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I am delighted to be serving as the current Chair of the National Research Council’s (NRC) Water Science and Technology Board (WSTB). The WSTB, created in 1982, has the unique role of independently evaluating and advising upon some of the nation’s prominent and complex water-related issues through consensus studies, workshops, and other activities that bring together the nation’s top scientific experts.

As most of this report’s readers will appreciate, water-related issues pose increasingly difficult management and scientific challenges across the nation. Water supplies in many areas of the country, both in the arid West and in the more humid East, face increasing stresses because of competing water demands, including population growth and greater recognition of water needs for ecosystems. The long-term sustainability of the nation’s water supplies will depend to some extent on nontraditional water sources such as wastewater, stormwater, or seawater, calling for improved technologies to cost-effectively remove a wide range of contaminants. A greater reliance on alternative water sources will, in turn, require new investments in the nation’s water infrastructure. At the same time, many of the nation’s systems for water treatment and delivery, wastewater and stormwater conveyance, and flood protection are reaching the limits of their intended lifespans.

As WSTB studies in the California Bay-Delta, the Mississippi River delta, and the Chesapeake Bay have highlighted, the various sources of water pollution, the multiple users of water, and the resulting stresses on aquatic ecosystems make it difficult to identify clear priorities and solutions. On top of all these challenges is the reality of hydrologic nonstationarity and changing patterns of the droughts and floods that drive hydrologic cycles. Now more than ever, the WSTB can play a useful role by advising stakeholders on the scientific complexities that underpin many of these ongoing and emerging management challenges via independent, expert review.

New studies in the WSTB project portfolio illustrate well the broad range of science, engineering, and policy issues that can benefit from independent scientific advice. In South-Central Texas, the Edwards Aquifer has supplied waters to millions of domestic and agricultural users for decades, including the city of San Antonio. The aquifer and the springs it feeds have many recreational benefits and also are home to several endangered species, some of which exist nowhere else in the world. The WSTB is helping local aquifer management authorities by reviewing their predictive models, which are used to inform management decisions that must balance urban uses, irrigation, recreation, industry, and protection of endangered species. The WSTB also has begun two studies for the Federal Emergency Management Agency (FEMA) that relate to policies within its National Flood Insurance Program. The insurance program has faced many challenges in the past decade, especially in the wake of Hurricanes Katrina and Sandy. The WSTB will advise FEMA on many technical and other factors involved in setting insurance premiums and on the overall costs and benefits of national flood insurance. Finally, the WSTB
is overseeing a study sponsored by the U.S. Army Corps of Engineers that is examining the nation’s experiences in coastal risk protection along the eastern and Gulf coasts.

This booklet provides a snapshot of the WSTB program and how its reports and projects are supporting national decisions regarding water supplies, water quality, ecosystems, hydrologic hazards, and infrastructure needs. It was prepared and issued in the midst of continuing concerns about federal and state budget deficits and their implications for national water planning, development, and operations and maintenance. These concerns include tight budgets for water science and planning, declining investment in the nation’s stream gaging network, and continued negligence of an aging and deteriorating water infrastructure.

Over the years, the WSTB has made numerous contributions to stronger science-based and integrative water management across the nation. WSTB reports have guided restoration activities in the Florida Everglades, the California Bay-Delta, and the Missouri River. They have documented the state of the science for groundwater remediation and water treatment technologies. WSTB reports have supported policy initiatives and shifts in the water programs of numerous federal agencies, including EPA, the U.S. Army Corps of Engineers, the Department of the Interior, and the Department of Defense. The WSTB looks forward to continuing to serve as a national resource in helping federal agencies and other entities pursue sound policies and identify creative solutions. I look forward to working over the next three years to ensure that WSTB’s work will be as effective and fruitful as it has been in the past. Such service to the nation motivates my colleagues and me to serve as volunteers in this distinctive organization.

We thank you for your interest in the WSTB. We hope you find this booklet interesting and informative and we welcome inquiries about any aspect of our program.

