

SAN DIEGO NEWS NETWORK

Overcoming the stigma of ‘toilet-to-tap’ water

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San Diego River at mouth to Mission Beach jetty

Water resource specialist Chris Reilly would often take his sixth grade students to waterways - streams, ponds, estuaries - when he was a teacher for the Boulder Creek YMCA in Santa Cruz. A 1985 graduate of Cal Poly San Luis Obispo and a future water resource specialist with the San Diego County Water Authority, he would take the kids on field trips to discuss nature, water and the life-cycle of all living things on the planet.

“I would have them look at the life in the water and think about the water they were playing in or drinking,” said Reilly, who spent 12 years with the San Diego County Water Authority and now serves Northern California’s Indian Valley as Water Master for the California Department of Water Resources. “I would remind them that the water they were studying was the same water the dinosaurs had once drank and lived on. All water is recycled and the same water that was around 5 million years ago is still with us. There is no such thing as new water.”

With the city of San Diego declaring a Level 2 drought alert and Gov. Arnold Schwarzenegger issuing a water shortage emergency, water specialists like Reilly feel it is critical communities across the state develop as many water retention, conservation and reserve capabilities as possible.

“We can’t afford to take anything off the table and that includes indirect potable reuse water that is very safe when the proper filtration systems are in place,” Reilly said.

For almost two decades, San Diego has debated the use of Indirect Potable Reuse (IPR) water as a source of replenishing the reservoirs in the city and county for its drinking supply. From water officials at the San Diego County Water Authority (SDCWA) and the local water districts within the county, to academics, and private business experts, all agree that the reuse of water for drinking is safe, affordable and necessary.



But buttressing this argument is the “yuk factor” associated with the concept of drinking treated sewage water, and the belief by many that trying to blend sewage water into the drinking supply is a recipe for disease and a public health disaster. The term “toilet-to-tap” has become the rallying cry for opponents to IPR, who include San Diego Mayor Jerry Sanders.

“Mayor Sanders is concerned with the public’s perception of indirect potable reuse and feels there are other priorities which the city should focus on - mainly in the area of conservation of water,” said Bill Harris, deputy press secretary to Sanders.

In San Diego County, water is delivered and collected through three primary sources: The Sacramento/San Joaquin River, the Colorado River, and the many reservoirs built within the region. But more than 80 percent of the county’s water comes from the Colorado River, with less than 15 percent collected through local sources. According to the Southern California Metropolitan Water District (MWD), most water supplies in Southern California begin as snowmelt or rainfall that flows into rivers. However, 75 percent of that runoff occurs in the northern parts of the state, while the majority of California’s population lives in the south.



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Colorado River (courtesy of Colorado Tourism Office)

In order to bring that water supply down to residents in Southern California, the water is carried through aqueducts that are several hundred miles long. Whether from the Colorado River - that has a point of origin just north of Colorado's Grand Lake in the Rocky Mountains - or snow melt and rain runoff transported south via aqueduct, MWD notes both federal and state rules protect the drinking water along its journey.

Under Title 22 of the California Code of Regulations, water safety is monitored and regulated so that it will be safe before coming in human contact. Several agencies - including the U.S. Environmental Protection Agency, the State Water Resources Control Board, the California Department of Health Services, and of course, the Metropolitan Water District of Southern California - keep an eye on water, even before it reaches a treatment plant.

Nevertheless, millions of people also make use of the river water and other sources, fueling the complaint by IPR advocates that there is something inherently cleaner about water originating from these sources over supplies already being used.

“There seems to be a myth that water coming down the Colorado is ‘pure Rocky Mountain spring water.’ In fact, nothing could be further from the truth,” said San Diego State University professor Phillip Pryde in 2004.

Pryde, who served as chairman of the San Diego County Water Authority's Reclamation Committee, noted that water from the Colorado River passed through several towns and cities on its way to San Diego.



