

Desalination is no longer a pipe dream in Southern California

Lauren Williams, *The Orange County Register*, 1-22-17

Here's an idea: Let's use the ocean to create an endless supply of pure water, no matter how much rain and snow falls (or doesn't) on California.

If it sounds like something out of the future, consider: As of today, seven ocean desalination plants are under consideration along the coasts from Dana Point through Monterey Bay. By the mid-2020s, those plants could be using the Pacific to produce about 10 percent of the fresh water needed in parts of Los Angeles and Orange counties. Another project, in Carlsbad, opened about a year ago and is on track to produce about 8 percent of San Diego's water.

Desalination, long considered something out of "The Jetsons," is real.

But also consider this: Though the promise of desalination is appealing — fresh, clean water that can outlast any drought — critics and water experts have many questions.

Some believe the desalination process can inflict permanent environmental harm to the ocean and sea life. Others argue the technology is relatively new and expensive, and that investing in new plants today will mean sunk costs that might look wasteful in the near future. Still others believe enough isn't being done to conserve water we already have.

Among the local projects under consideration, two face particularly stiff opposition — a \$380 million plant in El Segundo that could churn out 20 million gallons each day and a \$1 billion plant in Huntington Beach that would generate 50 million gallons a day.

By summer, the State Lands Commission could issue a new environmental report on the Huntington Beach plant and renew a lease with the company behind the plant, Poseidon Water. If state and regional approvals come later this year, the project could go online by 2021. The El Segundo project also needs various approvals, and could open by 2023.

Here are some commonly asked questions about desalination.

Q: How does it work?

A: Sea water is drawn from the ocean through intake pipes set out in the open ocean or below the sea floor. That water is filtered for bigger contaminants (and some essential, tiny sea creatures) before it is sent through a reverse osmosis system that pressurizes the water through membranes and separates out the salt. The remaining product is drinkable water, though minerals are added to reduce its corrosive qualities and for taste. Another desalination technology involves freezing water, but that's not being considered for Southern California.

Q: Is it true that water produced through desalination is more expensive than ground water or imported water from the Colorado, Sacramento and San Joaquin rivers?

A: At current prices, yes. According to the Orange County Water District, ground water costs \$402 per acre foot (an acre foot is about 326,000 gallons, about enough for two average American families). Meanwhile,

imported water costs \$1,059 per acre foot in Southern California. Desalinated ocean water costs cost \$1,900 to \$2,100 per acre foot. If proposed desalination projects go forward, the average household bill is expected to increase by \$3 to \$6 each month.

But as the state's population grows and natural resources dwindle, the cost of locally sourced groundwater or imported water could rise, while the cost of making desalted water with improving technology could decline, so that difference might not be as staggering as it appears now.

Q: Does it hurt the environment?

A: The jury is still out on this one. One of the biggest criticisms of desalination is that it's energy intensive. That's also what makes it expensive. Backers of desalination point to mitigation measures they take to lessen a plant's carbon footprint, and that the process of moving water from sources as distant as the Colorado River to Southern California also is energy intensive.

"It is energy intensive, but so is the alternative," said Scott Maloni, Poseidon Water's vice president of project development.

Other concerns for the environment are focused on the discharged water that returns to the ocean, which is twice as salty as the ocean water drawn into the plant. Seawater is naturally about 3 percent salt and the brine — or salty discharge — is about 6 percent salt.

"No marine life can live in that area," said Ray Hiemstra, associate director of programs for Orange County Coastkeeper, an environmental group that has opposed the Poseidon plant. "If we have this desal plant (all day, every day) there's going to be this salt plume."

Q: Can sea creatures get sucked into the intake pipes?

A: They might, though they're not the biggest marine animals, like dolphins, turtles, seals or whales. Instead, the sea life that could be effected by desalination is microscopic — think fish larvae and small plankton. "When we think of ocean life, we think of all that big stuff, but the reality is the vast majority of ocean life is really tiny," Hiemstra said.

The State Water Resources Control Board established rules for intake pipes in the ocean, calling for them to be outfitted with screens that have openings as thick as a credit card, and suck in water at half a foot per second, so sea life doesn't get stuck on the pipes.

But environmental groups argue those measures aren't enough.

"Those screens won't protect it at all," Hiemstra said. "Ninety-nine percent of everything out there is smaller than 1 millimeter."

Poseidon has said its intake pipe will minimize the impact on ocean life, and that the screens reduce the harm even more.

Q: Where is desalination popular?

A: Desalination is mostly concentrated in arid, drought-stricken countries, with more than 18,000 desalting plants in 150 countries worldwide, according to the trade organization International Desalination Association.

Saudi Arabia is the biggest producer of fresh water through desalination, with 27 plants, many near the Red Sea and Persian Gulf. In the early 2000s, Israel turned to desalination in response to severe drought conditions, according to Feldman. Now the country is flush with fresh water.

Other places that use desal include Singapore and Australia.

Q: Why are some plants more controversial than others?

A: A lot of it comes down to how the water gets into the plant. Environmental groups thus far haven't opposed a plan for a desalination plant in Dana Point because it would use slant wells far below the ocean floor to extract saltwater. This process makes the likelihood of hurting marine life virtually nonexistent. From small marine life to larger animals and even contaminants, most of these things are filtered through the sand and don't wind up getting sucked into the plant. That said, less water can go through these wells than can be extracted through an underwater pipe.

Q: Can these plants adapt with new technology?

A: Much of the advances in desalination are in membrane technology, which is becoming more efficient, lasting longer and requiring less energy to create fresh water, Maloni said. Poseidon's plants are modular and automated, making it easier — and cost-effective — to switch in new membrane technology when it becomes available. "We have an incentive to keep the plant modern and operational," Maloni said.

Q: Where does the state stand on all of this?

A: Overall, the State Water Resources Control Board, one of three regulatory agencies that oversees desalination plants, supports desalination as a complement to a broader portfolio of clean water resources.

However, there are more affordable and energy-free alternatives to desal, such as conservation, said Frances Spivy-Weber, the board's vice chairwoman. Desalination, Spivy-Weber said, should be considered an alternative when other options have been exhausted.

"If you're a water agency or a community that is considering these things, you would want to make sure your agency looks at cost-effectiveness and reliability before they take that leap, before they go straight to desal."

Q: Would desalination ensure us clean water during droughts?

A: Yes. From government agencies to environmental groups, there seems to be some consensus that some desal is needed, though when such plants should come online, and what technology they should use, is at the heart of most of the controversy.

"Desal is going to be part of our mix," said Hiemstra of the Orange County Coastkeeper. "It's a matter of doing it right."

Q: How much of our water supply will come from desal if it's approved?

A: In southwest L.A. County, the proposed desal plant in El Segundo could provide 10 percent of the water supply to West Basin Municipal Water District's 1 million customers across 17 cities from Inglewood to Malibu. About 8 percent of Orange County's total water supply could come from Poseidon.

Staff writers Megan Barnes and Sandy Mazza contributed to this report.