

NGWA workshop on “Making Groundwater Sustainable”

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Growing population, increases in irrigated agriculture, and rising energy-related uses of water have combined with other demands to increase the use of groundwater. Declining water levels and groundwater storage depletion in many aquifers across the US, coupled with potential impacts of climate change, makes it clear that current withdrawal rates from many aquifers are simply not sustainable for an indefinite period of time. The National Ground Water Association (NGWA) sponsored a ½-day workshop in Washington, DC, on February 22, 2016, on problems and solutions aimed at “making groundwater sustainable.” The workshop was a prelude to their “Groundwater Fly-In” designed to allow groundwater professionals to meet with and educate politicians, their staff, and other decision-makers about issues and concerns of groundwater professionals.

The workshop was intended to provide a forum for exchanges of information, presentation of ideas, and opportunities for discussion on how to develop groundwater sustainably. It was designed to include a suite of technical presentations on related issues and to include ample time for audience participation and discussion. The meeting was attended by approximately 60–70 people; questions were many, and discussions were lively and informative. The format was to split the morning workshop into two sequential panel sessions, each with three speakers, who also served as panelists for their session. Each speaker gave a 20-min presentation, and then, those three speakers served on the panel for open discussions with the

audience. Bill Alley, NGWA’s Director of Science and Technology, served as the moderator for the workshop.

The workshop opened with a short introduction and welcome address from Kevin McCray, Executive Director of NGWA, followed by the first Panel Session, which focused on the impacts of agriculture and energy development on groundwater. The first speaker, Dr. Mark Giordano (Georgetown University), spoke about the challenges of global groundwater management. He noted that there has been a boom in groundwater usage, because, it is ubiquitous and available on demand. Thus, it is not easy to govern, especially for agricultural uses. Dr. Giordano’s remarks indicated that, in a sense, groundwater management is more of a social and political problem than technical and economic. Giordano compared groundwater issues and solutions among Australia, India, and the United States. The next speaker, Dr. Bridget Scanlon (Texas Bureau of Economic Geology, University of Texas at Austin), discussed groundwater usage for energy extraction and electricity generation. She noted that groundwater is critical for hydraulic fracturing in many areas, and its use contributes to water-level declines in some aquifers. But a holistic analysis indicates that if the natural gas generated by that hydraulic fracturing is used for power generation, it leads to a substantial overall saving of water, as compared to coal-generated power. The third speaker, Dr. Diana Bauer [US Department of Energy (DOE)], discussed the energy-water nexus. She noted that DOE wants to reduce stress on water resources related to energy development. A recent analysis and report on the topic are available from the web page at: <http://energy.gov/epsa/energy-water-nexus>. The Department of Energy aims to optimize the energy efficiency of water management, treatment, distribution, and end use. The discussions during the panel session raised some interesting points, including that water

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losses from unlined canals represent a gain for the underlying groundwater system. Also, groundwater is a global and national issue, but a “local” resource, which makes development of optimal generic management strategies more difficult. The importance of water quality also was acknowledged.

The second panel session focused on the role of groundwater in water scarcity. The first speaker, Dr. Leonard Konikow (US Geological Survey, Emeritus Scientist), talked about the magnitude of long-term cumulative depletion in major aquifer systems across the US, as well as global estimates. The three largest volumes of depletion in the US occur in the High Plains aquifer, the Mississippi Embayment aquifer, and the Central Valley of California, which had the greatest depletion intensity in the US during 2000–2008. The rate of depletion has increased in the twenty-first century. Lessons from some areas where innovative water management policies have led to decreased use and increased supplies show that steps can be taken to extend the life of our precious groundwater resources. The next speaker, Dr. Frederick Bloetscher (Florida Atlantic University), discussed the role of managed aquifer recharge in water-scarce areas. He noted that solutions could involve reuse, recapture, and storage, and that aquifer storage and recovery (ASR) has been successfully employed at more than 200 sites across the US to store water during times of surplus, for future use during times of excess demand. However, problems with clogging during the storage (recharge) phase remains an ongoing technical issue, and in some cases, overall recovery efficiency is not as high as desired. The third and final speaker, Libby Bernick, PE (Trucost Company), spoke about the true value of groundwater. She indicated that water scarcity is the new normal, and that a major problem is that water is

undervalued in much of the world as prices are inversely related to scarcity and risk. Rarely is the full value of the asset assessed. She indicated that a free online tool, The Water Risk Monetizer, is available that provides actionable information to help businesses understand and quantify water-related risks in financial terms (at <http://water.riskmonetizer.com/>). She further stated that things of value get measured, and what gets measured gets managed. The theme of economics continued to be a focus during the questions and discussions in the final panel session. For example, the commonly believed concept that water is a free commodity, and you only pay for delivery, may need to be rethought. Water utilities may need to do more outreach and marketing to garner support for customers to pay for the full costs of collection, treatment, distribution, and maintenance of the water resource and related infrastructure.

After the session ended, participants were invited to stay for lunch and a keynote presentation by Joel Beauvais, Deputy Assistant Administrator for the Office of Water, US Environmental Protection Agency. Among other things, Beauvais called attention to the EPA’s online mapping tool (Drinking Water Mapping Application to Protect Source Waters, or DWMAPS) to help people find information about drinking water in their community. More information is available at the website : <http://www.epa.gov/sourcewaterprotection/dwmaps>.

Overall, the workshop seemed to be a great success in raising awareness and knowledge about the problem of groundwater sustainability. It included discussions of both obstacles and pathways towards making groundwater sustainable. Raising awareness is a key to implementation of improved policies.