

Golden Gate Climate Update Transcript

Interview with Dr. Patrick Barnard
Research Geologist, U.S. Geological Survey
Interviewed on July 7, 2010
Will Elder interviewer
Part 2

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Will - Hi, I'm Ranger Will Elder, and welcome to Golden Gate Climate Update, your source for information on climate change and sustainability.

This episode is a continuation of our interview with Dr. Patrick Barnard, research geologist with United States Geological Survey coastal and marine geology program. Before we get back to the interview, here's the answer to the climate update challenge. A study released by the Heinz Center estimates that twenty five percent of houses within 500 feet of the U.S. shoreline could be claimed by coastal erosion in the next 60 years.

Now back to Patrick. So, as the sea level rises, will all the beaches along the coast in the Bay Area be threatened? Could some beaches actually experience accretion, or gain in their amount of sediment?

Patrick - There is definitely a feedback between rising sea level and input of sediment from cliff erosion, but I don't necessarily think it is a one to one. Typically, cliffs contribute a fairly small percentage of the sand in the littoral system in this region. One of the big unknowns from a climate standpoint is the change in river discharge, which ultimately is what gets sand on beaches for the most part in California. If there is an increase in precipitation and in the size of floods, where more and more sediment could be introduced to the littoral system adjacent to river mouths, in those locations there could be significant actual accretion, but I think by and large, with a rise in sea level, a large percentage of the coast is going to be threatened. One example of where you could expect to see an increase in beach size and width with climate change is down at the Santa Clara River mouth. There was the largest flood on record in January 2005, and it actually input about 10 years of supply into the beach in a matter of just a few days.

Will - Now, what affect will wave direction have on places where sediment is distributed?

Patrick - The beach orientation is a function of the wave direction, and the balance of sediments is very tenuous based on the wave directionality. So, certainly we see this during *El Nino*, when the waves come more out of the southwest, the southern part of the beaches tend to erode and we get more accretion on the north end, and that certainly could be true as we move

forward with more climate change. With the waves coming more and more out of the southwest we'll see areas that don't commonly experience erosion for more than just a season during an *El Nino*, it could be more pronounced and certainly increase rates in areas where we wouldn't expect them to, given current trends.

Will - Okay. Well it sounds like a very complex situation that I am sure you are studying all different angles on and hopefully there will be lots of beach areas left for our park visitors in the future.

Patrick - Yeah. Well I think that there will always be beaches there, it's just that they may be in a different location. They're just going to be moving inland in a lot of areas. As long as they don't get pinched out by infrastructure, then there should always be beaches.

Will - So, thanks Patrick for talking to us today.

Patrick - Sure Will.

Will – Please join us for our next podcast, when we will be interviewing Dr. James Johnstone, postdoctoral researcher at the University of Washington's Joint Institute for the Study of Atmosphere and Ocean. He will be discussing his research on fog along the coast, and upwelling in the coastal ocean. Until our next podcast, this is Will Elder. Thanks for listening.

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Male voice - Golden Gate Climate Update is produced by Will Elder and is a product of the Earth to Sky Program, an innovative partnership between the National Park Service, the U.S. Fish and Wildlife Service and NASA.

Music from *A Walk in the Desert* by Electronic Symphonic