9%
<i>Budget Adjustment⁶</i>	-4	--	--	--		
Education and Human Resources (EHR)	894	903	938	1,157	1.0%	3.9%
Major Research Equipment	139	149	202	211	7.0%	36.2%
Salaries and Expenses ⁷	170	193	226	214	13.0%	17.2%
Office of Inspector General	7	9	9	8	35.9%	-4.6%
Total NSF Budget	4,823	5,310	5,481	6,391	10.1%	3.2%

Source: NSF budget justification and data tables & AAAS (revised March 2003)

¹ FY 2003 Enacted figures reflect the final FY 2003 omnibus appropriations bill passed by Congress on Feb. 13, 2003 and signed by the President on Feb. 20, 2003.

² FY 2004 President's budget request was released Feb. 3, 2003 before Congress passed the FY 2003 omnibus appropriations bill.

³ FY 2004 Authorized figures are from the NSF Authorization Act of 2002, which was passed by Congress Nov 15, 2002 and signed by the President Dec 19, 2002.

⁴ Percent change from FY 2002 actual to FY 2003 enacted appropriations

⁵ Percent change from FY 2003 enacted budget to the President's FY 2004 budget request

⁶ Adjustment from budget obligation to budget authority

⁷ Includes NSB Staff Salaries

Biological Sciences Directorate. Under the FY 2004 budget request, funding for NSF's Biological Sciences Directorate would decline by 1.6 percent relative to the FY 2003 enacted appropriations bill (Table 2). Within the Biological Sciences Directorate, the budget for Environmental Biology would decline by 2.8 percent, Integrative Biology and Neuroscience would decline by 3.1 percent, and Emerging Frontiers would increase by 11.6 percent.

Geosciences Directorate. Funding for the Geosciences Directorate would increase by 0.5 percent, but two of its three divisions would face cuts in FY 2004 relative to the FY 2003 enacted appropriations bill. Funding for the Earth Sciences Division would decline by 4.9 percent and funding for the Ocean Sciences Division would decline by 0.7 percent.

Biocomplexity and the Environment Priority Area. NCSE is particularly supportive of NSF's priority area on Biocomplexity and the Environment. This initiative provides a focal point for investigators from different disciplines to work together to understand complex environmental systems, including the roles of humans in shaping these systems.

The Biocomplexity and the Environment initiative is a growing priority within NSF, as reflected by the growth of its budget from \$59.0 million in FY 2002 to \$99.8 million in the FY 2004 budget request. This priority area has been expanded to include research in microbial genome sequencing and ecology of infectious diseases—to help develop strategies to assess and manage the risks of infectious diseases, invasive species, and biological weapons. We urge Congress to support this critical initiative and to consider funding it at a level of \$136 million, as proposed in FY 2000 budget request for NSF.

Major Research Equipment. The NSF budget request includes funding for the National Ecological Observatory Network (NEON) and EarthScope in its account for Major Research Equipment and Facilities Construction. These projects would provide major new opportunities for environmental research.

- **National Ecological Observatory Network.** NEON would be a continental scale research instrument consisting of 10 geographically distributed observatories, networked via state-of-the-art communications, for integrated studies to obtain a predictive understanding of the nation's environments. NSF is requesting \$12 million in initial funding for the first two NEON observatories in FY 2004.
- **EarthScope.** EarthScope would be a distributed, multi-purpose geophysical instrument array that is designed to make major advances in our knowledge and understanding of the structure and dynamics of the North American continent. Three components of the project would be the United States Seismic Array (USArray), the San Andreas Fault Observatory at Depth, and the Plate Boundary Observatory. NSF is requesting \$45 million for EarthScope in FY 2004.

We urge Congress to fund both NEON and EarthScope at the levels specified in FY 2004 budget request. Both NEON and EarthScope were included in NSF's budget request for FY 2001 but

funding for these projects was not provided in the enacted appropriations bill. NSF's budget request for FY 2002 did not contain any new starts for the MREFC account. In FY 2003, the NSF budget request included initial funding for both NEON and EarthScope. Congress appropriated \$30 million for EarthScope in FY 2003 but deferred funding for NEON "without prejudice," implying that the project was not rejected based on merit and may be funded in the future.

National Science Board Report on Environmental Science and Engineering

The National Council for Science and the Environment encourages Congress to support full and effective implementation of the National Science Board's report, *Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation*, within the context of a doubling of the budget for the NSF.

