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# Will global warming leave LA's poor under water?

by [Madeline Ostrander \(/profiles/o/madeline-ostrander.html\)](/profiles/o/madeline-ostrander.html) | February 27, 2014 | 6:00AM ET

New research could help the city anticipate the impact of rising sea levels on its beaches and neighborhoods

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Los Angeles' wealthy Venice neighborhood could face more flooding as a result of climate change. Its residents have more means to plan for the consequences of global warming, though, than poorer residents near the Port of Los Angeles and elsewhere. Madeline Ostrander

LOS ANGELES — A contractor laughed when Robin Rudisill asked, more than five years ago, if she should consider the impact of rising sea levels in her plans for remodeling her taupe-colored three-story house here on the oceanfront walk of Venice Beach. “I was serious,” she said.

Rudisill had moved into the house with her mother, grandmother and daughter a few years after leaving her job as a top financial executive at Bank of America. “I have a lot of people to take care of. I’ve got to figure out how long this place will last,” she said. “He thought that was the dumbest thing he'd ever heard.”

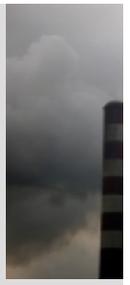
The science has since proved her point. Multiple studies predict that as global warming melts ice caps and ocean waters expand, surging seawater could flood the famed beach and swamp Rudisill’s neighborhood by the end of the century. But the predictions haven’t been detailed enough to inform homeowners like her how to protect beach property, let alone help city officials anticipate the impact of higher water, bigger waves and fiercer storms on the string of neighborhoods, roads and power and wastewater plants along the coast.

But now scientists at the U.S. Geological Survey are developing more intricate “beach scale” models of sea-level rise along the length of the California coast. Los Angeles is one of many cities around the country that are beginning to plan for the inevitable.

The city commissioned a 270-page study ([http://www.usc.edu/org/seagrant/research/sea\\_level\\_rise\\_vulnerability.html](http://www.usc.edu/org/seagrant/research/sea_level_rise_vulnerability.html)) — released in January by the University of Southern California Sea Grant Program — that maps out L.A.’s oceanfront assets and makes the most detailed assessment yet of what areas are at risk when sea-level rise combines with storm surges and high tides. In this report, the core of Venice — its canals and bustling streets of boutiques and restaurants — appears as a splotch of lavender on a map, meaning it will likely experience flooding by 2100 when about 5 feet of sea-level rise combines with a hefty rainstorm. So will other spots along the coast, and many parts of L.A.’s iconic golden beaches could erode.

The research will allow Los Angeles to begin updating its emergency response plans and weighing its options for flood control. In the years to come, will it need to “floodproof” wastewater pumps and drinking water pipes, reroute storm drains or wall off the coastal highway? Should it bulk up miles of beaches with imported sand and fill to avoid losing hundreds of millions of dollars in annual tourist revenue? Where is it possible to put up barriers against the sea and elevate buildings to protect parks and properties? And who will need to simply move?

The report also spells out one of the city’s toughest challenges: As it plans for climate change, Los Angeles must balance the needs of its diverse population and come to terms with its yawning social and economic inequality. among the worst of any major U.S. city. In some communities near the Port



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of Los Angeles, the average family earns only \$13,000 annually. On the other end of the city, the houses that line Venice's canals (including properties that have been home to celebrities like Matt Groening, creator of "The Simpsons") stand about a mile from a spot where homeless people frequently camp at night.

Research says people of less means — and those who are more transient or have less education — are less able to prepare for and rebound from natural disasters. According to some estimates, fully a quarter of Los Angeles County lives in poverty (<http://www.latimes.com/local/politics/la-me-poverty-20131001,0,60926.story#axzz2roiHGns5>). Climate change could make life worse for people who already have it rough (<http://www.dailyclimate.org/tdc-newsroom/2009/05/Climate-Change-hitting-poor-in-U.S.-hardest>).