George M. Hornberger, Chair
About WSTB and Its Work

The planning and management of the nation’s water resources is a far-reaching and multi-disciplinary enterprise, involving thousands of experts in science, engineering, economics, law, and public administration. In addition to the many agencies that carry out federal, state, and local policies for water use and management, numerous industries, utilities, associations, professional societies, and nonprofit organizations provide input into water resources decision making. These decisions affect an array of economic and social sectors including human health, flood risk management, agricultural production, aquatic ecology, commercial navigation, and hydroelectric power production.

Decision makers face many water management challenges, particularly balancing the demands of a growing population, economic development considerations, and the water needs of endangered species and valuable ecosystems. These challenges are expected to increase in the future, especially in areas experiencing high population growth and that are sensitive to drought conditions. For example, in western cities such as Las Vegas and Phoenix, rapid population growth and recurrent droughts threaten long-term reliability of water supplies. Recent water shortages in the Southeast suggest that these water supply issues are not restricted to the arid West. The need to provide water to protect endangered species entails difficult trade-off decisions in areas such as California’s Sacramento Bay-Delta and the Edwards Aquifer in Texas.

Despite large investments in flood protection infrastructure, the nation continues to experience extensive flood damages, whether in the extreme cases of Hurricanes Katrina and Sandy or via smaller-scale, more localized events. Along the nation’s coasts, governments must make difficult financial and policy decisions that balance the need for coastal protection with the risks posed by the turbulent nature of coastal storms.

Addressing these and other similar water-related challenges requires decision makers to have access to information based on credible and objective science. The nation’s decision makers often turn to the Water Science and Technology Board (WSTB), an interdisciplinary program in the National Research Council (NRC), for independent, objective scientific and technical advice. Since its founding in 1982, the WSTB has overseen hundreds of studies and advised on emerging water-related challenges in order to help strengthen the scientific basis for water resources decision-making across the nation.

History and Mission

The National Academy of Sciences (NAS) was chartered by Congress under President Lincoln in 1863. It initially was composed of 50 of the nation’s eminent scientists who, in addition to being honored for their achievements, advised the government on many scientific and engineering topics. The Academy’s charter specified that these scientists would not be compensated for their labor, but only for direct costs incurred in carrying out studies. Since its inception, this financial and organizational independence has enabled the Academy to provide scientific advice unbiased by political influences.

Today, studies of the Academies are conducted under the aegis of the National Research Council. Created in 1916, the NRC enlists both Academy members and nonmembers to advise on an array of scientific, engineering, and medical issues. At any given time, some 10,000 volunteer experts are serving on NRC committees. The WSTB is a unit within the Division on Earth and Life Studies (DELS) of the NRC. The scope of the WSTB program includes all dimensions of...
water and water resources, including scientific, engineering, economic, policy, and social factors.

WSTB’s Work
At the heart of the WSTB’s work are water-related studies that lead to reports representing consensus opinions of expert committees convened to address a specific question or sets of questions. The credibility of these reports rests upon the institution’s reputation for providing independent, objective, and non-partisan advice with high standards of scientific and technical quality. Checks and balances are applied throughout the study process to protect the integrity of the reports and to maintain public confidence in the process.

Beyond consensus reports, the WSTB conducts workshops, symposia, and other meetings (either as part of our studies or as separate activities) that allow for exchange among policymakers, members of industry, scientists, and the general public to discuss timely issues. Although most of the WSTB’s work is in response to requests for studies and workshops concerning water issues, the board cooperates with other units of the NRC to conduct cross-disciplinary studies, and with outside groups that have mutual interests.

Most WSTB studies are funded by federal agencies, with the remainder sponsored by state government agencies, private sector groups, and foundations. The National Academies is a 501(c)(3) scientific nonprofit organization that receives nearly all funds for its advisory work via contracts, grants, and other agreements. In 2010-2013, funding from these diverse sources for all WSTB activities totaled over $8 million.

