

ASR and the “Big Picture”

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Hundreds of water providers throughout the United States are already using some form of well or surface recharge for managed underground storage (MUS, called aquifer storage and recovery [ASR] in this publication) as an integral part of their water supply management. The Congressional Water Caucus recently identified “groundwater banking” as a priority for U.S. water policy.

Yet as a 2008 National Research Council (NRC) report reveals, little quantifiable, reliable information is available regarding total amounts of water stored underground, subsurface storage locations, or available storage. Nor are there widely accepted metrics for assessing storage suitability, economic and financial costs and benefits of ASR, or ways to compare and combine surface and subsurface storage alternatives for conjunctive (joint groundwater and surface-water) management. This lack of information, along with inconsistent regulatory guidance, creates challenges for individual providers considering ASR, but is also a problem for planners considering the bigger picture: How can we apply and integrate ASR into conjunctive water management to address regional and national or federal priorities?

On March 19, 2008, NRC hosted a forum in Washington, D.C., to discuss institutional issues of managed underground storage such as science- and risk-based ASR policy and regulations for water supply and protection of health and the environment; and monitoring, management, and planning. Held in partnership with the Ground Water Protection Council, National Ground Water Association, and Groundwater Resources Association of California, the forum attracted speakers and participants from more than 25 states and three federal agencies. Some points and questions raised at the forum follow.

Public and Policy Maker Education

Education was widely recognized as a critical component for ASR to be perceived

and accepted as a mainstream tool for water management. The Southwest has generally higher water knowledge than other regions, and most western states have ASR-specific permitting regulations. However, nationally and federally, the concepts, challenges, and benefits associated with ASR have been poorly communicated to policy makers and the public, making it hard to gain public trust.

Efforts to address policy and management aspects often become bogged down over technical details and debates over terminology—such as whether to use “ASR” or “MUS”—or derailed by characterizations of ASR as an experimental and untested technology in spite of its widespread use. Many water managers discount ASR, saying “We use surface water, not groundwater.”

Groundwater organizations have taken the lead on organizing ASR symposia and developing educational materials—but since most ASR system supplies are surface water, is ASR really just a groundwater issue? Policy makers and the public usually understand water only in surface-water terms. What metrics and educational tools could help translate ASR benefits and constraints into terms that fit a surface-water paradigm?

UIC and Groundwater Protection

The biggest direct federal involvement in ASR comes from the U.S. Environmental Protection Agency’s Underground Injection Control (UIC) program. ASR wells are “Class V” wells, a catch-all category mainly for permitting waste disposal. UIC is implemented by states if EPA grants them primary enforcement responsibility, or by regional EPA offices. EPA headquarters is completing an internal review on how ASR works, but has not provided states or regional agencies with guidance on UIC interpretation, resulting in inconsistent permitting approaches.

UIC-related questions raised in the NRC report and forum include: 1) Do residence-

time requirements reflect site-specific conditions for different constituents? 2) Are state interpretations of “antidegradation” preventing ASR development in cases where the risk is remote of impacting other groundwater users pumping from an underground source of drinking water and where the benefits to the water supply—and even water quality—are high? 3) Do primary drinking water standards need to be met at the wellhead or at the edge of a limited zone of conditioning?

State agencies, regional EPA staff, and water providers at the forum saw no need for new regulations, and stressed that permit requirements must be specific to site conditions, operations, and risk of adverse interactions between the stored water and water in the aquifer. However, they requested federal guidance for more consistent interpretation of UIC and funding to develop approaches for ASR permit application review.

Federal Support

While water supply issues are handled at the state level, federal agencies have long been involved in ASR, from the U.S. Geological Survey’s post-World War II groundwater recharge studies to the U.S. Bureau of Reclamation’s Ground Water Recharge Demonstration Projects of the 1980s, a major catalyst for western ASR development. The proposed SECURE Water Act would increase the activities of USGS and Reclamation related to water resources data and water availability, including groundwater. Will these studies consider use of aquifers not just as groundwater reserves but also as potential underground storage zones?

The U.S. Army Corps of Engineers’ (Corps) Water Resources Principles & Guidelines (P&G), which provide standards for evaluating water resources management alternatives and planning, are being reviewed and updated (see page 8). Colorado, Utah, and Oregon have developed metrics for evaluating potential underground storage areas, as has the

Corps Central Everglades Restoration Plan. Individual water entities such as South Metro (Colorado) Water Authority and the cities of Phoenix and Beaverton, Oregon, have developed methods for comparing benefits and costs of storage options, supporting more integrated planning approaches. When agencies such as Corps and Reclamation are developing basinwide and regional water plans to meet national priorities, such as ensuring water is left in streams to preserve habitat, will all opportunities for storage (surface and underground) and considerations of conjunctive water use be incorporated as critical components for optimal water management?

Other federal agencies, such as those that own land with potential recharge sites or are involved with water-intensive activities, also are interested in underground storage. In Colorado, the National Resources Conservation Service and U.S. Fish and Wildlife Service have funded and supported projects on state wildlife areas and

private lands where recharge ponds for stream augmentation provide habitat benefits. The U.S. Department of Energy is currently exploring increased use of treated effluent and water produced during energy extraction. In Wyoming, water providers have completed pilot studies on produced-water ASR. Will federal agencies consider and incorporate underground and surface storage options and conjunctive management for federal activities involving water storage?

Building a National Network

The NRC forum was the first national meeting on ASR institutional issues. Water providers and state agencies from across the country want this dialogue to continue with the benefit of widely accessible statistics, metrics, policy and facility profiles, and case studies. A national network of ASR water providers, agency personnel, and other stakeholders is being considered, which would work with existing water education organizations and associations that consider ASR an issue

of interest to their members. The network could improve communication between ASR systems and regulatory programs, make reliable information more widely available, develop statistics on national ASR use, and further national dialogue on policy, permitting, and planning.

Contact Cat Shrier at cat@watercatconsulting.com. Read or purchase NRC's "Prospects for Managed Underground Storage of Recoverable Water" (National Academies Press, 2008) at books.nap.edu/openbook.php?record_id=12057&page=R1.

VIEW THE WEBCAST of NRC's March 19, 2008 **Forum on Policy, Regulatory, and Economic Issues Associated with Managed Underground Storage of Recoverable Water** for no charge until June 30. Link through these partner organizations:

- National Ground Water Association (www.ngwa.org)
- Groundwater Resources Association of California (www.grac.org)
- Ground Water Protection Council (www.gwpc.org)

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