


Groundwater

Guest Editorial/

The Federal Role in Addressing Groundwater Depletion

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Groundwater depletion has been brought to the public's attention lately, beginning with a series of high-profile articles in the *New York Times*. The articles infer the need for greater federal involvement and control over the nation's groundwater. Separately, the President's Council of Advisors on Science and Technology (PCAST) formed a working group and solicited input on "America's Groundwater Challenges." The PCAST request suggested federal actions were needed. However, many responses raised questions and concerns about the nature and scope of such actions (PCAST 2024a).

While safeguarding groundwater is a global challenge, the most effective solutions are found at the local or regional aquifer system level. Groundwater occurs in aquifers that are highly variable in size, geology, climate, overlying land use, water quality, and water uses. The response times of groundwater systems to pumping, connections to surface water, recharge characteristics, and environmental functions also vary widely. Each groundwater system requires individual attention.

Most critically, effective groundwater management and governance require meaningful and continuing engagement of numerous local stakeholders in the decision-making process. People's diverse values about the environment, property rights, livelihood, individual and community economic gains, and current and intergenerational equity come into play, as do diverse perspectives and passions on how to balance the often-competing demands around groundwater use and protection. Communication and facilitation among stakeholders, decisionmakers, scientists, technical experts, and groundwater users play critical roles in structuring informed and productive conversations.

Consideration of these key attributes is central to achieving sustainable groundwater management. It is also important to recognize that States and Tribes have authority over the allocation and administration of rights to the use of groundwater within their borders. States and Tribes also administer groundwater quality rules, as well as federal water-quality standards if they have achieved federal delegation. As indicated by several responses to the PCAST query, any effort to impose federal oversight on groundwater pumping would face fierce opposition from states, agricultural groups, and others.

Indeed, PCAST in their final recommendations acknowledged that the federal government does not manage groundwater (PCAST 2024b). The question becomes what is the role of the federal government among a host of partners, including state, federal, tribal, regional, and local entities; nonprofits and community-based organizations; university and private researchers; water districts; industry; and landowners?

Among the multiple ways the federal government can help are financial assistance for managed aquifer recharge, research and support for new technology for desalination, treatment, and water reuse or to reduce water demands, support for private well owners and underserved communities, public education and outreach, improved characterization of major aquifer systems, and expanded monitoring of groundwater status and trends across the nation, including groundwater levels and quality, land subsidence, seawater intrusion, and interaction with surface water and groundwater-dependent ecosystems. In addition, projects focused on reducing groundwater overdraft and emphasizing cooperative efforts among stakeholders can be encouraged in funding relevant agricultural, energy, environmental, and urban/industry programs.

Building on the National Ground-Water Monitoring Network (NGWMN) operated jointly by the U.S. Geological Survey and states, enhanced monitoring systems and data delivery are needed to better understand threats and opportunities to agriculture, energy, the environment, and drinking water users. A federally involved initiative in close collaboration with states is needed to

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enhance monitoring and data delivery systems. Funding and resources to academic, public and private institutions (including NGOs), and Tribes are also necessary to build the professional capacity, including education (Ferre 2024) and research opportunities, to meet future challenges in managing groundwater resources.

Underlying all these possibilities is the challenge of enhancing “groundwater visibility” (Alley et al. 2016). The visibility provided by the *New York Times* and PCAST provides an opportunity to take meaningful steps toward addressing groundwater depletion while respecting state and tribal roles.

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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