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(courtesy of Colorado Tourism Office)

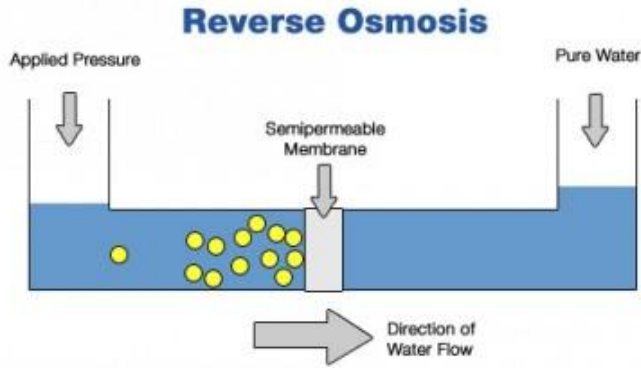
“Tens of thousands of recreational users of the river make direct use of it for ‘fast, fast relief’ while floating down it or swimming in it (as do, in some cases, their pets),” he said. “A portion of this water goes directly into our drinking water plants without prior treatment. It may be argued that it’s highly diluted, if that makes people feel better, but it still contains untreated human wastes.”

The process for treatment of water involves a multi-phase filtration system broken down into nine steps.

During the first two steps, the water passes through various screens and sedimentation, including beds of anthracite coal, which removes most suspended solids from the water. According to experts familiar with the process, the water at this point is safe for irrigation and other non-drinking uses.

After these initial steps, the water is sent through a treatment called “microfiltration” which further filters out any remaining solids. Water is then run through a procedure called reverse osmosis, which pumps the water through special membranes whose pores are so small, only water molecules or something smaller are said to be able to pass. During a 1998 debate on the topic, the SDCWA issued a pamphlet describing the differences in size between water molecules and other molecules, by claiming that if a water molecule were the size of a tennis ball, a virus would be the size of a semi-truck, a bacteria the size of a pyramid, and a protozoa the size of a volcano. The SDCWA further stated that even the molecules of microscopic metals and other inorganic compounds, as well as organic

compounds, would be too large to pass through the Reverse Osmosis membrane.



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After the Reverse Osmosis procedure, the water is further cleaned by introducing Ion Exchange, which reduces nitrate concentrations to negligible levels, much as a water softener works. Then Ozone, a disinfectant, is released into the water for further cleansing.

In the next phase, the recycled water is blended into the surface water reservoirs of San Diego, where it is mixed with the raw water supply. From the reservoir, the water is once again run through the normal filtration process before being distributed to the general public.

“The re-purified water is cleaner than the water that comes out of the tap,” Reilly said. “Then that water is blended in with the reservoirs and run through the normal filtration process, so that nobody should be worried about the safety of that water.”

Former Ramona Municipal Water District manager Tom Brammell agreed.

“Personally, drinking recycled water is OK with me,” Brammell said. The filtration and dilution make the water extremely clean.”



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San Diego River at Alpine

County supervisor Bill Horn, an avocado rancher, said re-purified water was so clean he often had to add components into the mix before using it for his crops.

Horn's board colleague - Pam Slater-Price said it was important the region look at every option for sources of water.

“We definitely have to do it. We no longer have the luxury of not using Indirect Potable Reuse water and in fact are already doing it,” said Slater-Price. “People have the conception of water coming from the Colorado River or other natural sources as pristine and they may be repulsed by the thought of sewage water being reused for drinking. But when you understand that all water is reused and the system of treatment in place cleans the water so thoroughly that it is cleaner than when it comes out of the tap, then you realize it is something we can do and is necessary.”

Yet worries about the health of the water persist and memories of the 1993 cryptosporidium outbreak in Milwaukee fuel continued fears about what can happen when sewage water is mixed into a drinking water supply. Cryptosporidium is a virus which passes through the intestines of animals, mostly cattle, and exits through their fecal matter. It can cause severe stomach flu-like symptoms, such as diarrhea, nausea, vomiting, fatigue and low grade fever. The disease is particularly susceptible to waterborne delivery.

