

heightened considerably over the past decade or so. The 1991 report of the WSTB, *Opportunities in the Hydrologic Sciences*, helped define and develop a modern science most useful to understanding and addressing complex emerging water and environmental issues. Many reports since from the WSTB and other units have addressed pieces of the hydrologic puzzle. As this issue of the WSTB Newsletter goes to press, a new Committee on Hydrologic Science is being formed by the WSTB and BASC. The initial focus of this "standing" committee will be on trying to assure the best possible hydrologic components for large national and international programs related to global change and biogeochemical cycle research. It is anticipated that the committee will include experts from both the scientific and policy arenas, as there is currently a highly charged policy debate underway dealing with long-term effects of potential climate change. This joint study between WSTB and BASC underscores the fact that understanding climate and weather is critical to appreciating the role of water in the operation of the Earth system.

Joe Friday, a meteorologist, is the new Director of the NRC's Board on Atmospheric Sciences and Climate. Formerly he was director of the National Weather Service.

NEW REPORTS

New Strategies for America's Watersheds

by Chris Elfring

The belief that watersheds make a sound basis for water resources planning and management is not new, as evidenced by waves of scientific, policy, and public interest going as far back as the 1930s. Yet after many years of high expectations, the nation is still struggling to find ways to implement integrated management at the watershed level. Much of the science and technology needed to provide the underpinnings necessary for integrated watershed management already exists. Numerous reports have highlighted the potential benefits to be gained from a watershed approach. However, most attempts to turn our understanding of watersheds and the benefits of integrated management into action have fallen short. Given the complex social, economic, and environmental setting that exists in any watershed, decisionmakers have struggled to put all the pieces together in support of a long-term vision that meets a variety of needs. In a new report from the WSTB, *New Strategies for America's Watersheds*, the opportunities and constraints associated with watershed-scale management are investigated and recommendations to improve these activities are made.

The challenge of water resource management goes beyond simple reductions in pollution, from both point and nonpoint sources. The nation's water needs are complex and interrelated, and piecemeal attempts to solve specific problems have in the past exacerbated other problems or created new ones. According to the report, watershed-based approaches can offer a more integrated way to address water resources management. Watershed-scale management can be difficult to implement because it requires (1) cooperation across different jurisdictions and agencies, and (2) a sophisticated understanding of watershed processes. To date, watershed management has been most successful when implemented at small scales and in relatively simple systems. Implementation has been more difficult in larger, complex watersheds where more problems and more people's interests must be addressed.

The report provides information on (1) the functions of watersheds and their variability, (2) state-of-the-art of watershed science, (3) issues related to connecting science and decisionmaking, and (4) organizing and financing watershed activities. In its conclusions, the report notes that watershed science in general has yet to develop an effective interface between what is known and how that knowledge is used. The report challenges the Congress and the President to use the reauthorization of the Clean Water Act as a mechanism to give national emphasis to the conservation and enhancement of watersheds. The report also provides conclusions and recommendations relating to (1) the basic philosophy behind using watersheds as management units, (2) watershed management and research needs, and (3) the relative strengths and weaknesses of various government agencies (at the federal, regional, state, and local levels) for planning and implementing watershed activities.

The report was prepared by a 15-member committee chaired by Will Graf of the University of Arizona. The project was sponsored by the Environmental Protection Agency, the Tennessee Valley Authority, the National Biological Service, the Natural Resources Conservation Service, the Bureau of Reclamation, the Forest Service, the McKnight Foundation, and the National Water Resources Institute. Prepublication copies of the report can be obtained from the National Academy Press at 800-624-6242 or 202-334-3313 or online at <http://www.nap.edu>. The published volume should be available in late January, also via the National Academy Press.

