



## Broadening Brackish Desalination: A Conversation With Bill Alley of the National Ground Water Association

**A**s increased demand and drought conditions stress traditional groundwater supplies, alternate sources like brackish groundwater have become more important. Many western communities are undertaking or expanding desalination projects in order to supplant traditional groundwater sources, but there is more work to be done to fully develop brackish water resources.

The National Ground Water Association (NGWA) is one of the organizations bringing together scientific, technical, and trade professionals to increase the proliferation of brackish desalination technology. Dr. Bill Alley is the NGWA's director of science and technology. He joined the association in 2012 after serving for 18 years as chief of the Office of Groundwater at the U.S. Geological Survey (USGS).

Dr. Alley spoke with Municipal Water Leader's senior writer, John Crotty, about how brackish desalination has evolved, its utility for municipal communities, and how it can continue to provide an effective alternate water supply in the future.

**John Crotty:** What is the mission of the NGWA, and what initiatives is it working on?

**Dr. Bill Alley:** The NGWA is a combination of a trade association and a professional organization. We have 11,000 members. The trade side consists of people who drill wells, manufacture pumps, or build other system components. The professional side includes scientists and engineers who deal with groundwater issues. Our mission is to ensure that groundwater is used responsibly worldwide. We have meetings throughout the year and publish three journals. The meetings include professional presentations, workshops, and technical training sessions.



**John Crotty:** How has the interest in brackish desalination evolved over the years?

**Dr. Bill Alley:** There has been a lot of recent interest in desalination of brackish groundwater, particularly in New Mexico and Texas. The largest inland desalination plant in the world is in El Paso, and the San Antonio system has plans to expand its desalination capabilities. Like Texas, New Mexico has a lot of brackish groundwater and has put in some regulating statutes over the past decade. There

is particular interest in using that water for municipal purposes. Around 2006, there was a sudden abundance of notices filed with interest in that resource. New Mexico had a broad exception to its permitting process for wells in brackish aquifers deeper than 2,500 feet, but the state revamped those exemptions in the wake of increased demand for the resource.

There is a large amount of brackish groundwater, but the issue is how much can be accessed and extracted in a way that is cost effective and environmentally friendly and that ensures high water quality. There is a limited amount of information available on brackish water, so the recent USGS national study on brackish groundwater resources was timely and needed.

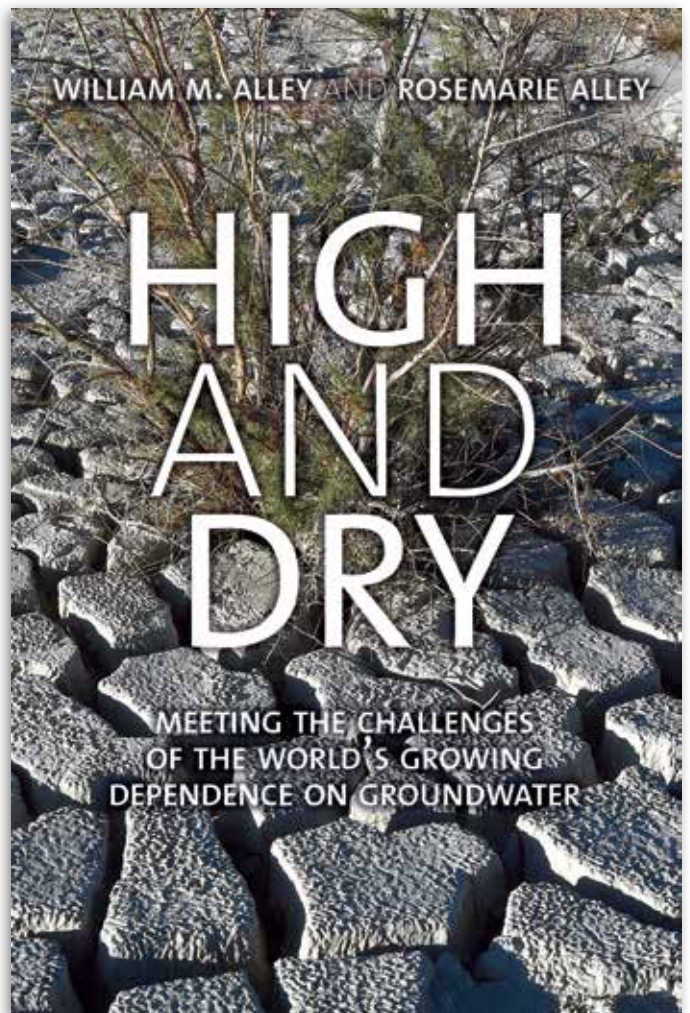
**John Crotty:** What trends have come about in the past decade to spark the renewed interest in brackish groundwater?

**Dr. Bill Alley:** Water availability has been the biggest factor, particularly in light of climate change and its effects on water supplies. Many parts of the West have been experiencing persistent drought, and that has brought attention to the need to develop alternative water supplies. There is only so much brackish groundwater that can be developed before factors such as pumping costs or environmental effects become limiting factors. Thus, the challenge is to tap into the brackish water resource in a cost-effective and sustainable manner while minimizing adverse effects on nearby existing freshwater resources. Other considerations include the disposal of brine and energy consumed to process the brackish water.

**John Crotty:** What are some of the ways that those issues are being addressed?

**Dr. Bill Alley:** Most of the brine in the El Paso system is injected deep underground. The disposal of brackish brine is more difficult than in coastal areas. Under the Safe Drinking Water Act, the U.S. Environmental Protection Agency (EPA) classifies wells that dispose of materials underground into different classes, including saline water. Under EPA oversight, the states run the Underground Injection Control program, which regulates the construction of disposal wells to prevent contamination of freshwater aquifers. The other way [to dispose of brine] is to use evaporation ponds, but that can increase salinity in some areas.

As for energy consumption, more and more operators are exploring the use of solar-powered desalination facilities. The Carlsbad facility in California is linked to a power plant and is using some of the heat generated by



the plant to assist in the desalination of the water. Similar concepts could be applicable in other locations as well, both in the United States and elsewhere.

**John Crotty:** What kind of potential do you see down the line for municipal entities in tapping brackish groundwater resources?

**Dr. Bill Alley:** It is definitely a resource that municipalities should consider for longer-term planning. San Antonio and El Paso provide examples of how effective a quality desalination program can be.

**John Crotty:** Can you tell us more about the book you and your wife recently wrote?

**Dr. Bill Alley:** The book, *High and Dry: Meeting the Challenges of the World's Growing Dependence on Groundwater*, is likely the world's first general interest book on groundwater. Our goal was to write it more like a novel than a tutorial. Yale published it in February.