U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

HEARING CHARTER

Water Supply Challenges for the 21st Century

Wednesday, May 14, 2008
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Purpose

On Wednesday, May 14, 2008, at 10:00 a.m. the House Committee on Science and Technology, Subcommittee on Energy and Environment will hold a hearing entitled **"Water Supply Challenges for the 21st Century."** The purpose of the hearing is to examine the challenges of managing water supplies to meet social, economic and environmental needs in the United States. Population growth, changes in water use patterns, competing demands for water supply, degradation of water quality, and climatic variation are all factors influencing the availability and use of water. The hearing will also examine the role of the federal government in helping states and local communities adopt and implement sensible and cost-effective water resource management policies.

Background

Water is necessary to every aspect of life. Although some regions of the U.S. have limited water supplies, especially areas west of the Mississippi River, the U.S. is endowed with substantial supplies of fresh water. However, population growth, increased per capita water use, water quality degradation, and increased withdrawals to support agricultural, industrial, and energy production activities combined with climate variability have increased water shortages across the country.

In order to meet the challenge of providing safe, reliable water supplies for society we need improved information about the status of our water resources, policies to encourage water conservation, and technological improvements that will enable us to maintain and improve water quality and to improve our water-use efficiency to allow us to accomplish society's goals with less water. Through this hearing, the Committee hopes to ascertain how and to what extent water science and technology can ease the nation's water resource challenges.

Assessment of U.S. Water Supply

In the 19th century, U.S. population stood at a little more than 5 million citizens. By 1959, the U.S. population had grown to almost 180 million people. Our population is now over 300 million with a one percent rate of growth. Available surface water supplies

have not increased in the United States since the 1990s, and groundwater tables are continuing to decline.[1] It is clear that the U.S. water supply cannot support future populations and economic activity at its current rate of consumption.

In order to better manage water supplies, there is a critical need for good data about our water resources and how supplies vary over time. Currently, quantitative knowledge of water supply is inadequate in the United States.[2] The U.S. Water Resources Council completed the most recent, comprehensive, national water availability and use assessment in 1978.[3]

In response to increased concerns about future increased water shortages, the Bush Administration created the Subcommittee on Water Availability and Quality (SWAC) of the National Science and Technology Council's Committee on Environment and Natural Resources to coordinate a multiyear plan to improve research on water availability and quality. The Subcommittee concluded in a 2007 report that a robust process for measuring water requires a systems approach to assess surface water, ground water, rainfall, and snow pack from the perspectives of quantity, quality, timing, and location.[4]

Initiatives to Address Water Supply Shortages

States have initiated a number of steps to address water shortages. These activities include: Development of drought preparedness plans to reduce their vulnerability to droughts and development of drought response plans to provide assistance to communities and businesses that are vulnerable to drought; monitoring water availability and water use of major water supplies; coordinating management of ground and surface water supplies; developing and implementing policies to encourage water conservation and allocate water among competing uses within their jurisdictions; exploring options for increasing water supply such as cloud seeding to increase rainfall or investment in desalinization plants.

At the federal level, there are numerous federal departments, independent agencies, and several bilateral organizations have some responsibility for water programs and projects within the United States. The federal agencies with primary responsibilities for water resources include: The Bureau of Reclamation which provides municipal and irrigation water and operates hydroelectric facilities in the western states; the Army Corps of Engineers which has responsibility for projects involving flood control and floodplain

[1] "Report to Congress on the Inter-dependency of Energy and Water," U.S. Department of Energy. December 2006.

[2] U.S. Government Accounting Office, 2003 Report: *Freshwater Supply States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Water Shortages*. GAO-03-514; National Research Council, 2004. *Assessing the National Streamflow Information Program*. National Academies Press, Washington, D.C

[3] The Council, established by the Water Resources Planning Act in 1965 (P.L. 89-80), comprising the heads of several federal departments and agencies, such as Interior and the Environmental Protection Agency, has not been funded since 1983. U.S. Government Accounting Office, 2003 Report: *Freshwater Supply States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Water Shortages*. GAO-03-514.

[4] The Subcommittee on Water Availability and Quality. *A Strategy for Federal Science and Technology to Support Water Availability and Quality in the United States*. September 2007. 35pp.

management, water supply, navigation, and hydroelectric power generation; the National Oceanic and Atmospheric Administration which is responsible for weather and climate prediction through the National Weather Service, including the operation of the National Drought Information System and maintains wildlife habitat and ecosystem protection through its coastal zone and fisheries management programs; the U.S. Geological Survey which assesses the quality, quantity, and use of U.S. water resources and maintains a national stream gauge network used for monitoring stream and river flows and flood forecasting; the Environmental Protection Agency which protects public health and the environment by ensuring safe drinking water, controlling water pollution, and protecting ground water.

The federal government has also established standards for toilets and the Environmental Protection Agency recently established a voluntary program, WaterSense, to encourage the marketing and adoption of water conserving technologies and practices.