WSTB’s People
The WSTB includes both its volunteer board members and its full-time staff. Board members serve for staggered three-year terms, thus maintaining annual rotation of membership. Numerous other volunteers serve as study committee members, report reviewers, and as government agency liaisons to the WSTB. Program participants come from universities, government agencies, and the private sector. Staff members organize board and committee meetings, help formulate study topics, identify prospective committee members, maintain contact with government agencies and other sponsors, conduct background research, and provide report writing and editing support for study committees.

WSTB members generally meet with WSTB staff twice annually to discuss recently completed and ongoing projects, identify and develop new initiatives, and convene periodic strategic planning sessions. The meetings also foster communication within the water resources community. Liaisons from federal agencies with water-related responsibilities regularly attend the meetings to provide input and guidance, and prospective sponsors of WSTB studies often participate, as well.

Communications and Outreach
From print media to a comprehensive website (http://www.nationalacademies.org/wstb), the WSTB places great emphasis on outreach and communication. The board website contains information about projects, meetings, reports, and lectures. It also contains links to recent webinars and videos summarizing important report conclusions. Finally, the WSTB maintains a website called Safe Drinking Water is Essential (http://drinking-water.org), which is a virtual, multimedia exhibit that provides information about water availability and quality. It also offers a decision-support platform that can be used in preliminary assessments for those considering water management options.

WSTB staff offices are located in the Keck Center of the National Academies, Washington, DC.
A newly convened WSTB committee is considering the potential for on-site reuse of stormwater and gray water (i.e., water generated from showers, washbasins, and laundry) to supplement water supply systems. One of its goals is to consider economic costs and benefits of on-site stormwater and gray water reuse compared to other water supply alternatives.

Groundwater Protection and Remediation

Almost half of the nation’s drinking water comes from groundwater, with billions of gallons being pumped daily for agriculture, industry, and other uses. At the same time, uncontrolled releases of industrial chemicals used by the private sector, the military, and the Department of Energy (among others) have contaminated groundwater at hundreds of thousands of sites across the United States. Despite more than 30 years of identification, characterization, and attempted cleanup of these sites, which range in scale from a small dry cleaner to an entire Army base, many still have contamination at levels that pose human health risks. As groundwater use increases to meet growing water demands, more supplies are being found to have contamination, prompting difficult choices about how to best clean up the groundwater.

For more than 20 years, the WSTB has been an important resource for the federal government and other responsible parties, state regulators, and the stakeholder community in providing both policy and scientific advice in the area of subsurface remediation. Beginning in 1994 with Alternatives for Ground Water Cleanup, committees organized by the
WSTB have produced reports on remediation technologies, monitored natural attenuation, bioavailability concepts, and how to integrate adaptive management into site remediation. The 2005 installment in the series, *Contaminants in the Subsurface: Source Zone Assessment and Remediation*, documented the growing interest in using aggressive source remediation technologies to remove contaminants from the subsurface, despite a profound lack of evidence for their effectiveness. The report proposed elements of a protocol for accomplishing source remediation that will enable project managers to decide whether and how to pursue source remediation at their sites.

**Hydrologic Hazards**

Losses of life and property resulting from hydrologic hazards, including floods, droughts, and related phenomena, are significant in the United States and throughout the world—and in many places are increasing. In the United States, over three-quarters of federal disaster declarations result from water-related events like floods. Historically, the nation has attempted to reduce flood losses through structural measures like dams and levees, although floodplain management, which includes nonstructural approaches such as land use regulations and zoning, is increasingly recognized as an important component of flood risk reduction.

