

The Critical Need for Data in Managing Western Water Resources

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The Western States Water Council (WSWC) is an advisory body whose members are appointed by the governors of the seventeen western states and Alaska. Its members include the state engineers and other resource agency heads responsible for water administration, planning, management, supply, rights permitting, quality regulation, and dam safety. Water use data collection, analyses, and dissemination are also important functions. The council is closely aligned with the Western Governors' Association (WGA).

The arid Southwest includes some of the fastest growing states in the nation: Arizona (3.5 percent from 2004 to 2005), Nevada (3.5 percent), Utah (2.0 percent), Texas (1.7 percent), Colorado (1.4 percent), and New Mexico (1.3 percent). State water managers must have good data to plan to meet future demands. Western water laws, plans, and policies must operate within the context of considerable uncertainty and year-to-year fluctuations in snowpack, precipitation, streamflow, and temperature. Future climate changes could lead to increasing variability and greater extreme events, such as drought and floods. Moreover, small temporal changes in runoff patterns could significantly impact water availability. Scientists predict that global warming in the middle latitudes will lead to more rain and less snow, earlier snowmelt and seasonal peak runoff, extended growing seasons, and greater summer evapotranspiration. What effect will such changes have on water supply and demand, particularly for current surface-water storage systems?

In September 2004, WSWC sponsored a workshop on western water supply challenges attended by council representatives and senior federal water officials. Following the workshop, the council representatives met to discuss

issue areas where federal and state "cooperative conservation" efforts might be most effective. It shouldn't come as a surprise that accurate and timely information on water supplies and uses was recognized as the top priority. Good data and sound science are prerequisites to good decision-making. Even as more and more analytical tools and decision support models become available, we still lack enough basic data to paint a complete picture of our western waterscape.

Data Collection Programs Struggling

Regionally, the council has focused its efforts on two federal programs threatened by an erosion of federal funding that are of particular concern to western water managers. First, snowpack data and water supply projections are provided by the U.S. Department of Agriculture's National Water and Climate Center in Portland, Oregon, under the Natural Resources Conservation Service (NRCS). This regional system of 731 automated SNOTEL sites and 920 manually measured snow courses provides invaluable data for projecting spring and summer streamflow. NRCS also supports a growing Soil and Climate Analysis Network (SCAN) for direct soil moisture monitoring in 32 states. WSWC urged Congress to appropriate \$12.3 million for FY2006, but Congress appropriated \$10.65 million, well short of that amount. The Bush Administration's FY2007 budget request is \$10,588,000 – again short of the amount needed to cover inflation and increasing program costs.

Second, the U.S. Geological Survey's Cooperative Water Program (CWP) and National Streamflow Information Program (NSIP) together comprise a national

network of some 8,000 stream gauges, most of which provide real-time data. This network is critical to informed water management and emergency flood operations, but every year more gauges are lost as funding is eroded by inflation. CWP is a 110-year-old jointly funded partnership that includes some 1,400 state, tribal, regional, and local organizations. Originally, a fifty-fifty matching program, non-USGS cooperators now pay roughly 67 percent of costs. To the extent that Congress does not cover cost increases, cooperators face

the distasteful choice of either shouldering an increasingly disproportionate share of the expense or dropping support for particular gauges. In the past, USGS did not have authority to unilaterally fund gauges, and many of national significance were lost, some with over 30 years of record. USGS and cooperators face this "death by a thousand cuts" each year.

A few years ago, USGS sought and received authority for NSIP, a fully federally funded system of gauges, as the backbone of a national stream-gauging network. To control costs, some states have established their own separate stream gauge networks. USGS and its cooperators continue to consider cost containment alternatives such as allowing greater in-kind contributions or having USGS serve as a clearinghouse and provide quality control for data gathered by others. States have expressed a preference for federal spending on basic data-gathering rather than interpretive studies, while recognizing that both are important.

Funding Falls Short of Requests

Last August, WSWC and nineteen other diverse organizations asked the Bush

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of the cost of the total network but enjoy equal access to the entire hydrologic database. Nearly all of the network data are accessed and used by multiple sources.

