

# Confronting the Nation's Water Problems: The Role of Research

Over the last several decades, publicly funded research has played a critical role in addressing water resources problems. Research has enabled the nation to increase the productivity of its water resources, such that today an acre-foot of water yields, on average, more value than it did 50 or 100 years ago. Additional research can be expected to increase that productivity even more. Managing the nation's water resources in environmentally sensitive and benign ways is more important than ever, given the recognition now afforded to aquatic ecosystems and their environmental services.

Unfortunately, water resource problems in the United States are growing in both number and intensity. This is exemplified by conflicts about water not only in the arid West (for example, the Colorado and Klamath River basins) and the Midwest (the Missouri River) but also in the supposedly water-rich East (for example, battles between Maryland and Virginia over the Potomac River). The United States needs to make a new commitment to water resources research in order to confront the increasingly severe water problems faced by all parts of the country. To address these problems successfully, decision makers at all levels of government will need to make informed choices among often conflicting and uncertain alternative actions—choices best made with the full benefit of research and analysis.

In *Confronting the Nation's Water Problems: The Role of Research*, the National Academies' Committee on Assessment of Water Resources Research refines the findings from the June 2001 *Envisioning the Agenda for Water Resources Research in the 21st Century* report, examines investments in federal water resources research, addresses the need to better coordinate water resources research,

and identifies institutional options for the improved coordination, prioritization, and implementation of this research.

## Research Priorities

The research topics from the *Envisioning* report are the current best statement of research needs, although this list is expected to change as circumstances and knowledge evolve. The committee provides six questions that can be used to regularly review and revise the research portfolio. The following questions should ensure that the research agenda is balanced with respect to time scale, focus, source of problem statement, and source of expertise conducting the research:

1. Is there a federal role in this research area?
2. What is the expected value of this research?
3. To what extent is the research of national significance?
4. Does the research fill a gap in knowledge?
5. How well is this research area progressing?
6. How does the research area complement the overall water resources research portfolio?

## Funding

A comprehensive survey was conducted by the committee to gather budget information from over 20 federal agencies in 71 categories of water resources research for three recent fiscal years. Figure 1 shows the percentage of total federal funding for water resources research by agency in FY 2000.

When compared to data from 30 years ago, the committee found that total spending for water resources research has remained relatively constant (around \$700 million in 2000 dollars) since the mid 1970s. When Category XI (aquatic ecosystems research) is subtracted from the total funding, there is a very high likelihood that the total funding level has actually declined over the last 30 years. Funds in Categories III (water supply augmentation and conservation), V (water quality management and protection), VI (water

resources planning and institutional issues), and VII (research on resources data) have declined severely since the mid 1970s. Given the research priorities laid out in the *Envisioning* report, the committee recommends that \$20 million annually in federal funding go to research on institutional topics (such as water law, economics, and social science) while \$50 million be devoted to all aspects of research on water use, including water supply augmentation and conservation.

Water resources research funding has also not paralleled growth in demographic and economic parameters such as population, gross domestic product (GDP), or budget outlays (unlike research in other fields such as health). More specifically, over the last 30 years water resources research funding has decreased from 0.0156 percent to 0.0068 percent of the GDP, while the portion of the federal budget devoted to water resources research has shrunk from 0.08 percent to 0.037 percent. The per capita spending on water resources research has fallen from \$3.33 in 1973 to \$2.40 in 2001. Given that the pressure on water resources varies more or less directly with population and economic growth, and given sharp

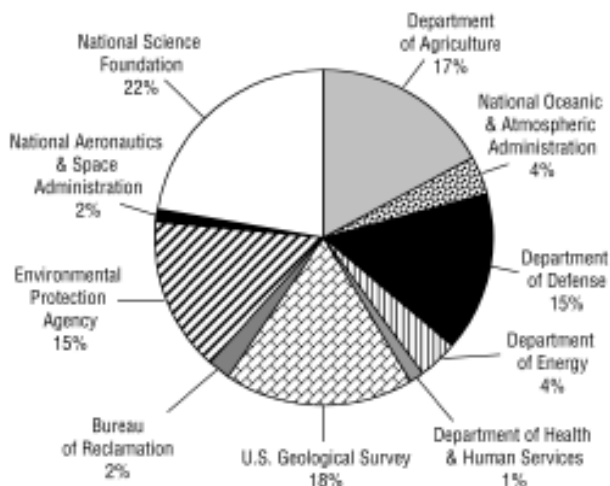
and intensifying increases in conflicts over water, these trends are very troubling.

## Coordination

The nation is not actually getting \$700 million worth of water resources research because of the lack of coordination among the more than 20 federal agencies conducting and funding research. Coordination is needed to make deliberative judgments about the allocation of funds and scope of research, to minimize duplication, to present Congress and the public with a coherent strategy for federal investment, and to facilitate the large-scale multi-agency research efforts that will likely be needed to deal with future water problems.

The committee recommends that a new entity be formed to coordinate water research at the national level. The following three institutional models are proposed: (1) the Subcommittee on Water Availability and Quality administered by the Office of Science and Technology Policy, (2) a congressionally authorized neutral third party, or (3) a hybrid model that would be led by OMB and formally tied to the budget process. Whatever model is chosen, some entity will need to:

- Do a regular survey of water resources research using input from federal agency representatives;
- Advise OMB and Congress on the content and balance of a long-term national water resources research agenda every three to five years;
- Advise OMB and Congress on the adequacy of mission-driven research budgets of the federal agencies;
- Advise OMB and Congress on key priorities for fundamental research that could form the core of a competitive grants program administered by the National Science Foundation or a third party;
- Engage in vertical coordination with states, industry, and other stakeholders, which would ultimately help refine the agenda-setting process.



**Figure 1.** Agency contributions as a percentage of the total federal funding for water resources research in 2000.

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This report brief was prepared by the National Research Council based on the committee's report. For more information, contact the Water Science and Technology Board at (202) 334-3422. Copies of *Confronting the Nation's Water Problems: The Role of Research* are available from the National Academies Press, 500 Fifth Street, NW, Washington, D.C. 20001; (800) 624-6242; www.nap.edu.