The WSTB has published numerous reports that concern hydrologic hazard analyses, structural approaches to hazard reduction, and floodplain management—some in response to crises and others with a more prospective view. As an example of the former, following devastating flooding on the U.S. Gulf Coast from Hurricane Katrina, the WSTB engaged in a series of studies on the causes of flooding and engineering analysis and flood risk reduction planning for the future, the most recent of which is *The New Orleans Hurricane Protection System: Assessing Pre-Katrina Vulnerability and Improving Mitigation and Preparedness* (2009). That same year the WSTB published jointly with the NRC’s Board on Earth Sciences and Resources a report that addressed how to improve the representation of flood risk in the National Flood Insurance Program, *Mapping the Zone: Improving Flood Map Accuracy* (2009).

As natural disasters grow in frequency across the country, federal programs designed to protect human life and property are being reanalyzed and reformed. In particular, as new flood maps are issued in areas hard hit by Hurricanes Katrina, Irene, and Sandy, public scrutiny of the National Flood Insurance Program and the roles of the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers has intensified. Two ongoing WSTB projects funded by FEMA are evaluating the National Flood Insurance Program in terms of (1) its costs and benefits to the nation and (2) ways to better price insurance policies for buildings lying below the base flood elevation. The WSTB is also advising the Corps on how to reduce coastal flood risk from storm surges.

**Water Quality**

High quality water, from both groundwater and surface water systems, is essential to a variety of human, socioeconomic, and environmental services—from drinking water supply to supporting aquatic ecosystem habitat. Clean water has large direct economic benefits as well as indirect values related to ecosystem health, aesthetics, recreation, and tourism.

Over the last 30 years, the WSTB has carried out numerous studies related to water quality monitoring, assessment, and restoration, often targeting programs stemming from the 1972 Clean Water Act. For example, it has advised EPA on its Total Maximum Daily Load process for managing water quality, its Vessel General Permit, and its Stormwater Permitting Program. The WSTB also has issued multiple reports on the USGS National Water Quality Assessment Program, the federal government’s main effort to monitor and understand changes in the nation’s water quality.

The WSTB also has been engaged in numerous region-specific evaluations of water quality, many of which have targeted the Mississippi River Basin and the northern Gulf of Mexico. For example, the 2010 report *Missouri River Planning: Recognizing and Incorporating Sediment*
Management assessed several water quality issues related to sediment and nutrients along the Missouri River and downstream to the northern Gulf of Mexico. The 2011 report Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation recommended changes to how the Bay watershed is managed if it is to achieve ecosystem recovery following a century of excess nutrient and sediment inputs. The WSTB Review of the EPA’s Economic Analysis of Final Water Quality Standards for Lakes and Flowing Waters in Florida (2012) weighed in on that state's push to use numeric, rather than narrative, standards for nutrients.

Finally, a committee of the WSTB hosted a November 2013 workshop in St. Louis for broad discussion of monitoring and evaluation of Mississippi River water quality, and to encourage stronger interstate collaboration in the monitoring and analysis of the river.

River Systems and Aquatic Ecosystems Management

The United States long has relied heavily on its river systems and aquatic ecosystems to provide a variety of economic functions. For example, thousands of dams have been built to control floods and encourage floodplain development, stabilize river flows to support commercial navigation, impound reservoirs to provide water supplies for irrigated agriculture and municipal users, generate hydroelectric power, and support recreational uses.

As our understanding of the ecological functioning of water resources has improved, so too have conflicts among multiple uses that compete for limited water resources, especially during drought conditions. Federal and state agencies charged with dam operations and reservoir releases face persistent challenges in providing water for traditional constituents and at the same time satisfying newly acknowledged uses (e.g., flows for species listed under the Endangered Species Act).

The WSTB has an extensive record of providing scientific, technical, and policy guidance for managing many of the nation’s major river systems and aquatic ecosystems. It began with the all-time WSTB “best seller,” Restoration of Aquatic Ecosystems (1992), which helped shaped the theory and practice of aquatic ecosystems restoration. Since then, the WSTB has written reports on navigation and ecology on the Upper Mississippi River–Illinois Waterway System, on climate variability and water management across the Colorado River basin, and on how to sustain water supplies and a healthy environment for endangered species in the California Bay-Delta system. As discussed in the foreword, a new project is underway to advise local officials on groundwater management in the Edwards Aquifer, where domestic water supplies and endangered species needs are threatened by drought conditions.