This financially opportunistic process for supporting the hydrologic network provides parity for support; however, it also creates some systemic program limitations. Financial support for a gauging station generally is dependent on two factors: a management issue of sufficient importance to justify the construction and continuing support for a network station, and the availability of discretionary tax revenues. These requirements tend to bias the establishment of stations in developed and densely populated areas (see map, page 19). While this benefits highly populated regions which are generally near critical locations for river discharge accounting, it causes network gaps in less-developed regions. Funding restrictions also create a bias toward regulated or

managed rivers. Diversions, withdrawals, and regulation of water use are usually responsible for hydrologic issues deemed sufficient to justify river gauging. Consequently there is a dearth of network stations and corresponding hydrologic data to represent undeveloped conditions.

We are only beginning to fully understand the value of long-term databases and the important role they play. Stations that have been operated for 50 years or more provide insight on hydrologic conditions and trends that may not be available from any other source. Natural climatic wet and dry periods as well as climate change occur in cycles of decades or more, and long-term records are essential to detect real trends and impacts on water resources.

Unfortunately, too many data recorders and data collection sites in the USGS network are discontinued or relocated when the issue that motivated their establishment matures or is resolved

and/or cooperative funding is no longer available. Consequently, too few areas have long-term surface-water records. This is particularly true of undisturbed areas, from which long-term basin and climatologic inferences could be drawn. Nevertheless, USGS remains committed to providing high-quality data for a multitude of users, and in recent years the agency has received appropriated resources that at least temporarily have helped reverse the decline of numbers of long-term stations.

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USGS Data Websites

Real-time and historic surface-water, groundwater, and water-quality data from NWISWeb: waterdata.usgs.gov/nwis/; use *sw/*, *gw/*, or *qw/* extensions, respectively.

NAWQA data warehouse: infotrek.er.usgs.gov/traverse/?p=NAWQA:HOME:2200096155959254017

Reference

Wahl, K.L., W.O. Thomas, and R.M. Hirsch, 1995. An overview of the streamflow-gauging program, U.S. Geological Survey Fact Sheet FS-066-95.

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Administration for \$16.2 million for NSIP and \$74 million for CWP, along with significant future increases. The President's FY2007 budget request includes \$16.8 million for NSIP—an increase of \$2.8 million over FY2006—but only \$62.2 million for CWP—representing a cut of \$2 million to CWP interpretive studies. Neither the NSIP nor CWP requests include enough money to fully offset anticipated federal cost increases.

On Sept. 30, in a letter to then-Interior Secretary Gale Norton and Joshua Bolten, director of the Office of Management and Budget, ten U.S. senators called for a much more ambitious effort to increase spending on CWP and NSIP by \$180 million over the next five years, with minimum annual increases of \$15 million and \$20 million respectively. The letter stated, "Over the last seven years, Congress and the Administration have struggled to understand and achieve a balance in the appropriate federal investment in the collection and management of water resources data." It continues listing various federal programs, as well as events and

circumstances, that require good water data, including multi-decade droughts, dramatic increases in water demands due to population growth, regional impacts of climate change, river management impacts on ocean environments, monitoring river health, understanding required total maximum daily [pollutant] loads (TMDLs), hydropower production, and real-time flood warning and emergency response.

WSWC also supports other data-related initiatives, including enactment of a National Drought Policy bill introduced by Senator Pete Domenici and the related creation of a National Integrated Drought Information System (NIDIS). NIDIS would facilitate public access to real-time data and help water users and others anticipate and mitigate drought-related impacts. The WGA is leading efforts to make NIDIS a reality, with or without authorizing legislation (see www.westgov.org/wga/initiatives/drought/).

Further, the council has urged the Administration to ensure the next generation of Landsat instruments is capable of thermal imaging and observations at a resolution sufficient

for continuing calculations of evapotranspiration that increasing numbers of states are using to monitor water use and improve water management. The current Landsat 5 and Landsat 7 satellites provide valuable data, but age and equipment malfunctions limit their future reliability. The President's Office of Science and Technology Policy recently directed NASA to acquire a single Landsat data continuity mission in the form of a free-flyer spacecraft to collect land surface data and deliver it to USGS. Reportedly, \$98 million is in the 2007 request for this purpose, but the "actively cooled thermal sensor technology" used in the Landsat 7 spacecraft was a large factor in the overall cost of both systems and is no longer a firm baseline requirement.

It will take a significant grassroots effort from all those with a stake in the quantity and quality of hydrologic data in the West to raise the political will necessary to produce the information we will need to assess and address our future water resources challenges.

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