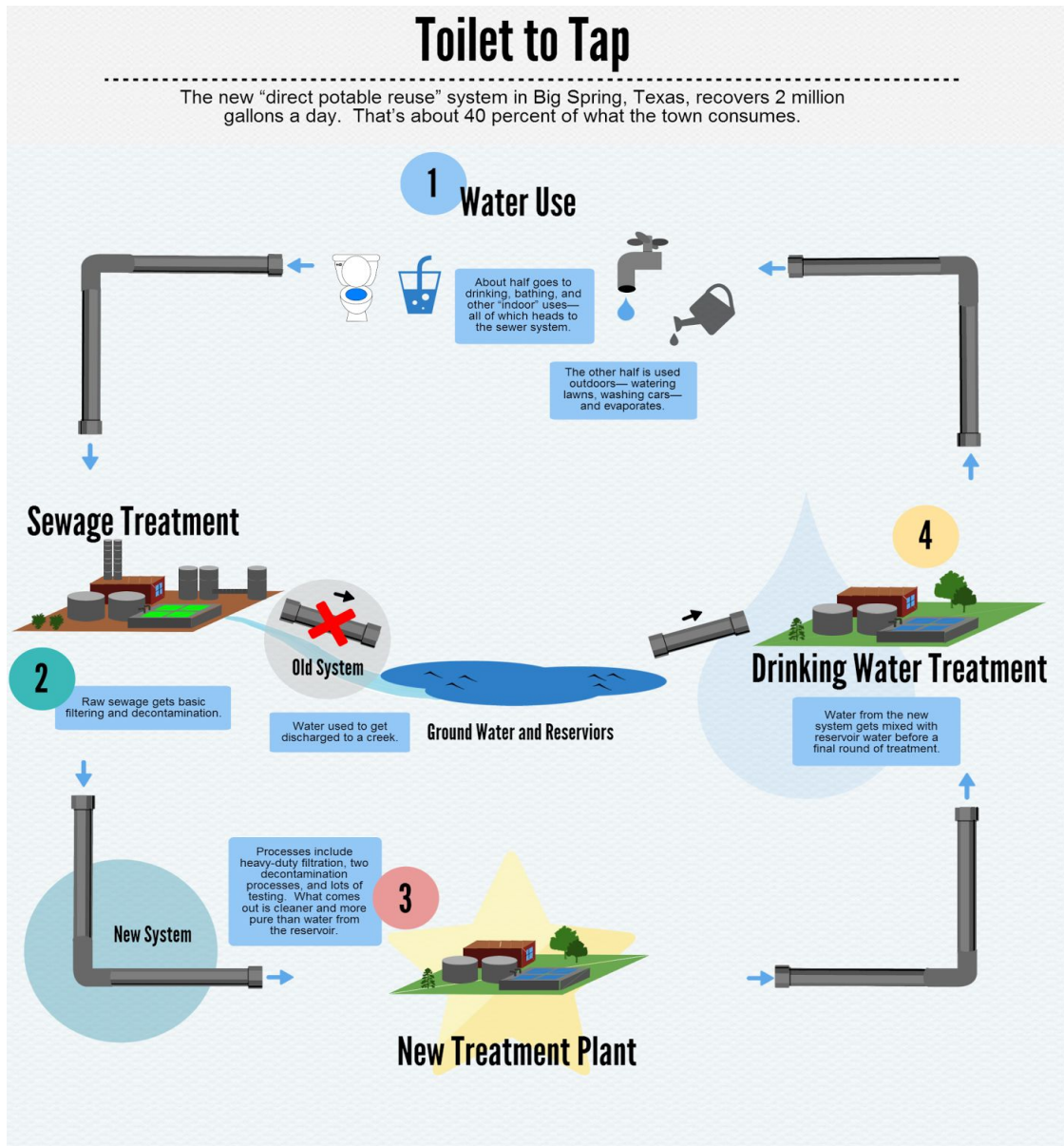


Drought is Making Treated Wastewater a Tastier Option

Focus Question: How are scientists cleaning water to address California's drought?

LOS ANGELES, CA — Experts say there is an effective way to help California deal with its long-running drought. However, there is one big problem with their solution — the “yuck factor.” For a fourth straight year, California's drought has been shrinking the state's water supply. In response, water managers are pushing for something known as **direct potable reuse**. Direct potable reuse is a system that makes use of wastewater, much of it from toilets (see Figure 1 below). The idea is to purify the sewage so it can be used as drinking water. The idea of drinking “toilet water” makes some people gag. However, the process has been used in Namibia in Africa and drought-stricken cities, including Big Spring and Wichita Falls in Texas, and San Diego in California.

