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*Cover photo:* A view of the Milky Way over Phoinix Ranch in Jim Wells and Live Oak counties.

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## **Book Review: The Water Recycling Revolution: Tapping into the Future**

Alley WM, Alley R. 2022. The Water Recycling Revolution: Tapping into the Future. Lanham (Maryland): Rowman & Littlefield. ISBN 9781538160411. 231 p.

Reviewed by Robert E. Mace\*<sup>1</sup>

<sup>1</sup> The Meadows Center on Water and the Environment, Department of Geography and Environmental Studies, Texas State University

\* Corresponding authors: [robertmace@txstate.edu](mailto:robertmace@txstate.edu)

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One of my Ph.D. advisors (Dr. John [Jack] Sharp Jr.) liked to tell a joke back in the 1990s: “I have good news and bad news. The good news is that we are going to be drinking each other’s wastewater effluent. The bad news is that there isn’t going to be enough!” At the time, we chuckled—and maybe even guffawed—but today, this is becoming more and more of a reality. William and Rosemarie Alley, the married supercouple who have previously published books on radioactive waste disposal and the U.S. Environmental Protection Agency, address this coming water-reuse revolution by documenting its technical, political, and sociological history.

Dr. Bill Alley is the scientist in the duo, providing technical rigor and experience to the writing and research and leveraging his hydrogeologic background to provide accurate watery context. Rosemarie Alley is the non-scientist writer weaving an engaging story and keeping the text understandable to non-specialists. And they succeed with a readable book of reasonable length that is simultaneously full of interesting and useful information for technical and non-technical readers alike. The science and engineering discussions are appropriately short and sweet to meet the goals of the book, because it’s really the people and their stories that are the most interesting, especially with a topic as touchy as toilet to tap.

Take, for example, the Revolting Grandmas (not to be confused with the mid-1980s Wax Trax band of a similar name). The grandmas were a colorful opposition group that protested against potable reuse in San Diego, preferring “showers to flowers” non-potable reuse over “toilet to tap” potable reuse. Or how the purple pipes used to mark reuse water became purple (and specifically Irvine Purple). Or the awareness campaign titled “What happens in Vegas doesn’t stay in Vegas” that informed Californians that they were already drinking treated wastewater. Or how Denver operated the first direct potable reuse pilot project in the United States from 1985 to 1991. Or that the public has preferred treated wastewater to conventionally treated raw water in blind taste tests.

The Alleys dug up a lot of interesting reuse history during their research. For example, they suggest that Chanute, Kansas, had “in many ways” the first direct potable reuse project in the United States. In 1956, Chanute dammed the then-dry Neosho River below their wastewater discharge back up water to their upstream intake. This dam and the subsequent storing of treated wastewater resulted in a 17-day residence time from discharge point to the intake where was pumped into their surface-water treatment plant and delivered to customers. But, with apologies to Gertrude Stein, an environmental buffer is an environmental buffer, so I would still call that indirect reuse. But I get their point.

I was relieved to see that the Alleys got the facts right. I have an argument recurrence interval (ARI) of 1.4 months over Cloudcroft’s direct potable reuse project (people erroneously think that it has been up and running for years) and an ARI of 2.7 over Singapore’s reuse (people erroneously think that they do direct potable reuse). So I was pleased to see that the Alleys got those details and many others right.

As you might expect, various projects in Texas appear in the book, including projects in El Paso, San Antonio, Big Spring, Wichita Falls, Austin, and even Wimberley. But they missed North Texas Municipal Water District’s engineered wetlands—the largest in the United States—in the Dallas-Fort Worth area, which is a project that doubled the firm yield of the district’s reservoir. The prominent role water reuse (and direct potable water reuse) plays in Texas’ water plan also did not make it into the book. It was surprising that more real estate (barely one page) wasn’t dedicated to the direct potable reuse project in Big Spring, Texas since it was the first project of its kind in the United States. The book presents the Big Spring project as a small-town deal, missing that the water is delivered not only to Big Spring but also to other customers of the Colorado River Municipal River District, including Midland and Odessa.

If I have a quibble, it’s with the organization: The various stories seem randomly presented under broad topical banners. Perhaps due to the couple’s location in California, there is much more emphasis on the reuse stories from the Golden State than other parts of the United States. Outside of the United States, only Namibia is mentioned—but if you only mention one country, that’s the one. It might have been better to have told the story of water reuse over time, progressing from decade to decade. I also wish the Alleys had directly tackled the reliability of water reuse, which many erroneously think of as a reliable source of water simply by definition. However, water reuse is only as reliable as its source water and acts as a primary source amplifier. When the source water is gone, so is the reuse in short order due to system losses. Regardless, the authors make an excellent point on the greenhouse gas emission benefits from reusing water instead of transporting and treating raw water, especially for interbasin transfers.

Despite my quibbles, this is a must-read book for the water reuser or anyone interested in the subject, including newbies. It’s an easy read about a critically important resource. And as Dr. Sharp noted about the reuse resource, there isn’t going to be enough of it to go around.