

**Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.**

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**Climate change and rising sea level**

**San Francisco Bay Scenarios for Sea Level Rise  
SFO**



*The San Francisco International Airport and parts of Highway 101 go underwater with a three-foot rise in sea level, and actually begin to flood at 16 inches.*

The records of the climate changes that the Earth has experienced are diverse, widespread and well documented. These include the extent of past glaciers and the stuff they left behind, the isotopic signatures from long ice cores from Antarctica and Greenland (indicating alternating warm and cooler periods that go back as far as 800,000 years), and the fossil record from deep-sea sediment cores that extends

back many millions of years. Climate change has taken place ever since we have had an Earth and a sun, and in fact, the climate is always changing. These fluctuations were first discovered over 150 years ago and correctly attributed in large part to the irregularities in the Earth's orbit around the sun and how much heat we receive.

So why is the climate change taking place today such a big deal? Well, for one thing, while there have been much warmer periods in the geologic past, as well as much cooler periods, there weren't any or many people around to deal with those extremes. Mastodons and cave bears came and went. Entire populations of plants and animals flourished, migrated or disappeared. When it got warm and the ice melted, sea level rose and the coastline just moved inland 10 or 20 or 50 miles. But we didn't have cities on the shoreline like Santa Cruz, San Francisco, or New York City to deal with 125,000 years ago. Climate change happened; it happened repeatedly, and whatever was around adjusted or went extinct.

Another important factor is that the 6.6 billion people now on Earth have had a very measureable effect on the Earth's atmosphere. Greenhouse gases have been increasing for 150 years and denial is not a river in Egypt.

The latest climate change report released by the state of California several weeks ago concluded that a continuation of warming could lead to a 1.4-meter rise in sea level rise by 2100. Several years ago, the San Francisco Bay Conservation and Development Commission (BCDC) was concerned enough about the potential impacts of sea level rise on the low-lying areas around San Francisco Bay that they commissioned a survey to map out what might be threatened in the future. A one-meter rise in sea level would completely inundate the San Francisco and Oakland International airports, as well as sections of the Bayshore Freeway.

John Holdren, a highly respected physicist from Harvard, and the new science advisor to President Obama, has stated in regard to global climate change that "We basically have three choices: mitigation, adaptation, and suffering. We're going to do some of each. The question is what the mix is going to be. The more mitigation we do, the less adaptation will be required and the less suffering there will be."

Mitigation suggests that there is something we can actually affect or alter. Can we mitigate climate change? Can we adapt to climate change, or are we, and our children, just doomed to suffer? Until somewhat recently, climate change seemed to be happening fairly slowly, but many indicators are showing more rapid change than most scientists had predicted. We should be hoping for the best but planning

for the worst.