Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Distinguished Professor of Earth and Planetary Sciences, UC Santa Cruz.

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The Costs of Desalination

After 15 years of planning, design, environmental impact assessment and review, and final political approvals, the largest desalination plant in the United States went on line at Carlsbad in northern San Diego County in December of 2015. This is the most technologically advanced and energy-efficient desalination facility in the Western Hemisphere and taps the world's largest reservoir of water, the Pacific Ocean.

The Poseidon plant has the capacity to produce 50 million gallons of fresh water a day, which is about seven to ten percent of San Diego County's total water usage. San Diego is an arid region and imports most of their water from somewhere else. About 60% comes from the Colorado River (which is about 130 miles away and oversubscribed), and about 20% comes from the Sacramento-San Joaquin delta region, which is nearly 500 miles away and also oversubscribed in dry years. The remaining 20% is locally derived.

San Diego has historically been dependent on sources of water many miles away that are no longer completely reliable. A large desalination plant, while expensive, gives them some measure of independence and reliability.

Although the original construction costs were estimated at $270 million, in the 15 years from inception to completion, the total price tag grew to about $1 billion. There was also considerable opposition along the way as desalination proposals in California have rarely met with complete public approval.

In part this is because no large coastal construction project is ever welcomed with open arms by everyone, in part because there were a number of environmental concerns raised, and also because there wasn't a long track record in California on the impacts of desalination plants.

The complex issues associated with desalination can be summed up briefly: the ocean contains 97% of the planet's water and is a very reliable source for coastal

areas; it is independent of drought or changing climate; but it is still one of the most costly sources of fresh water and comes with energy and environmental costs.

The three major issues that are nearly always raised and then argued with every new proposal for a desalting plant include: 1) costs, 2) energy usage, and 3) potential impacts on the marine environment.

One important factor in the economic feasibility of the Carlsbad facility was the commitment of the San Diego County Water Authority to buy the entire fresh water output of the plant at a guaranteed price for the next 30 years. Because this is the newest, largest and most advanced desalination plant in the USA, the costs of producing fresh water from the adjacent Pacific Ocean should be some of the best available for comparison with other water sources.

In any community, whenever future water sources are proposed and discussed, regardless of whether its desalination, treating wastewater, a new dam or any other source, the most often heard arguments are usually about costs, with the simple statement that "*it's going to cost more than we are paying today*". And they are absolutely correct.

What we all need to understand is that the water supply systems Santa Cruz City Water Department customers rely on today (the Newell Creek Dam and Loch Lomond reservoir, small diversion dams on three north coast streams and some long pipelines, several wells, and the Graham Hill Road water treatment plant and the water distribution system) were all built and paid for decades ago.

While we still pay for operations, maintenance, upgrades and replacement of pipes, storage and treatment systems, the big-ticket items were paid off years ago. Any of our future options are going to cost money- a lot of money. There is no more cheap water around.

Costs of fresh water produced from the new Carlsbad plant are a little over twice what the San Diego County Water Authority presently pays for imported water, although there is no certainty in the years ahead with a changing climate that they will still be able to obtain water from the Colorado River and the Bay Delta.

The price tag for the 30-year contract is at least $110 million per year, which would increase the typical homeowner's water bill by about $5 to $7 a month. A $1 billion desalination plant with annual $110 million amortization costs sounds like a very expensive investment; but $5 to $7 a month, the cost of two lattes,

doesn’t sound like much at all for a family’s guaranteed monthly water needs that aren’t dependent upon the vagaries of future rainfall or uncertainties in future water allocation by some political process.