Study finds California's seaside cliffs crumbling without discernible pattern

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Thinking about building a new home on a bluff overlooking the sea? You may want to think again.

A new report out of UC San Diego's Scripps Institution of Oceanography finds that methods of tracking coastal cliff erosion using historical data to predict the impacts of sea-level rise may be unreliable.

"Using those old rates could significantly under predict what's going to happen at a particular location," said the study's author and Scripps researcher Adam Young. "You could see very high rates of retreat in the future in areas that have so far seen very little."

The report released online and slated for publication early next year in the journal *Geomorphology* called out California's worst areas for cliff failure in the first decade of this century—including San Onofre State Beach, Daly City, Point Reyes National Seashore and Palos Verdes. The research was funded by the National Oceanic and Atmospheric Administration's California Sea Grant program.

In these areas, ocean waves, rain storms and other factors eroded coastal bluffs at a frightening pace of up to about 12 feet a year.

However, Young said he was surprised to find that there was little historical precedent for the most rapidly crumbling shorelines within these regions.

"What this says is the predictions of future coastal erosion from sea-level rise could be significantly under or over predicted for some locations," Young said.

Cities around the world are grappling with ocean waves that threaten to destroy everything from roads to railways to military bases to homes and businesses. About a quarter of the world's population lives along the coast, with many communities pushed right up against a shoreline.

In March of this year, the U.S. Geological Survey forecasted that rising tides would swallow up to 67 percent of beaches in Southern California from Santa Barbara to San Diego by 2100.

To improve the understanding of how such impacts will play out, Young is using "light detection and ranging" technology, called LIDAR, to create three dimensional images of California's coastline.

"New laser technology has really revolutionized the way we map the cliffs," Young said. "In the past, we were using aerial photographs and old topographic maps. The resolution and accuracy of those methods are a lot less (accurate) than compared to the type of technology that we have right now."

The laser mapping data Young used for his study was from 1998 to 2010, the most recent available at the time. New maps for the California coast were released this year, which he said he will use in his ongoing research.

The results will likely be sought after as local governments and state agencies prepare for the worst impacts of climate change.

A large part of planning for a future of rapidly rising tides is determining where to build sea walls to protect vulnerable cliffs. Armoring the coast

can save structures but it also prevents bluff erosion from naturally replenishing beaches.

That's pitted homeowners that favor using the walls against environmental groups that advocate for a slow retreat to save the shorelines for public use.

"Right now, what we're doing is choosing if we want to save our beaches and deciding which of those beaches we want to save," said Jennifer Savage, California policy managers with the San Clemente-based Surfrider Foundation.

Nowhere in the state is that debate raging louder than in North San Diego County, Savage said.

"We see every month at the (California) Coastal Commission hearings where homeowners show up because they want to put in a seawall," she said. "Certainly, there's cases up and down the coast, but if I had to name one place in California that we hear about it would be Del Mar and Solana Beach."

Developers have taken note of the conflicts inherent in seaside living. For many builders, constructing communities atop costal bluffs is no longer in vogue.

"The amount of housing planned along our shoreline is very small and nearly all custom home related," said Borre Winckel, president of the Building Industry Association of San Diego County. "Anecdotally, we hear that folks who rebuild or build newly are dissuaded from (building near) the shoreline, because the (coastal) commission wants the ocean to reclaim the beach and allow for natural sand replenishment where this can occur."

As officials consider the tradeoffs between saving beaches and protecting property, Young said that science will eventually give us the tools to help make those hard choices.

"Ultimately, we'd love to make predictions," Young said. "We're getting more and more data as we move forward, and the data is getting much better. We'll start to understand these things in the future for sure."