The WSTB has an ongoing project providing biennial advice to the U.S. Army Corps of Engineers and the state of Florida regarding restoration of the Greater Everglades Ecosystem. The latest report in the series, Progress Toward Restoring the Everglades: The Fourth Biennial Review (2012), found that 12 years into the Comprehensive Everglades Restoration Project, California. Three WSTB reports issued between 2010 and 2012 reviewed the California Bay-Delta’s Habitat Conservation Plan and evaluated the trade-offs inherent in providing water for cities, agriculture, and endangered species.
Project, little progress has been made in restoring the core of the remaining Everglades ecosystem.

Data, Models, and Concepts in Water Science and Technology
Since its founding, the WSTB program has been partly driven by the needs of water resources management decisions for sound scientific underpinnings, particularly as society takes a more global, interdisciplinary, and systems-oriented view of the environment. An important component of the WSTB portfolio thus provides advice on advancing the various relevant sciences (e.g., hydrology, limnology) and technologies (e.g., treatment processes), setting of research priorities and organization of scientific programs, and improving water resources planning procedures and economic approaches for valuing ecosystem services.

Some of these reports have focused on specific disciplines, such as the seminal 1991 WSTB report *Opportunities in the Hydrologic Sciences*, which helped establish hydrologic science as a distinct earth science. The 2012 sequel, *Challenges and Opportunities in the Hydrologic Sciences*, reviews the state of the field and identifies promising opportunities to advance hydrologic sciences. Others have considered all fields of water resources, like the 2004 report *Confronting the Nation’s Water Problems*. It found that the U.S. research dollars necessary to address the nation’s water resource challenges have been stagnant for the past 30 years and, unlike research in other fields such as human health, have not paralleled growth in demographic and economic parameters.

The WSTB has been advising the U.S. Geological Survey (USGS) on its important responsibilities for 25 years, from providing program reviews (such as the National Streamflow Information Program) to tackling complex topics such as river science. The most recent report is *Preparing for the Third Decade (Cycle 3) of the National Water-Quality Assessment Program* (2012), which evaluates the current state and future directions for this important program. In a similar vein, in 2010 the WSTB established an ongoing advisory activity for the U.S. Army Corps of Engineers and in 2013 published *Corps of Engineers Water Resources Infrastructure: Deterioration, Investment, or Divestment?* That report notes the deterioration of much of the Corps’ water resources infrastructure, and identifies options for the Corps and the nation in setting maintenance and rehabilitation priorities.
The Abel Wolman Lecture

Since 1990, the WSTB has sponsored a lecture to honor the life and career of Abel Wolman, one of the world’s preeminent experts in water science and technology. A member of the faculty at Johns Hopkins University, Abel Wolman was a major contributor over seven decades in the science and engineering of sanitation, pollution control, and water resources. His work in water resources management and water supply, especially his pioneering efforts in introducing chlorination, helped bring safe drinking water and better health to people throughout the world. In recognition of his work, Dr. Wolman was an elected member of both the National Academy of Sciences and National Academy of Engineering. Dr. Wolman was 90 years old when the WSTB was founded in 1982 and was actively engaged in professional activities until his passing in 1989. He was a close adviser through the 1980s to those involved in founding and steering the WSTB through its early years. He had a profound and lasting impact, and the Lecture is maintained to preserve his significant legacy. The Abel Wolman lectures cover areas reflecting Dr. Wolman’s broad interests. Past Wolman Lecturers are:

