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Article Last Updated: 06/29/2006 06:42:37 AM PDT

Water, water everywhere

Scientists predict that in 100 years, 'Bay Area' may be just 'bay'

By [Julia Scott](#), STAFF WRITER

Someday, having that perfect Bayside view may not be all it is cracked up to be.

Scientists are predicting the Bay's waters could rise by 3 to 4 feet in 100 years, flooding up to 4 miles of low-lying Baylands in a climate-change scenario not unlike the images of sinking cities in Al Gore's bracing documentary, "An Inconvenient Truth."

What no one knows, however, is when. Predicting the future of climate change is notoriously difficult, especially when it comes to variables such as greenhouse gas emissions, melting ice sheets, rising tides, shifting winds and other atmospheric conditions.

Worldwide, modest global warming has caused the sea level to rise 6 to 8 inches in the past century, at a stable 2 mm per year. But by 2100, that number could increase by an additional 3 feet, according to a March 2006 report from the California Climate Change Center.

Scientists associate two major factors with the accelerated pace of rising sea levels: the warming of our oceans, causing them to expand; and the melting of ice sheets in Greenland and Antarctica. Much of the melting began in the 20th century, a fact many climate-change scientists attribute to an increase in carbon dioxide and other greenhouse gas emissions. Fluctuations in wind, atmosphere and temperature also affect tides.

With 1 million more people expected to call the Bay Area home by 2020, scientists fear cities will continue to develop in areas close to shore and put themselves at risk.

"We have not incorporated climate change into our long-term planning," said Dr. Peter Gleick, director of the Pacific Institute in Oakland.

A map the Pacific Institute created in 1990 graphically illustrates what lower Bayside elevations could be facing in 100 years. If water levels were to rise 3.3 feet, or 1 meter, much of San Mateo County east of Highway 101 could be inundated. Foster City would be underwater, as well as San Francisco International Airport and parts of Redwood City and East Palo Alto.

In the East Bay, much of Alameda would be filled, as well as up to four miles of low-lying Hayward and Union City.

Gleick's study predicted it would take \$1.358 billion (in today's dollars) just to protect existing development in vulnerable areas. That does not include the costs of erecting and maintaining levees, pumps and drainage systems.

It also excludes the costs to the environment — wetlands, animal habitat, beaches, and nature preserves that could be destroyed or damaged by the encroaching water.

Hayward City Councilman Bill Quirk said his city's levees have created a tidal marshland where wildlife can thrive, but the walls were nearly breached in last winter's storms.

"Once the marshland is inundated by the Bay, we've lost any chance at having them," said Quirk. "The water will be lapping up against our industrial buildings."

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ACCORDING TO the United States Geological Survey, Surfer's Beach in El Granda has been eroding two meters a year due to rising sea levels. Scientists are predicting the Bay Area's waters could rise by 3 to 4 feet in 100 years. (Mathew Sumner - Staff)

Around the Bay, cities are considering development projects that could be located within the danger zone, from Brisbane's commercial complex next to Highway 101 to a new elementary school to be located within Redwood Shores.

Unlike some cities in the area, which have urban boundaries that prevent them from developing too close to the water's edge, Foster City is hoping a series of recent levee improvements will be enough to keep the tides at bay. The city added another 3 feet to its existing levees in 1990 at FEMA's recommendation, and will add more if necessary, said City Manager Jim Hardy.

"We don't think it's going to happen overnight," he said.

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On the Coast, the dual threats of rising water levels and stormy weather combine to erode cliffsides and beaches. The 1997-98 El Nio events eroded Pacifica's Esplanade, causing homes to drop into the ocean. The city is constantly fortifying itself against the rising tide, and it recently asked FEMA for \$800,000 to shore up several sea walls damaged by 30-foot



SCIENTISTS SAY the Bay Area's sandy beaches are at high risk of erosion due to the effects of rising tides. (Ron Lewis - Staff)

waves this winter; a residential neighborhood sits no more than 75 feet away.

According to a study by the United States Geological Survey to be released later this summer, more than half of the California coast is in the midst of eroding for the first time this century. The trend began in 1970 after a century of stability, said Dr. Peter Ruggiero, a geosciences professor at Oregon State University who participated in the USGS study.

"Over the past century, wave height is going up even more rapidly than the sea level itself. (This) will lead to more coastal erosion in the coming decades."

Bay Area beaches' soft, sandy quality makes them particularly vulnerable to erosion, according to another USGS study. They are classified at "very high risk" because of future sea-level rise.

Levees and sea walls are temporary solutions to a problem that would be solved by better planning and reductions in carbon dioxide emissions, said Dr. Gleick of the Pacific Institute.

"We ought to be rethinking what kind of development we allow in our coastal area. Maybe we shouldn't be building in certain places," he said. "We know what we need to do, but our federal policymakers aren't doing it."

That may sound practical, but it will never be popular, said USGS geologist Bruce Richmond.

"It's so valuable to live here. Until we get to the stage where we're putting our properties at risk, I don't know whether our habits will change," he said.

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