Figure 1: Diagram showing how direct potable reuse system works in Big Texas.



Time Might Be Ripe For "Toilet To Tap"

In other cities in California, however, such plans have run into heavy opposition. In 2000, opponents of a proposed reuse program in Los Angeles came up with the mocking phrase "toilet to tap." Their efforts to stop the program were ultimately successful. Still, supporters of the process are now pushing the idea again. They say the time has finally come for Californians to accept direct potable reuse as a partial solution to their growing water problem. With California Governor Jerry Brown ordering a 25-percent cut in water use in some areas, the solution makes sense, they say.

It particularly makes sense, they argue, for large coastal cities such as Los Angeles, that flush hundreds of billions of gallons of treated sewage into the Pacific Ocean each year. They could instead capture that wastewater, clean it and turn it into drinking water, supporters of reuse say. "That water is discharged into the ocean and lost forever," said Tim Quinn, director of the Association of California Water Agencies. "Yet it's probably the single largest source of water supply for California over the next quarter-century."

Drought Is Changing Attitudes

California's severe drought may finally have changed long-held attitudes on potable reuse. Recently, a leader in the effort to stop the earlier Los Angeles project said he might consider a new plan. "You know, toilet to tap might be the only answer at this point," said activist Donald Schultz. "I don't support it, but we're running out of options. In fact, we may have already run out of options." Supporters of potable reuse insist that the public's distaste for the idea is based on ignorance. They note that more than 200 wastewater treatment plants already pour sewage into the Colorado River. The river is a primary source of drinking water for Southern California.

Microfiltration
Filters out **bacteria, protozoa, and any solids** floating in the water

Reverse Osmosis
Filters out **viruses, dissolved salts, and most chemicals**

UV and H₂O₂
Destroys any remaining **chemicals and bacteria** that escaped

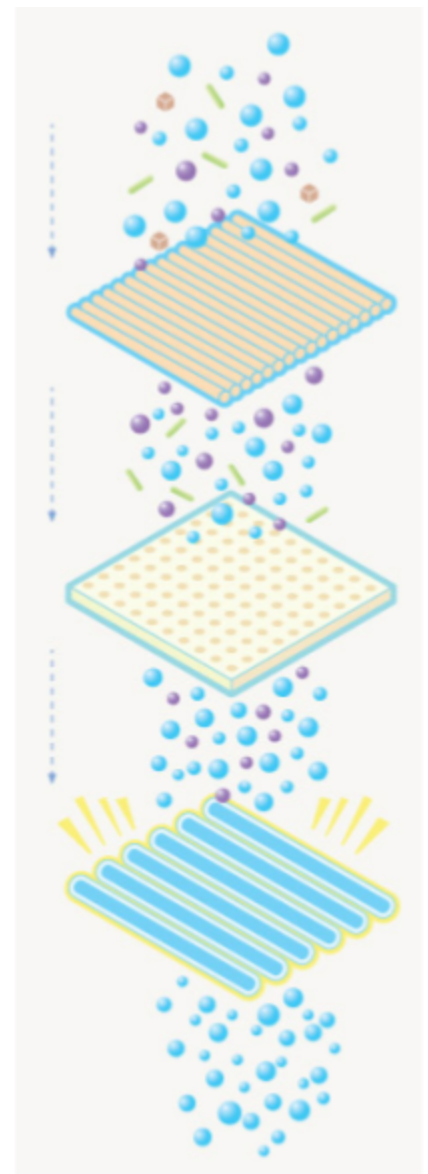


Figure 2. The three stages of the **Direct Potable Reuse** process. Text and image adapted from trojantechnologies.com

Wastewater Ends Up Cleaner Than Most Bottled Waters

In potable reuse systems, sewage is cleaned numerous times and very thoroughly. Look at Figure 2. First, the water is passed through a microfilter that blocks anything larger than 1/300th the thickness of a human hair. Next, it undergoes even finer filtering through a process called reverse osmosis: water is forced through a membrane that blocks fertilizers, drug compounds, viruses and salts. In the third step, ultraviolet light and hydrogen peroxide are used to break down any disease-causing bacteria that escaped the first two steps.

The result is a purified liquid that is cleaner than most bottled waters, supporters say. However, it is still sent to a traditional water treatment plant afterward. There it is blended with other sources of water, processed and pumped to homes.

Supporters of potable reuse say opposition is mostly driven by the so-called yuck factor. However, opponents say they have a variety of other reasons for their resistance, including cost and other unknown long-term effects.