WESTERN STATES WATER

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THE WEEKLY NEWSLETTER OF THE WESTERN STATES WATER COUNCIL

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ADMINISTRATION UPDATE/WATER RESOURCES

National Science & Technology Council/Water Census

The National Science and Technology Council's Committee on Environment and Natural Resources, Subcommittee on Water Availability and Quality (SWAQ), has released, "A Strategy for Federal Science and Technology to Support Water Availability and Quality in the United States." A cover letter by John H. Marburger, Director, Office of Science and Technology Policy (OSTP), says: "The United States has reaped the benefits of abundant and reliable supplies of fresh water since its founding. However, the impacts of population growth, development, and climate change are placing increasing stress on our Nation's water supplies.... The Subcommittee was charged with: (1) identifying science and technology needs to address the growing issues related to fresh water supplies; (2) developing a coordinated, multi-year plan to improve research to understand the processes that control water availability and quality, and (3) enhancing the collection and availability of the data needed to ensure an adequate water supply for the Nation's future."

Marburger continued, "This report is a result of... interagency collaboration." The Subcommittee consists of 29 representatives from the U.S. Army Corps of Engineers' Institute for Water Resources, Bureau of Reclamation, Geological Survey, Fish and Wildlife Service, USDA's Cooperative State Research and Education and Extension Service, Natural Resources Conservation Service, Department of Commerce, Department of Energy, Environmental Protection Agency, Department of health and Human Services, Department of State, National Aeronautics and Space Administration, National Science Foundation, Tennessee Valley Authority, Office of Management and Budget and Office of Science and Technology Policy (both the latter in the Executive Office of the President). He added that the report "...provides an overview of the set of challenges that face us in our pursuit of adequate fresh water supplies, lays out the research priorities associated with those challenges, and provides recommendations for a federal science strategy to address this important issue."

The report has been posted on the OSTP website at: http://www.ostp.gov/nstc/html/_reports.html. Any comments may be sent to Jo Leslie Eimers, SWAQ Co-Executive Secretary at jleimers@usgs.gov.

This SWAQ report adds water quality and builds on a 2004 report, "Science and Technology to Support Fresh Water Availability in the United States," which highlighted the need for coordinated efforts. The new report does not contain an inventory of current programs, but rather focuses on topics and the benefits to be realized from greater "interagency and public/private collaboration and/or increased resources." The report recognizes, "Authority to manage water resources is largely delegated to States, Tribes, and local municipalities. SWAQ is committed to productive collaboration with these water managers." SWAQ has already begun work on implementation plans for some of the priorities identified in the report.

Among the new challenges identified in the report are climate variability and change, ground water mining, and water quality degradation. It also adds increasing competition between water users, which will result in critical decisions about allocating water for "agricultural use and consumption by cities, for maintaining water reservoirs and ensuring in-stream flows for aquatic ecosystems, and for industrial and energy production and recreational uses." It suggests, "[T]he Nation will again rely on opportunities and tools offered by science and technology. Federal water research and development will increase the range of options and will inform the public, water managers, policymakers, and the private sector about the benefits, costs, and risks of the variety of decisions they face."

What is our current water use? We have estimates for instream use for hydropower, and withdrawals from surface and ground water for off-stream uses, but no nationwide estimates for instream uses to support ecological needs, nor estimates of precipitation that never reaches our river, streams and aquifers (such as crop and vegetation uses due to evapotranspiration from non-irrigated lands). For total off stream withdrawals, for 2000, "our best guess" is 408,000 million gallons per day (mgd). This figure includes freshwater withdrawals of 344,1000 mgd and saline water withdrawals of 62,270 mgd. The later includes 59,500 mgd for thermoelectric power uses, 1,280 mgd for industrial use and 1,490 mgd for mining. Fresh water withdrawals were dominated by irrigation (137,000 mgd) and thermoelectric use (136,000 mgd), followed by public water supply (43,300 mgd), industrial use (18,500 mgd), aquaculture (3,700 mgd), domestic self supply (3,590 mgd) and mining (2,010 mgd). Surface water accounted for 79%, and ground water 21%.

Our consumption of water resources, the difference between withdrawals and water returned to surface or ground water sources, was last "systematically estimated nationwide in 1995, when about 30% of freshwater withdrawals were used consumptively.