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**“ Vulnerable communities don't have the resources to rebuild, to repair, to evacuate. We really need to help prepare those communities, both nationally and, certainly, here in L.A. ”**

**— Matt Petersen**  
Los Angeles' chief sustainability officer

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Los Angeles officials say they want to prioritize the needs of the city's most vulnerable residents, shake the city's longstanding stereotype as a haphazardly planned and sprawling metropolis and emerge as a leader in adapting to climate change. In addition to collaborating with Sea Grant, the city has helped support a group of researchers at the University of California, Los Angeles, who are developing a series of hyperlocal models predicting other consequences of climate change on Los Angeles neighborhoods, like changes in temperature. Los Angeles Mayor Eric Garcetti, who took office last June, has joined President Barack Obama's task force on climate change preparedness, a group of local and state policymakers who are collaborating on responses to drought, wildfires and other challenges.

“Vulnerable communities don't have the resources to rebuild, to repair, to evacuate,” said Matt Petersen, L.A.'s chief sustainability officer, who previously ran an organization that aided hurricane recovery in New Orleans. “We really need to help prepare those communities, both nationally and, certainly, here in L.A.”

Rudisill said steps to address sea-level rise will be a tough sell in Venice. Nobody denies that the neighborhood is already flood-prone; in a heavy storm, shin-deep water puddles into some of the side streets near Rudisill's house.

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But any conversation about property and planning here can raise hackles. Venice also lies in a “tsunami hazard zone” — in the path of destructive high waves produced if earthquakes strike the coast. When Rudisill and a neighbor helped to persuade the city to erect signs in 2009 to mark tsunami evacuation routes, “some people got really upset that (it) was going to increase their insurance ... and impact values of real estate,” she said. New discussions about flood preparedness as it relates to sea-level rise could be just as contentious.

Moreover, some locals are already leery of local government agencies. Dede Audet, a community activist who has lived for decades in Venice, can remember multiple floods that have streamed down local streets. Her squat two-bedroom house is about a mile from a set of tide gates, first constructed in the 1930s, that control the water level in the canals. “The city of Los Angeles has not done a good job of looking after our canals area,” she said. “If those tidal gates go, it won't be just the canals. What are they going to do when we have a high, high tide and a rainstorm? We'll all be swimming.”

Among the most vulnerable will be Venice's homeless population, who already have few options when it storms. “There really isn't anywhere to go,” said Antonio Frazier, who was homeless for three years in Venice and now lives in Sun Valley. “When it's raining, we would go into someone's carport or find an apartment where (the roof) would overhang.” If it floods, he said, “there are no facilities opening up for anyone to go into. You've just got to get to high ground.” But attempts to expand homeless services in Venice can also become a hot-button topic: A number of local residents turned out at a January community meeting to air both supportive and rancorous comments on a decision about where to locate a storage container in which homeless people could keep their belongings.

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**“ Against the rising sea we will not win in the long term. We will lose money. We will lose ecosystems. We will lose houses. So how do we deal with that loss? ”**

**— Susanne Moser**  
Social scientist and consultant

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Some citizens on the coast are more equipped to fight for their interests (and their beaches) than others. Affluent homeowners (including the likes of Steven Spielberg and Julia Roberts) on the now-infamous mile-long Broad Beach in Malibu, west of Los Angeles, have spent millions building a rock wall to shield their luxury houses from the encroaching ocean. But whenever water smacks against a wall, the force of the waves reflects back onto the beach, eroding sand around and



back onto the beach, eroding sand around and

Broad Beach Madeline Ostrander

near the wall. The sand at Broad Beach has

subsequently washed away, and the residents have battled for permission to import new sand from elsewhere. The situation has provoked ire and mockery from agencies, environmental groups and local government officials. Broad Beach has become a parable of shortsightedness, and some experts believe the residents there will ultimately need to abandon or move their homes as the water rises — a strategy euphemistically known as “managed retreat.”

“Against the rising sea we will not win in the long term. We will lose money. We will lose ecosystems. We will lose houses. So how do we deal with that loss?” said social scientist Susanne Moser, who specializes in helping communities make decisions about environmental issues. “I think the key ... is to find what it is that the community together wants and to foster a really effective dialogue to deal with these difficult choices.”

Many in Los Angeles want to avoid the kinds of lopsided decisions that were made in Malibu. The city of Los Angeles and Sea Grant hired Moser and researcher Julia Ekstrom to do what’s called a “social vulnerability assessment” — identifying the places where people are the least equipped to adapt and cope with changes and emergencies. For example, they mapped the sections of the city with a higher number of renters, households headed by women (including single moms), people with lower incomes and those with limited English-language skills. Along the coast and in the inner city are pockets where people already live in what looks like a constant crisis of poverty and aren’t ready to cope with an environmental disaster. Even in places that are not as desperate, people may not have adequate insurance and will never have the means to floodproof their homes or recoup losses from property damage.

