Desalination plants aren't a good solution for California drought

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L.A. Times

4/24/15

As surely as the hot, dry Santa Ana winds bring blue skies to the coast and wildfires to the hills, severe California droughts bring calls to build desalination plants up and down the seashore.

All that ocean water, begging to be converted to fresh and pumped into our pipelines, would solve our water supply problems instantly and permanently, boosters *(people who promote something)* say. In the coming months, the drumbeat will only get louder. That's not only because the current drought is the longest and most severe in memory, but because [a $1-billion desalination project](http://poseidonwater.com/our_projects/all_projects/carlsbad_project) scheduled to start operating in Carlsbad this fall will be attracting lots of attention. The plant, the largest of its kind in the U.S., is designed to provide San Diego County with about 50 million desalinated gallons a day, about 7% of its water needs.

1. How much fresh water is the desalination plant going to provide California with?

Enthusiasm for desalination tends to overlook its high costs, which stem *(come)* in part from its enormous energy demand and weighty environmental footprint. The modern process, known as reverse osmosis, involves forcing seawater at high pressure through a membrane that screens out the salt, leaving behind a heavily brackish *(salty)* residue *(material remaining)*.

"There are definite advantages to seawater desalination," says Heather Cooley, water program director at the Oakland-based environmental think tank Pacific Institute. "It's a reliable supply, independent of weather conditions like drought. But it's still among the most expensive water supply options."

San Diego is making a risky bet that may be ill-advised *(a poor decision)* in a crisis. "Investing in desalination is not a good way to address a drought," says [Henry J. Vaux Jr.,](http://bit.ly/1QpwihX) an emeritus water economist at UC Berkeley, "because by the time you finish it the drought is over."

That's what happened to Santa Barbara, which began building a $34-million desalination plant during the drought-stricken 1980s. By the time it was completed in 1992, the rains had returned; the facility went through a few weeks of pilot testing, then was mothballed *(cancelled or postponted)* and partially dismantled *(taken apart)*. The city is now contemplating restarting it at [a cost of $40 million,](http://www.latimes.com/local/california/la-me-santa-barbara-desal-20150303-story.html) plus $5 million a year in operating costs. That would place the cost of desalinated water at about $3,000 an acre-foot and drive up average monthly household water bills to $108 from $78 today.

2) Why wasn’t the desalination plant in Santa Barabara ever put to use?

The least visible cost, of course, is environmental damage. Ocean inflows *(a large amount of water that is moved or transferred to a place)* suck up and kill larval *(juvenile)* marine organisms. At the other end of the desalination cycle, the salt extracted from seawater produces a heavy brine to be pumped back into the ocean, potentially destabilizing the ecology around the outflows.

"Dumping water that is saltier than seawater into the ocean isn't harmless," says Vaux, who contributed to a [2008 blue-ribbon study of desalination](http://bit.ly/1yUu8S2://) for the National Research Council. "Some organisms can't survive, others move in — the ocean isn't a great big garbage can."

1. How can brine be damaging to the environment?

**Is desalination the future of drought relief in California?**

PBS News Hour

On the surface, San Diego doesn’t scream “water crisis.” Kids still splash in public fountains, and the lawns haven’t all been converted to sand and succulents (*plants that require little water)*.

But the water story below the surface is historically grim. Four years of almost no rain, record low snowpack from the Sierra Nevada Mountains, and record high temperatures are causing the worst drought since the state has kept weather records.

1) What factors have lead to the drought in California?

California has imposed conservation measures requiring a 25-percent reduction in water usage. Even the state’s biggest drinkers — the agricultural producers who consume 80 per cent of the state’s water — are being forced to cut back

Now, the state’s second most populous county, San Diego County, is betting on the largest desalination plant in the western hemisphere to boost its water supply.

Today, at least 120 countries use desalination — or “desal,” as it’s commonly called. Saudi Arabia relies on desalination for 70 percent of its water needs and Poseidon Water sees itself starting a trend in the U.S. here in San Diego, out of necessity.

2) What percentage of the state’s water does the agriculture industry consume?

Here’s how state-of-the-art desalination process works: The plant draws saltwater through ocean intake pipes with screens to keep out marine organisms.

Sand and chemical filters further clean the seawater, which is pushed through thousands of tubes — each with filters so fine that water can get through, but the larger salt particles cannot. It’s a technology known as “reverse osmosis.”

This version of the process uses half as much energy as it did 20 years ago while also pumping out a higher volume of water.

The captured salt is diluted with the cooling water from the neighboring power station, and that’s discharged back into the ocean. Fresh water is what remains.

The last step: These eight high-powered pumps start shoving 50 million gallons of fresh water a day through these big pipes, up the hill and straight in to the aqueduct that serves 112,000 homes, some 300,000 people, about a tenth the population of San Diego County.

San Diego County has committed to buying water from this plant for the next 30 years. That will increase monthly water bills for residents and businesses by about 6 percent, says Bob Yamada of the San Diego County Water Authority.

3) Will using water from a desalination plant cost more money for San Diego residents? How much?