"Simply stated, quantitative knowledge of U.S. water supply is currently inadequate." The first challenge is to accurately assess the quantity and quality of our water resources, accurately measure and monitor how water is used, and know how water supply and use changes over time. This includes information on surface and ground water, rainfall and snowpack in terms of quantity, quality,

timing and location. "A comprehensive assessment of U.S. water resources should build upon significant monitoring programs by water management authorities, States, and Federal government agencies to ensure that regional and national water resources are measured accurately. Data and information...should be relevant to decisionmakers, from the individual homeowner to regional water managers...[which] will allow more efficient and equitable allocation...and minimize over allocation of limited supplies."

The report continues, "To manage water effectively, we should know our present and future demands.... Furthermore, data and information about...demand for water should integrate physical and social sciences.... Water-use studies should encompass combined surface-water and ground-water management. Water-use data should have seasonal resolution, and should be collected using a combination of measurement and statistical estimation." Other needs include knowing the role of ecosystems in maintaining water availability and quality, and how to maximize the use of our existing infrastructure to better meet current water needs.

The second challenge is developing methods that will allow expansion of fresh water supplies while using existing supplies more efficiently in agriculture, buildings and homes, energy production, industry and other uses. The report address the potential for science and technology to expand water supplies, by adopting new approaches to storage, new water management techniques, new treatment technologies, and other tools. It says, "Storage and recovery of water should also be improved so that water not immediately needed for in-stream use may be saved for future use.... Aquifer storage and recovery is becoming more common." It adds, "Using behavioral and management sciences, we should develop a 'toolbox' of public awareness and education, technology transfer, incentives, legal, institutional, and economic systems that affect water use to gain acceptance for water-saving technologies, water reuse, and markets for water quantity and quality." There is a need to "reduce conflict and better manage competing demands [and] develop ways to better incorporate scientific and technical information into water-resource decision-making."

A third challenge is developing and improving predictive water management tools to help anticipate the outcomes of both long-term policy and planning decisions, and short-term decisions about water releases, withdrawals, storage and uses. The report observes, "Improved forecasts will prevent costly mistakes and stretch the utility of existing supplies and infrastructure." The goal is to reduce uncertainty and risk, and "...support decisions such as to store or release water, divert water for off-stream use, treat water, or, in times of flood or water-quality incidents, keep the public and water users out of harms way." Further, "Communities of water users and water resource managers should anticipate long-term water availability and quality on time scales of years to decades. They should base resource-management, planning, and policy decisions both on historical data and on predictions about future hydrologic, meteorologic, and ecologic conditions." Both probabilistic and physical modeling capabilities are needed, as well as better ways to communicate with decisionmakers and stakeholders.

Briefly, the proposed "strategy," building on past SWAQ work, includes seven key actions: (1) implement a National Water Census; (2) develop a new generation of water monitoring techniques; (3) develop and expand technologies for enhancing reliable water supply; (4) develop innovative water-use technologies and tools to enhance public acceptance; (5) develop collaborative tools and processes for U.S. water solutions; (6) improve our understanding of the water-related ecosystem services and ecosystem needs for water; and (7) improve hydrologic prediction models and their applications. An important component of the National Water Census would be a water quality monitoring net-work, together with an inventory of water supplies, water use and infrastructure. The census would be undertaken in partnership with State, regional and local water agencies and develop and adopt uniform data collection, communication and availability standards and protocols integrating existing monitoring networks. It would also establish regional and national priorities for data needs.

The SWAQ also identified a number of critical actions for water monitoring, including developing sensors and systems to "...remotely measure water volumes and movement – inexpensively, precisely, and in real time – in rivers, lakes, aquifers, wetlands, estuaries, snowpack, and soil...[and]...measure water quality inexpensively in real time." The report also says appropriate agencies should develop innovative technologies to use water more efficiently, provide tools to "deal with the human impacts of changing water availability and use," and increase investment in public education and outreach. It further suggests pilot studies to integrate decision tools, expanding ecosystem monitoring with non-federal partners, and ways improve and apply hydrologic models. SWAQ will next convene multi-agency teams to review needs, and benchmark skills, capabilities and tools currently available.

The WESTERN STATES WATER COUNCIL is an organization of representatives appointed by the Governors of Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.