



NSF

Closer to a Compromise

on the Direction of Environmental Research

Federal Agencies

CNIE

In his 9 July 1970 message to Congress accompanying the plan to create the U.S. Environmental Protection Agency (EPA), President Richard Nixon said, “As concern with the condition of our physical environment has intensified, it has become increasingly clear that we need to know more about the total environment—land, water, and air. It also has become increasingly clear that only by reorganizing our federal efforts can we develop that knowledge and effectively ensure the protection, development, and enhancement of the total environment itself.” Nixon expressed a concept that has become fundamental to environmental policy: that such policy must be based on sound science. Thirty years later, people and organizations with concern for environmental quality and

protection continue to stress the need for more and better environmental science and engineering research.

On 29 July 1999, the National Science Board (NSB)—a panel of leading scientists appointed by President Bill Clinton to set policy and recommend priorities for programs and funding to the National Science Foundation (NSF)—approved an interim report that recommends an expanded federal program of environmental research, planning, education, and scientific assessment with a funding target of an additional \$1 billion over five years. The report, *Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation*, stresses the importance of environmental research in formulating environmental protection programs. It also suggests

that the NSF create “a high-visibility, NSF-wide organizational focal point” for an integrated environmental research program.

The NSB is not the first to propose expansion and integration of federal environmental research programs. In 1990, the non-governmental Committee for the National Institute for the Environment (CNIE) was created to improve the scientific basis for making decisions on environmental issues. The CNIE has proposed that Congress create an independent federal agency—the National Institute for the Environment—to manage a program of environmental sciences and engineering research and a national library of environmental science to oversee data collection and dissemination. To advocate for the establishment of such an agency, the group has over the past decade developed

a broad constituency that includes the U.S. Chamber of Commerce, 20 state and local chambers, 6 state and local government associations, 50 environmental advocacy organizations, and over 100 members of Congress from both sides of the aisle. However, says Peter Saudry, executive director of the CNIE, “After several years of pushing the [National Institute for the Environment] as a new federal agency, we found ourselves in the ‘lonely middle.’ We had many friends on the right and many friends on the left who believed in the concepts advocated by the CNIE. Unfortunately, we couldn’t find a compromise on the issue of creating a new federal agency.” According to Saudry, the goals proposed for the new agency were not at issue; rather, Congress was averse to adding a new agency to the federal bureaucracy. The NSB report may represent a compromise plan that could expand the federal environmental science base without the addition of a new federal agency.

The CNIE had approached the NSF staff in 1997 about their willingness to adopt their proposal and implement it. The CNIE was successful at that time in getting Congress to direct the NSF to study how it would establish an institute for the environment. A resolution was then put before the NSB that endorsed the need for more crosscutting research assessments but fell short of an ambitious program of research, education, and information acquisition and dissemination. The resolution passed but such limited action was not sufficient to satisfy all the board members. NSB member Jane Lubchenco argued for an expansion of NSF environmental sciences and engineering research activities, and her view prevailed in the NSB. Chairman Eamon Kelly appointed Lubchenco to lead a board task force to define the role of the NSF in environmental science and engineering in the 21st century. It was the report of this task force that was adopted by the full board. Although the report has been adopted, it will retain “interim” status until public comment is received and considered. (The full report and the executive summary are available on the NSB Web site at www.nsf.gov/nsb/. Comments can be sent to TFE@nsf.gov.)

Lubchenco, a distinguished professor of zoology at Oregon State University in Corvallis and past president of the American Association for the Advancement of Science, argues that expanded research in environmental sciences and engineering should be viewed in a broader context than merely providing greater resources for research. In a 23

January 1998 article in *Science*, Lubchenco wrote, “[T]here is increased realization of the intimate connections between [ecological] systems and human health, the economy, social justice, and national security. The concept of what constitutes ‘environment’ is changing rapidly.” In exchange for public funding, Lubchenco urged all scientists to produce “more comprehensive information, understanding, and technologies for society to move toward a more sustainable biosphere—one which is ecologically sound, economically feasible, and socially just.” To this end, the NSB report calls for both interdisciplinary and long-term research and for envi-

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ronmental education, an environmental information network, and coordinated international partnerships among related federal agencies and nongovernmental organizations.