The NSB report sets out a bold, ambitious set of recommendations that could dramatically improve the scientific basis for environmental decisionmaking. The first keystone recommendation is as follows:

"Environmental research, education, and scientific assessment should be one of NSF's highest priorities. The current environmental portfolio represents an expenditure of approximately \$600 million per year. 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 the next 5 years, to reach an annual expenditure of approximately \$1.6 billion."

NSF has taken many steps to implement the recommendations of the NSB. It has appointed an environmental coordinator and created a new position in the office of the Director. It has established a Priority Area on Biocomplexity and the Environment that provides new opportunities for multidisciplinary research on the interactivity of biota and the environment. NSF has formed an Advisory Committee on Environmental Research and Education. In January 2003, the Advisory Committee released a report entitled *Complex Environmental Systems: Synthesis for Earth, Life, and Society in the 21st Century*, which provides a 10-year outlook in environmental research and education for the NSF. The report presents pathways for building interdisciplinary bridges and increasing capacity to address environmental challenges. "The concept of synthesis-based research is a touchstone for environmental research and education," said Stephanie Pfirman, Past Chair of the Advisory Committee, "and long-term support is necessary to fulfill its promise."

Full implementation of the NSB report will require strong support from Congress and a significant increase in funding for NSF's portfolio of environmental science, engineering and education.

EPA's STAR Graduate Fellowship Program

NCSE urges Congress to restore full funding for the Environmental Protection Agency's Science to Achieve Results (STAR) graduate fellowship program. STAR is the only federally supported fellowship program specifically aimed at graduate students in the environmental sciences and policy areas. From 1995 to 2001, EPA funded over 800 STAR fellows at 168 colleges and universities. The STAR fellowship program is highly competitive, with only 7 percent of applicants being awarded fellowships.

The FY 2004 budget request for EPA would cut funding for the EPA STAR fellowship by 50 percent, from \$9.75 million in the FY 2003 omnibus appropriations bill to \$4.875 million in the FY 2004 budget request. Last year, the EPA budget request for FY 2003 would have eliminated all funding for new STAR fellowships. Congress responded by restoring full funding for the STAR fellowship program in the FY 2003 appropriations process and we call upon Congress to restore full funding again in FY 2004. NCSE urges Congress to appropriate at least \$9.75 million for the STAR fellowship program in FY 2004. A higher appropriation is needed to redress the impact of the cancellation of the STAR fellowship competition last year. The proposed elimination of the STAR fellowship in the President's FY 2003 budget request led to the suspension of new fellowships beginning in February 2002, despite the fact that over 1,400 applications had already been received and reviewed for 100 new fellowships.

Homeland Security and Environmental R&D

Environmental R&D is a critical component of homeland security. Homeland defense will benefit from a robust and balanced research agenda in addition to the rapid development of existing technologies. Consider, for example, research on the explosion of a "dirty bomb" in an urban area. In addition to research related to the treatment of victims, protection of first responders, and emergency response plans, a balanced research agenda would include interdisciplinary studies on the fate, transport, and clean-up of radionuclides and toxins in air, water, and land. Environmental scientists conduct research on chemical, isotopic and biological tracers on a broad range of length scales and time scales. They are well-positioned to contribute to homeland defense. We encourage Congress to explore the role of environmental R&D in homeland security and counterterrorism and to recommend actions that would improve the nation's capacity in this area.

The National Council for Science and the NCSE commends the Chairman and Ranking Member of the Senate Appropriations Subcommittee on VA, HUD, and Independent Agencies for their bipartisan leadership on science for the nation's future. No other Appropriations Subcommittee has a greater impact on the future of environmental science. Investments in the environmental science continue to pay enormous dividends to the nation. Thank you very much for your interest in improving the scientific basis for environmental decisionmaking.

Biographical Sketch of Witness

Craig M. Schiffries is Director of Science Policy and Senior Scientist at the National Council for Science and the Environment. He previously served as a Congressional Science Fellow on the staff of the United States Senate Judiciary Committee; Director of Government Affairs for the American Geological Institute; Director of the Board on Earth Sciences and Resources of the National Academy of Sciences / National Research Council; visiting faculty member at Yale University; and consultant with Monitor Company. Dr. Schiffries simultaneously earned his B.S. and M.S. degrees from Yale University, where he was elected to *Phi Beta Kappa*, graduated *summa cum laude*, and double-majored in Geology and Geophysics and in Economics and Political Science. He was a Marshall Scholar at Oxford University, where he earned an honors B.A. in Philosophy, Politics, and Economics. He received a Ph.D. in Geology from Harvard University, where he held a fellowship from the Hertz Foundation.