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**“ It’s going to cost a fortune, and we don’t want to make bad decisions. ”**

**— Beth Jines**

Los Angeles Department of Water and Power

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Some experts and environmental advocates in Los Angeles, meanwhile, feel that the city’s first stab at predicting the damage is too conservative. The models Sea Grant used in this newest assessment extrapolate outward from a modest El Niño storm from January 2010, an event with a 1-in-10 likelihood of occurring every year. A major disaster — say, when a once-in-a-century storm meets higher sea levels caused by climate change — is the subject of the next set of research and reports by Sea Grant and the U.S. Geological Survey.

Even now, parts of Los Angeles are unprepared for a sizable downpour. The 2010 storm wasn’t particularly remarkable. But when the rains struck the low-lying downtown of the San Pedro neighborhood, they overwhelmed the storm drains. The waters rose several feet above the

neighborhood, they overwhelmed the storm drains. The waters rose several feet above the pavement, forming a strong current. City police officers had to pull several people out of a submerged corner store and from apartments, said Sgt. Jeff Hamilton, now retired: "I was keeping my head above water, trying to breathe with these people on my back, trying to get them out of this flood zone."

On nearby blocks, people tried to wait out the flooding. Some of them, especially undocumented immigrants, were afraid to accept help from anyone they didn't know. "They were using their clothes to absorb the water," recalled Gloria Lockhart, who ran a nearby community center at the time. People took shelter in its gymnasium.

Sea-level rise could make problems like this worse. The drainage system is already linked to the ocean: Small white markers near the downtown San Pedro drains, each painted with a blue dolphin, read, "No Dumping: Drains to Ocean." If higher ocean waters back up into the drains where they discharge, they have less capacity to handle stormwater. The Bureau of Sanitation has since re-engineered the drains in the area that flooded, according to Environmental Supervisor Jim Marchese, but the Sea Grant report says the San Pedro storm-drain network is vulnerable.

Lonna Calhoun, an emergency manager in San Pedro, said there simply hasn't been enough money or effort invested in emergency planning at a community level. "Very little is coming from any of our government agencies as far as working on community emergency preparedness," she said. "And there really is not a cohesive plan within this community."

In an era of budget constraints, it will be tough for the city to finance solutions to sea-level rise. The Rockefeller Foundation has named Los Angeles as one of its "100 Resilient Cities," making it part of a program that offers cities around the world money to hire a "chief resilience officer," who can help plan for emergencies. Beth Jines, director of strategic initiatives for the Los Angeles Department of Water and Power, said the city is also redrawing emergency hazard maps to reflect climate change risks, such as from sea-level rise and heat waves — with the hope of getting additional federal funding.

"For governments like ours, if you're going to do major infrastructure, it's a 20- to 30-year process, by the time you get approval (and) you get the money together," said Jines. "That's why we're starting this work now. It's going to cost a fortune, and we don't want to make bad decisions."

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**Russ Bowers** 3 days ago

The coast line will keep changing no matter what. Beaches will erode, cliffs will collapse back into the sea, those with a lot of money will fight these changes to protect their homes. I think this story is missing a few elements. It would have made more sense to address the more realistic issue of letting go and moving as opposed to hanging on in the face of the inevitable loss of homes and property due ever changing climate and weather patterns. The poor will always move to another location when living there is no longer possible. Where they would go next might be a more interesting topic.

⌵

**REPLY** 2 replies



**Jack Wolf** 3 days ago

It won't matter much if you're rich or poor in the future with a 4C rise on the way. That's beyond cardinal temperature limits for us and for all that we depend on..

⌵

**REPLY** 1 reply



**Russ Bowers** 3 days ago

That may well be a long way off.... and despite rumors to the contrary, humankind is remarkable adaptable, so by the time such an event has come to pass, a method for continued survival will have been found and implemented.