Setting Priorities for Drinking Water Contaminants

By Mark Gibson

The Safe Drinking Water Act (SDWA) Amendments of 1996 require the EPA to publish a list of unregulated chemical and microbial contaminants and contaminant groups that are known or anticipated to occur in public

water systems. This list, the Drinking Water Contaminant Candidate List (CCL), will provide the basis for deciding whether to regulate at least five new contaminants every five years. The EPA published the first final CCL on March 2, 1998. The CCL is essentially a list of research needs for drinking water contaminants. That is, additional research and monitoring need to be conducted for many, if not most, of the contaminants on the current CCL. The EPA faces a challenging task in (1) assessing the available scientific information on contaminant risk and (2) making risk management decisions (based on such assessments) regarding which contaminants should be removed from the CCL and become regulated.

To help the EPA address this task, the WSTB and the Board on Environmental Studies and Toxicology (BEST) have released a report that provides a phased decision process for determining which contaminants on the CCL are appropriate candidates for regulatory decisions and which will require research or monitoring. The report, *Setting Priorities for Drinking Water Contaminants*, is guided first and foremost by concerns about public health and concludes that there is no replacement for policy judgments by the EPA. In summary, the steps in the decision process are as follows:

1. Gather and analyze available health effects, exposure, and treatment and analytical methods data for each contaminant.

2. Conduct a preliminary risk assessment for each contaminant based on the available data.

3. Issue a decision document for each contaminant describing the outcome of the preliminary risk assessment.

4. Issue a health advisory for each contaminant not dropped from the CCL after the preliminary risk assessment. A health advisory is an informal technical guidance document that defines a non-regulatory (i.e., non-enforceable) concentration of a drinking water contaminant at which no adverse health effects would be anticipated to occur over specific exposure durations.

5. Begin compiling a regulatory package for contaminants removed from the CCL *or* conduct research for each contaminant remaining on the CCL after the preliminary risk assessment. For contaminants not slated for a regulatory decision, research results should be fed back into another preliminary risk assessment, and a new decision document should be issued based on the results of this second risk assessment.

A recommended time line for completing each phase of the process is also included in the report to help the EPA allocate time and resources in meeting the statutory requirements of the SDWA.

To assist in the development of a decisionmaking process, the report reviews several private and governmental chemical hazard-ranking schemes to examine what methodological elements and data

considerations in these schemes may be useful for moving CCL contaminants towards regulatory action. Based on this review, the report concludes that a ranking process that attempts to sort or prioritize contaminants is not appropriate for the selection of drinking water contaminants from the CCL for regulation, monitoring, or research. In the absence of complete information, the output of simple quantitative ranking processes is so uncertain (though this uncertainty is generally not stated) that they are of limited use in making more than preliminary risk management decisions about drinking water contaminants. Furthermore, if enough information is available to determine that a contaminant occurs in drinking water at levels and frequencies that may pose a health risk, then the contaminant should be considered for immediate regulation, without attempting to first assign a priority to it.

The report was written by the Committee on Drinking Water Contaminants, chaired by Warren Muir of the Hampshire Research Institute. Funding for the report was provided by the EPA's Office of Ground Water and Drinking Water. To order the report, contact the National Academy Press at 800-624-6242, <http://www.nap.edu>.

Environmental Cleanup at Navy Facilities: Risk-Based Methods

By Laura Ehlers

The Environmental Restoration Program of the United States Navy is responsible for 4,448 waste sites at Navy installations across the country. At almost every Navy base, soils, sediment, or ground water have been exposed to chemical contaminants, such as metals, chlorinated solvents, and petroleum compounds. Because cleanup efforts can be time consuming, expensive, and of limited effectiveness, the Navy requested that the National Research Council (NRC) study how the Navy can improve its Environmental Restoration Program. A new report from the WSTB, *Environmental Cleanup at Navy Facilities: Risk-Based Methods*, presents the results of the first phase of the study, focusing on the use of risk-based methodologies for increasing the speed and cost-effectiveness of Navy environmental remediation projects. The report was written by the WSTB Committee on Environmental Remediation at Naval Facilities, chaired by Edward Bouwer of the Johns Hopkins University.

The report reviews several risk-based methodologies, giving detailed consideration to the EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the American Society for Testing and Material's (ASTM) Risk-Based Corrective Action (RBCA) methodology. The CERCLA process, which governs cleanup of hazardous wastes at 66% of all Navy sites, outlines specific risk assessment