

Water Quality Compliance Cost Challenges Identified

As Congress considered legislation to provide additional resources to communities to address regulatory costs and aging water infrastructure last year, it sought a more complete understanding of the federal water requirements affecting local communities—such as the new, more stringent arsenic standard—and the cumulative costs associated with implementing them.

To address this issue, the U.S. Senate Committee on Environment and Public Works directed the U.S. Government Accounting Office to investigate: which key federal water requirements local communities are subject to under the Safe Drinking Water Act and the Clean Water Act; to what extent existing studies provide information on the cumulative costs of such requirements to

communities; and what challenges inhibit the development of reliable cost estimates.

The U.S. EPA administers the two water-related acts, and communities of all sizes must bear the cost of compliance with the water requirements established under them. Under the Unfunded Mandates Reform Act of 1995, EPA is required to identify the costs and benefits of federal mandates contained in certain regulations. But such cost estimates focus only on single regulations, are prospective, have been subject to criticism for both overestimating and underestimating actual costs of implementation, and do not provide a meaningful measure of actual cumulative compliance costs when added together, the investigators found.

After meeting with EPA representatives, water association leaders, community water providers, and system managers, and conducting site visits to selected

communities, the investigators identified several significant obstacles to developing reliable cumulative cost estimates:

- *Obtaining accurate and complete cost data.* Institutional knowledge or historical records on the costs of compliance efforts are simply lacking.
- *Accurately allocating costs.* Costs are sometimes shared by multiple overlapping jurisdictions. Further, communities generally track costs by project rather than federal requirement, and projects may involve changes that serve multiple purposes or impose indirect but related costs.
- *Establishing a causal link between community investments and federal water requirements.* For some requirements, no good baseline measure exists of what communities would have done in

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the absence of such requirements. Some investments are made in anticipation of federal requirements. And some states or regional entities may have more stringent requirements than federal criteria.

No solutions were offered to address these challenges in the report to Congress.

The findings are contained in "Federal Water Requirements: Challenges to Estimating the Cost Impact on Local Communities," available at www.gao.gov/new.items/d06151r.pdf.

A Winter of Extremes

In March and April, California newspapers carried headlines such as "Flooding worries rise as rain keeps falling" (*Fresno Bee*), "Rainier than usual (now it's official)" (*Modesto Bee*), "State has abundance of water in the bank; Reservoirs at 100% capacity" (*San Francisco Chronicle*), "Rain won't be going away" (*Contra Costa*

Times), and "Wet March, and still more rain to come" (*Chico Enterprise-Record*).

Meanwhile, headlines in Arizona and New Mexico read "Arizona goes on 'red' alert over drought" and "High country lacks snowpack for first time since '30s" (*Arizona Republic*), "Dry winter, landscape prompt New Mexicans to brace for grim fire season" (*Free New Mexican*), "Southwest suffers historic drought" (*USA Today*), and "Local officials keeping a wary eye on water situation" (*Portales News-Tribune*).

What do the numbers show? As the tables on this page show, most of the southwestern cities received below-normal precipitation for the Oct. 1, 2005 to March 31, 2006 period. However, statewide, California and Nevada precipitation

Precipitation and Snowpack Extremes by State, 2005-2006 Water Year Through March

Precipitation (percent of normal on April 4)				
	Least		Most	
AZ	San Francisco Peaks	33%	Little CO River headwaters	47%
CA	northern Great Basin	135%	Lake Tahoe	151%
NV	eastern NV	105%	Clover Valley	153%
NM	Rio Hondo	27%	San Juan River headwaters	84%
UT	southeastern UT	71%	Price-San Rafael	124%
Snowpack (percent of normal on April 4)				
	Least		Most	
AZ	Little CO headwaters	3%	San Francisco Peaks	74%
CA	northern Great Basin	129%	Klamath	174%
NV	Lower Humboldt	115%	Clover Valley	182%
NM	Rio Hondo	0%	Animas River	77%
UT	southeastern UT	69%	Provo R.-Utah Lake-Jordan R.	137%