⌵



**Shawn Spitler**

4 days ago

I have a basic question that's plagued me for years. We were always taught in school that if you had a cup of ice water and the ice melted, the level of the water would actually go down. Why is this not true of polar ice caps? Wouldn't the water recede just like the water in my glass?

⤵

**REPLY**

6 replies

0



**Franklin Cat**

4 days ago

You were taught wrong, if that in fact was what you were taught. Ice floating in your cup of water will not change the height of the water as it melts, because it displaces its weight in water. The ice that will cause the sea level to rise is in the ice sheets sitting on land in Greenland and Antarctica. Those ice sheets contain more than 99% of the freshwater ice on earth. Melting land ice is only part of the problem since the sea level will also rise because of thermal expansion. Most of the sea level rise of the last century was due to thermal expansion.

⤵

**REPLY**

4 replies

+2



**Bob Huntley**

4 days ago

You have to wonder what will happen if and when the ice melts and all that weight is re-distributed around the earth. Will it affect the earth's axis?

⤵

**REPLY**

3 replies

0



**Franklin Cat**

4 days ago

There are many things that have tiny influences on the location of the axis, some seasonal such as winter snow and ice accumulation and melting. Other influences are different heights of the ocean surface because of temperature, air pressure, or winds. There are also progressive changes driven by plate tectonics, post-glacial rebounding, and indeed melting ice sheets, especially on Greenland. Nevertheless this drift is measured in milliarcseconds per year and is more of a curiosity dwarfed by the serious effects of rising CO2 levels.

⤵

**REPLY**

1 reply

0



**Bob Huntley**

3 days ago



Thanks for your informative response. I was thinking more along the lines of the impact of something like the 3 Gorges Dam had and tipping points.



REPLY

0



**Jack Wolf** 3 days ago

It will certainly change the forces on the plates. That's why all previous periods of climate change also involved a lot of geophysical activity. Hopefully though you are not near a fault.



REPLY

0



**Bob Bingham** 4 days ago

You are partly right. If the cup is full of ice and it melted the level would go down because ice has a bigger volume than water but if the ice is floating as it is in the Arctic the level will stay the same



REPLY

0



**Drew Bennett** 4 days ago

I live in L.A. and I think this article is poorly named. I assure you that the vast majority of neighborhoods that will most be affected by rising sea levels are coastal areas that are among the richest in the city, stretching from Malibu all through Orange County. The article should read, "Will global warming leave LA's rich under water?" Only some homeless people live in these coastal communities and one community even like banned homeless people from their streets (Santa Monica).

I think this article is good, but they only chose such an inaccurate title because it would get more clicks, since average people are more likely to sympathize with the poor and resent the rich.



REPLY

0



**Napoleon Bonaparte** 4 days ago

So what I'm getting out of this article is: A top executive at Bank of America is going to be drowned by rising sea levels. If that isn't poetic justice, then what is?



REPLY

-1



**Anthony Thomas**

4 days ago

Sea level rise of 5 feet by the end of this century? That's (politely!) an evidence free statement, by which I mean that it is just silly. If you do have any evidence (apart from content free speculation) let's have it.

Tony.

⌵

**REPLY**

2 replies

0



**Franklin Cat**

4 days ago

The melting of the ice sheets in Greenland and Antarctica has been accelerating. Greenland melting increased from 137 Gt/yr in 2002-2003 to 286 Gt/yr in 2007-2009; Antarctic melting increased from 104 Gt/yr in 2002-2003 to 246 Gt/yr in 2006-2007 (Isabella Velicogna DOI: 10.1029/2009GL040222). Sea level will rise not only because of melting ice sheets, but also because of thermal expansion. The heat content of the oceans have increased steadily since the late 1960's absorbing nearly  $30 \times 10^{22}$  joules in that time (NODC-NOAA). Most of the rise in sea level over the last century was because of thermal expansion. The last time earth saw CO2 levels as high as they are today sustained over a long period was 14 to 20 million years ago: Greenland was ice free and Antarctica had a greatly reduced ice cap. At that time sea levels were 75 to 120 feet higher than today (Tripathi).

⌵

**REPLY**

+1



**Luke Adams**

4 days ago

Hi Anthony,

You have fingers, you can use them to search for pictures of glaciers. That will be evidence of how much they are melting, and not coming back. Where do you think that water goes?

⌵

**REPLY**

0

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