In healthy persons, the infection can last up to two weeks, according to Dr. William R. Mac Kenzie in a 1994 article for the New England Journal of Medicine. But in people with weak immune systems, such as the elderly, babies and those diagnosed with other illnesses such as the HIV virus, cryptosporidium infection can be deadly. During the Milwaukee outbreak, 50 cryptosporidium-associated deaths were reported, according to the Wisconsin Bureau of Public Health. The outbreak resulted from flooding which overwhelmed the Milwaukee sewage system.

“A heavy snowfall followed by spring flooding and a heavy storm contributed to sending record amounts of overflow from the Milwaukee Harbor into Lake Michigan,” Mac Kenzie wrote. “This caused sewer overflows and a sewage bypass which created an overworked waste water treatment plant system and sent the cryptosporidium virus into the water.”

San Diego does not suffer flooding problems from heavy snow and ice, but other natural disasters do occur, including wildfires and even the occasional earthquake.

But, Reilly said, what happened in Milwaukee resulted from older technology that has been improved in the last 15 years.



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Lake Jennings Reservoir

“That outbreak was a result of mechanical failures within the treatment plant and it is always possible mechanical devices will break and some portion of the treatment process will fail. But there are so many backup systems and safety procedures in place, that you have to trust they will work in the case of a natural disaster,” he said.

Mike Espiritu, the former water quality superintendent with the Helix Water District, shares Reilly’s view. During San Diego’s debate over reusable water a decade ago, Espiritu said that what happened in Milwaukee would not happen in San Diego.

“Milwaukee was an aberration. They were ill-prepared. Every one of their multiple barrier systems broke down. San Diego’s system is much better. The safeguards we have in San Diego would prevent such an accident,” he said in 1998.

Slater -Price said that before she ever voted on a system for using IPR water, she would discuss the safety conditions with all available water experts and would tour the treatment plants, making sure health safeguards were in place.

Yet the term “Toilet-to-Tap” persists and registers in the public arena very easily. Originating from Gerald Silver, an angry Encino homeowner’s association president who used the phrase in 1995 during a debate over IPR in Los Angeles, the phrase quickly became the term most opponents used to refer to the idea of IPR.

In San Diego, when the plan was put to public review in 1998, angry protestors including then city councilmember George Stevens, assemblymember Howard Wayne, and former San Diego city councilmember Bruce Henderson used the term to state their opposition to IPR.

Bernie Rhinerson, who served as chair of the SDCWA in 2003, said inflammatory language such as phrases like “toilet-to-tap” were more for political purposes than scientific ones.

“It’s used because the public is still against it,” he said. But all the science I’ve read says (IPR) is a viable source of potable water. Diversity of water supplies has to be at the center of our commitment to provide enough water for residents.”

During an October 2007 water conservation summit held at the University of San Diego, mayor Sanders spoke to a large collection of academics, engineers and other water experts. While he supported their efforts on conservation and the use of non-drinking recycled water for agriculture and landscapes, his opposition to IPR created frustration with many of the other speakers.

Among them was James Stayer, Division Manager for the PBS&J West Water/Wastewater Group, which is based in Carlsbad. The firm works on water and water reuse projects in California, Nevada and Arizona. Stayer blamed both politicians and the media for the continued use of the term toilet-to-tap.

“This is a drought proof water supply and the media is to blame for creating this image of toilet to tap. It does not allow any room for meaningful discussion of the subject,” said Stayer.

But Slater-Price, in assessing why an idea that so many agree works well is still not in use after more than a decade of debate, said the blame for the lack of support among the public was universal.

“There are a lot of people living with ignorance on this subject and it is not just politicians. We have not done a good job of explaining this, but neither have those in academia and professional circles. A lot of them were way ahead of the public on this topic and they don’t seem to understand that. It is incumbent on all of us who care about this and want to see IPR put in place to do a better job educating people why it is needed.”