Source: Natural Resources Conservation Service SNOTEL data

and snowpack at the beginning of April were well above normal. Interestingly, in Arizona, the San Francisco Peaks had the lowest relative amount of precipitation for the water year, but the greatest snowpack in the state, whereas the headwaters of the Little Colorado River received the greatest overall precipitation but had the lowest snowpack of the monitored sites. Conditions in Utah ranged from below average in the southeastern part of the state to above average in the north. And in New Mexico, the Rio Hondo was parched, whereas the northwestern part of the state was closer to, but still below, average.

Visit www.wcc.nrcs.usda.gov/snow/ and www.nws.noaa.gov.

Precipitation for Western Cities, Winter 2005-2006

	Oct 1 - Mar 31 precipitation (inches)	normal precipitation (inches)	Percent of normal
Albuquerque	1.3	3.7	36
Las Vegas	1.7	2.8	61
Los Angeles	9.9	13.5	73
Phoenix	1.7	5.1	33
Sacramento	19.9	15.7	127
Tucson	0.7	5.6	13

Source: National Weather Service forecast offices

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ABSTRACTS DUE OCT. 15, 2006

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Toxic Cocktails Pack Greater Punch

A great cocktail of natural and manmade compounds exists in our waters, even in treated drinking water. The U.S. Environmental Protection Agency and other agencies try to determine which are the more dangerous chemicals and establish maximum allowable concentrations designed to protect our health. But they work with one compound at a time. These compounds don't occur in water systems one at a time, however. What happens when they are part of a mixture? With infinite combinations and concentrations possible, the challenge of testing mixtures seems enormous but must be overcome if we are to truly protect humans and other species.

Researchers at the University of California at Berkeley have begun to test the effects on frogs of mixtures of pesticides typically found in agricultural runoff, reported the *Oakland Tribune*, citing an online publication in *Environmental Health Perspectives*. The results are showing that mixtures of chemicals, even at individual concentrations 10 to 100 times below EPA standards, caused "significant harmful effects."

Among those effects, according to the newspaper, were smaller size, death from

a common pathogen that the control group was able to fight off, holes in the thymus, higher levels of the hormone corticosterone, and efficient switching of testosterone to estrogen, causing some male frogs to produce eggs rather than sperm.

Lead researcher Tyrone Hayes has seen these effects in frogs at concentrations as low as 0.1 parts per billion (ppb), whereas an average concentration of 2,400 ppb of some of the compounds are found in the urine of a farm worker, the *Tribune* said.

Phthalates, compounds used in nail polish, cosmetics, and plastics, have also been studied for their effects on humans, the newspaper reported. Again, compounds that are known to cause minimal effects at low concentrations become more potent when mixed together. The paper cited an EPA study where phthalate mixtures caused permanent reproductive damage in about a quarter of the animals tested.

Chemical manufacturers interviewed by the *Tribune* had little to say, other than that there is insufficient evidence of harmful effects at low concentrations. One former regulator, now consulting for the American Chemical Council, acknowledged to the newspaper that few data are available regarding the effects of compounds on children.

Visit www.oaklandtribune.com.