- Michael Kavanaugh, Geosyntec Consultants, 2012
- Judy L. Meyer, University of Georgia, 2010
- John M. Barry, author, New Orleans, Louisiana, 2006
- James Morgan, California Institute of Technology, 2004
- John Boland, Johns Hopkins University, 2003
- Rita R. Colwell, National Science Foundation, 2002
- Perry L. McCarty, Stanford University, 2001
- Gilbert F. White, University of Colorado, 1999
- Kader Asmal, Ministry of Water Affairs and Forestry, Republic of South Africa, 1998
- M. Gordon Wolman, Johns Hopkins University, 1996
- John Cairns, Jr., Virginia Polytechnic Institute and State University, 1994
- Helen Ingram, University of Arizona, 1993
- Jan van Schilfgaarde, U.S. Department of Agriculture, 1992
- Daniel A. Okun, University of North Carolina at Chapel Hill, 1991
- Luna Leopold, University of California, Berkeley, 1990
Defining and Initiating the Study

Studies are generally initiated when WSTB staff and board members collaborate with sponsors to determine a specific set of questions to be addressed. This may follow Congressional action, an agency request, or proactive suggestions from the board. A formal “statement of task” is then developed that defines the scope of the study and serves as the basis for determining the expertise and the balance of perspectives needed on the committee.

Committee Selection and Approval

Selection of appropriate committee members, individually and collectively, is essential for the success of every study. Consistent with the Academies’ congressional charter, experts volunteer to serve on study committees without compensation. All committee members serve as individual experts, not as representatives of organizations or interest groups. Each member is expected to contribute to the project on the basis of his or her own expertise and good judgment. Once a project is funded, the National Academies seek nominees for committee members from many sources. Before a committee can be approved, a thorough balance and conflict of interest discussion is held. Committee members are considered provisional until this process is completed.

Committee Meetings, Deliberations, and Report Drafting

Study committees typically gather information through: (1) meetings with invited speakers that are open to the public and announced in advance through the National Academies’ website, (2) submission of information by outside parties, (3) reviews of scientific literature, and (4) investigations by the committee members and staff. In all cases, efforts are made to solicit input from the sponsor and individuals who have special knowledge of the topic under consideration. Sponsors are invited to make presentations to the committee at its first few meetings to discuss the sponsors’ expectations for the study. The committee also deliberates in meetings closed to the public and sponsors in order to develop draft findings and recommendations free from outside influence. All committee analyses and drafts remain confidential.

Report Review

To maintain the highest levels of quality and objectivity, all committee reports must undergo a rigorous external review by independent experts before becoming finalized. The review process is designed to ensure that the report addresses its statement of task, that findings are supported by the scientific evidence or otherwise supported, that the report’s exposition and organization are effective, and that the report is impartial and objective. The review process is overseen by one or two additional independent report reviewers who ensure that the report review criteria have been satisfied. Review comments are not publicly disclosed.

Report Release and Dissemination

Study results generally are published as printed books by the National Academies Press (http://www.nap.edu) and are posted on the National Academies website. A prepublication version of the report typically is given to the sponsor and posted on the National Academies website in advance of the final printed report. Reports are not provided to sponsors in draft and thus report contents are not influenced by sponsor reviews. Briefings of sponsors, the Congress, and the press usually accompany the release of reports. For studies with broad interest, the National Academies may prepare a press release and a short “Report in Brief” or other derivative materials that are circulated widely. Also, committee members and project staff may testify or make public presentations about the content of the reports once they have been released.
2011–2013 Studies at a Glance

The WSTB studies produced in 2011–2013 include several high-profile reports that were “in the news.”

In recent years, extreme storms and hurricanes have caused increasingly disastrous flooding along U.S. rivers and coastlines, with much of the damage occurring when levees failed or were overtopped. This report examines how FEMA National Flood Insurance Program assesses, mitigates, and insures against flood risk behind levees. It recommends an updated approach to analyze and manage flood risk to give public officials and individual property owners a more precise idea of the risks they face.