The Report

Although the NSB report recognizes that the federal government makes a significant contribution to environmental science and engineering research, it stresses the inadequacy of the funding available to generate scientific data for use in setting environmental policies. The NSF estimates that it spends approximately \$600 million on environmental research annually. The EPA research budget is also about \$600 million. But the environmental sciences research agenda is broad and deep. It encompasses ecological effect studies in the many plant and animal species, atmospheric and oceanographic chemistry and other studies related to global warming, and hydrogeologic investigations to determine flow and change in the chemical composition and toxicity of pollutants through subsurface structure. The logistics and equipment needed to conduct these kinds of research studies in the field are exceedingly costly. According to the NSF, present levels of funding are inadequate to support all the needed research, and opportunities to fill important data gaps are being missed because of a lack of resources. As a result, says the NSF, many environmental problems continue to worsen.

The CNIE has also continuously voiced the concern that the EPA’s efforts to pursue the large number of environmental research and policy questions have been constrained by inadequate funding. The EPA research

budget must support human health effects research, ecological research, and engineering research and technology development. The committee argues that \$600 million does not go far when allocated among these competing needs for new data, particularly since the agency has decided to put the greatest emphasis on public health, leaving less money for expensive environmental science and engineering research projects. Furthermore, the EPA is a regulatory agency and needs sound data on which to develop regulations to protect air, land, water, and human health from countless potential hazards. Thus, although the EPA has significantly expanded its research grants programs over the past three years to \$100 million per year, it still is not possible to fully fund all the outstanding research proposals submitted by independent, nonagency scientists. Because of its

need for short-term, issue-specific data, only about one-third of the EPA’s grants support long-term studies in basic ecological research. Finally, although the EPA has developed an outstanding organization of laboratories with staff scientists who conduct the majority of the research supported by the agency, basic research that is not directly related to immediate environmental issues generally must be assigned low priority.

The EPA has not officially commented on the recommendation to boost the national investment in environmental sciences and engineering research in another agency, but Kathy Melbourne, a spokesperson for the agency, notes, “It is not unusual for other federal agencies to conduct environmental research. We will wait until we see a specific proposal in the NSF budget for Fiscal Year 2001. If there is a budget request, it may be appropriate [for] EPA to comment or to help assure that NSF and EPA coordinate research planning.”

Kenneth Olden, director of the NIEHS, endorses the NSB report. “I had been asked informally by members of Congress if I believed that the NIEHS should be the agency assigned to administer the kinds of environmental science and engineering grants as well as information and education efforts that the CNIE had suggested,” he says. “My first reaction was to say yes but after discussion within [the National Institutes of Health] and the Department of Health and Human Services, we decided that, although the need for additional science is clear, the scope of the research is too far removed from our biomedical core. I was happy to learn that the NSF might take on the responsibility.”

The NSB report calls for the foundation to “complement and enhance, not duplicate or replace, the extant portfolio of other Federal activities in this area.” It recommends that additional funding “primarily go to [grant] awards based on external, peer-reviewed national competition, and these investments provide advances in fundamental understanding of environmental systems.”

The NSF distributes most of its \$600 million research budget through investigator-initiated grants to academic and other non-governmental scientists. Research proposals are competitive and are evaluated on the basis of scientific merit and relationship to the broad general science and engineering disciplines assigned priority by NSF officials and Congress. The NSB interim report contains 12 recommendations intended to enhance and complement the existing NSF-supported research activities in environmental sciences and engineering. The recommendations ask that the NSF create an “organizational focal point” to identify research gaps, particularly in interdisciplinary research, with budget authority to allocate an additional \$200 million per year over the next five years toward filling these gaps. New disciplinary research grants would be funded and funding for existing long-term studies would be increased. More resources would be available for training and education in environmental science and engineering. In addition, efforts would be launched to bring students with interests in related fields such as information management, communications, and problem solving into the fields of environmental training, research, protection, and technology development. To increase the effectiveness and efficiency of research programs, the interim report suggests that the infrastructure for research be improved through a network of environmental research and education hubs similar to the NSF Science and Technology Centers and Engineering Research Centers.

