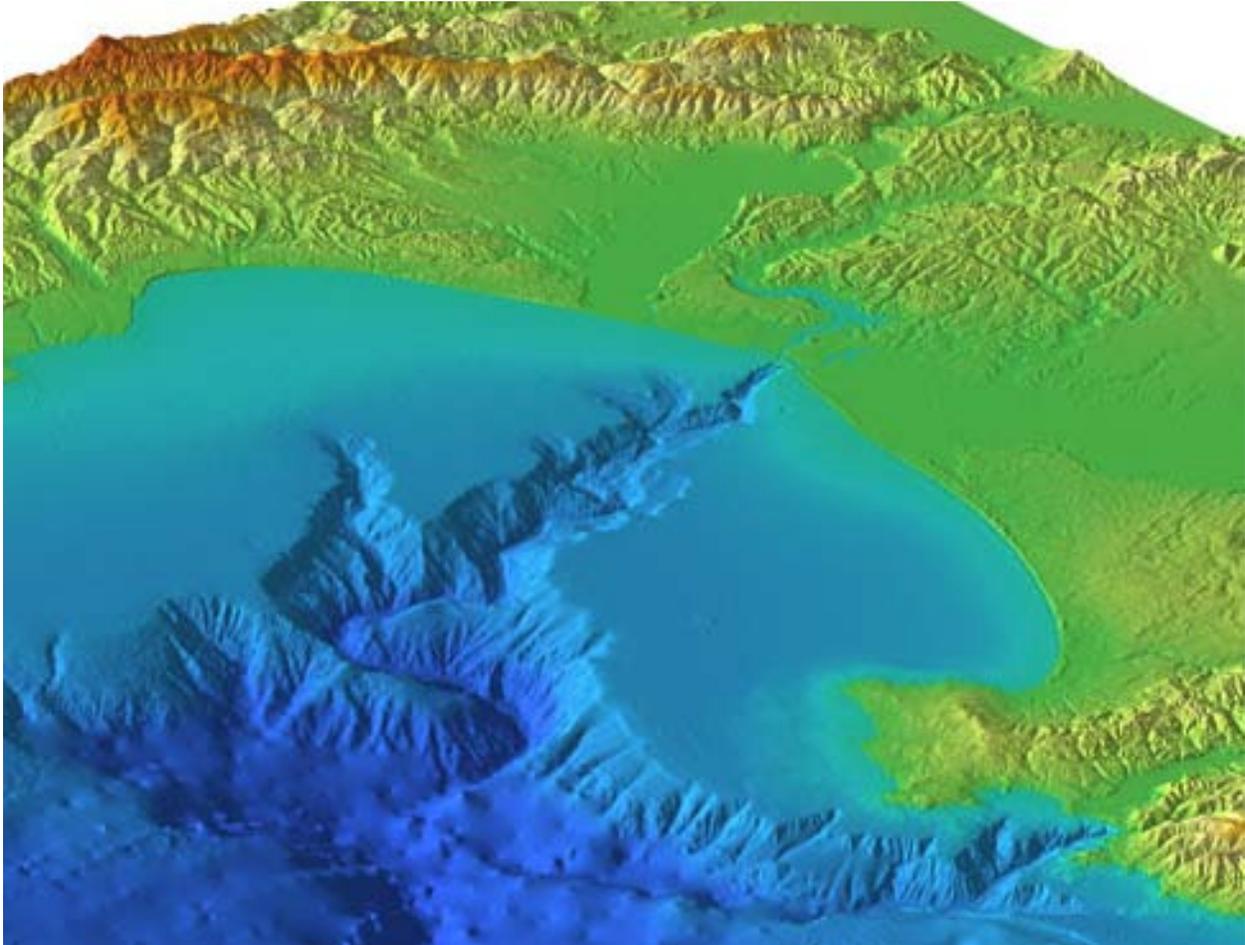


Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Our flooded edge



This seafloor image of Monterey Bay shows the extent of the submerged continental shelf, which was all exposed as dry land during the last Ice Age when sea level was 350 feet lower.

Several weeks ago I wrote how most of us live, drive, and bike or walk on an ancient seafloor every day in Santa Cruz. I tried to explain how the interaction of long-term fluctuations in sea level, wave erosion in the surf zone, and gradual coastal uplift over perhaps 500,000 years had produced a set of flat, elevated marine terraces that we call home. The part of this story that may be the most difficult to grasp, but which is really important to understand as we think about climate change today, is that of sea level rising and falling.

If we look any of those very cool maps of the seafloor of Monterey Bay, or the seafloor off virtually any coastline in the world, we will see a nearly flat, relatively smooth submerged terrace- the continental shelf. This shelf extends only a few miles offshore in Big Sur, about 8 to 10 miles off Santa Cruz, and nearly 25 miles off of San Francisco. The outer edge of the continental shelf is usually about 400 feet deep, and at that point the ocean bottom drops off more steeply to the deep sea floor some 10,000 – 12,000 feet below.

Studies of the continental shelf around the world over the past 75 years have revealed that this flat feature was created by sea level rising and falling and waves washing back and forth across the edge of the continent many times. Each time this happened, the coastal cliffs were eroded back farther, and the seafloor was gradually smoothed as breaking waves eroded off the high points and sand and mud filled in the depressions. Old beach sands, shallow water fossils, and even peat beds, which form in fresh water bogs, have been recovered from the submerged continental shelf hundreds of feet below present sea level, providing evidence that this area has been swept over repeatedly by the ocean, leaving behind a preserved record of that history of alternating exposure and inundation.

Lowering sea level 400 feet exposed a land bridge across the Bering Sea, which allowed early humans to migrate from Siberia to North America perhaps 15,000 years ago, and then gradually work their way south, and slowly populate the Americas. At the same time, the English Channel between England and France was dry land and allowed for migration back and forth. And we could have walked from San Francisco out to the Farallons without even getting our feet wet.

There is a lot of real estate offshore that is gone forever, at least for the next several thousand years, perhaps longer. While we lease the continental shelves off southern California, as well as Louisiana and Texas for oil drilling and extraction, it isn't going to provide any home sites in the near future.

A logical question you might be asking at this point is where did all of that 10,000,000 cubic miles of ocean water go that we sucked up out of the oceans in order to lower sea level 400 feet? That story will have to wait until the next column.