

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 Ocean Impacts of Desalination

Desalination is one of several issues that have divided our community in recent years, the other two on our plate right now are Trail or Rail and Rent Control. Years ago I was talking to a former mayor who told me something he had learned being involved in local politics – that the most common approach with any contentious issue was to draw a line in the sand, pick sides and duke it out. This sounds pretty familiar.

But what he learned was the more effective approach to actually resolve the issue was to draw a circle and get everyone inside and work it out. Some issues lend themselves to compromising, but unfortunately many don't.

Something I've learned from being involved in local environmental issues for 50 years is that any good environmentalist will bring up every conceivable argument, valid or not, in order to derail or stop a project.

While facts today don't settle all or even many arguments, as a scientist I believe that it's important to learn as much as we can about an issue before making a decision or taking a position. My objective in these columns is to put out what we do know to provide background and perspective and not to advocate any particular position.

One issue that is brought up in all discussions about desalination is the potential impact on the marine environment. We love our ocean backyard and a lot of dedication and effort over the years has gone into protecting it.

Any large industrial facility or process will have some environmental impacts and desalination is no exception. All potential impacts need to be evaluated, understood and mitigated or reduced to an acceptable level through an Environmental Impact Report (EIR) process. This includes plant siting, construction and operation, and importantly, the effects of pumping large volumes of salt water from the ocean and also any impacts of discharging the salty brine back into the ocean.

Water from the coastal ocean in most places will contain a variety of organisms ranging in size from large marine mammals and fish down to microscopic plankton. The types of organisms and their abundance will vary from place to place, depending upon the productivity of the local waters, the time of year, and also with the depth from which water is pumped if taken directly from the coastal ocean.

Intake pipes are normally covered with screens, and the mesh or size of the openings in the screen will determine the organisms that won't enter the intake, or be caught on the screen (impingement), and those that will pass through and be entrained in the feed water. Fish and marine mammals will not be trapped with a small screen size, but death can normally be expected for any plankton that pass through the screens and enter the plant (entrainment).

The magnitude of these lethal effects (impingement or entrainment) is dependent upon the volume of water being withdrawn, the source of the water, and therefore the abundance of different types of marine life and their size.

Impingement and entrainment have usually been considered as the largest single ecological barriers to desalination plant siting in recent environmental impact assessments. An important perspective should be kept in mind in these assessments, however, and that is the volume of seawater used for cooling in existing coastal power plants. Most coastal states have sited their electrical generating stations along the coastline so they can use the very large volumes of easily accessible ocean water in the cooling process. California is no exception.

The Moss Landing Power Plant has been operating since 1950. Cooling water, which is withdrawn at a rate of about 1.2 billion gallons a day, is taken from either the adjacent Elkhorn Slough or Monterey Bay.

The proposed desalination plant studied jointly by the Soquel Creek County Water District and the Santa Cruz Water Department over 10 years ago would have pumped about five million gallons a day from the bay in order to produce about two million gallons a day of fresh water.

While the potential impingement or entrainment effects of this volume of water were raised as concerns, five million gallons a day is only 0.4% of the 1.2 billion gallons a day of seawater that has been withdrawn continuously by the power plant

for 68 years. Moss Landing pumps 240 times more water every day than the proposed desalination plant.

Monterey Bay is a highly productive environment that supports a healthy commercial and recreational fishery, and is widely known for the diversity and abundance of its marine life. It's important to know what have we learned from studies of the Moss Landing Power Plant.