The interim report proposes a research program in what is termed scientific assessment, defined as “inquiry-based analysis of relevant biological, socioeconomic, and physical environmental scientific information to provide an informed basis for prioritizing scientific investments and addressing environmental issues.” This expands the more traditional calls for additional research in environmental risk assessment and risk management, which are based predominantly on analyses of the toxic potential of an environmental agent for human health and the costs and effectiveness of regulatory or other interventions. The NSB suggests that additional research into the adverse impacts

of environmental hazards on ecological systems and the physical environment would yield data that would substantially improve risk assessments and risk management.

Finally, the interim report proposes that the NSF fund the development of new environmental technologies that protect and preserve natural resources and for development of a plan for the systematic collection of environmental data.

CNIE Response

The initial CNIE response to the interim report was quick and positive. In a news release issued three days after the report was made public, CNIE board members praised the report and called for the NSF to fully implement the recommendations. In the release, Richard Benedict, president of the CNIE, said that if the NSF followed through on the recommendations, “it would help focus science on important environmental problems that people care about.”

On the surface, this reaction may appear to have been somewhat overstated in light of

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— Jane Lubchenco

the CNIE having been such a strong proponent of a new federal agency with authority to provide grants to independent scientists for environmental science and engineering studies. The group has been deeply committed to House Bill 2914, a measure that was introduced by Representative James Saxton (D–New Jersey) to create the National Institute for the Environment and the National Library for the Environment under the NSF. The bill had 92 sponsors. But Saudry says that as long ago as 1996, members of the CNIE had begun to realize that the “politics of establishing a new agency had become an obstacle that likely could not be overcome. We began to seriously consider other strategies to achieve the important goal of increasing environmental research within an agency that would be credible and could also begin to implement the other related aims of the CNIE.” In a survey of CNIE members and supporting institutions, Saudry says, it was clear that most believed that the NSF met those criteria. The only reservations voiced in the survey, he says, were the perceptions that the NSF was too heavily focused on disciplinary research and that the foundation did not make a rigorous effort to (as he puts it) “bridge the disconnect between research funding decisions and societal needs.”

The CNIE provided a less enthusiastic formal response to the interim report in a letter to Lubchenco on 16 September 1999. The CNIE board of directors voiced concern that the report was too vague about how the NSF would organize and manage expanded programs of environmental science and engineering research. They argued, “Unless the final report unequivocally recommends the creation of an implementing entity with strong leadership and budgetary authority, there is a significant risk that the objectives of the report will not be achieved.” The CNIE was also disappointed that the interim report does not go as far as the committee would like in suggesting a completely integrated program of research and the associated collection, maintenance, and distribution of research findings. The CNIE ended its comments with a promise: “If the NSF leadership accepts the opportunity represented by the NSB report with genuine commitment, and offers a well-conceived plan for implementing the Board’s recommendations, the CNIE and its constituents will support its initiatives and will

work enthusiastically with NSF to mobilize public and political support for the needed resources.”

Finally, in an announcement released on 27 October 1999, the organization said, “The CNIE strongly supports full funding and effective implementation of all the National Science Board’s recommendations in an integrated fashion. Furthermore, the CNIE is suspending our call for the creation of a National Institute for the Environment to work in support of the NSF initiative.”

The CNIE’s support will indeed be needed if the NSF goes forward with implementing the program. The NSF staff would use the interim report as the basis for the requisite budget submission to Congress for new program authorities and increased funding. The budget request must clear the White House in an election year where one of the key issues is whether Congress will offer a major tax cut or, alternatively, use additional tax money from a booming economy to support new federal programs. The CNIE has an outstanding track record in lobbying for expanded environmental science and engineering research. The coming year will test their skills in influencing federal bureaucrats, presidential candidates, and members of Congress. In the meantime, environmental scientists and engineers stand by with their research proposals ready for submission to whatever federal grant program may emerge to achieve the goal set by President Nixon 30 years ago.

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