**Alternatives for Managing the Nation’s Complex Contaminated Groundwater Sites (2013)**
This report estimates that at least 126,000 hazardous waste sites across the U.S. still have contaminated groundwater, and their closure is expected to cost from $110 billion to $127 billion. About 10 percent of these sites are considered “complex,” meaning restoration is unlikely to be achieved in the next 50 to 100 years due to technological limitations. The report recommends evaluating whether these complex sites should transition to long-term management, where risks would be monitored and harmful exposures prevented, but at reduced costs.

**Water Reuse: Potential for Expanding the Nation’s Water Supply through Reuse of Municipal Wastewater (2012)**
This report addresses the potential for municipal wastewater reuse to expand and enhance water supply for drinking water, irrigation, groundwater recharge, and environmental purposes. The report includes a new analysis that suggests the risk of exposure to certain microbial and chemical contaminants from drinking reclaimed water is no higher than that experienced in at least some current drinking water treatment systems and may be lower. Adjustments to the federal regulatory framework could increase public confidence in water reuse.

**Sustainable Water and Environmental Management in the California Bay-Delta (2012)**
Water management in the California Bay Delta is meant to provide a more reliable water supply for California and protect and rehabilitate the Delta ecosystem, including endangered fish species that live in or migrate through the Delta. This report discusses the issue of water scarcity, factors affecting the listed species and the Delta ecosystem, future water-supply and delivery options, scientific uncertainties, the degree of restoration likely to be attainable, and the need for comprehensive planning.

**Assessing the Relationship Between Propagule Pressure and Invasion Risk in Ballast Water (2011)**
The release of invasive species from ships’ ballast water to U.S. waterways has caused extensive impacts (on the order of $1 billion since 1989 for zebra and quagga mussels alone). To limit the spread of invasive species, EPA and the Coast Guard will begin regulating the concentration of living organisms discharged from ballast water. This report found that the development of a robust statistical model relating organism concentration in ballast water to invasions is hampered by insufficient data. Thus, a two-track approach is recommended to gather both experimental and field-based descriptive data, and to then select various risk-release models to analyze these data.

Photo credit (top of page): USGS Wyoming-Montana Water Science Center
Published Reports (2003–2013)

The WSTB has published over 200 reports covering a wide range of water science, technology, and policy matters. Titles of those reports produced from 2010 to 2013 are listed below. Information about these reports, including information about how to obtain them, can be found on the websites of the WSTB (http://dels.nas.edu/wstb) and National Academies Press (http://www.nap.edu/).

2013
- Delta Waters: Research to Support Integrated Water and Environmental Management in the Lower Mississippi River
- Levees and the National Flood Insurance Program: Improving Policies and Practices
- Alternatives for Managing the Nation’s Complex Contaminated Groundwater Sites
- Himalayan Glaciers: Climate Change, Water Resources, and Water Security
- Preparing for the Third Decade (Cycle 3) of the National Water-Quality Assessment Program
- Sustainable Water and Environmental Management in the California Bay-Delta

2012
- Improving Water Quality in the Mississippi River Basin and Northern Gulf of Mexico: Strategies and Priorities
- Review of the EPA’s Economic Analysis of Final Water Quality Standards for Lakes and Flowing Waters in Florida
- Challenges and Opportunities in the Hydrologic Sciences
- Water Reuse: Potential for Expanding the Nation’s Water Supply through Reuse of Municipal Wastewater
- Approaches for Ecosystem Services Valuation for the Gulf of Mexico After the Deepwater Horizon Oil Spill: Interim Report
- Global Change and Extreme Hydrology: Testing Conventional Wisdom
- Assessing the Relationship Between Propagule Pressure and Invasion Risk in Ballast Water