Most of the authority for allocating water resides within state governments. When water disputes arise involving two or more states, the federal government has a role to play based upon Congress's power to regulated interstate commerce and through congressional approvals of binding agreements known as compacts. The seven Colorado Basin states have a long-established compact governing water allocation of the Colorado River. The extended drought in the Southeast has brought attention to an ongoing interstate conflict among Alabama, Florida, and Georgia over water allocation in the Apalachicola-Chattahoochee-Flint (ACF) river system. According to the Congressional Research Service, at least 47 states and the District of Columbia at some time have been involved in disputes over water that have resulted in litigation or initiated negotiations to establish an interstate compact.[5]

In a 2003 report of the Government Accountability Office (GAO) report, states identified five federal actions they believed could best support their efforts to improve water management. Better coordinated federal participation in water management agreements along with financial assistance to increase storage and distribution capacity, improved water data, flexibility in the administration of environmental laws, and increased consultation on federal or tribal use of water rights.[6]

Economic Impacts Associated with Water Shortages

In the United States, over 50,000 water utilities withdraw approximately 40 billion gallons per day of water from the nation's resources, to supply water for domestic consumption, industry, and other uses.[7] When severe water shortages occur, the economic effect can be substantial. According to a 2000 report from the National

[5] Congressional Research Service, Memorandum to the House Committee on Science and Technology, "States involved in Interstate Water Disputes," May 9, 2008. 3pp.
[6] U.S. Government Accounting Office, 2003 Report: *Freshwater Supply States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Water Shortages*. GAO-03-514
[7] "Water Loss Control," George Kunkel Jr. *Water Efficiency*

Oceanic and Atmospheric Administration, eight water shortages from drought or heat waves each resulted in $1 billion or more in monetary losses over the past 20 years.[8]

An adequate supply of treated water is integral to many industries, including agriculture and food processing, beverages, power generation, paper production, manufacturing, and mineral extraction. Water shortages can negatively affect companies and entire industries and reduce job creation and retention. Current industry trajectories, population growth, and dwindling water supplies all point to increased water shortages. Increased water demand will come with increased costs to all businesses, industries, and municipalities which rely on the same water resources. The Association of California Water Agencies (ACWA) reported in April 2008 that California is now losing income and jobs due to the state's water supply crisis. [9]

Water Energy Nexus

Water is a vital component of our economy's energy sector. Water is used for resource extraction, refining and processing and transportation. Water also is essential for electricity generation. The expansion of biofuel supply is also going to require substantial water resources. The National Research Council predicts that the surge in ethanol production is likely to lead to adverse effects on local water sources and water quality.[10]

The use of water in the extraction and processing of petroleum-based transportation fuels is relatively small compared to the electric-generating industry. According to the Department of Energy's National Energy Technology Laboratory, the thermoelectric power sector accounts for 39 percent of total freshwater withdrawal in the United States, and 3.3 percent of total freshwater consumption. This consumption for electricity production accounts for over 20 percent of nonagricultural water consumption. Water is also used directly in hydroelectric generation, which constituted approximately 14 percent of energy produced in the United States in 2006 according to the Energy Information Administration (EIA).

Not only do we need vast quantities of water for energy production, but we also need energy to transport and treat water. DOE estimates that nationwide, about 4 percent of U.S. power generation is used for water supply and treatment. Across the country, the amount of energy used to provide water to meet agriculture needs represents the most significant regional difference. However, the supply and transport of water can be quite energy-intensive. For example, pumping water to consumers that live far away from the source can be energy intensive. California's State Water Project pumps water 444 miles of aqueducts from three recreational lakes in Plumas County in Northern California to Riverside County in Southern California and is the state's largest energy consumer using between 2 to 3 percent of California's energy (5,000 GWh per year).[11]

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[8] U.S. Government Accounting Office, 2003 Report: *Freshwater Supply States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Water Shortages*. GAO-03-514

[9] "California Water Supply Crisis Affecting Economy," *Water and Wastewater News*. April 21, 2008

[10] "Fuel for Thought," National Academies in Focus. Volume 8 Number 1.

[11] "Water Energy Use in California," California Energy Commission.

Witnesses

Dr. Stephen Parker, Director, Water Science and Technology Board, National Research Council. Dr. Parker will discuss the recent work undertaken by the Water Science and Technology Board of the National Academy of Sciences on water supply and water management. He will also discuss the major challenges facing states and local governments in providing adequate water supply to meet societies competing needs.

Dr. Jonathan Overpeck, Director, Institute for the Study of Planet Earth, and Professor, Geosciences and Atmospheric Sciences, University of Arizona. Dr. Overpeck will discuss the potential impacts of climate change on water supply, particularly in the Southwest.

Dr. Robert Wilkinson, Director, Water Policy Program, Bren School of Environmental Science and Management, University of California-Santa Barbara. Dr. Wilkinson will discuss the linkage between energy and water supplies both in terms of the water needed to provide energy and in terms of the energy needed to transport and treat water.

Mr. Marc Levinson, Economist, US Corporate Research, JPMorgan Chase. Mr. Levinson will discuss the key findings of JP Morgan's recent report "Watching Water: A Guide to Evaluating Corporate Risks in a Thirsty World," and the potential impacts of water supply shortage on businesses and the economy.

Dr. Roger Pulwarty, Program Director, National Integrated Drought Information System (NIDIS) NOAA Climate Program Office. Dr. Pulwarty will discuss what information is currently available through NIDIS to regional, state and local water decision-makers. He will also address what future information is required for better water policy planning.