DOE Determines Yucca Mountain Infiltration Studies Technically Sound

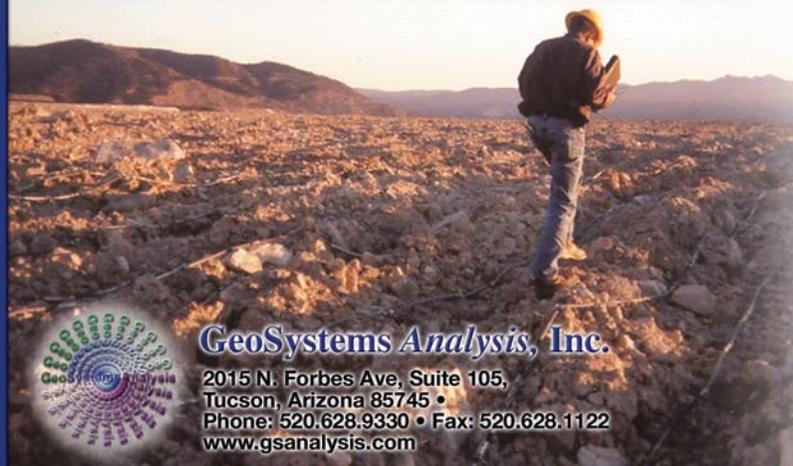
In February, the U.S. Department of Energy's Office of Civilian Radioactive Waste Management released a report confirming the technical soundness of infiltration modeling work performed by U.S. Geological Survey employees.

Last March, DOE disclosed e-mails between USGS employees that appeared to suggest they had failed to follow certain quality assurance procedures during their work (see *Southwest Hydrology*, Jul/Aug 2005). In response, this report was developed to assess how issues raised by the e-mails may have impacted some of the scientific conclusions contributing to the Yucca Mountain Site Recommendation of 2002 and the Key Technical Agreements between DOE and the Nuclear Regulatory Commission. The report found no impact on those conclusions.

The 144-page final report, "Evaluation of Technical Impact on the Yucca Mountain Project Technical Basis Resulting from Issues Raised by E-mails of Former Project Participants," examined work products developed by the USGS

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employees—mainly the infiltration contributing to the evaluation of the long-term performance modeling of the underground repository. The report concludes that the net infiltration ranges, as determined by the USGS employees, were consistent with groundwater recharge rates measured by scientists studying other arid and semi-arid regions in the United States and provide reasonable inputs to models used for the 2002 site recommendation.

The report is available at www.ocrwm.doe.gov/newsroom/documents/evaluation/evaluation.pdf.

USGS IDs Science's Role in Water Management

from the U.S. Geological Survey

The U.S. Geological Survey recently released a report that examines western water availability, the modern role for science, and the value of monitoring and research to ensure an adequate water supply for the future.

According to USGS scientist and report co-author Mark T. Anderson, "Effective water management in the West is challenged by increasing and often competing needs among various water users: agricultural use and consumption by cities, maintaining water reservoirs and ensuring in-stream flows for aquatic ecosystems, industrial and energy production, and recreation. Scientific information becomes a crucial factor for resource managers to support their decision-making."

Such factors as a demographic shift, climate variability (including the potential for severe sustained droughts), climate change, water-rights issues, depletion of groundwater in storage, introduction of new storage and water-use technologies, and protection of endangered species add to a growing complexity for water management.

The report compiles findings from a variety of USGS studies and data in

an effort to help citizens and public officials better understand changing water situations in the West and the ways that new scientific understanding can support wise management of the resources. It cites examples and scientific challenges from four western basins experiencing significant water availability and sustainability concerns: the Middle Rio Grande Basin in New Mexico, the Greater Los Angeles area, San Pedro Riparian National Conservation Area in Arizona, and the Upper Klamath Lake basin in Oregon.

The report, "Water Availability for the Western United States—Key Scientific Challenges" (Circular 1261), is available at pubs.water.usgs.gov/circ1261/.

New Water Management Degree at TAMU

Last fall, Texas A&M University launched a new, interdisciplinary

graduate degree program in water management and hydrologic sciences, the first of its kind in the state. Granting both masters and doctorate degrees, the program includes faculty members from 12 departments in the colleges of engineering, geosciences, and agricultural and life sciences at the university. The program aims to encourage interdepartmental collaboration among faculty members with the goal of establishing a nationally and internationally recognized water program, and to prepare students for careers in research or practice-related water management and hydrology.

The program will be recognized with a 2006 Education and Public Service award from the Universities Council on Water Resources at its July conference in Santa Fe.

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