2011
- Missouri River Planning: Recognizing and Incorporating Sediment Management
- A Review of the Use of Science and Adaptive Management in California’s Draft Bay Delta Conservation Plan
- Achieving Nutrient and Sediment Reduction Goals in the Chesapeake Bay: An Evaluation of Program Strategies and Implementation
- National Water Resources Challenges Facing the U.S. Army Corps of Engineers
- Letter Report Assessing the USGS National Water Quality Assessment Program’s Science Plan
- A Review of the Proposed Revisions to the Federal Principles and Guidelines Water Resources Planning Document
- Progress Toward Restoring the Everglades: The Third Biennial Review
- Management and Effects of Coalbed Methane Produced Water in the United States
- Review of the WATERS Network Science Plan
- A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California’s Bay Delta
- Letter Report Assessing the USGS National Water Quality Assessment Program’s Science Framework
- Review of the St. Johns River Water Supply Impact Study: First and Second Reports
- Nutrient Control Actions for Improving Water Quality in the Mississippi River Basin and Northern Gulf of Mexico
- Urban Stormwater Management in the United States
- The New Orleans Hurricane Protection System: Assessing Pre-Katrina Vulnerability and Improving Mitigation and Preparedness
- Mapping the Zone: Improving Flood Map Accuracy
- Toward a Sustainable and Secure Water Future: A Leadership Role for the U.S. Geological Survey
- Final Report from the NRC Committee on the Review of the Louisiana Coastal Protection and Restoration (LACPR) Program
- Letter Report Assessing the WATERS Network Science Plan

Photo credit (top of page): National Weather Service Advanced Hydrologic Prediction Service
Desalination: A National Perspective
First Report from the NRC Committee on the Review of the Louisiana Coastal Protection and Restoration (LACPR) Program
Fourth Report of the NAE/NRC Committee on New Orleans Regional Hurricane Protection Projects: Review of the IPET Volume VIII
Great Lakes Shipping, Trade, and Aquatic Invasive Species
Hydrologic Effects of a Changing Forest Landscape
Integrating Multiscale Observations of U.S. Waters
Progress Toward Restoring the Everglades: The Second Biennial Review
Mississippi River Water Quality and the Clean Water Act: Progress, Challenges, and Opportunities
Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability
Improving the Nation's Water Security: Opportunities for Research
Prospects for Managed Underground Storage of Recoverable Water
River Science at the U.S. Geological Survey
Water Implications of Biofuels Production in the United States
CLEANER and NSF's Environmental Observatories
Drinking Water Distribution Systems: Assessing and Reducing Risks
Managing Coal Combustion Residues in Mines
Progress Toward Restoring the Everglades: The First Biennial Review
Review of the Lake Ontario—St. Lawrence River Studies
Advice on New Orleans Hurricane Protection Projects (three short reports)
Toward a New Advanced Hydrologic Prediction Service
Three Reports of the NAE/NRC Committee on New Orleans Regional Hurricane Protection Projects
Contaminants in the Subsurface: Source Zone Assessment and Remediation
Endangered and Threatened Species of the Platte River
Regional Cooperation for Water Quality Improvement in Southwestern Pennsylvania
Re-Engineering Water Storage in the Everglades: Risks and Opportunities
Valuing Ecosystem Services: Toward Better Environmental Decision-Making
Water Resources Planning for the Upper Mississippi River and Illinois Waterway
Adaptive Management for Water Resources Planning
Analytical Methods for Water Resources Project Planning
Assessing the National Streamflow Information Program
Confronting the Nation’s Water Problems: The Role of Research
Groundwater Fluxes at Interfaces
Indicators for Waterborne Pathogens
Managing the Columbia River: Instream Flows, Water Withdrawals, and Salmon Survival
Review of the Desalination and Water Purification Technology Roadmap
Review of the U.S. Army Corps of Engineers Restructured Draft Feasibility Study for the Upper Mississippi River–Illinois Waterway Restructured Feasibility Study
River Basin and Coastal Systems Planning
U.S. Army Corps of Engineers Water Resources Project Planning: A New Opportunity for Service
Adaptive Monitoring and Assessment for Comprehensive Everglades Restoration Plan
Bioavailability of Contaminants in Soils and Sediments
Does Water Flow Influence Everglades Landscape Patterns?
Environmental Cleanup at Navy Facilities: Adaptive Site Management
WSTB Members and Staff

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